BEFORE THE
STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

In the Matter of

SUEZ Water New York, Inc., SUEZ Water Westchester, Inc., and SUEZ Water Owego-Nichols, Inc.
Cases 19-W-0168 and 19-W-0269

July 2019

Prepared Exhibits of:

Staff Finance Panel

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STAFF OF THE DEPARTMENT OF PUBLIC SERVICE
INTERROGATORY/DOCUMENT REQUEST
SUEZ Water New York · SUEZ Westchester
SUEZ Owego Nichols · Forest Park

Request No.: DPS-071

Requested By: Hasan Ahmed

Date of Request: April 15, 2019

Response Due: April 25, 2019

Witness: Harold Walker III

Subject: Derivation of 5.7% Historical Risk Premium

Reference page 56, line 13 to 22 of Mr. Walker's direct testimony in which he estimated an overall risk premium of 5.7% for his Risk Premium-derived ROE results by "averaging" two historical risk premia of 4.7% and 7.1% for an "A" rated public utility under two different scenarios. Explain in detail how Mr. Walker mathematically derived the 5.7% risk premium given that the average of the two risk premiums is 5.9, not 5.7.

Response:

As noted in the question, the average should be corrected to read 5.9 not 5.7.

STAFF OF THE DEPARTMENT OF PUBLIC SERVICE
INTERROGATORY/DOCUMENT REQUEST
SUEZ Water New York · SUEZ Westchester
SUEZ Owego Nichols · Forest Park

Request No.: DPS-074

Requested By: Hasan Ahmed

Date of Request: April 15, 2019

Response Due: April 25, 2019

Witness: Harold Walker III

Subject: Proxy Group Composition

Reference page 11, lines 14 and 15 of Mr. Walker's testimony in which he indicated that one of his proxy group selection criteria was that the candidate should not be involved in a pending merger transaction. However, at the time of Mr. Walker's testimony, two publicly traded water companies, Connecticut Water Service and SJW Group, were discussing a merger. Explain why Mr. Walker included SJW Group but excluded Connecticut Water in his comparable water proxy group.

Response:

Mr. Walker's selection criteria includes the phase, "are not the announced subject of an acquisition." SJW Group is not the target of an acquisition but is the entity acquiring Connecticut Water. Accordingly, SJW Group is "not the announced subject of an acquisition."

STAFF OF THE DEPARTMENT OF PUBLIC SERVICE
INTERROGATORY/DOCUMENT REQUEST
SUEZ Water New York · SUEZ Westchester
SUEZ Owego Nichols · Forest Park

Request No.: DPS-078

Requested By: Hasan Ahmed

Date of Request: April 15, 2019

Response Due: April 25, 2019

Witness: Harold Walker III

Subject: Credit Metrics

Reference page 2 of Mr. Walker's Schedule 10 in which he provided financial parameters for his water proxy group. To the extent that the Company has proposed capital structure, cost rates and other forecasted items such as CAPEX, rate base, AFUDC, deferred income tax, and other non-cash items for the rate year, provide, in electronic format, with all formulas intact, the following financial ratios for the SWNY Consolidated, SWNY standalone, SWCC, SWON for the rate year using the assumptions contained in the Companies' rate filing:

As defined by S&P:

1. Funds from operations (FFO)/debt
2. Debt/EBITDA
3. Cash flow from operations (CFO)/debt
4. Free operating cash flow (FOCF)/debt
5. Discretionary cash flow (DCF)/debt
6. FFO + interest)/cash interest (FFO cash interest
7. coverage)
8. EBITDA/interest

Similarly, as defined by Moody's:

1. Funds from Operations Interest Coverage(FFO+interest)/Interest);
2. Funds from Operations/Net Debt——(FFO/Net Debt)
3. Debt/Total Capital.
4. Restricted Cash Flow/Net Debt—— (RCF/Net Debt)

Note: Retained cash flow should be calculated as FFO minus common, preferred, and minority dividends; FFO must be calculated as Cash flow from operations (CFO) before

changes in working capital and changes in other short-term and long-term operating leases and liabilities; Debt should be calculated as current portion of long-term debt plus long-term debt. Free cash flow should be calculated as CFO minus capital expenditure (CAPEX) minus common, preferred, and minority dividends. Free operating cash flow (FOCF) should be calculated by deducting capital expenditures from CFO; Discretionary cash flow (DCF) should be calculated as cash flow from operating activities less capital expenditures and total dividends or FOCF minus cash dividends for common stock and preferred stock. Capitalization per Moody's is debt plus total equity plus minority interest plus non-current deferred Income taxes. If the Company has no proposed data for an item, the Company can use historical average or most recent data as a proxy. In your response, please provide copies of all work-papers, data, source documents, and assumptions that are used to develop the financial metrics.

Response:

SWNY is a direct subsidiary of SUEZ Water New Jersey ("SWNJ"). SWWC & SWON and SWNJ are direct subsidiaries of SUEZ Water Resources. For financial purposes, including metrics which would otherwise be provided to rating agencies (cash flow, dividend payments and other metrics) are not projected at a subsidiary level.

Please refer to DPS-078 Attachment for Debt/EBITDA and EBITDA/Interest. Debt is calculated by multiplying Rate Base by the pro forma 50% debt percentage. Interest is calculated by multiplying the Debt amount by the Test Year average cost of debt.

STAFF OF THE DEPARTMENT OF PUBLIC SERVICE
INTERROGATORY/DOCUMENT REQUEST
SUEZ Water New York · SUEZ Westchester
SUEZ Owego Nichols · Forest Park

Request No.: DPS-080

Requested By: Hasan Ahmed

Date of Request: April 15, 2019

Response Due: April 25, 2019

Witness: Harold Walker III

Subject: Business and Risk Profile Categories

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1. Based on your assessment of SWNY, SWWC, and SWON's risk profiles and financial metrics, what are the most probable Moody's and Standard & Poor's (S&P's) issuer credit ratings for SWNY?

2. Based on your assessment, what is the most probable business risk profile of SWNY, SWWC, and SWON? The S&P's categorizes business risk profiles as: "Excellent", "Strong", "Satisfactory", "Fair", "Weak", and "Vulnerable". Please provide an analysis to support your response.

3. Based on your assessment, what is the most probable S&P's financial risk profile of SWNY, SWWC, and SWON? S&P's categorizes financial risk profiles as: "Minimal", "Modest", "Intermediate", "Significant", Aggressive", and "Highly leveraged"? Please provide an analysis to support your response.

4. Given your recommendation of 10% ROE for SWNY, SWWC, and SWON, what will the assessment of business risk and financial risk be based on the S&P's guidelines for the rate year ending January 31, 2021?

Response:

1. Mr. Walker has not been engaged to determine the "the most probable Moody's and Standard & Poor's (S&P's) issuer credit ratings for SWNY."

2. Mr. Walker has not been engaged to determine the "most probable business risk profile of SWNY, SWWC, and SWON."

3. Mr. Walker has not been engaged to determine the "most probable S&P's financial risk profile of SWNY, SWWC, and SWON."

4. Mr. Walker has not been engaged to determine the "the assessment of business risk and financial risk be based on the S&P's guidelines for the rate year ending January 31, 2021."

STAFF OF THE DEPARTMENT OF PUBLIC SERVICE
INTERROGATORY/DOCUMENT REQUEST
SUEZ Water New York · SUEZ Westchester
SUEZ Owego Nichols · Forest Park

Request No.: DPS-100

Requested By: Hasan Ahmed

Date of Request: April 18, 2019

Response Due: April 28, 2019

Witness: Harold Walker III

Subject: Suez Water Resources Financing Activities

Reference the Attachment to the pre-filed Staff IR-54 showing the derivation of the Companies' 4.66% proposed cost of debt. The derivation reflects long-term debt that has already matured as shown in the Insert 1, below. Moreover, the exhibit does not reflect the amount of additional financing needed (shown in Insert 2 below) during the rate year per the Companies' response to the pre-filed Staff IR-58.

a) Please provide an updated cost of debt in an Excel spreadsheet, with formulas intact, reflecting these changes in potential financing activities and updated debt portfolio.

b) Please provide the missing offering dates for the $5 million, $25 million and $0.769 million UWR debt securities listed in the Attachment to the pre-filed Staff IR-54.

c) Please explain why offering date of North Jersey Water District 6.58% debt is shown as not applicable("na").

d) Please indicate which of the outstanding debts listed in the Attachment to the pre-filed Staff IR-54 were issued on behalf of Suez Water New York and Suez Water Westchester.

e) Has SWR already refinanced the four debt securities that mature during the bridge period (10/1/2018 to 1/31/2020) as shown in Insert 1 below?

f) Does SWR plan to retire or refinance the Senior Note Series 2010 during the rate year? If SWR plans to do so, please

provide the estimated interest rates, term, proposed issuance dates, and estimated issuance cost associated with the refinancing.

g) How much interest expense was paid by Suez Water New York and Suez Water Westchester to Suez Water Resources from 2016 to 2018 for the debt issued on behalf of Suez Water New York and Suez Water Westchester?

h) Please provide the issuance cost for each listed debt in the referenced attachment.

Insert 1: Taken from Attachment of Pre-Filing IR STAFF-54

Description of Debt:	Stated Interest Rate	Date of Issue	Date of Maturity	Principal Amt Outstanding as of 9/30/2018
Medium Term Note NY Life A	6.21%	10/1/2008	10/1/2018	$12,500,000
Medium Term Note NY Life B	6.31%	12/15/2008	12/15/2018	$12,500,000
Senior Note Series 2010	4.74%	2/28/2010	2/28/2020	$30,000,000
UWR	7.04%		1/1/2019	$5,000,000
UWR	6.70%		1/1/2019	$769,230

Insert 2: Taken from Pre-Filing IR STAFF-58.

SWR Financing Plans	2018	2019	2020
Financing Needs	38,500,000	63,400,000	92,000,000
LT Debt Maturing	12,507,683	5,783,523	30,015,187
Total External Debt Issuances	51,007,683	69,183,523	122,015,187

Response:

a. The Company does not forecast interest rates for future issuances. Please refer to DPS-100 Attachment for an updated debt table reflecting the current debt outstanding.

b. They were issued as part of the January 15, 1999 offering.

c. This debt was not part of a note offering it is a contractual obligation.

d. SWR Parent issues all new debt borrowings on behalf of all its subsidiaries. However, four legacy notes remain that were issued directly by SWNY and are listed below:

SWNY Debt

Description of Debt	Issue Date	Maturity Date	Amount Outstanding	Interest Rate
Senior Note 2012 Series A	Oct-12	Oct-27	10,000,000	3.47%
Senior Note 2012 Series B	Oct-12	Oct-32	30,000,000	3.91%
Senior Note	Jan-95	Jan-25	12,000,000	8.98%
Senior Note Series 2010	Feb-10	Feb-20	30,000,000	4.74%
Total Long-Term Debt			82,000,000	

e. The four debt securities have not been refinanced as of yet, they will be incorporated as part of a larger issuance anticipated for later in 2019.

f. The company does not forecast interest rates. The prevailing market interest rate determines the interest rate and is finalized upon the issuance.

g. As noted in response to d) above, SWR issues the debt on behalf of all the regulated subsidiaries. The debt cost is allocated to the subsidiaries based on capitalization. The allocated affiliate interest for SWNY and SWWC are included in the table below.

	2016	2017	2018
SWNY	5,020	4,909	3,903
SWWC	5,804	5,690	5,080

h. Please note that four of the five notes listed in the table taken from Pre-Filing IR STAFF-54 Attachment have matured and been retired. The issuance cost for Senior Note Series 2010, the only active one, was $229K.

STAFF OF THE DEPARTMENT OF PUBLIC SERVICE
INTERROGATORY/DOCUMENT REQUEST
SUEZ Water New York · SUEZ Westchester
SUEZ Owego Nichols · Forest Park

Request No.: DPS-121

Requested By: Hasan Ahmed

Date of Request: April 29, 2019

Response Due: May 9, 2019

Witness: Harold Walker III

Subject: Corrections to Risk Premium Results and Recommended 10.75% ROE.

In response to Staff's IR-DPS-71, Mr. Walker corrected his estimated Risk Premium from 5.7% to 5.9%.

Is Mr. Walker correcting his Risk Premium 11.1% and overall 10.75% recommended ROE? If so, please provide the corrections to your RP and overall ROE recommendations.

Response:

Mr. Walker is correcting his Risk Premium that was originally 11.1% to the corrected number of 11.3%. Mr. Walker is not changing his overall ROE recommendation as his original recommendation still falls within the range of his corrected results.

PUBLIC SERVICE COMMISSION

STAFF OF THE DEPARTMENT OF PUBLIC SERVICE
Pre-Filing INTERROGATORY/DOCUMENT REQUEST
SUEZ Water New York Consolidated

Request No.: Pre-Filing STAFF-58

Requested By: DPS Staff

Date of Request: Pre-Filing

Response Due: With Filing

Witness: Walker

Subject: Rate of Return

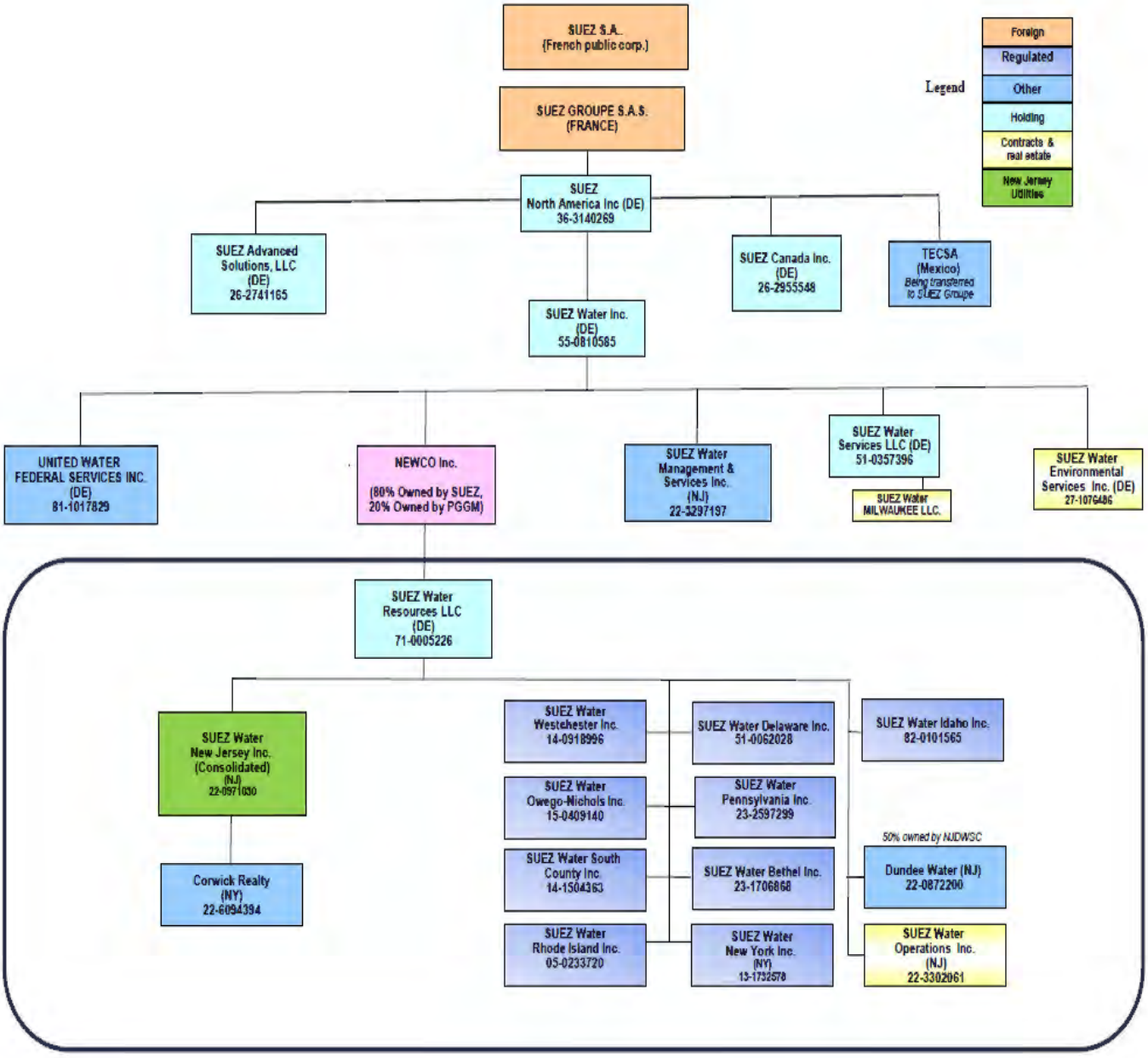
Provide a list of all forecast external financings expected from the end of the historic test year through the end of each rate year.

Response:

Please refer to the table below. SUEZ Water Resources, parent company of SUEZ Water New York, SUEZ Water Westchester and SUEZ Water Owego-Nichols, only projects current year budget + 2 years of financing.

SWR Financing Plans	2018	2019	2020
Financing Needs	38,500,000	63,400,000	92,000,000
LT Debt Maturing	12,507,683	5,783,523	30,015,187
Total External Debt Issuances	51,007,683	69,183,523	122,015,187

Structure: Post-Internal Reorganization and Proposed Investment



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US Regulated Electric and Gas Utilities

High Leverage at the Parent Often Hurts the Whole Family

US utilities use leverage at the holding-company level to invest in other businesses, make acquisitions and earn higher returns on equity. In some cases, an increase in leverage at the parent can hurt the credit profiles of its regulated subsidiaries.

» **High leverage at the parent can have negative implications for the whole family.** The larger the parent's unregulated businesses are and the larger its holding-company debt is as a share of consolidated debt, the greater the likelihood that credit quality in the family will suffer. Increased leverage at the holding company often leads to a more than one-notch rating difference between the holding company and the operating company.

» **When a parent exits a large unregulated business, holding-company debt sometimes remains.** There are instances, such as CMS Energy Corp. (CMS, Baa2 stable) and TECO Energy Inc. (TECO, Baa1 stable), in which holding company debt once used to finance unregulated businesses remains even after the parent has exited the business, placing additional stress on the credit profiles of regulated utilities within the family. The regulated utility finds itself not only responsible for servicing its own debt but also for supporting the parent's debt.

» **"Double leverage" drives returns for some utilities but could pose risks down the road.** The use of double leverage, a long-standing practice whereby a holding company takes on debt and downstreams the proceeds to an operating subsidiary as equity, could pose risks down the road if regulators were to ascribe the debt at the parent level to the subsidiaries or adjust the authorized return on capital.

» **Regulators could take steps to mitigate contagion risks within the family.** Ring-fencing techniques can go a long way toward insulating the regulated utility, as in the case of Oncor Electric Delivery Company LLC (Baa1 senior secured rating, positive). But complete protection from an insolvent parent is not guaranteed. Also, regulators could attempt to influence changes in the capital structure or could adjust a utility's allowed rate of return because of the parent's use of double leverage, although we have not seen this in practice.

All in the Family

Unlike most US corporates in unregulated industries, US regulated electric and gas utilities typically have substantial barriers to the free movement of cash among members of the corporate family, and they issue material debt at their operating companies and at the holding-company level. As a result, we generally observe a meaningful difference in the credit profiles of US utility operating companies and their holding companies, a view that is often reflected in a difference in their respective ratings of one or more notches.

The most pervasive driver has been structural subordination of debt at the holding company. The operating company services its debt with cash flow from its operations, whereas the holding company depends on dividends from subsidiaries to service its debt obligations, which can be less certain. For US utilities, the greatest drivers of rating differentials of more than one notch have been the degree of leverage at the parent and/or investments in unregulated businesses with higher operating risk.

In our analysis of US utilities, we have also found that leverage at the parent has often had negative implications for the parent itself (with greater implications when the percentage of consolidated debt at the holding company was higher), and that very high leverage at the parent has affected the credit quality of the whole family. While an increase in leverage at the holding company does not increase structural subordination per se, it can exacerbate the impact of any structural subordination that exists. For instance, approximately 3% of the consolidated debt of Pinnacle West Capital Corp. (Baa1 positive) is at the parent, and there is a one-notch difference between its issuer rating and the issuer rating of its primary subsidiary, Arizona Public Service Company (A3 positive). By contrast, there is a two-notch difference between the issuer ratings of Duke Energy Corp. (A3 stable) and its two largest utility subsidiaries, partly because debt at the parent is 30% of the consolidated total.

We have also observed that unregulated businesses have added volatility to the cash flows of US utility holding companies. We do not view all unregulated businesses equally, since some are riskier than others, but volatility has generally been proportionate to the size of those businesses and the market risk to which they are exposed. For instance, there is a three-notch difference between the senior unsecured rating of Public Service Enterprise Group Inc. ((P)Baa2 stable), which has essentially no debt at the parent level but obtains about 40% of its cash flows from its unregulated power subsidiary (PSEG Power LLC , Baa1 stable), and the issuer rating of its utility subsidiary, Public Service Electric and Gas Company (A2 stable).

Furthermore, in some cases, depending on the amount of holding-company debt or the riskiness and scope of the unregulated businesses, the rating of the regulated utility has been constrained. An example of this is Dayton Power & Light Company (DP&L, Baa3 stable), a regulated utility whose rating is currently constrained by its highly leveraged parent, DPL Inc. (Ba3 stable), and to a lesser extent, its unregulated retail energy marketing affiliate.

Exhibit 1

Examples of Holding Companies Whose Debt and Unregulated Businesses Drive Wider Notching Differences

Holding Company	Unsecured / Issuer Rating	Primary Utility Subsidiaries	Unsecured / Issuer Rating	Notching Difference in Ratings	HoldCo Debt (% of Consolidated Debt)	Unregulated Business (% of Consolidated Earnings/Cash Flow)
Dominion Resources Inc.	Baa2	Virginia Electric and Power Company / Dominion Gas Holdings, LLC	A2	3	47%	20%
NextEra Energy, Inc.	Baa1	Florida Power & Light Company	A1	3	40%	50%
Sempra Energy	Baa1	Southern California Gas Company / San Diego Electric & Gas Company	A1	3	37%	16%
Public Service Enterprise Group Incorporated	(P)Baa2	Public Service Electric and Gas Company	A2	3	0%	40%
Otter Tail Corp	Baa2	Otter Tail Power Company	A3	2	11%	24%
OGE Energy Corp.	A3	Oklahoma Gas & Electric Company	A1	2	7%	25%
Entergy Corporation	Baa3	Entergy Louisiana, LLC / Entergy Arkansas, Inc.	Baa1 / Baa2	1 / 2	20%	24%

Source: Moody's Investors Service

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on www.moodys.com for the most updated credit rating action information and rating history.

Since DP&L is the main source of cash flow to service DPL's high level of debt, in our credit analysis we have considered this debt part of DP&L's capital structure from a debt-servicing standpoint.

For a discussion of our approach to ratings within a utility family, please see Appendix D of our Regulated Electric and Gas Utility Methodology , published December 2013.

Industry Consolidation Is a Key Driver of Holding-Company Debt

One of the main reasons for significant holding-company debt is merger and acquisition activity. DPL Inc. is one example. Its ultimate parent, The AES Corporation (Ba3 stable) acquired the regulated utility, DP&L, and financed it largely by placing an additional $1.25 billion of debt at DPL Inc.

A more recent example is The Laclede Group 's (Baa2 stable) 2014 acquisition of Alabama Gas Corp. (Alagasco, A2 stable). An increase in debt of $625 million at the parent level to finance the acquisition of Alagasco led us to downgrade Laclede Group's senior unsecured rating to Baa2 from Baa1. Laclede Group's holding-company debt increased to approximately 37% of total consolidated debt from less than 3%. Not only did the increase in debt drive the rating change at Laclede Group, but the significant holding-company leverage currently constrains Alagasco's A2 senior unsecured rating. Otherwise, Alagasco's rating could be higher given the utility's strong financial metrics and low risk business model operating in a credit-supportive Alabama regulatory jurisdiction.

The Last Man Standing

When a parent exits an unregulated business, some of the debt associated with the business remains at the holding company and can hurt the credit profiles of the remaining regulated subsidiaries. Some utility holding companies have sizable amounts of debt originally used to finance unregulated businesses that the parent exited, adding stress to the regulated utility's credit profile.

In this case, the regulated utility ends up responsible not only for servicing its own debt but also for supporting the legacy debt at the parent. Depending on the amount of legacy holding-company debt that remains, the de-leveraging effort can be a multiyear endeavor and, in some cases, requires the parent to reduce its dividend to maintain financial flexibility across the company.

One example is CMS Energy Corp. (CMS, Baa2 stable), parent of Consumers Energy Company (Consumers, A1 senior secured rating, stable), a regulated electric and gas utility in Michigan. About $3.4 billion, or 34%, of its consolidated debt is at the parent. Much of

Energy Future Holdings Corp.: Too Much Holding-Company Debt Gone Wrong

Amid Energy Future Holdings Corp.'s (EFH, not rated) downward spiral, which culminated in bankruptcy in April 2014, we downgraded the senior secured rating of its indirectly owned regulated electric transmission and distribution utility, Oncor Electric Delivery Company LLC, to Baa3 in February 2013. We downgraded Oncor to one notch above speculative grade for several reasons: the highly leveraged capital structure at Energy Future Intermediate Holding Company LLC (EFIH, not rated), Oncor's indirect parent; EFIH's high reliance on dividends from Oncor to support debt service; and EFH's high reliance on Oncor's upstream tax payments to support debt service, along with the interwoven cash-transfer relationship between EFH and EFIH.

At the same time, Oncor's senior secured rating did not fall below investment grade given the strong insulation from the existing ring-fence-type arrangements. Rather, Oncor's lower rating reflected EFIH's heavy and permanent reliance on Oncor. We did not expect the ring-fencing mechanisms to fail, and we expected that Oncor would not be materially affected by the contagion risk of a default and restructuring at its affiliates or parent holding companies. Oncor's rating also reflected its strong fundamentals, including the stability and predictability of its revenue and cash flow as well as the supportive regulatory environment in Texas.

Since EFH's bankruptcy filing, we have upgraded Oncor's senior secured rating to Baa1, which reflects both the stability and predictability of Oncor's low risk rate-regulated business and the credit protection provided by the uncontested ring-fencing provisions. We expect the oversight from the Public Utility Commission of Texas will continue to substantially shield Oncor from any uncertainties associated with its parent holding companies.

this debt was used to finance its previous unregulated businesses, most of which CMS exited several years ago. Today, only about 5% of CMS's cash flows come from its remaining unregulated businesses. Given that the remaining unregulated businesses contribute modestly to consolidated results, the onerous amount of parent debt falls on the shoulders of Consumers. As such, the holding-company debt has constrained the rating of Consumers, given CMS's lack of material cash-flow diversification. The dividend upstream from Consumers is essential to servicing its parent's debt, which, in turn, limits the utility's ability to respond to unforeseen events, a credit negative.

Entergy Corporation (Baa3 stable) is another example of a utility holding company whose credit profile is currently constrained by the substantial amount of debt at the parent. This debt is largely tied to Entergy Corp.'s highly volatile and shrinking unregulated nuclear business, Entergy Wholesale Commodities (EWC, not rated). EWC's aging, small and concentrated portfolio, which operates mostly in the Northeast, has inherently high operating costs, is exposed to event risk and faces persistent local opposition and increasing regulatory mandates. As such, EWC's volatile earnings and cash flow are driven by a market of low power prices and rising operating costs. A significant amount of debt is associated with EWC (about $2.8 billion of the total $14 billion in consolidated reported debt) and resides at the parent holding company. In a stand-alone credit assessment, we have assessed EWC as below investment grade, which weighs on Entergy Corp.'s Baa3 rating. However, Entergy Corp.'s financial metrics are strong for its rating category and are enhanced by diverse and stable cash flows from its multi-state regulated utilities.

Exhibit 2

Examples of Holding Companies Whose Debt Is the Main Driver of Notching Differentials

Holding Company	Unsecured / Issuer Rating	Primary Utility Subsidiaries	Unsecured / Issuer Rating	Notching Difference in Ratings	HoldCo Debt (% of Consolidated Debt)	Unregulated Business (% of Consolidated Earnings/Cash Flow)
DPL Inc. *	Ba3	Dayton Power & Light Company	Baa3	3	60%	<10%
Duquesne Light Holdings, Inc.	Baa3	Duquesne Light Company	A3	3	48%	<10%
The Laclede Group	Baa2	Alabama Gas Corporation / Laclede Gas Company	A2 / (P)A3	2 / 3	37%	5%
ITC Holdings Corp.	Baa2	All four transcos (e.g. ITC Midwest LLC)	A3	2	55%	0%
IPALCO Enterprises, Inc.	Baa3	Indianapolis Power & Light Company	Baa1	2	35%	0%
CMS Energy Corp	Baa2	Consumers Energy Company	A3**	2	34%	5%
Integrys Energy Group,, Inc.	A3	Wisconsin Public Service Corporation	A1	2	31%	<5%
Puget Energy Inc.	Baa3	Puget Sound Energy, Inc.	Baa1	2	31%	0%
Duke Energy Corporation	A3	Duke Energy Carolinas, LLC / Duke Energy Progress, Inc.	A1	2	30%	15%
TECO Energy Inc.	Baa1	Tampa Electric Power Company	A2	2	29%	<5%

* The ultimate parent of DPL Inc. and Dayton Power & Light Company is The AES Corp. (Ba3 stable). ** Consumers Energy Company does not have a senior unsecured rating but a first-mortgage bond senior secured rating of A1. Therefore, its implied senior unsecured rating is A3.

Source: Moody's Investors Service

Double Leverage Helps Drive Returns for Some Utilities but Adds Stress on the Family's Credit Profile

Double leverage, whereby the holding company takes on debt and downstreams the proceeds to its operating subsidiary, is a long-standing practice in the industry. If down the road regulators decide to revisit this corporate financial strategy by imputing holding-company debt to subsidiaries, it could hurt credit quality across an issuer's family. The principal reason is that US regulators generally set rates based on an actual capital structure at the utility and provide a higher return to the equity capital component.

Many of the utility holding companies we rate use double leverage in one form or another. ITC Holdings Corp. (ITC, Baa2 stable) is a holding company of electric transmission regulated operating subsidiaries: International Transmission Company , Michigan Electric

Transmission Company LLC , ITC Midwest LLC and ITC Great Plains LLC . Each subsidiary has a senior unsecured rating of A3, two notches higher than ITC's rating. ITC has historically issued debt at the parent level to finance acquisitions and equity infusions for its transmission subsidiaries. As a result, ITC Holdings' adjusted debt-to-capitalization ratio was about 64% at year-end 2014, while its subsidiaries' ratios were between 20%-40%.

Double Leverage Defined

Double leverage is a financial strategy whereby the parent raises debt but downstreams the proceeds to its operating subsidiary, likely in the form of an equity investment. Therefore, the subsidiary's operations are financed by debt raised at the subsidiary level and by debt financed at the holding-company level. In this way, the subsidiary's equity is leveraged twice, once with the subsidiary debt and once with the holding-company debt. In a simple operating-company / holding-company structure, this practice results in a consolidated debt-to-capitalization ratio that is higher at the parent than at the subsidiary because of the additional debt at the parent.

ITC's parent debt represents approximately 55% of ITC Holdings' total consolidated debt, and our analysis of ITC focuses on the vantage point of the consolidated parent. The substantial amount of holding-company debt in the capital structure drives the two-notch rating differential between ITC and its operating subsidiaries. We note that among US utilities, FERC-regulated transmission operating companies have among the lowest business risk and are sometimes permitted higher amounts of equity in their capital structure than other utilities.

Local natural-gas distribution companies (LDCs) have typically used debt at the parent to infuse equity down to their regulated LDC operating subsidiaries in order to finance capital investments. Two examples are Vectren Corporation (Vectren, not rated) and AGL Resources Inc. (AGL, not rated), which both have large LDC footprints in multiple states as well as other non-utility businesses. Most of the proceeds from Vectren's intermediate holding company, Vectren Utility Holdings Inc. (A2 stable), and AGL's holding-company debt are used to finance safety and reliability pipeline replacement programs at each of their LDCs, which generally receive timely rate recovery through adjustment mechanisms allowed by regulators.

Regulators Could Take Steps to Mitigate Contagion Risks

Ring-fencing techniques can go a long way toward insulating a regulated utility, as in the case of Oncor (please see the blue box on page 3). But complete protection from an insolvent parent is not guaranteed. Ring-fencing provisions have been used for some time, at least dating back to the 1990s, when Enron acquired Portland General Electric Company (PGE, A3 stable). The Oregon Public Utility Commission implemented ring-fencing requirements to help ensure that PGE was insulated from Enron's other unregulated operations that eventually led to Enron's bankruptcy. Among these conditions was a requirement to maintain a minimum of 48% equity in the utility's capital structure as well as a requirement that the utility give regulators advance notice of any large dividend payment from the utility to the parent. While PGE's rating was downgraded several notches subsequent to the Enron bankruptcy, the existence of ring-fencing protections helped preserve PGE's investment-grade rating throughout the Enron bankruptcy.

Ring-fencing protections will continue to be considered by regulators, especially when involving M&A activity or when the state regulator becomes concerned about the potential contagion effect on the utility from the parent's unregulated operations or more debt.

Separately, regulators could attempt to influence changes in the capital structure or could adjust a utility's allowed rate of return because of the parent's use of double leverage. However, we have not seen evidence of this in practice. Given the widespread and long-standing use of double leverage across the industry, we do not expect that regulators will attempt to dissuade the use of this financial strategy unless regulators see it harming the utility.

Regulators could also offset the risk of additional holding-company leverage with future benefits to ratepayers by recognizing some or all parent level debt when setting rates. This, too, is uncommon and unlikely, since regulators' purview is typically focused on the

regulated entity and not the parent's capital structure. In addition, it could be difficult to allocate holding-company debt given the complexity of some organizational structures that operate in multi-state jurisdictions and that have unregulated businesses.

Rising Interest Rates Will Increase the Burden on the Family

Rising interest rates will increase refinancing costs at the parent level. Unlike a regulated utility, a holding company can not typically recover rising costs through customer rate increases. A higher interest expense at a leveraged parent that has no other sources of cash flow will further increase the burden on its regulated utility.

Moody's Related Research

Special Comments

» Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles, March 2015 (1003101)

» Adequate regulatory returns and timely cost recovery drive stable outlook..., November 2014 (177389)

» Wider Rating Differentials Seen for a Number of U.S. Utility and Parent Companies, October 2011 (136354)

» Proposed Wider Notching Between Certain Senior Secured Debt Ratings and Senior Unsecured Debt Ratings for Investment Grade Regulated Utilities, May 2009 (116748)

Outlooks

» 2015 Outlook - US Regulated Utilities: Regulatory Support Drives Our Stable Outlook, December 2014 (1000683)

» 2015 Outlook - US Unregulated Power: Stable Gas Prices, Declining Reserve Margins Underpin Our Stable Outlook, December 2014 (1000699)

Rating Methodologies

» Regulated Electric and Gas Networks Rating Methodology, November 2014 (159570)

» Unregulated Utilities and Unregulated Power Companies, November 2014 (172784)

» Moody's Regulated Electric and Gas Utilities Methodology, December 2013 (157160)

AN ILLUSTRATION OF THE EFFECT OF DOUBLE LEVERAGE

Below is an illustration of how the use of double leverage in the ratemaking process leads to returns in excess of the cost of capital. First, let's assume a hypothetical subsidiary called XYZ with a total capitalization of $500 with 50% equity and 50% debt shown in Table A.

	Table A	
	SUBSIDIARY-ONLY	
	CAPITAL STRUCTURE	
	Amount	Percent
Common Equity	$250	50%
Subsidiary Debt	$250	50%
Totals	$500	100%

Let's further assume that the parent, ABC, provides the $250 common equity by issuing debt of $125(assuming debt cost rate of 6.0%) and common equity of $125, the capital structure of the parent will be 50%/50% debt/equity as shown in Table B.

	Table B	
	PARENT-ONLY	
	CAPITAL STRUCTURE	
	Amount	Percent
Parent Equity	$125	50%
Parent Debt	$125	50%
Totals	$250	100%

As shown in Table C, the consolidated capital structure of the holding company will show $125 of parent's common equity and $375 of debt consisting of $125 of parent's debt and $250 of subsidiary's debt.

	Table C	
	PARENT COMPANY CONSOLIDATED	
	CAPITAL STRUCTURE	
	Amount	Percent
Parent Equity	$125	25%
Parent Debt	$125	25%
Subsidiary Debt	$250	50%
Totals	$500	100%

With XYZ's 5.0% cost of debt, a 9.0% cost of equity, and tax rate of 35%, the subsidiary's after-tax and pre-tax cost of capital will be 7.0% and 9.42%, respectively as shown in Table D.

	Table D				
SUBSIDIARY PRE-TAX OVERALL COST OF CAPITAL					
	Amount	Percent	Cost	Wt. Cost	Pre-tax Cost
Common Equity	$250	50%	9.00%	4.50%	6.92%
Subsidiary Debt	$250	50%	5.00%	2.50%	2.50%
Totals	$500	100%		7.0%	9.42%

Given the after-tax return of 7.0%, the subsidiary will earn $35 after-tax (7.0% *$500). The subsidiary will then pay its own interest expenses of $13(5%*250), leaving $23 as dividends. When the $23 is paid to the parent as dividend, the parent will pay its debt expense of $8(6%*$125). After paying its debt cost, the parent is left with $15. When the amount of profit of $15 is measured against the parent's actual equity investment of $125, the rate of return on shareholders' equity is 12.0% as shown in Table E below.

Table E

Return on rate base	$35
Utility debt expense	$12.5
Dividend to parent	$23
Equity on parent books	$125
Amount borrowed by parent	$125
Debt cost rate (assuming)	6%
Interest on the $125 debt	$8
Profit after interest payment	$15
Profit as a % of parent's equity	12.0%
ROE of parent	12.0%
ROE of subsidiary	9.0%
Parent cost of equity absent double leverage	9.0%

MOODY'S
INVESTORS SERVICE

US utility sector upgrades driven by stable and transparent regulatory frameworks

» We recently upgraded most US investor-owned utilities and many of their holding companies due to our view that the US regulatory environment has improved over the past several years. Most of the companies placed on review for upgrade in November 2013[1] were upgraded in late January 2014, and most by one notch. Please see Appendix A for a list of companies that were upgraded.

» US regulated utilities appear financially secure, thanks to their suite of transparent and timely cost and investment recovery mechanisms. When compared with other regulatory environments in developed countries[2], the overall regulatory environment for US utilities has steadily improved over the past few years and is expected to remain supportive and constructive for at least the next 3-5 years.

» A more favorable regulatory environment allows US regulated utilities to generate relatively stable and predictable revenue and cash flow, which can support a material amount of leverage. But most US utilities maintain a conservative capital structure, where the ratios of debt to EBITDA and cash flow to debt hover in the 4.0x and 20% range, respectively. Key financial ratios are likely to decline over the next few years, as interest rates rise and tax payments increase with the expiration of bonus depreciation.

» US utilities own and operate enormous, capital intensive, long-lived critical infrastructure assets. They are often one of the larger companies residing in a particular state, they pay big property taxes and employ lots of people. The importance of utilities to state and local governments is not lost on elected officials, and utilities maintain very effective constituency outreach programs.

» Utilities have demonstrated strong, stable access to the capital markets. Utilities do not maintain high cash balances, but their committed credit facilities are typically syndicated across several banks and contain few, if any, borrowing constraints. However, a combination of significant capital investments and sizable shareholder dividends that are typically well beyond the cash generated from operations means that utilities are generally in a negative free cash flow position.

» A handful of companies placed on review in late 2013 were not upgraded. Some of the reasons include sizable non-utility businesses with higher business risk, or a large amount of debt at the holding company as a percentage of total consolidated debt. For a few issuers, ratings weren't upgraded because these companies were viewed as being appropriately positioned at their existing rating category, relative to their rated peers.

[1] See press release: Moody's places ratings of most US regulated utilities on review for upgrade, November 08,2013.

[2] For example: Australia, Canada, Japan, South Korea and the United Kingdom.

Supportive regulatory frameworks

Over the past few years, the US regulatory environment has been very supportive of utilities. We think this is partly a function of regulators acknowledging that their utility infrastructure needs a material amount of ongoing investment for maintenance, refurbishment and renovation purposes. Utility infrastructure is necessary to facilitate a growing economy, and since utility investments help create jobs, utilities have been able to garner support from both politicians and regulators to authorize prudently incurred investments in these critical assets. We also think regulators prefer to regulate financially healthy utilities. Recent legislation that helps utilities recover their costs and investments in a more timely manner are evidenced in Virginia, South Carolina, Florida and Illinois.

We think political risks are also manageable, in part, because elected officials are increasingly viewing their local utilities as a reliable source of investment into the local infrastructure. Investments bring jobs, and employment growth helps the economy. This is part of the "virtuous circle" for regulated utilities, and we see a few more years of continued smooth sailing, where elected officials, their regulators, consumer groups and utilities share a common understanding with respect to strengthening this infrastructure sector.

From a practical perspective, a few regulatory hot spots of contentiousness will flare up over our rating horizon, but it is unclear at this time as to which utilities might be affected. We have generally seen such situations result in outcomes that were difficult for utilities but not punitive, and they have generally been isolated incidents rather than a broad pandemic. As a result, we continue to keep an eye on the magnitude of rate increases, and how likely those rates can be absorbed by the service territory or market before consumers become intolerant, in order to identify utilities that are exceptions to the generally positive regulatory environment.

Stable and predictable financial profile

A transparent suite of timely recovery mechanisms helps utilities generate stable and predictable revenues and cash flows, which can support a material amount of leverage. But most US utilities maintain a relatively solid capital structure, where the ratios of debt to EBITDA and cash flow to debt hovers in the 4.0x and 20% range, respectively. Key financial ratios are likely to decline over the next few years, as interest rates rise and tax payments increase with the expiration of bonus depreciation.

In the table below, we illustrate the sector's financial stability by showing the historical medians for most of the companies included in our US utility rated universe. We show the 4-year (2009 – 2012) and 2-year (2011 – 2012) average medians by rating category. We also include the latest twelve months ended September 2013. In general, lower debt to EBITDA and dividend payout ratios correspond with higher credit ratings, as do higher cash flow to debt ratios. We note that A1 rated companies invest more heavily in their assets, relative to depreciation and amortization (D&A). Because we show these financial ratios by rating category, the rating category might include different kinds of companies included in our peer groups. For example, the Baa1 rating category might include parent holding companies (which also include hybrid integrated companies), vertically integrated, transmission and distribution, local gas distribution or transmission only companies.

EXHIBIT 1

US regulated utilities – selected financial ratios, by rating category (medians)

	Debt / EBITDA			CFO / debt			Dividend payout			Cap Ex / D&A		
Rating	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM
A1	2.7	2.8	3.0	31%	32%	25%	35%	33%	39%	2.4	2.7	2.7
A2	3.3	3.3	3.5	27%	26%	22%	67%	70%	64%	1.8	1.9	2.0
A3	3.9	4.0	4.0	22%	23%	22%	56%	67%	52%	2.1	1.9	2.2
Baa1	4.1	4.2	4.0	19%	20%	19%	61%	64%	52%	1.8	1.9	2.2
Baa2	4.3	4.3	4.5	17%	17%	17%	56%	56%	78%	1.7	1.9	2.1
Baa3	4.2	4.4	4.3	18%	17%	18%	120%	91%	99%	1.3	1.5	1.4

We also examined the broad peer group of utilities by sector classification. For example, we looked at the selected financial ratios for parent holding companies, vertically integrated utilities, transmission and distribution utilities and natural gas local distribution companies. We note that the financial ratios by sector classification means that both A3 and Baa3 rated companies might be included in the "Vertically Integrated" peer group and in other peer groups. We observe that the ratio of cash flow to debt is better for the utilities than it is for the parent holding companies[3].

EXHIBIT 2

US regulated utilities – selected financial ratios, by sector classification

		Debt / EBITDA			CFO / debt			Dividend payout			Cap Ex / D&A		
Sector		4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM
Holding companies	Median	4.5	4.7	4.4	18%	18%	17%	68%	69%	69%	2.3	2.3	2.5
	Total	4.1	4.3	4.2	19%	19%	18%	67%	73%	78%	2.0	2.1	2.1
LDC's	Median	4.0	4.0	4.1	24%	22%	22%	75%	70%	76%	2.0	2.2	3.1
	Total	3.5	3.5	3.4	26%	25%	23%	60%	61%	58%	2.1	2.3	2.5
T&D (electric or gas)	Median	4.0	3.7	4.2	21%	22%	20%	97%	88%	57%	1.6	1.9	1.5
	Total	3.7	3.7	3.7	22%	22%	20%	92%	86%	67%	1.5	1.8	1.9
Transmission	Median	2.3	2.3	2.5	37%	33%	26%	82%	92%	71%	5.7	6.4	6.4
	Total	3.9	3.9	4.1	20%	19%	16%	80%	83%	58%	4.7	5.3	5.5
Vertically Integrated	Median	3.7	3.7	3.7	22%	23%	20%	53%	59%	56%	2.0	2.0	2.1
	Total	3.6	3.6	3.6	23%	23%	23%	59%	64%	68%	2.1	2.1	2.1

[3] See Appendix A for a table of selected financial ratios by sector classification, by rating

Critical infrastructure assets

US utilities own and operate enormous, capital intensive, long-lived critical infrastructure assets. They are often cited as being one of the larger companies residing in a particular state, pay big property taxes and employ lots of people. The importance of utilities to state and local governments is not lost on elected officials, and utilities maintain very effective constituency outreach programs[4].

EXHIBIT 3

US regulated utilities – selected financial data, by rating category ($ billions)

	Revenues			EBITDA			CFO			Debt		
Rating	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM
Medians												
A1	$2.6	$2.7	$2.8	$0.8	$0.8	$0.8	$0.6	$0.7	$0.6	$2.1	$2.2	$2.4
A2	$1.6	$1.5	$1.4	$0.4	$0.5	$0.5	$0.4	$0.4	$0.4	$1.5	$1.6	$1.7
A3	$1.7	$1.7	$1.7	$0.4	$0.5	$0.5	$0.4	$0.4	$0.4	$1.7	$1.8	$1.9
Baa1	$1.6	$1.6	$1.6	$0.4	$0.4	$0.5	$0.3	$0.4	$0.4	$1.7	$1.8	$1.9
Baa2	$1.6	$1.6	$1.6	$0.8	$0.5	$0.5	$0.3	$0.4	$0.4	$2.0	$2.1	$2.3
Baa3	$1.7	$1.7	$1.6	$0.5	$0.5	$0.5	$0.4	$0.4	$0.4	$2.2	$2.2	$2.3
Total												
A1	$50.3	$50.2	$51.3	$15.8	$16.3	$17.5	$13.2	$13.7	$14.2	$50.7	$54.8	$58.3
A2	$86.4	$85.4	$86.6	$25.6	$27.1	$29.0	$22.2	$23.6	$22.8	$86.6	$92.0	$98.9
A3	$151.3	$154.0	$166.8	$47.5	$49.9	$54.2	$39.3	$42.5	$45.3	$187.3	$199.4	$221.6
Baa1	$468.5	$473.4	$499.6	$144.4	$150.8	$160.0	$117.3	$125.7	$130.9	$576.9	$610.6	$668.0
Baa2	$1.7	$1.6	$1.6	$32.7	$32.2	$40.4	$25.5	$26.9	$27.1	$125.1	$129.1	$135.8
Baa3	$5.4	$5.6	$5.6	$17.6	$18.8	$18.2	$1.7	$1.8	$1.8	$81.3	$89.6	$94.8

EXHIBIT 4

US regulated utilities – selected financial data, by sector classification ($ billions)

		Revenue			EBITDA			CFO			Total Debt		
Sector		4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM
Holding companies	Median	$4.0	$4.1	$4.5	$1.1	$1.1	$1.2	$0.9	$1.0	$0.9	$5.2	$5.3	$5.2
	Total	$337.4	$342.1	$358.4	$106.3	$109.7	$121.9	$84.7	$89.8	$92.1	$437.5	$467.0	$509.5
LDC's	Median	$0.7	$0.7	$0.6	$0.1	$0.2	$0.2	$0.1	$0.1	$0.1	$0.6	$0.6	$0.6
	Total	$26.8	$25.7	$26.0	$5.9	$6.3	$6.5	$5.4	$5.4	$5.1	$20.5	$22.0	$22.3
T&D (electric or gas)	Median	$1.4	$1.2	$1.1	$0.3	$0.4	$0.3	$0.3	$0.3	$0.3	$1.3	$1.3	$1.4
	Total	$74.7	$70.5	$67.3	$21.3	$21.8	$22.5	$16.8	$17.7	$16.5	$78.1	$80.0	$84.2
Transmission	Median	$0.3	$0.3	$0.3	$0.2	$0.2	$0.2	$0.1	$0.1	$0.1	$0.4	$0.5	$0.6
	Total	$2.0	$2.2	$2.5	$1.4	$1.5	$1.7	$1.1	$1.1	$1.2	$5.5	$6.0	$7.1
Vertically Integrated	Median	$1.7	$1.7	$1.7	$0.5	$0.5	$0.5	$0.4	$0.4	$0.4	$1.7	$1.8	$1.9
	Total	$195.3	$197.9	$202.7	$60.1	$62.9	$65.5	$49.2	$52.4	$53.6	$215.9	$227.7	$237.5

[4] See Appendix B for a table of selected financial data, by sector classification by rating

Strong, Stable access to capital

Our view of the supportive US utility regulatory environments resulted in several rating upgrades where companies attained an A2 rating from A3, or Baa2 from Baa3. Consistent with these long term rating changes, some utilities also achieved a change in their short-term commercial paper (CP) ratings. For more information on the linkage between long term ratings and short term ratings, please see Moody's Rating Symbols and Definitions.

EXHIBIT 5

Selected companies that received short-term commercial paper rating changes*

Name	Sector	Old Rating	New Rating	Rating Outlook	Short term Rating
Questar Corporation	Holdco	A3	A2	Stable	P-1 from P-2
Wisconsin Energy Corporation	Holdco	A3	A2	Stable	P-1 from P-2
DTE Gas Company	LDC	A3	A2	Stable	P-1 from P-2
Northern Illinois Gas Company	LDC	A3	A2	Stable	P-1 from P-2
Peoples Gas Light and Coke Company	LDC	A3	A2	Stable	P-1 from P-2
Consolidated Edison Company of New York, Inc.	T&D (electric or gas)	A3	A2	Stable	P-1 from P-2
PECO Energy Company	T&D (electric or gas)	A3	A2	Stable	P-1 from P-2
Public Service Electric and Gas Company	T&D (electric or gas)	A3	A2	Stable	P-1 from P-2
Atmos Energy Corporation	LDC	Baa1	A2	Stable	P-1 from P-2
DTE Electric Company	Vertically Integrated	A3	A2	Stable	P-1 from P-2
Northern States Power Company (Minnesota)	Vertically Integrated	A3	A2	Stable	P-1 from P-2
Northern States Power Company (Wisconsin)	Vertically Integrated	A3	A2	Stable	P-1 from P-2
Southern California Edison Company	Vertically Integrated	A3	A2	Stable	P-1 from P-2
Piedmont Natural Gas Company, Inc.	LDC	A3	A2	Stable	P-1 from P-2
South Jersey Gas Company	LDC	A3	A2	Stable	P-1 from P-2
Vectren Utility Holdings, Inc.	Vertically Integrated	A3	A2	Stable	P-1 from P-2
Virginia Electric and Power Company	Vertically Integrated	A3	A2	Stable	P-1 from P-2
Pinnacle West Capital Corporation	Holdco	Baa2	Baa1	Stable	P-2 from P-3
Ameren Corporation	Holdco	Baa3	Baa2	Stable	P-2 from P-3
NiSource Finance	Holdco	Baa3	Baa2	Stable	P-2 from P-3
Union Electric Company	Vertically Integrated	Baa2	Baa1	Stable	P-2 from P-3
Kansas City Power & Light Greater MO Op.	Vertically Integrated	Baa3	Baa2	Stable	P-2 from P-3

*Not all short-term ratings are listed here. Instead, we show a list of upgrades associated with the short term commercial paper rating. This list does not include utilities that may have had short-term ratings on industrial development bonds, such as Duke Indiana and Duke Carolinas. In Duke's case, both companies had their short-term IDB ratings upgraded (both VMIG and Prime ratings), but are not included on our list, but are available on the individual company's press releases.

Utility credit facilities are usually unsecured, so we tend to examine the few instances of secured revolving credits more closely . In many cases, security for credit facilities was initially granted when the utility incurred financial stress and/or was rated below investment grade. Similar to first mortgage bonds, secured credit facilities at the utility level are mostly viewed as having a materially lower risk of incurring any losses given a default. As a result, the costs and fees for secured credit facilities are typically lower than unsecured credit facilities, which regulators may view in a positive light, although we typically view utilities with secured credit facilities as possessing somewhat less financial flexibility.

One of the big credit positives that unsecured credit facilities provide utilities is the "ability" to raise capital or secure continued liquidity through a secured facility. This is a type of financial flexibility that can be useful for utilities experiencing a period of financial distress, since the security may be

granted in exchange for accommodations from lenders such as an increase in facility size, longer maturities, or easing of financial covenants or other terms.

EXHIBIT 6

Selected companies with secured credit facilities

Name	Sector	Old	New	Outlook	Comment
Avista Corp.	Vertically Integrated	Baa2	Baa1	Stable	Secured Revolver
Consumers Energy Company	Vertically Integrated	Baa1	A3	Stable	Secured Revolver
Oncor Electric Delivery Company LLC	T&D (electric or gas)	Baa3	Baa3	Stable	Secured Revolver
Puget Energy, Inc.	Holdco	Ba1	Baa3	Stable	Cross - Over / secured rev.
UNS Energy Corporation	Holdco	Baa3	Baa2	Stable	Secured Revolver
Westar Energy, Inc.	Holdco	Baa2	Baa1	Stable	Secured Revolver

Notable upgrades

Two companies were upgraded by 2-rating notches, Edison International (EIX: A3 stable) and Western Massachusetts Electric Company (WMECO: A3 stable). Prospectively, both companies are increasing the stability and predictability of their revenues and cash flows, because they are becoming more regulated.

EXHIBIT 7

Selected companies with 2 notch rating upgrades

Name	Sector	Old	New	Outlook
Atmos Energy Corporation	LDC	Baa1	A2	Stable
Edison International	Holdco	Baa2	A3	Stable
Western Massachusetts Electric Company	T&D (electric or gas)	Baa2	A3	Stable

For EIX, the increase in regulated revenues and cash flows (as a percentage of the total) will result from the divestiture of its risky non-utility businesses. In this case, EIX has benefitted because the former merchant generation operations at Edison Mission Energy (EME not rated) are no longer part of the consolidated entity, and we view the litigation risk from suits by EME creditors as manageable for EIX.

With the recent completion of a large transmission project in December 2013, WMECO is increasing the portion of its revenues derived from FERC-regulated transmission only assets. The FERC regulatory environment is viewed as being both transparent and predictable over the long term, with a very timely suite of cost recovery mechanisms and a reasonable assurance of a guaranteed return.

Four companies crossed over to the investment grade rating category from the non-investment grade category. Three are parent holding companies, all of which own solid investment grade utility operating subsidiaries.

EXHIBIT 8

Selected companies that crossed-over into investment grade from non-investment grade

Name	Sector	Old	New	Outlook
PNM Resources, Inc.	Holdco	Ba1	Baa3	Positive
Entergy Texas, Inc.	Vertically Integrated	Ba1	Baa3	Stable
Puget Energy, Inc.	Holdco	Ba1	Baa3	Stable
IPALCO	Holdco	Ba1	Baa3	Stable

For Entergy Texas Inc (ET: Baa3 stable), where we think Texas regulation is less favorable for non-ERCOT, vertically integrated utilities than they are on the unbundled transmission and distribution utilities, we see a steadily improving financial profile, including a sustainable production of cash flow to debt in the low-teen's, at a minimum. However, ET has the most most challenging regulatory relations of all the Texas utilities.

Puget Energy's (PE: Baa3 Stable)cross over to investment grade reflects an expectation for sustained improvement in the company's financials, due to supportive regulatory treatment. For example, the most recent rate case decision for its utility Puget Sound Energy, Inc. (PSE: Baa1, stable) by the Washington Utilities and Transportation Commission's (WUTC) allowance for a full electric and gas revenue decoupling mechanism and a series of predetermined annual delivery rate increases, including cost escalation factors.

Five issuers in two corporate families, Cleco Corporation (Cleco: Baa2, positive) and PNM Resources Inc. (PNM: Baa3, positive), continue to exhibit materially favorable regulatory or financial trends, reflected in the positive rating outlooks assigned at the conclusion of our review. For the remainder of the companies, stable rating outlooks were the norm.

EXHIBIT 9

Selected companies with positive rating outlooks

Name	Sector	Old	New	Outlook	Comment
Cleco Corporation	Holdco	Baa3	Baa2	Positive	
Cleco Power LLC	Vertically Integrated	Baa2	Baa1	Positive	
PNM Resources, Inc.	Holdco	Ba1	Baa3	Positive	Cross - Over
Texas-New Mexico Power Company	T&D (electric or gas)	Baa2	Baa1	Positive	
Public Service Company of New Mexico	Vertically Integrated	Baa3	Baa2	Positive	

For PNM, as soon as its San Juan Generating Station environmental compliance requirement is resolved, or close to it, and assuming financial metrics remain consistent with our expectations, additional rating upgrades could be considered. For Cleco, the positive outlooks reflect our expectation that Cleco Power LLC (CNL: Baa1, positive) will receive a constructive outcome on its latest regulatory filing, including the extension of its formula rate plan for another five-year period. This would follow the December 2013 approval received from the Louisiana Public Service Commission to transfer the Coughlin power plant to CLN.

EXHIBIT 10

Selected companies still on review for possible upgrade

Name	Sector	Old	New	Outlook	Comment
Brooklyn Union Gas Company	LDC	A3	A3	RUR – up	
Key Span Gas East Corp	LDC	A3	A3	RUR - up	
Niagara Mohawk Power Corp	T&D (electric or gas)	A3	A3	RUR – up	
New England Power Corp	T&D (electric or gas)	A3	A3	RUR - uP	

Companies not upgraded

For some holding companies with material non-utility businesses, rating upgrades were constrained. Our analysis was heavily influenced by the size, composition and strategy of those non-utility businesses. We widened the notching between some parent holding companies and their operating subsidiaries, especially if there was significant non-utility subsidiary debt or parent holding company debt. Negative rating consequences might also hold back the rating at the utility subsidiary, since parent holding company debt could be viewed as a proxy for utility subordinated debt or preferred stock.

As part of our review process, several corporate families are now characterized by a wider rating notching differential between the parent and one or more utility subsidiaries.

EXHIBIT 11

Parent holding companies with a three notch differential from one or more subsidiaries

Parent	Rating	Subsidiary	Rating	Notch differential
NextEra	Baa1	Florida Power & Light	A1	3
Sempra	Baa1	San Diego Gas & Electric	A1	3
Exelon Corp	Baa2	PECO Energy	A2	3
Dominion Resources	Baa2	VEPCO / DomGas	A2	3
PS Enterprises Group	Baa2	Public Service Electric & Gas	A2	3
Southern Company	Baa1	Alabama Power	A1	3
Integrys Energy	Baa1	Wisconsin Public Service	A1	3
Duquesne Light Holdgs.	Baa3	Duquesne Light Company	A3	3

In the table below, we show the utilities and holdcos that were placed on review for upgrade but were not upgraded. For these companies, ratings were confirmed at their existing rating categories[5].

EXHIBIT 12

Selected companies that were not upgraded

Name	Sector	Old	New	Outlook	Summary Rationale
American Transmission Company LLC	Transmission	A1	A1	Stable	Credit supportive FERC regulation already incorporated
Madison Gas and Electric Company	Vertically Integrated	A1	A1	Stable	Credit supportive regulation already incorporated
NSTAR Electric Company	T&D (electric or gas)	A2	A2	Stable	Credit supportive regulation already incorporated
International Transmission Company	Transmission	A3	A3	Stable	Credit supportive FERC regulation already incorporated
ITC Midwest LLC	Transmission	A3	A3	Stable	Credit supportive FERC regulation already incorporated
Michigan Electric Transmission Company, LLC	Transmission	A3	A3	Stable	Credit supportive FERC regulation already incorporated
Otter Tail Power Company	Vertically Integrated	A3	A3	Stable	Supportive regulation already incorporated
Integrys Energy Group, Inc.	Holdco	Baa1	Baa1	Stable	Non-utility business / Holdco debt
ITC Great Plains LLC	Transmission	Baa1	Baa1	Stable	Credit supportive FERC regulation already incorporated
Hawaiian Electric Company, Inc.	Vertically Integrated	Baa1	Baa1	Stable	Declining metrics, higher leverage
Duke Energy Kentucky, Inc.	Vertically Integrated	Baa1	Baa1	Stable	Declining metrics, higher leverage
Dominion Resources Inc.	Holdco	Baa2	Baa2	Stable	Non-utility business / Holdco debt
Hawaiian Electric Industries, Inc.	Holdco	Baa2	Baa2	Stable	Declining metrics, higher leverage
LG&E and KU Energy LLC	Holdco	Baa2	Baa2	Stable	Holdco debt
Bay State Gas Company	LDC	Baa2	Baa2	Stable	Supportive regulation already incorporated

[5] See Appendix C for a table of selected companies that were not placed on review for upgrade on 8 November 2013.

EXHIBIT 12

Selected companies that were not upgraded

Name	Sector	Old	New	Outlook	Summary Rationale
ITC Holdings Corp.	Transmission	Baa2	Baa2	Stable	Credit supportive FERC regulation already incorporated
Entergy Arkansas, Inc.	Vertically Integrated	Baa2	Baa2	Stable	Supportive regulation already incorporated
Kentucky Power Company	Vertically Integrated	Baa2	Baa2	Stable	Supportive regulation already incorporated
Duquesne Light Holdings, Inc.	Holdco	Baa3	Baa3	Stable	Non-utility business / Holdco debt
Pepco Holdings, Inc.	Holdco	Baa3	Baa3	Stable	Holdco debt
PPL Corporation	Holdco	Baa3	Baa3	Stable	Holdco debt
Atlantic City Electric Company	T&D (electric or gas)	Baa2	Baa2	Stable	Supportive regulation already incorporated

For a few companies, such as Madison Gas and Electric Company (MG&E: A1, stable) and NSTAR Electric Company (NSTAR Electric: A2, stable), their ratings already captured our view about the credit supportiveness of their regulatory environment and they exhibit prospective financials that are commensurate with their rating category. Their ratings also compare well with similarly rated utilities that operate in commensurately sized metro areas. The same can be said for Otter Tail Power Company (OTP: A3, stable), where we confirmed the utility at A3 and upgraded the parent holding company Otter Tail Corporation (OTC: Baa2, stable) to Baa2, thus narrowing the notching differential between the parent and the subsidiary.

The FERC regulated transmission companies, namely American Transmission Company LLC (ATC: A, stable) and ITC Holdings Corp. (ITC: Baa2, stable) and its operating subsidiaries, were not upgraded because the credit supportive FERC regulatory framework is already sufficiently incorporated into our credit analysis. Moreover, unlike most state regulatory jurisdictions, which are improving, we see the FERC maintaining a relatively steady level of supportiveness, which is high.

We summarize the rationale behind our rating confirmations for the rest of the companies in the pages that follow.

American Transmission Company (A1, stable)

The rating confirmation for American Transmission Company (ATC) reflects our view of the supportive regulatory framework of the FERC. We believe ATC's A1 issuer rating is well positioned reflecting the relatively stable and predictable cash flows supported by a federal regulatory framework governed by the FERC that promotes a tariff framework that allows timely recovery of operating and investment costs. The rating also considers ATC's low business risk profile, which is characterized by limited exposure to demand volatility and solid market position. The rating is constrained by ATC's small size, lack of geographic diversification, financial metrics that are weak for the rating but mitigated by the favorable FERC regulatory framework and the funding requirements associated with the company's significant capital expenditure program.

Our view of the supportive federal regulatory framework governed by the FERC is balanced against the current Section 206 complaint filed against the regional rate used by Transmission Owners in the Midcontinent Independent System Operator, Inc. (MISO) in November 2013. To date, FERC has taken no action on this complaint, which the TOs have filed a motion to dismiss. While it is too early in the process to determine the ultimate credit impact of any final outcome from the Section 206 complaint on ATC, we believe the final resolution of a similar Section 206 complaint filed at FERC currently being litigated against TOs in the New England ISO will provide some clarity on how similar cases will be treated going forward as to FERC's policies on these matters. We expect a final resolution by the FERC on the New England Section 206 complaint by the second quarter of 2014.

Given that ATC's credit metrics are expected to continue to be weak for its rating, ongoing favorable regulatory support provided by the FERC regulatory construct represents an essential factor in ATC's ability to maintain its financial strength.

ITC Holdings Corp (Baa2, stable) & subsidiaries

The rating confirmation for ITC Holdings Corp (ITC) and its subsidiaries reflects our view of the supportive regulatory framework of the FERC. We believe ITC Holdings' Baa2 senior unsecured rating is well positioned reflecting the relatively stable and predictable cash flows provided by its electric transmission operating subsidiaries and a solid market position. The Baa2 rating is constrained by the significant amount of debt maintained at the parent level and consolidated credit metrics that are weak for the rating but mitigated by the favorable FERC regulatory framework. The rating also considers the significant capital expenditure program currently being undertaken at ITC Holdings' operating subsidiaries.

Our view of the supportive federal regulatory framework governed by the FERC is balanced against the current Section 206 complaint filed against the regional rate used by Transmission Owners in the MISO including ITC's MISO-based subsidiaries (ITC Transmission, METC and ITC Midwest) in November 2013. To date, FERC has taken no action on this complaint, which the TOs have filed a motion to dismiss. While it is too early in the process to determine the ultimate credit impact of any final outcome from the Section 206 complaint on ITC's MISO-based subsidiaries, we believe the final resolution of a similar Section 206 complaint filed at FERC currently being litigated against the TOs in the New England ISO will provide some clarity on how similar cases will be treated going forward as to FERC's policies on these matters. We expect a final resolution by the FERC on the New England Section 206 complaint by the second quarter of 2014. Given that ITC's credit metrics are expected to continue to be weak for its rating, ongoing favorable regulatory support provided by the FERC regulatory construct represents an essential factor in ITC's ability to maintain its financial strength.

The ratings of ITC's subsidiaries reflect the same supportive FERC regulatory framework that provides a robust set of timely recovery mechanisms and healthy returns resulting in strong credit metrics. However, ITC's subsidiary ratings are constrained by the significant leverage at its parent, ITC Holdings, Corp. ITC has historically issued debt at the parent level to finance acquisitions, which accounts for approximately 70% of total parent level debt, as well as to finance equity infusions to its transmission subsidiaries. This holdco/opco financing approach used within the industry creates a benefit of double leverage by having higher equity ratios at the utility subsidiaries. As of September 30, 2013, parent level debt represented approximately 54% of ITC's consolidated debt. ITC has indicated it expects to continue funding its operations with internally generated cash, revolving credit facilities and long-term debt at the operating subsidiaries and parent as necessary.

Madison Gas &Electric Company (A1, stable)

The rating confirmation of MG&E's rating reflects our view that the utility already capture the regulatory environment in Wisconsin as above average relative to its integrated utility peers. The rating further acknowledges that MG&E's credit metrics have historically been strong for the rating category but are expected to soften as the company funds its near term capital expenditure program with a mix of internally generated funds and incremental debt, but should remain in line with comparable A1 rated utilities. Finally, the rating captures MG&E's comparatively small and concentrated service territory relative to the other utilities in the same rating category.

NSTAR Electric Company (A2, stable)

The rating confirmation of NSTAR Electric reflects our view that the regulatory environment in Massachusetts is slightly above average for T&D utilities, and those associated benefits have already been incorporated with NSTAR's current rating. The rating further acknowledges that NSTAR Electric's credit metrics are commensurate with the mid range of the A-rating category and that it compares well relative to other A2-rated transmission and distribution peers operating in a single metro area. It also captures that NSTAR Electric has a standalone $450 million committed credit facility and that the utility's historical ability to report significant amounts of positive free cash flow has diminished in recent years.

Otter Tail Power Company (A3, stable)

The rating confirmation of OTP reflects the overall credit supportive regulatory environments which the utility currently operates; a robust suite of recovery mechanisms that provide timely recovery of prudent costs and investments; and reasonably diverse service territory spread across three states. The rating also factors in the expected slight decline in financial metrics due to the current substantial capex program to grow rate base, including sizeable investments in transmission assets, as well as the continued pressure from material upstream dividend distributions to help the parent meet its somewhat aggressive dividend policy.

Duke Energy Kentucky, Inc (Baa1, stable)

The rating confirmation of Duke Energy Kentucky, Inc. reflects adequate but declining financial metrics, increasing capital expenditures, and anticipated higher debt levels that offset the generally credit supportive regulatory environment in Kentucky. The utility's cash flow pre-working capital to debt ratio has fallen from the 25% range in 2011 and prior years to the 20% range more recently, and is likely to fall into the high teens as debt levels rise. The utility has not filed for a rate increase in several years and has no immediate plans to file a base rate case. Duke Energy Kentucky Inc's small size and status as a subsidiary of Baa1 rated Duke Energy Ohio, which was not placed on review for upgrade in November, are also rating constraints.

Hawaiian Electric Industries, Inc. (Baa2, stable) and utility subsidiary

The rating confirmation of Hawaiian Electric Company, Inc. (HECO: Baa1, stable) reflects a weak financial profile. The ratings of Hawaiian Electric Industries, Inc (HEI: Baa2, stable)) at current levels reflect the relatively stable earnings and cash flow historically provided by both the vertically integrated utility businesses at HECO and the stable banking operations at American Savings Bank. The ratings also recognize the challenges at HECO and its subsidiaries, which have some of the highest retail electric rates in the country. The utility operations face heavy pressure from regulators and stakeholders to reduce rates and dependence on fuel oil. While rate reduction initiatives involving infrastructure improvements and new generation may present investment opportunities for the utilities, they also present the potential for under-recovery. HEI projects $2.9 billion of capital expenditures at the utilities over the next five years, which is sizable compared with the total authorized rate base of $2.2 billion. HECO benefits from a robust suite of regulatory mechanisms to mitigate this risk, including the revenue adjustment mechanism (RAM), which allows for rate base additions in between rate cases. The banking subsidiary, which provides about one-third of operating income to HEI, is managing well through the housing downturn and the low net interest margin environment.

Integrys Energy Group (Baa1, stable)

The confirmation of Integrys Energy Group's (Integrys: Baa1, stable) rating takes into consideration the company's sizable non-regulated energy marketing business, currently making up about 10-15% of consolidated earnings as well as the substantial amount of debt held at the parent. Today's rating action assumes Integrys' management will keep holding company debt around 30% of consolidated debt, while maintaining the size of its unregulated segment at current levels. It further assumes that management would take necessary actions to address any deterioration in its business risk profile if required in the future.

Bay State Gas Company (Baa2, stable)

The rating confirmation of Bay State Gas Company (Bay State: Baa2, stable) reflects the inter-company relationship with its parent, NiSource. This intercompany relationship constrains Bay State's rating at the parent rating level because Bay State's debt is being guaranteed by its Baa2 rated parent.

Dominion Resources Inc. (Baa2 stable)

The rating confirmation of Dominion Resources Inc (Dominion: Baa2, stable) reflects high leverage at the parent holding company. We also see weak near term cash flow generation at the non-utilities businesses; a sustained period of high capital investments, much of which is associated with a risky, multi-year construction program to construct an LNG export terminal (which will also create some asset concentration risk), and; a more welcoming stance towards corporate financial engineering, which contribute to a more complex capital structure and a net reduction of financial flexibility.

Duquesne Light Holdings, Inc (Baa3, stable)

The rating confirmation of Duquesne Light Holdings, Inc (DLH: Baa3, stable)) reflects the high level of parent company debt and unregulated operations which do not benefit from our more favorable view of the US regulatory environment.

Pepco Holdings Inc. (Baa3, stable) and subsidiary

The rating confirmation of Pepco Holdings Inc.'s (PHI: Baa3, stable) reflects meaningful parent company debt and an aggressive dividend payout policy primarily funded through incremental debt issuances prevented upward movement in its rating.

Despite generally improving regulatory environments across the US, Atlantic City Electric Company's (ACE: Baa2, stable) regulatory construct has not benefitted from similar developments. For instance, unlike the majority of its sister utilities, ACE does have access to a decoupling mechanism that would improve the predictability of its earnings by eliminating fluctuations based on weather and changes in customer usage patterns. Furthermore, ACE continues to wrestle with significant lag in its earnings which keep the company's financial metrics squarely in the mid-Baa range.

Kentucky Power Company (Baa2, stable)

The rating confirmation of Kentucky Power Company (KEPCO: Baa2, stable) reflects the high leverage, a large capital expenditure program and weak financial metrics. The settlement outcome of last October clears the path to complete the transfer of the Mitchell Plant (including considerations of potential greenhouse initiatives), and the conversion of the Big Sandy Unit 1 to natural gas. KEPCO'S financial metrics for LTM third-quarter 2013, are reasonably within the range for the rating

category. However, on a forward looking basis, a large capital expenditure program and increased leverage will contribute to weaker financial metrics such as CFO pre-WC to debt averaging between 12-14% and CFO pre WC – Div to debt between 9-11%.

Entergy Arkansas, Inc. (Baa2, stable)

The rating confirmation of Entergy Arkansas Inc. (EA: Baa2, stable) reflects less favorable rate case outcomes in May 2010 and December 2013. Arkansas operates under traditional rate of return regulation rather than the more credit supportive formula rate plans in place in Louisiana and Mississippi, where Entergy's other large subsidiaries operate. The rate of return regulation contributes to regulatory lag at EA. Under Arkansas regulation, the test year is either fully historical or 6 months historical and 6 months projected. However, there are fuel and certain other riders that help offset some aspects of the lag.

LTM third-quarter 2013 metrics are consistent with that of fiscal year end 2012, with Cash Flow Interest Coverage of 4.5x and CFO pre-WC to debt of 13%. According to Moody's adjusted projections, EA will be able to maintain appropriate metrics for the rating, including CFO pre-WC to debt, and CFO pre-WC – Div to debt of around 16% and 14% respectively.

PPL Corporation (Baa3, stable)

The rating confirmation of PPL Corporation (PPL: Baa3, stable) reflects the upgrades of its US regulated utilities, which represent 31% of consolidated earnings, but these upgrades were not sufficient to shift PPL's consolidated credit profile as their financial metrics remain weak for its rating category. LKE did not receive an upgrade because of the high debt level at LKE relative to the consolidated LKE. Moreover, because there is free movement of cash between PPL and LKE, PPL has a constraining effect on LKE's ratings.

Appendix A: Selected utility sector rating changes

Name	Sector	Old	New	Outlook
AES Corporation, (The)	HoldCo	Ba3	Ba3	Stable
Indianapolis Power & Light Company	Integrated	Baa2	Baa1	Stable
IPALCO Enterprises, Inc.	HoldCo	Ba1	Baa3	Stable
AGL Resources Inc.	HoldCo	Baa1	A3	Stable
AGL Resources Inc.	HoldCo	Baa1	A3	Stable
Atlanta Gas Light Company	LDC	A3	A2	Stable
Northern Illinois Gas	LDC	A3	A2	Stable
Pivotal Utility Holdings	LDC	A3	A2	Stable
ALLETE, Inc.	Integrated	Baa1	A3	Stable
Superior Water, Light and Power Company	Integrated	Baa1	A3	Stable
Alliant Energy Corporation	HoldCo	Baa1	A3	Stable
Wisconsin Power and Light Company	Integrated	A2	A1	Stable
Ameren Corporation	HoldCo	Baa3	Baa2	Stable
Ameren Illinois Company	T&D	Baa2	Baa1	Stable
Union Electric Company	Integrated	Baa2	Baa1	Stable
American Electric Power Company, Inc.	HoldCo	Baa2	Baa1	Stable
AEP Texas Central Company	T&D	Baa2	Baa1	Stable
AEP Texas North Company	T&D	Baa2	Baa1	Stable
Appalachian Power Company	Integrated	Baa2	Baa1	Stable
Indiana Michigan Power Company	Integrated	Baa2	Baa1	Stable
Public Service Company of Oklahoma	Integrated	Baa1	A3	Stable
Southwestern Electric Power Company	Integrated	Baa3	Baa2	Stable
Atmos Energy Corporation	LDC	Baa1	A2	Stable
Avista Corp.	Integrated	Baa2	Baa1	Stable
MidAmerican Energy Holdings Co.	HoldCo	Baa1	A3	Stable
MidAmerican Energy Company	Integrated	A2	A1	Stable
MidAmerican Funding, LLC	HoldCo	A3	A2	Stable
PacifiCorp	Integrated	Baa1	A3	Stable
NV Energy Inc.	HoldCo	Baa3	Baa2	Stable
Nevada Power Company	Integrated	Baa2	Baa1	Stable
Sierra Pacific Power Company	Integrated	Baa2	Baa1	Stable
Black Hills Corporation	HoldCo	Baa2	Baa1	Stable
Black Hills Power, Inc.	Integrated	Baa1	A3	Stable
CenterPoint Energy, Inc.	HoldCo	Baa2	Baa1	Stable
CenterPoint Energy Houston Electric, LLC	T&D	Baa1	A3	Stable

Name	Sector	Old	New	Outlook
CH Energy Group, Inc.	HoldCo	not rated		
Central Hudson Gas & Electric Corporation	T&D	A3	A2	Stable
Cleco Corporation	HoldCo	Baa3	Baa2	Positive
Cleco Power LLC	Integrated	Baa2	Baa1	Positive
CMS Energy Corporation	HoldCo	Baa3	Baa2	Stable
Consumers Energy Company	Integrated	Baa1	A3	Stable
Consolidated Edison, Inc.	HoldCo	Baa1	A3	Stable
Consolidated Edison Company of New York, Inc.	T&D	A3	A2	Stable
Orange and Rockland Utilities, Inc.	T&D	Baa1	A3	Stable
Dominion Resources Inc.	HoldCo	Baa2	Baa2	Stable
Dominion Gas Holdings	LDC	A3	A2	Stable
Virginia Electric and Power Company	Integrated	A3	A2	Stable
DTE Energy Company	HoldCo	Baa1	A3	Stable
DTE Electric Company	Integrated	A3	A2	Stable
DTE Gas Company	LDC	A3	A2	Stable
Duke Energy Corporation	HoldCo	A3	Baa1	Stable
Duke Energy Carolinas, LLC	Integrated	A2	A1	Stable
Duke Energy Florida, Inc.	Integrated	Baa1	A3	Stable
Duke Energy Indiana, Inc.	Integrated	A3	A2	Stable
Duke Energy Progress, Inc.	Integrated	A2	A1	Stable
Progress Energy, Inc.	HoldCo	Baa2	Baa1	Stable
Duquesne Light Holdings, Inc.	HoldCo	Baa3	Baa3	Stable
Duquesne Light Company	T&D	Baa1	A3	Stable
Edison International	HoldCo	Baa2	A3	Stable
Southern California Edison Company	Integrated	A3	A2	Stable
El Paso Electric Company	Integrated	Baa2	Baa1	Stable
Empire District Electric Company (The)	Integrated	Baa2	Baa1	Stable
Portland General Electric Company	Integrated	Baa1	A3	Stable
Entergy Corporation	HoldCo	Baa3	Baa3	Stable
Entergy Gulf States Louisiana, LLC	Integrated	Baa2	Baa1	Stable
Entergy Louisiana, LLC	Integrated	Baa2	Baa1	Stable
Entergy Mississippi, Inc.	Integrated	Baa3	Baa2	Stable
Entergy Texas, Inc.	Integrated	Ba1	Baa3	Stable

Name	Sector	Old	New	Outlook
Exelon Corporation	HoldCo	Baa2	Baa2	Stable
Baltimore Gas and Electric Company	T&D	Baa1	A3	Stable
Commonwealth Edison Company	T&D	Baa2	Baa1	Stable
PECO Energy Company	T&D	A3	A2	Stable
Great Plains Energy Incorporated	HoldCo	Baa3	Baa2	Stable
Kansas City Power & Light Company	Integrated	Baa2	Baa1	Stable
Kansas City Power & Light Greater MO Oper	Integrated	Baa3	Baa2	Stable
Iberdrola S.A.	HoldCo	Baa1	Baa1	Negative
Central Maine Power Company	T&D	Baa1	A3	Stable
New York State Electric and Gas Corporation	T&D	Baa1	A3	Stable
Rochester Gas & Electric Corporation	T&D	Baa2	Baa1	Stable
IDACORP, Inc.	HoldCo	Baa2	Baa1	Stable
Idaho Power Company	Integrated	Baa1	A3	Stable
Integrys Energy Group, Inc.	HoldCo	Baa1	Baa1	Stable
North Shore Gas Company	LDC	A3	A2	Stable
Peoples Gas Light and Coke Company	LDC	A3	A2	Stable
Wisconsin Public Service Corporation	Integrated	A2	A1	Stable
Laclede Group, Inc. (The)	LDC	Baa2	Baa1	Stable
Laclede Gas Company	LDC	Baa1	A3	Stable
LDC HOLDINGS LLC	HoldCo	not rated		
PNG Companies LLC	LDC	Baa3	Baa2	Stable
New Jersey Resources Corp	HoldCo	not rated		
New Jersey Natural Gas Company	LDC	Aa3	Aa2	Stable
NextEra Energy, Inc.	HoldCo	Baa1	Baa1	Stable
Florida Power & Light Company	Integrated	A2	A1	Stable
NiSource Inc.	HoldCo	(P)Ba2 (preferred)	(P)Ba1 (preferred)	Stable
NiSource Finance	HoldCo	Baa3	Baa2	Stable
Northern Indiana Public Service Company	Integrated	Baa2	Baa1	Stable
Northeast Utilities	HoldCo	Baa1	Baa1	Stable
Connecticut Light and Power Company	T&D	Baa2	Baa1	Stable
Public Service Company of New Hampshire	Integrated	Baa2	Baa1	Stable
Western Massachusetts Electric Company	T&D	Baa2	A3	Stable
Yankee Gas Services Company	LDC	Baa2	Baa1	Stable
NorthWestern Corporation	Integrated	Baa1	A3	Stable

Name	Sector	Old	New	Outlook
OGE Energy Corp.	HoldCo	Baa1	A3	Stable
Oklahoma Gas & Electric Company	Integrated	A2	A1	Stable
Otter Tail Corporation	HoldCo	Baa3	Baa2	Stable
Pepco Holdings, Inc.	HoldCo	Baa3	Baa3	Stable
Delmarva Power & Light Company	T&D	Baa2	Baa1	Stable
Potomac Electric Power Company	T&D	Baa2	Baa1	Stable
Piedmont Natural Gas Company, Inc.	LDC	A3	A2	Stable
Pinnacle West Capital Corporation	HoldCo	Baa2	Baa1	Stable
Arizona Public Service Company	Integrated	Baa1	A3	Stable
PNM Resources, Inc.	HoldCo	Ba1	Baa3	Positive
Public Service Company of New Mexico	Integrated	Baa3	Baa2	Positive
Texas-New Mexico Power Company	T&D	Baa2	Baa1	Positive
PPL Corporation	HoldCo	Baa3	Baa3	Stable
Kentucky Utilities Co.	Integrated	Baa1	A3	Stable
Louisville Gas & Electric	Integrated	Baa1	A3	Stable
PPL Electric Utilities Corporation	T&D	Baa2	Baa1	Stable
Public Service Enterprise Group Incorporated	HoldCo	(P)Baa2	(P)Baa2	Stable
Public Service Electric and Gas Company	T&D	A3	A2	Stable
Puget Energy, Inc.	HoldCo	Ba1	Baa3	Stable
Puget Sound Energy, Inc.	Integrated	Baa2	Baa1	Stable
Questar Corporation	HoldCo	A3	A2	Stable
Questar Gas Company	LDC	A3	A2	Stable
SEMCO Energy, Inc.	LDC	Baa2	Baa1	Stable
Sempra Energy	HoldCo	Baa1	Baa1	Stable
San Diego Gas & Electric Company	Integrated	A2	A1	Stable
Southern California Gas Company	LDC	A2	A1	Stable
SourceGas Holdings LLC	HoldCo	not rated		
SourceGas LLC	LDC	Baa3	Baa2	Stable
South Jersey Industries Inc	HoldCo	not rated		
South Jersey Gas Company	LDC	A3	A2	Stable
Southern Company (The)	HoldCo	Baa1	Baa1	Stable
Alabama Power Company	Integrated	A2	A1	Stable
Gulf Power Company	Integrated	A3	A2	Stable

Name	Sector	Old	New	Outlook
Southwest Gas Corporation	LDC	Baa1	A3	Stable
TECO Energy, Inc.	HoldCo	Baa2	Baa1	Stable
Tampa Electric Company	Integrated	A3	A2	Stable
UGI Corporation	HoldCo	not rated		
UGI Utilities, Inc.	LDC	A3	A2	Stable
UIL Holdings Corporation	HoldCo	Baa3	Baa2	Stable
Berkshire Gas Company	LDC	Baa2	Baa1	Stable
Connecticut Natural Gas Corporation	LDC	Baa1	A3	Stable
Southern Connecticut Gas Company	LDC	Baa2	Baa1	Stable
United Illuminating Company	T&D	Baa2	Baa1	Stable
UNS Energy Corporation	HoldCo	Baa3	Baa2	Stable
Tucson Electric Power Company	Integrated	Baa2	Baa1	Stable
UNS Electric, Inc.	Integrated	Baa2	Baa1	Stable
UNS Gas, Inc.	LDC	Baa2	Baa1	Stable
Vectren Utility Holdings, Inc.	HoldCo	A3	A2	Stable
Indiana Gas Company, Inc.	LDC	A3	A2	Stable
Southern Indiana Gas & Electric Company	Integrated	A3	A2	Stable
Westar Energy, Inc.	HoldCo	Baa2	Baa1	Stable
WGL Holdings, Inc.	HoldCo	no long term rating		
Washington Gas Light Company	LDC	A2	A1	Stable
Wisconsin Energy Corporation	HoldCo	A3	A2	Stable
Wisconsin Electric Power Company	Integrated	A2	A1	Stable
Wisconsin Gas LLC	LDC	A2	A1	Stable
Xcel Energy Inc.	HoldCo	Baa1	A3	Stable
Northern States Power Company (Minnesota)	Integrated	A3	A2	Stable
Northern States Power Company (Wisconsin)	Integrated	A3	A2	Stable
Public Service Company of Colorado	Integrated	Baa1	A3	Stable
Southwestern Public Service Company	Integrated	Baa2	Baa1	Stable

Appendix B: Selected financial ratios – by sector classification, by rating

		Debt / EBITDA			CFO / debt			Dividend payout			Cap Ex / D&A		
Name		4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM
Holding companies	Median	4.3	4.3	3.8	21%	22%	23%	51%	60%	62%	2.7	2.8	2.7
A2 and A3 rated	Total	4.1	4.2	4.3	21%	20%	19%	56%	59%	60%	2.2	2.2	2.2
Holding companies	Median	4.6	5.0	3.8	19%	15%	18%	66%	71%	59%	1.7	1.8	1.5
Baa1 rated	Total	4.1	4.2	4.4	19%	19%	18%	65%	65%	74%	2.2	2.3	2.2
Holding companies	Median	5.4	5.3	5.2	14%	15%	16%	71%	79%	110%	2.0	2.0	1.9
Baa2 ad lower rated	Total	4.1	4.3	3.9	19%	19%	17%	83%	99%	103%	1.7	1.9	2.0
LDC's	Median	3.9	3.8	3.8	24%	23%	19%	71%	78%	79%	1.9	2.3	2.4
A - rated	Total	3.3	3.3	3.4	27%	26%	23%	63%	65%	58%	2.0	2.3	2.6
LDC's	Median	3.8	3.9	3.4	26%	21%	26%	82%	76%	74%	1.7	1.9	2.0
Baa1 and Baa2 rated	Total	4.0	4.0	3.3	23%	21%	23%	42%	39%	52%	2.3	2.0	2.1
T&D (electric or gas)	Median	2.9	2.8	2.7	27%	30%	26%	60%	67%	37%	1.7	2.0	1.8
A - rated	Total	3.5	3.5	3.6	24%	26%	22%	67%	67%	57%	1.8	2.0	2.1
T&D (electric or gas)	Median	5.0	4.6	4.3	16%	16%	16%	72%	69%	55%	1.9	2.0	2.3
Baa1 rated	Total	3.9	3.8	3.8	21%	20%	18%	98%	89%	66%	1.6	1.8	2.1
T&D (electric or gas)	Median	3.6	4.1	4.5	21%	18%	19%	155%	141%	87%	1.0	1.0	1.0
Baa2 and lower rated	Total	3.6	3.7	3.8	20%	20%	20%	133%	127%	95%	1.2	1.4	1.3
Transmission	Median	2.3	2.3	2.5	37%	33%	26%	82%	92%	71%	5.7	6.4	6.4
	Total	3.9	3.9	4.1	20%	19%	16%	80%	83%	58%	4.7	5.3	5.5
Vertically Integrated	Median	3.6	3.7	4.1	25%	25%	17%	29%	29%	33%	2.0	1.9	1.8
A1 rated	Total	3.1	3.2	3.2	27%	26%	25%	45%	46%	63%	2.3	2.4	2.0
Vertically Integrated	Median	3.6	3.6	3.7	22%	20%	18%	76%	80%	61%	2.2	2.2	2.2
A2 rated	Total	3.2	3.2	3.1	27%	26%	25%	57%	58%	51%	2.2	2.1	2.1
Vertically Integrated	Median	3.9	4.0	4.0	22%	22%	20%	50%	64%	48%	2.1	1.9	2.2
A3 rated	Total	3.8	3.8	3.8	22%	23%	23%	66%	84%	71%	2.0	1.9	2.1
Vertically Integrated	Median	3.8	3.9	4.2	18%	18%	17%	69%	74%	73%	1.8	1.8	2.1
Baa1 rated	Total	4.2	4.1	4.5	19%	19%	19%	67%	70%	103%	1.9	2.0	2.2
Vertically Integrated	Median	5.8	5.7	5.4	14%	16%	17%	55%	47%	74%	2.1	1.9	2.1
Baa2 and lower rated	Total	4.4	4.3	4.0	16%	18%	17%	65%	46%	65%	2.3	2.4	2.4

Appendix C: Selected financial data – by sector classification, by rating

		Revenue			EBITDA			CFO			Total Debt		
Name		4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM	4-yr avg	2-yr avg	LTM
Holding companies	Median	$4.0	$4.1	$4.5	$1.1	$1.2	$1.4	$1.0	$1.2	$1.2	$4.9	$5.3	$5.2
A2 and A3 rated	Total	$90.5	$92.4	$103.7	$28.6	$30.2	$34.0	$24.1	$25.8	$27.9	$117.6	$126.9	$147.2
Holding companies	Median	$5.9	$5.5	$7.2	$1.6	$1.7	$2.4	$1.3	$1.2	$1.7	$7.3	$8.6	$9.2
Baa1 rated	Total	$111.0	$111.0	$114.9	$35.3	$36.5	$37.5	$27.5	$29.3	$29.7	$145.7	$153.8	$163.4
Holding companies	Median	$3.2	$3.2	$3.1	$1.0	$1.0	$1.0	$0.7	$0.8	$0.8	$5.1	$5.3	$5.1
Baa2 ad lower rated	Total	$135.9	$138.7	$139.8	$42.3	$43.0	$50.4	$33.0	$34.7	$34.5	$174.2	$186.3	$198.8
LDC's	Median	$0.9	$0.9	$0.8	$0.2	$0.2	$0.2	$0.2	$0.2	$0.2	$0.7	$0.8	$0.8
A - rated	Total	$19.0	$18.6	$18.7	$4.5	$4.9	$5.1	$4.1	$4.3	$4.0	$14.9	$16.4	$17.7
LDC's	Median	$0.4	$0.4	$0.4	$0.1	$0.1	$0.1	$0.1	$0.1	$0.1	$0.3	$0.3	$0.3
Baa1 and Baa2 rated	Total	$7.7	$7.1	$7.4	$1.4	$1.4	$1.4	$1.3	$1.2	$1.0	$5.6	$5.6	$4.6
T&D (electric or gas)	Median	$1.7	$1.6	$1.6	$0.6	$0.6	$0.7	$0.5	$0.5	$0.5	$1.7	$1.8	$1.8
A - rated	Total	$27.4	$25.8	$25.3	$7.9	$8.1	$8.5	$6.5	$7.2	$6.6	$27.4	$28.3	$30.7
T&D (electric or gas)	Median	$1.3	$1.2	$1.2	$0.3	$0.4	$0.4	$0.3	$0.3	$0.3	$1.6	$1.7	$1.8
Baa1 rated	Total	$31.4	$30.4	$28.3	$8.2	$8.6	$9.0	$6.7	$6.6	$6.1	$32.1	$32.8	$34.2
T&D (electric or gas)	Median	$1.3	$1.1	$0.9	$0.4	$0.3	$0.3	$0.3	$0.2	$0.3	$1.3	$1.3	$1.4
Baa2 and lower rated	Total	$16.0	$14.4	$13.7	$5.2	$5.1	$5.1	$3.6	$3.8	$3.8	$18.6	$18.9	$19.3
Transmission	Median	$0.3	$0.3	$0.3	$0.2	$0.2	$0.2	$0.1	$0.1	$0.1	$0.4	$0.5	$0.6
	Total	$2.0	$2.2	$2.5	$1.4	$1.5	$1.7	$1.1	$1.1	$1.2	$5.5	$6.0	$7.1
Vertically Integrated	Median	$3.4	$3.5	$3.7	$1.0	$1.1	$1.2	$0.9	$1.0	$0.8	$3.7	$4.1	$4.8
A1 rated	Total	$39.7	$39.7	$40.7	$13.0	$13.5	$14.7	$10.9	$11.2	$11.7	$40.2	$43.2	$46.6
Vertically Integrated	Median	$3.3	$3.3	$3.3	$0.9	$0.9	$1.0	$0.7	$0.7	$0.6	$3.2	$3.4	$3.6
A2 rated	Total	$40.1	$40.7	$42.4	$12.8	$13.7	$14.9	$11.0	$11.3	$11.5	$40.8	$43.6	$46.8
Vertically Integrated	Median	$1.7	$1.7	$1.7	$0.4	$0.5	$0.5	$0.4	$0.4	$0.4	$1.7	$1.8	$1.9
A3 rated	Total	$66.4	$67.2	$68.6	$20.3	$21.0	$21.5	$16.6	$18.2	$18.8	$76.1	$79.2	$80.9
Vertically Integrated	Median	$1.5	$1.5	$1.6	$0.4	$0.4	$0.4	$0.3	$0.3	$0.3	$1.5	$1.6	$1.7
Baa1 rated	Total	$36.8	$37.7	$38.0	$10.5	$11.1	$10.6	$8.2	$8.9	$8.9	$43.6	$45.8	$47.7
Vertically Integrated	Median	$1.2	$1.2	$1.3	$0.3	$0.3	$0.3	$0.2	$0.3	$0.3	$1.6	$1.6	$1.6
Baa2 and lower rated	Total	$12.3	$12.5	$12.9	$3.5	$3.7	$3.9	$2.5	$2.8	$2.6	$15.2	$15.8	$15.6

Appendix D: Companies not placed on review for upgrade

Name	Sector	Old	New	Outlook	Comment
Northwest Natural Gas Company	LDC	A3	A3	Negative	Not placed on review on November 8
Public Service Co. of North Carolina, Inc.	LDC	A3	A3	Stable	Not placed on review on November 8
Georgia Power Company	Vertically Integrated	A3	A3	Stable	Not placed on review on November 8
Pacific Gas & Electric Company	Vertically Integrated	A3	A3	Stable	Not placed on review on November 8
Interstate Power and Light Company	Vertically Integrated	A3	A3	Stable	Not placed on review on November 8
Oncor Electric Delivery Company LLC	T&D (electric or gas)	Ba2	Ba2	Stable	Not placed on review on November 8
DPL Inc.	Holdco	Ba2	Ba2	Stable	Not placed on review on November 8
Entergy New Orleans, Inc.	Vertically Integrated	Ba2	Ba2	Stable	Not placed on review on November 8
NextEra Energy, Inc.	Holdco	Baa1	Baa1	Stable	Not placed on review on November 8
PG&E Corporation	Holdco	Baa1	Baa1	Stable	Not placed on review on November 8
Sempra Energy	Holdco	Baa1	Baa1	Stable	Not placed on review on November 8
Southern Company (The)	Holdco	Baa1	Baa1	Stable	Not placed on review on November 8
Duke Energy Ohio, Inc.	T&D (electric or gas)	Baa1	Baa1	Stable	Not placed on review on November 8
Monongahela Power Company	T&D (electric or gas)	Baa1	Baa1	Stable	Not placed on review on November 8
Ohio Power Company	T&D (electric or gas)	Baa1	Baa1	Stable	Not placed on review on November 8
Mississippi Power Company	Vertically Integrated	Baa1	Baa1	Stable	Not placed on review on November 8
Exelon Corporation	Holdco	Baa2	Baa2	Stable	Not placed on review on November 8
Public Service Enterprise Group Incorporated	Holdco	Baa2	Baa2	Stable	Not placed on review on November 8
CenterPoint Energy Resources Corp.	LDC	Baa2	Baa2	Stable	Not placed on review on November 8
Jersey Central Power & Light Company	T&D (electric or gas)	Baa2	Baa2	Negative	Not placed on review on November 8
Metropolitan Edison Company	T&D (electric or gas)	Baa2	Baa2	Stable	Not placed on review on November 8
Ohio Edison Company	T&D (electric or gas)	Baa2	Baa2	Stable	Not placed on review on November 8
Pennsylvania Electric Company	T&D (electric or gas)	Baa2	Baa2	Stable	Not placed on review on November 8
Pennsylvania Power Company	T&D (electric or gas)	Baa2	Baa2	Stable	Not placed on review on November 8
South Carolina Electric & Gas Company	Vertically Integrated	Baa2	Baa2	Stable	Not placed on review on November 8
Entergy Corporation	Holdco	Baa3	Baa3	Stable	Not placed on review on November 8
FirstEnergy Corp.	Holdco	Baa3	Baa3	Negative	Not placed on review on November 8
SCANA Corporation	Holdco	Baa3	Baa3	Stable	Not placed on review on November 8
Cleveland Electric Illuminating Company (The)	T&D (electric or gas)	Baa3	Baa3	Stable	Not placed on review on November 8
Dayton Power & Light Company	T&D (electric or gas)	Baa3	Baa3	Stable	Not placed on review on November 8
Potomac Edison Company (The)	T&D (electric or gas)	Baa3	Baa3	Stable	Not placed on review on November 8
Toledo Edison Company	T&D (electric or gas)	Baa3	Baa3	Stable	Not placed on review on November 8

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Group Influence

Ratings Score Snapshot

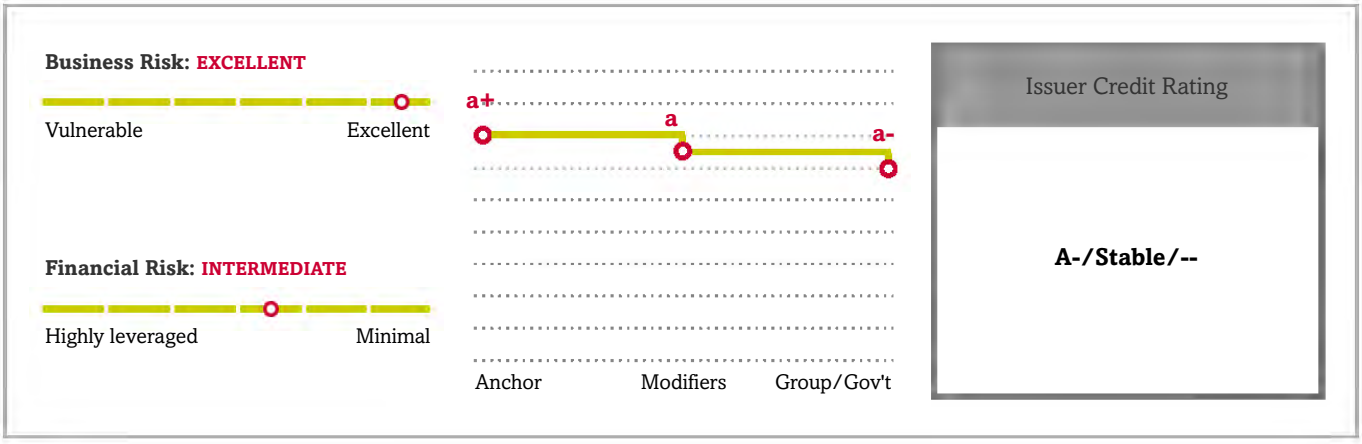
Issue Ratings--Subordination Risk Analysis

Related Criteria

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Summary:

SUEZ Water Resources Inc.



Rationale

Business Risk: Excellent

- SUEZ Water Resources Inc. (SWR) is a lower-risk and mostly regulated water utility.
- We view the company's management of regulatory risk as effective.
- SWR has sufficient geographic and regulatory diversity with operations spread across five states.
- SWR has a large customer base.
- Overall, we view the company as being in the higher half of our business risk assessment category.

Financial Risk: Intermediate

- We assess SWR's financial measures using our low-volatility financial benchmark tables, reflecting SWR's lower-risk and mostly regulated water utility operations, and effective management of regulatory risk.
- We expect SWR's financial measures to remain consistent with our financial risk profile assessment despite a modest weakening due to higher capital spending and the negative cash flow effects of U.S. tax reform.
- Specifically, we expect funds from operations (FFO) to debt to average about 15% through 2020, down from about 17% in 2017.
- We expect SWR's capital spending to average about $260 million annually through 2020.
- We expect SWR's capital spending and dividend payments to result in negative discretionary cash flows over the next several years.

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Outlook: Stable

The stable outlook on Paramus, N.J.-based SUEZ Water Resources Inc. reflects S&P Global Ratings' expectation that the company's unrated ultimate parent, SUEZ Environnement S.A. (SEV), will continue to maintain a diverse mix of businesses and financial measures that support our assessment of the overall group credit profile.

Downside scenario

We could lower our ratings on SWR over the next 12 months if we revise downward our assessment of SEV's group credit profile. This could occur if the quality and mix of businesses for the group proved inconsistent with our view of the group profile or if the company's financial measures weakened.

Upside scenario

Although unlikely, we could raise the rating on SWR if financial measures for the group consistently improved, warranting an upward reassessment of the group credit profile.

Our Base-Case Scenario

Assumptions

- Periodic rate case filings;
- Continued use of constructive regulatory riders such as the Distribution System Improvement Charge (DSIC) in multiple jurisdictions;
- Stability in the company's long-term contracts;
- Capital spending averaging about $260 million annually through 2020; and
- Assumed dividend payments of about $35 million.

Key Metrics

	2017A	2018E	2019E
FFO to debt (%)	17	14.7-15.7	15.3-16.3
Debt to EBITDA (x)	4	4.5-5	4.3-4.8

A--Actual. E--Estimated. FFO--Funds from operations.

Company Description

SWR owns and operates water and wastewater utilities throughout the U.S. The company also operates water and wastewater systems for municipal clients through a variety of public-private partnership contract structures. The company manages municipal water and wastewater contracts in Indianapolis; Milwaukee, Wis.; Jersey City, N.J.; and Gary, Ind. The company was founded in 1869 and is a subsidiary of Suez Water Inc.

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Business Risk: Excellent

Our assessment of SWR's business risk profile is based on its mostly lower-risk and rate-regulated water distribution business that serves about 2 million customers across New Jersey, New York, Delaware, Pennsylvania, and Idaho. We view SWR's management of regulatory risk as above average, partially reflecting the extensive use of constructive regulatory mechanisms, including the DSIC rider in New Jersey, Pennsylvania, and Delaware, as well as a revenue decoupling mechanism in New York. Under our base-case scenario, we expect that the company will continue to effectively manage regulatory risk, in part due to the frequency of rate case filings, and will continue to use riders that we collectively view as favorable for the company's credit quality.

In July 2018, Suez Environnement announced that it will sell a 20% stake in SWR to PGGM, a pension fund based in the Netherlands. We view this proposed transaction as neutral in our assessment of SWR's overall credit quality, reflecting our expectation that SWR's governance structure, including on key decisions, is likely to remain largely intact.

Financial Risk: Intermediate

We assess SWR's financial risk profile using our low-volatility financial benchmark table, which reflects the company's mostly lower-risk, regulated utility businesses and effective management of regulatory risk. Under our base-case scenario of capital spending averaging about $260 million through 2020, dividend payments of about $35 million annually, continued rate case filings, and further use of the DSIC, we expect FFO to debt to average about 15% through 2020, down from about 17% in 2017, in part due to higher capital spending and the effects of U.S. tax reform. Furthermore, we expect SWR's capital spending and dividend payments to result in negative discretionary cash flows over the next several years.

Liquidity: Adequate

SWR has adequate liquidity in our view and can cover its needs for the next 12 months, even if EBITDA declines by 10%. We expect the company's liquidity sources over the next 12 months will exceed uses by more than 1.1x. Under our stress scenario, we do not expect that SWR would require access to the capital markets to meet its liquidity needs. SWR also benefits from generally prudent risk management, sound relationships with banks, and a generally satisfactory standing in the credit markets.

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Principal Liquidity Sources	Principal Liquidity Uses
• Consolidated credit facility availability of $250 million; • Consolidated cash FFO averaging about $190 million; and • Minimal cash assumed.	• Consolidated capital spending averaging about $240 million over the next 12 months; • Consolidated long-term debt maturity close to $31 million in 2019; and • Dividend payment of about $35 million.

Other Credit Considerations

We assign a negative comparable ratings analysis modifier reflecting SWR's financial measures that we expect will reflect the lower end of the range for its financial risk profile category.

Group Influence

Under our group rating methodology, we view SWR as a wholly owned subsidiary of SEV. We view SWR as strategically important to SEV, reflecting our view that SWR is unlikely to be sold, is important to the group's long-term strategy, has a strong long-term commitment from the company's senior management, and is closely linked to the parent's name and reputation.

Ratings Score Snapshot

Issuer Credit Rating

A-/Stable/--

Business risk: Excellent

- **Country risk:** Very low
- **Industry risk:** Very low
- **Competitive position:** Excellent

Financial risk: Intermediate

- **Cash flow/Leverage:** Intermediate

Anchor: a+

Modifiers

- **Diversification/Portfolio effect:** Neutral (no impact)
- **Capital structure:** Neutral (no impact)
- **Financial policy:** Neutral (no impact)

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- **Liquidity:** Adequate (no impact)
- **Management and governance:** Satisfactory (no impact)
- **Comparable rating analysis:** Negative (-1 notch)

Stand-alone credit profile : a

- **Group credit profile:** a-
- **Entity status within group:** Core (-1 notch from SACP)

Issue Ratings--Subordination Risk Analysis

Capital structure	Analytical conclusions
SWR's capital structure includes close to $890 million of consolidated senior unsecured debt, including about $155 million issued at subsidiary SUEZ Water New Jersey Inc.	We rate SWR's senior unsecured debt 'A-', same as our issuer credit rating on the company because of the absence of structural subordination, consistent with our criteria.

Related Criteria

- Criteria - Corporates - General: Reflecting Subordination Risk In Corporate Issue Ratings, March 28, 2018
- General Criteria: Methodology For Linking Long-Term And Short-Term Ratings, April 7, 2017
- Criteria - Corporates - General: Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers, Dec. 16, 2014
- Criteria - Corporates - Industrials: Key Credit Factors For The Environmental Services Industry, Feb. 12, 2014
- General Criteria: Group Rating Methodology, Nov. 19, 2013
- General Criteria: Country Risk Assessment Methodology And Assumptions, Nov. 19, 2013
- Criteria - Corporates - General: Corporate Methodology: Ratios And Adjustments, Nov. 19, 2013
- Criteria - Corporates - General: Corporate Methodology, Nov. 19, 2013
- Criteria - Corporates - Utilities: Key Credit Factors For The Regulated Utilities Industry, Nov. 19, 2013
- General Criteria: Methodology: Industry Risk, Nov. 19, 2013
- General Criteria: Methodology: Management And Governance Credit Factors For Corporate Entities And Insurers, Nov. 13, 2012
- General Criteria: Use Of CreditWatch And Outlooks, Sept. 14, 2009

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Business And Financial Risk Matrix

Business Risk Profile	Financial Risk Profile					
	Minimal	Modest	**Intermediate**	Significant	Aggressive	Highly leveraged
Excellent	aaa/aa+	aa	**a+/a**	a-	bbb	bbb-/bb+
Strong	aa/aa-	a+/a	a-/bbb+	bbb	bb+	bb
Satisfactory	a/a-	bbb+	bbb/bbb-	bbb-/bb+	bb	b+
Fair	bbb/bbb-	bbb-	bb+	bb	bb-	b
Weak	bb+	bb+	bb	bb-	b+	b/b-
Vulnerable	bb-	bb-	bb-/b+	b+	b	b-

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S&P Capital IQ

Suez SA Capital Structure and Balance Sheet(2016-2018)

In Millions of USD, except per share items.

Balance Sheet

Balance Sheet as of:	Dec-31-2016	Restated Dec-31-2017	Dec-31-2018
Currency	*USD*	*USD*	*USD*
ASSETS			
Cash And Equivalents	3,087.4	3,868.0	3,920.4
Trading Asset Securities	65.8	68.3	33.4
Total Cash & ST Investments	**3,153.2**	**3,936.4**	**3,953.9**
Accounts Receivable	4,266.3	6,153.7	5,966.6
Other Receivables	50.4	11.8	49.7
Notes Receivable	96.7	152.1	75.9
Total Receivables	**4,413.4**	**6,317.6**	**6,092.2**
Inventory	277.3	546.5	571.9
Other Current Assets	1,747.7	1,584.4	1,830.0
Total Current Assets	**9,591.6**	**12,384.8**	**12,447.9**
Gross Property, Plant & Equipment	17,420.5	20,239.9	20,042.4
Accumulated Depreciation	(8,680.0)	(10,026.1)	(9,996.1)
Net Property, Plant & Equipment	**8,740.4**	**10,213.9**	**10,046.3**
Long-term Investments	2,148.0	2,587.4	2,421.2
Goodwill	3,849.8	6,174.5	5,981.0
Other Intangibles	4,457.9	5,903.3	5,704.3
Accounts Receivable Long-Term	1.0	26.9	110.3
Loans Receivable Long-Term	242.5	374.9	464.6
Deferred Tax Assets, LT	826.7	756.5	625.8
Other Long-Term Assets	1,055.3	1,000.1	615.1
Total Assets	**30,913.1**	**39,422.3**	**38,416.4**
LIABILITIES			
Accounts Payable	2,943.8	4,089.5	4,038.5
Short-term Borrowings	1,698.9	1,668.9	1,798.3
Curr. Port. of LT Debt	925.5	860.8	1,345.7
Curr. Port. of Cap. Leases	51.7	89.1	38.7
Unearned Revenue, Current	-	1,271.4	1,118.0
Other Current Liabilities	4,975.8	5,132.6	5,015.7
Total Current Liabilities	**10,595.8**	**13,112.3**	**13,354.8**
Long-Term Debt	8,995.0	11,637.1	11,167.2

S&P Capital IQ

Capital Leases	158.3	89.9	61.1
Unearned Revenue, Non-Current	-	322.6	329.4
Def. Tax Liability, Non-Curr.	690.9	780.0	743.5
Other Non-Current Liabilities	2,697.5	2,647.2	2,464.3
Total Liabilities	**23,137.5**	**28,589.2**	**28,120.3**
Common Stock	2,383.2	2,994.0	2,845.7
Additional Paid In Capital	4,890.0	6,287.7	5,970.2
Retained Earnings	-	-	-
Treasury Stock	(30.2)	(92.5)	(59.3)
Comprehensive Inc. and Other	(1,441.4)	(1,371.8)	(1,438.3)
Total Common Equity	**5,801.6**	**7,817.5**	**7,318.3**
Minority Interest	1,973.9	3,015.6	2,977.8
Total Equity	**7,775.6**	**10,833.1**	**10,296.1**
Total Liabilities And Equity	**30,913.1**	**39,422.3**	**38,416.4**
Supplemental Items			
Total Shares Out. on Filing Date	562.5	618.3	617.8
Total Shares Out. on Balance Sheet Date	562.5	618.3	617.8
Book Value/Share	$10.31	$12.64	$11.85
Tangible Book Value	(2,506.1)	(4,260.3)	(4,367.0)
Tangible Book Value/Share	($4.46)	($6.89)	($7.07)
Total Debt	11,829.5	14,345.9	14,410.9
Net Debt	8,676.3	10,409.6	10,457.1
Debt Equiv. of Unfunded Proj. Benefit Obligation	841.1	945.4	913.3
Debt Equivalent Oper. Leases	3,677.8	4,449.6	4,652.2
Total Minority Interest	1,973.9	3,015.6	2,977.8
Equity Method Investments	2,002.0	2,434.8	2,268.9
Inventory Method	NA	NA	NA
Land	1,953.8	2,426.4	2,302.6
Buildings	3,496.0	3,965.3	3,808.8
Machinery	10,075.6	11,572.4	11,595.3
Construction in Progress	786.8	1,021.6	1,113.5
Full Time Employees	82,536	NA	NA
Accum. Allowance for Doubtful Accts	334.3	376.0	407.7
Filing Date	Mar-08-2018	Feb-27-2019	Feb-27-2019
Restatement Type	NC	RS	O
Currency	USD	USD	USD
Exchange Rate	1.055631796	1.200768492	1.144950767
Conversion Method	H	H	H

S&P Capital IQ

Capital Structure

	2016	2017	2018
Curr. Port. of LT Debt	925.5	860.8	1,345.7
Long-term debt	8,995.0	11,637.1	11,167.2
Minority Interest	1,973.9	3,015.6	2,977.8
Common Equity	5,801.6	7,817.5	7,318.3
Total	**17,696.1**	**23,331.1**	**22,808.9**

	2016	2017	2018
Curr. Port. of LT Debt	5%	3.7%	5.9%
Long-term debt	51%	49.9%	49.0%
Minority Interest	11%	12.9%	13.1%
Common Equity	33%	33.5%	32.1%
Total	**100%**	**100.0%**	**100.0%**

Rev Req Effect of 10 Basis Points of ROE		
Requested Equity % of Capital		50.00%
Change in Equity Cost Rate		0.10%
Weighted Equity Cost Rate Change		0.050%
Net Income Retention Factor		71.1345%
Pretax Weighted Equity Cost Rate Change		0.07%
Requested Rate Base	$	684,955,793
Rev Req: 10 BPS Change in Equity Cost Rate	$	481,451

Rev Req Effect of 1% Change in Equity Ratio					
	Cost Rate	**Ratio**	**Weighted**		**Retention Adj**
Debt	4.59%	-1%	-0.05%		-0.05%
Rate Base				$	684,955,793
After Tax Return					(348,549)
	Cost Rate	**Ratio**	**Weighted**		**Retention Adj**
Equity	10.00%	1%	0.10%		0.14%
Rate Base				$	684,955,793
Rev Req: 1% Change in Equity Ratio					962,902
Total Effect of 1% Change				$	614,353

Retention factor Before Income Taxes	98.2581%
Retention factor After Income Taxes	71.1345%

New York State Allowed ROEs and Common Equity Ratios For Water Companies

#	Company		Term	Type of Outcome	Case #	Staff ROE For 1-Year Rate Plan	Requested ROE	Allowed ROE	Date of Decision	Allowed Equity Ratio	Requested Equity Ratio	Staff Recommended Equity	Cost of STD Approved	Cost of LTD Approved	Preferred Stock
1	Long Island Water Company	LIAW	3-Year	Negotiation	11-W-0200	8.90%	11.50%	9.65%	20-Mar-12	42.00%	43.38%	43.76%		5.81%	4.50%
2	United Water New Rochelle	UWNR	4-Year	Negotiation	09-W-0824	9.60%	11.35%	10.00%	15-Oct-10	45.00%	51.12%	41.30%		6.03%	
3	United Water New York	UWNY	3-Year	Negotiation	09-W-0731	9.80%	11.55%	10.20%	20-Jul-10	45.00%	48.46%	39.00%	2.44%	5.64%	4.70%
4	United Water Westchester	UWW	4-Year	Negotiation	09-W-0828	9.30%	11.40%	10.00%	17-Dec-10	45.00%	51.12%	41.30%		6.03%	
5	New York Water Service Corp.	NYWS	3-Year	Negotiation	09-W-0237	10.30%	10.50%	10.50%	29-Jan-10	46.80%	50.14%	45.70%		5.53%	
6	United Water Owego-Nichols Inc	UWON	3-Year	Negotiation	11-W-0082	10.00%	10.90%	9.58%	21-Mar-12	44.35%	52.20%	39.33%		6.03%	
7	United Water New York	UWNY	3-year	Negotiation	06-W-0131	9.20%	11.10%	9.60%	14-Dec-06	45.68%	45.68%	45.68%	4.33%	5.74%	4.71%
8	United Water New Rochelle	UWNR	3 year	Negotiation	13-W-0539	8.71%	10.55%	9.20%	3-Jul-14	47.00%	53.64%	45.43%			
9	United Water Westchester	UWW	3 year	Negotiation	13-W-0564	8.71%	10.55%	9.20%	3-Jul-14	47.00%	53.64%	45.43%			
10	United Water New York	UWNY	1 year	Litigated	13-W-0295	8.75%	10.85%	9.00%	26-Jun-14	44.00%	52.13%	44.00%		5.07%	
			2-yr option chosen	Option	13-W-0295			9.20%	26-Jun-14	44.00%					
11	Suez Water New York	SWNY	3-Year	Negotiation	16-W-0130	8.50%	9.30%	9.00%	24-Jan-17	46.00%	50.00%	47.00%		5.15%	
12	New York American Water	NYAW	4-Year	Negotiation	16-W-0259	8.55%	10.75%	9.10%	18-May-17	46.00%	48.00%	45.10%		4.39%	
13	SUEZ Water Owego-Nichols	SWON	3-Year	Negotiation	17-W-0528	8.55%	10.25%	8.90%	13-Jan-18	46.00%	54.31%	46.00%			
14	Forest Park	FP	1 year	Negotiation	17-W-0754	8.70%	9.30%	8.70%	13-Jul-18	46.00%	54.31%	46.00%			
	Average					**9.11%**	**10.70%**	**9.46%**		**45.32%**	**50.58%**	**43.93%**	**3.39%**	**5.54%**	**4.64%**
	Consolidated SWNY (Averages Since 2013)					**8.63%**	**9.99%**	**9.00%**		**46.40%**	**53.18%**	**45.97%**		**5.15%**	

PROXY GROUP STATISTICS

	Ratings Moody's	Ratings S&P	2018 % Of Utility Revenue	2018 Equity Ratio 10K	S&P Business Profile	Numerical Business Risk Weighting	S&P Financial Profile	Numerical Financial Risk Weighting	Business Category
Allete, Inc.	Baa1	BBB+	71%	59.20%	Strong	2	Significant	4	Electric
Alliant Energy Corp.	Baa1	A-	99%	44.57%	Excellent	1	Significant	4	Electric & Gas Combo
Ameren Corp.	Baa1	BBB+	100%	47.52%	Excellent	1	Significant	4	Electric & Gas Combo
American Electric Power	Baa1	A-	88%	44.37%	Excellent	1	Significant	4	Electric
Avista Corp.	Baa2	BBB	98%	49.05%	Strong	2	Significant	4	Electric & Gas Combo
Black Hills Corp.	Baa2	BBB+	100%	41.60%	Excellent	1	Significant	4	Electric
CMS Energy Corp.	Baa1	BBB+	94%	29.03%	Excellent	1	Significant	4	Electric & Gas Combo
Consolidated Edison	Baa1	A-	94%	47.34%	Excellent	1	Significant	4	Electric & Gas Combo
Dominion Energy, Inc	Baa2	BBB+	71%	37.56%	Excellent	1	Significant	4	Electric & Gas Combo
Duke Energy Corp.	Baa1	A-	98%	44.55%	Strong	2	Significant	4	Electric & Gas Combo
Edison International	Baa3	BBB	100%	37.81%	Excellent	1	Significant	4	Electric
Entergy Corp.	Baa2	BBB+	87%	34.49%	Excellent	1	Significant	4	Electric
Eversource Energy	Baa1	A+	100%	45.29%	Excellent	1	Intermediate	3	Electric
FirstEnergy Corp.	Baa3	BBB	97%	26.98%	Excellent	1	Aggressive	5	Electric
Hawaiian Electric Industries Inc.	WR	BBB-	89%	53.13%	Strong	2	Significant	4	Electric
IDACORP, Inc.	Baa1	BBB	100%	56.30%	Strong	2	Significant	4	Electric
MGE Energy, Inc.	NR	AA-	100%	62.12%	Excellent	1	Intermediate	3	Electric & Gas Combo
NextEra Energy, Inc	Baa1	A-	71%	50.34%	Excellent	1	Intermediate	3	Electric
NorthWestern Corp.	Baa2	BBB	100%	48.02%	Strong	2	Significant	4	Electric & Gas Combo
OGE Energy Corp.	(P)Baa1	BBB+	100%	55.35%	Excellent	1	Significant	4	Electric & Gas Combo
PNM Resources Inc.	Baa3	BBB+	81%	37.98%	Strong	2	Significant	4	Electric
Pinnacle West Capital Corp.	A3	A-	99%	49.37%	Excellent	1	Significant	4	Electric
Portland General Electric Co.	A3	BBB+	92%	50.24%	Strong	2	Significant	4	Electric
PPL Corp.	Baa2	A-	100%	35.75%	Excellent	1	Significant	4	Electric
Sempra Energy	Baa1	BBB+	86%	34.83%	Strong	2	Significant	4	Electric & Gas Combo
Southern Co. (The)	Baa2	A-	88%	33.69%	Excellent	1	Significant	4	Electric & Gas Combo
WEC Energy Group	Baa1	A-	99%	48.51%	Excellent	1	Significant	4	Electric
Xcel Energy, Inc.	Baa1	A-	99%	42.99%	Excellent	1	Significant	4	Electric & Gas Combo
American Water Works Co. ,Inc.	Baa1	A	87%	43%	Excellent	1	Intermediate	3	Water
American States Water Co.	WR	A+	75%	57%	Excellent	1	Intermediate	3	Water
California Water Service Group	NR	NR	97%	47%	Excellent	1	Intermediate	3	Water
Middlesex Water Co	NR	A	88%	60%	Excellent	1	Intermediate	3	Water
The York Water Company	NR	A-	99%	57%	Excellent	1	Intermediate	3	Water
Median	Baa1	BBB+	**97.38%**	**47.26%**	Excellent	1	Significant	4	
Average of Proxy Group	Baa1	A-	**92.31%**	**45.86%**	Close to Excellent	1.27	Close to Significant	3.8	
				Min	Max				

Excluded from company proxy
Connecticut Water -
included
York Water Co

Sources
Latest Credit Ratings from Standard & Poor's & Moody's Credit Reports
% Utility Revenue from 2018 Annual reports(10K)
2018 Equity Ratios from CapitalIQ, a business sunit of Standard and Poor's
Business & Financial Profiles From Standard & Poor's Latest Credit Reports

Proxy Group Capital Structure as of December 31, 2018

	Company	Current Portion of LTD	Long-term Debt(LTD)	Total LTD	Pref Stock	Minority Interest	Customer Deposits	Total Common Equity(CE)	Total LTD + CE	Total Capitalization	Common Equity Ratio	Moody's Rating	S&P Rating
1	Allete, Inc.	$58	$1,429	$1,486	$0	$0	$0	$2,156	$3,584	$3,642	59.20%	Baa1	BBB+
2	Alliant Energy Corp.	$257	$5,246	$5,503	$0	$200	$0	$4,586	$9,832	$10,289	44.57%	Baa1	A-
3	Ameren Corp.	$573	$7,596	$8,169	$0	$142	$116	$7,631	$15,227	$16,058	47.52%	Baa1	BBB+
4	American Electric Power	$1,699	$21,648	$23,347	$0	$100	$412	$19,028	$40,677	$42,888	44.37%	Baa1	A-
5	Avista Corp.	$105	$1,736	$1,841	$0	$1	$0	$1,773	$3,509	$3,615	49.05%	Baa2	BBB
6	Black Hills Corp.	$6	$2,951	$2,957	$0	$106	$0	$2,182	$5,132	$5,244	41.60%	Baa2	BBB+
7	CMS Energy Corp.	$974	$10,615	$11,589	$0	$37	$0	$4,755	$15,370	$16,381	29.03%	Baa1	BBB+
8	Consolidated Edison	$650	$17,495	$18,145	$0	$113	$351	$16,726	$34,221	$35,335	47.34%	Baa1	A-
9	Dominion Energy, Inc	$3,650	$27,830	$31,480	$0	$1,941	$0	$20,107	$47,937	$53,528	37.56%	Baa2	BBB+
10	Duke Energy Corp.	$3,406	$51,123	$54,529	$0	$17	$0	$43,817	$94,940	$98,363	44.55%	Baa1	A-
11	Edison International	$79	$14,632	$14,711	$0	$2,193	$299	$10,459	$25,091	$27,662	37.81%	Baa3	BBB
12	Entergy Corp.	$650	$15,518	$16,168	$0	$219	$412	$8,844	$24,363	$25,644	34.49%	Baa2	BBB+
13	Eversource Energy	$890	$12,832	$13,722	$0	$156	$0	$11,487	$24,319	$25,364	45.29%	Baa1	A+
14	FirstEnergy Corp.	$485	$17,696	$18,181	$71	$0	$0	$6,743	$24,439	$24,995	26.98%	Baa3	BBB
15	Hawaiian Electric Industries Inc.	$45	$1,828	$1,873	$0	$34	$0	$2,162	$3,990	$4,070	53.13%	WR	BBB-
16	IDACORP, Inc.	$0	$1,835	$1,835	$0	$5	$0	$2,370	$4,205	$4,211	56.30%	Baa1	BBB
17	MGE Energy, Inc.	$5	$493	$498	$0	$0	$0	$817	$1,310	$1,315	62.12%	NR	AA-
18	NextEra Energy, Inc	$2,716	$26,782	$29,498	$0	$3,737	$445	$34,144	$60,926	$67,824	50.34%	Baa1	A-
19	NorthWestern Corp.	$0	$2,102	$2,102	$0	$0	$0	$1,942	$4,045	$4,045	48.02%	Baa2	BBB
20	OGE Energy Corp.	$250	$2,897	$3,147	$0	$0	$84	$4,005	$6,902	$7,236	55.35%	(P)Baa1	BBB+
21	PNM Resources Inc.	$0	$2,670	$2,670	$0	$76	$11	$1,688	$4,358	$4,445	37.98%	Baa3	BBB+
22	Pinnacle West Capital Corp.	$500	$4,638	$5,138	$0	$126	$91	$5,223	$9,861	$10,578	49.37%	A3	A-
23	Portland General Electric Co.	$304	$2,178	$2,482	$0	$0	$0	$2,506	$4,684	$4,988	50.24%	A3	BBB+
24	PPL Corp.	$534	$20,157	$20,691	$0	$0	$257	$11,657	$31,814	$32,605	35.75%	Baa2	A-
25	Sempra Energy	$1,676	$21,795	$23,471	$2,258	$2,110	$0	$14,880	$36,675	$42,719	34.83%	Baa1	BBB+
26	Southern Co. (The)	$3,174	$40,357	$43,531	$0	$4,607	$522	$24,723	$65,080	$73,383	33.69%	Baa2	A-
27	WEC Energy Group	$361	$9,978	$10,338	$0	$54	$0	$9,789	$19,766	$20,181	48.51%	Baa1	A-
28	Xcel Energy, Inc.	$406	$15,803	$16,209	$0	$0	$0	$12,222	$28,025	$28,431	42.99%	Baa1	A-
29	American Water Works Co. ,Inc.	$85	$7,576	$7,661	$0	$0	$0	$5,864	$13,440	$13,525	43.36%	Baa1	A
30	American States Water Co.	$40	$377	$417	$0	$0	$0	$558	$935	$975	57.25%	WR	A+
31	California Water Service Group	$105	$710	$815	$0	$0	$0	$730	$1,440	$1,545	47.26%	NR	NR
32	Middlesex Water Co	$7	$153	$160	$2	$0	$0	$249	$402	$411	60.47%	NR	A
33	The York Water Company	$0	$95	$95	$0	$0	$0	$126	$221	$221	57.01%	NR	A-
	Total	***$23,688***	***$370,771***	***$394,459***	***$2,331***	***$15,974***	***$2,999***	***$295,950***	***$666,721***	***$711,713***		**Baa1**	**BBB+**
	Average	**$718**	**$11,235**	**$11,953**	**$71**	**$484**	**$91**	**$8,968**	**$20,204**	**$21,567**	**45.86%**	**Baa1**	**A-**
	Median	**$304**	**$7,576**	**$7,661**	**$0**	**$34**	**$0**	**$5,223**	**$13,440**	**$13,525**	**47.26%**		

Total Capital= common equity+total debt+minority interest+customer deposits+ prefeferred stock

Total Assets includes Goodwill

Source:

2018 Annual reports(10K) using S&P Capital IQ

S&P Global Ratings

RatingsDirect®

Criteria | Corporates | General:

Corporate Methodology

November 19, 2013

*(**Editor's Note:** We republished this article on April 1, 2019, following the publication of our updated "Corporate Methodology: Ratios And Adjustments," on April 1, 2019, which superseded parts of these criteria, and to make other nonmaterial changes. See the "Revisions And Updates" section for details.)*

1. These criteria present S&P Global Ratings' methodology for rating corporate industrial companies and utilities. The criteria organize the analytical process according to a common framework and articulate the steps in developing the stand-alone credit profile (SACP) and issuer credit rating (ICR) for a corporate entity.
2. This article is related to our criteria article "Principles Of Credit Ratings."

SUMMARY OF THE CRITERIA

3. The criteria describe the methodology we use to determine the SACP and ICR for corporate industrial companies and utilities. Our assessment reflects these companies' business risk profiles, their financial risk profiles, and other factors that may modify the SACP outcome (see "General Criteria: Stand-Alone Credit Profiles: One Component Of A Rating," for the definition of SACP). The criteria provide clarity on how we determine an issuer's SACP and ICR and are more specific in detailing the various factors of the analysis. The criteria also provide clear guidance on how we use these factors as part of determining an issuer's ICR. S&P Global Ratings intends for these criteria to provide the market with a framework that clarifies our approach to fundamental analysis of corporate credit risks.
4. The business risk profile comprises the risk and return potential for a company in the markets in which it participates, the competitive climate within those markets (its industry risk), the country risks within those markets, and the competitive advantages and disadvantages the company has within those markets (its competitive position). The business risk profile affects the amount of financial risk that a company can bear at a given SACP level and constitutes the foundation for a company's expected economic success. We combine our assessments of industry risk, country risk, and competitive position to determine the assessment for a corporation's business risk profile.
5. The financial risk profile is the outcome of decisions that management makes in the context of its business risk profile and its financial risk tolerances. This includes decisions about the manner in which management seeks funding for the company and how it constructs its balance sheet. It also reflects the relationship of the cash flows the organization can achieve, given its business risk profile, to the company's financial obligations. The criteria use cash flow/leverage analysis to determine a corporate issuer's financial risk profile assessment.
6. We then combine an issuer's business risk profile assessment and its financial risk profile

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assessment to determine its anchor (see table 3). Additional rating factors can modify the anchor. These are: diversification/portfolio effect, capital structure, financial policy, liquidity, and management and governance. Comparable ratings analysis is the last analytical factor under the criteria to determine the final SACP on a company.

7. These criteria are complemented by industry-specific criteria called Key Credit Factors (KCFs). The KCFs describe the industry risk assessments associated with each sector and may identify sector-specific criteria that supersede certain sections of these criteria. As an example, the liquidity criteria state that the relevant KCF article may specify different standards than those stated within the liquidity criteria to evaluate companies that are part of exceptionally stable or volatile industries. The KCFs may also define sector-specific criteria for one or more of the factors in the analysis. For example, the analysis of a regulated utility's competitive position is different from the methodology to evaluate the competitive position of an industrial company. The regulated utility KCF will describe the criteria we use to evaluate those companies' competitive positions (see "Key Credit Factors For The Regulated Utility Industry").

SCOPE OF THE CRITERIA

8. This methodology applies to nonfinancial corporate issuer credit ratings globally. Please see "Recovery Rating Criteria For Speculative-Grade Corporate Issuers," and "Reflecting Subordination Risk In Corporate Issue Ratings," for further information on our methodology for determining issue ratings. This methodology does not apply to the following sectors, based on the unique characteristics of these sectors, which require either a different framework of analysis or substantial modifications to one or more factors of analysis: project finance entities, project developers, commodities trading, investment holding companies and companies that maximize their returns by buying and selling equity holdings over time, Japanese general trading companies, corporate securitizations, nonprofit and cooperative organizations (other than agricultural cooperatives, and other entities whose cash flows are primarily derived from partially owned equity holdings.

9. This paragraph has been deleted.

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METHODOLOGY

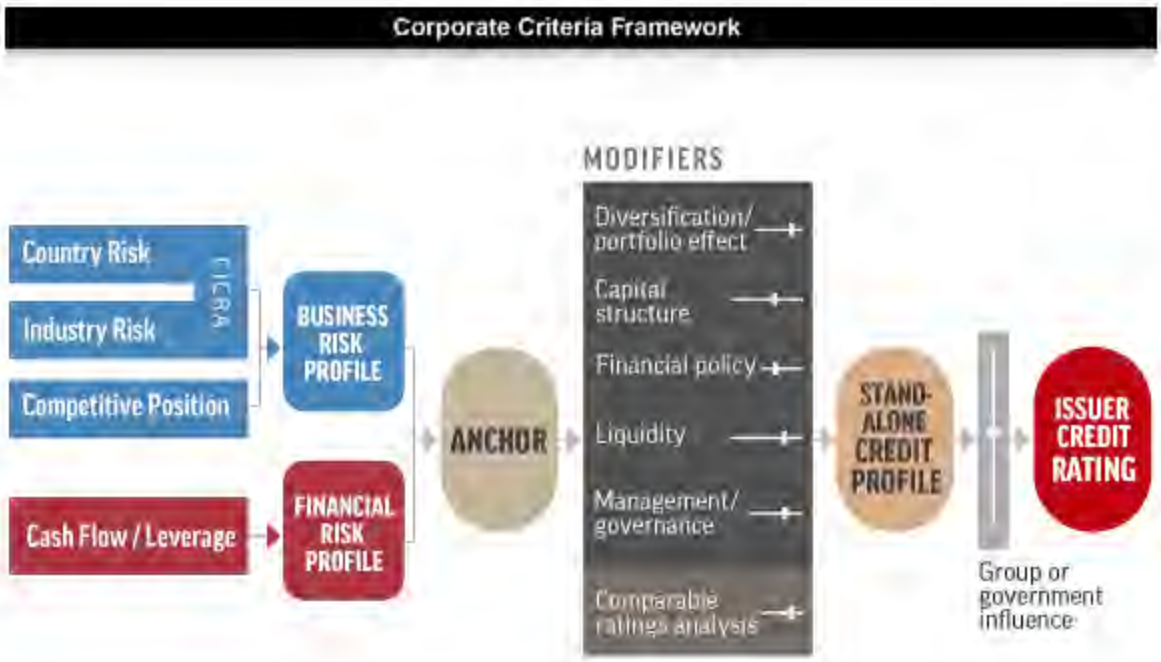
A. Corporate Ratings Framework

11. The corporate analytical methodology organizes the analytical process according to a common framework, and it divides the task into several factors so that S&P Global Ratings considers all salient issues. First we analyze the company's business risk profile, then evaluate its financial risk profile, then combine those to determine an issuer's anchor. We then analyze six factors that could potentially modify our anchor conclusion.

12. To determine the assessment for a corporate issuer's business risk profile, the criteria combine our assessments of industry risk, country risk, and competitive position. Cash flow/leverage analysis determines a company's financial risk profile assessment. The analysis then combines the corporate issuer's business risk profile assessment and its financial risk profile assessment to determine its anchor. In general, the analysis weighs the business risk profile more heavily for investment-grade anchors, while the financial risk profile carries more weight for speculative-grade anchors.

13. After we determine the anchor, we use additional factors to modify the anchor. These factors are: diversification/portfolio effect, capital structure, financial policy, liquidity, and management and governance. The assessment of each factor can raise or lower the anchor by one or more notches--or have no effect. These conclusions take the form of assessments and descriptors for each factor that determine the number of notches to apply to the anchor.

14. The last analytical factor the criteria call for is comparable ratings analysis, which may raise or lower the anchor by one notch based on a holistic view of the company's credit characteristics.



15. The three analytic factors within the business risk profile generally are a blend of qualitative assessments and quantitative information. Qualitative assessments distinguish risk factors, such as a company's competitive advantages, that we use to assess its competitive position. Quantitative information includes, for example, historical cyclicality of revenues and profits that we review when assessing industry risk. It can also include the volatility and level of profitability we consider in order to assess a company's competitive position. The assessments for business risk profile are: 1, excellent; 2, strong; 3, satisfactory; 4, fair; 5, weak; and 6, vulnerable.

16. In assessing cash flow/leverage to determine the financial risk profile, the analysis focuses on quantitative measures. The assessments for financial risk profile are: 1, minimal; 2, modest; 3, intermediate; 4, significant; 5, aggressive; and 6, highly leveraged.

17. The ICR results from the combination of the SACP and the support framework, which determines the extent of the difference between the SACP and the ICR, if any, for group or government influence. Extraordinary influence is then captured in the ICR. Please see "Group Rating Methodology," and "Rating Government-Related Entities: Methodology And Assumptions," for our methodology on group and government influence.

18. Ongoing support or negative influence from a government (for government-related entities), or from a group, is factored into the SACP (see "SACP criteria"). While such ongoing support/negative

influence does not affect the industry or country risk assessment, it can affect any other factor in business or financial risk. For example, such support or negative influence can affect: national industry analysis, other elements of competitive position, financial risk profile, the liquidity assessment, and comparable ratings analysis.

19. The application of these criteria will result in an SACP that could then be constrained by the relevant sovereign rating and transfer and convertibility (T&C) assessment affecting the entity when determining the ICR. In order for the final ICR to be higher than the applicable sovereign rating or T&C assessment, the entity will have to meet the conditions established in "Ratings Above The Sovereign--Corporate And Government Ratings: Methodology And Assumptions."

1. Determining the business risk profile assessment

20. Under the criteria, the combined assessments for country risk, industry risk, and competitive position determine a company's business risk profile assessment. A company's strengths or weaknesses in the marketplace are vital to its credit assessment. These strengths and weaknesses determine an issuer's capacity to generate cash flows in order to service its obligations in a timely fashion.

21. Industry risk, an integral part of the credit analysis, addresses the relative health and stability of the markets in which a company operates. The range of industry risk assessments is: 1, very low risk; 2, low risk; 3, intermediate risk; 4, moderately high risk; 5, high risk; and 6, very high risk. The treatment of industry risk is in section B.

22. Country risk addresses the economic risk, institutional and governance effectiveness risk, financial system risk, and payment culture or rule of law risk in the countries in which a company operates. The range of country risk assessments is: 1, very low risk; 2, low risk; 3, intermediate risk; 4, moderately high risk; 5, high risk; and 6, very high risk. The treatment of country risk is in section C.

23. The evaluation of an enterprise's competitive position identifies entities that are best positioned to take advantage of key industry drivers or to mitigate associated risks more effectively--and achieve a competitive advantage and a stronger business risk profile than that of entities that lack a strong value proposition or are more vulnerable to industry risks. The range of competitive position assessments is: 1, excellent; 2, strong; 3, satisfactory; 4, fair; 5, weak; and 6, vulnerable. The full treatment of competitive position is in section D.

24. The combined assessment for country risk and industry risk is known as the issuer's Corporate Industry and Country Risk Assessment (CICRA). Table 1 shows how to determine the combined assessment for country risk and industry risk.

Table 1

Determining The CICRA

	--Country risk assessment--					
Industry risk assessment	**1 (very low risk)**	**2 (low risk)**	**3 (intermediate risk)**	**4 (moderately high risk)**	**5 (high risk)**	**6 (very high risk)**
1 (very low risk)	1	1	1	2	4	5
2 (low risk)	2	2	2	3	4	5
3 (intermediate risk)	3	3	3	3	4	6
4 (moderately high risk)	4	4	4	4	5	6
5 (high risk)	5	5	5	5	5	6

Table 1

Determining The CICRA (cont.)

	--Country risk assessment--					
Industry risk assessment	**1 (very low risk)**	**2 (low risk)**	**3 (intermediate risk)**	**4 (moderately high risk)**	**5 (high risk)**	**6 (very high risk)**
6 (very high risk)	6	6	6	6	6	6

25. The CICRA is combined with a company's competitive position assessment in order to create the issuer's business risk profile assessment. Table 2 shows how we combine these assessments.

Table 2

Determining The Business Risk Profile Assessment

	--CICRA--					
Competitive position assessment	**1**	**2**	**3**	**4**	**5**	**6**
1 (excellent)	1	1	1	2	3*	5
2 (strong)	1	2	2	3	4	5
3 (satisfactory)	2	3	3	3	4	6
4 (fair)	3	4	4	4	5	6
5 (weak)	4	5	5	5	5	6
6 (vulnerable)	5	6	6	6	6	6

*See paragraph 26.

26. A small number of companies with a CICRA of 5 may be assigned a business risk profile assessment of 2 if all of the following conditions are met:

- The company's competitive position assessment is 1.
- The company's country risk assessment is no riskier than 3.
- The company produces significantly better-than-average industry profitability, as measured by the level and volatility of profits.
- The company's competitive position within its sector transcends its industry risks due to unique competitive advantages with its customers, strong operating efficiencies not enjoyed by the large majority of the industry, or scale/scope/diversity advantages that are well beyond the large majority of the industry.

27. For issuers with multiple business lines, the business risk profile assessment is based on our assessment of each of the factors--country risk, industry risk, and competitive position--as follows:

- Country risk: We use the weighted average of the country risk assessments for the company across all countries where companies generate more than 5% of sales or EBITDA, or where more than 5% of fixed assets are located.
- Industry risk: We use the weighted average of the industry risk assessments for all business lines representing more than 20% of the company's forecasted earnings, revenues or fixed assets, or other appropriate financial measures if earnings, revenue, or fixed assets do not accurately reflect the exposure to an industry.

- Competitive position: We assess all business lines identified above for the components competitive advantage, scope/scale/diversity, and operating efficiency (see section D). They are then blended using a weighted average of revenues, earnings, or assets to form the preliminary competitive position assessment. The level of profitability and volatility of profitability are then assessed based on the consolidated financials for the enterprise. The preliminary competitive position assessment is then blended with the profitability assessment, as per section D.5, to assess competitive position for the enterprise.

2. Determining the financial risk profile assessment

28. Under the criteria, cash flow/leverage analysis is the foundation for assessing a company's financial risk profile. The range of assessments for a company's cash flow/leverage is 1, minimal; 2, modest; 3, intermediate; 4, significant; 5, aggressive; and 6, highly leveraged. The full treatment of cash flow/leverage analysis is the subject of section E.

3. Merger of financial risk profile and business risk profile assessments

29. An issuer's business risk profile assessment and its financial risk profile assessment are combined to determine its anchor (see table 3). If we view an issuer's capital structure as unsustainable or if its obligations are currently vulnerable to nonpayment, and if the obligor is dependent upon favorable business, financial, and economic conditions to meet its commitments on its obligations, then we will determine the issuer's SACP using "Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings." If the issuer meets the conditions for assigning 'CCC+', 'CCC', 'CCC-', and 'CC' ratings, we will not apply Table 3.

Table 3

Combining The Business And Financial Risk Profiles To Determine The Anchor

	--Financial risk profile--					
Business risk profile	**1 (minimal)**	**2 (modest)**	**3 (intermediate)**	**4 (significant)**	**5 (aggressive)**	**6 (highly leveraged)**
1 (excellent)	aaa/aa+	aa	a+/a	a-	bbb	bbb-/bb+
2 (strong)	aa/aa-	a+/a	a-/bbb+	bbb	bb+	bb
3 (satisfactory)	a/a-	bbb+	bbb/bbb-	bbb-/bb+	bb	b+
4 (fair)	bbb/bbb-	bbb-	bb+	bb	bb-	b
5 (weak)	bb+	bb+	bb	bb-	b+	b/b-
6 (vulnerable)	bb-	bb-	bb-/b+	b+	b	b-

30. When two anchor outcomes are listed for a given combination of business risk profile assessment and financial risk profile assessment, an issuer's anchor is determined as follows:

- When a company's financial risk profile is 4 or stronger (meaning, 1-4), its anchor is based on the comparative strength of its business risk profile. We consider our assessment of the business risk profile for corporate issuers to be points along a possible range within its category (e.g., "strong"). Consequently, each of these assessments that ultimately generate the business risk profile for a specific issuer can be at the upper or lower end of such a range. Issuers with a stronger business risk profile for the range of anchor outcomes will be assigned the higher anchor. Those with a weaker business risk profile for the range of anchor outcomes will be assigned the lower anchor.

- When a company's financial risk profile is 5 or 6, its anchor is based on the comparative strength of its financial risk profile. Issuers with stronger cash flow/leverage ratios for the range of anchor outcomes will be assigned the higher anchor. Issuers with weaker cash flow/leverage ratios for the range of anchor outcomes will be assigned the lower anchor. For example, a company with a business risk profile of (1) excellent and a financial risk profile of (6) highly leveraged would generally be assigned an anchor of 'bb+' if its ratio of debt to EBITDA was 8x or greater and there were no offsetting factors to such a high level of leverage.

4. Building on the anchor

31. The analysis of diversification/portfolio effect, capital structure, financial policy, liquidity, and management and governance may raise or lower a company's anchor. The assessment of each modifier can raise or lower the anchor by one or more notches--or have no effect in some cases (see tables 4 and 5). We express these conclusions using specific assessments and descriptors that determine the number of notches to apply to the anchor. However, this notching in aggregate can't lower an issuer's anchor below 'b-' (see "Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings," for the methodology we use to assign 'CCC' and 'CC' category SACPs and ICRs to issuers).

32. The analysis of the modifier diversification/portfolio effect identifies the benefits of diversification across business lines. The diversification/portfolio effect assessments are 1, significant diversification; 2, moderate diversification; and 3, neutral. The impact of this factor on an issuer's anchor is based on the company's business risk profile assessment and is described in Table 4. Multiple earnings streams (which are evaluated within a firm's business risk profile) that are less-than-perfectly correlated reduce the risk of default of an issuer (see Appendix D). We determine the impact of this factor based on the business risk profile assessment because the benefits of diversification are significantly reduced with poor business prospects. The full treatment of diversification/portfolio effect analysis is the subject of section F.

Table 4

Modifier Step 1: Impact Of Diversification/Portfolio Effect On The Anchor

	--Business risk profile assessment--					
Diversification/portfolio effect	**1 (excellent)**	**2 (strong)**	**3 (satisfactory)**	**4 (fair)**	**5 (weak)**	**6 (vulnerable)**
1 (significant diversification)	+2 notches	+2 notches	+2 notches	+1 notch	+1 notch	0 notches
2 (moderate diversification)	+1 notch	+1 notch	+1 notch	+1 notch	0 notches	0 notches
3 (neutral)	0 notches	0 notches	0 notches	0 notches	0 notches	0 notches

33. After we adjust for the diversification/portfolio effect, we determine the impact of the other modifiers: capital structure, financial policy, liquidity, and management and governance. We apply these four modifiers in the order listed in Table 5. As we go down the list, a modifier may (or may not) change the anchor to a new range (one of the ranges in the four right-hand columns in the table). We'll choose the appropriate value from the new range, or column, to determine the next modifier's effect on the anchor. And so on, until we get to the last modifier on the list—management and governance. For example, let's assume that the anchor, after adjustment for diversification/portfolio effect but before adjusting for the other modifiers, is 'a'. If the capital structure assessment is very negative, the indicated anchor drops two notches, to 'bbb+'. So, to determine the impact of the next modifier-—financial policy-—we go to the column 'bbb+ to bbb-' and find the appropriate assessment—in this theoretical example, positive. Applying that assessment moves the anchor up one notch, to the 'a- and higher' category. In our example,

liquidity is strong, so the impact is zero notches and the anchor remains unchanged. Management and governance is satisfactory, and thus the anchor remains 'a-' (see chart following table 5).

Table 5

Modifier Step 2: Impact Of Remaining Modifier Factors On The Anchor

	--Anchor range--			
	'a-' and higher	**'bbb+' to 'bbb-'**	**'bb+' to 'bb-'**	**'b+' and lower**
Factor/Assessment				
Capital structure (see section G)				
1 (Very positive)	2 notches	2 notches	2 notches	2 notches
2 (Positive)	1 notch	1 notch	1 notch	1 notch
3 (Neutral)	0 notches	0 notches	0 notches	0 notches
4 (Negative)	-1 notch	-1 notch	-1 notch	-1 notch
5 (Very negative)	-2 or more notches	-2 or more notches	-2 or more notches	-2 notches
Financial policy (FP; see section H)				
1 (Positive)	+1 notch if M&G is at least satisfactory	+1 notch if M&G is at least satisfactory	+1 notch if liquidity is at least adequate and M&G is at least satisfactory	+1 notch if liquidity is at least adequate and M&G is at least satisfactory
2 (Neutral)	0 notches	0 notches	0 notches	0 notches
3 (Negative)	-1 to -3 notches(1)	-1 to -3 notches(1)	-1 to -2 notches(1)	-1 notch
4 (FS-4, FS-5, FS-6, FS-6 [minus])	N/A(2)	N/A(2)	N/A(2)	N/A(2)
Liquidity (see section I)				
1 (Exceptional)	0 notches	0 notches	0 notches	+1 notch if FP is positive, neutral, FS-4, or FS-5 (3)
2 (Strong)	0 notches	0 notches	0 notches	+1 notch if FP is positive, neutral, FS-4, or FS-5 (3)
3 (Adequate)	0 notches	0 notches	0 notches	0 notches
4 (Less than adequate [4])	N/A	N/A	-1 notch(5)	0 notches
5 (Weak)	N/A	N/A	N/A	'b-' cap on SACP
Management and governance (M&G; see section J)				
1 (Strong)	0 notches	0 notches	0, +1 notches(6)	0, +1 notches(6)
2 (Satisfactory)	0 notches	0 notches	0 notches	0 notches
3 (Fair)	-1 notch	0 notches	0 notches	0 notches
4 (Weak)	-2 or more notches(7)	-2 or more notches(7)	-1 or more notches(7)	-1 or more notches(7)

(1) Number of notches depends on potential incremental leverage. (2) See "Financial Policy," section H.2. (3) Additional notch applies only if we expect liquidity to remain exceptional or strong. (4) See "Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers." SACP is capped at 'bb+.' (5) If issuer SACP is 'bb+' due to cap, there is no further notching. (6) This adjustment is one notch if we have not already captured benefits of strong management and governance in the analysis of the issuer's competitive position. (7) Number of notches depends upon the degree of negative effect to the enterprise's risk profile.

Example: How Remaining Modifiers Can Change The Anchor



*After adjusting for diversification/portfolio effect. See paragraph 33.

34. Our analysis of a firm's capital structure assesses risks in the firm's capital structure that may not arise in the review of its cash flow/leverage. These risks include the currency risk of debt, debt maturity profile, interest rate risk of debt, and an investments subfactor. We assess a corporate issuer's capital structure on a scale of 1, very positive; 2, positive; 3, neutral; 4, negative; and 5, very negative. The full treatment of capital structure is the subject of section G.

35. Financial policy serves to refine the view of a company's risks beyond the conclusions arising from the standard assumptions in the cash flow/leverage, capital structure, and liquidity analyses. Those assumptions do not always reflect or adequately capture the long-term risks of a firm's financial policy. The financial policy assessment is, therefore, a measure of the degree to which owner/managerial decision-making can affect the predictability of a company's financial risk profile. We assess financial policy as 1) positive, 2) neutral, 3) negative, or as being owned by a financial sponsor. We further identify financial sponsor-owned companies as "FS-4", "FS-5", "FS-6", or "FS-6 (minus)." The full treatment of financial policy analysis is the subject of section H.

36. Our assessment of liquidity focuses on the monetary flows--the sources and uses of cash--that are the key indicators of a company's liquidity cushion. The analysis also assesses the potential for a company to breach covenant tests tied to declines in earnings before interest, taxes, depreciation, and amortization (EBITDA). The methodology incorporates a qualitative analysis that addresses such factors as the ability to absorb high-impact, low-probability events, the nature of bank relationships, the level of standing in credit markets, and the degree of prudence of the company's financial risk management. The liquidity assessments are 1, exceptional; 2, strong; 3, adequate; 4, less than adequate; and 5, weak. An SACP is capped at 'bb+' for issuers whose liquidity is less than adequate and 'b-' for issuers whose liquidity is weak, regardless of the assessment of any modifiers or comparable ratings analysis. (For the complete methodology on assessing corporate issuers' liquidity, see "Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers.")

37. The analysis of management and governance addresses how management's strategic competence, organizational effectiveness, risk management, and governance practices shape the company's competitiveness in the marketplace, the strength of its financial risk management, and the robustness of its governance. The range of management and governance assessments is: 1, strong; 2, satisfactory; 3, fair; and 4, weak. Typically, investment-grade anchor outcomes reflect strong or satisfactory management and governance, so there is no incremental benefit. Alternatively, a fair or weak assessment of management and governance can lead to a lower anchor. Also, a strong assessment for management and governance for a weaker entity is viewed as a favorable factor, under the criteria, and can have a positive impact on the final SACP outcome. For the full treatment of management and governance, see "Methodology: Management And Governance Credit Factors For Corporate Entities And Insurers.".

5. Comparable ratings analysis

38. The anchor, after adjusting for the modifiers, could change one notch up or down in order to arrive at an issuer's SACP based on our comparable ratings analysis, which is a holistic review of a company's stand-alone credit risk profile, in which we evaluate an issuer's credit characteristics in aggregate. A positive assessment leads to a one-notch improvement, a negative assessment leads to a one-notch reduction, and a neutral assessment indicates no change to the anchor. The application of comparable ratings analysis reflects the need to 'fine-tune' ratings outcomes, even after the use of each of the other modifiers. A positive or negative assessment is therefore likely to be common rather than exceptional.

B. Industry Risk

39. The analysis of industry risk addresses the major factors that S&P Global Ratings believes affect the risks that entities face in their respective industries. (See "Methodology: Industry Risk.")

C. Country Risk

40. The analysis of country risk addresses the major factors that S&P Global Ratings believes affect the country where entities operate. Country risks, which include economic, institutional and governance effectiveness, financial system, and payment culture/rule of law risks, influence overall credit risks for every rated corporate entity. (See "Country Risk Assessment Methodology And Assumptions.")

1. Assessing country risk for corporate issuers

41. The following paragraphs explain how the criteria determine the country risk assessment for a corporate entity. Once it's determined, we combine the country risk assessment with the issuer's industry risk assessment to calculate the issuer's CICRA (see section A, table 1). The CICRA is one of the factors of the issuer's business risk profile. If an issuer has very low to intermediate exposure to country risk, as represented by a country risk assessment of 1, 2, or 3, country risk is neutral to an issuer's CICRA. But if an issuer has moderately high to very high exposure to country risk, as represented by a country risk assessment of 4, 5, or 6, the issuer's CICRA could be influenced by its country risk assessment.

42. Corporate entities operating within a single country will receive a country risk assessment for that jurisdiction. For entities with exposure to more than one country, the criteria prospectively measure the proportion of exposure to each country based on forecasted EBITDA, revenues, or fixed assets, or other appropriate financial measures if EBITDA, revenue, or fixed assets do not accurately reflect the exposure to that jurisdiction.

43. Arriving at a company's blended country risk assessment involves multiplying its weighted-average exposures for each country by each country's risk assessment and then adding those numbers. For the weighted-average calculation, the criteria consider countries where the company generates more than 5% of its sales or where more than 5% of its fixed assets are located, and all weightings are rounded to the nearest 5% before averaging. We round the assessment to the nearest integer, so a weighted assessment of 2.2 rounds to 2, and a weighted assessment of 2.6 rounds to 3 (see table 6).

Table 6

Hypothetical Example Of Weighted-Average Country Risk For A Corporate Entity

Country	Weighting (% of business*)	Country risk§	Weighted country risk
Country A	45	1	0.45
Country B	20	2	0.4
Country C	15	1	0.15
Country D	10	4	0.4
Country E	10	2	0.2
Weighted-average country risk assessment (rounded to the nearest whole number)	--	--	2

*Using EBITDA, revenues, fixed assets, or other financial measures as appropriate. §On a scale from 1-6, lowest to highest risk.

44. A weak link approach, which helps us calculate a blended country risk assessment for companies with exposure to more than one country, works as follows: If fixed assets are based in a higher-risk country but products are exported to a lower-risk country, the company's exposure would be to the higher-risk country. Similarly, if fixed assets are based in a lower-risk country but export revenues are generated from a higher-risk country and cannot be easily redirected elsewhere, we measure exposure to the higher-risk country. If a company's supplier is located in a higher-risk country, and its supply needs cannot be easily redirected elsewhere, we measure exposure to the higher-risk country. Conversely, if the supply chain can be re-sourced easily to another country, we would not measure exposure to the higher risk country.

45. Country risk can be mitigated for a company located in a single jurisdiction in the following narrow case. For a company that exports the majority of its products overseas and has no direct exposure to a country's banking system that would affect its funding, debt servicing, liquidity, or ability to transfer payments from or to its key counterparties, we could reduce the country risk assessment by one category (e.g., 5 to 4) to determine the adjusted country risk assessment. This would only apply for countries where we considered the financial system risk subfactor a constraint on the overall country risk assessment for that country. For such a company, other country risks are not mitigated: economic risk still applies, albeit less of a risk than for a company that sells domestically (potential currency volatility remains a risk for exporters); institutional and governance effectiveness risk still applies (political risk may place assets at risk); and payment culture/rule of law risk still applies (legal risks may place assets and cross-border contracts at risk).

46. Companies will often disclose aggregated information for blocks of countries, rather than disclosing individual country information. If the information we need to estimate exposure for all countries is not available, we use regional risk assessments. Regional risk assessments are calculated as averages of the unadjusted country risk assessments, weighted by gross domestic product of each country in a defined region. The criteria assess regional risk on a 1-6 scale (strongest to weakest). Please see Appendix A, Table 26, which lists the constituent countries of the regions.

47. If an issuer does not disclose its country-level exposure or regional-level exposure, its individual country risk exposures or regional exposures will be estimated.

2. Adjusting the country risk assessment for diversity

48. We will adjust the country risk assessment for a company that operates in multiple jurisdictions and demonstrates a high degree of diversity of country risk exposures. As a result of this diversification, the company could have less exposure to country risk than the rounded weighted average of its exposures might indicate. Accordingly, the country risk assessment for a corporate entity could be adjusted if an issuer meets the conditions outlined in paragraph 49.

49. The preliminary country risk assessment is raised by one category to reflect diversity if all of the following four conditions are met:

- If the company's head office, as defined in paragraph 51, is located in a country with a risk assessment stronger than the preliminary country risk assessment;
- If no country, with a country risk assessment equal to or weaker than the company's preliminary country risk assessment, represents or is expected to represent more than 20% of revenues, EBITDA, fixed assets, or other appropriate financial measures;
- If the company is primarily funded at the holding level, or through a finance subsidiary in a similar or stronger country risk environment than the holding company, or if any local funding could be very rapidly substituted at the holding level; and
- If the company's industry risk assessment is '4' or stronger.

50. The country risk assessment for companies that have 75% or more exposure to one jurisdiction cannot be improved and will, in most instances, equal the country risk assessment of that jurisdiction. But the country risk assessment for companies that have 75% or more exposure to one jurisdiction can be weakened if the balance of exposure is to higher risk jurisdictions.

51. We consider the location of a corporate head office relevant to overall risk exposure because it influences the perception of a company and its reputation--and can affect the company's access to capital. We determine the location of the head office on the basis of 'de facto' head office operations rather than just considering the jurisdiction of incorporation or stock market listing for public companies. De facto head office operations refers to the country where executive management and centralized high-level corporate activities occur, including strategic planning and capital raising. If such activities occur in different countries, we take the weakest country risk assessment applicable for the countries in which those activities take place.

D. Competitive Position

52. Competitive position encompasses company-specific factors that can add to, or partly offset, industry risk and country risk--the two other major factors of a company's business risk profile.

53. Competitive position takes into account a company's: 1) competitive advantage, 2) scale, scope, and diversity, 3) operating efficiency, and 4) profitability. A company's strengths and weaknesses on the first three components shape its competitiveness in the marketplace and the sustainability or vulnerability of its revenues and profit. Profitability can either confirm our initial assessment of competitive position or modify it, positively or negatively. A stronger-than-industry-average set of competitive position characteristics will strengthen a company's business risk profile. Conversely, a weaker-than-industry-average set of competitive position characteristics will weaken a company's business risk profile.

54. These criteria describe how we develop a competitive position assessment. They provide guidance on how we assess each component based on a number of subfactors. The criteria define the

weighting rules applied to derive a preliminary competitive position assessment. And they outline how this preliminary assessment can be maintained, raised, or lowered based on a company's profitability. S&P Global Ratings' competitive position analysis is both qualitative and quantitative.

1. The components of competitive position

55. A company's competitive position assessment can be: 1, excellent; 2, strong; 3, satisfactory; 4, fair; 5, weak; or 6, vulnerable.

56. The analysis of competitive position includes a review of:

- Competitive advantage;
- Scale, scope, and diversity;
- Operating efficiency; and
- Profitability.

57. We follow four steps to arrive at the competitive position assessment. First, we separately assess competitive advantage; scale, scope, and diversity; and operating efficiency (excluding any benefits or risks already captured in the issuer's CICRA assessment). Second, we apply weighting factors to these three components to derive a weighted-average assessment that translates into a preliminary competitive position assessment. Third, we assess profitability. Finally, we combine the preliminary competitive position assessment and the profitability assessment to determine the final competitive position assessment. Profitability can confirm, or influence positively or negatively, the competitive position assessment.

58. We assess the relative strength of each of the first three components by reviewing a variety of subfactors (see table 7). When quantitative metrics are relevant and available, we use them to evaluate these subfactors. However, our overall assessment of each component is qualitative. Our evaluation is forward-looking; we use historical data only to the extent that they provide insight into future trends.

59. We evaluate profitability by assessing two subcomponents: level of profitability (measured by historical and projected nominal levels of return on capital, EBITDA margin, and/or sector-specific metrics) and volatility of profitability (measured by historically observed and expected fluctuations in EBITDA, return on capital, EBITDA margin, or sector specific metrics). We assess both subcomponents in the context of the company's industry.

Table 7

Competitive Position Components And Subfactors

Component	Explanation	Subfactors
1. Competitive advantage (see Appendix B, section 1)	The strategic positioning and attractiveness to customers of a company's products or services, and the fragility or sustainability of its business model	• Strategy • Differentiation/uniqueness/product positioning/bundling • Brand reputation and marketing • Product and/or service quality • Barriers to entry and customers' switching costs • Technological advantage and capabilities and vulnerability to/ability to drive technological displacement • Asset base characteristics
2. Scale, scope, and diversity (see Appendix B, section 2)	The concentration or diversification of business activities	• Diversity of products or services • Geographic diversity • Volumes, size of markets and revenues, and market share • Maturity of products or services
3. Operating efficiency (see Appendix B, section 3)	The quality and flexibility of a company's asset base and its cost management and structure	• Cost structure • Manufacturing processes • Working capital management • Technology
4. Profitability		• Level of profitability (historical and projected return on capital, EBITDA margin, and/or sector-relevant measure) • Volatility of profitability

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2. Assessing competitive advantage, scale, scope, and diversity, and operating efficiency

60. We assess competitive advantage; scale, scope, and diversity; and operating efficiency as: 1, strong; 2, strong/adequate; 3, adequate; 4, adequate/weak; or 5, weak. Tables 8, 9, and 10 provide guidance for assessing each component.

61. In assessing the components' relative strength, we place significant emphasis on comparative analysis. Peer comparisons provide context for evaluating the subfactors and the resulting component assessment. We review company-specific characteristics in the context of the company's industry, not just its narrower subsector. (See list of industries and subsectors in Appendix B, table 27.) For example, when evaluating an airline, we will benchmark the assessment against peers in the broader transportation-cyclical industry (including the marine and trucking subsectors), and not just against other airlines. Likewise, we will compare a home furnishing manufacturer with other companies in the consumer durables industry, including makers of appliances or leisure products. We might occasionally extend the comparison to other industries if, for instance, a company's business lines cross several industries, or if there are a limited

number of rated peers in an industry, subsector, or region.

62. An assessment of strong means that the company's strengths on that component outweigh its weaknesses, and that the combination of relevant subfactors results in lower-than-average business risk in the industry. An assessment of adequate means that the company's strengths and weaknesses with respect to that component are balanced and that the relevant subfactors add up to average business risk in the industry. A weak assessment means that the company's weaknesses on that component override any strengths and that its subfactors, in total, reveal higher-than-average business risk in the industry.

63. Where a component is not clearly strong or adequate, we may assess it as strong/adequate. A component that is not clearly adequate or weak may end up as adequate/weak.

64. Although we review each subfactor, we don't assess each individually--and we seek to understand how they may reinforce or weaken each other. A component's assessment combines the relative strengths and importance of its subfactors. For any company, one or more subfactors can be unusually important--even factors that aren't common in the industry. Industry KCF articles identify subfactors that are consistently more important, or happen not to be relevant, in a given industry.

65. Not all subfactors may be equally important, and a single one's strength or weakness may outweigh all the others. For example, if notwithstanding a track record of successful product launches and its strong brand equity, a company's strategy doesn't appear adaptable, in our view, to changing competitive dynamics in the industry, we will likely not assess its competitive advantage as strong. Similarly, if its revenues came disproportionately from a narrow product line, we might view this as compounding its risk of exposure to a small geographic market and, thus, assess its scale, scope, and diversity component as weak.

66. From time to time companies will, as a result of shifting industry dynamics or strategies, expand or shrink their product or service lineups, alter their cost structures, encounter new competition, or have to adapt to new regulatory environments. In such instances, we will reevaluate all relevant subfactors (and component assessments).

Table 6

Competitive Advantage Assessment

Qualifier	What it means	Guidance
Strong	• The company has a major competitive advantage due to one or a combination of factors that supports revenue and profit growth, combined with lower-than-average volatility of profits. • There are strong prospects that the company can sustain this advantage over the long term. • This should enable the company to withstand economic downturns and competitive and technological threats better than its competitors can. • Any weaknesses in one or more subfactors are more than offset by strengths in other subfactors that produce sustainable and profitable revenue growth.	• The company's business strategy is highly consistent with, and appropriate to, industry trends and conditions and supports its leadership in the marketplace. • It consistently develops and markets well-differentiated products or services, aligns products with market demand, and enhances the attractiveness or uniqueness of its value proposition through bundling. • Its superior track record of product development, service quality, and customer satisfaction and retention supports its ability to maintain or improve its market share. • Its products or services command a clear price premium relative to its competitors' thanks to its brand equity, technological leadership, or quality of service; it is able to sustain this advantage with innovation and effective marketing. • It benefits from barriers to entry from regulation, market characteristics, or intrinsic benefits (such as patents, technology, or customer relationships) that effectively reduce the threat of new competition. • It has demonstrated a commitment and ability to effectively reinvest in its asset base, as evidenced by a continuous pipeline of new products and/or improvement in key capabilities, such as employee retention, customer care, distribution, and supplier relations. These tangible and intangible assets support long-term prospects of sustainable and profitable growth.
Adequate	• The company has some competitive advantages, but not so large as to create a superior business model or durable benefit compared to its peers'. • It has some but not all drivers of competitiveness. Certain factors support the business' long-term viability and should result in average profitability and average profit volatility during recessions or periods of increased competition. However, these drivers are partially offset by the company's disadvantages or lack of sustainability of other factors.	• The company's strategy is well adapted to marketplace conditions, but it is not necessarily a leader in setting industry trends. • It exhibits neither superior nor subpar abilities with respect to product or service differentiation and positioning. • Its products command no price premium or advantage relative to competing brands as a result of its brand equity or its technological positioning. • It may enjoy some barriers to entry that provide some defense against competitors but don't overpower them. It faces some risk of product/service displacement or substitution longer term. • Its metrics of product or service quality and customer satisfaction or retention are in line with its industry's average. The company could lose customers to competitors if it makes operational missteps. • Its asset profile does not exhibit particularly superior or inferior characteristics compared to other industry participants. These assets generate consistent revenue and profit growth although long-term prospects are subject to some uncertainty.

Weak	• The company has few, if any, competitive advantages and a number of competitive disadvantages. • Because the company lacks many competitive advantages, its long-term prospects are uncertain, and its profit volatility is likely to be higher than average for its industry. • The company is less likely than its competitors to withstand economic, competitive, or technological threats. • Alternatively, the company has weaknesses in one or more subfactors that could keep its profitability below average and its profit volatility above average during economic downturns or periods of increased competition.	• The company's strategy is inconsistent with, or not well adapted to, marketplace trends and conditions. • There is evidence of little innovation, slowness in developing and marketing new products, an inability to raise prices, and/or ineffective bundling. • Its products generally enjoy no price premium relative to competing brands and it often has to sell its products at a lower price than its peers can command. • It has suffered or is at risk of suffering customer defections due to falling quality and because customers perceive its products or services to be less valuable than those of its competitors. • Its revenues and market shares are vulnerable to aggressive pricing by existing or new competitors or to technological displacement risks over the near to medium term. • Its metrics of product or service quality and customer satisfaction or retention are weaker than the industry average. • Its reinvestment in its business is lower than its peers', its ability to retain operational talent is limited, its distribution network is inefficient, and its revenue could stagnate or decline as result.

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Table 9

Scale, Scope, And Diversity

Qualifier	What it means	Guidance
Strong	• The company's overall scale, scope, and diversity supports stable revenues and profits by rendering it essentially invulnerable to all but the most disruptive combinations of adverse factors, events, or trends. • Its significant advantages in scale, scope, and diversity enable it to withstand economic, regional, competitive, and technological threats better than its competitors can.	• The company's range of products or services is among the most comprehensive in its sector. It derives its revenue and profits from a broader set of products or services than the industry average. • Its products and services enjoy industry leading market shares relative to other participants in its industry. • It does not rely on a particular customer or small group of customers. If it does, the customer(s) is/are of high credit quality, their demand is highly sustainable, or the company and its customer(s) have significant interdependence. • It does not depend on any particular supplier or related group of suppliers that it could not easily replace. If it does, the supplier(s) is/are of high credit quality, or the company and its supplier(s) have significant interdependence. • It enjoys broader geographic diversity than its peers and doesn't overly depend on a single regional or local market. If it does, the market is local, often for regulatory reasons. The company's production or service centers are diversified across several locations. • It holds a strategic investment that provides positive business diversification.
Adequate	• The company's overall scale, scope, and diversity is comparable to its peers'. • Its ability to withstand economic, competitive, or technological threats is comparable to the ability of others within its sector.	• The company has a broad range of products or services compared with its competitors and doesn't depend on a particular product or service for the majority of its revenues and profits. • Its market share is average compared with that of its competitors. • Its dependence on or concentration of key customers is no higher than the industry average, and the loss of a top customer would be unlikely to pose a high risk to its business stability. • It isn't overly dependent on any supplier or regional group of suppliers that it couldn't easily replace. • It doesn't depend excessively on a single local or regional market, and its geographic footprint of production and revenue compares with that of other industry participants.

Weak	• The company's lack of scale, scope, and diversity compromises the stability and sustainability of its revenues and profits. • The company's vulnerability to, or reliance on, various elements of scale, scope, and diversity leaves it less likely than its competitors to withstand economic, competitive, or technological threats.	• The company's product or service lineup is somewhat limited compared to those of its sector peers. The company derives its profits from a narrow group of products or services, and has not achieved significant market share compared with its peers. • Demand for its products or services is lower than for its competitors', and this trend isn't improving. • It relies heavily on a particular customer or small group of customers, and the characteristics of the customer base do not mitigate this risk. • It depends on a particular supplier or group of suppliers which it would not be able to easily replace without incurring high switching costs. • It depends disproportionately on a single local or regional economy for selling its goods or services, and the company's industry is global. • Key production assets are concentrated by location, and the company has limited ability to quickly replace them without incurring high costs relative to its profits.

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Table 10

Operating Efficiency Assessment

Qualifier	What it means	Guidance
Strong	• The company maximizes revenues and profits via intelligent use of assets and by minimizing costs and increasing efficiency. • The company's cost structure should enable it to withstand economic downturns better than its peers.	• The company has a lower cost structure than its peers resulting in higher profits or margins even if capacity utilization or demand are well below ideal levels and during down economic and industry cycles. • It has demonstrated its ability to efficiently manage fixed and variable costs in cyclical downturns, and has a history of successful and often ongoing cost reductions programs. • Its capacity utilization is close to optimal at the peak of the industry cycle and outperforms the industry average over the cycle. • It has demonstrated that it can pass along increases in input costs and we expect this will continue. • It has a very high ability to adjust production and labor costs in response to changes in demand without repercussions for product quality, or has demonstrated the ability to operate very profitably in a more costly or less flexible labor environment. • Its suppliers have demonstrated an ability to meet swings in demand without causing bottlenecks or quality issues, and can absorb all but the most severe supply chain disruptions. • It has superior working capital management, as evidenced by a consistently better than-average "cash conversion cycle" and other working capital metrics, supporting higher cash flow and lower funding costs. • Its investments in technology are likely to increase revenue growth and/or improve its cost structure and operating efficiency.

Adequate	• A combination of cost structure and efficiency should support sustainable profits with average profit volatility relative to the company's peers. Its cost structure is similar to its peers'.	• The company has demonstrated the ability to manage some fixed and most variable costs except during periods of extremely weak demand, and has some history of cutting costs in good and bad times. • Its cost structure permits some profitability even if capacity utilization or customer demand is well below ideal levels. The company can at least break even during most of the industry/demand cycle. • Its cost structure is in line with its peers'. For example, its selling, general, and administrative (SG&A) expense as a percent of revenue is similar to its peers' and is likely to be stable. • It has demonstrated an ability to adjust labor costs in most scenarios without hurting product output and quality, or can operate profitability in a more costly or less flexible labor environment; it has some success passing on input cost increases, although perhaps only partially or with time lag. • Its suppliers have met typical swings in demand without causing widespread bottlenecks or quality issues, and the company has some capacity to withstand limited supply chain disruptions. • It has good working capital management, evidenced by its cash conversion cycle and working capital metrics that are on par with its peers'. • Its investments in technology are likely to help it at least maintain its cost structure and current level of operating efficiency.
Weak	• The company's operating efficiency leaves it with lower profitability than its peers' due to lower asset utilization and/or a higher, less flexible cost structure.	• The company's cost structure permits better-than-marginal profitability only if capacity utilization is at the top of the cycle or during periods of strong demand. The company needs solid and sustained industry conditions to generate fair profitability. • It has limited success or capability of managing fixed costs and even most typically variable costs are fixed in the next two to three years. • It has a limited track record of successful cost reductions such as reducing labor costs in the face of swings in demand, or it has limited ability to pass along increases in input costs. • Its costs are higher than its peers'. For example, the company's SG&A expense as a percent of revenue is above that of its peers, and likely to remain so. • Its suppliers may face bottlenecks or quality issues in the event of modest swings in demand, or have limited technological capabilities. There is evidence that a limited supply chain disruption would make it difficult for suppliers to meet their commitments to the company. • Its working capital management is weak, as evidenced by working capital metrics that are significantly worse than those of its peers, resulting in lower cash flow and higher funding costs. • It lacks investments in technology, which could hurt its revenue growth and/or result in a higher cost structure and less efficient operations relative to its peers'.

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3. Determining the preliminary competitive position assessment: Competitive position group profile and category weightings

67. After assessing competitive advantage; scale, scope, and diversity; and operating efficiency, we determine a company's preliminary competitive position assessment by ascribing a specific weight to each component. The weightings depend on the company's Competitive Position Group Profile (CPGP).

68. There are six possible CPGPs: 1) services and product focus, 2) product focus/scale driven, 3) capital or asset focus, 4) commodity focus/cost driven, 5) commodity focus/scale driven, and 6) national industry and utilities (see table 11 for definitions and characteristics).

Table 11

Competitive Position Group Profile (CPGP)

	Definition and characteristics	Examples
Services and product focus	Brands, product quality or technology, and service reputation are typically key differentiating factors for competing in the industry. Capital intensity is typically low to moderate, although supporting the brand often requires ongoing reinvestment in the asset base.	Typically, these are companies in consumer-facing light manufacturing or service industries. Examples include branded drug manufacturers, software companies, and packaged food.
Product focus/scale driven	Product and geographic diversity, as well as scale and market position are key differentiating factors. Sophisticated technology and stringent quality controls heighten risk of product concentration. Product preferences or sales relationships are more important than branding or pricing. Cost structure is relatively unimportant.	The sector most applicable is medical device/equipment manufacturers, particularly at the higher end of the technology scale. These companies largely sell through intermediaries, as opposed to directly to the consumer.
Capital or asset focus	Sizable capital investments are generally required to sustain market position in the industry. Brand identification is of limited importance, although product and service quality often remain differentiating factors.	Heavy manufacturing industries typically fall into this category. Examples include telecom infrastructure manufacturers and semiconductor makers.
Commodity focus/cost driven	Cost position and efficiency of production assets are more important than size, scope, and diversification. Brand identification is of limited importance	Typically, these are companies that manufacture products from natural resources that are used as raw materials by other industries. Examples include forest and paper products companies that harvest timber or produce pulp, packaging paper, or wood products.
Commodity focus/scale driven	Pure commodity companies have little product differentiation, and tend to compete on price and availability. Where present, brand recognition or product differences are secondary or of less importance.	Examples range from pure commodity producers and most oil and gas upstream producers, to some producers with modest product or brand differentiation, such as commodity foods.
National industries and utilities	Government policy or control, regulation, and taxation and tariff policies significantly affect the competitive dynamics of the industry (see paragraphs 72-73).	An example is a water-utility company in an emerging market.

69. The nature of competition and key success factors are generally prescribed by industry characteristics, but vary by company. Where service, product quality, or brand equity are important competitive factors, we'll give the competitive advantage component of our overall assessment a higher weighting. Conversely, if the company produces a commodity product, differentiation comes less into play, and we will more heavily weight scale, scope, and diversity as well as operating efficiency (see table 12).

Table 12

Competitive Position Group Profiles (CPGPs) And Category Weightings

Component	--(%)--					
	Services and product focus	**Product focus/scale driven**	**Capital or asset focus**	**Commodity focus/cost driven**	**Commodity focus/scale driven**	**National industries and utilities**
1. Competitive advantage	45	35	30	15	10	60
2. Scale, scope, and diversity	30	50	30	35	55	20
3. Operating efficiency	25	15	40	50	35	20
Total	100	100	100	100	100	100
Weighted-average assessment*	1.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0

*1 (strong), 2 (strong/adequate), 3 (adequate), 4 (adequate/weak), 5 (weak).

70. We place each of the defined industries (see Appendix B, table 27) into one of the six CPGPs (see above and Appendix B, table 27). This is merely a starting point for the analysis, since we recognize that some industries are less homogenous than others, and that company-specific strategies do affect the basis of competition.

71. In fact, the criteria allow for flexibility in selecting a company's group profile (with its category weightings). Reasons for selecting a profile different than the one suggested in the guidance table could include:

- The industry is heterogeneous, meaning that the nature of competition differs from one subsector to the next, and possibly even within subsectors. The KCF article for the industry will identify such circumstances.
- A company's strategy could affect the relative importance of its key factors of competition.

72. For example, the standard CPGP for the telecom and cable industry is services and product focus. While this may be an appropriate group profile for carriers and service providers, an infrastructure provider may be better analyzed under the capital or asset focus group profile. Other examples: In the capital goods industry, a construction equipment rental company may be analyzed under the capital or asset focus group profile, owing to the importance of efficiently managing the capital spending cycle in this segment of the industry, whereas a provider of hardware, software, and services for industrial automation might be analyzed under the services and product focus group profile, if we believe it can achieve differentiation in the marketplace based on product performance, technology innovation, and service.

73. In some industries, the effects of government policy, regulation, government control, and taxation and tariff policies can significantly alter the competitive dynamics, depending on the country in which a company operates. That can alter our assessment of a company's competitive advantage; scale, size, and diversity; or operating efficiency. When industries in given countries have risks that differ materially from those captured in our global industry risk profile and assessment (see "Methodology: Industry Risk," section B), we will weight competitive advantage more heavily to capture the effect, positive or negative, on competitive dynamics. The assessment of competitive advantage; scale, size, and diversity; and operating efficiency will reflect advantages or disadvantages based on these national industry risk factors. Table 13 identifies the circumstances under which national industry risk factors are positive or negative.

Table 13

National Industry Risk Factors

National industry risk factors are positive	• Government policy including regulation, ownership, and taxation is supportive and has a good track record of mitigating risks to the stability of industry margins. • Any government ownership, tariff, and taxation policy supports growth prospects for revenues and profit generation. • There is very little discernible risk of negative policy, regulatory, ownership, or taxation changes that could threaten business stability.
National industry risk factors are negative	• Government policy and regulation has a weak track record of stabilizing margins and reducing industry risks. • Any government ownership, tariff, and taxation policy undermine growth prospects for revenues and profit generation. • There is an increasing risk of negative policy, ownership, and taxation changes that could undermine industry stability.

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74. When national industry risk factors are positive for a company, typically they support revenue growth, profit growth, higher EBITDA margins, and/or lower-than-average volatility of profits. Often, these benefits provide barriers to entry that impede or even bar new market entrants, which should be reflected in the competitive advantage assessment. These benefits may also include risk mitigants that enable a company to withstand economic downturns and competitive and technological threats better in its local markets than its global competitors can. The scale, scope, and diversity assessment might also benefit from these policies if the company is able to withstand economic, regional, competitive, and technological threats better than its global competitors can. Likewise, the company's operating efficiency assessment may improve if, as a result, it is better able than its global competitors to withstand economic downturns, taking into account its cost structure.

75. Conversely, when national industry risk factors are negative for a company, typically they detract from revenue growth and profit growth, shrink EBITDA margins, and/or increase the average volatility of profits. The company may also have less protection against economic downturns and competitive and technological threats within its local markets than its global competitors do. We may also adjust the company's scale, scope, and diversity assessment lower if, as a result of these policies, it is less able to withstand economic, regional, competitive, and technological threats than its global competitors can. Likewise, we may adjust its operating efficiency assessment lower if, as a result of these policies, it is less able to withstand economic downturns, taking into account the company's cost structure.

76. An example of when we might use a national industry risk factor would be for a telecommunications network owner that benefits from a monopoly network position, supported by substantial capital barriers to entry, and as a result is subject to regulated pricing for its services. Accordingly, in contrast to a typical telecommunications company, our analysis of the company's competitive position would focus more heavily on the monopoly nature of its operations, as well as the nature and reliability of the operator's regulatory framework in supporting future revenue and earnings. If we viewed the regulatory framework as being supportive of the group's future earnings stability, and we considered its monopoly position to be sustainable, we would assess these

national industry risk factors as positive in our assessment of the group's competitive position.

77. The weighted average assessment translates into the preliminary competitive position assessment on a scale of 1 to 6, where one is best. Table 14 describes the matrix we use to translate the weighted average assessment of the three components into the preliminary competitive position assessment.

Table 14

Translation Table For Converting Weighted-Average Assessments Into Preliminary Competitive Position Assessments

Weighted average assessment range	Preliminary competitive position assessment
1.00 – 1.50	1
>1.50 – 2.25	2
>2.25 – 3.00	3
>3.00 – 3.75	4
>3.75 – 4.50	5
>4.50 – 5.00	6

4. Assessing profitability

78. We assess profitability on the same scale of 1 to 6 as the competitive position assessment.

79. The profitability assessment consists of two subcomponents: level of profitability and the volatility of profitability, which we assess separately. We use a matrix to combine these into the final profitability assessment.

a) Level of profitability

80. The level of profitability is assessed in the context of the company's industry. We most commonly measure profitability using return on capital (ROC) and EBITDA margins, but we may also use sector-specific ratios. Importantly, as with the other components of competitive position, we review profitability in the context of the industry in which the company operates, not just in its narrower subsector. (See list of industries and subsectors in Appendix B, table 27.)

81. We assess level of profitability on a three-point scale: above average, average, and below average. We may establish numeric guidance, for instance by stating that an ROC above 12% is considered above average, between 8%-12% is average, and below 8% is below average for the industry, or by differentiating between subsectors in the industry. In the absence of numeric guidance, we compare a company against its peers across the industry. When establishing numeric guidance for assessing profitability within an industry or subsector, we typically consider the distribution of profitability measures across rated issuers in the sector. Depending on the shape of the distribution, we choose logical breakpoints between above average, average, and below average profitability. For instance, for a distribution that resembles a normal curve, we typically assess the top quartile of the relevant profitability indicator to be above average, the two middle quartiles average, and the bottom quartile below average. For a relatively flat distribution curve, we typically assess the top third to be above average, the middle third to be average, and the bottom third to be below average. We also may take averages of historical data or adjust the thresholds between the three ranges to consider factors such as variation over the business cycle and across regions. Finally, we may incorporate our expertise in the sector to adjust for underlying M&A trends or

other distortions, as appropriate.

82. We calculate profitability ratios generally based on a five-year average, consisting of two years of historical data, our projections for the current year (incorporating any reported year-to-date results and estimates for the remainder of the year), and the next two financial years. There may be situations where we consider longer or shorter historical results or forecasts, depending on such factors as availability of financials, transformational events (such as mergers or acquisitions [M&A]), cyclical distortion (such as peak or bottom of the cycle metrics that we do not deem fully representative of the company's level of profitability), and we take into account improving or deteriorating trends in profitability ratios in our assessment.

b) Volatility of profitability

83. We base the volatility of profitability on the standard error of the regression (SER) for a company's historical EBITDA, EBITDA margins, or return on capital. The KCF articles provide guidance on which measures are most appropriate for a given industry or set of companies. For each of these measures, we divide the standard error by the average of that measure over the time period in order to ensure better comparability across companies.

84. The SER is a statistical measure that is an estimate of the deviation around a 'best fit' linear trend line. We regress the company's EBITDA, EBITDA margins, or return on capital against time. A key advantage of SER over standard deviation or coefficient of variation is that it doesn't view upwardly trending data as inherently more volatile. At the same time, we recognize that SER, like any statistical measure, may understate or overstate expected volatility and thus we will make qualitative adjustments where appropriate (see paragraphs 86-90). Furthermore, we only calculate SER when companies have at least seven years of historical annual data and have not significantly changed their line of business during the timeframe, to ensure that the results are meaningful.

85. As with the level of profitability, we evaluate a company's SER in the context of its industry group. For most industries, we establish a six-point scale with 1 capturing the least volatile companies, i.e., those with the lowest SERs, and 6 identifying companies whose profits are most volatile. We have established industry-specific SER parameters using the most recent seven years of data for companies within each sector. We believe that seven years is generally an adequate number of years to capture a business cycle. (See Appendix B, section 4 for industry-specific SER parameters.) For companies whose business segments cross multiple industries, we evaluate the SER in the context of the organization's most dominant industry--if that industry represents at least two-thirds of the organization's EBITDA, sales, or other relevant metric. If the company is a conglomerate and no dominant industry can be identified, we will evaluate its profit volatility in the context of SER guidelines for all nonfinancial companies.

86. In certain circumstances, the SER derived from historical information may understate--or overstate--expected future volatility, and we may adjust the assessment downward or upward. The scope of possible adjustments depends on certain conditions being met as described below.

87. We might adjust the SER-derived volatility assessment to a worse assessment (i.e., to a higher assessment for greater volatility) by up to two categories if the expected level of volatility isn't apparent in historical numbers, and the company either:

- Has a weighted country risk assessment of 4 or worse, which may, notwithstanding past performance, result in a less stable business environment going forward;
- Operates in a subsector of the industry that may be prone to higher technology or regulation changes, or other potential disruptive risks that have not emerged over the seven year period;

- Is of limited size and scope, which will often result in inherently greater vulnerability to external changes; or
- Has pursued material M&A or internal growth projects that obscure the company's underlying performance trend line. As an example, a company may have consummated an acquisition during the trough of the cycle, masking what would otherwise be a significant decline in performance.

88. The choice of one or two categories depends on the degree of likelihood that the related risks will materialize and our view of the likely severity of these risks.

89. Conversely, we may adjust the SER-derived volatility assessment to a better assessment (i.e., to a lower assessment reflecting lower volatility) by up to two categories if we observe that the conditions historically leading to greater volatility have receded and are misrepresentative. This will be the case when:

- The company grew at a moderately faster, albeit more uneven, pace relative to the industry. Since we measure volatility around a linear trend line, a company growing at a constant percentage of moderate increase (relative to the industry) or an uneven pace (e.g., due to "lumpy" capital spending programs) could receive a relatively unfavorable assessment on an unadjusted basis, which would not be reflective of the company's performance in a steady state. (Alternatively, those companies that grow at a significantly higher-than-average industry rate often do so on unsustainable rates of growth or by taking on high-risk strategies. Companies with these high-risk growth strategies would not receive a better assessment and could be adjusted to a worse assessment;)
- The company's geographic, customer, or product diversification has increased in scope as a result of an acquisition or rapid expansion (e.g. large, long-term contracts wins), leading to more stability in future earnings in our view; or
- The company's business model is undergoing material change that we expect will benefit earnings stability, such as a new regulatory framework or major technology shift that is expected to provide a significant competitive hedge and margin protection over time.

90. The choice of one or two categories depends on the degree of likelihood that the related risks will materialize and our view of the likely severity of these risks.

91. If the company either does not have at least seven years of annual data or has materially changed its business lines or undertaken abnormally high levels of M&A during this time period, then we do not use its SER to assess the volatility of profitability. In these cases, we use a proxy to establish the volatility assessment. If there is a peer company that has, and is expected to continue having, very similar profitability volatility characteristics, we use the SER of that peer entity as a proxy.

92. If no such matching peer exists, or one cannot be identified with enough confidence, we perform an assessment of expected volatility based on the following rules:

- An assessment of 3 if we expect the company's profitability, supported by available historical evidence, will exhibit a volatility pattern in line with, or somewhat less volatile than, the industry average.
- An assessment of 2 based on our confidence, supported by available historical evidence, that the company will exhibit lower volatility in profitability metrics than the industry's average. This could be underpinned by some of the factors listed in paragraph 89, whereas those listed in paragraph 87 would typically not apply.
- An assessment of 4 or 5 based on our expectation that profitability metrics will exhibit

somewhat higher (4), or meaningfully higher (5) volatility than the industry, supported by available historical evidence, or because of the applicability of possible adjustment factors listed in paragraph 87.

- Assessments of either 1 or 6 are rarely assigned and can only be achieved based on a combination of data evidence and very high confidence tests. For an assessment of 1, we require strong evidence of minimal volatility in profitability metrics compared with the industry, supported by at least five years of historical information, combined with a very high degree of confidence that this will continue in the future, including no country risk, subsector risk or size considerations that could otherwise warrant a worse assessment as per paragraph 87. For an assessment of 6 we require strong evidence of very high volatility in profitability metrics compared with the industry, supported by at least five years of historical information and very high confidence that this will continue in the future.

93. Next, we combine the level of profitability assessment with the volatility assessment to determine the final profitability assessment using the matrix in Table 15.

Table 15

Profitability Assessment

	--Volatility of profitability assessment--					
Level of profitability assessment	**1**	**2**	**3**	**4**	**5**	**6**
Above average	1	1	2	3	4	5
Average	1	2	3	4	5	6
Below average	2	3	4	5	6	6

5. Combining the preliminary competitive position assessment with profitability

94. The fourth and final step in arriving at a competitive position assessment is to combine the preliminary competitive position assessment with the profitability assessment. We use the combination matrix in Table 16, which shows how the profitability assessment can confirm, strengthen, or weaken (by up to one category) the overall competitive position assessment.

Table 16

Combining The Preliminary Competitive Position Assessment And Profitability Assessment

	--Preliminary competitive position assessment--					
Profitability assessment	**1**	**2**	**3**	**4**	**5**	**6**
1	1	2	2	3	4	5
2	1	2	3	3	4	5
3	2	2	3	4	4	5
4	2	3	3	4	5	5
5	2	3	4	4	5	6
6	2	3	4	5	5	6

95. We generally expect companies with a strong preliminary competitive position assessment to

exhibit strong and less volatile profitability metrics. Conversely, companies with a relatively weaker preliminary competitive position assessment will generally have weaker and/or more volatile profitability metrics. Our analysis of profitability helps substantiate whether management is translating any perceived competitive advantages, diversity benefits, and cost management measures into higher earnings and more stable return on capital and return on sales ratios than the averages for the industry. When profitability differs markedly from what the preliminary/anchor competitive position assessment would otherwise imply, we adjust the competitive position assessment accordingly.

96. Our method of adjustment is biased toward the preliminary competitive position assessment rather than toward the profitability assessment (e.g., a preliminary competitive assessment of 6 and a profitability assessment of 1 will result in a final assessment of 5).

E. Cash Flow/Leverage

97. The pattern of cash flow generation, current and future, in relation to cash obligations is often the best indicator of a company's financial risk. The criteria assess a variety of credit ratios, predominately cash flow-based, which complement each other by focusing on the different levels of a company's cash flow waterfall in relation to its obligations (i.e., before and after working capital investment, before and after capital expenditures, before and after dividends), to develop a thorough perspective. Moreover, the criteria identify the ratios that we think are most relevant to measuring a company's credit risk based on its individual characteristics and its business cycle.

98. For the analysis of companies with intermediate or stronger cash flow/leverage assessments (a measure of the relationship between the company's cash flows and its debt obligations as identified in paragraphs 106 and 124), we primarily evaluate cash flows that reflect the considerable flexibility and discretion over outlays that such companies typically possess. For these entities, the starting point in the analysis is cash flows before working capital changes plus capital investments in relation to the size of a company's debt obligations in order to assess the relative ability of a company to repay its debt. These "leverage" or "payback" cash flow ratios are a measure of how much flexibility and capacity the company has to pay its obligations.

99. For entities with significant or weaker cash flow/leverage assessments (as identified in paragraphs 105 and 124), the criteria also call for an evaluation of cash flows in relation to the carrying cost or interest burden of a company's debt. This will help us assess a company's relative and absolute ability to service its debt. These "coverage"- or "debt service"-based cash flow ratios are a measure of a company's ability to pay obligations from cash earnings and the cushion the company possesses through stress periods. These ratios, particularly interest coverage ratios, become more important the further a company is down the credit spectrum.

1. Assessing cash flow/leverage

100. Under the criteria, we assess cash flow/leverage as 1, minimal; 2, modest; 3, intermediate; 4, significant; 5, aggressive; or 6, highly leveraged. To arrive at these assessments, the criteria combine the assessments of a variety of credit ratios, predominately cash flow-based, which complement each other by focusing attention on the different levels of a company's cash flow waterfall in relation to its obligations. For each ratio, there is an indicative cash flow/leverage assessment that corresponds to a specified range of values in one of three given benchmark tables (see tables 17, 18, and 19). We derive the final cash flow/leverage assessment for a company by determining the relevant core ratios, anchoring a preliminary cash flow assessment based on the relevant core ratios, determining the relevant supplemental ratio(s), adjusting the preliminary cash flow assessment according to the relevant supplemental ratio(s), and, finally,

modifying the adjusted cash flow/leverage assessment for any material volatility.

2. Core and supplemental ratios

a) Core ratios

101. For each company, we calculate two core credit ratios--funds from operations (FFO) to debt and debt to EBITDA--in accordance with S&P Global Ratings' ratios and adjustments criteria (see "Corporate Methodology: Ratios And Adjustments"). We compare these payback ratios against benchmarks to derive the preliminary cash flow/leverage assessment for a company. These ratios are also useful in determining the relative ranking of the financial risk of companies.

b) Supplemental ratios

102. The criteria also consider one or more supplemental ratios (in addition to the core ratios) to help develop a fuller understanding of a company's financial risk profile and fine-tune our cash flow/leverage analysis. Supplemental ratios could either confirm or adjust the preliminary cash flow/leverage assessment. The confirmation or adjustment of the preliminary cash flow/leverage assessment will depend on the importance of the supplemental ratios as well as any difference in indicative cash flow/leverage assessment between the core and supplemental ratios as described in section E.3.b.

103. The criteria typically consider five standard supplemental ratios, although the relevant KCF criteria may introduce additional supplemental ratios or focus attention on one or more of the standard supplemental ratios. The standard supplemental ratios include three payback ratios--cash flow from operations (CFO) to debt, free operating cash flow (FOCF) to debt, and discretionary cash flow (DCF) to debt--and two coverage ratios, FFO plus interest paid to cash interest paid and EBITDA to interest.

104. The criteria provide guidelines as to the relative importance of certain ratios if a company exhibits characteristics such as high leverage, working capital intensity, capital intensity, or high growth.

105. If the preliminary cash flow/leverage assessment is significant or weaker (see section E.3), then two coverage ratios, FFO plus cash interest paid to cash interest paid and EBITDA to interest, will be given greater importance as supplemental ratios. For the definition of these metrics please see "Corporate Methodology: Ratios And Adjustments".

106. If the preliminary cash flow/leverage assessment is intermediate or stronger, the criteria first apply the three standard supplemental ratios of CFO to debt, FOCF to debt, and DCF to debt. When FOCF to debt and DCF to debt indicate a cash flow/leverage assessment that is lower than the other payback-ratio-derived cash flow/leverage assessments, it signals that the company has either larger than average capital spending or other non-operating cash distributions (including dividends). If these differences persist and are consistent with a negative trend in overall ratio levels, which we believe is not temporary, then these supplemental leverage ratios will take on more importance in the analysis.

107. If the supplemental ratios indicate a cash flow/leverage assessment that is different than the preliminary cash flow/leverage assessment, it could suggest an unusual debt service or fixed charge burden, working capital or capital expenditure profile, or unusual financial activity or policies. In such cases, we assess the sustainability or persistence of these differences. For example, if either working capital or capital expenditures are unusually low, leading to better indicated assessments, we examine the sustainability of such lower spending in the context of its

impact on the company's longer term competitive position. If there is a deteriorating trend in the company's asset base, we give these supplemental ratios less weight. If either working capital or capital expenditures are unusually high, leading to weaker indicated assessments, we examine the persistence and need for such higher spending. If elevated spending levels are required to maintain a company's competitive position, for example to maintain the company's asset base, we give more weight to these supplemental ratios.

108. For capital-intensive companies, EBITDA and FFO may overstate financial strength, whereas FOCF may be a more accurate reflection of their cash flow in relation to their financial obligations. The criteria generally consider a capital-intensive company as having ongoing capital spending to sales of greater than 10%, or depreciation to sales of greater than 8%. For these companies, the criteria place more weight on the supplementary ratio of FOCF to debt. Where we place more analytic weight on FOCF to debt, we also seek to estimate the amount of maintenance or full cycle capital required (see Appendix C) under normal conditions (we estimate maintenance or full-cycle capital expenditure required because this is not a reported number). The FOCF figure may be adjusted by adding back estimated discretionary capital expenditures. The adjusted FOCF to debt based on maintenance or full cycle capital expenditures often helps determine how much importance to place on this ratio. If both the FOCF to debt and the adjusted (for estimated discretionary capital spending) FOCF to debt derived assessments are different from the preliminary cash/flow leverage assessment, then these supplemental leverage ratios take on more importance in the analysis.

109. For working-capital-intensive companies, EBITDA and FFO may also overstate financial strength, and CFO may be a more accurate measure of the company's cash flow in relation to its financial risk profile. Under the criteria, if a company has a working capital-to-sales ratio that exceeds 25% or if there are significant seasonal swings in working capital, we generally consider it to be working-capital-intensive. For these companies, the criteria place more emphasis on the supplementary ratio of CFO to debt. Examples of companies that have working-capital-intensive characteristics can be found in the capital goods, metals and mining downstream, or the retail and restaurants industries. The need for working capital in those industries reduces financial flexibility and, therefore, these supplemental leverage ratios take on more importance in the analysis.

110. For all companies, when FOCF to debt or DCF to debt is negative or indicates materially lower cash flow/leverage assessments, the criteria call for an examination of management's capital spending and cash distribution strategies. For high-growth companies, typically the focus is on FFO to debt instead of FOCF to debt because the latter ratio can vary greatly depending on the growth investment the company is undergoing. The criteria generally consider a high-growth company one that exhibits real revenue growth in excess of 8% per year. Real revenue growth excludes price or foreign exchange related growth, under these criteria. In cases where FOCF or DCF is low, there is a greater emphasis on monitoring the sustainability of margins and return on capital and the overall financing mix to assess the likely trend of future debt ratios. In addition, debt service ratio analysis will be important in such situations. For companies with more moderate growth, the focus is typically on FOCF to debt unless the capital spending is short term or is not funded with debt.

111. For companies that have ongoing and well entrenched banking relationships we can reflect these relationships in our cash flow/leverage analysis through the use of the interest coverage ratios as supplemental ratios. These companies generally have historical links and a strong ongoing relationship with their main banks, as well as shareholdings by the main banks, and management influence and interaction between the main banks and the company. Based on their bank relationships, these companies often have lower interest servicing costs than peers, even if the macro economy worsens. In such cases, we generally use the interest coverage ratios as

supplemental ratios. This type of banking relationship occurs in Japan, for example, where companies that have the type of bank relationship described in this paragraph tend to have a high socioeconomic influence within their country by way of their revenue size, total debt quantum, number of employees, and the relative importance of the industry.

c) Time horizon and ratio calculation

112. A company's credit ratios may vary, often materially, over time due to economic, competitive, technological, or investment cycles, the life stage of the company, and corporate or strategic actions. Thus, we evaluate credit ratios on a time series basis with a clear forward-looking bias. The length of the time series is dependent on the relative credit risk of the company and other qualitative factors and the weighting of the time series varies according to transformational events. A transformational event is any event that could cause a material change in a company's financial profile, whether caused by changes to the company's capital base, capital structure, earnings, cash flow profile, or financial policies. Transformational events can include mergers, acquisitions, divestitures, management changes, structural changes to the industry or competitive environment, and/or product development and capital programs. This section provides guidance on the timeframe and weightings the criteria apply to calculate the indicative ratios.

113. The criteria generally consider the company's credit ratios for the previous one to two years, current-year forecast, and the two subsequent forecasted financial years. There may be situations where longer--or even shorter--historical results or forecasts are appropriate, depending on such factors as availability of financials, transformational events, or relevance. For example, a utility company with a long-term capital spending program may lend itself to a longer-term forecast, whereas for a company experiencing a near-term liquidity squeeze even a two-year forecast will have limited value. Alternatively, for most commodities-based companies we emphasize credit ratios based on our forward-looking view of market conditions, which may differ materially from the historical period.

114. Historical patterns in cash flow ratios are informative, particularly in understanding past volatility, capital spending, growth, accounting policies, financial policies, and business trends. Our analysis starts with a review of these historical patterns in order to assess future expected credit quality. Historical patterns can also provide an indication of potential future volatility in ratios, including that which results from seasonality or cyclicality. A history of volatility could result in a more conservative assessment of future cash flow generation if we believe cash flow will continue to be volatile.

115. The forecast ratios are based on an expected base-case scenario developed by S&P Global Ratings, incorporating current and near-term economic conditions, industry assumptions, and financial policies. The prospective cyclical and longer-term volatility associated with the industry in which the issuer operates is addressed in the industry risk criteria (see section B) and the longer-term directional influence or event risk of financial policies is addressed in our financial policy criteria (see section H).

116. The criteria generally place greater emphasis on forecasted years than historical years in the time series of credit ratios when calculating the indicative credit ratio. For companies where we have five years of ratios as described in section E.3, generally we calculate the indicative ratio by weighting the previous two years, the current year, and the forecasted two years as 10%, 15%, 25%, 25%, and 25%, respectively.

117. This weighting changes, however, to place even greater emphasis on the current and forecast years when:

- The issuer meets the characteristics described in paragraph 113, and either shorter- or longer-term forecasts are applicable. The weights applied will generally be quite forward weighted, particularly if a company is undergoing a transformational event and there is moderate or better cash flow certainty.
- The issuer is forecast to generate negative cash flow available for debt repayment, which we believe could lead to deteriorating credit metrics. Forecast negative cash flows could be generated from operating activities as well as capital expenditures, share buybacks, dividends, or acquisitions, as we forecast these uses of cash based on the company's track record, market conditions, or financial policy. The weights applied will generally be 30%, 40%, and 30% for the current and two subsequent years, respectively.
- The issuer is in an industry that is prospectively volatile or that has a high degree of cash flow uncertainty. Industries that are prospectively volatile are industries whose competitive risk and growth assessments are either high risk (5) or very high risk (6) or whose overall industry risk assessments are either high risk (5) or very high risk (6). The weights applied will generally be 50% for the current year and 50% for the first subsequent forecast year.

118. When the indicative ratio(s) is borderline (i.e., less than 10% different from the threshold in relative terms) between two assessment thresholds (as described in section E.3 and tables 17, 18, and 19) and the forecast points to a switch in the ratio between categories during the rating timeframe, we will weigh the forecast even more heavily in order to prospectively capture the trend.

119. For companies undergoing a transformational event, the weighting of the time series could vary significantly.

120. For companies undergoing a transformational event and with significant or weaker cash flow/leverage assessments, we place greater weight on near-term risk factors. That's because overemphasis on longer-term (inherently less predictable) issues could lead to some distortion when assessing the risk level of a speculative-grade company. We generally analyze a company using the arithmetic mean of the credit ratios expected according to our forecasts for the current year (or pro forma current year) and the subsequent financial year. A common example of this is when a private equity firm acquires a company using additional debt leverage, which makes historical financial ratios meaningless. In this scenario, we weight or focus the majority of our analysis on the next one or two years of projected credit measures.

3. Determining the cash flow/leverage assessment

a) Identifying the benchmark table

121. Tables 17, 18, and 19 provide benchmark ranges for various cash flow ratios we associate with different cash flow/leverage assessments for standard volatility, medial volatility, and low volatility industries. The tables of benchmark ratios differ for a given ratio and cash flow/leverage assessment along two dimensions: the starting point for the ratio range and the width of the ratio range.

122. If an industry exhibits low volatility, the threshold levels for the applicable ratios to achieve a given cash flow/leverage assessment are less stringent than those in the medial or standard volatility tables, although the range of the ratios is narrower. Conversely, if an industry exhibits medial or standard levels of volatility, the threshold for the applicable ratios to achieve a given cash flow/leverage assessment are elevated, albeit with a wider range of values.

123. The relevant benchmark table for a given company is based on our assessment of the company's associated industry and country risk volatility, or the CICRA (see section A, table 1). The low volatility table (table 19) will generally apply when a company's CICRA is 1, unless otherwise indicated in a sector's KCF criteria. The medial volatility table (table 18) will be used under certain circumstances for companies with a CICRA of 1 or 2. Those circumstances are described in the respective sectors' KCF criteria. The standard volatility table (table 17) serves as the relevant benchmark table for companies with a CICRA of 2 or worse, and we will always use it for companies with a CICRA of 1 or 2 and whose competitive position is assessed 5 or 6. Although infrequent, we will use the low volatility table when a company's CICRA is 2 for companies that exhibit or are expected to exhibit low levels of volatility. The choice of volatility tables for companies with a CICRA of 2 is addressed in the respective sector's KCF article.

Table 17

Cash Flow/Leverage Analysis Ratios--Standard Volatility

	--Core ratios--		--Supplementary coverage ratios--		--Supplementary payback ratios--		
	FFO/debt (%)	Debt/EBITDA (x)	FFO/cash interest(x)	EBITDA/interest (x)	CFO/debt (%)	FOCF/debt (%)	DCF/debt (%)
Minimal	60+	Less than 1.5	More than 13	More than 15	More than 50	40+	25+
Modest	45-60	1.5-2	9-13	10-15	35-50	25-40	15-25
Intermediate	30-45	2-3	6-9	6-10	25-35	15-25	10-15
Significant	20-30	3-4	4-6	3-6	15-25	10-15	5-10
Aggressive	12-20	4-5	2-4	2-3	10-15	5-10	2-5
Highly leveraged	Less than 12	Greater than 5	Less than 2	Less than 2	Less than 10	Less than 5	Less than 2

Table 18

Cash Flow/Leverage Analysis Ratios--Medial Volatility

	--Core ratios--		--Supplementary coverage ratios--		--Supplementary payback ratios--		
	FFO/debt (%)	Debt/EBITDA (x)	FFO/cash interest (x)	EBITDA/interest (x)	CFO/debt (%)	FOCF/debt (%)	DCF/debt (%)
Minimal	50+	less than 1.75	10.5+	14+	40+	30+	18+
Modest	35-50	1.75-2.5	7.5-10.5	9-14	27.5-40	17.5-30	11-18
Intermediate	23-35	2.5-3.5	5-7.5	5-9	18.5-27.5	9.5-17.5	6.5-11
Significant	13-23	3.5-4.5	3-5	2.75-5	10.5-18.5	5-9.5	2.5-6.5
Aggressive	9-13	4.5-5.5	1.75-3	1.75-2.75	7-10.5	0-5	(11)-2.5
Highly leveraged	Less than 9	Greater than 5.5	Less than 1.75	Less than 1.75	Less than 7	Less than 0	Less than (11)

Table 19

Cash Flow/Leverage Analysis Ratios--Low Volatility

	--Core ratios--		--Supplementary coverage ratios--		--Supplementary payback ratios--		
	FFO/debt (%)	Debt/EBITDA (x)	FFO/cash interest (x)	EBITDA/interest (x)	CFO/debt (%)	FOCF/debt (%)	DCF/debt (%)
Minimal	35+	Less than 2	More than 8	More than 13	More than 30	20+	11+
Modest	23-35	2-3	5-8	7-13	20-30	10-20	7-11
Intermediate	13-23	3-4	3-5	4-7	12-20	4-10	3-7
Significant	9-13	4-5	2-3	2.5-4	8-12	0-4	0-3
Aggressive	6-9	5-6	1.5-2	1.5-2.5	5-8	(10)-0	(20)-0
Highly leveraged	Less than 6	Greater than 6	Less than 1.5	Less than 1.5	Less than 5	Less than (10)	Less than (20)

b) Aggregating the credit ratio assessments

124. To determine the final cash flow/leverage assessment, we make these calculations:

1) First, calculate a time series of standard core and supplemental credit ratios, select the relevant benchmark table, and determine the appropriate time weighting of the credit ratios.

- Calculate the two standard core credit ratios and the five standard supplemental credit ratios over a five-year time horizon.
- Consult the relevant industry KCF article (if applicable), which may identify additional supplemental ratio(s). The relevant benchmark table for a given company is based on our assessment of the company's associated industry and country risk volatility, or the CICRA.
- Calculate the appropriate weighted average cash flow/leverage ratios. If the company is undergoing a transformational event, then the core and supplemental ratios will typically be calculated based on S&P Global Ratings' projections for the current and next one or two financial years.

2) Second, we use the core ratios to determine the preliminary cash flow assessment.

- Compare the core ratios (FFO to debt and debt to EBITDA) to the ratio ranges in the relevant benchmark table.
- If the core ratios result in different cash flow/leverage assessments, we will select the relevant core ratio based on which provides the best indicator of a company's future leverage.

3) Third, we review the supplemental ratio(s).

- Determine the importance of standard or KCF supplemental ratios based on company-specific characteristics, namely, leverage, capital intensity, working capital intensity, growth rate, or industry.

4) Fourth, we calculate the adjusted cash flow/leverage assessment.

- If the cash flow/leverage assessment(s) indicated by the important supplemental ratio(s) differs from the preliminary cash flow/leverage assessment, we might adjust the preliminary cash flow/leverage assessment by one category in the direction of the cash flow/leverage assessment indicated by the supplemental ratio(s) to derive the adjusted cash flow/leverage assessment. We will make this adjustment if, in our view, the supplemental ratio provides the

best indicator of a company's future leverage.

- If there is more than one important supplemental ratio and they result in different directional deviations from the preliminary cash flow/leverage assessment, we will select one as the relevant supplemental ratio based on which, in our opinion, provides the best indicator of a company's future leverage. We will then make the adjustment outlined above if the selected supplemental ratio differs from the preliminary cash flow/leverage assessment and the selected supplemental ratio provides the best overall indicator of a company's future leverage.

5) Lastly, we determine the final cash flow/leverage assessment based on the volatility adjustment.

- We classify companies as stable for these cash flow criteria if cash flow/leverage ratios are expected to move up by one category during periods of stress based on their business risk profile. The final cash flow/leverage assessment for these companies will not be modified from the adjusted cash flow/leverage assessment.
- We classify companies as volatile for these cash flow criteria if cash flow/leverage ratios are expected to move one or two categories worse during periods of stress based on their business risk profiles. Typically, this is equivalent to EBITDA declining about 30% from its current level. The final cash flow/leverage assessment for these companies will be modified to one category weaker than the adjusted cash flow/leverage assessment; the adjustment will be eliminated if cash flow/leverage ratios, as evaluated, include a moderate to high level of stress already.
- We classify companies as highly volatile for these cash flow criteria if cash flow/leverage ratios are expected to move two or three categories worse during periods of stress, based on their business risk profiles. Typically, this is equivalent to EBITDA declining about 50% from its current level. The final cash flow/leverage assessment for these companies will be modified to two categories weaker than the adjusted cash flow/leverage assessment; the adjustment will be eliminated or reduced to one category if cash flow/leverage ratios, as evaluated, include a moderate to high level of stress already.

125. The volatility adjustment is the mechanism by which we factor a "cushion" of medium-term variance to current financial performance not otherwise captured in either the near-term base-case forecast or the long-term business risk assessment. We make this adjustment based on the following:

- The expectation of any potential cash flow/leverage ratio movement is both prospective and dependent on the current business or economic conditions.
- Stress scenarios include, but are not limited to, a recessionary economic environment, technology or competitive shifts, loss or renegotiation of major contracts or customers, and key product or input price movements, as typically defined in the company's industry risk profile and competitive position assessment.
- The volatility adjustment is not static and is company specific. At the bottom of an economic cycle or during periods of stressed business conditions, already reflected in the general industry risk or specific competitive risk profile, the prospect of weakening ratios is far less than at the peak of an economic cycle or business conditions.
- The expectation of prospective ratio changes may be formed by observed historical performance over an economic, business, or product cycle by the company or by peers.
- The assessment of which classification to use when evaluating the prospective number of scoring category moves will be guided by how close the current ratios are to the transition point (i.e. "buffer" in the current scoring category) and the corresponding amount of EBITDA

movement at each scoring transition.

F. Diversification/Portfolio Effect

126. Under the criteria, diversification/portfolio effect applies to companies that we regard as conglomerates. They are companies that have multiple core business lines that may be operated as separate legal entities. For the purpose of these criteria, a conglomerate would have at least three business lines, each contributing a material source of earnings and cash flow.

127. The criteria aim to measure how diversification or the portfolio effect could improve the anchor of a company with multiple business lines. This approach helps us determine how the credit strength of a corporate entity with a given mix of business lines could improve based on its diversity. The competitive position factor assesses the benefits of diversity within individual lines of business. This factor also assesses how poorly performing businesses within a conglomerate affect the organization's overall business risk profile.

128. Diversification/portfolio effect could modify the anchor depending on how meaningful we think the diversification is, and on the degree of correlation we find in each business line's sensitivity to economic cycles. This assessment will have either a positive or neutral impact on the anchor. We capture any potential factor that weakens a company's diversification, including poor management, in our management and governance assessment.

129. We define a conglomerate as a diversified company that is involved in several industry sectors. Usually the smallest of at least three distinct business segments/lines would contribute at least 10% of either EBITDA or FOCF and the largest would contribute no more than 50% of EBITDA or FOCF, with the long-term aim of increasing shareholder value by generating cash flow. Industrial conglomerates usually hold a controlling stake in their core businesses, have highly identifiable holdings, are deeply involved in the strategy and management of their operating companies, generally do not frequently roll over or reshuffle their holdings by buying and selling companies, and therefore have high long-term exposure to the operating risks of their subsidiaries.

130. In rating a conglomerate, we first assess management's commitment to maintain the diversified portfolio over a longer-term horizon. These criteria apply only if the company falls within our definition of a conglomerate.

1. Assessing diversification/portfolio effect

131. A conglomerate's diversification/portfolio effect is assessed as 1, significant diversification; 2, moderate diversification; or 3, neutral. An assessment of moderate diversification or significant diversification potentially raises the issuer's anchor. To achieve an assessment of significant diversification, an issuer should have uncorrelated diversified businesses whose breadth is among the most comprehensive of all conglomerates'. This assessment indicates that we expect the conglomerate's earnings volatility to be much lower through an economic cycle than an undiversified company's. To achieve an assessment of moderate diversification, an issuer typically has a range of uncorrelated diversified businesses that provide meaningful benefits of diversification with the expectation of lower earnings volatility through an economic cycle than an undiversified company's.

132. We expect that a conglomerate will also benefit from diversification if its core assets consistently produce positive cash flows over our rating horizon. This supports our assertion that the company diversifies to take advantage of allocating capital among its business lines. To this end, our analysis focuses on a conglomerate's track record of successfully deploying positive discretionary

cash flow into new business lines or expanding capital-hungry business lines. We assess companies that we do not expect to achieve these benefits as neutral.

2. Components of correlation and how it is incorporated into our analysis

133. We determine the assessment for this factor based on the number of business lines in separate industries (as described in table 27) and the degree of correlation between these business lines as described in table 20. There is no rating uplift for an issuer with a small number of business lines that are highly correlated. By contrast, a larger number of business lines that are not closely correlated provide the maximum rating uplift.

Table 20

Assessing Diversification/Portfolio Effect

	--Number of business lines--		
Degree of correlation of business lines	**3**	**4**	**5 or more**
High	Neutral	Neutral	Neutral
Medium	Neutral	Moderately diversified	Moderately diversified
Low	Moderately diversified	Significantly diversified	Significantly diversified

134. The degree of correlation of business lines is high if the business lines operate within the same industry, as defined by the industry designations in Appendix B, table 27. The degree of correlation of business lines is medium if the business lines operate within different industries, but operate within the same geographic region (for further guidance on defining geographic regions, see Appendix A, table 26). An issuer has a low degree of correlation across its business lines if these business lines are both a) in different industries and b) either operate in different regions or operate in multiple regions.

135. If we believe that a conglomerate's various industry exposures fail to provide a partial hedge against the consolidated entity's volatility because they are highly correlated through an economic cycle, then we assess the diversification/portfolio effect as neutral.

G. Capital Structure

136. S&P Global Ratings uses its capital structure criteria to assess risks in a company's capital structure that may not show up in our standard analysis of cash flow/leverage. These risks may exist as a result of maturity date or currency mismatches between a company's sources of financing and its assets or cash flows. These can be compounded by outside risks, such as volatile interest rates or currency exchange rates.

1. Assessing capital structure

137. Capital structure is a modifier category, which adjusts the initial anchor for a company after any modification due to diversification/portfolio effect. We assess a number of subfactors to determine the capital structure assessment, which can then raise or lower the initial anchor by one or more notches--or have no effect in some cases. We assess capital structure as 1, very positive; 2, positive; 3, neutral; 4, negative; or 5, very negative. In the large majority of cases, we believe that a firm's capital structure will be assessed as neutral. To assess a company's capital structure, we analyze four subfactors:

- Currency risk associated with debt,
- Debt maturity profile (or schedule),
- Interest rate risk associated with debt, and
- Investments.

138. Any of these subfactors can influence a firm's capital structure assessment, although some carry greater weight than others, based on a tiered approach:

- Tier one risk subfactors: Currency risk of debt and debt maturity profile, and
- Tier two risk subfactor: Interest rate risk of debt.

139. The initial capital structure assessment is based on the first three subfactors (see table 21). We may then adjust the preliminary assessment based on our assessment of the fourth subfactor, investments.

Table 21

Preliminary Capital Structure Assessment

Preliminary capital structure assessment	Subfactor assessments
Neutral	No tier one subfactor is negative.
Negative	One tier one subfactor is negative, and the tier two subfactor is neutral.
Very negative	Both tier one subfactors are negative, or one tier one subfactor is negative and the tier two subfactor is negative.

140. Tier one subfactors carry the greatest risks, in our view, and, thus, could have a significant impact on the capital structure assessment. This is because, in our opinion, these factors have a greater likelihood of affecting credit metrics and potentially causing liquidity and refinancing risk. The tier two subfactor is important in and of itself, but typically less so than the tier one subfactors. In our view, in the majority of cases, the tier two subfactor in isolation has a lower likelihood of leading to liquidity and default risk than do tier one subfactors.

141. The fourth subfactor, investments, as defined in paragraph 153, quantifies the impact of a company's investments on its overall financial risk profile. Although not directly related to a firm's capital structure decisions, certain investments could provide a degree of asset protection and potential financial flexibility if they are monetized. Thus, the fourth subfactor could modify the preliminary capital structure assessment (see table 22). If the subfactor is assessed as neutral, then the preliminary capital structure assessment will stand. If investments is assessed as positive or very positive, we adjust the preliminary capital structure assessment upward (as per table 22) to arrive at the final assessment.

Table 22

Final Capital Structure Assessment

	--Investments subfactor assessment--		
Preliminary capital structure assessment	Neutral	Positive	Verypositive
Neutral	Neutral	Positive	Very positive
Negative	Negative	Neutral	Positive
Very negative	Very negative	Negative	Negative

2. Capital structure analysis: Assessing the subfactors

a) Subfactor 1: Currency risk of debt

142. Currency risk arises when a company borrows without hedging in a currency other than the currency in which it generates revenues. Such an unhedged position makes the company potentially vulnerable to fluctuations in the exchange rate between the two currencies, in the absence of mitigating factors. We determine the materiality of any mismatch by identifying situations where adverse exchange-rate movements could weaken cash flow and/or leverage ratios. We do not include currency mismatches under the following scenarios:

- The country where a company generates its cash flows has its currency pegged to the currency in which the company has borrowed, or vice versa (or the currency of cash flows has a strong track record and government policy of stability with the currency of borrowings), examples being the Hong Kong dollar which is pegged to the U.S. dollar, and the Chinese renminbi which is managed in a narrow band to the U.S. dollar (and China's foreign currency reserves are mainly in U.S. dollars). Moreover, we expect such a scenario to continue for the foreseeable future;
- A company has the proven ability, through regulation or contract, to pass through changes in debt servicing costs to its customers; or
- A company has a natural hedge, such as where it may sell its product in a foreign currency and has matched its debt in that same currency.

143. We also recognize that even if an entity generates insufficient same-currency cash flow to meet foreign currency-denominated debt obligations, it could have substantial other currency cash flows it can convert to meet these obligations. Therefore, the relative amount of foreign denominated debt as a proportion of total debt is an important factor in our analysis. If foreign denominated debt, excluding fully hedged debt principal, is 15% or less of total debt, we assess the company as neutral on currency risk of debt. If foreign-denominated debt, excluding fully hedged debt principal, is greater than 15% of total debt, and debt to EBITDA is greater than 3.0x, we evaluate currency risks through further analysis.

144. If an entity's foreign-denominated debt in a particular currency represents more than 15% of total debt, and if its debt to EBITDA ratio is greater than 3.0x, we identify whether a currency-specific interest coverage ratio indicates potential currency risk. The coverage ratio divides forecasted operating cash flow in each currency by interest payments over the coming 12 months for that same currency. It is often easier to ascertain the geographic breakdown of EBITDA as opposed to operating cash flow. So in situations where we don't have sufficient cash flow information, we may calculate an EBITDA to interest expense coverage ratio in the relevant currencies. If neither cash flow nor EBITDA information is disclosed, we estimate the relevant exposures based on available information.

145. In such an instance, our assessment of this subfactor is negative if we believe any appropriate interest coverage ratio will fall below 1.2x over the next 12 months.

b) Subfactor 2: Debt maturity profile

146. A firm's debt maturity profile shows when its debt needs to be repaid, or refinanced if possible, and helps determine the firm's refinancing risk. Lengthier and more evenly spread out debt

maturity schedules reduce refinancing risk, compared with front-ended and compressed ones, since the former give an entity more time to manage business- or financial market-related setbacks.

147. In evaluating debt maturity profiles, we measure the weighted average maturity (WAM) of bank debt and debt securities (including hybrid debt) within a capital structure, and make simplifying assumptions that debt maturing beyond year five matures in year six. WAM = (Maturity1/Total Debt)*tenor1 + (Maturity2/Total Debt)* tenor2 +… (Thereafter/Total Debt)* tenor6

148. In evaluating refinancing risk, we consider risks in addition to those captured under the 12-month to 24-month time-horizons factored in our liquidity criteria (see "Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers"). While we recognize that investment-grade companies may have more certain future business prospects and greater access to capital than speculative-grade companies, all else being equal, we view a company with a shorter maturity schedule as having greater refinancing risk compared to a company with a longer one. In all cases, we assess a company's debt maturity profile in conjunction with its liquidity and potential funding availability. Thus, a short-dated maturity schedule alone is not a negative if we believe the company can maintain enough liquidity to pay off debt that comes due in the near term.

149. Our assessment of this subfactor is negative if the WAM is two years or less, and the amount of these near-term maturities is material in relation to the issuer's liquidity so that under our base-case forecast, we believe the company's liquidity assessment will become less than adequate or weak over the next two years due to these maturities. In certain cases, we may assess a debt maturity profile as negative regardless of whether or not the company passes the aforementioned test. We expect such instances to be rare, and will include scenarios where we believed a concentration of debt maturities within a five-year time horizon poses meaningful refinancing risk, either due to the size of the maturities in relation to the company's liquidity sources, the company's leverage profile, its operating trends, lender relationships, and/or credit market standings.

c) Subfactor 3: Interest rate risk of debt

150. The interest rate risk of debt subfactor analyzes the company's mix of fixed-rate and floating-rate debt. Generally, a higher proportion of fixed-rate debt leads to greater predictability and stability of interest expense and therefore cash flows. The exception would be companies whose operating cash flows are to some degree correlated with interest rate movements--for example, a regulated utility whose revenues are indexed to inflation--given the typical correlation between nominal interest rates and inflation.

151. The mix of fixed versus floating-rate debt is usually not a significant risk factor for companies with intermediate or better financial profiles, strong profitability, and high interest coverage. In addition, the interest rate environment at a given point in time will play a role in determining the impact of interest rate movements. Our assessment of this subcategory will be negative if a 25% upward shift (e.g., from 2.0% to 2.5%) or a 100 basis-point upward shift (e.g., 2% to 3%) in the base interest rate of the floating rate debt will result in a breach of interest coverage covenants or interest coverage rating thresholds identified in the cash flow/leverage criteria (see section E.3).

152. Many loan agreements for speculative-grade companies contain a clause requiring a percentage of floating-rate debt to be hedged for a period of two to three years to mitigate this risk. However, in many cases the loan matures after the hedge expires, creating a mismatched hedge. We consider only loans with hedges that match the life of the loan to be--effectively--fixed-rate debt.

d) Subfactor 4: Investments

153. For the purposes of the criteria, investments refer to investments in unconsolidated equity affiliates, other assets where the realizable value isn't currently reflected in the cash flows generated from those assets (e.g. underutilized real-estate property), we do not expect any additional investment or support to be provided to the affiliate, and the investment is not included within S&P Global Ratings' consolidation scope and so is not incorporated in the company's business and financial risk profile analysis. If equity affiliate companies are consolidated, then the financial benefits and costs of these investments will be captured in our cash flow and leverage analysis. Similarly, where the company's ownership stake does not qualify for consolidation under accounting rules, we may choose to consolidate on a pro rata basis if we believe that the equity affiliates' operating and financing strategy is influenced by the rated entity. If equity investments are strategic and provide the company with a competitive advantage, or benefit a company's scale, scope, and diversity, these factors will be captured in our competitive position criteria and will not be used to assess the subfactor investments as positive. Within the capital structure criteria, we aim to assess nonstrategic financial investments that could provide a degree of asset protection and financial flexibility in the event they are monetized. These investments must be noncore and separable, meaning that a potential divestiture, in our view, has no impact on the company's existing operations.

154. In many instances, the cash flows generated by an equity affiliate, or the proportional share of the associate company's net income, might not accurately reflect the asset's value. This could occur if the equity affiliate is in high growth mode and is currently generating minimal cash flow or net losses. This could also be true of a physical asset, such as real estate. From a valuation standpoint, we recognize the subjective nature of this analysis and the potential for information gaps. As a result, in the absence of a market valuation or a market valuation of comparable companies in the case of minority interests in private entities, we will not ascribe value to these assets.

155. We assess this subfactor as positive or very positive if three key characteristics are met. First, an estimated value can be ascribed to these investments based on the presence of an existing market value for the firm or comparable firms in the same industry. Second, there is strong evidence that the investment can be monetized over an intermediate timeframe--in the case of an equity investment, our opinion of the marketability of the investment would be enhanced by the presence of an existing market value for the firm or comparable firms, as well as our view of market liquidity. Third, monetization of the investment, assuming proceeds would be used to repay debt, would be material enough to positively move existing cash flow and leverage ratios by at least one category and our view on the company's financial policy, specifically related to financial discipline, supports the assessment that the potential proceeds would be used to pay down debt. This subfactor is assessed as positive if debt repayment from the investment sale has the potential to improve cash flow and leverage ratios by one category. We assess investments as very positive if proceeds upon sale of the investment have the potential to improve cash flow and leverage ratios by two or more categories. If the three characteristics are not met, this subfactor will be assessed as neutral and the preliminary capital structure assessment will stand.

156. We will not assess the investments subfactor as positive or very positive when the anchor is 'b+' or lower unless the three conditions described in paragraph 155 are met, and:

- For issuers with less than adequate or weak liquidity, the company has provided a credible near-term plan to sell the investment.
- For issuers with adequate or better liquidity, we believe that the company, if needed, could sell the investment in a relatively short timeframe.

H. Financial Policy

157. Financial policy refines the view of a company's risks beyond the conclusions arising from the standard assumptions in the cash flow/leverage assessment (see section E). Those assumptions do not always reflect or entirely capture the short-to-medium term event risks or the longer-term risks stemming from a company's financial policy. To the extent movements in one of these factors cannot be confidently predicted within our forward-looking evaluation, we capture that risk within our evaluation of financial policy. The cash flow/leverage assessment will typically factor in operating and cash flows metrics we observed during the past two years and the trends we expect to see for the coming two years based on operating assumptions and predictable financial policy elements, such as ordinary dividend payments or recurring acquisition spending. However, over that period and, generally, over a longer time horizon, the firm's financial policies can change its financial risk profile based on management's or, if applicable, the company's controlling shareholder's (see Appendix E, paragraphs 254-257) appetite for incremental risk or, conversely, plans to reduce leverage. We assess financial policy as 1) positive, 2) neutral, 3) negative, or as being owned by a financial sponsor. We further identify financial sponsor-owned companies as "FS-4", "FS-5", "FS-6", or "FS-6 (minus)" (see section H.2).

1. Assessing financial policy

158. First, we determine if a company is owned by a financial sponsor. Given the intrinsic characteristics and aggressive nature of financial sponsor's strategies (i.e. short- to intermediate-term holding periods and the use of debt or debt-like instruments to maximize shareholder returns), we assign a financial risk profile assessment to a firm controlled by a financial sponsor that reflects the likely impact on leverage due to these strategies and we do not separately analyze management's financial discipline or financial policy framework.

159. If a company is not controlled by a financial sponsor, we evaluate management's financial discipline and financial policy framework. Management's financial discipline measures its tolerance for incremental financial risk or, conversely, its willingness to maintain the same degree of financial risk or to lower it compared with recent cash flow/leverage metrics and our projected ratios for the next two years. The company's financial policy framework assesses the comprehensiveness, transparency, and sustainability of the entity's financial policies. We do not assess these factors for financial sponsor controlled firms.

160. The financial discipline assessments can have a positive or negative influence on an enterprise's overall financial policy assessment, or can have no net effect. Conversely, the financial policy framework assessment cannot positively influence the overall financial policy assessment. It can constrain the overall financial policy assessment to no greater than neutral.

161. The separate assessments of a company's financial policy framework and financial discipline determine the financial policy adjustment.

162. We assess management's financial discipline as 1, positive; 2, neutral; or 3, negative. We determine the assessment by evaluating the predictability of an entity's expansion plans and shareholder return strategies. We take into account, generally, management's tolerance for material and unexpected negative changes in credit ratios or, instead, its plans to rapidly decrease leverage and keep credit ratios within stated boundaries.

163. A company's financial policy framework assessment is: 1, supportive or 2, non-supportive. We make the determination by assessing the comprehensiveness of a company's financial policy framework and whether financial targets are clearly communicated to a large number of

stakeholders, and are well defined, achievable, and sustainable.

Table 23

Financial Policy Assessments

Assessment	What it means	Guidance
Positive	Indicates that we expect management's financial policy decisions to have a positive impact on credit ratios over the time horizon, beyond what can be reasonably built in our forecasts on the basis of normalized operating and cash flow assumptions. An example would be when a credible management team commits to dispose of assets or raise equity over the short to medium term in order to reduce leverage. A company with a 1 financial risk profile will not be assigned a positive assessment.	If financial discipline is positive, and the financial policy framework is supportive
Neutral	Indicates that, in our opinion, future credit ratios won't differ materially over the time horizon beyond what we have projected, based on our assessment of management's financial policy, recent track record, and operating forecasts for the company. A neutral financial policy assessment effectively reflects a low probability of "event risk," in our view.	If financial discipline is positive, and the financial policy framework is non-supportive. Or when financial discipline is neutral, regardless of the financial policy framework assessment.
Negative	Indicates our view of a lower degree of predictability in credit ratios, beyond what can be reasonably built in our forecasts, as a result of management's financial discipline (or lack of it). It points to high event risk that management's financial policy decisions may depress credit metrics over the time horizon, compared with what we have already built in our forecasts based on normalized operating and cash flow assumptions.	If financial discipline is negative, regardless of the financial policy framework assessment
Financial Sponsor*	We define a financial sponsor as an entity that follows an aggressive financial strategy in using debt and debt-like instruments to maximize shareholder returns. Typically, these sponsors dispose of assets within a short to intermediate time frame. Accordingly, the financial risk profile we assign to companies that are controlled by financial sponsors ordinarily reflects our presumption of some deterioration in credit quality in the medium term. Financial sponsors include private equity firms, but not infrastructure and asset-management funds, which maintain longer investment horizons.	We define financial sponsor-owned companies as nonfinancial corporate entities in which one or more financial sponsors own at least 40% of the entity's common equity, or retain the majority of the voting rights and control through preference shares, and where we consider that the sponsors exercise control of the company either solely or jointly.

*Assessed as FS-4, FS-5, FS-6, or FS-6 (minus).

2. Financial sponsor-controlled companies

164. We define a financial sponsor as an entity that follows an aggressive financial strategy in using debt and debt-like instruments to maximize shareholder returns. Typically, these sponsors dispose of assets within a short-to-intermediate time frame. Financial sponsors include private equity firms, but not infrastructure and asset-management funds, which maintain longer investment horizons.

165. We define financial sponsor-owned companies as nonfinancial corporate entities in which one or more financial sponsors own at least 40% of the entity's common equity, or retain the majority of the voting rights and control through preference shares, and where we consider that the sponsors exercise control of the company either solely or jointly. "Control" refers to the sponsors' ability to dictate an entity's strategy and cash flow. The strategic goals of the sponsors must be aligned for us to consider the sponsors as having joint control.

166. We differentiate between financial sponsors and other types of controlling shareholders and

companies that do not have controlling shareholders based on our belief that short-term ownership--such as exists in private equity sponsor-owned companies--generally entails financial policies aimed at achieving rapid returns for shareholders typically through aggressive debt leverage.

167. Financial sponsors often dictate policies regarding risk-taking, financial management, and corporate governance for the companies that they control. There is a common pattern of these investors extracting cash in ways that increase the companies' financial risk by utilizing debt or debt like instruments. Accordingly, the financial risk profile we assign to companies that are controlled by financial sponsors ordinarily reflect our presumption of some deterioration in credit quality or steadily high leverage in the medium term.

168. We assess the influence of financial sponsor ownership as "FS-4", "FS-5", "FS-6", and "FS-6 (minus)" depending on how aggressive we assume the sponsor will be and assign a financial risk profile accordingly (see table 24).

169. Generally, financial sponsor-owned issuers will receive an assessment of "FS-6" or "FS-6 (minus)", leading to a financial risk profile assessment of '6', under the criteria. A "FS-6" assessment indicates that, in our opinion, forecasted credit ratios in the medium term are likely be to be consistent with a '6' financial risk profile, based on our assessment of the financial sponsor's financial policy and track record. A "FS-6 (minus)" will likely be applied to companies that we forecast to have near-term credit ratios consistent with a '6' financial risk profile, but we believe the financial sponsor to be very aggressive and that leverage could increase materially even further from our forecasted levels.

170. In a small minority of cases, a financial sponsor-owned entity could receive an assessment of "FS-5". This assessment will apply only when we project that the company's leverage will be consistent with a '5' (aggressive) financial risk profile (see tables 17, 18, and 19), we perceive that the risk of releveraging is low based on the company's financial policy and our view of the owner's financial risk appetite, and liquidity is at least adequate.

171. In even rarer cases, we could assess the financial policy of a financial sponsor-owned entity as "FS-4". This assessment will apply only when all of the following conditions are met: other shareholders own a material (generally, at least 20%) stake, we expect the sponsor to relinquish control over the intermediate term, we project that leverage is currently consistent with a '4' (significant) financial risk profile (see tables 17, 18, and 19), the company has said it will maintain leverage at or below this level, and liquidity is at least adequate.

Table 24

Financial Risk Profile Implications For Sponsor-Owned Issuers

Assessment	What it Means	Guidance
FS-4	Financial risk profile set at '4'	Issuer must meet all of the following conditions: • Other shareholders must own a material (no less than 20%) stake; • We anticipate that the sponsor will relinquish control over the medium term; • For issuers subject to Table 17 (standard volatility), debt to EBITDA is less than 4x, and we estimate that it will remain less than 4x. For issuers that are subject to Table 18 (medial volatility), debt to EBITDA is below 4.5x and we forecast it to remain below that level. Or for issuers subject to Table 19 (low volatility), debt to EBITDA is less than 5x and our estimation is it will remain below that level; • The company has indicated a financial policy stipulating a level of leverage consistent with a significant or better financial risk profile (that is, debt to EBITDA of less than 4x when applying standard volatility tables, 4.5x when applying medial volatility tables, or less than 5x when applying low volatility tables) and • We assess liquidity to be at least adequate, with adequate covenant headroom.
FS-5	Financial risk profile set at '5'	Issuer must meet all of the following conditions: • For issuers subject to the standard volatility table, debt to EBITDA is less than 5x, and we estimate that it will remain less than 5x. For issuers that are subject to the medial volatility table, debt to EBITDA is below 5.5x and we forecast it to remain below that level. Or for issuers subject to the low volatility table, debt to EBITDA is less than 6x and our estimation is it will remain below that level; • We believe the risk of releveraging beyond 5x (standard volatility issuer), 5.5x (medial volatility issuer), or 6x (low volatility issuer) is low; and • We assess liquidity to be at least adequate, with adequate covenant headroom.
FS-6	Financial risk profile set at '6'	Standard & Poor's debt to EBITDA is greater than 5x (when applying the standard volatility table), greater than 5.5x (when applying the medial volatility table), or greater than 6x (when applying the low volatility table). However, we believe leverage is unlikely to increase meaningfully beyond these levels.
FS-6 (minus)	Financial risk profile set at '6', and anchor reduced by one notch (unless this results in a final rating below 'B-')	In determining the anchor the financial risk profile is a '6', but we believe the track record of the financial sponsor indicates that leverage could increase materially from already high levels.

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3. Companies not controlled by a financial sponsor

172. For companies not controlled by a financial sponsor we evaluate management's financial discipline and financial policy framework to determine the influence on an entity's financial risk profile beyond what is implied by recent credit ratios and our cash flow and leverage forecasts. This influence can be positive, neutral, or negative.

173. We do not distinguish between management and a controlling shareholder that is not a financial sponsor when assessing these subfactors, as the controlling shareholder usually has the final say

on financial policy.

a) Financial discipline

174. The financial discipline assessment is based on management's leverage tolerance and the likelihood of event risk. The criteria evaluate management's potential appetite to incur unforeseen, higher financial risk over a prolonged period and the associated impact on credit measures. We also assess management's capacity and commitment to rapidly decrease debt leverage to levels consistent with its credit ratio targets.

175. This assessment therefore seeks to determine whether unforeseen actions by management to increase, maintain, or reduce financial risk are likely to occur during the next two to three years, with either a negative or positive effect, or none at all, on our baseline forecasts for the period.

176. This assessment is based on the leverage tolerance of a company's management, as reflected in its plans or history of acquisitions, shareholder remuneration, and organic growth strategies (see Appendix E, paragraphs 258 to 263).

177. We assess financial discipline as positive, neutral, or negative, based on its potential impact on our forward-looking assessment of a firm's cash flow/leverage, as detailed in table 25. For example, a neutral assessment for leverage tolerance reflects our expectation that management's financial policy will unlikely lead to significant deviation from current and forecasted credit ratios. A negative assessment acknowledges a significant degree of event risk of increased leverage relative to our base-case forecast, resulting from the company's acquisition policy, its shareholder remuneration policy, or its organic growth strategy. A positive assessment indicates that the company is likely to take actions to reduce leverage, but we cannot confidently incorporate these actions into our baseline forward-looking assessment of cash flow/leverage.

178. A positive assessment indicates that management is committed and has the capacity to reduce debt leverage through the rapid implementation of credit enhancing measures, such as asset disposals, rights issues, or reductions in shareholder returns. In addition, management's track record over the past five years shows that it has taken actions to rapidly reduce unforeseen increases in debt leverage and that there have not been any prolonged periods when credit ratios were weaker than our expectations for the rating. Management, even if new, also has a track record of successful execution. Conversely, a negative assessment indicates management's financial policy allows for significant increase in leverage compared with both current levels and our forward-looking forecast under normal operating/financial conditions or does not have observable time limits or stated boundaries. Management has a track record of allowing for significant and prolonged peaks in leverage and there is no commitment or track record of management using mitigating measures to rapidly return to credit ratios consistent with our expectations.

179. As evidence of management's leverage tolerance, we evaluate its track record and plans regarding acquisitions, shareholder remuneration, and organic growth strategies (see Appendix E, paragraphs 258 to 263). Acquisitions could increase the risk that leverage will be higher than our base-case forecast if we view management's strategy as opportunistic or if its financial policy (if it exists) provides significant headroom for debt-financed acquisitions. Shareholder remuneration could also increase the risk of leverage being higher than our base-case forecast if management's shareholder reward policies are not particularly well defined or have no clear limits, management has a tolerance for shareholder returns exceeding operating cash flow, or has a track record of sustained cash returns despite weakening operating performance or credit ratios. Organic growth strategies can also result in leverage higher than our base-case forecast if these plans have no clear focus or investment philosophy, capital spending is fairly unpredictable, or there is a track

record of overspending or unexpected or rapid shifts in plans for new markets or products.

180. We also take into account management's track record and level of commitment to its stated financial policies, to the extent a company has a stated policy. Historical evidence and any deviations from stated policies are key elements in analyzing a company's leverage tolerance. Where material and unexpected deviation in leverage may occur (for example, on the back of operating weakness or acquisitions), we also assess management's plan to restore credit ratios to levels consistent with previous expectations through rapid and proactive non-organic measures. Management's track record to execute its deleveraging plan, its level of commitment, and the scope and timeframe of debt mitigating measures will be key differentiators in assessing a company's financial policy discipline.

Table 25

Assessing Financial Discipline

Descriptor	What it means	Guidance
Positive	Management is likely to take actions that result in leverage that is lower than our base-case forecast, but can't be confidently included in our base-case assumptions. Event risk is low.	Management is committed and has capacity to reduce debt leverage and increase financial headroom through the rapid implementation of credit enhancing measures, in line with its stated financial policy, if any. This relates primarily to management's careful and moderate policy with regard to acquisitions and shareholder remuneration as well as to its organic growth strategy. The assessments are supported by historical evidence over the past five years of not showing any prolonged weakening in the company's credit ratios, or relative to our base-case credit metrics' assumptions. Management, even if new, has a track record of successful execution.
Neutral	Leverage is not expected to deviate materially from our base-case forecast. Event risk is moderate.	Management's financial discipline with regard to acquisitions, shareholder remuneration, as well as its organic growth strategy does not result in significantly different leverage as defined in its stated financial policy framework.
Negative	Leverage could become materially higher than our base-case forecast. Event risk is high.	Management's financial policy framework does not explicitly rule out a significant increase in leverage compared to our base-case assumptions, possibly reflecting a greater event risk with regard to its M&A and shareholder remuneration policy as well as to its organic growth strategy. These points are supported by historical evidence over the past five years of allowing for significant and prolonged peaks in leverage, which remained unmitigated by credit supporting measures by management.

b) Financial policy framework

181. The company's financial policy framework assesses the comprehensiveness, transparency, and sustainability of the entity's financial policies (see Appendix E, paragraphs 264-268). This will help determine whether there is a satisfactory degree of visibility into the issuer's future financial risk profile. Companies that have developed and sustained a comprehensive set of financial policies are more likely to build long-term, sustainable credit quality than those that do not.

182. We will assess a company's financial policy framework as supportive or non-supportive based on evidence that supports the characteristics listed below. In order for an entity to receive a supportive assessment for financial policy framework, there must be sufficient evidence of management's financial policies to back that assessment.

183. A company assessed as supportive will generally exhibit the following characteristics:

- Management has a comprehensive set of financial policies covering key areas of financial risk, including debt leverage and liability management. Financial targets are well defined and

quantifiable.

- Management's financial policies are clearly articulated in public forums (such as public listing disclosures and investor presentations) or are disclosed to a limited number of key stakeholders such as main creditors or to the credit rating agencies. The company's adherence to these policies is satisfactory.
- Management's articulated financial policies are considered achievable and sustainable. This assessment takes into consideration historical adherence to articulated policies, existing financial risk profile, capacity to sustain capital structure through nonorganic means, demands of key stakeholders, and the stability of financial policy parameters over time.

184. A company receives a non-supportive assessment if it does not meet all the conditions for a supportive assessment. We expect a non-supportive assessment to be uncommon.

I. Liquidity

185. Our assessment of liquidity focuses on monetary flows--the sources and uses of cash--that are the key indicators of a company's liquidity cushion. The analysis assesses the potential for a company to breach covenant tests related to declines in EBITDA, as well as its ability to absorb high-impact, low-probability events, the nature of the company's bank relationships, its standing in credit markets, and how prudent (or not) we believe its financial risk management to be (see "Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers").

J. Management And Governance

186. The analysis of management and governance addresses how management's strategic competence, organizational effectiveness, risk management, and governance practices shape the issuer's competitiveness in the marketplace, the strength of its financial risk management, and the robustness of its governance. Stronger management of important strategic and financial risks may enhance creditworthiness (see "Methodology: Management And Governance Credit Factors For Corporate Entities And Insurers").

K. Comparable Ratings Analysis

187. The comparable ratings analysis is our last step in determining a SACP on a company. This analysis can lead us to raise or lower our anchor, after adjusting for the modifiers, on a company by one notch based on our overall assessment of its credit characteristics for all subfactors considered in arriving at the SACP. This involves taking a holistic review of a company's stand-alone credit risk profile, in which we evaluate an issuer's credit characteristics in aggregate. A positive assessment leads to a one-notch upgrade, a negative assessment leads to a one-notch downgrade, and a neutral assessment indicates no change to the anchor.

188. The application of comparable ratings analysis reflects the need to "fine-tune" ratings outcomes, even after the use of each of the other modifiers. A positive or negative assessment is therefore likely to be common rather than exceptional.

189. We consider our assessments of each of the underlying subfactors to be points within a possible range. Consequently, each of these assessments that ultimately generate the SACP can be at the upper or lower end, or at the mid-point, of such a range:

- A company receives a positive assessment if we believe, in aggregate, its relative ranking

across the subfactors typically to be at the higher end of the range;

- A company receives a negative assessment if we believe, in aggregate, its relative ranking across the subfactors typically to be at the lower end of the range;
- A company receives a neutral assessment if we believe, in aggregate, its relative ranking across the subfactors typically to be in line with the middle of the range.

190. The most direct application of the comparable ratings analysis is in the following circumstances:

- Business risk assessment. If we expect a company to sustain a position at the higher or lower end of the ranges for the business risk category assessment, the company could receive a positive or negative assessment, respectively.
- Financial risk assessment and financial metrics. If a company's actual and forecasted metrics are just above (or just below) the financial risk profile range, as indicated in its cash flow/leverage assessment, we could assign a positive or negative assessment.

191. We also consider additional factors not already covered, or existing factors not fully captured, in arriving at the SACP. Such factors will generally reflect less frequently observed credit characteristics, may be unique, or may reflect unpredictability or uncertain risk attributes, both positive and negative.

192. Some examples that we typically expect could lead to a positive or negative assessment using comparable ratings analysis include:

- Short operating track record. For newly formed companies or companies that have experienced transformational events, such as a significant acquisition, a lack of an established track record of operating and financial performance could lead to a negative assessment until such a track record is established.
- Entities in transition. A company in the midst of changes that we anticipate will strengthen or weaken its creditworthiness and that are not already fully captured elsewhere in the criteria could receive a positive or negative assessment. Such a transition could occur following major divestitures or acquisitions, or during a significant overhaul of its strategy, business, or financial structure.
- Industry or macroeconomic trends. When industry or macroeconomic trends indicate a strengthening or weakening of the company's financial condition that is not already fully captured elsewhere in the criteria, the company could receive a positive or negative assessment, respectively.
- Unusual funding structures. A company with exceptional financial resources that the criteria do not capture in the traditional ratio or liquidity analysis, or in capital structure analysis, could receive a positive assessment.
- Contingent risk exposures. How well (or not) a company identifies, manages, and reserves for contingent risk exposures that can arise if guarantees are called, derivative contract break clauses are activated, or substantial lawsuits are lost could lead to a negative assessment.

APPENDIXES

A. Country Risk

Table 26

Country And Regional Risk

Region
Western Europe
Southern Europe
Western + Southern Europe
East Europe
Central Europe
Eastern Europe and Central Asia
Middle East
Africa
North America
Central America
Latin America
The Caribbean
Asia-Pacific
Central Asia
East Asia
Australia NZ

Country	Region
South Africa	Africa
Egypt	Africa
Nigeria	Africa
Algeria	Africa
Morocco	Africa
Angola	Africa
Tunisia	Africa
Ethiopia	Africa
Ghana	Africa
Kenya	Africa
Tanzania	Africa
Uganda	Africa
Botswana	Africa
Congo, Democratic Republic of	Africa
Gabon	Africa
Senegal	Africa

Mozambique	Africa
Burkina Faso	Africa
Zambia	Africa
Congo, Republic of	Africa
Zimbabwe	Africa
Eritrea	Africa
Indonesia	Asia-Pacific
Taiwan	Asia-Pacific
Thailand	Asia-Pacific
Malaysia	Asia-Pacific
Philippines	Asia-Pacific
Vietnam	Asia-Pacific
Bangladesh	Asia-Pacific
Sri Lanka	Asia-Pacific
Cambodia	Asia-Pacific
Laos	Asia-Pacific
Papua New Guinea	Asia-Pacific
Mongolia	Asia-Pacific
Australia	Australia NZ
New Zealand	Australia NZ
Guatemala	Central America
Costa Rica	Central America
Panama	Central America
Honduras	Central America
India	Central Asia
Pakistan	Central Asia
Kazakhstan	Central Asia
Bhutan	Central Asia
Poland	Central Europe
Czech Republic	Central Europe
Romania	Central Europe
Hungary	Central Europe
Slovakia	Central Europe
Bulgaria	Central Europe
Croatia	Central Europe
Serbia	Central Europe
Lithuania	Central Europe

Latvia	Central Europe
Bosnia and Herzegovina	Central Europe
Estonia	Central Europe
Albania	Central Europe
Macedonia	Central Europe
China	East Asia
Japan	East Asia
South Korea	East Asia
Hong Kong	East Asia
Singapore	East Asia
Macau	East Asia
Greece	Eastern Europe
Slovenia	Eastern Europe
Cyprus	Eastern Europe
Russia	Eastern Europe and Central Asia
Ukraine	Eastern Europe and Central Asia
Belarus	Eastern Europe and Central Asia
Azerbaijan	Eastern Europe and Central Asia
Georgia	Eastern Europe and Central Asia
Brazil	Latin America
Mexico	Latin America
Argentina	Latin America
Colombia	Latin America
Venezuela	Latin America
Peru	Latin America
Chile	Latin America
Ecuador	Latin America
Bolivia	Latin America
Uruguay	Latin America
El Salvador	Latin America
Paraguay	Latin America
Trinidad and Tobago	Latin America
Suriname	Latin America
Belize	Latin America
Turkey	Middle East
Saudi Arabia	Middle East
United Arab Emirates	Middle East

Israel	Middle East
Qatar	Middle East
Kuwait	Middle East
Iraq	Middle East
Oman	Middle East
Lebanon	Middle East
Jordan	Middle East
Bahrain	Middle East
United States	North America
Canada	North America
Italy	Southern Europe
Spain	Southern Europe
Portugal	Southern Europe
Dominican Republic	The Caribbean
Jamaica	The Caribbean
Bahamas	The Caribbean
Barbados	The Caribbean
Curacao	The Caribbean
Cayman Islands	The Caribbean
Grenada	The Caribbean
Turks and Caicos	The Caribbean
Germany	Western Europe
United Kingdom	Western Europe
France	Western Europe
Netherlands	Western Europe
Belgium	Western Europe
Sweden	Western Europe
Switzerland	Western Europe
Austria	Western Europe
Norway	Western Europe
Denmark	Western Europe
Finland	Western Europe
Ireland	Western Europe
Luxembourg	Western Europe
Iceland	Western Europe
Malta	Western Europe

B. Competitive Position

Table 27

List Of Industries, Subsectors, And Standard Competitive Position Group Profiles

Industry	Subsector	Competitive position group profile
Transportation cyclical	Airlines	Capital or asset focus
	Marine	Capital or asset focus
	Trucking	Capital or asset focus
Auto OEM	Automobile and truck manufacturers	Capital or asset focus
Metals and mining downstream	Aluminum	Commodity focus/cost driven
	Steel	Commodity focus/cost driven
Metals and mining upstream	Coal and consumable fuels	Commodity focus/cost driven
	Diversified metals and mining	Commodity focus/cost driven
	Gold	Commodity focus/cost driven
	Precious metals and minerals	Commodity focus/cost driven
Homebuilders and developers	Homebuilding	Capital or asset focus
Oil and gas refining and marketing	Oil and gas refining and marketing	Commodity focus/scale driven
Forest and paper products	Forest products	Commodity focus/cost driven
	Paper products	Commodity focus/cost driven
Building Materials	Construction materials	Capital or asset focus
Oil and gas integrated, exploration and production	Integrated oil and gas	Commodity focus/scale driven
	Oil and gas exploration and production	Commodity focus/scale driven
Agribusiness and commodity foods	Agricultural products	Commodity focus/scale driven
Real estate investment trusts (REITs)	Diversified REITs	Real-estate specific*
	Health care REITS	Real-estate specific*
	Industrial REITs	Real-estate specific*
	Office REITs	Real-estate specific*
	Residential REITs	Real-estate specific*
	Retail REITs	Real-estate specific*
	Specialized REITs	Not appplicable**
	Self-storage REITs	Real-estate specific*
	Net lease REITs	Real-estate specific*
	Real estate operating companies	Real-estate specific*
Leisure and sports	Casinos and gaming	Services and product focus
	Hotels, resorts, and cruise lines	Services and product focus
	Leisure facilities	Services and product focus
Commodity chemicals	Commodity chemicals	Commodity focus/cost driven

	Diversified chemicals	Commodity focus/cost driven
	Fertilizers and agricultural chemicals	Commodity focus/cost driven
Auto suppliers	Auto parts and equipment	Capital or asset focus
	Tires and rubber	Capital or asset focus
	Vehicle-related suppliers	Capital or asset focus
Aerospace and defense	Aerospace and defense	Services and product focus
Technology hardware and semiconductors	Communications equipment	Capital or asset focus
	Computer hardware	Capital or asset focus
	Computer storage and peripherals	Capital or asset focus
	Consumer electronics	Capital or asset focus
	Electronic equipment and instruments	Capital or asset focus
	Electronic components	Capital or asset focus
	Electronic manufacturing services	Capital or asset focus
	Technology distributors	Capital or asset focus
	Office electronics	Capital or asset focus
	Semiconductor equipment	Capital or asset focus
	Semiconductors	Capital or asset focus
Specialty Chemicals	Industrial gases	Capital or asset focus
	Specialty chemicals	Capital or asset focus
Capital Goods	Electrical components and equipment	Capital or asset focus
	Heavy equipment and machinery	Capital or asset focus
	Industrial componentry and consumables	Capital or asset focus
	Construction equipment rental	Capital or asset focus
	Industrial distributors	Services and product focus
Engineering and construction	Construction and engineering	Services and product focus
Railroads and package express	Railroads	Capital or asset focus
	Package express	Services and product focus
	Logistics	Services and product focus
Business and consumer services	Consumer services	Services and product focus
	Distributors	Services and product focus
	Facilities services	Services and product focus
	General support services	Services and product focus
	Professional services	Services and product focus
Midstream energy	Oil and gas storage and transportation	Commodity focus/scale driven

Technology software and services	Internet software and services	Services and product focus
	IT consulting and other services	Services and product focus
	Data processing and outsourced services	Services and product focus
	Application software	Services and product focus
	Systems software	Services and product focus
	Consumer software	Services and product focus
Consumer durables	Home furnishings	Services and product focus
	Household appliances	Services and product focus
	Housewares and specialties	Services and product focus
	Leisure products	Services and product focus
	Photographic products	Services and product focus
	Small appliances	Services and product focus
Containers and packaging	Metal and glass containers	Capital or asset focus
	Paper packaging	Capital or asset focus
Media and entertainment	Ad agencies and marketing services companies	Services and product focus
	Ad-supported internet content platforms	Services and product focus
	Broadcast TV networks	Services and product focus
	Cable TV networks	Services and product focus
	Consumer and trade magazines	Services and product focus
	Data/professional publishing	Services and product focus
	Directories	Services and product focus
	E-Commerce (services)	Services and product focus
	Educational publishing	Services and product focus
	Film and TV programming production	Capital or asset focus
	Miscellaneous media and entertainment	Services and product focus
	Motion picture exhibitors	Services and product focus
	Music publishing	Services and product focus
	Music recording	Services and product focus
	Newspapers	Services and product focus
	Outdoor advertising	Services and product focus
	Printing	Commodity focus/scale driven
	Radio broadcasters	Services and product focus
	Trade shows	Services and product focus
	TV stations	Services and product focus

Oil and gas drilling, equipment and services	Onshore contract drilling	Commodity focus/scale driven
	Offshore contract drilling	Capital or Asset Focus
	Oil and gas equipment and services (oilfield services)	Commodity focus/scale driven
Retail and restaurants	Catalog retail	Services and product focus
	Internet retail	Services and product focus
	Department stores	Services and product focus
	General merchandise stores	Services and product focus
	Apparel retail	Services and product focus
	Computer and electronics retail	Services and product focus
	Home improvement retail	Services and product focus
	Specialty stores	Services and product focus
	Automotive retail	Services and product focus
	Home furnishing retail	Services and product focus
Health care services	Health care services	Commodity focus/scale driven
Transportation infrastructure	Airport services	National industries and utilities
	Highways	National industries and utilities
	Railtracks	National industries and utilities
	Marine ports and services	National industries and utilities
Environmental services	Environmental and facilities services	Services and product focus
Regulated utilities	Electric utilities	National industries and utilities
	Gas utilities	National industries and utilities
	Multi-utilities	National industries and utilities
	Water utilities	National industries and utilities
Unregulated power and gas	Independent power producers and energy traders	Capital or asset focus
	Merchant power	Capital or asset focus
Pharmaceuticals	Branded pharmaceuticals	Services and product focus
	Generic pharmaceuticals	Commodity focus/scale driven
Health care equipment	High-tech health care equipment	Product focus/scale driven
	Low-tech health care equipment	Commodity focus/scale driven
Branded nondurables	Brewers	Services and product focus
	Distillers and vintners	Services and product focus
	Soft drinks	Services and product focus
	Packaged foods and meats	Services and product focus

	Tobacco	Services and product focus
	Household products	Services and product focus
	Apparel, footwear, accessories, and luxury goods	Services and product focus
	Personal products	Services and product focus
Telecommunications and cable	Cable and satellite	Services and product focus
	Alternative carriers	Services and product focus
	Integrated telecommunication services	Services and product focus
	Wireless towers	Capital or asset focus
	Data center operators	Capital or asset focus
	Fiber-optic carriers	Capital or asset focus
	Wireless telecommunication services	Services and product focus

*See "Key Credit Factors For The Real Estate Industry." **For specialized REITs, there is no standard CPGP, as the CPGP will vary based on the underlying industry exposure (e.g. a forest and paper products REIT).

1. Analyzing subfactors for competitive advantage

193. Competitive advantage is the first component of our competitive position analysis. Companies that possess a sustainable competitive advantage are able to capitalize on key industry factors or mitigate associated risks more effectively. When a company operates in more than one business, we analyze each segment separately to form an overall view of its competitive advantage. In assessing competitive advantage, we evaluate the following subfactors:

- Strategy;
- Differentiation/uniqueness, product positioning/bundling;
- Brand reputation and marketing;
- Product/service quality;
- Barriers to entry, switching costs;
- Technological advantage and capabilities, technological displacement; and
- Asset profile.

a) Strategy

194. A company's business strategy will enhance or undermine its market entrenchment and business stability. Compelling business strategies can create a durable competitive advantage and thus a relatively stronger competitive position. We form an opinion as to the source and sustainability (if any) of the company's competitive advantage relative to its peers'. The company may have a

differentiation advantage (i.e., brand, technology, regulatory) or a cost advantage (i.e., lower cost producer/servicer at the same quality level), or a combination.

195. Our assessment of a company's strategy is informed by a company's historical performance and how realistic we view its forward-looking business objectives to be. These may include targets for market shares, the percentage of revenues derived from new products, price versus the competition's, sales or profit growth, and required investment levels. We evaluate these objectives in the context of industry dynamics and the attractiveness of the markets in which the company participates.

b) Differentiation/uniqueness, product positioning/bundling

196. The attributes of product or service differentiation vary by sector, and may include product or services features, performance, durability, reliability, delivery, and comprehensiveness, among other measures. The intensity of competition may be lower where buyers perceive the product or service to be highly differentiated or to have few substitutes. Conversely, products and services that lack differentiation, or offer little value-added in the eyes of customers, are generally commodity-type products that primarily compete on price. Competition intensity will often be highest where limited or moderate investment (R&D, capital expenditures, or advertising) or low employee skill levels (for service businesses) are required to compete. Independent market surveys, media commentaries, market share trends, and evidence of leading or lagging when it comes to raising or lowering prices can indicate varying degrees of product differentiation.

197. Product positioning influences how companies are able to extend or protect market shares by offering popular products or services. A company's abilities to replace aging products with new ones, or to launch product extensions, are important elements of product positioning. In addition, the ability to sell multiple products or services to the same customer, known as bundling or cross-selling, (for instance, offering an aftermarket servicing contract together with the sale of a new appliance) can create a competitive advantage by increasing customers' switching costs and fostering loyalty.

c) Brand reputation and marketing

198. Brand equity measures the price premium a company receives based on its brand relative to the generic equivalent. High brand equity typically translates into customer loyalty, built partially via marketing campaigns. One measure of advertising effectiveness can be revenue growth compared with the increase in advertising expenses.

199. We also analyze re-investment and advertising strategies to anticipate potential strengthening or weakening of a company's brand. A company's track record of boosting market share and delivering attractive margins could indicate its ability to build and maintain brand reputation.

d) Product/service level quality

200. The strength and consistency of a value proposition is an important factor contributing to a sustainable competitive advantage. Value proposition encompasses the key features of a product or a service that convince customers that their purchase has the right balance between price and quality. Customers generally perceive a product or a service to be good if their expectations are consistently met. Quality, both actual and perceived, can help a company attract and retain customers. Conversely, poor product and service quality may lead to product recalls, higher-than-normal product warnings, or service interruptions, which may reduce demand.

Measures of customer satisfaction and retention, such as attrition rates and contract renewal rates, can help trace trends in product/service quality.

201. Maintaining the value proposition requires consistency and adaptability around product design, marketing, and quality-related operating controls. This is pertinent where product differentiation matters, as is the case in most noncommodity industries, and especially so where environmental or human health (concerns for the chemical, food, and pharmaceutical industries) adds a liability dimension to the quality and value proposition. Similarly, regulated utilities (which often do not set their own prices) typically focus on delivering uninterrupted service, often to meet the standards set by their regulator.

e) Barriers to entry, switching costs

202. Barriers to entry can reduce or eliminate the threat of new market entrants. Where they are effective, these barriers can lead to more predictable revenues and profits, by limiting pricing pressures and customer losses, lowering marketing costs, and improving operating efficiency. While barriers to entry may enable premium pricing, a dominant player may rationally choose pricing restraint to further discourage new entrants.

203. Barriers to entry can be one or more of: a natural or regulatory monopoly; supportive regulation; high transportation costs; an embedded customer base that would incur high switching costs; a proprietary product or service; capital or technological intensiveness.

204. A natural monopoly may result from unusually high requirements for capital and operating expenditures that make it uneconomic for a market to support more than a single, dominant provider. The ultimate barrier to entry is found among regulated utilities, which provide an essential service in their 'de juris' monopolies and receive a guaranteed rate of return on their investments. A supportive regulatory regime can include rules and regulations with high hurdles that discourage competitors, or mandate so many obligations for a new entrant as to make market entry financially unviable.

205. In certain industrial sectors, proprietary access to a limited supply of key raw materials or skilled labor, or zoning laws that effectively preclude a new entrant, can provide a strong barrier to entry. Factors such as relationships, long-term contracts or maintenance agreements, or exclusive distribution agreements can result in a high degree of customer stickiness. A proprietary product or service that's protected by a copyright or patent can pose a significant hurdle to new competitors.

f) Technological advantage and capabilities, technological displacement

206. A company may benefit from a proprietary technology that enables it to offer either a superior product or a commodity-type product at a materially lower cost. Proven research and development (R&D) capabilities can deliver a differentiated, superior product or service, as in the pharmaceutical or high tech sectors. However, optimal R&D strategies or the importance or effectiveness of patent protection differ by industry, stage of product development, and product lifecycle.

207. Technological displacement can be a threat in many industries; new technologies or extensions of current ones can effectively displace a significant portion of a company's products or services.

g) Asset profile

208. A company's asset profile is a reflection of its reinvestment, which creates tangible or intangible

assets, or both. Companies in similar sectors and industries usually have similar reinvestment options and, thus, their asset profiles tend to be comparable. The reinvestment in "heavy" industries, such as oil and gas, metals and mining, and automotive, tends to produce more tangible assets, whereas the reinvestment in certain "light" industries, such as services, media and entertainment, and retail, tends to produce more intangible assets.

209. We evaluate how a company's asset profile supports or undermines its competitive advantage by reviewing its manufacturing or service creation capabilities and investment requirements, its distribution capabilities, and its track record and commitment to reinvesting in its asset base. This may include a review of the company's ability to attract and retain a talented workforce; its degree of vertical integration and how that may help or hinder its ability to secure supply sources, control the value-added part of its production chain, or adjust to technological developments; or its ability develop a broad and strong distribution network.

2. Analyzing subfactors for scale, scope, and diversity

210. In assessing the relative strength of this component, we evaluate four subfactors:

- Diversity of product or service range;
- Geographic diversity;
- Volumes, size of markets and revenues, and market shares; and
- Maturity of products or services.

211. In a given industry, entities with a broader mix of business activities are typically lower risk, and entities with a narrower mix are higher risk. High concentration of business volumes by product, customer, or geography, or a concentration in the production footprint or supplier base, can lead to less stable and predictable revenues and profits. Comparatively broader diversity helps a company withstand economic, competitive, or technological threats better than its peers.

212. There is no minimum size criterion, although size often provides a measure of diversification. Size and scope of operations is important relative to those of industry peers, though not in absolute terms. While relatively smaller companies can enjoy a high degree of diversification, they will likely be, almost by definition, more concentrated in terms of product, number of customers, or geography than their larger peers in the same industry.

213. Successful and continuing diversification supports a stronger competitive position. Conversely, poor diversification weakens overall competitive position. For example, a company will weaken its overall business position if it enters new product lines and countries where it has limited expertise and lacks critical mass to be a real competitor to the incumbent market leaders. The weakness is greater when the new products or markets are riskier than the traditional core business.

214. Where applicable, we also include under scale, scope, and diversity an assessment of the potential benefits derived from unconsolidated (or partially consolidated) investments in strategic assets. The relative significance of such an investment and whether it is in an industry that exhibits high or, conversely, low correlation with the issuer's businesses would be considered in determining its potential benefits to scale, scope, and diversity. This excludes nonstrategic, financial investments, the analysis of which does not fall under the competitive position criteria but, instead, under the capital structure criteria.

a) Diversity of product or service range

215. The concentration of business volumes or revenues in a particular or comparatively small set of

products or services can lead to less stable revenues and profits. Even if this concentration is in an attractive product or service, it may be a weakness. Likewise, the concentration of business volumes with a particular customer or a small group of customers, or the reliance on one or a few suppliers, can expose the company to a potentially greater risk of losing and having to replace related revenues and profits. On the other hand, successful diversification across products, customers, and/or suppliers can lead to more stable and predictable revenues and profits, which supports a stronger assessment of scale, scope, and diversity.

216. The relative contribution of different products or services to a company's revenues or profits helps us gauge its diversity. We also evaluate the correlation of demand between product or services lines. High correlation in demand between seemingly different product or service lines will accentuate volume declines during a weak part of the business cycle.

217. In most sectors, the share of revenue a company receives from its largest five to 10 customers or counterparties reveals how diversified its customer base is. However, other considerations such as the stability and credit quality of that customer base, and the company's ability to retain significant customers, can be mitigating or accentuating factors in our overall evaluation. Likewise, supplier dependency can often be measured based on a supplier's share of a company's operating or capital costs. However, other factors, such as the degree of interdependence between the company and its supplier(s), the substitutability of key supply sources, and the company's presumed ability to secure alternative supply without incurring substantial switching costs, are important considerations. Low switching costs (i.e. limited impact on input price, quality, or delivery times as a result of having to adapt to a new supply chain partner) can mitigate a high level of concentration.

b) Geographic diversity

218. We assess geographic diversity both from the standpoint of the breadth of the company's served or addressable markets, and from the standpoint of how geographically concentrated its facilities are.

219. The concentration of business volumes and revenues within a particular region can lead to greater exposure to economic factors affecting demand for a company's goods or services in that region. Even if the company's volumes and revenues are concentrated in an attractive region, it may still be vulnerable to a significant drop in demand for its goods and services. Conversely, a company that serves multiple regions may benefit from different demand conditions in each, possibly resulting in greater revenue stability and more consistent profitability than a more focused peer's. That said, we consider geographic diversification in the context of the industry and the size of the local or regional economy. For instance, companies operating in local industries (such as food retailers) may benefit from a well-entrenched local position.

220. Generally, though, geographically concentrated production or service operations can expose a company to the risk of disruption, and damage revenues and profitability. Even when country risks don't appear significant, a company's vulnerability to exogenous factors (for example, natural disasters, labor or political unrest) increases with geographic concentration.

c) Volumes, size of markets and revenues, market share

221. Absolute sales or unit volumes and market share do not, by themselves, support a strong assessment of scale, scope, and diversity. Yet superior market share is a positive, since it may indicate a broad range of operations, products, or services.

222. We view volume stability (relative to peers') as a positive especially when: a company has

demonstrated it during an economic downturn; if it has been achieved without relying on greater price concessions than competitors have made; and when it is likely to be sustained in the future. However, volume stability combined with shrinking market share could be evidence of a company's diminishing prospects for future profitability. We assess the predictability of business volumes and the likely degree of future volume stability by analyzing the company's performance relative to peers' on several industry factors: cyclicality; ability to adapt to technological and regulatory threats; the profile of the customer base (stickiness); and the potential life cycle of the company's products or services.

223. Depending on the industry sector, we measure a company's relative size and market share based on unit sales; the absolute amount of revenues; and the percentage of revenues captured from total industry revenues. We also adjust for industry and company specific qualitative considerations. For example, if an industry is particularly fragmented and has a number of similarly sized participants, none may have a particular advantage or disadvantage with respect to market share.

d) Maturity of products or services

224. The degree of maturity and the relative position on the lifecycle curve of the company's product or service portfolio affect the stability and sustainability of its revenues and margins. It is important to identify the stage of development of a company's products or services in order to measure the life cycle risks that may be associated with key products or services.

225. Mature products or services (e.g. consumer products or broadcast programming) are not necessarily a negative, in our view, if they still contribute reliable profits. If demand is declining for a company's product or service, we examine its track record on introducing new products with staying power. Similarly, a company's track record with product launches is particularly relevant.

3. Analyzing subfactors for operating efficiency

226. In assessing the relative strength of this component, we consider four subfactors:

- Cost structure,
- Manufacturing processes,
- Working capital management, and
- Technology.

227. To the extent a company has high operating efficiency, it should be able to generate better profit margins than peers that compete in the same markets, whatever the prevailing market conditions. The ability to minimize manufacturing and other operational costs and thus maximize margins and cash flow--for example, through manufacturing excellence, cost control, and diligent working capital management--will provide the funds for research and development, marketing, and customer service.

a) Cost structure

228. Companies that are well positioned from a cost standpoint will typically enjoy higher capacity utilization and be more profitable over the course of the business cycle. Cost structure and cost control are keys to generating strong profits and cash flow, particularly for companies that produce commodities, operate in mature industries, or face pricing pressures. It is important to

consider whether a company or any of its competitors has a sustainable cost advantage, which can be based on access to cheaper energy, favorable manufacturing locations, or lower and more flexible labor costs, for example.

229. Where information is available, we examine a company's fixed versus variable cost mix as an indication of operating leverage, a measure of how revenue growth translates into growth in operating income. A company with significant operating leverage may witness dramatic declines in operating profit if unit volumes fall, as during cyclical downturns. Conversely, in an upturn, once revenues pass the breakeven point, a substantial percentage of incremental revenues typically becomes profit.

b) Manufacturing process

230. Capital intensity characterizes many heavy manufacturing sectors that require minimum volumes to produce acceptable profits, cash flow, and return on assets. We view capacity utilization through the business cycle (combined with the cost base) as a good indication of manufacturers' ability to maintain profits in varying economic scenarios. Our capacity utilization assessment is based on a company's production capacity across its manufacturing footprint. In addition, we consider the direction of a company's capacity utilization in light of our unit sales expectations, as opposed to analyzing it plant-by-plant.

231. Labor relations remain an important focus in our analysis of operating efficiency for manufacturers. Often, a company's labor cost structure is driven by its history of contractual negotiations and the countries in which it operates. We examine the rigidity or flexibility of a company's labor costs and the extent to which it relies on labor rather than automation. We analyze labor cost structure by assessing the extent of union representation, wage and benefit costs as a share of cost of goods sold (when available), and by assessing the balance of capital equipment vs. labor input in the manufacturing process. We also incorporate trends in a company's efforts to transfer labor costs from high-cost to low-cost regions.

c) Working capital management

232. Working capital management--of current or short-term assets and liabilities--is a key factor in our evaluation of operating efficiency. In general, companies with solid working capital management skills exhibit shorter cash conversion cycles (defined as days' investment in inventory and receivables less days' investment in accounts payable) than their lower-skilled peers. Short cash-conversion cycles could, for instance, demonstrate that a company has a stronger position in the supply chain (for example, requiring suppliers or dealers to hold more of its inventory). This allows a company to direct more capital than its peers can to other areas of investment.

d) Technology

233. Technology can play an important role in achieving superior operating efficiency through effective yield management (by improving input/output ratios), supply chain automation, and cost optimization.

234. Achieving high yield management is particularly important in industries with limited inventory and high fixed costs, such as transportation, lodging, media, and retail. The most efficient airlines can achieve higher revenue per available seat mile than their peers, while the most efficient lodging companies can achieve a higher revenue per available room than their peers. Both industries rely

heavily on technology to effectively allocate inventory (seats and rooms) to maximize sales and profitability.

235. Effective supply chain automation systems enable companies to reduce investments in inventory and better forecast future orders based on current trends. By enabling electronic data interchange between supplier and retailer, such systems help speed orders and reorders for goods by quickly pinpointing which merchandise is selling well and needs restocking. They also identify slow moving inventory that needs to be marked down, making space available for fresh merchandise.

236. Effective use of technology can also help hold down costs by improving productivity via automation and workflow management. This can reduce selling, general, and administrative costs, which usually represent a substantial portion of expenditures for industries with high fixed costs, thus boosting earnings.

4. Industry-specific SER parameters

Table 28

SER Calibration By Industry Based On EBITDA

	--Volatility of profitability assessment*--					
	1	2	3	4	5	6
Transportation cyclical	=<10%	>10%-14%	>14%-22%	>22%-33%	>33%-76%	>76%
Auto OEM	=<25%	>25%-33%	>33%-35%	>35%-40%	>40%-46%	>46%
Metals and mining downstream	=<16%	>16%-31%	>31%-42%	>42%-53%	>53%-82%	>82%
Metals and mining upstream	=<16%	>16%-23%	>23%-28%	>28%-34%	>34%-59%	>59%
Homebuilders and developers	=<19%	>19%-33%	>33%-46%	>46%-65%	>65%-95%	>95%
Oil and gas refining and marketing	=<14%	>14%-21%	>21%-35%	>35%-46%	>46%-82%	>82%
Forest and paper products	=<9%	>9%-18%	>18%-26%	>26%-51%	>51%-114%	>114%
Building materials	=<9%	>9%-16%	>16%-19%	>19%-24%	>24%-33%	>33%
Oil and gas integrated, exploration and production	=<12%	>12%-19%	>19%-22%	>22%-28%	>28%-38%	>38%
Agribusiness and commodity foods	=<12%	>12%-19%	>19%-25%	>25%-39%	>39%-57%	>57%
Real estate investment trusts (REITs)	=<5%	>5%-9%	>9%-13%	>13%-20%	>20%-32%	>32%
Leisure and sports	=<5%	>5%-9%	>9%-12%	>12%-16%	>16%-24%	>24%
Commodity chemicals	=<14%	>14%-19%	>19%-28%	>28%-37%	>37%-51%	>51%
Auto suppliers	=<15%	>15%-20%	>20%-26%	>26%-32%	>32%-45%	>45%
Aerospace and defense	=<6%	>6%-9%	>9%-15%	>15%-24%	>24%-41%	>41%
Technology hardware and semiconductors	=<11%	>11%-15%	>15%-22%	>22%-31%	>31%-58%	>58%
Specialty chemicals	=<5%	>5%-10%	>10%-14%	>14%-23%	>23%-36%	>36%
Capital goods	=<12%	>12%-16%	>16%-21%	>21%-30%	>30%-45%	>45%
Engineering and construction	=<9%	>9%-14%	>14%-20%	>20%-28%	>28%-39%	>39%
Railroads and package express	=<5%	>5%-8%	>8%-10%	>10%-13%	>13%-22%	>22%

SER Calibration By Industry Based On EBITDA (cont.)

	--Volatility of profitability assessment*--					
	1	2	3	4	5	6
Business and consumer services	=<4%	>4%-8%	>8%-11%	>11%-16%	>16%-30%	>30%
Midstream energy	=<5%	>5%-9%	>9%-11%	>11%-15%	>15%-31%	>31%
Technology software and services	=<4%	>4%-9%	>9%-14%	>14%-19%	>19%-33%	>33%
Consumer durables	=<7%	>7%-10%	>10%-13%	>13%-19%	>19%-35%	>35%
Containers and packaging	=<5%	>5%-7%	>7%-12%	>12%-18%	>18%-26%	>26%
Media and entertainment	=<6%	>6%-10%	>10%-14%	>14%-20%	>20%-29%	>29%
Oil and gas drilling, equipment and services	=<16%	>16%-22%	>22%-28%	>28%-44%	>44%-62%	>62%
Retail and restaurants	=<4%	>4%-8%	>8%-11%	>11%-16%	>16%-26%	>26%
Health care services	=<4%	>4%-5%	>5%-9%	>9%-12%	>12%-19%	>19%
Transportation infrastructure	=<2%	>2%-4%	>4%-7%	>7%-12%	>12%-19%	>19%
Environmental services	=<5%	>5%-9%	>9%-13%	>13%-22%	>22%-29%	>29%
Regulated utilities	=<4%	>4%-7%	>7%-9%	>9%-14%	>14%-26%	>26%
Unregulated power and gas	=<7%	>7%-16%	>16%-20%	>20%-29%	>29%-47%	>47%
Pharmaceuticals	=<5%	>5%-8%	>8%-11%	>11%-17%	>17%-32%	>32%
Health care equipment	=<3%	>3%-5%	>5%-6%	>6%-10%	>10%-25%	>25%
Branded nondurables	=<4%	>4%-7%	>7%-10%	>10%-15%	>15%-43%	>43%
Telecommunications and cable	=<3%	>3%-6%	>6%-9%	>9%-13%	>13%-23%	>23%
Overall	=<5%	>5%-9%	>9%-15%	>15%-23%	>23%-43%	>43%

*The data ranges include the values up to and including the upper bound. As an example, for a range of 5%-9%, a value of 5% is excluded, while a value of 9% is included; the numbers are rounded to the nearest whole number for presentation purposes.

Table 29

SER Calibration By Industry Based On EBITDA Margin

	--Volatility of profitability assessment*--					
	1	2	3	4	5	6
Transportation cyclical	=<4%	>4%-8%	>8%-16%	>16%-28%	>28%-69%	>69%
Auto OEM	=<15%	>15%-19%	>19%-29%	>29%-31%	>31%-45%	>45%
Metals and mining downstream	=<10%	>10%-18%	>18%-26%	>26%-36%	>36%-56%	>56%
Metals and mining upstream	=<8%	>8%-10%	>10%-14%	>14%-19%	>19%-31%	>31%
Homebuilders and developers	=<10%	>10%-18%	>18%-30%	>30%-56%	>56%-114%	>114%
Oil and gas refining and marketing	=<12%	>12%-22%	>22%-28%	>28%-42%	>42%-71%	>71%
Forest and paper products	=<8%	>8%-13%	>13%-21%	>21%-41%	>41%-117%	>117%
Building materials	=<4%	>4%-8%	>8%-13%	>13%-18%	>18%-23%	>23%
Oil and gas integrated, exploration and production	=<4%	>4%-6%	>6%-8%	>8%-13%	>13%-22%	>22%

SER Calibration By Industry Based On EBITDA Margin (cont.)

	--Volatility of profitability assessment*--					
	1	2	3	4	5	6
Agribusiness and commodity foods	=<9%	>9%-14%	>14%-18%	>18%-27%	>27%-100%	>100%
Real estate investment trusts (REITs)	=<2%	>2%-5%	>5%-8%	>8%-13%	>13%-34%	>34%
Leisure and sports	=<3%	>3%-5%	>5%-6%	>6%-9%	>9%-18%	>18%
Commodity chemicals	=<9%	>9%-14%	>14%-18%	>18%-25%	>25%-37%	>37%
Auto suppliers	=<9%	>9%-13%	>13%-18%	>18%-23%	>23%-40%	>40%
Aerospace and defense	=<3%	>3%-6%	>6%-7%	>7%-12%	>12%-24%	>24%
Technology hardware and semiconductors	=<7%	>7%-10%	>10%-15%	>15%-21%	>21%-62%	>62%
Specialty chemicals	=<3%	>3%-6%	>6%-10%	>10%-19%	>19%-28%	>28%
Capital goods	=<6%	>6%-9%	>9%-13%	>13%-20%	>20%-33%	>33%
Engineering and construction	=<6%	>6%-8%	>8%-12%	>12%-17%	>17%-26%	>26%
Railroads and package express	=<2%	>2%-6%	>6%-8%	>8%-10%	>10%-17%	>17%
Business and consumer services	=<3%	>3%-5%	>5%-7%	>7%-12%	>12%-22%	>22%
Midstream energy	=<3%	>3%-6%	>6%-9%	>9%-14%	>14%-28%	>28%
Technology software and services	=<3%	>3%-6%	>6%-10%	>10%-15%	>15%-30%	>30%
Consumer durables	=<4%	>4%-8%	>8%-11%	>11%-15%	>15%-26%	>26%
Containers and packaging	=<5%	>5%-7%	>7%-9%	>9%-15%	>15%-22%	>22%
Media and entertainment	=<4%	>4%-6%	>6%-9%	>9%-14%	>14%-24%	>24%
Oil and gas drilling, equipment and services	=<6%	>6%-12%	>12%-16%	>16%-22%	>22%-32%	>32%
Retail and restaurants	=<3%	>3%-5%	>5%-7%	>7%-12%	>12%-21%	>21%
Health care services	=<3%	>3%-5%	>5%-6%	>6%-8%	>8%-15%	>15%
Transportation infrastructure	=<1%	>1%-3%	>3%-5%	>5%-7%	>7%-15%	>15%
Environmental services	=<3%	>3%-4%	>4%-6%	>6%-10%	>10%-24%	>24%
Regulated utilities	=<4%	>4%-7%	>7%-9%	>9%-14%	>14%-24%	>24%
Unregulated power and gas	=<6%	>6%-10%	>10%-15%	>15%-23%	>23%-41%	>41%
Pharmaceuticals	=<4%	>4%-5%	>5%-7%	>7%-10%	>10%-21%	>21%
Health care equipment	=<2%	>2%-4%	>4%-5%	>5%-10%	>10%-16%	>16%
Branded nondurables	=<3%	>3%-6%	>6%-9%	>9%-13%	>13%-28%	>28%
Telecommunications and cable	=<2%	>2%-4%	>4%-5%	>5%-7%	>7%-13%	>13%
Overall	=<3%	>3%-6%	>6%-10%	>10%-16%	>16%-32%	>32%

*The data ranges include the values up to and including the upper bound. As an example, for a range of 5%-9%, a value of 5% is excluded, while a value of 9% is included; the numbers are rounded to the nearest whole number for presentation purposes.

SER Calibration By Industry Based On Return On Capital

	--Volatility of profitability assessment*--					
	1	2	3	4	5	6
Transportation cyclical	=<14%	>14%-28%	>28%-39%	>39%-53%	>53%-156%	>156%
Auto OEM	=<42%	>42%-64%	>64%-74%	>74%-86%	>86%-180%	>180%
Metals and mining downstream	=<25%	>25%-32%	>32%-43%	>43%-53%	>53%-92%	>92%
Metals and mining upstream	=<22%	>22%-30%	>30%-38%	>38%-45%	>45%-93%	>93%
Homebuilders and developers	=<12%	>12%-31%	>31%-50%	>50%-70%	>70%-88%	>88%
Oil and gas refining and marketing	=<14%	>14%-30%	>30%-48%	>48%-67%	>67%-136%	>136%
Forest and paper products	=<10%	>10%-22%	>22%-40%	>40%-89%	>89%-304%	>304%
Building materials	=<13%	>13%-20%	>20%-26%	>26%-36%	>36%-62%	>62%
Oil and gas integrated, exploration and production	=<16%	>16%-22%	>22%-31%	>31%-43%	>43%-89%	>89%
Agribusiness and commodity foods	=<12%	>12%-15%	>15%-29%	>29%-55%	>55%-111%	>111%
Real estate investment trusts (REITs)	=<8%	>8%-14%	>14%-20%	>20%-26%	>26%-116%	>116%
Leisure and sports	=<11%	>11%-17%	>17%-26%	>26%-34%	>34%-64%	>64%
Commodity chemicals	=<19%	>19%-28%	>28%-41%	>41%-50%	>50%-73%	>73%
Auto suppliers	=<20%	>20%-39%	>39%-50%	>50%-67%	>67%-111%	>111%
Aerospace and defense	=<7%	>7%-13%	>13%-19%	>19%-27%	>27%-61%	>61%
Technology hardware and semiconductors	=<8%	>8%-21%	>21%-34%	>34%-49%	>49%-113%	>113%
Specialty chemicals	=<5%	>5%-18%	>18%-28%	>28%-43%	>43%-64%	>64%
Capital goods	=<15%	>15%-24%	>24%-31%	>31%-45%	>45%-121%	>121%
Engineering and construction	=<12%	>12%-21%	>21%-23%	>23%-33%	>33%-54%	>54%
Railroads and package express	=<3%	>3%-11%	>11%-17%	>17%-20%	>20%-27%	>27%
Business and consumer services	=<9%	>9%-17%	>17%-23%	>23%-40%	>40%-87%	>87%
Midstream energy	=<5%	>5%-11%	>11%-17%	>17%-22%	>22%-34%	>34%
Technology software and services	=<8%	>8%-21%	>21%-35%	>35%-65%	>65%-105%	>105%
Consumer durables	=<8%	>8%-13%	>13%-20%	>20%-35%	>35%-60%	>60%
Containers and packaging	=<6%	>6%-14%	>14%-23%	>23%-35%	>35%-52%	>52%
Media and entertainment	=<9%	>9%-17%	>17%-26%	>26%-40%	>40%-86%	>86%
Oil and gas drilling, equipment and services	=<25%	>25%-33%	>33%-45%	>45%-65%	>65%-90%	>90%
Retail and restaurants	=<6%	>6%-14%	>14%-18%	>18%-26%	>26%-69%	>69%
Health care services	=<6%	>6%-10%	>10%-15%	>15%-25%	>25%-44%	>44%
Transportation infrastructure	=<5%	>5%-9%	>9%-12%	>12%-16%	>16%-27%	>27%
Environmental Services	=<7%	>7%-12%	>12%-24%	>24%-35%	>35%-72%	>72%

SER Calibration By Industry Based On Return On Capital (cont.)

	--Volatility of profitability assessment*--					
	1	2	3	4	5	6
Regulated utilities	=<6%	>6%-9%	>9%-13%	>13%-20%	>20%-36%	>36%
Unregulated power and gas	=<14%	>14%-19%	>19%-29%	>29%-55%	>55%-117%	>117%
Pharmaceuticals	=<6%	>6%-8%	>8%-15%	>15%-20%	>20%-33%	>33%
Health care equipment	=<4%	>4%-8%	>8%-19%	>19%-31%	>31%-81%	>81%
Branded nondurables	=<6%	>6%-10%	>10%-17%	>17%-29%	>29%-63%	>63%
Telecommunications and cable	=<7%	>7%-13%	>13%-19%	>19%-26%	>26%-60%	>60%
Overall	=<7%	>7%-15%	>15%-23%	>23%-38%	>38%-81%	>81%

*The data ranges include the values up to and including the upper bound. As an example, for a range of 5%-9%, a value of 5% is excluded, while a value of 9% is included; the numbers are rounded to the nearest whole number for presentation purposes.

C. Cash Flow/Leverage Analysis

1. The merits and drawbacks of each cash flow measure

a) EBITDA

237. EBITDA is a widely used, and therefore a highly comparable, indicator of cash flow, although it has significant limitations. Because EBITDA derives from the income statement entries, it can be distorted by the same accounting issues that limit the use of earnings as a basis of cash flow. In addition, interest can be a substantial cash outflow for speculative-grade companies and therefore EBITDA can materially overstate cash flow in some cases. Nevertheless, it serves as a useful and common starting point for cash flow analysis and is useful in ranking the financial strength of different companies.

b) Funds from operations (FFO)

238. FFO is a hybrid cash flow measure that estimates a company's inherent ability to generate recurring cash flow from its operations independent of working capital fluctuations. FFO estimates the cash flow available to the company before working capital, capital spending, and discretionary items such as dividends, acquisitions, etc.

239. Because cash flow from operations tends to be more volatile than FFO, FFO is often used to smooth period-over-period variation in working capital. We consider it a better proxy of recurring cash flow generation because management can more easily manipulate working capital depending on its liquidity or accounting needs. However, we do not generally rely on FFO as a guiding cash flow measure in situations where assessing working capital changes is important to judge a company's cash flow generating ability and general creditworthiness. For example, for working-capital-intensive industries such as retailing, operating cash flow may be a better indicator than FFO of the firm's actual cash generation.

240. FFO is a good measure of cash flow for well-established companies whose long-term viability is

relatively certain (i.e., for highly rated companies). For such companies, there can be greater analytical reliance on FFO and its relation to the total debt burden. FFO remains very helpful in the relative ranking of companies. In addition, more established, healthier companies usually have a wider array of financing possibilities to cover potential short-term liquidity needs and to refinance upcoming maturities. For marginal credit situations, the focus shifts more to free operating cash flow--after deducting the various fixed uses such as working capital investment and capital expenditures--as this measure is more directly related to current debt service capability.

c) Cash flow from operations (CFO)

241. The measurement and analysis of CFO forms an important part of our ratings assessment, in particular for companies that operate in working-capital-intensive industries or industries in which working capital flows can be volatile. CFO is distinct from FFO as it is a pure measure of cash flow calculated after accounting for the impact on earnings of changes in operating assets and liabilities. CFO is cash flow that is available to finance items such as capital expenditures, repay borrowing, and pay for dividends and share buybacks.

242. In many industries, companies shift their focus to cash flow generation in a downturn. As a result, even though they typically generate less cash from ordinary business activities because of low capacity utilization and relatively low fixed-cost absorption, they may generate cash by reducing inventories and receivables. Therefore, although FFO is likely to be lower in a downturn, the impact on CFO may not be as great. In times of strong growth the opposite will be true, and consistently lower CFO compared to FFO without a corresponding increase in revenue and profitability can indicate an untenable situation.

243. Working capital is a key element of a company's cash flow generation. While there tends to be a need to build up working capital and therefore to consume cash in a growth or expansion phase, changes in working capital can also act as a buffer in case of a downturn. Many companies will sell off inventories and invest a lower amount in raw materials because of weaker business activities, both of which reduce the amount of capital and cash that is tied up in working capital. Therefore, working capital fluctuations can occur both in periods of revenue growth and contraction and analyzing a company's near-term working capital needs is crucial for estimating future cash flow developments.

244. Often, businesses that are capital intensive are not working-capital-intensive: most of the capital commitment is upfront in equipment and machinery, while asset-light businesses may have to invest proportionally more in inventories and receivables. That also affects margins, because capital-intensive businesses tend to have proportionally lower operating expenses (and therefore higher EBITDA margins), while working-capital-intensive businesses usually report lower EBITDA margins. The resulting cash flow volatility can be significant: because all investment is made upfront in a capital-intensive business, there is usually more room to absorb subsequent EBITDA volatility because margins are higher. For example, a capital-intensive company may remain reasonably profitable even if its EBITDA margin declines from 30% to 20%. By contrast, a working-capital-intensive business with a lower EBITDA margin (due to higher operating expenses) of 8% can post a negative EBITDA margin if EBITDA volatility is large.

d) Free operating cash flow (FOCF)

245. By deducting capital expenditures from CFO, we arrive at FOCF, which can be used as a proxy for a company's cash generated from core operations. We may exclude discretionary capital expenditures for capacity growth from the FOCF calculation, but in practice it is often difficult to discriminate between spending for expansion and replacement. And, while companies have some

flexibility to manage their capital budgets to weather down cycles, such flexibility is generally temporary and unsustainable in light of intrinsic requirements of the business. For example, companies can be compelled to increase their investment programs because of strong demand growth or technological changes. Regulated entities (for example, telecommunications companies) might also face significant investment requirements related to their concession contracts (the understanding between a company and the host government that specifies the rules under which the company can operate locally).

246. Positive FOCF is a sign of strength and helpful in distinguishing between two companies with the same FFO. In addition, FOCF is helpful in differentiating between the cash flows generated by more and less capital-intensive companies and industries.

247. In highly capital-intensive industries (where maintenance capital expenditure requirements tend to be high) or in other situations in which companies have little flexibility to postpone capital expenditures, measures such as FFO to debt and debt to EBITDA may provide less valuable insight into relative creditworthiness because they fail to capture potentially meaningful capital expenditures. In such cases, a ratio such as FOCF to debt provides greater analytical insight.

248. A company serving a low-growth or declining market may exhibit relatively strong FOCF because of diminishing fixed and working capital needs. Growth companies, in contrast, exhibit thin or even negative FOCF because of the investment needed to support growth. For the low-growth company, credit analysis weighs the positive, strong current cash flow against the danger that this high level of cash flow might not be sustainable. For the high-growth company, the opposite is true: weighing the negatives of a current cash deficit against prospects of enhanced cash flow once current investments begin yielding cash benefits. In the latter case, if we view the growth investment as temporary and not likely to lead to increased leverage over the long-term, we'll place greater analytical importance on FFO to debt rather than on FOCF to debt. In any event, we also consider the impact of a company's growth environment in our business risk analysis, specifically in a company's industry risk analysis (see section B).

e) Discretionary cash flow (DCF)

249. For corporate issuers primarily rated in the investment-grade universe, DCF to debt can be an important barometer of future cash flow adequacy as it more fully reflects a company's financial policy, including decisions regarding dividend payouts and share buybacks. In addition, potential M&A can represent a very significant use of cash and is an important component in cash flow analysis.

250. The level of dividends depends on a company's financial strategy. Companies with aggressive dividend payout targets might be reluctant to reduce dividends even under some liquidity pressure. In addition, investment-grade companies are less likely to reduce dividend payments following some reversals--although dividends ultimately are discretionary. DCF is the truest reflection of excess cash flow, but it is also the most affected by management decisions and, therefore, does not necessarily reflect the potential cash flow available.

D. Diversification/Portfolio Effect

1. Academic research

251. Academic research recently concluded that, during the global financial crisis of 2007-2009, conglomerates had the advantage over single sector-focused firms because they had better

access to the credit markets as a result of their debt co-insurance and used the internal capital markets more efficiently (i.e., their core businesses had stronger cash flows). Debt co-insurance is the view that the joining-together of two or more firms whose earnings streams are less-than-perfectly correlated reduces the risk of default of the merged firms (i.e., the co-insurance effect) and thereby increases the "debt capacity" or "borrowing ability" of the combined enterprise. These financing alternatives became more valuable during the crisis. (Source: "Does Diversification Create Value In The Presence Of External Financing Constraints? Evidence From The 2007-2009 Financial Crisis," Venkat Kuppuswamy and Belen Villalonga, Harvard Business School, Aug. 19, 2011.)

252. In addition, fully diversified, focused companies saw more narrow credit default swap spreads from 2004-2010 vs. less diversified firms. This highlighted that lenders were differentiating for risk and providing these companies with easier and cheaper access to capital. (Source: "The Power of Diversified Companies During Crises," The Boston Consulting Group and Leipzig Graduate School of Management, January 2012.)

253. Many rated conglomerates are either country- or region-specific; only a small percentage are truly global. The difference is important when assessing the country and macroeconomic risk factors. Historical measures for each region, based on volatility and correlation, reflect regional trends that are likely to change over time.

E. Financial Policy

1. Controlling shareholders

254. Controlling shareholder(s)--if they exist--exert significant influence over a company's financial risk profile, given their ability to use their direct or indirect control of the company's financial policies for their own benefit. Although the criteria do not associate the presence of controlling shareholder(s) to any predefined negative or positive impact, we assess the potential medium- to long-term implications for a company's credit standing of these strategies. Long-term ownership--such as exists in many family-run businesses--is often accompanied by financial discipline and reluctance to incur aggressive leverage. Conversely, short-term ownership--such as exists in private equity sponsor-owned companies--generally entails financial policies aimed at achieving rapid returns for shareholders typically through aggressive debt leverage.

255. The criteria define controlling shareholder(s) as:

- A private shareholder (an individual or a family) with majority ownership or control of the board of directors;
- A group of shareholders holding joint control over the company's board of directors through a shareholder agreement. The shareholder agreement may be comprehensive in scope or limited only to certain financial aspects; and
- A private equity firm or a group of private equity firms holding at least 40% in a company or with majority control of its board of directors.

256. A company is not considered to have a controlling shareholder if it is publicly listed with more than 50% of voting interest listed or when there is no evidence of a particular shareholder or group of shareholders exerting 'de facto' control over a company.

257. Companies that have as their controlling shareholder governments or government-related entities, infrastructure and asset-management funds, and diversified holding companies and

conglomerates are assessed in separate criteria.

2. Financial discipline

a) Leverage influence from acquisitions

258. Companies may employ more or less acquisitive growth strategies based on industry dynamics, regulatory changes, market opportunities, and other factors. We consider management teams with disciplined, transparent acquisition strategies that are consistent with their financial policy framework as providing a high degree of visibility into the projected evolution of cash flow and credit measures. Our assessment takes into account management's track record in terms of acquisition strategy and the related impact on the company's financial risk profile. Historical evidence of limited management tolerance for significant debt-funded acquisitions provides meaningful support for the view that projected credit ratios would not significantly weaken as a result of the company's acquisition policy. Conversely, management teams that pursue opportunistic acquisition strategies, without well-defined parameters, increase the risks that the company's financial risk profile may deteriorate well beyond our forecasts.

259. Acquisition funding policies and management's track record in this respect also provide meaningful insight in terms of credit ratio stability. In the criteria, we take into account management's willingness and capacity to mobilize all funding resources to restore credit quality, such as issuing equity or disposing of assets, to mitigate the impact of sizable acquisitions on credit ratios. The financial policy framework and related historical evidence are key considerations in our assessment.

b) Leverage influence from shareholder remuneration policies

260. A company's approach to rewarding shareholders demonstrates how it balances the interests of its various stakeholders over time. Companies that are consistent and transparent in their shareholder remuneration policies, and exhibit a willingness to adjust shareholder returns to mitigate adverse operating conditions, provide greater support to their long-term credit quality than other companies. Conversely, companies that prioritize cash returns to shareholders in periods of deteriorating economic, operating, or share price performance can significantly undermine long-term credit quality and exacerbate the credit impact of adverse business conditions. In assessing a company's shareholder remuneration policies, the criteria focus on the predictability of shareholder remuneration plans, including how a company builds shareholder expectations, its track record in executing shareholder return policies over time, and how shareholder returns compare with industry peers'.

261. Shareholder remuneration policies that lack transparency or deviate meaningfully from those of industry peers introduce a higher degree of event risk and volatility and will be assessed as less predictable under the criteria. Dividend and capital return policies that function primarily as a means to distribute surplus capital to shareholders based on transparent and stable payout ratios--after satisfying all capital requirements and leverage objectives of the company, and that support stable to improving leverage ratios--are considered the most supportive of long term credit quality.

c) Leverage influence from plans regarding investment decisions or organic growth strategies

262. The process by which a company identifies, funds, and executes organic growth, such as expansion into new products and/or new markets, can have a significant impact on its long-term credit quality. Companies that have a disciplined, coherent, and manageable organic growth strategy, and have a track record of successful execution are better positioned to continue to attract third-party capital and maintain long-term credit quality. By contrast, companies that allocate significant amounts of capital to numerous, unrelated, large and/or complex projects and often incur material overspending against the original budget can significantly increase their credit risk.

263. The criteria assess whether management's organic growth strategies are transparent, comprehensive, and measurable. We seek to evaluate the company's mid- to long-term growth objectives--including strategic rationales and associated execution risks--as well as the criteria it uses to allocate capital. Effective capital allocation is likely to include guidelines for capital deployment, including minimum return hurdles, competitor activity analysis, and demand forecasting. The company's track record will provide key data for this assessment, including how well it executes large and/or complex projects against initial budgets, cost overruns, and timelines.

3. Financial policy framework

a) Comprehensiveness of financial policy framework

264. Financial policies that are clearly defined, unambiguous, and provide a tight framework around management behavior are the most reliable in determining an issuer's future financial risk profile. We assess as consistent with a supportive assessment, policies that are clear, measurable, and well understood by all key stakeholders. Accordingly, the financial policy framework must include well-defined parameters regarding how the issuer will manage its cash flow protection strategies and debt leverage profile. This includes at least one key or a combination of financial ratio constraints (such as maximum debt to EBITDA threshold) and the latter must be relevant with respect to the issuer's industry and/or capital structure characteristics.

265. By contrast, the absence of established financial policies, policies that are vague or not quantifiable, or historical evidence of significant and unexpected variation in management's long-term financial targets could contribute to an overall assessment of a non-supportive financial policy framework.

b) Transparency of financial policies

266. We assess as supportive financial policy objectives that are transparent and well understood by all key stakeholders and we view them as likely to influence an issuer's financial risk profile over time. Alternatively, financial policies, if they exist, that are not communicated to key stakeholders and/or where there is limited historical evidence to support the company's commitment to these policies, are non-supportive, in our view. We consider the variety of ways in which a company communicates its financial policy objectives, including public disclosures, investor presentation materials, and public commentary.

267. In some cases, however, a company may articulate its financial policy objectives to a limited number of key stakeholders, such as its main creditors or to credit rating agencies. In these situations, a company may still receive a supportive classification if we assess that there is a sufficient track record (more than three years) to demonstrate a commitment to its financial policy objectives.

c) Achievability and sustainability of financial policies

268. To assess the achievability and sustainability of a company's financial policies, we consider a variety of factors, including the entity's current and historical financial risk profile; the demands of its key stakeholders (including dividend and capital return expectations of equity holders); and the stability of the company's financial policies that we have observed over time. If there is evidence that the company is willing to alter its financial policy framework because of adverse business conditions or growth opportunities (including M&A), this could support an overall assessment of non-supportive.

4. Financial policy adjustments--examples

269. Example 1: A moderately leveraged company has just been sold to a new financial sponsor. The financial sponsor has not leveraged the company yet and there is no stated financial policy at the outset. We expect debt leverage to increase upon refinancing, but we are not able to factor it precisely in our forecasts yet.
Likely outcome: FS-6 financial policy assessment, implying that we expect the new owner to implement an aggressive financial policy in the absence of any other evidence.

270. Example 2: A company has two owners—-a family owns 75%, a strategic owner holds the remaining 25%. Although the company has provided S&P Global Ratings with some guidance on long-term financial objectives, the overall financial policy framework is not sufficiently structured nor disclosed to a sufficient number of stakeholders to qualify for a supportive assessment. Recent history, however, does not provide any evidence of unexpected, aggressive financial transactions and we believe event risk is moderate.
Likely outcome: Neutral financial policy impact, including an assessment of neutral for financial discipline. Although the company's financial framework does not support long-term visibility, historical evidence and stability of management suggest that event risk is not significant. The unsupportive financial framework assessment, however, prevents the company from qualifying for an overall positive financial policy assessment, should the conditions for positive financial discipline be met.

271. Example 3: A company (not owned by financial sponsors) has stated leverage targets equivalent to a significant financial risk profile assessment. The company continues to make debt-financed acquisitions yet remains within its leverage targets, albeit at the weaker end of these. Our forecasts are essentially built on expectations that excess cash flow will be fully used to fund M&A or, possibly pay share repurchases, but that management will overall remain within its leverage targets.
Likely outcome: Neutral financial policy impact. Although management is fairly aggressive, the company consistently stays within its financial policy targets. We think our forecasts provide a realistic view of the evolution of the company's credit metrics over the next two years. No event risk adjustment is needed.

272. Example 4: A company (not owned by a financial sponsor) has just made a sizable acquisition (consistent with its long-term business strategy) that has brought its credit ratios out of line. Management expressed its commitment to rapidly improve credit ratios back to its long-term ratio targets-—representing an acceptable range for the SACP--through asset disposals or a rights issue. We see their disposal plan (or rights issue) as realistic but precise value and timing are uncertain. At the same time, management has a supportive financial policy framework, a positive track record of five years, and assets are viewed as fairly easily tradable.
Likely outcome: Positive financial policy impact. Although forecast credit ratios will remain temporarily depressed, as we cannot fully factor in asset disposals (or rights issue) due to

uncertainty on timing/value, or without leaking confidential information, the company's credit risk should benefit from management's positive track record and a supportive financial policy framework. The anchor will be better by one notch if management and governance is at least satisfactory and liquidity is at least adequate.

273. Example 5: A company (not owned by a financial sponsor) has very solid financial ratios, providing it with meaningful flexibility for M&A when compared with management's long-term stated financial policy. Also, its stock price performance is somewhat below that of its closest industry peers. Although we have no recent evidence of any aggressive financial policy steps, we fundamentally believe that, over the long-term term, the company will end up using its financial flexibility for the right M&A opportunity, or alternatively return cash to shareholders.
Likely outcome: Negative financial policy impact. Long-term event risk derived from M&A cannot be built into forecasts nor shareholder returns (share buybacks or one-off dividends) be built into forecasts to attempt aligning projected ratios with stated long-term financial policy levels. This is because our forecasts are based on realistic and reasonably predictable assumptions for the medium term. The anchor will be adjusted down, by one notch or more, because of the negative financial policy assessment.

F. Corporate Criteria Glossary

Anchor: The combination of an issuer's business risk profile assessment and its financial risk profile assessment determine the anchor. Additional rating factors can then modify the anchor to determine the final rating or SACP.

Asset profile: A descriptive way to look at the types and quality of assets that comprise a company (examples can include tangible versus intangible assets, those assets that require large and continuing maintenance, upkeep, or reinvestment, etc.).

Business risk profile: This measure comprises the risk and return potential for a company in the market in which it participates, the country risks within those markets, the competitive climate, and the competitive advantages and disadvantages the company has. The criteria combine the assessments for Corporate Industry and Country Risk Assessment (CICRA), and competitive position to determine a company's business risk profile assessment.

Capital-intensive company: A company exhibiting large ongoing capital spending to sales, or a large amount of depreciation to sales. Examples of capital-intensive sectors include oil production and refining, telecommunications, and transportation sectors such as railways and airlines.

Cash available for debt repayment: Forecast cash available for debt repayment is defined as the net change in cash for the period before debt borrowings and debt repayments. This includes forecast discretionary cash flow adjusted for our expectations of any share issuance and M&A. Discretionary cash flow is defined in our Ratios And Adjustments criteria and guidance.

Competitive position: Our assessment of a company's: 1) competitive advantage; 2) operating efficiency; 3) scale, scope, and diversity; and 4) profitability.

- Competitive advantage--The strategic positioning and attractiveness to customers of the company's products or services, and the fragility or sustainability of its business model.
- Operating efficiency--The quality and flexibility of the company's asset base and its cost management and structure.
- Scale, scope, and diversity--The concentration or diversification of business activities.
- Profitability--Our assessment of both the company's level of profitability and volatility of profitability.

Competitive Position Group Profile (CPGP): Used to determine the weights to be assigned to the three components of competitive position other than profitability. While industries are assigned to one of the six profiles, individual companies and industry subsectors can be classified into another CPGP because of unique characteristics. Similarly, national industry risk factors can affect the weighing. The six CPGPs are:

- Services and product focus,
- Product focus/scale driven,
- Capital or asset focus,
- Commodity focus/cost driven,
- Commodity focus/scale driven, and
- National industry and utilities.

Conglomerate: Companies that have at least three distinct business segments, each contributing between 10%-50% of EBITDA or FOCF. Such companies may benefit from the diversification/portfolio effect.

Controlling shareholders: Equity owners who are able to affect decisions of varying effect on operations, leverage, and shareholder reward without necessarily being a majority of shareholders.

Corporate Industry and Country Risk Assessment (CICRA): The result of the combination of an issuer's country risk assessment and industry risk assessment.

Debt co-insurance: The view that the joining-together of two or more firms whose earnings streams are less-than-perfectly correlated reduces the risk of default of the merged firms (i.e., the co-insurance effect) and thereby increases the "debt capacity" or "borrowing ability" of the combined enterprise. These financing alternatives became more valuable during the global financial crisis of 2007-2009.

Financial headroom: Measure of deviation tolerated in financial metrics without moving outside or above a pre-designated band or limit typically found in loan covenants (as in a debt to EBITDA multiple that places a constraint on leverage). Significant headroom would allow for larger deviations.

Financial risk profile: The outcome of decisions that management makes in the context of its business risk profile and its financial risk tolerances. This includes decisions about the manner in which management seeks funding for the company and how it constructs its balance sheet. It also reflects the relationship of the cash flows the organization can achieve, given its business risk profile, to its financial obligations. The criteria use cash flow/leverage analysis to determine a corporate issuer's financial risk profile assessment.

Financial sponsor: An entity that follows an aggressive financial strategy in using debt and debt-like instruments to maximize shareholder returns. Typically, these sponsors dispose of assets within a short to intermediate time frame. Financial sponsors include private equity firms, but not infrastructure and asset-management funds, which maintain longer investment horizons.

Profitability ratio: Commonly measured using return on capital and EBITDA margins but can be measured using sector-specific ratios. Generally calculated based on a five-year average, consisting of two years of historical data, and our projections for the current year and the next two financial years.

Shareholder remuneration policies: Management's stated shareholder reward plans (such as a

buyback or dividend amount, or targeted payout ratios).

Stand-alone credit profile (SACP): S&P Global Ratings' opinion of an issue's or issuer's creditworthiness, in the absence of extraordinary intervention or support from its parent, affiliate, or related government or from a third-party entity such as an insurer.

Transfer and convertibility assessment: S&P Global Ratings' view of the likelihood of a sovereign restricting nonsovereign access to foreign exchange needed to satisfy the nonsovereign's debt service obligations.

Unconsolidated equity affiliates: Companies in which an issuer has an investment, but which are not consolidated in an issuer's financial statements. Therefore, the earnings and cash flows of the investees are not included in our primary metrics unless dividends are received from the investees.

Upstream/midstream/downstream: Referring to exploration and production, transport and storage, and refining and distributing, respectively, of natural resources and commodities (such as metals, oil, gas, etc.).

Volatility of profitability/SER: We base the volatility of profitability on the standard error of the regression (SER) for a company's historical EBITDA. The SER is a statistical measure that is an estimate of the deviation around a 'best fit' trend line. We combine it with the profitability ratio to determine the final profitability assessment. We only calculate SER when companies have at least seven years of historical annual data, to ensure that the results are meaningful.

Working-capital-intensive companies: Generally a company with large levels of working capital in relation to its sales in order to meet seasonal swings in working capital. Examples of working-capital-intensive sectors include retail, auto manufacturing, and capital goods.

FREQUENTLY ASKED QUESTIONS

A. Volatility of cash flows

If a company exhibits volatile cash flow metrics, does S&P Global Ratings capture this in the cash flow volatility adjustment or in the financial policy assessment?

We capture this in either analytic factor, as appropriate. As per paragraph 125, the volatility adjustment is the mechanism by which we factor a "cushion" of medium-term variance to current financial performance not otherwise captured in either the near-term base-case forecast or the long-term business risk assessment. We make this adjustment based on the following:

- The expectation of any potential cash flow/leverage ratio movement is both prospective and dependent on the current business or economic conditions.
- Stress scenarios include, but are not limited to, a recession, technology or competitive shifts, loss or renegotiation of major contracts or customers, and key product or input price movements, as typically defined in the company's industry risk profile and competitive position assessment.
- The volatility adjustment is not static and is company-specific. At the bottom of an economic cycle or during periods of stressed business conditions, already reflected in the general

industry risk or specific competitive risk profile, the prospect of weakening ratios is far less than at the peak of an economic cycle or business conditions.

- The expectation of prospective ratio changes may be formed by observed historical performance over an economic, business, or product cycle by the company or by peers.
- The assessment of which classification to use when evaluating the prospective number of scoring category moves will be guided by how close the current ratios are to the transition point (i.e. "buffer" in the current scoring category) and the corresponding amount of EBITDA movement at each scoring transition.

As per paragraph 157, financial policy refines our view of a company's risks beyond the conclusions arising from the standard assumptions in the cash flow/leverage assessment. Those assumptions do not always reflect or entirely capture the short-to-medium term event risks or the longer-term risks stemming from a company's financial policy. To the extent movements in one of these factors cannot be confidently predicted within our forward-looking evaluation of cash flow/leverage, we capture that risk in our evaluation of financial policy.

What constitutes a period of stress when assessing whether a company has a volatile or highly volatile level of cash flow/leverage?

As guidance, our global default studies demonstrate significant correlation of defaults with weak points in business cycles and banking crises. The 1991 peak default rate occurred after a mild recession in the U.S., a severe but short recession in the U.K., and the Nordic banking crisis. Other developed-market speculative-grade default peaks were the U.S., at 10.6% in 2001 (the U.S. recession) and 11.4% in 2009 (the global banking crisis and recession); and Europe, at 12.3% in 2002 (due in part to the bursting of the technology/Internet bubble and failures of a large number of telecom start-ups). (Sources: "2012 Annual Global Corporate Default Study," published March 18, 2013, and "Understanding Standard & Poor's Rating Definitions.")

Additional guidance can be found in "Methodology: Industry Risk," Appendix 1 where we considered sensitivity to economic cycles, as measured by the historical cyclical peak-to-trough decline in profitability and revenues for major recessions ('BBB' and 'BB' stress) mapped to specific industry sectors.

B. Profitability

If a company operates in a region or in a country where local inflation is high, and you believe that this affects the comparability of its profitability measures with industry peers', how do you incorporate this in your assessment?

When analyzing level of profitability, we use, where available, the numeric guidance developed by considering the distribution of profitability measures within an industry or subsector. These thresholds apply globally irrespective of the underlying level of inflation, although we also consider trends in the profitability ratio to determine the level of profitability assessment. However, high inflation environments are often associated with exposure to countries with a high country risk, in which case as per paragraph 87 we may adjust the volatility of profitability assessment to account for this exposure. Finally, to the extent not captured elsewhere in the

analysis, we may incorporate this factor as part of the comparable ratings analysis.

REVISIONS AND UPDATES

This article was originally published on Nov. 19, 2013. These criteria became effective on the date of publication.

Changes introduced after original publication:

- Following our periodic review completed on Oct. 16, 2015, we deleted paragraphs 9 and 10, which were related to the initial publication of our criteria and no longer relevant. We also made some adjustments to language. These adjustments have no impact on our ratings or the effective date of the criteria.
- Following our periodic review completed on Oct. 14, 2016, we updated criteria references, the contact list, and the definitions of financial sponsor-owned companies and financial sponsors to be consistent with those in the article "The Treatment Of Non-Common Equity Financing In Nonfinancial Corporate Entities," published April 29, 2014.
- On Feb. 8, 2017, we republished the article to correct an error in the regional grouping for the countries of Bhutan, Grenada, and Eritrea introduced after the periodic criteria review closed on Oct. 14, 2016.
- Following our periodic review completed on Oct. 11, 2017, we updated criteria references.
- On April 23, 2018, we updated the definition of a financial sponsor-owned company in table 23. We also updated the contact information.
- On Dec. 7, 2018, we republished this criteria article to make nonmaterial changes. We updated table 26, which supplements paragraph 46, by removing the GDP weightings of each country making up each defined region. The GDP weightings were removed because they were outdated and because a static table does not reflect the fact that GDP data change dynamically. Consistent with the criteria (see paragraph 46), we calculate regional risk assessments as the average of the unadjusted country risk assessments, weighted by the GDP of each country in a defined region. These GDP weights were published in the criteria at the time of initial publication for reference only. Since the GDP data change, we use current GDP data each time we recalculate the regional risk assessments. We also updated the contact information and a criteria reference.
- On April 1, 2019, we changed the definition of discretionary cash flow in the Corporate Criteria Glossary section because it was superseded by "Corporate Methodology: Ratios And Adjustments," published on April 1, 2019 (Ratios and Adjustments). We also aligned the FFO to cash interest coverage ratio in paragraphs 103 and 105 with Ratios and Adjustments. We also made a nonmaterial change to paragraph 81 and the Frequently Asked Questions to provide additional transparency on how we assess profitability. Finally, we updated criteria references.

Sectors that fall in the scope of these criteria since the original publication include:

- Agricultural cooperatives following publication of "Key Credit Factors For Agricultural Cooperatives" on March 17, 2015;
- Entities engaged in commodities trading activities that generate less than 70% of expected earnings from commodities trading following publication of "Commodities Trading Industry Methodology," published Jan. 19, 2017;
- Master limited partnerships and general partnerships of master limited partnerships trading

following publication of "Methodology: Master Limited Partnerships And General Partnerships" on Sept. 22, 2014; and

- Transportation equipment leasing and car rental companies following publication of "Key Credit Factors For The Operating Leasing Industry," published on Dec. 14, 2016.

RELATED CRITERIA AND RESEARCH

Superseded Criteria

- Companies Owned By Financial Sponsors: Rating Methodology, March 21, 2013
- Methodology: Business Risk/Financial Risk Matrix Expanded, Sept. 18, 2012
- How Stock Prices Can Affect An Issuer's Credit Rating, Sept. 26, 2008
- 2008 Corporate Criteria: Analytical Methodology, April 15, 2008
- Credit FAQ: Knowing The Investors In A Company's Debt And Equity, April 4, 2006

Related Criteria

- Corporate Methodology: Ratios And Adjustments, April 1, 2019
- Reflecting Subordination Risk In Corporate Issue Ratings, March 28, 2018
- Recovery Rating Criteria For Speculative-Grade Corporate Issuers, Dec. 7, 2016
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- Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers, Dec. 16, 2014
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These criteria represent the specific application of fundamental principles that define credit risk and ratings opinions. Their use is determined by issuer- or issue-specific attributes as well as Standard & Poor's Ratings Services' assessment of the credit and, if applicable, structural risks for a given issuer or issue rating. Methodology and assumptions may change from time to time as a result of market and economic conditions, issuer- or issue-specific factors, or new empirical evidence that would affect our credit judgment.

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MOODY'S INVESTORS SERVICE

RATING METHODOLOGY

Regulated Water Utilities

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This rating methodology replaces "Regulated Water Utilities", last revised on December 22, 2015. We have updated some outdated links and removed certain issuer-specific information.

Summary

This rating methodology explains our approach to assessing credit risk for rated issuers in the regulated water utilities sector, globally. This document provides general guidance that helps companies, investors, and other interested market participants understand how qualitative and quantitative risk characteristics are likely to affect rating outcomes for regulated water utilities. This document does not include an exhaustive treatment of all factors that are reflected in our ratings but should enable the reader to understand the qualitative considerations and financial information and ratios that are usually most important for ratings in this sector.[1]

This report includes a detailed scorecard. The scorecard is a reference tool that can be used to approximate credit profiles within the regulated water sector in most cases. The scorecard provides summarised guidance for the factors that are generally most important in assigning ratings to companies in the regulated water utilities industry. However, the scorecard is a summary that does not include every rating consideration. The weights shown for each factor in the scorecard represent an approximation of their importance for rating decisions but actual importance may vary substantially. The scorecard-indicated outcome is not expected to match the actual rating of each company.

[1] This update may not be effective in certain jurisdictions until certain requirements are met.

The scorecard contains four factors that are important in our assessments for ratings of regulated water utilities:

1. Business Profile

2. Financial Policy

3. Leverage and Coverage

The scoring for factors 1-3 results in a preliminary scorecard-indicated outcome. In addition, we apply the following factor 4, which can result in upward notching for issuers that benefit from structural enhancements in their corporate structure, their regulatory licence or their financing arrangements – this has mainly been relevant for highly-leveraged financing structures that apply to an entire corporate group and for project financings.

4. Uplift for Structural Considerations

Some of these factors also encompass a number of sub-factors. An issuer's scoring on a particular scorecard factor or sub-factor often will not match its overall rating.

This rating methodology is not intended to be an exhaustive discussion of all factors that our analysts consider in assigning ratings in this sector. We note that our analysis for ratings in this sector covers factors that are common across all industries such as ownership, management, liquidity, corporate legal structure, governance and country related risks which are not explained in detail in this document, as well as other factors that can be meaningful on a company-specific basis. Our ratings consider these and other qualitative considerations that do not lend themselves to a transparent presentation in a scorecard format. The scorecard used for this methodology reflects a decision to favour a relatively simple and transparent presentation rather than a more complex scorecard that would map scorecard-indicated outcomes more closely to actual ratings.

Highlights of this report include:

- An overview of the rated universe
- A summary of the rating methodology
- A description of factors that drive rating quality
- Comments on the rating methodology assumptions and limitations, including a discussion of rating considerations that are not included in the scorecard

The Appendices show (1) the full scorecard (Appendix A) and (2) a more detailed description of the water and wastewater industry, including different operational models (Appendix B).

This methodology describes the analytical framework used in determining credit ratings. In some instances, our analysis is also guided by additional publications that describe our approach for analytical considerations that are not specific to any single sector. Examples of such considerations include but are not limited to: the assignment of short-term ratings, the relative ranking of different classes of debt and hybrid securities, how

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on www.moodys.com for the most updated credit rating action information and rating history.

sovereign credit quality affects non-sovereign issuers, and the assessment of credit support from other entities.[2]

About the Rated Universe

This methodology is applicable to regulated utilities whose principal line of business is the provision of water and/or wastewater (also referred to as sanitation or sewerage) services. Many companies provide services along the entire value chain of the process, from resources/collection, transport, via distribution through to supplying the end consumer. However, the methodology also applies to pure wholesalers, or single asset providers (e.g., water desalination plants, water reservoirs, or sewage interceptor tunnels), where revenues are earned under a regulated licensing, concession or similar arrangement. Services may be provided under contract or concession agreements or direct licensing arrangements with the relevant governmental authority, and the assets may be owned outright by the issuer or operated under the terms of a concession or licence.

Companies rated under this methodology are primarily rate-regulated monopolies or, where companies are not outright monopolies, their ability to freely set tariffs is typically restricted through government policy or other regulations.

Independently-regulated water utilities are in the minority in the broader universe of global water utilities. Given the public importance of water supply and the health risks related to its service provision, most water services globally are provided by government entities that are not subject to independent regulation for the rates or tariffs they charge. Even where privatised, the sector maintains strong links to national, regional or local government bodies that ensure compliance with environmental and health and safety standards.

This methodology is applicable to regulated water utilities that are investor-owned (i.e. private sector) and to those owned by a regional or national government, provided they have an operating and financial profile that is distinct from that of the government administration (they may also be distinct legal entities), with revenues linked to a regulated (or in some cases, self-regulating) tariff-setting model. This methodology is not applicable to water and sanitary sewer utilities that operate as departments, boards, or independent authorities of US states or local governments, which are typically financed with tax-exempt revenue bonds and are covered under our methodology for rating US municipal utility revenue bonds.[3]

There are a variety of business models in the water sector, with varying degrees of private sector involvement. In the rated universe, companies have also adopted a range of different funding models. This methodology encompasses different types of financing for water utilities, including typical corporate funding with limited financial covenants, as well as more highly-structured arrangements with credit enhancing features. Some single asset financing structures are also rated under this methodology, but privately financed, public infrastructure projects that receive specific availability-based payments sufficient to service their debt from government procurement agencies are rated under Moody's rating methodologies for PPP and PFI transactions.[4]

[2] The methodologies covering our approach to these cross-sector considerations can be found in the Related Publications section of this report.

[3] Our methodology for rating US municipal utility revenue debt can be accessed by using the link in the Related Publications section of this report.

[4] Our methodologies for rating operational privately financed public infrastructure (PFI/PPP/P3) projects and construction risk in privately financed public infrastructure projects (PFI/PPP/P3) can be accessed by using the link in the Related Publications section of this report.

About this Rating Methodology

This report explains the rating methodology for regulated water utilities in six sections, which are summarised as follows:

1. Identification and Discussion of the Scorecard Factors

The scorecard in this rating methodology is comprised of four rating factors. The first three scorecard factors are comprised of sub-factors that provide further detail. The fourth factor is used to make notching adjustments for structural enhancements where they are incorporated either in the company's corporate structure, its regulatory licence or its financing arrangements.

EXHIBIT 1
Scorecard for Regulated Water Utilities

Rating Factors	Factor Weighting	Sub-Factors	Sub-Factor Weighting
BUSINESS PROFILE	50%	Stability and Predictability of Regulatory Environment	15%
		Asset Ownership Model	5%
		Cost and Investment Recovery (Sufficiency & Timeliness)	15%
		Revenue Risk	5%
		Scale and Complexity of Capital Programme & Asset Condition Risk	10%
FINANCIAL POLICY	10%	Financial Policy	10%
LEVERAGE AND COVERAGE	40%	Adjusted Interest Coverage OR FFO Interest Coverage	12.5%
		Net Debt / Regulated Asset Base OR Debt/Capitalisation	10%
		FFO / Net Debt	12.5%
		RCF / Net Debt	5%
Total	100%	Total	100%
UPLIFT FOR STRUCTURAL CONSIDERATIONS		Up to 3 notches	

2. Measurement or Estimation of Factors in the Scorecard

We explain our general approach for scoring each scorecard factor and show the weights used in the scorecard. We also provide a rationale for why each of these scorecard components is meaningful as a credit indicator. The information used in assessing the sub-factors is generally found in or calculated from information in company financial statements, derived from other observations or estimated by our analysts.

Our ratings are forward-looking and reflect our expectations for future financial and operating performance. However, historical results are helpful in understanding patterns and trends in a company's performance as well as for peer comparisons. We utilise an average of historical data over the last three years in the scorecard. However, the factors in the scorecard can be assessed using various time periods. For example, rating committees may find it analytically useful to examine both historic and expected future performance for periods of one year, several years or more.

All of the quantitative credit metrics incorporate Moody's standard adjustments to the income statement, cash flow statement and balance sheet amounts for restructuring, impairment, off-balance sheet accounts,

receivable securitisation programmes, under-funded pension obligations, and recurring operating leases.[5] We may also make other analytical adjustments that are specific to a particular company.

3. Mapping Scorecard Factors to the Rating Categories

After estimating or calculating each sub-factor, the outcomes for each of the sub-factors are mapped to a broad Moody's rating category (Aaa, Aa, A, Baa, Ba, B, Caa, or Ca).

4. Assumptions, Limitations and Rating Considerations Not Included in the Scorecard

This section discusses limitations in the use of the scorecard to map against actual ratings, some of the additional factors that are not included in the scorecard but can be important in determining ratings, and limitations and assumptions that pertain to the overall rating methodology.

5. Determining the Overall Scorecard-Indicated Outcome[6]

To determine the overall scorecard-indicated outcome, we convert each of the sub-factor scores into a numeric value based upon the scale below.

Aaa	Aa	A	Baa	Ba	B	Caa
1	3	6	9	12	15	18

A further weighting is applied by rating category as shown in the table below.

Aaa	Aa	A	Baa	Ba	B	Caa
1	1	1	1.15	2	3	5

We weight lower rating scores more heavily than higher scores for two reasons. In the first instance, we need to adjust for those situations where an issuer exhibits weak characteristics across the first two factors, which are not typically encountered within the rated universe and which would require more demanding thresholds for the credit metrics. Secondly, we recognise that a serious weakness in one area often cannot be completely offset by a strength in another area and that the lack of flexibility normally associated with high degrees of leverage can heighten risk.

The actual weighting applied to each sub-factor is the product of that sub-factor's standard weighting and its over-weighting, divided by the sum of these products for all the sub-factors (an adjustment that brings the sum of all the sub-factor weightings back to 100%).

The numerical score for each sub-factor is multiplied by the adjusted weight for that sub-factor with the results then summed to produce a composite weighted-factor score. The composite weighted-factor score is then mapped back to an alphanumeric rating based on the ranges in the table below.

[5] More information about our financial statement adjustments in the analysis of non-financial corporations can be accessed using the link in the Related Publications section of this report.

[6] In general, the scorecard-indicated outcome is oriented to the Corporate Family Rating (CFR) for speculative-grade issuers and the senior unsecured rating for investment-grade issuers. For issuers that benefit from ratings uplift due to parental support, government ownership or other institutional support, the scorecard-indicated outcome is oriented to the baseline credit assessment. For an explanation of baseline credit assessment, please refer to our rating methodology on government-related issuers. Individual debt instrument ratings also factor in decisions on notching for seniority level and collateral. The documents that provide broad guidance for these notching decisions are our rating methodologies on loss given default for speculative grade non-financial companies and for aligning corporate instrument ratings based on differences in security and priority of claim. The link to these and other sector and cross-sector credit rating methodologies can be found in the Related Publications section of this report.

Indicated Outcome	Overall Score
Aaa	x < 1.50
Aa1	1.50 ≤ x < 2.50
Aa2	2.50 ≤ x < 3.50
Aa3	3.50 ≤ x < 4.50
A1	4.50 ≤ x < 5.50
A2	5.50 ≤ x < 6.50
A3	6.50 ≤ x < 7.50
Baa1	7.50 ≤ x < 8.50
Baa2	8.50 ≤ x < 9.50
Baa3	9.50 ≤ x < 10.50
Ba1	10.50 ≤ x < 11.50
Ba2	11.50 ≤ x < 12.50
Ba3	12.50 ≤ x < 13.50
B1	13.50 ≤ x < 14.50
B2	14.50 ≤ x < 15.50
B3	15.50 ≤ x < 16.50
Caa1	16.50 ≤ x < 17.50
Caa2	17.50 ≤ x < 18.50
Caa3	18.50 ≤ x < 19.50

For example, an issuer with a composite weighted factor score of 11.7 would have a Ba2 preliminary scorecard-indicated outcome.

Finally, we consider whether the scorecard-indicated outcome should be adjusted to incorporate uplift from structural enhancements that may be included in the company's financial arrangements. The effectiveness of any such enhancements is graded to determine the appropriate uplift, as described in the section "Structural Considerations and Sources of Rating Uplift from Creditor Protection" below. This allows us to apply the methodology to regulated water utilities that have adopted certain credit-enhancing structural features typical of highly-geared financing structures.

6. Appendices

The Appendices provide the full scorecard and also provide additional commentary and insights on different operating models within the industry.

Discussion of the Scorecard Factors

The scorecard for regulated water utilities focuses on four broad factors:

1. Business Profile
2. Financial Policy
3. Leverage and Coverage
4. Uplift for Structural Considerations

Factor 1: Business Profile

WHY IT MATTERS

Regulated water utilities typically provide monopoly-type, relatively price-inelastic services that are viewed as a true necessity and are generally highly regulated. The combination of essentiality of service and regulatory frameworks that are typically well-established lend themselves to high levels of business visibility and revenue stability for most issuers. As a result, regulated water utilities are likely to have a longer-term strategic and financial horizon than most other corporate sectors. Accordingly, assessing the historical and expected stability of the regulated water utility's business and cash flow generation is a critical component of our analysis. Generally speaking, revenues and cash flows are a function of tariff levels and tariff-setting mechanisms as well as volumes sold. Tariffs are embedded in the broader framework of the applicable regulatory environment and/or a utility's concession agreement or lease contract. As such, the characteristics and transparency of the concession(s) and regulations under which the utility operates, the track record of the regulatory regime in setting tariffs and applying regulations consistently are key elements in assessing the overall stability of a water utility's business profile. We also assess the execution risk associated with a water utility's investment programme and the asset quality of a regulated water utility, which can have a material influence on its ability to provide services that meet regulatory expectations and on its future financial position.

HOW WE ASSESS IT FOR THE SCORECARD

In assessing a water utility's regulatory environment and business model we look at five sub-factors:

- Stability & Predictability of Regulatory Environment
- Asset Ownership Model
- Cost and Investment Recovery (Sufficiency & Timeliness)
- Revenue Risk
- Scale and Complexity of the Capital Programme & Asset Condition Risk

Stability & Predictability of Regulatory Environment

This sub-factor assesses the regulatory and/or concession framework under which the water utility operates.

The provision of water and wastewater services is generally a monopoly or quasi-monopoly regulated on a national or regional basis. Where water services are provided by a private sector company, the monopoly service responsibilities are typically performed under a concession agreement or license. Often the enabling legislation/legal framework sets out common terms and conditions for concessions and lays out the framework under which tariff decisions are made, but there may be meaningful variations in the granularity and transparency of the framework. The stability and predictability of such regulatory regime or concession framework is a key determinant in assessing a water utility's business risk profile, reflected in the scorecard weighting of 15%.

Issuers operating under regulatory regimes that have a very long track record of clearly defined risk allocation principles, which have been consistently applied and transparently disclosed to the public receive the highest scores under this sub-factor. Issuers operating in a jurisdiction that has not implemented a defined regulatory framework and/or is extremely unpredictable or politically driven receive the lowest scores under this sub-factor. For instance, the regulator or government may have a track record of making unilateral changes to the terms and conditions of concessions in water (or similar infrastructure sectors that

are relevant precedents) to the detriment of the concession-holder without providing compensation.[7] Concerns about the independence of the regulatory authorities and the risk of politically-motivated intervention in the regulatory process generally also result in a lower score.

In considering whether a regulatory framework is independent and developed, we also take into account the strength of the rule of law within the jurisdiction in which the relevant utility operates, and whether an independent judiciary exists that allows for legal rights (and especially concession rights) to be enforceable in practice. For a water company that is located in a country with generally poor institutional strength, our scoring of the regulatory framework typically reflects that weakness.

Where companies operate in multiple jurisdictions or under regulatory or concession models with differing characteristics, the score for this sub-factor will reflect our assessment of the blended profile of these regulatory frameworks.

Asset Ownership Model

The rated universe includes companies that own their assets outright in perpetuity or for a defined time horizon under a concession or other contractual agreement.[8]

In those cases where the water and wastewater assets are owned outright, we assess the implication of ownership rights that are subject to a licence or franchise agreement and the risk of termination thereof. We also consider whether the right to operate the assets is long term in nature or may only be granted over a short-term period. We additionally consider the recovery mechanism in relation to any residual asset value at the end of a concession or other contractual arrangement when scoring this sub-factor.

A water company that owns all its key water and wastewater assets outright in perpetuity and has ultimate control over them would typically score high on the scorecard. On the other end of the spectrum, a utility that holds the assets under a concession contract, which may be relatively short term or does not provide clear principles for the recovery of the residual asset value at the termination of the concession, would typically score relatively low (i.e. Ba or lower). In those instances, a track record of concession renewal or compensation arrangements being applied consistently could improve the score.

Most of the rated regulated water utilities own their key assets under a licence regime or long-term concessions. Outright ownership in perpetuity is less common. Operators with multiple concession arrangements are generally assessed based on the average concession life, weighted by each concession's contribution to overall cash flows.

The general rule of law and the value and enforcement of asset property rights and contracts are important considerations in assessing this sub-factor, since they affect the issuer's ability to benefit from its assets or concession/contract and the likelihood that compensation that an issuer expects to receive at the end of the concession or contract's life will be paid. For example, if there is a heightened risk of expropriation of assets for political reasons, we would score a company lower, even though it may own its assets. The expropriation risk may be higher for water and wastewater assets than for other infrastructure assets, given the significance of the services provided.

[7] Where regulatory or legislative changes do occur, water utilities can still be scored high on this sub-factor if the changes are sufficiently consulted upon, supportive of companies' credit quality and have involved the affected companies within the process. In contrast, water utilities will be scored low on this factor if changes to the regulatory framework have been implemented without consultation, are unclear, or are detrimental to credit quality.

[8] Please refer to Appendix B for further details on the water industry sector and the different business models applied.

Cost and Investment Recovery (Sufficiency & Timeliness)

As part of our assessment of the overall regulatory or concession regime, the ability of a regulated water utility to recover the cost of its operations and/or investments in a timely manner is another key determinant for the evaluation of the stability of cash flow generation. In this sub-factor, we assess the nature of the tariff regime, including the mechanisms under which the water utility is able to recover its ongoing costs and invested capital and earn a fair return on it, as well as the risk allocation between the water utility and its customers. We assess whether the regulator seeks to insulate consumers from the volatility and the uncertainty associated with operating and financial costs, whether there is risk-sharing between the water utility and its consumers, and whether the water utility is easily able to pass through its incurred costs, including financial costs.

Issuers regulated under frameworks that provide highly flexible arrangements to adjust tariffs as required to reflect the full range of incurred costs and investments score very high in this sub-factor. At the other end of the spectrum are tariff mechanisms that do not adequately cover the operator's costs, for instance due to politically-motivated low tariffs that hinder the utility's viability in the absence of government support.

In general, most tariff formulas seek to achieve a balance between reliability and quality of service standards, provide incentives for operational efficiency, protect consumers from monopoly-overcharging and meet certain social objectives, while allowing an adequate return for companies to be able to attract the debt and equity capital required to finance their investments.

In jurisdictions with separate regional regulation, e.g., in the US or Spain, we typically assess each state or region individually to consider the various factors that affect the utilities' profitability, including the type of fixed- versus variable-rate design allowed, historically-authorised tariff decisions, and the existence of mechanisms that permit recovery of operating and capital costs outside of a general tariff setting process. Furthermore, we take into account contractual obligations that restrict a water utility's ability to submit a tariff reset for approval within a defined period of time.

The ability of a water utility to recover its costs will also depend on its performance against regulatory cost allowances and efficiency targets. Companies that have a track record of significant overspending or are unlikely to meet target allowances may score lower. We also consider whether the tariffs can actually be afforded by the users of the water and wastewater services. This could be measured for example through the level of unpaid bills. If the level of unpaid bills is high or increasing materially we would normally score a water utility's ability to recover its costs lower than the theoretical tariff formula may imply.

Revenue Risk

Under this sub-factor, we assess the potential volatility of revenues generated by a regulated water utility, including considerations such as a company's exposure to fluctuations in the volume of water used. Volume of usage may be affected by scarcity of supply or decreases in demand. Some utilities are exposed to greater differences in weather patterns from year to year. Others have a more concentrated customer structure or reliance on a particular customer to generate a large proportion of revenues. If this customer chooses a different service provider or closes its operations, a significant portion of revenues could be lost. Similarly, a higher exposure to industrial customers or a tariff plan that assumes increasing revenues will be generated from new customers may have a negative impact on revenues in a recession scenario.

When scoring this sub-factor, we also consider whether a regulatory regime provides mechanisms whereby companies may be allowed to adjust tariffs within a regulatory period or at the next price review to reflect a divergence between collected and allowed revenues caused by fluctuating volumes.

Issuers that have no exposure to volume or customer concentration risk and are thus effectively immune from revenue volatility risks typically score Aaa. Water companies that are not immune but benefit from regulatory safeguards that allow them to adjust tariffs to recover lost revenue under a tested and transparent procedure typically score a bit lower but still at the high end of the scorecard. Water utilities that are subject to greater revenue risks from changes in volume (from droughts, recession, or a material reliance on new customer connections, etc.) that are not offset by increases in tariffs, or where the tariff re-set is delayed or uncertain, typically score at the lower end of the scorecard.

Scale and Complexity of the Capital Programme & Asset Condition Risk

Our assessment of a company's risk exposure captures (1) the general operational risk of dealing with an extensive capex programme and management's ability to deliver without significant delays or cost overruns; (2) the technological challenges of very complex investment projects; and (3) the financing risk that a significant capex programme may pose, if it cannot be funded out of operating cash flows.

To some extent, the size of a water utility's capital expenditure plans can be representative of the complexity of the programme. Thus, we consider the size of the annual capital expenditure plan[9] as a percentage of Regulated Asset Base (RAB – where applicable, it is typically obtained from regulatory filings) or the Fixed Assets (tangible and intangible)[10] as reported in a company's financial statements. However, this percentage may not directly correlate to risk in all scenarios, and replacement programmes that are large in scope may nevertheless present only limited execution risk. For example, a large capital expenditure programme could reflect a significant number of individual projects where overall execution risk is reduced through diversification, the repetitive nature of the programme, or the ability to reduce/modify the plan in light of changing circumstances. The experience of the utility in taking on expansion projects and delivering them within budget is also a relevant consideration in assessing the level of risk.

Capex programmes that are very large relative to existing asses base have a greater potential to create significant tariff increases for the end-consumer or disallowance or delay of cost and investment recovery by a regulator seeking to avoid such increases. For example, the asset value of companies that have been privatised may not reflect the actual replacement costs of such assets (essentially a form of subsidy to consumers to keep tariffs low). These companies may be required to undertake very large capital investment programmes to maintain and upgrade their infrastructure compared with a relatively small regulatory asset base, with the attendant execution and cost recovery risks. Expansionary programmes may not deliver expected revenue increases if new demand does not materialise, and even when the utility can adjust tariffs in light of lower-than-expected volumes, customer dissatisfaction and regulatory pressures may result.

Some regulatory frameworks or concession regimes may incentivise investment, either generally or for a particular project, in a manner that limits a company's exposure to capex-related risks, such as cost overruns. When this dynamic reduces the issuers risk in the capex programme, it is considered in our scoring of this sub- factor. Some incentive programmes simply provide capital that reduces the regulatory asset base (essentially a subsidy for consumers) without reducing the water utility's exposure to construction risks.

When scoring this factor, we also take into account the underlying asset condition and the related risk of potential asset failure. A functioning asset base is paramount for the water and wastewater utilities to

[9] Capital expenditure is considered before any government grants, construction subsidies or developers' contributions, to assess the full scale of the investment programme and potential execution risk.

[10] We include intangible assets in the denominator as companies may report their concession assets as intangibles. However, we do not include Goodwill as part of Fixed Assets.

comply with their regulatory duties and ensure stability of future cash flow generation. Deferred maintenance and under-investment may lead to the need for rapidly increasing capex in future years.

Issuers with large, modern asset bases requiring a limited amount of simple maintenance (with capital expenditure representing a low percentage of fixed assets) will likely have very high scores for this sub-factor. In contrast, water utilities that are engaging in highly complex, concentrated programs (and where annual capex represents a high percentage of fixed assets) will likely have very low scores for this factor. Furthermore, if a water utility has a history of serious asset failures or exhibits a significant deterioration in asset performance, it will typically have a score of Ba or lower under this sub-factor, depending on the severity of failures.

Factor 1: Business Profile (50%)

The following tables show the scorecard-scoring categories for each Business Profile sub-factor and the weighting thereof.

Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Stability and Predictability of Regulatory Environment	15%	Regulation is and expected to remain independent, well-established (>15 years of being predictable and stable) and transparent. Well-established, published regulatory principles clearly define risk allocation between companies and customers and are consistently applied, with public or shared financial model.	Regulation is independent, reasonably well-established (>10 years of being predictable and stable) and transparent. Well-established, published regulatory principles clearly define risk allocation between companies and customers and are generally consistently applied. Regulatory or concession framework has in recent years been (and is expected to remain) highly predictable, stable and supportive of utilities.	Regulation is generally independent and developed (e.g. published regulatory principles of risk allocation between companies and customers, based on established precedents in the same jurisdiction), and has above average predictability and reliability, although regulatory or concession regime may be sometimes less supportive of utilities.	Regulatory framework is well-developed, with evidence of some inconsistency or unpredictability in the framework's application. OR Regulatory framework is relatively new and untested, but regulatory principles are based on established precedents and jurisdiction has history of independent and transparent regulation for other utility services. Regulatory environment or concession framework may sometimes be challenging or politically charged.	Regulatory or concession framework is defined but there is a high degree of inconsistency or unpredictability in its application. Tariff setting may be subject to negotiation and political interference; there has been a history of difficult or less supportive regulatory decisions; however, there are some precedents in the relevant jurisdiction of predictable regulation for other utility services.	Regulatory or concession framework is unclear, untested or undergoing significant change, with a history of political interference. Utility regulatory body lacks a consistent track record and is or is expected to be unsupportive, uncertain or highly unpredictable.	Regulatory or concession framework is not defined, or is expected to be extremely unsupportive, unpredictable or politically driven.

Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Asset Ownership Model	5%	All key water and/or sewerage assets held outright in perpetuity.	All key water and/or sewerage assets held outright subject to a licence that can be terminated only for material underperformance, failure to meet certain financial parameters or insolvency OR held under long-term concession with clearly defined right to timely recovery of residual asset value at termination/end of concession underpinned by highly-rated entity; clear track record of consistently applying concession termination / recovery regime.	All key water and/or sewerage assets held under long-term concession with clearly defined right to recover value of residual assets at termination/end of concession underpinned by highly-rated entity but with undefined timeframe OR held/operated under medium-/ long-term operating leases or mgmt contract with very substantial portfolio diversification, very established market position and very high renewal rate (>95%).	All key water and/or sewerage assets held under long-term concession with entitlement to recover value of residual assets at termination/end of concession but procedures untested/undefined OR held/operated under medium-/ long-term operating leases or mgmt contract with substantial portfolio diversification, established market position and high renewal rate (>90%). Expropriation possible in case of insolvency or material failure to comply with licence conditions, but with full compensation for asset value.	All key water and/or sewerage assets held under concession with recovery of residual asset value at termination/end of concession subject to negotiation OR held/operated under short-term operating leases or mgmt contract with good degree of portfolio diversification and renewal rate (>80%). Expropriation possible, with some uncertainty in the prospect of full compensation.	All key water and/or sewerage assets held under concession with no recovery of residual asset value at termination/end of concession OR held/operated under short-term operating leases or mgmt contract (limited portfolio diversification). Expropriation likely, with material uncertainty in the prospect of full compensation.	Issuer is in default under its licence, concession or lease/contract, likely to lead to termination. Expropriation highly likely, with little or no prospect of compensation.

Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Cost and Investment Recovery (Sufficiency & Timeliness)	15%	No regulatory or contractual impediment to adjust tariffs (no approval or reviews required).	Tariff formula allows for timely recovery of operating expenditure including depreciation and a fair return on all investment. Depreciation allowance fairly reflects asset consumption. All capital expenditure is included in asset base as incurred or fully covered by specific riders/surcharges prior to the next rate case. Minimal challenges by regulators to companies' cost assumptions.	Tariff formula allows for recovery of operating expenditure including depreciation based on allowances set at frequent price reviews (e.g., 5-yearly intervals or shorter) and a fair return on all efficient investment: Depreciation allowance fairly reflects asset consumption; Capital expenditure is included in asset base as incurred or partially covered by specific riders/surcharges prior to the next rate case; Opex and capex can be subject to efficiency tests; Limited instances of regulatory challenges; limited delays to rate or tariff increases or cost recovery Performance is likely to be in line with regulatory expectations.	Tariff formula allows for recovery of operating expenditure including depreciation and return on investment but subject to retrospective regulatory approval or infrequent price reviews (e.g., > 5-yearly intervals): Some instances of revenue back-loading (e.g. depreciation allowance set below asset consumption or operating expenditure is capitalised) OR Rate/tariff reviews and cost recovery outcomes are usually predictable, although application of tariff formula may be unclear; potentially greater tendency for regulatory intervention and/or to disallow or delay costs Performance may be below regulatory expectations.	Tariff formula does not take into account all cost components and depreciation may be set below asset consumption. Revenues allow coverage of operating expenditures; however, investment is not clearly or fairly remunerated OR Rate/tariff reviews are inconsistent, with some history of unwillingness to make timely rate changes OR Operational underperformance likely to significantly impact the returns achieved by the business.	Highly uncertain rate reviews and cost recovery outcomes; regulators may materially delay or deny tariff increases based on more arbitrary questioning of the utility's costs or financing arrangements. Revenues only cover cash operating expenditures OR Tariff formula does not take into account material cost and investment recovery components:	Revenues only partially cover cash operating costs.

Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Revenue Risk	5%	No exposure to volume or customer concentration risk.	Minimal exposure to volume risk and timely recovery mechanism in place. AND Very limited customer concentration of volumes and revenues and to a customer/industry viewed as stable.	Some exposure to volume risk; recovery mechanism in place with some delay until next regulatory price review; generally limited revenue volatility expected. May have small concentration of volumes and revenues to a particular customer/industry viewed as stable.	Moderate exposure to volume risk but recovery mechanism in place, with some delay until next regulatory price review; moderate revenue volatility expected. May have a moderate concentration of volumes and revenues to a particular customer/industry.	More material exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels; recovery mechanism, may not follow regular intervals. OR Significant concentration of volumes and revenues to a particular customer/industry.	High exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels with recovery mechanism unclear or subject to very long delays. OR Very high concentration of volumes and revenues to one particular customer/industry.	Very high exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels with no meaningful recovery mechanism in place. OR Very high concentration of volumes and revenues to a particular customer/industry viewed as vulnerable.
Scale and Complexity of Capital Programme & Asset Condition Risk	10%	Capex programme is very limited in scale, with only minimum maintenance requirements (typically, total annual capex ≤ 4% of total fixed assets or regulated asset base). AND No asset condition risk (e.g. full and immediate cost pass-through).	Capex programme is limited in scale, with small maintenance or enhancement requirements (typically, total annual capex 4-6% of total fixed assets or regulated asset base). AND Well-developed asset base under tight regulatory supervision; asset performance is generally stable or improving.	Modest capex programme, including standard maintenance and enhancement expenditures (typically, total annual capex 6-8% of total fixed assets or regulated asset base). Well-developed asset base and no history of serious asset failure; asset performance is generally stable or improving.	Capex programme of manageable scale, including straight-forward maintenance and enhancement expenditure (typically, total annual capex 8-12% of total fixed assets or regulated asset base). Company has a reasonably developed asset base; may have some precedents of serious asset failures but asset performance is now and is expected to remain broadly stable.	Large capex programme (typically, total annual capex 12%-20% of total fixed assets or regulated asset base) or challenging in scope (small number of large and complex projects may account for majority of capital programme). OR Asset base not fully developed; or average asset performance is gradually deteriorating or there is some concern about asset condition.	Very large capex programme (typically, total annual capex 20-30% of total fixed assets or regulated asset base) or highly complex (one large and complex project may account for majority of capital programme). OR Performance of most assets is materially deteriorating, with serious assets failures likely or ongoing, or asset development is seriously below required target.	Extremely large capex programme (typically, total annual capex > 30% of total fixed assets or regulated asset base) or technically highly complex (includes one or more large projects of extreme technical complexity). OR Rapidly deteriorating asset performance or condition could put issuer at risk of termination of licence, concession or lease/contract.

Factor 2: Financial Policy

WHY IT MATTERS

Management and shareholder tolerance for financial risk is an important rating factor as it directly affects debt levels, credit quality and risk in the capital structure (e.g., refinancing risk, counterparty risk or exposure to interest rates or foreign exchange movements).

The generally stable and predictable cash flows of a regulated water utility create significant capacity to incur debt financing and potentially to invest in related businesses. While debt financing may be considered essential to the efficient capital structure of a water utility, a desire to enhance shareholder returns may lead to the pursuit of higher leverage, which increases credit risk. The way in which a water utility's owner uses its debt capacity, therefore, is a key rating consideration.

In this factor, we assess the likelihood that financial policy decisions, in their totality, could add uncertainty to future cash flow levels and divert resources away from creditors. In this regard, management's track record and their public commitment to maintaining the issuer's credit quality are key considerations.

HOW WE ASSESS IT FOR THE SCORECARD

We consider the company's approach to financing its activities, in particular the balance it strikes in apportioning risk between shareholders and creditors. We assess both the company's historical track record and its stated objectives with respect to leverage and financing decisions, as well as the investment return requirements of its owners. The behaviour of owners can be a key differentiating credit consideration – where owners' objectives are short-term, opaque or where there is a lack of track record, the regulated water utility will likely be scored lower in this factor than if its shareholders have more long-term return requirements and may be willing to forego near-term distributions to maintain financial flexibility.

Issuers are likely to have a high score on this factor if they have an extended track record of low levels of leverage plus a public commitment to maintaining high levels of credit quality. A water utility that has demonstrated a commitment to maintaining an average level of leverage for the industry (e.g. to a level implied within the regulator's allowed rate return) is likely to be scored in the middle of the range. However, scores of Baa and above would generally only apply where there are no (or only very limited) concerns regarding owners' behaviour – this would be the case, for example, for listed companies, government majority-owned companies or those owned by industrial shareholders. Issuers with consistently higher levels of leverage or those with a less transparent financial policy would likely score Ba or lower on this factor.

This factor is scored separately from a notching factor for specific structural enhancements that provide additional creditor protection (Factor 4). However, where they exist, such enhancements will be considered to the extent they define or clarify the issuer's overall financial policy.

Factor 2 – Financial Policy (10%)

Rating Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Financial Policy	10%	Long track record and expected maintenance of extremely conservative financial policy; very stable metrics; low debt levels for the industry; AND Public commitment to the highest credit quality over the long term.	Long track record and expected maintenance of a conservative financial policy; stable metrics; lower than average debt levels for the industry; AND Public commitment to a very high credit quality over the long term.	Extended track record and expected maintenance of a conservative financial policy; moderate debt leverage and a balance between shareholders and creditors; Not likely to increase shareholder distributions and/or make acquisitions which could lead to a weaker credit profile; Solid commitment to high credit quality.	Track record and expected maintenance of a conservative financial policy; an average level of debt for the industry and a balance between shareholders and creditors; Some risk that shareholder distributions and/or acquisitions could lead to a weaker credit profile; Solid commitment to targeted metrics.	Track record or expectation of maintenance of a financial policy that is likely to favour shareholders over creditors; higher than average, but not excessive, level of leverage; Owners are likely to focus on extracting distributions and acquisitions but not at the expense of financial stability.	Track record of aggressive financial policies or expected to have a financial policy that favours shareholders through high levels of leverage with only a modest cushion for creditors; OR High financial risk resulting from shareholder distributions or acquisitions.	Expected to have a financial policy unfavourable to creditors with a track record of or expected policy of maintaining excessively high debt leverage; OR Elevated risk of debt restructuring.

Factor 3: Leverage and Coverage

WHY IT MATTERS

In the first two rating factors, we assess the credit strengths and weaknesses afforded by the water utility's fundamental business and its financial policies. However, a company's ultimate credit profile must also incorporate its financial metrics, as a water utility that is substantially weaker than its peers in terms of cash flow generated or debt relative to the value of its asset base will generally have a higher probability of default.

When examining credit metrics, there is no single measure that can predict the likelihood of default. We utilise metrics that measure both the absolute capacity of the issuer to service its debt and the size of its debt burden relative to those of its peers. Leverage ratios aim to capture different measures of how easily an issuer can repay its debt; coverage ratios focus more on the ability to service the debt prior to repayment but may also take into account the necessary maintenance investments that are needed to ensure that the future cash flow generation is not impaired.

HOW WE ASSESS IT FOR THE SCORECARD

We use four financial metrics in the scorecard when examining a water utility's leverage and coverage.

» Adjusted Interest Coverage Ratio OR FFO Interest Coverage

» Net Debt to Regulated Asset Base (RAB)[11] OR Debt to Capitalisation

» Funds from Operation (FFO) to Net Debt

» Retained Cash Flow (RCF) to Net Debt

Adjusted Interest Coverage Ratio OR FFO Interest Coverage

The Adjusted Interest Coverage Ratio is our preferred metric for water utilities where allowed revenues/tariffs are determined using a 'building block' or equivalent approach and where the components of allowed revenues/tariffs are consistently available from an independent source – in many cases, publications from the regulatory authority itself. Typical components of the revenue building block include: (1) the amount of expenditure recovered on an annual basis and not capitalised into the RAB; (2) the depreciation of the RAB as well as a depreciation or maintenance allowance for assets that may not be fully factored in the RAB; and (3) the return allowed over the invested capital, typically calculated or estimated by applying an industry- or company-specific rate of return on the RAB. The building block generally also includes several other elements, such as taxes and levies, and adjustments for past over or under-recoveries.

The Adjusted Interest Coverage Ratio aims to measure the amount of "headroom" afforded by the company's cash flows in servicing its debt burden after taking into account the cost of maintaining a stable asset base. It thus recognises that the regulatory revenue allowances for a water utility include significant amounts that customers are required to pay to enable the utility to maintain and replenish its assets, both those that are included in the RAB and those that may be operated by the utility but not financed by its investors (e.g. assets built with public grants or assets that were privatised at a value below their replacement cost). As a result the utility's revenues (and thus FFO) can be boosted by significant amounts that are simply funding required expenditure, which is reported in company's financial statements not as operating expenditure but as capital expenditure.

[11] The Regulatory Asset Base (RAB) or equivalent regulatory term (e.g. RAV, Rate Base) is the monetary value attributed in the tariff setting regulatory model to the capital invested by the water utility, on which the regulator calculates an allowed return.

Where this regulatory dynamic applies, an EBITDA- or FFO-based interest coverage may limit the comparability of companies' interest coverage. Given the amounts of embedded subsidies often inherent in a private water utility model, the amounts of expenditure that the utility needs to manage to provide its services can be very significant in relation to the capital provided by its investors compared to other industries. This results in a high level of operational leverage, which is disguised by the accounting reporting of expenditure and has the illusive effect of boosting FFO and EBITDA-based metrics.[12]

The formula for the Adjusted Interest Coverage ratio is a variation on the typical FFO Interest Coverage ratio. In calculating the Adjusted Interest Coverage, the standard FFO Interest Coverage is adjusted for (1) the Capital Charges, i.e. expenditures recovered in revenues that are not accounted for as operating expenses and are not treated as additional invested capital incrementing the RAB; and (2) Inflation Accretion, a non-cash interest expense.

It is calculated or estimated as follows:

$$\frac{\text{FFO} + (\text{Interest Expense} - \text{Inflation Accretion}^{13}) - \text{Capital Charges}}{(\text{Interest Expense} - \text{Inflation Accretion})}$$

Inflation Accretion typically arises when the regulatory authority sets tariffs for the water utility in real terms, using a real rate of return, and then allows the utility to adjust tariffs annually by an inflation index. In this type of regulatory model, the utility's RAB is also revalued annually by inflation. Hence, inflation-linked debt aligns the debt service requirements with the utility's future cash flows, because the utility only pays a real rate of interest on the outstanding principal, which is adjusted annually by an inflation index. With positive inflation, the debt grows annually at the rate of inflation and this non-cash increment, which we define as Inflation Accretion, is typically reported as part of the Interest Expense in the company's income statement. The related increase in debt is captured by the leverage ratio below.

The Capital Charges represent the portion of revenues (and thus FFO) that is needed to replenish the regulated asset base. The maintenance of a stable asset base ensures that the earned return does not fall due to a decline in the asset base. Regulators – or issuers as part of their business plan submissions to the regulator during the price review process – may decide to allow more revenues today to the detriment of a slower growing asset base and, consequently lower revenues in the future, or vice versa. The Capital Charges in the Adjusted Interest Coverage Ratio incorporate these timing differences or other similar adjustments, e.g., regulatory revenue profiling to smooth the impact of tariff increases on customer bills.

In jurisdictions where regulatory revenues/tariffs are not determined with a 'building block approach' or where the regulatory information needed to calculate Capital Charges may not be consistently available, we use the FFO Interest Coverage, calculated (or for forward periods estimated) as (FFO + Interest Expense) / Interest Expense.

Net Debt to Regulated Asset Base OR Debt to Capitalisation

As explained above, regulated water utilities service their debt principally through the return they earn on the capital invested for the provision of the regulated services. Hence, we seek to measure leverage as the relationship between their debt and their invested capital.

[12] This is recognised in slightly more demanding ratio guidance.

[13] For the numerator, Interest net of Inflation Accretion is added back to the extent it was deducted in calculating FFO, i.e. FFO would be after Interest Expense, net of Inflation Accretion.

For the utilities regulated under a RAB-based model where the RAB accurately represents the invested capital on which the water utility will earn a return over time, we measure leverage as Net Debt to RAB.

For water utilities that (1) are regulated under tariff models without a RAB; (2) are regulated under a RAB-based model but where the RAB may not accurately represent the invested capital on which the water utility will earn a return over time (e.g. because of ex-post rate-setting); or (3) where the RAB may not be consistently available, we use Debt to Capitalisation as a measure of balance sheet leverage.

FFO to Net Debt

This ratio is a measure of dynamic leverage. As discussed above, this measure does not take into account the capital expenditures needed to maintain the asset base when comparing cash flows to a company's stock of debt. However, it allows a wider comparison across industries on a global basis and can be a useful indicator of a company's ability to generate cash flows over a period of time.

The numerator for this ratio is FFO. We use net debt owing to the sector's propensity to pre-fund its significant capital investments, which can result in substantial cash amounts held on balance sheet. The use of net debt also recognises the requirements under certain financing structures to maintain liquidity and debt service reserves. Where the debt position of a company may be overstated or understated by the debt figures as reported in the financial statements, we typically make non-standard adjustments for certain derivative transactions subject to the relevant hedge accounting rules for US-GAAP and IFRS accounting.

RCF to Net Debt

This ratio is also an indicator for financial leverage. However, in contrast to FFO to Net Debt, it considers the strength of a water utility's cash flow after dividend payments are made. Dividend obligations can be substantial, quasi-permanent outflows that affect the ability of a water utility to cover its debt obligations, and this ratio can also provide insight into its financial policies. The higher the level of retained cash flow relative to a water utility's debt, the more cash it has to support its capital expenditure programme. The numerator of this ratio is FFO minus dividends, and the denominator is net debt.

Factor 3 – Leverage and Coverage (40%)

The following tables show the scorecard-scoring categories for each Leverage and Coverage sub-factor and the weighting thereof.

Rating Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Adjusted Interest Coverage Ratio (1)	12.5%	≥8x	4.5-8x	2.5-4.5x	1.5-2.5x	1.2-1.5x	1-1.2x	<1x
		OR	OR	OR	OR	OR	OR	OR
OR		≥10x	7-10x	4.5-7x	2.5-4.5x	1.8-2.5x	1.5-1.8x	<1.5x
FFO Interest Coverage (2)								
Net Debt / Regulated Asset Base (3)	10%	<25%	25-40%	40-55%	55-70%	70-85%	85-100%	≥100%
OR								
Debt / Capitalisation								
FFO / Net Debt	12.5%	≥40%	25-40%	15-25%	10-15%	6-10%	4-6%	<4%
RCF / Net Debt	5%	≥30%	20-30%	10-20%	6-10%	4-6%	2-4%	<2%

Notes:

(1) The Adjusted Interest Coverage Ratio is our preferred metric for water utilities where allowed revenues/tariffs are determined using a 'building block' or equivalent approach and where the components of allowed revenues/tariffs are consistently available and can be verified by from an independent source – in many cases, publications from the regulatory authority itself. For the numerator, Interest net of Inflation Accretion is added back to the extent it was deducted in calculating FFO. Capital Charges represent expenditures recovered in revenues that are not accounted for as operating expenses and are not treated as additional invested capital incrementing the RAB, including regulatory revenue profiling to smooth the impact of tariff increases on customer bills.

(2) In jurisdictions where regulatory revenues/tariffs are not determined with a 'building block approach' or where the regulatory information needed to calculate Capital Charges may not be consistently available, we use the FFO Interest Coverage, calculated (or for forward periods estimated) as (FFO + Interest Expense) / Interest Expense.

(3) For the utilities regulated under a RAB-based model where the RAB accurately represents the invested capital on which the water utility will earn a return over time, we measure leverage as Net Debt to RAB. For water utilities that (1) are regulated under tariff models without a RAB; (2) are regulated under a RAB-based model but where the RAB may not accurately represent the invested capital on which the water utility will earn a return over time (e.g. because of ex-post rate-setting); or (3) where RAB may not be consistently available, we use Debt to Capitalisation.

Factor 4: Structural Considerations and Sources of Rating Uplift From Creditor Protection

WHY IT MATTERS

Regulated water utilities are financed under different financing structures. Companies may have entered into complex financing structures that provide additional creditor protection to maintain credit quality while increasing gearing. A transition from a publicly listed model to private ownership by infrastructure, pension and other specialist funds has led to the adoption of financing structures that incorporate structural enhancements similar to those used in project finance transactions in various infrastructure sectors.

We believe that structural enhancements may provide valuable protection to financial creditors in the regulated water utilities sector, and this can result in rating uplift. Such enhancements may be incorporated into the terms and conditions of financing agreements pertaining to essentially all of a utility's securities holders, or they may be a feature within the utility's regulatory licence, and include requirements such as maintaining a certain credit rating and demonstrating sufficient operating and financial resources.

HOW WE ASSESS IT FOR THE SCORECARD

Our determination of the degree of ratings uplift for a regulated water utility provided by debt structural features and/or regulatory provisions that insulate a utility's credit profile from its parent/owners is based primarily on an assessment of the following:

A. Factors that reduce risks that can lead to default, and

B. Factors that give creditors either the right, or ability to influence the taking of corrective action - to stop or reverse credit deterioration.

In order for structural features to provide ratings uplift they typically must benefit all debt creditors, although individual creditors may be subject to different payment priorities.

A. Factors that reduce risks that can lead to default

1. **Restriction on business activities.** Prohibiting an issuer from engaging in new activities or making acquisitions is seen as credit positive because it eliminates the business risk associated with corporate activity and ensures that all critical functionality is subject to the debt structural features.
2. **Restriction on raising additional debt.** Restricting additional indebtedness reduces the risk that a higher debt level can cause a payment default.
3. **Distribution lock-up tests.** Prohibiting distributions to shareholders in a distressed scenario preserves cash within the business, thus reducing the risk of default.
4. **Limits on debt structure.** Requiring the issuer to remove or mitigate certain financial risks, such as interest rate, currency or refinancing risk. The latter can range from restrictions on debt maturity concentration to the implementation of a fully amortizing debt structure, which in itself can achieve a full notch of ratings uplift. Covenants can also restrict the issuer's use of derivative products, thus reducing the likelihood of additional and/or sizeable claims on the business.
5. **Reserves to cover large future or unforeseen costs.** Dedicated timing reserves for large-cost items, e.g., one-off capital expenditure.

B. Factors that give creditors either the right, or ability, to influence the taking of corrective action – to stop or reverse credit deterioration

An important element of leveraged infrastructure debt structures has been the ability of debt creditors to force owners to reduce debt ahead of the point where equity value is lost and debt is impaired, and to take action to repay debt through the enforcement of security if this is not achieved. The debt event of default tests and the consequences of these are key elements of this protection. To provide effective protection to creditors, these features need to work within the context of the business being financed, in most cases to allow the operating businesses to continue as a going concern and to allow debt service to be paid though available liquidity facilities while action is being taken.

The elements of debt structural features that provide control rights are assessed in the following areas:

1. **Effectiveness of control rights.** The degree to which the exercise of control rights may be impeded (e.g., local jurisdiction laws or certain regulatory restrictions). We assess the proposed terms and conditions in conjunction with legal guidance to ascertain whether the proposed control rights are likely to operate as intended.
2. **Length of the control period.** The length of time debt creditors have to exercise control rights before the issuer loses the right to generate cash flow from the assets (e.g., before an insolvency process or before a concession/regulatory licence is terminated).
3. **Dedicated liquidity support.** Dedicated liquidity support facilities to cover ongoing debt service while control rights are exercised. To be considered valuable, such dedicated liquidity would need to be available for use in circumstances where control rights are exercised.

In almost all cases, to be effective and/or to assure the structure has integrity, debt structural features need to include the following elements:

1. The entity subject to the financing and the restrictions would be separated from the wider ownership group and any wider business group. The separation is achieved through legal means related to the creation of the issuer and/or restrictions in the financial structure.
2. All debt creditors must be subject to common terms that ensure that individual creditors or creditors cannot take unilateral action to destabilize the financing.
3. Creditor step-in rights should be specifically permitted under the concession, regulatory licence or legal framework, as well as the finance documents. Note that we give value to security arrangements only as one element, albeit usually a critical element, of a wider package of features designed to improve creditors' ability to detect early potential problems and rectify them if possible (in the first instance by retaining cash surpluses within the company). Further, if remedial action is not possible or fails, the security arrangements are used to maximize recovery prospects.

Structural features that provide a meaningful level of creditor protection would provide a notching uplift to the composite score generated from the scorecard factors, a final step to arrive at the scorecard-indicated outcome.

When assessing rating uplift we consider the package as a whole (i.e. elements of both A. and B. above) in order to gauge the overall effectiveness. For example, independent validation of compliance with financial ratio covenants may be an important consideration in assessing the ongoing effectiveness of such covenants.

Security is sometimes not allowed or is not enforceable on certain assets, the title of which may be retained by the state or other granting authority, or where the company is restricted from giving security over its assets by a pre-existing statute.

Structural enhancements that we view as very comprehensive and effective can deliver an uplift of up to three notches within the scorecard. However, across the rated universe, the current typical uplift is in the range of zero to two notches. Due to the broad spectrum of possible financing structures (which can contain a variety of elements in an array of potential combinations), these enhancements are scored in increments of half-a-notch. While debt structural features could in theory be stronger than those we have encountered, more restrictive terms and conditions would constrain management abilities to pursue strategies and policies and may not be suited to certain types of businesses, so they have typically fallen within a moderately narrow range.

Ratings fully incorporate our view of the actual structural or contractual features in a particular transaction. In rare cases, contractual features may provide greater uplift to the issuer's credit quality that what is reflected in the scorecard.

Assumptions, Limitations and Rating Considerations That Are Not Covered in the Scorecard

The scorecard in this rating methodology represents a decision to favour simplicity that enhances transparency and to avoid greater complexity that would enable the scorecard to map more closely to actual ratings. Accordingly, the four rating factors in the scorecard do not constitute an exhaustive treatment of all of the considerations that are important for ratings of companies in the regulated water utilities sector. In addition, our ratings incorporate expectations for future performance, while the financial information that is used for mapping in the scorecard is mainly historical. In some cases, our expectations for future performance may be informed by confidential information that we cannot disclose. In other cases, we estimate future results based upon past performance, industry trends, competitor actions or other factors. In either case, predicting the future is subject to the risk of substantial inaccuracy.

Assumptions that may cause our forward-looking expectations to be incorrect include unanticipated changes in any of the following factors: the macroeconomic environment and general financial market conditions, industry competition, disruptive technology, regulatory and legal actions.

Key rating assumptions that apply in this sector include our view that sovereign credit risk is strongly correlated with that of other domestic issuers, that legal priority of claim affects average recovery on different classes of debt sufficiently to generally warrant differences in ratings for different debt classes of the same issuer, and the assumption that access to liquidity is a strong driver of credit risk.

In choosing metrics for this rating methodology scorecard, we did not explicitly include certain important factors that are common to all companies in any industry such as the quality and experience of management, assessments of corporate governance and the quality of financial reporting and information disclosure. Therefore, ranking these factors by rating category in a scorecard would in some cases suggest too much precision in the relative ranking of particular issuers against all other issuers that are rated in various industry sectors.

Ratings may include additional factors that are difficult to quantify or that have a meaningful effect in differentiating credit quality only in some cases, but not all. Such factors include financial controls, exposure to uncertain licensing regimes and possible government interference in some countries. Regulatory, litigation, liquidity, technology and reputational risk as well as changes to consumer and business spending

patterns, competitor strategies and macroeconomic trends also affect ratings. While these are important considerations, it is not possible to precisely express these in the rating methodology scorecard without making the scorecard excessively complex and significantly less transparent. Ratings may also reflect circumstances in which the weighting of a particular factor will be substantially different from the weighting suggested by the scorecard.

This variation in weighting rating considerations can also apply to factors that we choose not to represent in the scorecard. For example, liquidity is a consideration frequently critical to ratings and which may not, in other circumstances, have a substantial impact in discriminating between two issuers with a similar credit profile. As an example of the limitations, ratings can be heavily affected by extremely weak liquidity that magnifies default risk. However, two identical companies might be rated the same if their only differentiating feature is that one has a good liquidity position while the other has an extremely good liquidity position, unless they are low-rated companies for which liquidity can be a substantial differentiator for relative default risk.

Other Rating Considerations

Ratings consider a number of additional considerations. These include but are not limited to: our assessment of the impact of non-core businesses, the quality of management, corporate governance, financial controls, parental support, liquidity management and event risk.

Impact of Non-Core Businesses / Multi-Utilities

This methodology scorecard is applied to the assessment of issuers whose primary activity is the ownership and operation of regulated water and wastewater assets. Where the company has or will seek to diversify its operations towards other business types, we consider the impact of such diversification on credit quality. In particular, the ownership of material businesses with higher credit risk than regulated water and wastewater services would likely result in an actual rating that is lower than the scorecard-indicated outcome.

In some cases, it is generally useful to apply this methodology to the monopoly-based water and wastewater business of multi-utilities, but a multi-utility's overall credit quality will reflect a combination of risk factors related to the combined group's activities, which may include regulated electric and gas networks, environmental services, etc.

Liquidity and Access to Capital Markets

Liquidity analysis is a key element in the financial analysis of water utilities, and it encompasses a company's ability to generate cash from internal sources as well as the availability of external sources of financing to supplement these internal sources. Liquidity and access to financing are of particular importance in this sector. Some water and wastewater assets can often have a very long useful life, even in excess of 50 years, as well as high price tags. Furthermore, the sector has historically experienced prolonged periods of negative free cash flow, such that a portion of capital expenditure must be debt financed. Dividends also represent a quasi-permanent outlay, as companies will only rarely cut their dividend. Liquidity is also important to meet maturing obligations, which often occur in large chunks.

Our assessment of liquidity for regulated water utilities typically involves an analysis of total sources and uses of cash over the next 12 months or more. Using our financial projections and our analysis of its available sources of liquidity (including an assessment of the quality and reliability of alternate liquidity such as committed credit facilities), we evaluate how its projected sources of cash (cash from operations, cash on hand and existing committed multi-year credit facilities) compare to its projected uses (including all or most capital expenditures, dividends, maturities of short and long-term debt, our projection of potential liquidity calls on financial hedges, and important issuer-specific items such as special tax payments). We assume no

access to capital markets or additional liquidity sources, no renewal of existing credit facilities, and no cut to dividends. We examine a company's liquidity profile under this scenario, its ability to make adjustments to improve its liquidity position, and any dependence on liquidity sources with lower quality and reliability.

Management Strategy

The quality of management is an important factor supporting a company's credit strength. Assessing the execution of business plans over time can be helpful in assessing management's business strategies, policies, and philosophies and evaluates management performance relative to performance of competitors and our projections. A record of consistency provides us with insight into management's likely future performance in stressed situations and can be an indicator of management's tendency to depart significantly from its stated plans and guidelines.

Size

The size and scale of a regulated water utility has generally not been a major determinant of its credit strength in the same way that it has been for most other industrial sectors. However, size can still be a very important factor in our assessment of certain risks that impact ratings, including event risk, construction risk and access to external funding. While the scorecard incorporates some of the execution risk around large or complex projects into the Scale and Complexity of Capital Programme & Asset Condition Risk sub-factor, for some issuers these considerations may be sufficiently important that the rating reflects a greater weight for these risks.

Interaction of Ratings with Government Policies and Sovereign Ratings

Compared with most industrial sectors, regulated water utilities are more likely to be impacted by government actions. Credit impacts can occur directly through regulation, and indirectly through environmental and tax policies. While Factor 1 – Business Profile captures many of these risks, for some issuers a greater weighting may be appropriate in assessing the rating. As purely domestic enterprises (in most cases), water utilities are typically subject to the same macro-economic trends as the sovereign in the country or countries in which they operate.

Ownership

Ownership (by a government or other entity) can also provide ratings lift for a particular water utility if it is owned by a highly-rated owner(s) and of strategic importance to those owners. In our analysis of parental support, we consider whether the parent has the financial capacity and strategic incentives to provide support in times of stress or financial need, or has already done so in the past. Conversely, if the parent puts a high dividend burden on the issuer which in turn reduces its flexibility, the ratings would typically reflect this risk.

Corporate Governance

Among the areas of focus in corporate governance are audit committee financial expertise, the incentives created by executive compensation packages, related party transactions, interactions with outside auditors, and ownership structure.

Financial Controls

We rely on the accuracy of audited financial statements to assign and monitor ratings in this sector. The quality of financial statements may be influenced by internal controls, including centralised operations and the proper tone at the top and consistency in accounting policies and procedures. Auditors' comments in financial reports and unusual financial statement restatements or delays in regulatory filings may indicate weaknesses in internal controls.

Event Risk

We also recognize the possibility that an unexpected event could cause a sudden and sharp decline in an issuer's fundamental creditworthiness. Typical special events include mergers and acquisitions, asset sales, spin-offs, capital restructuring programs, litigation and shareholder distributions.

Structural Subordination

A utility company can finance itself in many different ways but it may involve a regulated operating company (OpCo) and a holding company (HoldCo) structure with debt located at different levels. Given that creditors of the HoldCo usually have a secondary claim on the group's cash flows and assets after OpCo creditors, this leads to structural subordination. Our ratings of HoldCo debt are usually notched downwards from our assessment of group credit quality (which ignores priority of claim). In addition, our analysis takes into account a number of other factors including, *inter alia*, the following:

» Regulatory or other barriers to cash movement from OpCos to HoldCos

» Specific ring-fencing provisions or financial covenants at the OpCo level

» HoldCo exposure to subsidiaries with high business risk or volatile cash flows

» Strained liquidity at the HoldCo level

Low Inflation & Deflation / High Inflation

In a number of regulatory models, tariffs are designed in real terms (as opposed to nominal terms), where allowed revenues are computed in a fixed price base and subsequently inflated by a retail/consumer or other price index. Some of the stated purpose of indexation are to allocate the cost of the service across different generations of customers and to provide utilities some protection against cost inflation. However, water utilities governed by this type of regulatory model generally need to raise a material, if not predominant portion of their debt on a conventional basis (i.e. debt instruments whose coupon is based on nominal interest rates, which include an assumption of long-term inflation rates within the interest cost). This may cause a timing mismatch of cash flows and debt service, as well as a potentially higher reliance on continued market access to raise debt. Furthermore, subject to a company's dividend policy and tendency to maintain leverage (measured in relation to the regulated asset base) at constant levels close to the guidelines supporting their rating category, lower-than-expected inflation or deflation could lead certain companies to breach such parameters. In such cases, affected utilities have typically taken corrective actions (e.g. in the form of temporary reduction in shareholder distributions) to ensure that such breaches, if any, are of a temporary nature only. In the absence of such actions, ratings pressure may result.

Other regulatory models typically set rates in nominal terms based on actual capital costs at the time of rate-setting. Although the framework may have some forward-looking cost components, they are rarely linked to inflation. In such regulatory models, high inflation represents the greater risk, since tariff-setting typically lags well behind incurred expenditures in a rapidly rising cost environment. When deflation or inflation is severe, actual ratings may vary more materially from scorecard-indicated outcomes, especially those based on historical metrics.

Droughts and Potable Water Shortages

Periodic droughts can seriously reduce water available to utilities, and natural and man-made disasters can contaminate or otherwise reduce potable water supplies. Depending on the regulatory framework, there is some regional variation in utilities' cash flow impacts during periods of droughts and water rationing, or stemming from flooding or other disasters that interrupt service. Water shortages have the potential to increase customer dissatisfaction with service and damage regulatory relationships. Droughts may be a catalyst for large increases in capital spending, to secure water supplies or reduce leakage in the system.

Particularly in regulatory frameworks where the utility retains exposure to volumetric changes in usage, severe or long-lasting droughts may impact revenues and cash flows in a manner that causes actual ratings to vary more materially from scorecard-indicated outcomes, especially those based on historical metrics.

Appendix A – Regulated Water Utilities Scorecard

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Factor 1 – Business Profile								
Stability and Predictability of Regulatory Environment	15%	Regulation is and expected to remain independent, well-established (>15 years of being predictable and stable) and transparent. Well-established, published regulatory principles clearly define risk allocation between companies and customers and are consistently applied, with public or shared financial model.	Regulation is independent, reasonably well-established (>10 years of being predictable and stable) and transparent. Well-established, published regulatory principles clearly define risk allocation between companies and customers and are generally consistently applied. Regulatory or concession framework has in recent years been (and is expected to remain) highly predictable, stable and supportive of utilities.	Regulation is generally independent and developed (e.g. published regulatory principles of risk allocation between companies and customers, based on established precedents in the same jurisdiction), and has above average predictability and reliability, although regulatory or concession regime may be sometimes less supportive of utilities.	Regulatory framework is well-developed, with evidence of some inconsistency or unpredictability in the framework's application. OR Regulatory framework is relatively new and untested, but regulatory principles are based on established precedents and jurisdiction has history of independent and transparent regulation for other utility services. Regulatory environment or concession framework may sometimes be challenging or politically charged.	Regulatory or concession framework is defined but there is a high degree of inconsistency or unpredictability in its application. Tariff setting may be subject to negotiation and political interference; there has been a history of difficult or less supportive regulatory decisions; however, there are some precedents in the relevant jurisdiction of predictable regulation for other utility services.	Regulatory or concession framework is unclear, untested or undergoing significant change, with a history of political interference. Utility regulatory body lacks a consistent track record and is or is expected to be unsupportive, uncertain or highly unpredictable.	Regulatory or concession framework is not defined, or is expected to be extremely unsupportive, unpredictable or politically driven.

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Asset Ownership Model	5%	All key water and/or sewerage assets held outright in perpetuity.	All key water and/or sewerage assets held outright subject to a licence that can be terminated only for material underperformance, failure to meet certain financial parameters or insolvency OR held under long-term concession with clearly defined right to timely recovery of residual asset value at termination/end of concession underpinned by highly-rated entity; clear track record of consistently applying concession termination / recovery regime.	All key water and/or sewerage assets held under long-term concession with clearly defined right to recover value of residual assets at termination/end of concession underpinned by highly-rated entity but with undefined timeframe OR held/operated under medium-/ long-term operating leases or mgmt contract with very substantial portfolio diversification, very established market position and very high renewal rate (>95%).	All key water and/or sewerage assets held under long-term concession with entitlement to recover value of residual assets at termination/end of concession but procedures untested/undefined OR held/operated under medium-/ long-term operating leases or mgmt contract with substantial portfolio diversification, established market position and high renewal rate (>90%). Expropriation possible in case of insolvency or material failure to comply with licence conditions, but with full compensation for asset value.	All key water and/or sewerage assets held under concession with recovery of residual asset value at termination/end of concession subject to negotiation OR held/operated under short-term operating leases or mgmt contract with good degree of portfolio diversification and renewal rate (>80%). Expropriation possible, with some uncertainty in the prospect of full compensation.	All key water and/or sewerage assets held under concession with no recovery of residual asset value at termination/end of concession OR held/operated under short-term operating leases or mgmt contract (limited portfolio diversification). Expropriation likely, with material uncertainty in the prospect of full compensation.	Issuer is in default under its licence, concession or lease/contract, likely to lead to termination. Expropriation highly likely, with little or no prospect of compensation.

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Cost and Investment Recovery (Sufficiency & Timeliness)	15%	No regulatory or contractual impediment to adjust tariffs (no approval or reviews required).	Tariff formula allows for timely recovery of operating expenditure including depreciation and a fair return on all investment. Depreciation allowance fairly reflects asset consumption. All capital expenditure is included in asset base as incurred or fully covered by specific riders/surcharges prior to the next rate case. Minimal challenges by regulators to companies' cost assumptions.	Tariff formula allows for recovery of operating expenditure including depreciation based on allowances set at frequent price reviews (e.g., 5-yearly intervals or shorter) and a fair return on all efficient investment: Depreciation allowance fairly reflects asset consumption; Capital expenditure is included in asset base as incurred or partially covered by specific riders/surcharges prior to the next rate case; Opex and capex can be subject to efficiency tests; Limited instances of regulatory challenges; limited delays to rate or tariff increases or cost recovery Performance is likely to be in line with regulatory expectations.	Tariff formula allows for recovery of operating expenditure including depreciation and return on investment but subject to retrospective regulatory approval or infrequent price reviews (e.g., > 5-yearly intervals): Some instances of revenue back-loading (e.g. depreciation allowance set below asset consumption or operating expenditure is capitalised) OR Rate/tariff reviews and cost recovery outcomes are usually predictable, although application of tariff formula may be unclear; potentially greater tendency for regulatory intervention and/or to disallow or delay costs Performance may be below regulatory expectations.	Tariff formula does not take into account all cost components and depreciation may be set below asset consumption. Revenues allow coverage of operating expenditures; however, investment is not clearly or fairly remunerated OR Rate/tariff reviews are inconsistent, with some history of unwillingness to make timely rate changes OR Operational underperformance likely to significantly impact the returns achieved by the business.	Highly uncertain rate reviews and cost recovery outcomes; regulators may materially delay or deny tariff increases based on more arbitrary questioning of the utility's costs or financing arrangements. Revenues only cover cash operating expenditures OR Tariff formula does not take into account material cost and investment recovery components:	Revenues only partially cover cash operating costs.

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Revenue Risk	5%	No exposure to volume or customer concentration risk.	Minimal exposure to volume risk and timely recovery mechanism in place. AND Very limited customer concentration of volumes and revenues and to a customer/industry viewed as stable.	Some exposure to volume risk; recovery mechanism in place with some delay until next regulatory price review; generally limited revenue volatility expected. May have small concentration of volumes and revenues to a particular customer/industry viewed as stable.	Moderate exposure to volume risk but recovery mechanism in place, with some delay until next regulatory price review; moderate revenue volatility expected. May have a moderate concentration of volumes and revenues to a particular customer/industry.	More material exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels; recovery mechanism, may not follow regular intervals. OR Significant concentration of volumes and revenues to a particular customer/industry.	High exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels with recovery mechanism unclear or subject to very long delays. OR Very high concentration of volumes and revenues to one particular customer/industry.	Very high exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels with no meaningful recovery mechanism in place. OR Very high concentration of volumes and revenues to a particular customer/industry viewed as vulnerable.
Scale and Complexity of Capital Programme & Asset Condition Risk	10%	Capex programme is very limited in scale, with only minimum maintenance requirements (typically, total annual capex ≤ 4% of total fixed assets or regulated asset base). AND No asset condition risk (e.g. full and immediate cost pass-through).	Capex programme is limited in scale, with small maintenance or enhancement requirements (typically, total annual capex 4-6% of total fixed assets or regulated asset base). AND Well-developed asset base under tight regulatory supervision; asset performance is generally stable or improving.	Modest capex programme, including standard maintenance and enhancement expenditures (typically, total annual capex 6-8% of total fixed assets or regulated asset base). Well-developed asset base and no history of serious asset failure; asset performance is generally stable or improving.	Capex programme of manageable scale, including straight-forward maintenance and enhancement expenditure (typically, total annual capex 8-12% of total fixed assets or regulated asset base). Company has a reasonably developed asset base; may have some precedents of serious asset failures but asset performance is now and is expected to remain broadly stable.	Large capex programme (typically, total annual capex 12%-20% of total fixed assets or regulated asset base) or challenging in scope (small number of large and complex projects may account for majority of capital programme). OR Asset base not fully developed; or average asset performance is gradually deteriorating or there is some concern about asset condition.	Very large capex programme (typically, total annual capex 20-30% of total fixed assets or regulated asset base) or highly complex (one large and complex project may account for majority of capital programme). OR Performance of most assets is materially deteriorating, with serious assets failures likely or ongoing, or asset development is seriously below required target.	Extremely large capex programme (typically, total annual capex > 30% of total fixed assets or regulated asset base) or technically highly complex (includes one or more large projects of extreme technical complexity). OR Rapidly deteriorating asset performance or condition could put issuer at risk of termination of licence, concession or lease/contract.

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Factor 2 – Financial Policy								
Financial Policy	10%	Long track record and expected maintenance of extremely conservative financial policy; very stable metrics; low debt levels for the industry; AND Public commitment to the highest credit quality over the long term.	Long track record and expected maintenance of a conservative financial policy; stable metrics; lower than average debt levels for the industry; AND Public commitment to a very high credit quality over the long term.	Extended track record and expected maintenance of a conservative financial policy; moderate debt leverage and a balance between shareholders and creditors; Not likely to increase shareholder distributions and/or make acquisitions which could lead to a weaker credit profile; Solid commitment to high credit quality.	Track record and expected maintenance of a conservative financial policy; an average level of debt for the industry and a balance between shareholders and creditors; Some risk that shareholder distributions and/or acquisitions could lead to a weaker credit profile; Solid commitment to targeted metrics.	Track record or expectation of maintenance of a financial policy that is likely to favour shareholders over creditors; higher than average, but not excessive, level of leverage; Owners are likely to focus on extracting distributions and acquisitions but not at the expense of financial stability.	Track record of aggressive financial policies or expected to have a financial policy that favours shareholders through high levels of leverage with only a modest cushion for creditors; OR High financial risk resulting from shareholder distributions or acquisitions.	Expected to have a financial policy unfavourable to creditors with a track record of or expected policy of maintaining excessively high debt leverage; OR Elevated risk of debt restructuring.

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Factor 3 – Leverage and Coverage								
Adjusted Interest Coverage Ratio (1)	12.5%	≥8x	4.5-8x	2.5-4.5x	1.5-2.5x	1.2-1.5x	1.0-1.2x	<1.0x
		OR	OR	OR	OR	OR	OR	OR
OR								
FFO Interest Coverage (2)		≥10x	7-10x	4.5-7x	2.5-4.5x	1.8-2.5x	1.5-1.8x	<1.5x
Net Debt / Regulated Asset Base (3)	10%	<25%	25-40%	40-55%	55-70%	70-85%	85-100%	≥100%
OR								
Debt / Capitalisation								
FFO / Net Debt	12.5%	≥40%	25-40%	15-25%	10-15%	6-10%	4-6%	<4%
RCF / Net Debt	5%	≥30%	20-30%	10-20%	6-10%	4-6%	2-4%	<2%

Notes:

(1) The Adjusted Interest Coverage Ratio is our preferred metric for water utilities where allowed revenues/tariffs are determined using a 'building block' or equivalent approach and where the components of allowed revenues/tariffs are consistently available and can be verified by from an independent source – in many cases, publications from the regulatory authority itself. For the numerator, Interest net of Inflation Accretion is added back to the extent it was deducted in calculating FFO. Capital Charges represent expenditures recovered in revenues that are not accounted for as operating expenses and are not treated as additional invested capital incrementing the RAB, including regulatory revenue profiling to smooth the impact of tariff increases on customer bills.

(2) In jurisdictions where regulatory revenues/tariffs are not determined with a 'building block approach' or where the regulatory information needed to calculate Capital Charges may not be consistently available, we use the FFO Interest Coverage, calculated (or for forward periods estimated) as (FFO + Interest Expense) / Interest Expense.

(3) For the utilities regulated under a RAB-based model where the RAB accurately represents the invested capital on which the water utility will earn a return over time, we measure leverage as Net Debt to RAB. For water utilities that (1) are regulated under tariff models without a RAB; (2) are regulated under a RAB-based model but where the RAB may not accurately represent the invested capital on which the water utility will earn a return over time (e.g. because of ex-post rate-setting); or (3) where RAB may not be consistently available, we use Debt to Capitalisation.

Preliminary Scorecard-Indicated Outcome (Factors 1-3)

Factor 4 – Structural Considerations and Sources of Rating Uplift From Creditor Protection

Rating uplift of up to 3 notches provided by structural features to scorecard-indicated outcome from Factors 1-3 above

Scorecard-Indicated Outcome

Appendix B – Industry Overview

Generally, regulated water utilities exhibit significantly lower business risk than many other rated corporate sectors, and one of the lowest business risk profiles even among infrastructure issuers.

Underdeveloped regulatory frameworks, the very low business risk primarily reflects:

» Monopoly-type activities, most commonly supported by long-term licence or concession agreements.

» Characteristically strong visibility in revenues and profit generation, due to (1) importance of water and wastewater services provided, which results in overall low demand volatility and general resilience to economic fluctuations; and (2) clear and predictable mechanisms for tariff increases (embedded in the regulatory framework or concession regime), which will sustain revenues over the long term.

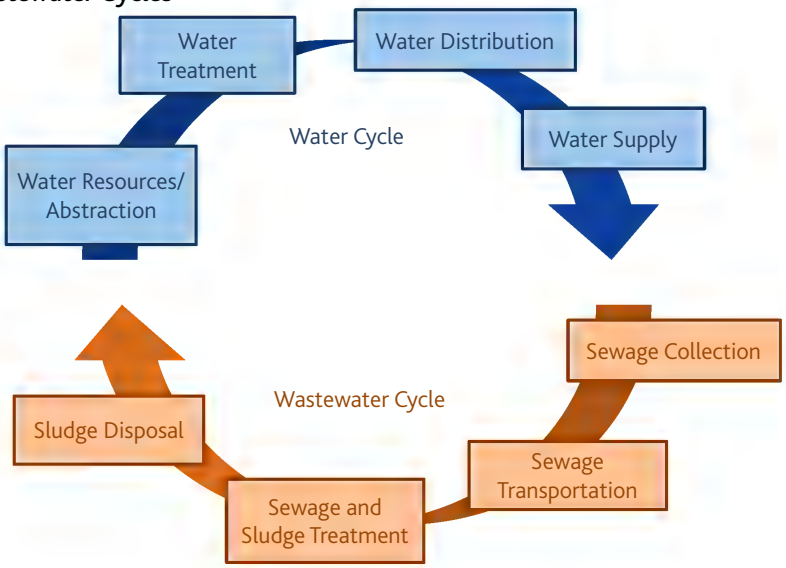
» Strong regulatory supervision due to the critical element of health and environmental implications of the water and wastewater services.

The stable and sustainable levels of cash flows afforded by these characteristics can also translate into a significant capacity to sustain high debt levels over the long term. This is of particular importance as the sector as a whole has massive infrastructure funding needs to enhance existing facilities to improve health and environmental standards. Due to the significant investment requirements issuers will need constant access to external funding as the vast amount of investments cannot be solely covered from internal cash flow generation. Although customer bills continue to rise to cover the additional capital costs of financing the water and wastewater infrastructure (partly offset by efficiency savings in the operations), the industry also remains heavily subsidised in many jurisdictions.

Levels and forms of subsidies differ from jurisdiction to jurisdiction. Most countries provide some form of cross subsidisation between customers through the application of average tariffs across any given water supply area compared to the actual cost of delivery to each respective customer. Furthermore, there are a number of explicit or implicit measures by which governments provide subsidies, such as reduced trade taxes for utilities, or income support and/or targeted assistance for customers in need. Subsidies can also be built directly into the tariff system.

Exhibit 2 illustrated the entire value chain of services in the water and wastewater cycle:

EXHIBIT 2
Water and Wastewater Cycles



Source: Moody's

The combination of water abstraction and treatment is also referred to as bulk supply or upstream wholesale activities. The vertical integration of the water supply chain can stop at this point. This is the case in a number of EU countries, where one large utility may be responsible for the upstream water activities, whilst a number of smaller – usually municipal-owned – suppliers undertake the distribution to the end-consumer. Most of the water utilities rated by us are integrated providers of water and/or wastewater services along the entire value chain, which in addition to the bulk supply also includes the distribution and sale to customers.

Different business models have been adopted globally in managing the water and wastewater activities. In many countries around the world, the supply of water and treatment of wastewater are public services and the legal responsibility of municipalities. In these cases the legal ownership of the assets also lies with the municipalities. However, there exist a variety of operational models that are derived from this set-up.

First, the water and wastewater infrastructure assets can be operated under direct management by the municipality itself. In these cases, the water and wastewater services would be part of the general regional or local administration (such instances are not covered under this rating methodology). Second, the management of the water and wastewater infrastructure can be delegated to another entity. Such entity can be – and in many instances is – partly or wholly owned by the regional or local government that retains the legal responsibility for the provision of water and wastewater services. Third, water services may be completely privatised along the entire value chain of water and/or wastewater provision, which has occurred in relatively few countries.

With respect to delegated management, a variety of different forms of contracts, concessions or licence arrangements exists, which can be summarised into the following main business models:

Management Contract: This is usually a short-term (3-5 years) arrangement for the management of operational facilities. The assets remain in the public sector, usually with the relevant municipality, which also collects the user charges from the customers. The managing entity is remunerated by the municipality through payment of a management fee. Depending on the contract, it may include a number of

performance targets against which the managing entity will be measured. Capital expenditure requirements and their funding remain principally the responsibility of the relevant municipality.

Lease Contract: A lease contract is similar to a management contract in that the asset ownership remains with the municipality. However, the relevant service undertaker responsible for the operation of the assets collects the user charges directly from the end customers, and may also be responsible for funding investments in the assets over the life of the contract. Lease contracts commonly apply over periods of 8-15 years.

Concession Contract: This is one of the most wide-ranging options in transferring responsibility for the assets to the relevant service undertaker. Concession arrangements usually cover a period of 25-30 years and transfer the economic benefits and costs of asset ownership to the service undertaker for the time of the concession. The service undertaker therefore also takes responsibility for capital investments and funding requirements. The terms of the concession are negotiated on a bilateral basis, but may be based on a general legislative and/or regulatory framework applied throughout a jurisdiction. Given the length of the contract, a concession also generally includes tariff reviews at specified intervals.

Licence: The licence approach is usually very similar to a long-term concession. However, the terms of the licence are usually set in law and are commonly applied to all licensed undertakers. Licences may have maturities similar to long-term concession or run in perpetuity, with an option to terminate the licence for severe performance failures. For example, licences apply for water companies operating in England and Wales; for these companies the licences include a condition that allows licence termination subject to a 25-year notice period.

Furthermore, for single asset transactions or projects, a number of specific arrangements can be applied, such as Design, Build, Operate (DBO); Build, Own, Operate (BOO); or Build, Operate, Transfer (BOT). These contractual arrangements are generally used in cases of large investment requirements for a specific asset, which can be transferred to the private sector, for example through project finance arrangements. Such contracts are commonly restricted to one particular asset, such as the construction and operation of a treatment work, and can have similar terms as concessions.

Generally, all contracts and concessions are initially put out to competitive tender, and will usually require re-tendering at their expiry.

Moody's Related Publications

Credit ratings are primarily determined by sector credit rating methodologies. Certain broad methodological considerations (described in one or more cross-sector rating methodologies) may also be relevant to the determination of credit ratings of issuers and instruments. An index of sector and cross-sector credit rating methodologies can be found here.

For data summarizing the historical robustness and predictive power of credit ratings, please click here.

For further information, please refer to Rating Symbols and Definitions, which is available here.

Moody's Basic Definitions for Credit Statistics (User's Guide) can be found here.

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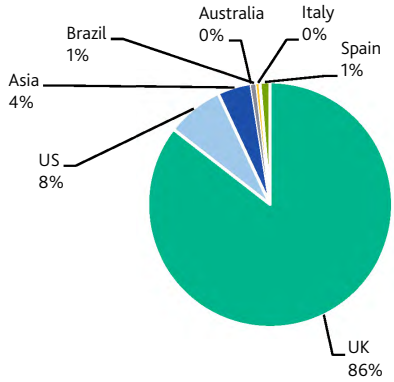
methodology, but privately financed, public infrastructure projects that receive specific availability-based payments sufficient to service their debt from government procurement agencies are rated under Moody's rating methodologies for PPP and PFI transactions: Operational Privately Financed Public Infrastructure (PFI/PPP/P3) Projects and Construction Risk in Privately Financed Public Infrastructure (PFI/PPP/P3) Projects.

Moody's currently rates 33 regulated water utility families, including multi-utilities in France and Italy, whose core business includes regulated water operations.

Publicly-rated regulated water utilities (including their fully-guaranteed finance subsidiaries) currently account for more than US$55 billion of total rated debt (this figure excludes the issuances of multi-utilities). UK issuers represent the vast majority of rated debt in the sector (see Exhibit 1).

EXHIBIT 1

Geographical distribution of rated debt within the regulated water sector (excluding multi-utilities)



Source: Moody's

Utilities rated under this methodology include those in Exhibit 2.

EXHIBIT 2

Regulated water utilities rated under this rating methodology include the following:

Issuer/Family	Issuer or Senior Unsecured Rating / BCA where applicable	Outlook	Jurisdiction
ACEA S.p.A.*	Baa2	Stable	Italy
Acquedotto Pugliese S.p.A.	Baa3/ba1	Stable	Italy
Affinity Water Limited	Baa1 (CFR)	Stable	United Kingdom
Aigues de Barcelona	Baa1	Stable	Spain
Aguas de Valencia S.A.	Baa3	Stable	Spain
American Water Works Company, Inc.	A3	Stable	Unites States
Anglian Water Services Ltd.	Baa1 (CFR)	Stable	United Kingdom
Anglian Water (Osprey) Financing plc	Ba3**	Stable	United Kingdom
Aquarion Company	Baa3	Stable	United States
Aquarion Water Company of Connecticut	Baa1	Stable	United States
Bristol Water plc	Baa1	Stable	United Kingdom

EXHIBIT 2

Regulated water utilities rated under this rating methodology include the following:

Issuer/Family	Issuer or Senior Unsecured Rating / BCA where applicable	Outlook	Jurisdiction
Canal de Isabel II Gestion, S.A.	Baa2/baa2	Positive	Spain
Companhia de San Bas do Estado de Sao Paulo	Ba1/ba2	Negative	Brazil
Companhia de Saneamento de Minas Gerais	Ba1/ba2	Under Review-Down	Brazil
Companhia de Saneamento do Parana – SANEPAR	Ba1/ba2	Under Review-Down	Brazil
Dee Valley Water PLC	Baa1 (CFR)	Stable	United Kingdom
Dwr Cymru Cyfyngedig	A3 (CFR)	Positive	United Kingdom
Golden State Water Company	A2	Stable	United States
Hera S.p.A.*	Baa1/baa1	Stable	Italy
Hunter Water Corporation	A1/baa2	Stable	Australia
Korea Water Resources Corporation	Aa3/baa2	Positive	South Korea
New Jersey-American Water Company, Inc.	A3	Stable	United States
Northumbrian Water Ltd.	Baa1	Stable	United Kingdom
Pennsylvania-American Water Company	A3	Stable	United States
Portsmouth Water Limited	Baa1 (CFR)	Stable	United Kingdom
Severn Trent Water Limited	A3	Negative	United Kingdom
Severn Trent plc	Baa1	Negative	United Kingdom
South East Water Limited	Baa2	Stable	United Kingdom
South Staffordshire Water Plc	Baa2	Stable	United Kingdom
Southern Water Services Limited	Baa2 (CFR)	Stable	United Kingdom
Suez Environnement Company*	A3	Stable	France
Sutton and East Surrey Water plc	Baa1	Stable	United Kingdom
Sydney Water Corporation	Aa3/baa1	Stable	Australia
Thames Water Utilities Ltd.	Baa1 (CFR)	Stable	United Kingdom
Thames Water (Kemble) Finance PLC	B1**	Stable	United Kingdom
United Utilities Water Limited	A3	Stable	United Kingdom
United Utilities PLC	Baa1	Stable	United Kingdom
Veolia Environnement S.A.*	Baa1	Stable	France
Wessex Water Services Limited	A3	Stable	United Kingdom
Yorkshire Water Services Limited	Baa2 (CFR)	Stable	United Kingdom

Note: * Multi-utilities with significant operations in the water/wastewater sector. ** Debt ratings reflect deeply subordinated position of the rated instrument in the group structure and cash waterfall.

Source: Moody's

The rating distribution in this sector ranges from Aa3 to B1, and is summarised in Exhibit 3. The average sector rating is Baa1.

SUMMARY OF CONSOLIDATED CORPORATION'S IMPLIED CREDIT METRICS

Standard & Poor's Credit Metrics	Per Staff	Per Company
*EBIT/Interest	3.2x	4.1x
Funds from Operation/Debt	15.8%	19.5%
Debt/EBITDA (x)	5.0x	4.0x
(FFO +Interest)/interest	4.5x	5.3x
EBITDA/Interest	4.4x	5.4x
CFO/Debt	16.0%	19.7%
FOCF/Debt	-8.8%	-6.8%
DCF/Debt	-14.4%	-12.9%
Business Risk Profile	Excellent	Excellent
Implied Rating	A/A-	A/A-

Moody's Credit Metrics		
FFO Interest Coverage (x)	4.5x	5.3x
FFO/Net Debt	15.8%	19.5%
Retained Cash Flow/Net Debt	10.2%	13.5%
Debt/Capital	48.8%	45.2%
Grid Numerical Score	6.53	6.15
Implied Rating	A3	A2

*EBIT interest coverage is for informational purposes because Moody's and S&P do not consider such metric in their rating analysis for regulated water utilities.

Detailed Moody's Credit Metrics Analysis: Per Staff

Qualitative Factors	Weight[1]	Rating[2]	Score	W'ted Score
Stability & Predictability of Regulatory Env.	15%	Aa	3	0.45
Asset Ownership	5%	Aa	3	0.15
Cost and Investment Recovery	15%	A	6	0.90
Revenue Risk	5%	Baa1	8	0.40
Scale of CAPEX Program & Asset Condition	10%	Baa	9	0.90
Financial Policy	10%	Baa1	8	0.80
Financial Strength				
FFO Interest Coverage (x)	12.5%	A	6	0.75
FFO/Net Debt	12.5%	Baa	9	1.13
Retained Cash Flow/Net Debt	5.0%	Baa	9	0.45
Debt/Capital	10.0%	A	6	0.60
Total	**100%**			**6.53**
Implied Rating				**A3**

Detailed Moody's Credit Metrics Analysis:Company's filing

Qualitative Factors	Weight[1]	Rating[2]	Score	W'ted Score
Stability & Predictability of Regulatory Env.	15%	Aa	3	0.45
Asset Ownership	5%	Aa	3	0.15
Cost and Investment Recovery	15%	A	6	0.90
Revenue Risk	5%	Baa1	8	0.40
Scale of CAPEX Program & Asset Condition	10%	Baa	9	0.90
Financial Policy	10%	Baa1	8	0.80
Financial Strength				
FFO Interest Coverage (x)	12.5%	A	6	0.75
FFO/Net Debt	12.5%	A	6	0.75
Retained Cash Flow/Net Debt	5.0%	Baa	9	0.45
Debt/Capital	10.0%	A	6	0.60
Total	**100%**			**6.15**
				A2

Consolidated Corporation Implied Credit Metrics

	One-Year Rate Plan: Per Staff	Ratings Category	One-Year Rate Plan: Per Company Filing	Ratings Category
Net Income	$26,112,925		$34,247,790	
Depreciation and Amortization	$20,164,769.00		$21,506,739	
Amortization of Deferred Haverstraw Costs	$5,644,533		$3,584,947	
Impact of low-ROE for Haverstraw Reg Assets	($183,000)			
Regulatory Liability-TCJA Tax Law Changes	($2,314,178)		($1,930,089)	
NYS Tax Law Changes-QMNY	$576,903		$922,409	
Amortization of Rate Case Expenses	$391,620		$965,970	
Amortization of Tank Painting Costs	$682,723		$682,723	
Amortization Pension & OPEB	$290,674		$283,554	
Amortization Miscellaneous	$165,769		$165,769	
Common Equity Component of AFUDC	$153,259		$153,258	
Deferred Income Taxes	$6,278,270		$6,289,840	
Changes in Working Capital	$730,642		730,642	
Funds From Operation (FFO)	$57,964,267		$66,872,910	
Cash Flow From Operation (CFO)	$58,694,909		$67,603,552	
Free Operating Cash Flow (FOCF)	($32,283,809)		($23,375,167)	
Discretionary Cash Flow (DCF)	($52,976,007)		($44,067,365)	
	-		-	
Net Income	$26,112,925		$34,247,790	
Interest Expense	$16,554,450		$15,719,735	
Income Taxes	$10,650,309		$13,968,161	
Depreciation and Amortization	$20,164,769		$21,506,739	
EBITDA	$73,482,453		$85,442,425	
Capital Expenditures	$90,978,718.14		90,978,718	
Dividend Payments	$20,692,198.00		20,692,198	
Accumulated Deferred Income Taxes	$72,146,875.46		$72,146,874	
Total Average Debt	$366,993,891		$342,477,897	
Total Average Capitalization	$679,847,038		$684,955,793	
Standard & Poor's Credit Metrics				
**EBIT/Interest	3.2x		4.1x	
Funds from Operation/Debt	15.8%	Intermediate	19.5%	Intermediate
Debt/EBITDA (x)	5.0x	Significant	4.01x	Significant
(FFO +Interest)/interest	4.5x	Intermediate	5.3x	Modest
EBITDA/Interest	4.4x	Intermediate	5.4x	Intermediate
CFO/Debt	16.0%	Intermediate	19.7%	Intermediate
FOCF/Debt	-8.8%	Aggressive	-6.8%	Aggressive
DCF/Debt	-14.4%	Aggressive	-12.9%	Aggressive
Business Risk Profile		Excellent		Excellent
Implied Rating		A/A-		A/A-
Moody's Credit Metrics				
FFO Interest Coverage (x)	4.5x	A	5.3x	A
FFO/Net Debt	15.8%	Baa	19.5%	A
Retained Cash Flow/Net Debt	10.2%	Baa	13.5%	Baa
Debt/Capital	48.8%	A	45.2%	A
Implied Rating		A3		A2

*Dividend and and working capital are based on Companies' latest financial statements
**EBIT interest coverage is for informational purposes because Moody's and S&P do not consider such metric in their rating analysis
***Actual rating can be one or two notches above or below the implied rating.

Rate Year Cost of Long-Term-Debt

Line #	[C1] Description of Debt	[C2] Stated Interest Rate	[C3] Date of Issue	[C4] Date of Maturity	[C5] Avg Amount Outstanding During Rate Year	[C6] C2xC5 Yearly Interest Expense	[C7] Unamortized Issuance Expenses as of September 2018	[C8] Yearly Amortization of Debt Expenses	[C9] Rate Year Average Balance of Unamortized Debt Expense	[C10] C6 +C8 Combined Interest & Debt expense amortization	[C11] C10/(C5-C9) Weighted Cost Rate
1	Medium Term Note Series A 1998	6.97%	2/3/1998	2/3/2023	$25,000,000	$1,742,500	$372,646	$85,706	$215,518	$1,828,206	0.17%
2	NEW UWR SENIOR NOTES 2015 SERIES A	3.80%	8/31/2015	8/31/2030	$75,000,000	$2,850,000	$342,241	$28,697	$289,630	$2,878,697	0.28%
3	NEW UWR SENIOR NOTES 2015 SERIES B	3.60%	8/31/2015	8/31/2031	$75,000,000	$2,700,000	$348,955	$26,996	$299,462	$2,726,996	0.26%
4	NEW UWR SENIOR NOTES 2015 SERIES C	4.09%	8/31/2015	8/31/2035	$125,000,000	$5,112,500	$615,295	$36,346	$548,660	$5,148,846	0.49%
5	Tax Exempt-Dauphin 92 TEF Series A	6.90%	6/1/1992	6/1/2024	$10,000,000	$690,000	$101,600	$17,906	$68,772	$707,906	0.07%
6	Senior Note Series 2010	4.92%	1/26/2010	1/26/2025	$45,000,000	$2,214,000	$518,000	$81,848	$367,944	$2,295,848	0.22%
7	Senior Note Series B	6.13%	11/15/2007	11/15/2028	$15,000,000	$919,500	$70,296	$6,936	$57,579	$926,436	0.09%
8	Medium Term Note Mutual of Omaha A	6.54%	10/1/2008	10/1/2029	$7,500,000	$490,500	$25,956	$2,357	$21,634	$492,857	0.05%
9	Medium Term Note Mutual of Omaha B	6.59%	12/15/2008	12/15/2029	$7,500,000	$494,250	$26,368	$2,351	$22,058	$496,601	0.05%
10	Tax-Exempt-NY Series 2010A	4.88%	9/1/2010	9/1/2040	$35,000,000	$1,706,250	$773,827	$35,275	$709,156	$1,741,525	0.17%
11	Senior Note Series 2011	4.10%	12/14/2011	12/14/2027	$20,000,000	$820,000	$463,470	$50,317	$371,222	$870,317	0.08%
12	Private Placement Note Series A	4.38%	4/13/2011	4/13/2021	$35,000,000	$1,533,000	$40,938	$16,137	$11,355	$1,549,137	0.15%
13	Private Placement Note Series B	4.68%	4/26/2011	4/13/2026	$40,000,000	$1,872,000	$494,958	$65,647	$374,606	$1,937,647	0.19%
14	Senior Note 2018 Series C	3.30%	1/24/2018	1/24/2033	$65,000,000	$2,145,000	$334,634	$23,354	$291,819	$2,168,354	0.21%
15	Senior Note 2018 Series D	3.77%	1/24/2018	1/24/2048	$65,000,000	$2,450,500	$348,745	$11,888	$326,951	$2,462,388	0.24%
16	Senior Note 2017 Series A	3.30%	12/14/2017	12/14/2032	$70,000,000	$2,310,000	$369,897	$26,019	$322,195	$2,336,019	0.22%
17	Senior Note 2017 Series B	3.77%	12/14/2017	12/14/2047	$75,000,000	$2,827,500	$414,332	$14,177	$388,340	$2,841,677	0.27%
18	North Jersey Water District	6.58%	n/a	7/1/2024	$93,544	$6,155	$0	$0	$0	$6,155	0.00%
19	Senior Note 2012 Series A	3.47%	10/16/2012	10/16/2027	$10,000,000	$347,000	$292,410	$32,313	$233,170	$379,313	0.04%
20	Senior Note 2012 Series B	3.91%	10/16/2012	10/16/2032	$30,000,000	$1,173,000	$1,041,901	$74,131	$905,994	$1,247,131	0.12%
21	Senior Note	8.98%	1/15/1995	1/15/2025	$12,000,000	$1,077,600	$23,187	$3,681	$16,438	$1,081,281	0.10%
22	Senior Note Series 2010	4.74%	2/28/2010	2/28/2020	$2,500,000	$118,500	$20,966	$1,236	$18,700	$119,736	0.01%
23	UWR	7.90%	1/15/1999	6/1/2022	$25,000,000	$1,975,000	$0	$0	$0	$1,975,000	0.19%
24	Senior Note Series 2010 (To be refinanced in 2020)	4.14%	3/1/2020	2/28/2030	$27,500,000	$1,138,500	$20,966	$1,683	$17,881	$1,140,183	0.11%
25	2019 New Debt Financing	4.14%	7/1/2019	2/28/2039	$63,400,000	$2,624,760	$20,966	$1,026	$19,084	$2,625,786	0.25%
26	2020 New Debt Financing	4.14%	1/1/2020	12/31/2039	$92,000,000	$3,808,800	$20,966	$986	$19,159	$3,809,786	0.36%
	Total				**$1,052,493,544**	**$45,146,815**	**$7,103,521**	**$647,015**	**$5,917,327**	**$45,793,830**	**4.38%**
29	**Additional Debt Costs**										
30	Unamortized Costs Associated With Retired Medium Term Note ($10M@8.84%)		12/15/2017	12/15/2036			32,760	$5,616	$22,464	$5,616	0.001%
31	Premium on Retirement of Medium Term Note						128,870	$22,092	$88,368	$22,092	0.002%
32	Premium on Retirement of Prudential Capital Corp. Debt ($20M @10.05%, and $15M @ 9.57%)						1,733,376	$340,992	$1,108,224	$340,992	0.034%
33	Premium on Amortized $25M 4.392%, $20M 4.318% and $20M 4.319%						35,687	$10,981	$15,556	$10,981	0.001%
34	Unamortized Costs Associated With Retired Jacksonville Debt ($12M @ 6.75%)						78,926	$24,924	$33,232	$24,924	0.002%
35	PEDFA SUEZ Water PA 2007 - Retired 12/13/17						788,554	$37,104	$720,530	$37,104	0.004%
36	12/14/17 2005						1,115,622	$52,488	$1,019,394	$52,488	0.005%
37	EDA Fixed Rate Bonds - Retired 01/25/18						2,833,301	$150,444.0	$2,557,487	$150,444	0.015%
38	EDA Fixed Rate Bonds 1996 - Retired 01/25/18						1,873,656	$99,486	$1,691,265	$99,486	0.010%
39	Call Premium retired bonds 2018						2,448,333	$129,996	$2,210,007	$129,996	0.013%
40	Call Premium retired bonds 2018							$0	$0	$0	0.000%
41	$35M EDA Fixed Rate Bonds - Retired 08/31/15						564,045	$42,048	$486,957	$42,048	0.004%
42	$65M EDA Fixed Rate Bonds - Retired 08/31/15						1,694,919	$126,324	$1,463,325	$126,324	0.013%
43	Tax Exempt-Boise 2001 TEF - Retired 08/31/15						1,674,000	$124,776	$1,445,244	$124,776	0.012%
44	Tax Exempt-DE 2002 TEF - Retired 08/31/15						1,046,554	$78,000	$903,554	$78,000	0.008%
45	Tax Exempt NY (NR) 2002 TEF - Retired 08/31/15						779,515	$58,092	$673,013	$58,092	0.006%
46	Two Amortization for PREFSTK3&6_100 TBR						7,875				
47	BOA/Clark Hill						154,001				
48	Accrued Invoices - Legal DLA Piper						71,929				
	Totals						**$24,165,445**	**$1,950,378**	**$20,355,948**	**$47,097,193**	**4.51%**

Corporate Bond Yield Averages

Ratings Categories

Moody's:	Aa2	Aa3	A1	Baa2
S&P:	AA	AA-	A+	BBB
Nov-18	4.40	1.51	3.02	5.03
Dec-18	4.24	1.46	2.92	4.92
Jan-19	4.18	1.45	2.90	4.91
Feb-19	4.05	1.42	2.83	4.78
Mar-19	3.98	1.39	2.77	4.65
Apr-19	3.91	1.36	2.72	4.55
May-19	3.84	1.33	2.65	4.47

Yield on A-/A3 (%)	4.14
Marginal Cost of Debt for SWR (%)	4.14

SUMMARY OF COST OF EQUITY

	Average
Proxy Group DCF ROE	8.37%
Traditional CAPM ROE	7.84%
Zero Beta CAPM ROE	8.62%
Generic (Average) CAPM ROE	8.23%
2/3 DCF & 1/3 CAPM Weighting	8.33%
ROE of Proxy Group	8.35%

Universe of Electric and Water Utilities

	Company	Moody's Rating	S&P Rating	2018 % of Utility Reg. Rev.	Dividend Paying?	Not in M&A Activity?	Regulated by State Commission	Proxy Group
1	ALLETE, Inc.	Baa1	BBB+	71%	Yes	Yes	Yes	selected
2	Alliant Energy Corp.	Baa1	A-	99%	Yes	Yes	Yes	selected
3	Ameren Corp.	Baa1	BBB+	100%	Yes	Yes	Yes	selected
4	American Electric Power	Baa1	A-	88%	Yes	Yes	Yes	selected
5	Avista Corp.	Baa2	BBB	98%	Yes	Yes	Yes	selected
6	Black Hills Corp.	Baa2	BBB+	100%	Yes	Yes	Yes	selected
7	CenterPoint Energy Inc.	Baa2	BBB+	58%	Yes	Yes	Yes	
8	CMS Energy Corp.	Baa1	BBB+	94%	Yes	Yes	Yes	selected
9	Consolidated Edison	Baa1	A-	94%	Yes	Yes	Yes	selected
10	Dominion Energy, Inc	Baa2	BBB+	71%	Yes	Yes	Yes	selected
11	DTE Energy Co.	Baa1	BBB+	47%	Yes	Yes	Yes	
12	Duke Energy Corp.	Baa1	A-	98%	Yes	Yes	Yes	selected
13	Edison International	Baa3	BBB	100%	Yes	Yes	Yes	selected
14	El Paso Electric	Baa1	BBB	86%	Yes	No	Yes	
15	Entergy Corp.	Baa2	BBB+	87%	Yes	Yes	Yes	selected
16	Eversource Energy	Baa1	A+	100%	Yes	Yes	Yes	selected
17	Exelon Corp.	Baa2	BBB+	47%	Yes	Yes	Yes	
18	FirstEnergy Corp.	Baa3	BBB	97%	Yes	Yes	Yes	selected
19	Hawaiian Electric Industries Inc.	Baa3	BBB-	89%	Yes	Yes	Yes	selected
20	IDACORP, Inc.	Baa1	BBB	100%	Yes	Yes	Yes	selected
21	MGE Energy, Inc.	Aa2	AA-	100%	Yes	Yes	Yes	selected
22	NextEra Energy, Inc	Baa1	A-	71%	Yes	Yes	Yes	selected
23	NorthWestern Corp.	Baa2	BBB	100%	Yes	Yes	Yes	selected
24	OGE Energy Corp.	(P)Baa1	BBB+	100%	Yes	Yes	Yes	selected
25	Otter Tail Corp.	Baa2	BBB	49%	Yes	Yes	Yes	
26	Pinnacle West Capital Corp.	A3	A-	99%	Yes	Yes	Yes	selected
27	PNM Resources Inc.	Baa3	BBB+	81%	Yes	Yes	Yes	selected
28	Portland General Electric Co.	A3	BBB+	92%	Yes	Yes	Yes	selected
29	PPL Corp.	Baa2	A-	100%	Yes	Yes	Yes	selected
30	Public Service Enterprise Group Inc.	Baa1	BBB+	64%	Yes	Yes	Yes	
31	Sempra Energy	Baa1	BBB+	86%	Yes	Yes	Yes	selected
32	Southern Co. (The)	Baa2	A-	88%	Yes	yes	Yes	selected
33	WEC Energy Group	Baa1	A-	99%	Yes	Yes	Yes	selected
34	Xcel Energy, Inc.	Baa1	A-	99%	Yes	Yes	Yes	selected
35	AVANGRID Inc.	Baa1	BBB+	80%	Yes	Yes	Yes	
36	Evergy Inc.	Baa2	A-	98%	Yes	Yes	Yes	
37	Fortis Inc	Baa3	A-	98%	Yes	Yes	No	
38	American States Water Co.	A1	A+	75%	Yes	Yes	Yes	selected
39	American Water Works Co. ,Inc.	Baa1	A	87%	Yes	Yes	Yes	selected
40	Aqua America	Baa2	NR	100%	Yes	No	Yes	
41	California Water Service Group	A1	A+	97%	Yes	Yes	Yes	selected
42	Connecticut Water Services	A3	A-	87%	Yes	No	Yes	
43	Consolidated Water Co.	NR	NR	86%	Yes	Yes	No	
44	Middlesex Water Co	A2	A	88%	Yes	Yes	Yes	selected
45	SJW Group	A2	A	97%	Yes	No	Yes	
46	The York Water Company	A3	A-	99%	Yes	Yes	Yes	selected
	Total Selected							**33**

Staff Proxy Group
3 Month Average Price Data

Company	Three-month Price	Mar-19 High	Mar-19 Low	Apr-19 High	Apr-19 Low	May-19 High	May-19 Low
Allete, Inc.	$81.55	84.26	80.40	83.43	78.86	83.35	78.98
Alliant Energy Corp.	$46.92	47.91	45.37	47.41	45.72	49.08	46.01
Ameren Corp.	$72.79	74.91	70.41	73.77	70.27	76.14	71.24
American Electric Power	$84.37	86.10	80.62	85.77	82.15	89.01	82.56
Avista Corp.	$41.68	41.58	39.75	43.27	40.38	43.94	41.15
Black Hills Corp.	$73.32	74.77	70.75	74.14	70.45	78.52	71.31
CMS Energy Corp.	$55.14	56.30	53.61	55.60	53.55	57.71	54.07
Consolidated Edison	$84.97	85.87	81.85	86.23	83.32	88.92	83.61
Dominion Energy, Inc	$75.71	77.22	73.77	77.91	74.41	78.31	72.61
Duke Energy Corp.	$89.19	91.67	88.66	91.33	87.93	91.06	84.46
Edison International	$62.20	66.30	57.63	67.43	61.16	62.45	58.22
Entergy Corp.	$95.32	96.87	91.60	96.94	92.73	99.84	93.91
Eversource Energy	$71.17	72.26	68.38	71.78	69.09	75.43	70.06
FirstEnergy Corp.	$41.22	42.13	40.17	42.09	39.27	43.24	40.42
Hawaiian Electric Industries Inc.	$40.74	41.10	38.05	41.71	40.22	42.59	40.74
IDACORP, Inc.	$99.54	102.01	97.46	100.00	95.93	104.70	97.16
MGE Energy, Inc.	$66.97	68.61	63.31	68.33	65.50	72.16	63.91
NextEra Energy, Inc	$192.70	195.55	186.57	194.65	187.43	204.73	187.30
NorthWestern Corp.	$69.95	71.77	68.01	70.92	67.38	73.07	68.53
OGE Energy Corp.	$42.25	43.76	41.82	43.25	40.90	43.36	40.42
PNM Resources Inc.	$46.16	47.92	43.43	47.42	44.28	48.35	45.57
Pinnacle West Capital Corp.	$94.75	97.27	91.90	96.33	93.14	97.92	91.95
Portland General Electric Co.	$51.70	52.60	49.65	52.55	49.79	53.93	51.66
PPL Corp.	$31.35	32.89	31.46	32.21	30.47	31.45	29.61
Sempra Energy	$127.12	126.86	119.94	130.00	124.91	136.37	124.67
Southern Co. (The)	$52.18	52.65	49.35	53.29	50.89	54.77	52.16
WEC Energy Group	$78.32	80.05	75.32	79.03	75.88	83.01	76.61
Xcel Energy, Inc.	$56.31	57.51	54.29	56.71	54.46	59.62	55.26
American Water Works Co. ,Inc.	$106.37	107.71	100.61	108.23	101.92	114.50	105.26
American States Water Co.	$70.82	72.50	69.33	71.50	67.52	74.65	69.43
California Water Service Group	$51.55	55.05	51.68	54.56	48.00	51.24	48.77
Middlesex Water Co	$57.54	60.48	55.01	58.14	52.51	63.68	55.45
The York Water Company	$34.31	36.50	33.12	34.55	32.29	36.33	33.06

Data Source

Capital IQ

STAFF DCF APPROACH - GENERIC FINANCE METHOD

Company	Beta	Price	EPS 2022-24	DPS 2019	DPS 2020	DPS 2022-24	BPS 2019	BPS 2020	BPS 2022-24	# of Shares 2019	# of Shares 2022-24	DPS Growth 2022-24
Allete, Inc.	0.65	$81.55	4.25	2.35	2.46	2.85	43.05	44.35	48.50	51.75	51.75	5.03%
Alliant Energy Corp.	0.60	$46.92	2.80	1.42	1.50	1.74	21.80	23.05	27.55	240.00	250.00	5.07%
Ameren Corp.	0.60	$72.79	4.25	1.93	2.06	2.55	32.95	35.10	40.75	246.50	255.00	7.37%
American Electric Power	0.55	$84.37	5.00	2.72	2.88	3.40	40.05	41.65	47.75	494.65	518.00	5.69%
Avista Corp.	0.65	$41.68	2.50	1.55	1.61	1.80	28.55	29.25	32.00	67.00	71.00	3.79%
Black Hills Corp.	0.80	$73.32	4.50	2.05	2.17	2.60	38.10	39.90	45.00	60.50	61.00	6.21%
CMS Energy Corp.	0.55	$55.14	3.25	1.53	1.64	2.00	17.90	19.35	24.50	285.00	297.00	6.84%
Consolidated Edison	0.45	$84.97	5.00	2.96	3.06	3.40	53.00	54.50	59.75	334.00	338.00	3.57%
Dominion Energy, Inc	0.55	$75.71	5.00	3.67	3.76	4.05	34.75	35.90	39.50	808.00	840.00	2.51%
Duke Energy Corp.	0.50	$89.19	5.75	3.75	3.83	4.15	61.65	63.20	68.50	733.00	755.00	2.71%
Edison International	0.60	$62.20	5.50	2.45	2.45	2.70	33.60	35.15	41.25	325.81	325.81	3.29%
Entergy Corp.	0.60	$95.32	6.25	3.66	3.74	4.00	51.35	53.15	60.25	200.00	210.00	2.27%
Eversource Energy	0.60	$71.17	4.25	2.14	2.26	2.65	37.70	39.50	46.75	318.50	350.00	5.45%
FirstEnergy Corp.	0.65	$41.22	3.25	1.52	1.60	1.90	14.90	16.10	20.00	540.00	550.00	5.90%
Hawaiian Electric Industries Inc.	0.60	$40.74	2.50	1.28	1.32	1.50	20.55	21.45	24.50	109.00	113.00	4.35%
IDACORP, Inc.	0.60	$99.54	5.25	2.56	2.72	3.20	48.80	50.65	56.50	50.40	50.40	5.57%
MGE Energy, Inc.	0.60	$66.97	3.80	1.38	1.45	1.65	24.55	26.00	31.95	35.00	36.00	4.40%
NextEra Energy, Inc	0.60	$192.70	11.25	5.00	5.65	7.00	69.05	72.50	84.50	535.00	535.00	7.40%
NorthWestern Corp.	0.60	$69.95	4.00	2.30	2.40	2.70	39.70	40.80	44.00	50.50	51.10	4.00%
OGE Energy Corp.	0.80	$42.25	2.75	1.54	1.65	1.95	20.55	21.15	23.25	200.00	200.00	5.73%
PNM Resources Inc.	0.65	$46.16	2.75	1.18	1.24	1.50	22.05	23.30	27.50	79.65	84.00	6.55%
Pinnacle West Capital Corp.	0.55	$94.75	5.75	3.04	3.22	3.80	48.30	50.00	55.50	112.50	114.50	5.68%
Portland General Electric Co.	0.60	$51.70	3.00	1.52	1.62	1.95	29.00	29.90	32.75	89.40	90.00	6.38%
PPL Corp.	0.70	$31.35	2.75	1.65	1.66	1.80	17.35	18.30	21.75	770.00	780.00	2.74%
Sempra Energy	0.75	$127.12	9.00	3.87	4.20	5.25	60.00	64.80	77.00	290.00	320.00	7.72%
Southern Co. (The)	0.50	$52.18	3.75	2.46	2.54	2.78	26.00	26.90	30.00	1045.00	1085.00	3.06%
WEC Energy Group	0.50	$78.32	4.50	2.36	2.50	3.00	32.05	33.10	36.75	315.50	315.50	6.27%
Xcel Energy, Inc.	0.50	$56.31	3.25	1.62	1.72	2.05	24.85	25.95	29.50	515.50	521.50	6.03%
American Water Works Co. ,Inc.	0.60	$106.37	4.70	1.94	2.10	2.75	34.55	36.55	41.25	181.00	189.00	9.41%
American States Water Co.	0.70	$70.82	2.75	1.14	1.22	1.70	15.85	16.60	19.35	36.90	37.50	11.69%
California Water Service Group	0.70	$51.55	2.00	0.79	0.82	1.05	15.45	15.80	17.00	48.50	50.00	8.59%
Middlesex Water Co	0.75	$57.54	2.40	0.97	1.00	1.15	15.75	16.10	17.65	16.50	17.00	4.77%
The York Water Company	0.75	$34.31	1.70	0.70	0.73	0.95	10.75	11.25	12.10	13.00	12.80	9.18%
Median Beta	***0.60***											
Average	**0.62**										Median	**5.68%**
Data Source	Latest Value Line Investment Survey										Avg.	**5.61%**

STAFF DCF APPROACH - GENERIC FINANCE METHOD

Company	Retention Rate 2023	Return on Equity 2023	B x R	Increase in Shares	MBR 2019	MBR-1 V Factor	(Accretion /dilutive) Growth S x V	Sustainable Growth	Long-Form ROE	
Allete, Inc.	32.94%	8.89%	2.93%	0.00%	1.89	0.89	0.00%	2.93%	6.04%	1
Alliant Energy Corp.	37.86%	10.47%	3.96%	1.03%	2.15	1.15	1.18%	5.14%	8.25%	2
Ameren Corp.	40.00%	10.69%	4.28%	0.85%	2.21	1.21	1.03%	5.30%	8.19%	3
American Electric Power	32.00%	10.71%	3.43%	1.16%	2.11	1.11	1.28%	4.71%	8.12%	4
Avista Corp.	28.00%	7.93%	2.22%	1.46%	1.46	0.46	0.67%	2.89%	6.78%	5
Black Hills Corp.	42.22%	10.20%	4.31%	0.21%	1.92	0.92	0.19%	4.50%	7.50%	6
CMS Energy Corp.	38.46%	13.79%	5.30%	1.04%	3.08	2.08	2.16%	7.46%	10.28%	7
Consolidated Edison	32.00%	8.50%	2.72%	0.30%	1.60	0.60	0.18%	2.90%	6.50%	8
Dominion Energy, Inc	19.00%	12.86%	2.44%	0.98%	2.18	1.18	1.15%	3.59%	8.36%	9
Duke Energy Corp.	27.83%	8.51%	2.37%	0.74%	1.45	0.45	0.33%	2.70%	6.94%	10
Edison International	50.91%	13.69%	6.97%	0.00%	1.85	0.85	0.00%	6.97%	10.48%	11
Entergy Corp.	36.00%	10.59%	3.81%	1.23%	1.86	0.86	1.05%	4.86%	8.48%	12
Eversource Energy	37.65%	9.35%	3.52%	2.39%	1.89	0.89	2.12%	5.64%	8.71%	13
FirstEnergy Corp.	41.54%	16.84%	6.99%	0.46%	2.77	1.77	0.81%	7.81%	11.40%	14
Hawaiian Electric Industries Inc.	40.00%	10.43%	4.17%	0.91%	1.98	0.98	0.89%	5.06%	8.17%	15
IDACORP, Inc.	39.05%	9.46%	3.69%	0.00%	2.04	1.04	0.00%	3.69%	6.48%	16
MGE Energy, Inc.	56.58%	12.30%	6.96%	0.71%	2.73	1.73	1.22%	8.18%	10.03%	17
NextEra Energy, Inc	37.78%	13.65%	5.16%	0.00%	2.79	1.79	0.00%	5.16%	8.16%	18
NorthWestern Corp.	32.50%	9.21%	2.99%	0.30%	1.76	0.76	0.23%	3.22%	6.65%	19
OGE Energy Corp.	29.09%	12.01%	3.50%	0.00%	2.06	1.06	0.00%	3.50%	7.53%	20
PNM Resources Inc.	45.45%	10.28%	4.67%	1.34%	2.09	1.09	1.46%	6.13%	8.75%	21
Pinnacle West Capital Corp.	33.91%	10.54%	3.57%	0.44%	1.96	0.96	0.42%	4.00%	7.46%	22
Portland General Electric Co.	35.00%	9.30%	3.25%	0.17%	1.78	0.78	0.13%	3.39%	6.68%	23
PPL Corp.	34.55%	13.01%	4.49%	0.32%	1.81	0.81	0.26%	4.75%	9.71%	24
Sempra Energy	41.67%	12.02%	5.01%	2.49%	2.12	1.12	2.79%	7.80%	10.98%	25
Southern Co. (The)	25.87%	12.73%	3.29%	0.94%	2.01	1.01	0.95%	4.24%	8.89%	26
WEC Energy Group	33.33%	12.46%	4.15%	0.00%	2.44	1.44	0.00%	4.15%	7.43%	27
Xcel Energy, Inc.	36.92%	11.25%	4.15%	0.29%	2.27	1.27	0.37%	4.52%	7.61%	28
American Water Works Co. ,Inc.	41.49%	11.62%	4.82%	1.09%	3.08	2.08	2.26%	7.08%	9.05%	29
American States Water Co.	38.18%	14.57%	5.56%	0.40%	4.47	3.47	1.40%	6.97%	8.76%	30
California Water Service Group	47.50%	11.91%	5.66%	0.76%	3.34	2.34	1.79%	7.44%	8.92%	31
Middlesex Water Co	52.08%	13.81%	7.19%	0.75%	3.65	2.65	1.99%	9.18%	10.57%	32
The York Water Company	44.12%	14.22%	6.27%	0.00%	3.19	2.19	0.00%	6.27%	8.45%	33
Average	***37.62%***	***11.45%***	***4.36%***	***0.69%***	***230.25%***	***130.25%***	***0.86%***	***5.22%***	***8.37%***	
Median	***37.78%***	***11.25%***	***4.15%***	***0.71%***	***209.35%***	***109.35%***	***0.81%***	***4.86%***	***8.25%***	

Lower Quartile **7.45%**
Upper Quartile **8.92%**

Long-Range Consensus U.S. Economic Projections

I. The table below shows the latest U.S. Blue Chip Consensus projections by years for 2021 through 2025, an average for the five-year period 2021-2025, and an average for the next five-year period 2026-2030. There are also Top 10 and Bottom 10 averages for each variable. *Apply these projections cautiously. For the most part economic and political forces over such long time spans cannot be evaluated with accuracy.*

		YEAR					Five-Year Averages	
ECONOMIC VARIABLE		2021	2022	2023	2024	2025	2021-25	2026-30
		Percent Change, Full Year-Over-Prior Year						
1. Real GDP (chained, 2012 dollars)	**CONSENSUS**	**1.7**	**1.9**	**2.0**	**2.0**	**2.0**	**1.9**	**2.0**
	Top 10 Avg.	2.2	2.3	2.4	2.3	2.3	2.3	2.3
	Bottom 10 Avg.	1.3	1.6	1.6	1.6	1.6	1.5	1.7
2. GDP Chained Price Index	**CONSENSUS**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Avg.	2.5	2.4	2.4	2.3	2.3	2.4	2.3
	Bottom 10 Avg.	1.8	1.9	1.9	1.9	1.9	1.9	1.9
3. Nominal GDP (current dollars)	**CONSENSUS**	**3.9**	**4.0**	**4.0**	**4.1**	**4.0**	**4.0**	**4.0**
	Top 10 Avg.	4.3	4.4	4.4	4.4	4.4	4.4	4.5
	Bottom 10 Avg.	3.3	3.6	3.7	3.7	3.7	3.6	3.7
4. Consumer Price Index (for all urban consumers)	**CONSENSUS**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
	Top 10 Avg.	2.6	2.6	2.6	2.5	2.4	2.5	2.4
	Bottom 10 Avg.	1.9	1.9	1.9	2.0	2.0	1.9	1.9
5. Industrial Production (total)	**CONSENSUS**	**1.7**	**2.0**	**2.1**	**2.2**	**2.2**	**2.0**	**2.2**
	Top 10 Avg.	2.5	2.8	2.9	3.0	2.9	2.8	2.8
	Bottom 10 Avg.	0.9	1.3	1.3	1.6	1.7	1.4	1.6
6. Disposable Personal Income (chained, 2012 dollars)	**CONSENSUS**	**1.8**	**2.0**	**2.1**	**2.1**	**2.1**	**2.0**	**2.1**
	Top 10 Avg.	2.2	2.4	2.4	2.5	2.4	2.4	2.4
	Bottom 10 Avg.	1.4	1.7	1.7	1.8	1.8	1.7	1.8
7. Personal Consumption Expenditures (chained, 2012 dollars)	**CONSENSUS**	**1.9**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**
	Top 10 Avg.	2.3	2.5	2.5	2.5	2.4	2.4	2.3
	Bottom 10 Avg.	1.4	1.7	1.6	1.6	1.6	1.6	1.7
8. Non-Residential Fixed Investment (chained, 2012 dollars)	**CONSENSUS**	**2.8**	**3.2**	**3.2**	**3.4**	**3.3**	**3.2**	**3.4**
	Top 10 Avg.	4.0	4.1	4.5	4.6	4.5	4.3	4.6
	Bottom 10 Avg.	1.5	2.3	2.3	2.4	2.3	2.2	2.5
9. Corporate Profits, Pretax (current dollars)	**CONSENSUS**	**3.4**	**3.7**	**4.0**	**4.3**	**4.1**	**3.9**	**4.3**
	Top 10 Avg.	5.3	4.6	5.1	5.6	5.2	5.2	5.2
	Bottom 10 Avg.	1.4	2.6	2.9	3.0	3.2	2.6	3.5
		Annual Average						
10. Treasury Bills, 3-Month (percent per annum)	**CONSENSUS**	**2.5**	**2.6**	**2.7**	**2.8**	**2.8**	**2.7**	**2.8**
	Top 10 Avg.	3.2	3.3	3.2	3.2	3.2	3.2	3.2
	Bottom 10 Avg.	1.6	1.7	2.0	2.2	2.3	2.0	2.4
11. Treasury Notes, 10-Year (yield per annum)	**CONSENSUS**	**3.1**	**3.2**	**3.4**	**3.5**	**3.5**	**3.3**	**3.5**
	Top 10 Avg.	3.8	3.8	3.8	3.9	4.0	3.9	4.1
	Bottom 10 Avg.	2.4	2.7	2.9	3.0	3.0	2.8	3.0
12. Unemployment Rate (% of civilian labor force)	**CONSENSUS**	**4.1**	**4.2**	**4.3**	**4.3**	**4.3**	**4.2**	**4.3**
	Top 10 Avg.	4.9	5.0	4.9	4.9	4.9	4.9	4.9
	Bottom 10 Avg.	3.5	3.6	3.7	3.7	3.7	3.7	3.8
		Total Units, Millions						
13. Housing Starts (millions of units)	**CONSENSUS**	**1.34**	**1.37**	**1.41**	**1.45**	**1.45**	**1.40**	**1.43**
	Top 10 Avg.	1.48	1.53	1.57	1.64	1.64	1.57	1.61
	Bottom 10 Avg.	1.18	1.21	1.27	1.29	1.28	1.25	1.28
14. Total Auto & Light Truck Sales (millions of units)	**CONSENSUS**	**16.2**	**16.4**	**16.5**	**16.7**	**16.7**	**16.5**	**16.7**
	Top 10 Avg.	16.9	17.2	17.3	17.5	17.5	17.3	17.6
	Bottom 10 Avg.	15.3	15.5	15.7	15.9	15.9	15.7	15.8
		Billions of Chained, 2012 Dollars						
15. Net Exports (billions of chained, 2012 dollars)	**CONSENSUS**	**-1018.9**	**-1031.8**	**-1041.8**	**-1035.6**	**-1045.0**	**-1034.6**	**-1085.9**
	Top 10 Avg.	-932.0	-939.9	-941.8	-945.3	-953.3	-942.5	-967.1
	Bottom 10 Avg.	-1106.3	-1135.7	-1154.5	-1132.0	-1144.2	-1134.5	-1215.3

Long-Range Consensus U.S. Economic Projections

II. . For comparison, this table includes a selection of the long-range consensus projections found on the preceding page, plus the latest long-range assumptions from the Congressional Budget Office[1] (CBO).

ECONOMIC VARIABLE		YEAR 2021	2022	2023	2024	2025	Five-Year Averages 2021-25	2026-30
		Percent Change, Full Year-Over-Prior Year						
1. Real GDP (chained, 2012 dollars)	**CONSENSUS**	**1.7**	**1.9**	**2.0**	**2.0**	**2.0**	**1.9**	**2.0**
	CBO[1]	1.6	1.6	1.7	1.8	1.8	1.7	1.8
2. GDP Chained Price Index	**CONSENSUS**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	CBO[1]	2.6	2.5	2.4	2.3	2.3	2.4	2.3
3. Nominal GDP (current dollars)	**CONSENSUS**	**3.9**	**4.0**	**4.0**	**4.1**	**4.0**	**4.0**	**4.0**
	CBO[1]	3.7	3.7	3.8	4.0	3.9	3.8	3.9
4. Consumer Price Index (for all urban consumers)	**CONSENSUS**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
	CBO[1]	2.2	2.1	2.1	2.0	2.0	2.1	2.0
		Annual Average						
5. Treasury Bills, 3-Month (percent per annum)	**CONSENSUS**	**2.5**	**2.6**	**2.7**	**2.8**	**2.8**	**2.7**	**2.8**
	CBO[1]	3.2	3.2	3.0	2.8	2.7	3.0	2.8
6. Treasury Notes, 10-Year (yield per annum)	**CONSENSUS**	**3.1**	**3.2**	**3.4**	**3.5**	**3.5**	**3.3**	**3.5**
	CBO[1]	3.7	3.7	3.8	3.7	3.7	3.7	3.7
7. Unemployment Rate (% of civilian labor force)	**CONSENSUS**	**4.1**	**4.2**	**4.3**	**4.3**	**4.3**	**4.2**	**4.3**
	CBO[1]	4.2	4.6	4.8	4.8	4.8	4.6	4.8

III. In this table, we compare the results of our most recent survey with those of our survey in October 2018[2].

ECONOMIC VARIABLE		YEAR 2021	2022	2023	2024	2025	Five-Year Averages 2021-25	2026-30
		Percent Change, Full Year-Over-Prior Year						
1. Real GDP (chained, 2012 dollars)	**March Consensus**	**1.7**	**1.9**	**2.0**	**2.0**	**2.0**	**1.9**	**2.0**
	October Consensus	1.8	1.9	2.1	2.1	na	na	na
2. GDP Chained Price Index	**March Consensus**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	October Consensus	2.1	2.1	2.1	2.1	na	na	na
3. Nominal GDP (current dollars)	**March Consensus**	**3.9**	**4.0**	**4.0**	**4.1**	**4.0**	**4.0**	**4.0**
	October Consensus	3.9	4.0	4.2	4.2	na	na	na
4. Consumer Price Index (for all urban consumers)	**March Consensus**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
	October Consensus	2.2	2.2	2.3	2.2	na	na	na
		Annual Average						
5. Treasury Bills, 3-Month (percent per annum)	**March Consensus**	**2.5**	**2.6**	**2.7**	**2.8**	**2.8**	**2.7**	**2.8**
	October Consensus	2.9	2.8	2.9	3.0	na	na	na
6. Treasury Notes, 10-Year (yield per annum)	**March Consensus**	**3.1**	**3.2**	**3.4**	**3.5**	**3.5**	**3.3**	**3.5**
	October Consensus	3.5	3.6	3.7	3.7	na	na	na
7. Unemployment Rate (% of civilian labor force)	**March Consensus**	**4.1**	**4.2**	**4.3**	**4.3**	**4.3**	**4.2**	**4.3**
	October Consensus	4.1	4.2	4.3	4.3	na	na	na

[1]The Budget and Economic Outlook: 2019 to 2029, Congressional Budget Office, January 28, 2019. CBO projections only extend through 2029, so averages for the 2026-2030 time period are based on CBO projections for the four-year period 2026-2029.. [2]Blue Chip Economic Indicators, October 10, 2018.

November 2013 to May 2016			
Date	DCF Median	DCF Average	Difference
Nov-13	8.41	8.49	0.08
Dec-13	8.45	8.48	0.03
Jan-14	8.48	8.52	0.04
Feb-14	8.50	8.59	0.09
Dec-14	8.09	8.22	0.13
Mar-15	7.97	8.09	0.12
Apr-15	7.97	8.08	0.11
May-15	8.11	8.21	0.10
Jun-15	8.18	8.27	0.09
Oct-15	8.24	8.44	0.20
Nov-15	8.24	8.44	0.20
Dec-15	8.22	8.44	0.22
Jan-16	8.22	8.44	0.22
Mar-16	8.22	8.41	0.19
Apr-16	8.11	8.32	0.21
May-16	8.12	8.34	0.22
Average:	**8.2080**	**8.3527**	**0.1447**
Median:	**8.2200**	**8.4250**	**0.1250**
Std. Dev.:	**0.1608**	**0.1461**	**0.0649**

June 2016 to March 2018			
Date	DCF Median	DCF Average	Difference
Jun-16	7.87	8.23	0.36
Jul-16	7.62	8.05	0.43
Aug-16	7.57	7.94	0.37
Sep-16	7.65	7.96	0.31
Oct-16	7.79	8.10	0.31
Nov-16	7.88	8.14	0.26
Dec-16	7.97	8.17	0.20
Jan-17	7.97	8.11	0.14
Feb-17	8.08	8.22	0.14
Mar-17	8.05	8.04	-0.01
Apr-17	7.75	8.05	0.30
May-17	7.63	8.12	0.49
Jun-17	7.69	8.16	0.47
Jul-17	7.79	8.18	0.39
Aug-17	7.60	8.08	0.48
Sep-17	7.63	8.11	0.48
Oct-17	7.55	8.05	0.50
Nov-17	7.54	8.16	0.62
Dec-17	7.52	8.11	0.59
Jan-18	7.53	8.11	0.58
Feb-18	7.70	8.17	0.47
Mar-18	8.01	8.37	0.36
Apr-18	7.99	8.39	0.40
May-18	7.89	8.35	0.46
Jun-18	7.87	8.44	0.57
Jul-18	7.87	8.43	0.56
Aug-18	7.83	8.36	0.53
Sep-18	7.83	8.34	0.51
Oct-18	7.87	8.26	0.39
Nov-18	7.82	8.18	0.36
Dec-18	7.78	8.16	0.38
Jan-19	8.08	8.23	0.15
Feb-19	8.02	8.23	0.21
Mar-19	8.04	8.38	0.34
Average:	**7.8024**	**8.1876**	**0.3853**
Median:	**7.6950**	**8.1100**	**0.3800**
Std. Dev.:	**0.1783**	**0.0900**	**0.1563**

INPUTS AND CALCULATIONS FOR STAFF CAPM

Merrill Lynch Cost of Market[1]

	Implied	Required
Mar-19	11.00%	11.10%
Apr-19	10.80%	10.90%
May-19	11.00%	11.10%

Merrill Lynch Cost of Market 10.98%

Treasury Rates[2]

	10 year	30 year
Mar-19	2.57%	2.98%
Apr-19	2.53%	2.94%
May-19	2.40%	2.82%

Risk-Free Rate (3/19-5/19) 2.7100%

Market Risk Premium (3/19-5/19) 8.27%

Proxy Group Beta 0.6200

Traditional CAPM Calculation
Risk Free Rate + (Beta * (Market Return - Risk Free Rate)

Traditional CAPM ROE 7.84% 8.27%

Zero Beta CAPM Calculation
Risk Free Rate + (0.75*Beta * (Market Return - Risk Free Rate))+(0.25*(Market Return - Risk Free Rate))

Zero Beta CAPM ROE 8.62%

Merrill Lynch cost of market figure is average of Implied and Required Returns for the 3 months ending May 2019 (Apr-May-Jun 2019 Editions) 8.62000%

Federal Reserve Statistical Release, FRB: Federal Reserve Statistical Release H.15 - Historical Data
Website : 'http://federalreserve.gov/releases/h15/

Quantitative Profiles

Distressed equities haven't been cheaper in almost two decades

04 April 2019 Corrected

Our "Low Price" screen is a coiled spring

Yes, we said low price. We have found that stocks with the lowest trading price tend to act like distressed equities: they generally suffer during periods of macro uncertainty, as a low trading price often represents liquidity, de-listing and/or bankruptcy risk. But this factor tends to aggressively outperform during "disaster averted" type scenarios. Low priced stocks (bottom decile of the S&P 500 by share price) are now trading at the cheapest relative discount to high priced stocks (which includes the "ANG" of FANG, as FB missed the cut) that we have seen in the history of our data (back to 2001). Given green shoots in our global teams' macro models, and fading recession risks, low price stocks could dramatically outperform from here. Note that when these baskets have seen similar levels of valuation disparity, Low Price has outperformed High Price by 15ppt over the subsequent six months.

Risky stocks and Multinationals led in 1Q

During 1Q, Risk was the best-performing factor group (+16.2% on avg.). But outperformance came entirely in January (where the group led the equal-weighted benchmark by 4ppt); since then, Risk has lagged both in Feb (by 1.1 ppt) and March (by 0.8 ppt). Risk factors may remain under pressure given our expectations for rising market volatility. Meanwhile, multinationals (our High Foreign Exposure factor) outperformed each month in 1Q and topped all other factors we follow for the quarter (+20.2%), helped by increasing optimism on a trade deal with China. Green shoots in Europe and China along with a potential bottoming in global EPS revisions suggest that multinationals could continue to fare well if these trends persist.

Momentum led in March, but weak for the quarter

After a dismal start earlier in the quarter, Momentum factors took the lead in March, advancing 2.3% on avg, outperforming next best group (Quality) by 0.6ppt. The five best performing factors overall in March were all momentum factors. But in 1Q overall, Momentum factors were up just 13.1% on avg., with only Value factors faring worse. As a flattening yield curve generally precedes amplified volatility, we remain cautious on Momentum factors, which tend to underperform when the VIX is rising.

Screens and performance data are available in Research Library in Excel format

Chart 1: Low priced stocks have never been less expensive than they are today

Relative P/E (Fwd) of High Price factor vs. Low Price factor



Source: BofA Merrill Lynch US Equity and US Quant Strategy

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Top 5 screens in 1Q	Perf.
High Foreign Exposure	20.2%
High Projected 5-Yr Growth	18.7%
High Beta	18.2%
ROC	16.9%
Small Size	16.8%
S&P 500 (Equal weighted)	**14.4%**

Bottom 5 screens in 1Q	Perf.
Low Price to Cash Flow	9.4%
Price Returns (3-Month)	9.9%
Earnings Yield	10.1%
Low Price to Free Cash Flow	10.5%
Relative Strength (Price/200D MA)	10.6%
S&P 500 (Equal weighted)	**14.4%**

Disclaimer: The valuations and screens contained herein are useful in assessing comparative valuations and comparative earnings prospects and are not intended to recommend transactions relating to any specific security. These indicators should be used in investment decisions only with other factors including financial risk, investment risk, management strategies and operating and financial outlooks.

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Refer to important disclosures on page 66 to 68. **11983324**

Bank of America Merrill Lynch

BofAML Universe Sector/Industry Factor Evaluation (cont'd)

	Valuation Analysis											Expectation Analysis						
	# of Comp	% Univ BofAML	Impl. Return	Reqd Return	DDM Alpha	Eqty. Duration	BofAML Adj ßeta	P/E Ratio	Price/ Book	Yield	Surprise	Earnings (Decile) Risk	Torp	Disp	Est. Rev.	PR 5yr Growth	EPS Growth 2018E	EPS Growth 2019E
CONSUMER STAPLES	42	6.65	9.5	8.7	0.8	35.4	0.74	19.5	4.47	2.9	6	5	4	2	5	6.2	2	8
FOOD & STAPLES RETAILING	9	1.36	9.4	8.8	0.6	39.3	0.75	18.0	4.14	1.8	6	4	4	3	3	6.6	4	8
BEVERAGES	8	1.83	9.0	8.8	0.2	36.3	0.75	22.8	5.77	2.8	8	6	4	2	7	6.3	1	9
FOOD PRODUCTS	11	0.83	9.9	8.8	1.1	33.5	0.75	17.2	2.52	2.8	7	7	3	2	5	5.3	-3	7
TOBACCO	2	0.92	11.2	9.6	1.6	23.2	0.84	15.2	7.28	5.3	8	4	5	3	4	6.9	3	8
HOUSEHOLD PRODUCTS	8	1.53	8.8	7.8	1	38.5	0.64	22.2	5.10	2.7	3	4	4	1	4	5.2	3	7
PERSONAL PRODUCTS	4	0.17	9.1	9.4	-0.3	42.5	0.81	24.1	4.80	1.5	5	2	5	2	3	9.8	8	9
HEALTH CARE	173	14.09	10.8	11.0	-0.2	33.3	1.00	16.9	4.02	1.6	6	6	5	3	4	13.8	7	11
HEALTH CARE EQUIP	33	3.15	9.8	11.2	-1.4	40.0	1.02	24.8	4.20	0.9	6	6	5	3	4	13.6	11	12
HEALTH CARE PROV	38	2.67	12.2	10.6	1.6	30.0	0.95	13.1	2.54	1.3	8	4	7	2	4	13.3	9	12
HEALTH CARE TECH	5	0.16	9.2	13.0	-3.8	44.4	1.23	31.5	4.93	0.0	5	3	4	3	4	14.3	7	14
BIOTECH	56	2.59	11.3	13.4	-2.1	28.7	1.27	15.6	5.86	1.9	5	7	6	6	5	24.3	11	16
PHARMACEUTICALS	29	4.44	10.5	9.4	1.1	31.6	0.82	15.5	4.38	2.5	7	8	5	3	5	7.8	1	7
LIFE SCIENCES	12	1.08	11.3	11.9	-0.6	36.4	1.10	25.0	5.35	0.2	4	4	6	1	4	14.8	11	12
FINANCIALS	148	9.84	12.1	11.8	0.3	26.7	1.08	10.4	1.39	2.9	5	4	7	4	5	9.1	10	10
BANKS	39	4.19	12.8	12.3	0.5	22.5	1.15	9.5	1.26	3.1	6	2	8	4	5	8.2	11	11
THRIFTS & MORTGAGE FINANCE	5	0.09	13.2	14.6	-1.4	26.6	1.41	10.8	1.47	1.4	8	6	6	5	3	14.3	0	8
DIV FINANCIALS	2	0.07	17.5	13.6	3.9	14.5	1.30	5.8	0.83	1.5	2		9	4	3	15.9	13	12
CONSUMER FINANCE	8	0.71		12.4			1.16	9.2	1.58	1.9		4	8	3	5	13.8	7	10
CAPITAL MARKETS	53	2.40	11.9	11.5	0.4	28.0	1.06	12.1	1.72	2.7	5	4	5	5	6	8.9	1	11
MORTGAGE REITS	12	0.18		8.3			0.69	8.8	1.08	10.7	2	5	2	4	5	-0.7	-3	2
INSURANCE	29	2.20	10.9	10.9	0	34.0	0.99	11.3	1.36	2.3	5	5	7	3	5	9.8	21	9
INFO TECH	152	21.17	10.9	12.2	-1.3	34.1	1.13	19.1	6.71	1.4	5	5	5	4	5	15.0	4	13
INTERNET SOFTWARE	1	0.03		12.1			1.12	nm		0.0	6		1	10	10	5.0	nm	nm
IT SERVICES	32	4.76	10.3	12.1	-1.8	36.8	1.12	21.4	8.96	1.1	5	3	6	2	4	16.9	11	12
SOFTWARE	53	7.17	10.9	12.3	-1.4	35.2	1.15	28.4	10.21	0.9	5	6	5	4	4	19.6	15	16
COMMUNICA. EQUIP	10	1.13	10.4	12.1	-1.7	34.7	1.13	17.1	5.50	2.2	5	9	7	3	3	10.9	14	10
COMPUTERS & PERIPH	10	3.74	11.4	11.9	-0.5	31.0	1.10	14.1	6.31	1.6	4	3	4	6	9	10.7	1	13
ELECTR EQUIP & INSTR	14	0.51	10.6	11.7	-1.1	35.5	1.08	14.7	2.61	1.3	5	6	6	4	5	10.1	7	10
SEMICONDUCTORS	32	3.83	11.4	12.3	-0.9	31.0	1.14	14.4	4.23	2.1	6	5	4	6	6	10.1	-8	12
COMMUNICATION SERVICES	58	12.22	11.0	10.8	0.2	34.1	0.97	14.6	3.36	1.1	3	5	5	6	4	12.7	10	16
DIVERSIFIED TELECOM SVS	9	1.87	11.5	8.3	3.2	26.0	0.69	10.5	1.91	5.2	6	7	3	3	5	5.8	3	2
WIRELESS TELECOM SVS	2	0.31		7.8			0.63	19.4	1.55	0.0		7	6	9	8	0.8	-17	19
MEDIA	19	1.53	12.1	12.1	0	30.2	1.13	15.8	2.41	1.7	7	5	8	7	4	10.2	7	16
ENTERTAINMENT	13	2.17	9.7	11.4	-1.7	40.5	1.05	24.1	4.25	0.8	3	6	4	7	7	12.1	5	12
INTERACTIVE MEDIA & SVCS	15	6.35	11.0	11.1	-0.1	35.2	1.02	13.9	4.80	0.0	1	5	6	6	4	16.1	17	22
UTILITIES	54	3.45	9.5	6.9	2.6	33.9	0.54	17.3	2.05	3.3	5	5	4	2	4	6.1	8	7
ELECTRIC UTILITIES	22	1.98	9.4	6.5	2.9	33.9	0.49	17.3	1.91	3.4	5	5	4	2	4	4.3	3	6
GAS UTILITIES	8	0.17	9.0	7.6	1.4	38.8	0.61	22.6	2.30	2.3	5	3	3	2	5	5.6	-1	10
MULTI-UTILITIES	14	1.06	9.4	7.1	2.3	33.6	0.55	19.8	2.30	3.5	5	4	4	2	5	5.0	1	9
WATER UTILITIES	1	0.07	8.8	6.5	2.3	40.6	0.49	28.6	3.21	1.7	9	2	4	1	3	8.2	8	9
INDEP POWER PROD & ENERGY TRAD	9	0.19	13.6	9.9	3.7	26.9	0.87	8.6	1.85	3.0	2	10	8	7	6	31.3	102	2
REAL ESTATE	106	3.88	9.8	9.4	0.4	32.8	0.81	19.4	2.73	3.5	6	6	3	2	7	8.8	2	6
REITS	100	3.77	9.8	9.2	0.6	32.8	0.80	19.6	2.74	3.6	6	6	3	2	7	8.8	2	6
REAL ESTATE MGMT & DEV	6	0.11	11.4	15.1	-3.7	33.7	1.47	14.2	2.56	0.3		3				9.7	-1	7
BofAML UNIVERSE	**1198**	**100.0**	**11.0**	**11.2**	**-0.2**	**32.5**	**1.02**	**16.8**	**3.14**	**2.0**						**12.3**	**6**	**12**
S&P 500	**505**	**90.68**	**11.0**	**11.1**	**-0.1**	**32.2**	**1.01**	**16.7**	**3.15**	**2.0**						**11.8**	**5**	**11**

Source: BofA Merrill Lynch US Equity and US Quant Strategy

Quantitative Profiles

Factor correlations near record levels

Bank of America Merrill Lynch

16 May 2019

Record correlations argue for a quality bias from here

Potentially driven by increased flows into factor-based funds, it has been increasingly difficult to have a diversified factor-based investment approach: the correlation between standard growth, value, quality, momentum, risk and size factors have risen to almost post-crisis highs (Chart 1). Rising correlations simply illustrate that factors' returns are increasingly similar. The last five times correlations were at similar levels, high quality stocks (High Return on Equity, Return on Capital, Return on Assets) consistently outperformed the market, on average by 8ppt over the subsequent 12 months.

Trading trade: rampant factor reversals in May

Following the recent escalation of trade tensions in early May, volatility has risen – the VIX shot above 20 (after remaining <14 throughout April) and the S&P 500 pulled back nearly 5% . Higher volatility typically heralds a shift in leadership – which we saw at the factor level last month. We highlight recent shifts below.

Risk-on, risk-off: Beta leads for the year, but ailed in May

While Risk factors outperformed in April (+4.1%), led by High Beta (+6.8%), performance has been risk-off in May: High Beta stocks are -5.9%, nearly reversing April's gains, and Risk factors are -4.5% on avg. Risk remains the best-performing group YTD (+15.6% through 5/15), but is at risk if we remain in a period of trade brinkmanship.

Out of Value

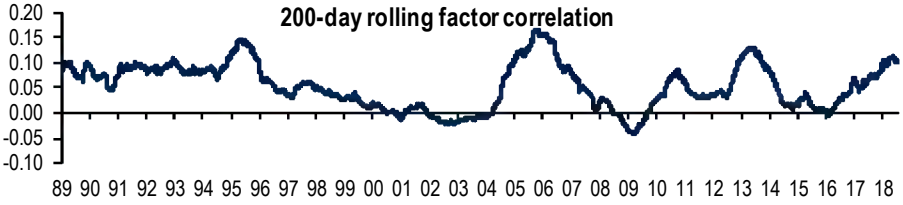
Value factors outperformed in April (+4.2%) after trailing in 1Q, but leadership was narrow (four led, five lagged). MTD, Value has been the weakest group (-5.3%). Value typically outperforms when profits are improving, and while 1Q EPS beat expectations, higher tariffs and rising risks of a trade war increase the risks of an EPS recession. After leading in 1Q, Growth factors underperformed the market both last month (+3.3%) and MTD (-3.8%), and are neck-in-neck with the benchmark YTD (but ahead of Value factors).

Momentum factors revived – but more volatility poses risk

Momentum factors were the biggest laggards in April (+1.3%) after lagging in 1Q. MTD, Momentum has actually been the best-performing group (-2.7%), as defensive sectors weathered the sell-off better than foreign-exposed cyclicals. But the factor group is still lagging YTD, and we remain cautious on Momentum as it tends to fare poorly later in the cycle and in periods of high volatility (VIX>25). The rotation into defensive bond-proxies also hurt medium duration stocks (High Dividend Growth -4.7% MTD), though they continue to outperform YTD (+14.6% through 5/15). Quality factors lagged both in April (+3.1%) and MTD (-4.1%), but we would stick with Quality as a hedge against vol.

Screens and performance data are available in Research Library in Excel format

Chart 1: Inter-factor correlations near post-crisis highs (200 day rolling factor correlations)



Source: BofA Merrill Lynch US Equity and US Quant Strategy. Based on growth, value, quality, momentum, risk and size factors.

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Top 5 screens in April	Perf.
Earnings Yield	7.8%
Forward Earnings Yield	7.2%
High Beta	6.8%
High Dividend Growth	6.4%
Share Repurchase	5.7%
S&P 500 (Equal weighted)	**3.6%**

Bottom 5 screens in April	Perf.
Relative Strength (10wk/40wk)	-0.8%
Relative Strength (30wk/75wk)	0.1%
Price Returns (12-Month)	0.4%
Price Returns (9-Month)	0.7%
Price Returns (11-m since 1 y ago)	1.0%
S&P 500 (Equal weighted)	**3.6%**

Disclaimer: The valuations and screens contained herein are useful in assessing comparative valuations and comparative earnings prospects and are not intended to recommend transactions relating to any specific security. These indicators should be used in investment decisions only with other factors including financial risk, investment risk, management strategies and operating and financial outlooks.

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BofAML Universe Sector/Industry Factor Evaluation (cont'd)

			Valuation Analysis								Expectation Analysis							
	# of Comp	% Univ BofAML	Impl. Return	Reqd Return	DDM Alpha	Eqty. Duration	BofAML Adj ßeta	P/E Ratio	Price/ Book	Yield	Earnings Surprise	Earnings (Decile) Risk	Torp	Disp	Est. Rev.	PR 5yr Growth	EPS Growth 2018E	EPS Growth 2019E
CONSUMER STAPLES	43	6.62	9.3	8.6	0.7	36.2	0.74	19.9	4.56	2.8	7	5	4	3	5	6.1	2	7
FOOD & STAPLES RETAILING	10	1.35	9.1	8.7	0.4	40.3	0.75	18.5	4.18	1.8	6	4	3	3	4	6.2	3	6
BEVERAGES	8	1.88	8.8	8.8	0	37.8	0.76	24.1	5.98	2.7	9	7	4	2	7	6.2	0	9
FOOD PRODUCTS	11	0.83	9.8	8.7	1.1	33.8	0.75	17.6	2.59	2.7	8	7	3	3	5	5.3	-3	7
TOBACCO	2	0.86	11.4	9.3	2.1	22.7	0.82	14.6	7.22	5.5	6	4	5	4	6	6.7	3	7
HOUSEHOLD PRODUCTS	8	1.53	8.8	7.8	1	38.7	0.64	22.6	5.15	2.7	4	4	4	2	4	5.5	4	6
PERSONAL PRODUCTS	4	0.17	9.0	9.3	-0.3	43.1	0.82	24.7	4.89	1.4	8	2	5	2	3	9.8	7	10
HEALTH CARE	175	13.30	10.7	10.6	0.1	33.7	0.98	16.3	3.36	1.7	6	6	6	3	5	13.2	8	11
HEALTH CARE EQUIP	35	2.98	9.8	10.8	-1	39.9	1.00	24.0	3.79	1.0	6	6	5	2	5	13.5	12	12
HEALTH CARE PROV	38	2.50	11.9	10.2	1.7	31.0	0.92	12.5	2.41	1.4	8	4	7	2	4	12.0	10	11
HEALTH CARE TECH	5	0.17	9.4	12.9	-3.5	43.8	1.25	33.9	5.41	0.0	6	3	5	5	3	15.8	8	19
BIOTECH	56	2.43	11.4	12.9	-1.5	28.2	1.24	14.9	5.49	2.0	5	7	6	6	5	24.5	17	14
PHARMACEUTICALS	29	4.18	10.3	9.1	1.2	32.2	0.80	14.9	2.08	2.6	7	9	5	3	5	6.6	1	7
LIFE SCIENCES	12	1.04	11.5	11.5	0	35.5	1.08	24.4	5.31	0.2	5	4	6	2	3	15.1	12	13
FINANCIALS	149	10.34	11.4	11.7	-0.3	29.0	1.10	11.2	1.42	2.7	6	4	7	4	5	7.8	9	9
BANKS	39	4.46	12.1	12.2	-0.1	25.1	1.17	10.6	1.35	2.9	8	2	8	4	4	8.0	9	8
THRIFTS & MORTGAGE FINANCE	5	0.09	13.3	14.5	-1.2	27.4	1.43	11.5	1.57	1.3	8	6	6	5	5	15.3	1	8
DIV FINANCIALS	2	0.07	16.6	13.6	3	15.7	1.32	6.4	0.92	1.4	4		9	5	1	16.0	14	12
CONSUMER FINANCE	8	0.76		12.3			1.18	9.9	1.61	1.7		4	8	3	4	6.9	8	9
CAPITAL MARKETS	54	2.51	10.9	11.4	-0.5	30.8	1.07	12.8	1.85	2.6	4	4	5	5	5	6.4	2	10
MORTGAGE REITS	12	0.18		8.2			0.69	9.0	1.08	10.6	2	5	2	5	5	-0.6	-4	2
INSURANCE	29	2.28	10.4	10.8	-0.4	35.2	1.00	12.0	1.34	2.2	5	5	7	3	5	9.1	20	10
INFO TECH	153	21.87	10.8	12.0	-1.2	34.6	1.14	20.2	7.21	1.3	5	5	5	4	5	15.3	4	13
INTERNET SOFTWARE	1	0.02		11.7			1.10	nm		0.0	5		1	10	10	5.0	nm	nm
IT SERVICES	33	4.83	10.3	11.8	-1.5	36.9	1.12	22.1	9.29	1.1	6	4	6	2	4	17.2	11	13
SOFTWARE	54	7.54	10.8	12.2	-1.4	36.1	1.16	30.0	10.85	0.8	3	6	6	4	3	19.7	15	16
COMMUNICA. EQUIP	10	1.14	10.2	11.9	-1.7	35.6	1.12	17.6	5.71	2.1	5	9	8	4	3	10.9	14	10
COMPUTERS & PERIPH	10	3.84	11.2	11.7	-0.5	31.9	1.11	14.9	7.13	1.5	4	3	4	6	8	10.7	0	13
ELECTR EQUIP & INSTR	14	0.52	10.4	11.6	-1.2	37.0	1.09	16.2	2.80	1.2	5	6	6	4	5	9.9	7	10
SEMICONDUCTORS	31	3.98	11.3	12.2	-0.9	30.9	1.16	15.4	4.57	1.9	6	5	4	6	6	10.9	-9	13
COMMUNICATION SERVICES	57	12.15	10.7	10.6	0.1	35.5	0.98	14.9	3.50	1.1	2	5	5	6	6	13.4	12	17
DIVERSIFIED TELECOM SVS	9	1.77	11.7	8.1	3.6	25.1	0.68	10.2	1.84	5.3	5	7	3	3	4	6.4	5	1
WIRELESS TELECOM SVS	2	0.31		7.7			0.64	20.4	1.60	0.0		7	6	9	6	17.6	93	16
MEDIA	19	1.61	12.8	12.0	0.8	29.6	1.14	16.2	2.57	1.5	5	5	8	6	3	21.1	10	14
ENTERTAINMENT	12	1.96	9.5	11.4	-1.9	41.4	1.07	27.3	5.17	0.7	3	5	4	7	8	12.5	3	12
INTERACTIVE MEDIA & SVCS	15	6.49	10.3	10.9	-0.6	38.0	1.01	14.3	4.91	0.0	1	4	6	6	7	13.4	17	26
UTILITIES	54	3.39	9.5	6.9	2.6	33.8	0.54	17.9	2.10	3.3	5	5	4	2	5	5.7	5	7
ELECTRIC UTILITIES	22	1.94	9.3	6.5	2.8	34.1	0.49	17.5	1.99	3.4	4	5	4	2	5	4.1	3	5
GAS UTILITIES	8	0.16	9.0	7.4	1.6	38.7	0.60	22.4	2.29	2.3	7	3	3	2	5	5.6	-2	14
MULTI-UTILITIES	14	1.03	9.5	7.0	2.5	32.9	0.55	19.9	2.31	3.5	6	4	4	2	5	5.8	2	8
WATER UTILITIES	1	0.07	8.7	6.6	2.1	40.6	0.50	29.5	3.33	1.8	9	1	4	1	4	8.2	8	9
INDEP POWER PROD & ENERGY TRAD	9	0.18	12.5	9.6	2.9	29.0	0.86	11.0	1.87	3.0	2	10	8	7	5	22.2	71	16
REAL ESTATE	106	3.75	9.9	9.2	0.7	32.9	0.81	19.3	2.73	3.5	6	6	4	2	7	9.1	2	6
REITS	100	3.64	9.9	9.1	0.8	32.6	0.79	19.4	2.73	3.6	6	6	4	2	7	9.1	2	5
REAL ESTATE MGMT & DEV	6	0.12	10.1	14.8	-4.7	40.7	1.46	16.6	2.93	0.3		3				9.5	0	7
BofAML UNIVERSE	1201	100.0	10.9	11.0	-0.1	33.3	1.03	17.5	3.21	1.9						13.0	6	13
S&P 500	505	91.33	10.8	10.9	-0.1	33.1	1.01	17.5	3.21	1.9						12.2	4	11

Source: BofA Merrill Lynch US Equity and US Quant Strategy

Quantitative Profiles

Time for a beta rally

Bank of America Merrill Lynch

13 June 2019

Low vs. High Beta perf. spread near post-crisis extremes

May saw almost the biggest underperformance of High Beta stocks relative to Low Beta stocks (-13ppt) since 2009, only eclipsed by Jan. 2016's commodity-meltdown-driven beta collapse. What next? In similar instances (when High Beta underperformed Low Beta by more than 10ppt), High Beta consistently outperformed Low Beta by over 6ppt on avg. in the next three months, and in six out of seven instances. See our High and Low Beta screens for stocks to own and avoid.

May sell-off fuels reversals; June to the rescue

As trade tensions escalated in May, risk assets sold off: the equal-weighted S&P 500 lost 7.1%, while low-risk US Treasury bonds rose (10-yr yield fell 38bp). Rampant reversals in factor performance were evident in May, as April's best performing factor groups (Cash Deployment, Value and Risk) suffered deepest losses. Month to date (MTD) as of 6/11, however, a more dovish Fed and an avoidance of tariffs on Mexico has fueled a risk rally, supporting May's losers over winners (more below).

Value, Risk and MNCs lagged most in May; lead MTD

Amid concerns over the global growth backdrop, Value factors, which tend to outperform when profits are accelerating, underperformed most in May (-12.1%), with all Value factors we track lagging the index and taking four of the bottom five factor spots overall. Risk factors (-11.2%) also underperformed, with High Beta (-13.4%) among the bottom five factors overall. So far this month, Risk (+5.9%) and Value (+5.6%) factors have been among the leaders, gaining back much of May's losses. And multinationals (MNCs), after falling sharply in May on growth/trade concerns (-12.6%), have surged to the top spot MTD (+8.5%).

Quality faring best so far in 2019

Quality factors have been in the middle of the pack both in May and June MTD. But so far this year (as of 6/11), Quality is the best performing factor group (+16.1%). We continue to prefer Quality as the best hedge against volatility (see our Quality Primer).

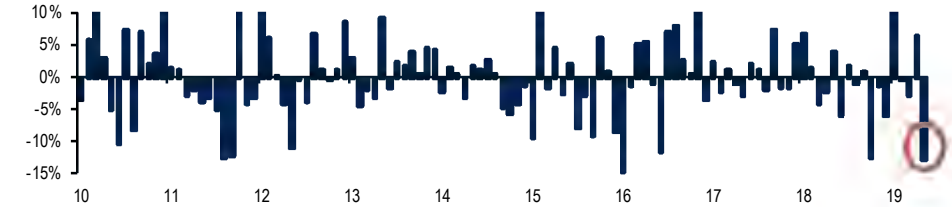
Momentum most resilient amid sell-off; lags in June

Momentum factors were the biggest laggards this year prior to May, but Momentum was the only group to beat the index last month (-5.7%), comprising four of the top five factors overall. But MTD, Momentum is lagging again, as foreign-exposed cyclical beat defensive sectors. Momentum tends to lag later in the cycle and when volatility rises; and is unlikely to lead in 2H.

Screens and performance data are available in Research Library in Excel format

Chart 1: Spread in Beta performance near post-crisis extremes

High Beta – Low Beta monthly performance spreads (Jan 2010-May2019)



Source: BofA Merrill Lynch US Equity and Quant Strategy, FactSet

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Top 5 screens in May	Perf.
Price Returns (12m plus 1m Rev.)	-3.5%
Price Returns (9-Month)	-4.1%
Relative Strength (30wk/75wk)	-4.7%
Short Interest	-5.0%
Price Returns (11m since 1y ago)	-5.1%
S&P 500 (Equal weighted)	**-7.1%**

Bottom 5 screens in May	Perf.
Low EV/EBITDA	-16.1%
Low Price to Cash Flow	-15.7%
High Free Cash Flow to EV	-14.0%
Low Price to Free Cash Flow	-13.6%
High Beta	-13.4%
S&P 500 (Equal weighted)	**-7.1%**

Disclaimer: The valuations and screens contained herein are useful in assessing comparative valuations and comparative earnings prospects and are not intended to recommend transactions relating to any specific security. These indicators should be used in investment decisions only with other factors including financial risk, investment risk, management strategies and operating and financial outlooks.

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BofAML Universe Sector/Industry Factor Evaluation (cont'd)

			Valuation Analysis								Expectation Analysis							
	# of	% Univ	Impl.	Reqd	DDM	Eqty.	BofAML	P/E	Price/			Earnings (Decile)				PR 5yr	EPS Growth	
	Comp	BofAML	Return	Return	Alpha	Duration	Adj ßeta	Ratio	Book	Yield	Surprise	Risk	Torp	Disp	Est. Rev.	Growth	2019E	2020E
CONSUMER STAPLES	44	6.75	9.5	8.6	0.9	35.5	0.74	19.0	4.42	3.0	7	5	4	2	5	6.2	2	7
FOOD & STAPLES RETAILING	10	1.39	9.2	8.7	0.5	39.6	0.74	17.7	4.08	1.9	7	4	4	3	3	6.2	3	6
BEVERAGES	8	1.96	8.8	8.7	0.1	37.5	0.74	23.5	5.87	2.7	9	7	4	2	7	6.2	0	9
FOOD PRODUCTS	12	0.84	10.0	8.7	1.3	33.6	0.75	16.7	2.49	2.8	7	7	3	3	4	5.4	-3	7
TOBACCO	2	0.82	12.2	9.7	2.5	20.0	0.85	12.9	6.52	6.2	4	4	5	3	6	7.4	3	8
HOUSEHOLD PRODUCTS	8	1.57	8.9	7.9	1	37.9	0.65	21.7	4.87	2.8	5	3	4	2	5	5.4	4	6
PERSONAL PRODUCTS	4	0.17	9.5	9.4	0.1	40.3	0.82	23.0	5.15	1.4	7	3	5	3	3	10.9	9	9
HEALTH CARE	177	13.77	10.7	10.5	0.2	33.4	0.95	15.8	3.81	1.7	7	6	6	3	5	12.6	9	10
HEALTH CARE EQUIP	35	3.12	9.8	10.7	-0.9	39.7	0.96	23.6	3.97	1.0	7	6	5	2	5	13.2	10	12
HEALTH CARE PROV	38	2.66	11.8	9.9	1.9	31.4	0.88	12.4	2.43	1.3	7	4	7	2	5	12.0	10	11
HEALTH CARE TECH	5	0.20	9.3	12.2	-2.9	44.5	1.13	35.4	5.76	0.5	6	3	5	4	2	16.4	11	18
BIOTECH	58	2.46	11.2	13.0	-1.8	27.7	1.22	14.2	5.11	2.1	4	7	6	6	5	21.0	19	11
PHARMACEUTICALS	29	4.28	10.4	9.1	1.3	31.4	0.79	14.3	4.30	2.7	8	9	5	3	4	7.0	3	6
LIFE SCIENCES	12	1.05	11.4	11.5	-0.1	35.6	1.05	23.1	5.04	0.2	5	4	6	2	4	15.1	12	13
FINANCIALS	148	10.28	11.7	11.8	-0.1	28.1	1.09	10.4	1.35	2.9	6	4	7	4	5	7.9	9	9
BANKS	39	4.30	12.6	12.6	0	23.6	1.17	9.6	1.23	3.2	8	2	8	4	5	8.0	9	8
THRIFTS & MORTGAGE FINANCE	5	0.09	13.6	14.8	-1.2	26.5	1.41	10.4	1.43	1.4	7	6	6	4	5	15.6	3	9
DIV FINANCIALS	2	0.07	18.1	13.7	4.4	13.7	1.30	5.8	0.79	1.7	5		9	4	2	16.3	14	12
CONSUMER FINANCE	8	0.77		12.3			1.14	9.4	1.60	1.8		4	7	3	5	6.5	8	10
CAPITAL MARKETS	53	2.48	11.2	11.6	-0.4	29.8	1.06	11.9	1.68	2.8	5	5	5	5	5	7.2	1	11
MORTGAGE REITS	12	0.18		8.5			0.72	8.5	0.99	11.3		4	2	5	7	-1.2	-7	2
INSURANCE	29	2.39	10.4	10.6	-0.2	34.9	0.95	11.7	1.32	2.4	4	5	7	3	4	9.1	23	8
INFO TECH	156	21.50	11.1	12.3	-1.2	33.2	1.14	18.4	6.47	1.4	5	5	5	4	4	15.3	4	13
INTERNET SOFTWARE	1	0.03		9.6			0.84	nm		0.0	10		1	10	10	0.0	nm	nm
IT SERVICES	35	5.27	10.5	11.7	-1.2	36.3	1.07	21.4	8.29	1.1	6	4	6	2	4	15.8	10	12
SOFTWARE	55	7.58	11.0	12.5	-1.5	35.1	1.16	28.3	10.11	0.9	3	6	6	4	3	20.1	14	16
COMMUNICA. EQUIP	10	1.09	10.4	12.3	-1.9	34.1	1.14	15.4	5.45	2.3	4	9	8	3	5	11.0	14	11
COMPUTERS & PERIPH	10	3.55	11.7	12.3	-0.6	29.9	1.14	12.8	6.18	1.9	3	3	4	6	4	10.5	1	11
ELECTR EQUIP & INSTR	14	0.47	10.9	12.2	-1.3	34.6	1.13	13.4	2.39	1.4	6	6	6	4	5	9.3	5	11
SEMICONDUCTORS	31	3.50	12.1	13.1	-1	27.8	1.23	12.8	3.76	2.3	6	5	4	6	6	11.4	-9	14
COMMUNICATION SERVICES	59	12.21	10.7	10.7	0	34.7	0.97	14.0	3.22	1.2	2	5	5	6	6	12.6	10	17
DIVERSIFIED TELECOM SVS	9	1.82	11.8	8.1	3.7	24.3	0.68	10.0	1.83	5.5	4	8	3	3	5	5.7	4	3
WIRELESS TELECOM SVS	2	0.35		6.9			0.54	25.8	1.73	0.0		7	6	7	4	4.9	-34	8
MEDIA	19	1.61	11.2	12.1	-0.9	30.9	1.12	15.3	2.43	1.7	5	5	7	6	4	20.0	11	14
ENTERTAINMENT	13	1.98	9.7	11.5	-1.8	40.5	1.05	25.8	3.81	0.7	2	4	4	6	8	12.0	2	12
INTERACTIVE MEDIA & SVCS	16	6.44	10.6	11.2	-0.6	36.8	1.01	13.1	4.54	0.0	1	4	6	6	7	13.4	17	26
UTILITIES	55	3.54	9.6	6.8	2.8	33.5	0.54	17.6	1.99	3.4	5	5	4	2	5	5.8	5	7
ELECTRIC UTILITIES	22	2.03	9.4	6.5	2.9	33.5	0.50	17.1	1.88	3.4	4	5	4	2	5	4.3	4	4
GAS UTILITIES	8	0.17	9.1	7.4	1.7	38.0	0.60	21.6	2.16	2.4	6	4	4	2	6	5.8	-2	14
MULTI-UTILITIES	15	1.10	9.5	6.9	2.6	33.1	0.55	19.9	2.19	3.5	6	5	4	2	5	5.5	1	8
WATER UTILITIES	1	0.08	8.6	6.1	2.5	41.5	0.46	30.6	3.44	1.8	10	1	4	1	4	8.2	8	9
INDEP POWER PROD & ENERGY TRAD	9	0.17	13.6	10.2	3.4	26.4	0.92	9.8	1.73	3.3	2	10	8	7	6	24.8	78	26
REAL ESTATE	102	3.90	9.9	8.7	1.2	32.7	0.75	19.5	2.74	3.6	5	6	4	2	6	9.5	2	6
REITS	100	3.90	9.9	8.7	1.2	32.7	0.75	19.4	2.74	3.6	5	6	4	2	6	9.5	2	6
REAL ESTATE MGMT & DEV	2	0.01	8.4	16.4	-8	47.8	1.59	nm	2.18	0.0						-0.1	nm	nm
BofAML UNIVERSE	**1204**	**100.0**	**11.0**	**11.2**	**-0.2**	**32.3**	**1.02**	**16.4**	**2.99**	**2.1**						**12.2**	**5**	**12**
S&P 500	**505**	**90.82**	**11.0**	**11.1**	**-0.1**	**32.1**	**1.01**	**16.3**	**2.98**	**2.1**						**11.5**	**4**	**11**

Source: BofA Merrill Lynch US Equity and Quant Strategy, FactSet

CFA Institute

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by Diana R. Harrington

Whose Beta is Best?

A cursory examination of the betas provided by different investment services reveals that these betas vary greatly, even when they are calculated on the basis of historical returns. How can one determine which beta is best? Using a mean square error test, the author evaluates betas from various commercial sources in terms of their accuracy in predicting subsequent betas and in predicting subsequent returns.

In general, the longer the horizon and the larger the portfolio, the better the forecast accuracy of any beta. On the other hand, all the methods tested left the possibility for over- and underestimations of troubling magnitudes.

More specifically, in terms of predicting ensuing betas, the Value Line forecasts exhibited the lowest mean square errors for a sample of utility stocks, but a naive forecast (assuming betas would equal one) performed almost as well. The Rosenberg long-term fundamental beta proved superior in forecasting the betas of a sample of industrial stocks. Performance in predicting return varied greatly, depending on the model parameters for market return and risk-free rate. A naive model performed best for the utility sample, but no one beta proved best in the case of the industrial sample.

BETA! It's hard to keep track of the number of articles that have been written about what it is and isn't, how to calculate, adjust, refine it (or find a better one), or why it is a concept whose time has passed. Some people suggest that beta is being kept alive by "hype" alone.

Is another article about beta like a discussion about the Edsel—historically interesting but of little practical value? I think not, and for several reasons. The primary reason is that beta, while under increasing scrutiny, is, at the same time, becoming more widely used to solve practical problems.

As investment analysts, portfolio managers and corporate planners and financial staff have increased their use of beta, several organizations have started to provide beta forecasts for a large number of common stocks. These forecasts, derived in a variety of ways, are revised and published monthly or quarterly, and beta users have begun to ask: "How good are these forecasts?"

That question led to this article. In order to provide some perspective on the quality of commercially available betas, I tested the accuracy of these beta forecasts and of forecasts that could be made by using several other methods available to the practitioner.

Beta Use and Users

The following description of how betas are being used in evaluating stocks, optimizing portfolios and evaluating performance will demonstrate the importance of good beta forecasts.

Essentially, beta is used two ways. First, it is used as a part of the Capital Asset Pricing Model (CAPM) to forecast the returns from a stock or portfolio.[1] The forecasts are then used by

> ...analysts in public utility rate-relief proceedings to estimate the expected return on equity for a given public utility; this return—the cost of equity—when combined with the costs of other capital, becomes part of the expenses allowed the public utility when

1. Footnotes appear at end of article.

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establishing the rates charged customers... (This use of the CAPM, infrequent in the past, has increased considerably since 1975.[2])

...corporate managers, in search of ways to estimate corporate or divisional hurdle rates; they have used and are using the CAPM to estimate costs of equity.

Beta by itself has been used by practitioners even more extensively, and perhaps more creatively, than the CAPM. Beta has been used to estimate the "risk class" of a given stock so that

...rate analysts in public utility proceedings can choose a group of comparable-risk, nonutility companies against which to test the "fairness" of the return on equity for a particular utility...

...security analysts and portfolio managers can identify over- and undervalued stocks...

...portfolio managers can design portfolios with particular risk characteristics. (Portfolio optimization models often require the manager to set a level of risk—beta—that will be tolerated in the portfolio.)

The increased use of beta has increased the need for beta forecasts. The practitioner has two primary methods for obtaining the necessary beta estimates—calculate betas from historical data or use beta estimates made by one of the investment advisory services. In either case, the user must be aware of the difficulty of obtaining a useful beta estimate.

Unfortunately, there is no single best method of estimating a beta. Even beta estimates based on the same historical returns may vary depending on such things as the time period over which the beta is calculated and the index chosen as a proxy for the market. The beta services use various methods for deriving their estimates. Some of the betas rest solely on the historical data. Others are adapted for problems such as the mean regression tendency of beta that were identified and recognized by the academic community.[3] Still others have created fundamental beta estimates from multivariate regressions of time-series, firm-fundamental characteristics.[4]

To have some idea of the difficulties encountered in choosing between beta estimates, one need only look at the differences between the betas estimated by the popular services. All the betas shown in Table I (except two of those provided by Barr Rosenberg) were taken from services that calculate betas from historical returns. The table vividly demonstrates just how different beta estimates can be when made by different services, for different stocks, and at different points in time.

Choosing a beta, then, is no simple task. If the user recognizes the substantive differences that can occur between betas from commercially published services, she or he has no way, other than intuition, of choosing among the offerings. It may be, however, that more information about some of these commercially available betas would allow a more informed choice.

To provide information to beta users, I examined the estimated betas of stocks in two sample groups—public utility stocks and industrials. Public utilities, whose betas are usually below the market average of 1.0, have had, over time, the most stable and significant betas; the stocks of

Table I Betas Calculated by Investment Services for Selected Stocks

	January 1974							
					Barr Rosenberg			
	Merrill Lynch (Adjusted)		*Market Model (Adjusted)*		*Historical*	*Short-Term Fundamental*	*Long-Term Fundamental*	*Value Line*
American Airlines	2.04	(1.69)	2.11	(1.01)	2.12	2.35	2.22	2.26
American Cyanamid	0.99	(1.00)	0.97	(0.98)	0.98	1.01	1.03	1.08
Houston Industries	1.08	(1.05)	1.12	(1.00)	1.21	1.12	1.10	0.77
San Diego Gas and Electric	0.99	(0.99)	0.98	(0.99)	1.03	0.87	0.90	0.73
Southern California Edison	1.33	(1.22)	1.33	(1.02)	1.32	0.99	0.99	0.98
	December 1972							
American Airlines	1.53	(1.35)	1.15	(0.77)	1.41	1.67	1.60	1.45
American Cyanamid	1.04	(0.84)	0.84	(0.76)	0.95	0.95	0.98	1.05
Houston Industries	1.00	(1.00)	0.69	(0.73)	1.05	1.08	0.98	0.90
San Diego Gas and Electric	0.61	(0.74)	0.48	(0.66)	0.65	0.82	0.88	0.70
Southern California Edison	0.72	(0.81)	0.52	(0.67)	0.72	0.82	0.84	0.80

Source: D.R. Harrington, "Predicting Betas and Returns Using Commercially Available Beta Forecasts" (Darden School Working Paper, Darden Graduate School of Business, University of Virginia, Charlottesville, 1982).

Table II Characteristics of the Beta Predictors

Source	*Method*	*Time Period*	*Interval*	*Index*	*Special Notes*	*Available From*
Merrill Lynch (ML1)	OLS[a]	5 years	monthly	S&P 500	price relatives only	1972
Merrill Lynch (ML2)	OLS/Bayesian-adjusted[a]	5 years	monthly	S&P 500	price relatives only	1972
Value Line (Value Line)	OLS[a]	5 years	weekly	NYSE Composite	price relatives only	1972
Drexel Burnham Lambert (Drexel)	OLS/Bayesian-adjusted[a]	8 cycles	8 cycles as defined by Drexel	S&P 500	Sample: 28 utilities, 16 industrials	10/1974
Wilshire Associates (Wilshire)	Fundamental	—	quarterly	—		1971-77
Barr Rosenberg & Assoc. (RF1)	OLS[a]	5 years	monthly	S&P 500	compound returns	1974
Barr Rosenberg & Assoc. (RF2)	Fundamental[b]	—	—	—	—	1974
Barr Rosenberg & Assoc. (RF3)	Fundamental[b]	—	—	—	—	1974
Ordinary Least Squares (OLS)	OLS[a]	5 years	monthly	S&P 500	compound returns	N/A
Adjusted Ordinary Least Squares (OLSB)	OLS/Bayesian-adjusted[a]	5 years	monthly	S&P 500	compound returns	N/A
Naive (Naive 2)	β = mean of the sample (utilities or industrials)	5 years	monthly	S&P 500	compound returns	N/A
Naive (Naive 1)	$\beta = 1$	5 years	N/A	N/A	N/A	N/A

N/A = not applicable

a. A simple linear regression of historical returns from the stock and the market (usually proxied by the S&P 500):

$R_j = \alpha_j + \beta_j(R_m) + \epsilon_j$,

where:

R_j = the total returns on a particular security or portfolio,
R_m = the return on the market,
α_j = the intercept from the regression,
ϵ_j = the residuals, or errors, and
β_j = the slope of the regression line.

b. A Rosenberg Assoc. spokesman stated that this particular fundamental prediction process is not good for utility stocks. Another method designed to provide better betas for utilities is being developed by them.

industrial firms typically have betas near or above 1.0. I gathered, for each stock, eight beta forecasts from five commercial beta producers. In addition, I calculated two other betas from historical returns; these are the kind of betas that practitioners might calculate themselves. Those two betas, plus two very simple, naive, forecasts, were included for comparison. Table II describes each of the 12 betas included in the study.

Beta Estimates as Predictors of Beta

The best test of beta forecast accuracy is one that measures the size of the errors that could be made if one were to use the forecast to predict. Thus each forecast was used to predict the actual, ensuing, beta and the difference between the predicted and actual betas was measured. (The actual betas were ordinary least-squares betas calculated using monthly total rates of return for each stock and the Standard & Poor's (S&P) 500.[5]) These forecast errors were squared, then averaged, and the mean square error for each stock was averaged for each of the two samples.[6]

This mean square error (MSE) test is especially useful since it can be used to determine the differences in accuracy of the beta forecasts. It can also be used to evaluate three potential sources of error—a consistent over- or underprediction (bias), an error that is linked to the size of the beta (inefficiency), or random error. Since some beta services purport to reduce one of these sources of error, such an analysis is useful.[7]

Time Horizon and Portfolio Effects

In executing the study, I attempted to approximate the way a practitioner might use these beta forecasts. Investors with a buy-and-hold strategy should be interested in longer horizons (four years was the longest from the available data), whereas those who trade more frequently would be interested in the accuracy of beta forecasts over shorter horizons. While shorter actual betas would be more difficult to forecast accurately because of the limited actual data, horizons of one, two, three and four years were included. In addition, because earlier tests showed that errors

Table III MSE and Mean Forecast Beta Using Naive 1 Beta Forecast

	Utility Sample			*Industrial Sample*		
Horizon	*MSE*	*Mean Beta*	*MSE as % of Mean*	*MSE*	*Mean Beta*	*MSE as % of Mean*
1 year	0.1617	0.6795	24%	0.4176	1.1304	37%
2 years	0.1092	0.6669	16	0.1092	1.1103	23
3 years	0.0866	0.6348	14	0.0866	1.0707	18
4 years	0.0630	0.5854	11	0.0630	0.9943	17

were significantly reduced when individual stocks were placed in portfolios, I tested beta forecasts for portfolios of five, 10 and 15 randomly chosen stocks from each of the two samples.[8]

Table III shows the results of using the Naive 1 estimate of beta (all beta forecasts equal to 1.0) to forecast betas over various time horizons. The forecasts made using betas from other sources yielded similar results.[9]

Several things are immediately apparent. First, as we might have anticipated, the longer the forecast horizon, the smaller the MSE (the random-error portion dropping most dramatically). Second, the MSEs for the utility sample were smaller than those for the industrials. Because the average beta for a utility is smaller than that for the average industrial, however, the real magnitude of the errors can only be seen in comparison with the average beta forecast. The table shows that the MSEs of the utility forecast were smaller in both an absolute and relative sense: Utility betas are more accurately forecast.

Table IV shows the results of using the Merrill Lynch unadjusted beta forecast in a portfolio context. The accuracy of the forecast improved as the size of the portfolio increased—that is, the MSE dropped, the reduction stemming from reductions in random error. The industrial sample MSE for the unadjusted Merrill Lynch beta five-stock portfolio was 0.2013; for the 15-stock portfolios, the MSE was 0.0600.

For the practitioner, these findings underline old lessons. First, the longer the horizon, the better the forecast, as the short-term errors cancel out. Second, better forecasts come when portfolios, rather than single securities, are being forecast; once again, errors cancel out.

Ranking the Forecasting Methods

The rankings by MSE of the various methods of forecasting beta were relatively stable over different horizons, particularly in the case of the utility sample. Table V shows that, for the utility sample, the Value Line forecast had the smallest MSE over each horizon. What is somewhat surprising is that the Naive 1 beta (all beta forecasts equal to 1.0) had the next lowest MSE for three of the four horizons. This beta is the simplest forecast that could be made. Note that, while the MSE differences were not large, the forecasts with the lowest MSEs had errors that were of very similar magnitude. Thus, from an economic point of view, when the errors are similar, the cheapest beta may be the best.

Table IV Portfolio Effect Using Merrill Lynch Unadjusted Forecast and One-Year Horizon

Portfolio Size	*MSE, Utility Sample*	*MSE, Industrial Sample*
5 stocks	0.0874	0.2013
10 stocks	0.0733	0.0728
15 stocks	0.0723	0.0600

Typically, the beta forecasts for the utility sample overestimated the actual betas. Because the betas for this sample are generally small, this result suggests inefficiency in the beta forecasts. An inefficient forecast will result in positive errors at low betas and negative errors at high betas.

The results for the utility sample suggest several conclusions. First, sizable errors can be made. If, for instance, your horizon was three years and you were using Value Line betas to forecast the beta for an average utility over this period, the average error you could have made would have been 0.28. Since the mean beta forecast for Value Line was only 0.7241, the error potential was sizable. Second, for the utilities, almost every method studied overestimated the actual beta. And third, when the direction as well as the magnitude of the error is taken into account (mean difference), the OLS forecast was better than the Value Line forecast for the utility sample. That is because the OLS beta forecasts both over- and underestimated actual betas. The

Table V MSE Results for the Utility Sample

Horizon	Smallest MSE (source)	Next Smallest MSE (source)	Mean MSE	Maximum MSE
1 year	0.1560 (V. Line)	0.1617 (Naive 1)	0.2062	0.2857
2 years	0.1005 (V. Line)	0.1071 (OLSB)	0.1324	0.2503
3 years	0.0799 (V. Line)	0.0866 (Naive 1)	0.1166	0.2271
4 years	0.0584 (V. Line)	0.0630 (Naive 1)	0.1098	0.1972

Table VI MSE Results for the Industrial Sample

Horizon	Smallest MSE (source)	Next Smallest MSE (source)	Mean MSE	Maximum MSE
1 year	0.3572 (RF3)	0.3624 (RF2)	0.4028	0.5644
2 years	0.1879 (RF3)	0.1962 (RF2)	0.2521	0.3941
3 years	0.1399 (RF3)	0.1434 (V. Line)	0.1975	0.3337
4 years	0.1239 (RF3)	0.1323 (V. Line)	0.1098	0.3180

offsetting errors yielded a better on-average forecast, a result the MSE test alone does not show.

For the industrial sample, the results, shown in Table VI, are somewhat different. The Rosenberg long-term fundamental beta (RF3) proved superior for each horizon being forecast. Again, however, the errors are sizable: For the three-year horizon, the mean error was 0.37, compared with the mean beta forecast of 1.228.

The implications of these findings for the beta user can be summarized as follows. (1) Longer forecast horizons provided more accurate forecasts than shorter ones. (2) Betas for larger portfolios were more accurately forecast than those for smaller portfolios. (3) The smaller MSEs were associated with the utility sample. (4) Some forecast methods consistently resulted in smaller MSEs. (5) All methods left the possibility of over- and underestimations of troubling magnitude. (6) Different forecasting methods reduced inefficiency more than they reduced the bias or random-error portion of the MSE.

Beta Estimates as Predictors of Return

Practitioners have been using beta, not only to predict beta, but to forecast expected returns. Thus a test of beta to predict beta does not fully resolve the problem facing practitioners. To test returns-forecasting accuracy, beta predictions must be turned into forecast returns and then tested against actual returns garnered by each security over the ensuing one, two, three or four years.

The CAPM was used to turn beta forecasts into forecasts of returns. The difficulty with this approach is that CAPM theory does not provide specific directions for implementation, and academics and practitioners disagree on the proper proxies for the risk-free rate and market return. I therefore used five different combinations of various possible risk-free rate and market return proxies to forecast returns using the given beta forecasts.[10] Table VII details the combinations.

The "perfect foresight" forecast was included to provide a benchmark for evaluating those models requiring forecasts for all three factors. To create the perfect foresight forecast, I assumed that one could accurately forecast the actual return on Treasury bills and the S&P 500 over the horizons of one, two, three and four years.[11]

Results

Table VIII provides the basic results for the five models. For the utility sample, the largest errors occurred with Models 1 and 2, which used a market return from 1926. Unexpectedly, for the more volatile industrials, the use of the longer market return resulted in a slightly smaller MSE. More importantly, it appeared to make little difference whether the rate of return from a short or longer-term Treasury security was used for the risk-free rate.

Note that perfect foresight did improve the results, especially for the utility sample. Even this improvement did little to yield good forecasts, however. Using perfect foresight, the utility mean error was 0.0894, with a mean forecast return of

Table VII Risk-Free Rate and Market Return Proxies

Model	*Risk-Free Rate*	*Market Return**
Perfect Foresight	actual return on 90-day Treasury bills over period being forecast	Actual return on S&P 500 over period being forecast
1	the rate on 90-day Treasury bills	S&P 500 average compound return (1926 to forecast date)
2	the rate on 7-year Treasury bonds	S&P 500 average compound return (1926 to forecast date)
3	the rate on 90-day Treasury bills	S&P 500 average compound return (1950 to forecast date)
4	the rate on 7-year Treasury bonds	S&P 500 average compound return (1950 to forecast date)

*Several investment management organizations have started to provide forecasts for the market return. Although these forecasts were not available for the full period studied, a forecast for the market return from May 1975 to December 1979 provided by Wells Fargo Investment Advisors was tested. The results were similar to the results given by the four basic models for the same period, but the MSEs for all the models tested over this period were smaller. Thus the period over which forecasts are made seems to be more important than how the forecasts are made, in determining the magnitude of the error.

Table VIII Minimum MSE Estimate by Model (three-year horizon)

	Utility Sample		*Industrial Sample*	
Model	*MSE* (source)*	*Mean Forecast*	*MSE (source)*	*Mean Forecast*
PF	0.0080 (OLS)	0.0880	0.0231 (Naive 2)	0.0797
1	0.0104 (Naive 2)	0.0896	0.0251 (RF3)	0.0956
2	0.0105 (Naive 2)	0.0896	0.0252 (RF1)	0.0934
3	0.0098 (Naive 2)	0.1026	0.0255 (OLSB)	0.0936
4	0.0098 (Naive 2)	0.1026	0.0256 (OLS)	0.1036

*The Drexel beta, based on a more limited sample, outperformed all other forecasting methods on the basis of smaller, matched samples.

0.0880. Even though the size of the error varies from stock to stock, the potential exists for a major misforecast. The same is true for the industrial sample, where the mean forecast, using perfect foresight, was 0.0797, with a mean error of 0.1520.

Finally, the accuracy of the forecast depended on the time over which it was tested (a fact of which investment professionals are all too aware), the size of the portfolio, and the length of the horizon. Again, longer periods and larger portfolios yielded the smallest errors.

Conclusion

Forecast accuracy seems to depend more on stability of the equity markets during the time period over which one is forecasting than on any elegantly refined forecast. Using beta to forecast returns compounds forecasting difficulty but, at least in some cases, reaps the benefits of offsetting errors.

The test has provided discouraging results: No method is very accurate. If we cannot develop an accurate beta forecast from history, is beta as a concept practically useless? No, for it is possible that history is a poor proxy for the future, and it is possible that no one has yet forecast beta with the required level of skill. Since the concept is economically logical, and the uses alluring, the arena is open for new and innovative artists. Meanwhile, Caveat Emptor. ■

Footnotes

1. The CAPM is:

$$\tilde{R}_j = \tilde{R}_f + \tilde{\beta}_j(\tilde{R}_m - \tilde{R}_f),$$

where:

$\tilde{R}_j$ = the expected return for the asset, security or portfolio,
$\tilde{R}_f$ = the expected return on a risk-free asset,
$\tilde{R}_m$ = the expected average return on all risky assets, and
$\tilde{\beta}_j$ = a measure of risk—the expected volatility of the asset's or portfolio's returns over time, relative to returns of R_m.

2. See D.R. Harrington, "The Changing Use of

Capital Asset Pricing Model in Utility Regulation," *Public Utilities Fortnightly*, 14 February 1980, pp. 28-30 and "Trends in Capital Asset Pricing Model Use," *Public Utilities Fortnightly*, 13 August 1981, pp. 27-31.

3. S → M. Blume, "Betas and Their Regression Tendencies," *Journal of Finance*, June 1975, pp. 785-796.
4. Barr Rosenberg Associates, *Fundamental Risk Measurement Service* (Berkeley, CA: Barr Rosenberg Associates, October 21, 1977) and Wilshire Associates, Inc., *Capital Equilibrium Statistics* (Santa Monica, CA: Wilshire Associates, Inc., June 30, 1978).
5. The actual betas are estimated as described in Table II and were not adjusted in any way. I was not attempting to form better forecasts from historical data, but to represent the actual relative volatility of the stocks' returns over the period being forecast.
6. The richest version of mean square error is calculated as follows:

$$MSE = \frac{1}{n}\sum_{j=1}^{n}(A_j - P_j)^2 ,$$

where:

n = the number of predictions,
j = the particular stock or portfolio,
A = the actual beta for the security or portfolio, and
P = the predicted beta for the security or portfolio;

or:

$$MSE = (\bar{A}-\bar{P})^2 + (1-\beta_1)^2 S_p^2 + (1-\gamma_{AP}^2)S_A^2 ,$$

where:

$(\bar{A}-\bar{P})^2$ = bias, to indicate whether the average prediction (P) is over or under the average realization (A),

$(1-\beta_1)^2 S_P^2$ = inefficiency, the tendency for errors to be negative for high beta forecasts and positive for low beta forecasts. Where β_1 is the slope coefficient of A regressed on P and S_P^2 is the variance of P, and

$(1-\gamma_{AP}^2)S_A^2$ = random error, where γ_{AP}^2 is the coefficient of determination for the regression of A on P, and S_A^2 is the variance of A on P.

To estimate the one-year MSE, the beta forecast for each stock was compared with its actual beta for the next 12 months. Since forecasts were typically updated monthly, the reported MSE for a stock is the average of the squared errors for each of the 60 forecast dates. The MSE for the sample was the average of the average MSEs for each stock in the sample.

7. Other methods of testing forecast accuracy are reported in G. Hawawini and A. Vora, "Investment Horizon, Diversification and the Efficiency of Alternative Beta Forecasts."
→ M. Blume, "On the Assessment of Risk," *Journal of Finance*, March 1971, pp. 1-10 ar → R.C. Klemkosky and J.D. Martin, "The Adjustment of Beta Forecasts," *Journal of Finance*, September 1975, pp. 1123-1128.
9. The full results are provided in D.R. Harrington, "Predicting Betas and Returns Using Commercially Available Beta Forecasts" (Darden School Working Paper, Darden Graduate School of Business, University of Virginia, Charlottesville, 1982). In addition to the results for the different forecasting methods, the paper reports the results of using other measures of predictive accuracy, including the mean difference.
10. Historical market returns were calculated using data from R.G. Ibbotson and R.A. Sinquefield, *Stocks, Bonds, Bills and Inflation* (Charlottesville, VA: Financial Analysts Research Foundation, 1980). Tests of the accuracy of beta in predicting returns are really a joint test of the accuracy of the beta forecast and forecasts for the market return and the risk-free rate; all could be forecast imperfectly.
11. For example, to develop the January 31, 1974 one-year perfect foresight forecast for any stock, the beta forecast for that stock as of January 31, 1974, the actual return on 90-day Treasury bills and the S&P 500 for the period February 1, 1974 to January 31, 1975, were combined.

BALTIMORE GAS AND ELECTRIC COMPANY

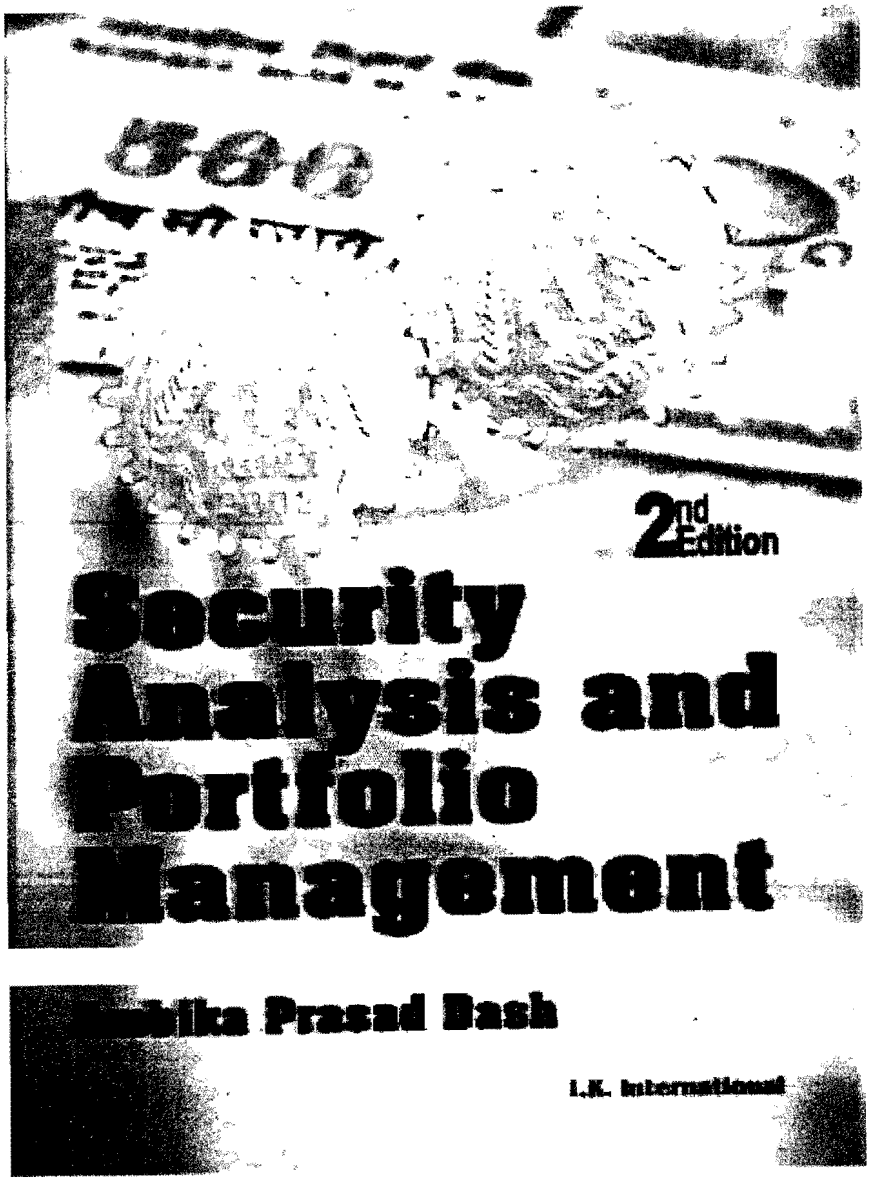
Dividends have been declared for the quarter ending June 30, 1983 at the following rates per share:

Common Stock—71 cents.

Preferred and Preference Stock—at the specified rates.

All are payable July 1, 1983 to holders of record at the close of business on June 10, 1983.

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THE MARKET PORTFOLIO

An investor might choose to invest a proportion of his or her wealth in a portfolio of risky assets with the remainder in cash—earning interest at the risk free rate (or indeed may borrow money to fund his or her purchase of risky assets in which case there is a negative cash weighting). Here, the ratio of risky assets to risk free asset determines overall return—this relationship is clearly linear. It is thus possible to achieve a particular return in one of two ways:

1. By investing all of one's wealth in a risky portfolio,
2. By investing a proportion in a risky portfolio and the remainder in cash (either borrowed or invested).

For a given level of return, however, only one of these portfolios will be optimal (in the sense of lowest risk). Since the risk free asset is, by definition, uncorrelated with any other asset, option 2) will generally have the lower variance and hence be the more efficient of the two.

This relationship also holds for portfolios along the efficient frontier: a higher return portfolio plus cash is more efficient than a lower return portfolio alone for that lower level of return. For a given risk free rate, there is only one optimal portfolio which can be combined with cash to achieve the lowest level of risk for any possible return. This is the market portfolio.

ASSUMPTIONS OF CAPM

- All investors have rational expectations.
- There are no arbitrage opportunities.
- Returns are normally distributed.
- Fixed quantity of assets.
- Perfectly efficient capital markets.
- Separation of financial and production sectors.
- Thus, production plans are fixed.
- Risk-free rates exist with limitless borrowing capacity and universal access.
- The Risk-free borrowing and lending rates are equal.
- No inflation and no change in the level of interest rate exists.
- Perfect information, hence all investors have the same expectations about security returns for any given time period.

from the mean) occur in the market more frequently than the normal distribution assumption would expect.

- The model assumes that the variance of returns is an adequate measurement of risk. This might be justified under the assumption of normally distributed returns, but for general return distributions other risk measures (like coherent risk measures) will likely reflect the investors' preferences more adequately.
- The model does not appear to adequately explain the variation in stock returns. Empirical studies show that low beta stocks may offer higher returns than the model would predict. Some data to this effect was presented as early as a 1969 conference in Buffalo, New York in a paper by Farhan Mukadam, Fischer Black, Michael Jensen, and Myron Scholes. Either that fact is itself rational (which saves the efficient markets hypothesis EMH but makes CAPM wrong), or it is irrational (which saves CAPM, but makes EMH wrong – indeed, this possibility makes volatility arbitrage a strategy for reliably beating the market).
- The model assumes that given a certain expected return investors will prefer lower risk (lower variance) to higher risk and conversely given a certain level of risk will prefer higher returns to lower ones. It does not allow for investors who will accept lower returns for higher risk. Casino gamblers clearly pay for risk, and it is possible that some stock traders will pay for risk as well.
- The model assumes that all investors have access to the same information and agree about the risk and expected return of all assets. (Homogeneous expectations assumption)
- The model assumes that there are no taxes or transaction costs, although this assumption may be relaxed with more complicated versions of the model.

- The market portfolio consists of all assets in all markets, where each asset is weighted by its market capitalization. This assumes no preference between markets and assets for individual investors, and that investors choose assets solely as a function of their risk-return profile. It also assumes that all assets are infinitely divisible as to the amount which may be held or transacted.
- The market portfolio should in theory include all types of assets that are held by anyone as an investment (including works of art, real estate, human capital...) In practice, such a market portfolio is unobservable and people usually substitute a stock index as a proxy for the true market portfolio. Unfortunately, it has been shown that this substitution is not innocuous and can lead to false inferences as to the validity of the CAPM, and it has been said that due to the unobservability of the true market portfolio, the CAPM might not be empirically testable. This was presented in greater depth in a paper by Richard Roll in 1977, and is generally referred to as Roll's Critique. Theories such as the Arbitrage Pricing Theory (APT) have since been formulated to circumvent this problem.

NEW
REGULATORY
FINANCE

Roger A. Morin, PhD

2006
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The pure-play methodology assumes that the pure-play companies have the same business risk as the division, and that, indeed, such pure-play companies can be identified to begin with. One difficulty with the approach is to identify undiversified ''single line of business'' proxy companies. The pool of pure-play companies is shrinking as utilities become more diversified over time. In fact, most companies, including utilities, are not perfectly homogeneous in risk and have multiple lines of business. Moreover, to the extent that the universe of pure-play companies is dwindling, the influence of abnormal observations, or outliers, on the proxy cost of capital estimate increases. Finally, the choice of screening parameters and cutoff points in defining a sample of pure-plays is arbitrary and judgmental. The analyst possesses a fair amount of latitude in defining screening criteria, such as degree of diversification, bond rating, company size, and non-utility business.

Another difficulty is that although the task of applying the pure-play approach to the broader utility segment of a diversified company is practically feasible, the task of applying the method at the more micro level, to each service category or customer class for example, becomes operationally prohibitive. A sample of market-traded firms comparable in risk to each of the individual service categories can be difficult to locate.

Another limitation of the technique is that it ignores the benefits of corporate diversification, that is to say, it assumes that the risk of a total company is simply the sum of the risk of its parts.

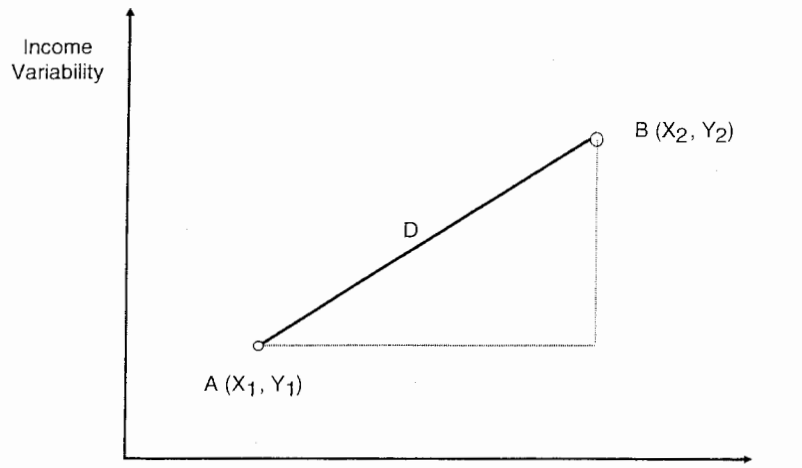
Cluster Analysis

With the Cluster Analysis approach, comparable companies are selected on the basis of ''closeness'' to the targeted entity in terms of such predetermined risk variables as bond rating, after-tax interest coverage, equity ratio, total capital, and variability of operating income. Cluster analysis generates a small group of publicly traded firms that are comparable in risk to a target division or firm from a much larger universe of diverse companies.

After determining the location of each publicly traded firm on a graph whose coordinates are the selected risk measures, closeness can be measured by the length of a straight line between the point associated with the division in question and the points associated with each other firm. This measurement process is illustrated graphically in Figure 7-3 for two risk measures: bond rating and income variability. Firm A has a lower income variability and a higher bond rating than firm B, as shown by points A and B on the graph.

The risk comparability of firms A and B is measured mathematically by the distance on the graph, or closeness, between the two points A and B as follows: If X and Y are two axes on a graph corresponding to two risk

FIGURE 7-3
CLUSTER ANALYSIS
Distance Concept



measures, and there are two points on a graph with coordinates (X_1,Y_1) and (X_2,Y_2), then the distance, D, between the two points is given by:

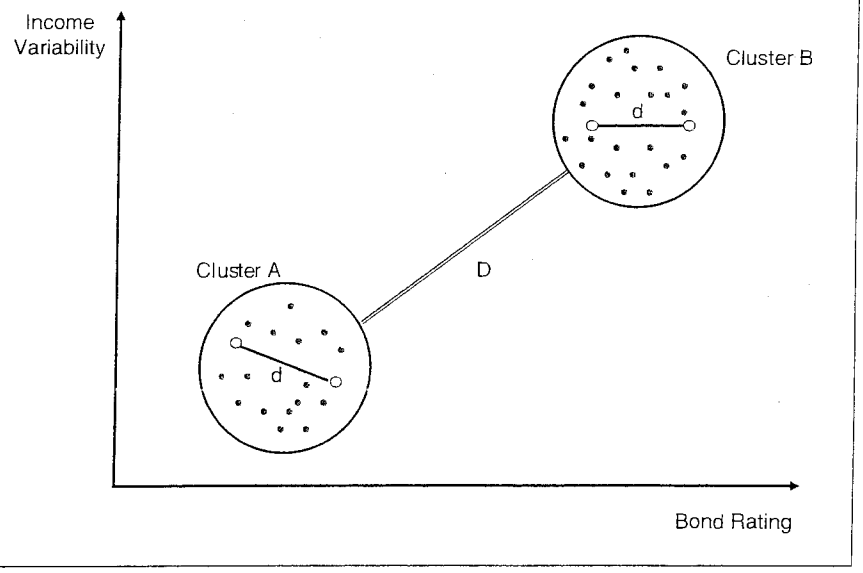
$$D = (X_2 - X_1)^2 + (Y_2 - Y_1)^2 \qquad (7\text{-}2)$$

If the X and Y axes corresponding to the two risk variables are not measured in the same units, it is necessary to convert them to a common measure using the standard deviation of the sample as scale factors.

This process can be easily extended to include as many risk variables as desired. Figure 7-4 displays the cluster analysis in simplified form using two risk variables. Two clusters of companies are shown on the graph in the form of two small circles, one cluster similar in risk to firm A and the other cluster similar in risk to firm B. Firms A and B could just as well be divisions rather than publicly traded firms. Operationally, the clustering criteria must be loose enough so as to include a sufficient number of companies, but also stringent enough so as to provide a comparable group of companies close to the candidate firm. This tradeoff can be seen by comparing the distance, D, between the two clusters and the diameter, d, of the two circles in Figure 7-4.

The distance between clusters has to be significantly larger than the distance within clusters if risk comparability is to be achieved, but d has to be large enough to allow the entry of a sufficient number of companies. A cluster size of 15 to 30 firms is reasonable. Once a cluster of comparable companies is identified for each firm or division, the average DCF and CAPM/ECAPM

FIGURE 7-4
CLUSTER ANALYSIS
Graphical Representation



cost of equity estimates for the publicly traded companies are used as estimates of equity costs for the divisions.

An excellent example of cluster analysis is provided by Vander Weide (1993) who implements the approach in 5 distinct steps. First, an adequate universe of companies is defined with sufficient market data to enable a DCF calculation and sufficient accounting data to compute the risk variables. Second, relevant risk variables that define the overall investment risk of the companies are selected. Vander Weide used the following 5 dimensions of investment risk and their associated measurement:

Risk Dimension	Risk Measurement
Variability	Operating income variability
Growth	Sales growth
Operating risk	Cash flow/assets ratio
Financial risk	Bond rating
Size	Total assets

Third, the risk variables are standardized for each firm because the risk variables are not measured in the same units. It is thus necessary to convert them to a common measure using the standard deviation of the sample as scale factors. Fourth, redundancies are eliminated by checking for the degree of correlation between each pair of risk variables. Highly correlated risk

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Earnings Growth: The Two Percent Dilution
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Earnings Growth: The Two Percent Dilution

William J. Bernstein and Robert D. Arnott

Two important concepts played a key role in the bull market of the 1990s. Both represent fundamental flaws in logic. Both are demonstrably untrue. First, many investors believed that earnings could grow faster than the macroeconomy. In fact, earnings must grow slower than GDP because the growth of existing enterprises contributes only part of GDP growth; the role of entrepreneurial capitalism, the creation of new enterprises, is a key driver of GDP growth, and it does not contribute to the growth in earnings and dividends of existing enterprises. During the 20th century, growth in stock prices and dividends was 2 percent less than underlying macroeconomic growth. Second, many investors believed that stock buybacks would permit earnings to grow faster than GDP. The important metric is not the volume of buybacks, however, but net buybacks—stock buybacks less new share issuance, whether in existing enterprises or through IPOs. We demonstrate, using two methodologies, that during the 20th century, new share issuance in many nations almost always exceeded stock buybacks by an average of 2 percent or more a year.

The bull market of the 1990s was largely built on a foundation of two immense misconceptions. Whether their originators were knaves or fools is immaterial; the errors themselves were, and still are, important. Investors were told the following:

1. With a technology revolution and a "new paradigm" of low payout ratios and internal reinvestment, earnings will grow faster than ever before. Real growth of 5 percent will be easy to achieve.

Like the myth of Santa Claus, this story is highly agreeable but is supported by neither observable current evidence nor history.

2. When earnings are not distributed as dividends and not reinvested into stellar growth opportunities, they are distributed back to shareholders in the form of stock buybacks, which are a vastly preferable way of distributing company resources to the shareholders from a tax perspective.

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Note: This article was accepted for publication prior to Mr. Arnott's appointment as editor of the Financial Analysts Journal.

True, except that over the long term, net buybacks (that is, buybacks minus new issuance and options) have been reliably negative.

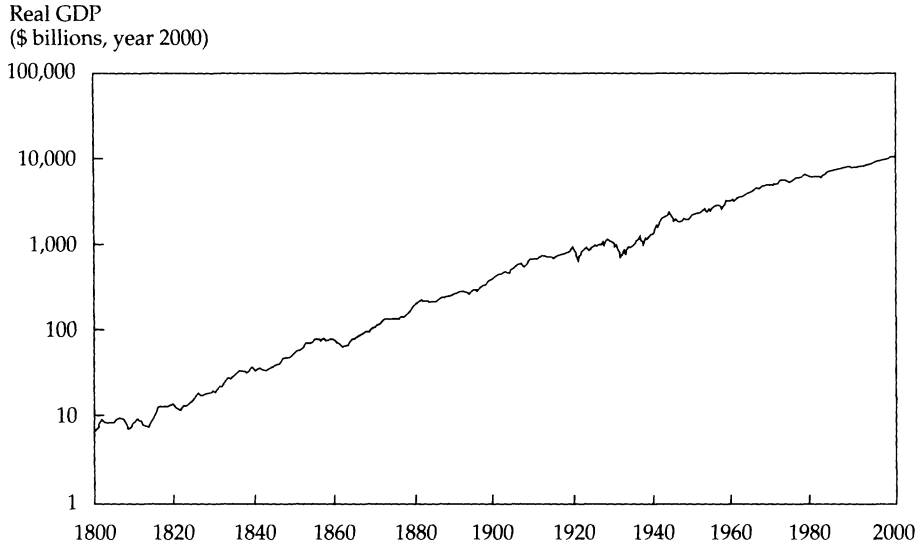
The vast majority of the institutional investing community has believed these untruths and has acted accordingly. Whether these tales are lies or merely errors, our implied indictment of these misconceptions is a serious one—demanding data. This article examines some of the data.

Big Lie #1: Rapid Earnings Growth

In the past two centuries, common stocks have provided a sizable risk premium to U.S. investors: For the 200 years from 1802 through 2001 (inclusive), the returns for stocks, bonds, and bills were, respectively, 8.42 percent, 4.88 percent, and 4.21 percent. In the most simplistic terms, the reason is obvious: A bill or a bond is a promise to pay interest and principal, and as such, its upside is sharply limited. Shares of common stock, however, are a claim on the future dividend stream of the nation's businesses. While the investor in fixed-income securities is receiving a modest fixed trickle from low-risk securities, the shareholder is the beneficiary of the ever-increasing fruits of innovation-driven economic growth.

Viewed over the decades, the powerful U.S. economic engine has produced remarkably steady growth. **Figure 1** plots the real GDP of the United States since 1800 as reported by the U.S. Department

Figure 1. Real U.S. GDP Growth, 1800–2000



of Commerce. From that year to 2000, the economy as measured by real GDP, averaging about 3.7 percent growth a year, has grown a thousandfold. The long-term uniformity of economic growth demonstrated in Figure 1 is both a blessing and a curse. To know that real U.S. GDP doubles every 20 years is reassuring. But it is also a dire warning to those predicting a rapid acceleration of economic growth from the computer and Internet revolutions. Such extrapolations of technology-driven increased growth are painfully oblivious to the broad sweep of scientific and financial history, in which innovation and change are constant and are neither new to the current generation nor unique.

The impact of recent advances in computer science pales in comparison with the technological explosion that occurred between 1820 and 1855. This earlier era saw the deepest and most far reaching technology-driven changes in everyday existence ever seen in human history. The changes profoundly affected the lives of those from the top to the bottom of the social fabric in ways that can scarcely be imagined today. At a stroke, the speed of transportation increased tenfold. Before 1820, people, goods, and information could not move faster than the speed of the horse. Within a generation, journeys that had previously taken weeks and months involved an order of magnitude less time, expense, danger, and discomfort. Moreover, important information that previously required the same long journeys could now be transmitted instantaneously.

The average inhabitant of 1820 would have found the world 35 years later incomprehensible, whereas a person transported from 1967 to 2002 would have little trouble understanding the intervening changes in everyday life. From 1820 to 1855, the U.S. economy grew sixfold, four times the growth seen in the "tech revolution" of the past 35 years. More importantly, a close look at the right edge of Figure 1—the last decade of the 20th century—shows that the acceleration in growth during the "new paradigm" of the tech revolution of the 1990s was negligible when measured against the broad sweep of history.

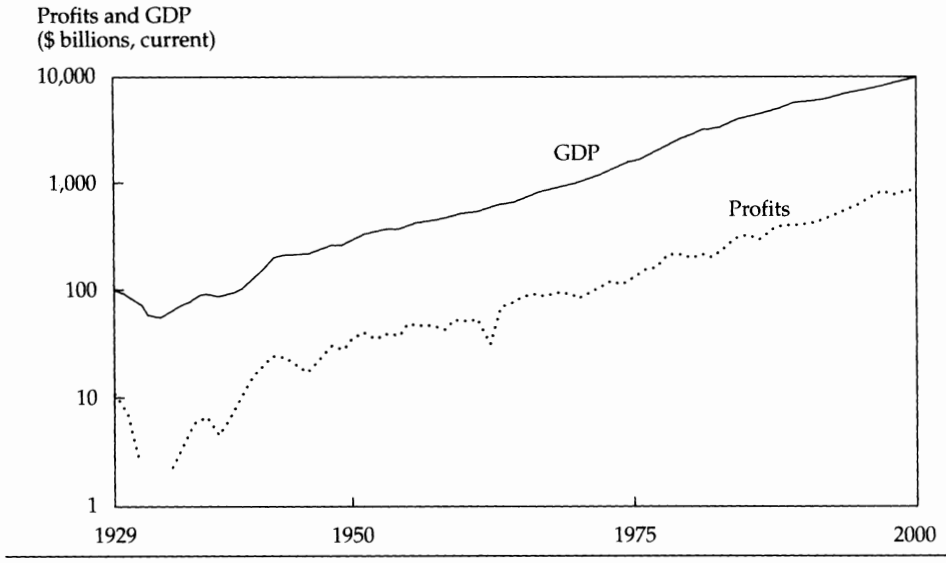
The relatively uniform increase in GDP shown in Figure 1 suggests that corporate profits experienced a similar uniformity in growth. And, indeed, **Figure 2** demonstrates that, except for the Great Depression, during which overall corporate profits briefly disappeared, nominal aggregate corporate earnings growth has tracked nominal GDP growth, with corporate earnings remaining constant at 8–10 percent of GDP since 1929. The trend growth in corporate profits shown in Figure 2 is nearly identical, within a remarkable 20 bps, to the trend growth in GDP.[1]

Cannot stock prices also, then, be assumed to grow at the same rate as GDP? After all, a direct relationship between aggregate corporate profits and GDP has existed since at least 1929. The problem with this assumption is that per share earnings and dividends keep up with GDP *only if* no new shares are created. Entrepreneurial capitalism, however, creates a "dilution effect" through new enterprises and new stock in existing enterprises. So, per share earnings and dividends grow considerably slower than the economy.

In fact, since 1871, real stock prices have grown at 2.48 percent a year—versus 3.45 percent a year for GDP. Despite rising price–earnings ratios, we observe a "slippage" of 97 bps a year between stock

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Figure 2. Nominal U.S. Corporate Profits and GDP, 1929–2000



prices and GDP. The true degree of slippage is much higher because almost half of the 2.48 percent rise in real stock prices after 1871 came from a substantial upward revaluation. The highly illiquid industrial stocks of the post–Civil War period rarely sold at more than 10 times earnings; often, they sold for multiples as low as 3 or 4 times earnings. These closely held industrial stocks gave way to instantly and cheaply tradable common shares, which today are priced nearly an order of magnitude more dearly.

Until the bull market of 1982–1999, the average stock was valued at 12–16 times earnings and 20–25 years' worth of dividends. By the peak of the bull market, both figures had tripled. Although the bull market was compressed into 18 years of the total period under discussion, this tripling of valuation levels was worth almost 100 bps a year—even when amortized over the full 130-year span. Thus, per share earnings and dividends grew 2 percent a year slower than the macroeconomy. If aggregate earnings and dividends grew as quickly as the economy while per share earnings and dividends were growing at an average of 2 percent a year slower, then shareholders have seen a slippage or dilution of 2 percent a year in the per share growth of earnings and dividends.

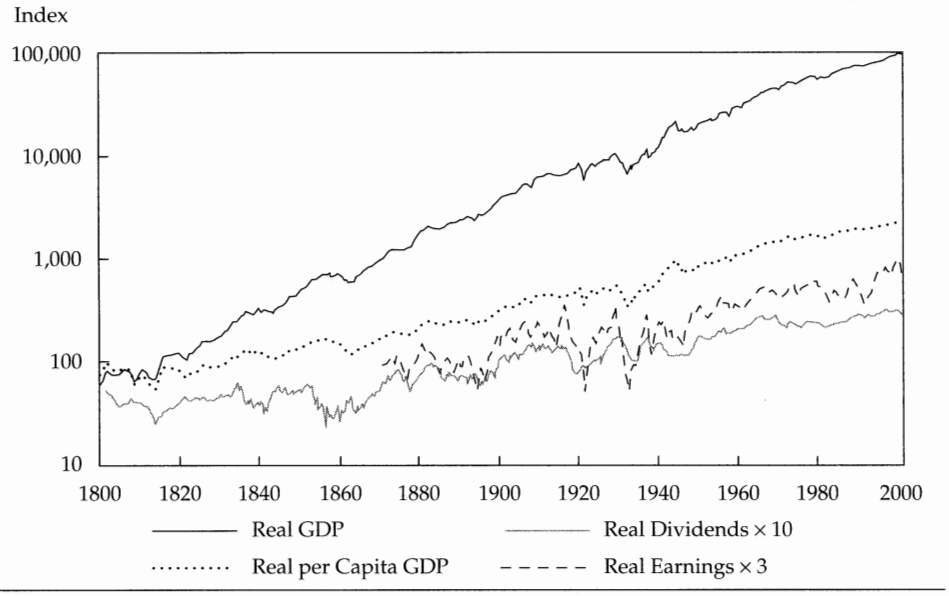
The dilution is the result of the net creation of shares as existing and new companies capitalize their businesses with equity. An often overlooked, but unsurprising, fact is that more than half of aggregate economic growth comes from new ideas and the creation of new enterprises, not from the growth of established enterprises. Stock investments can participate only in the growth of established businesses; venture capital participates only in the new businesses. The same investment capital cannot be simultaneously invested in both.

"Intrapreneurial capitalism," or the creation of new enterprises within existing companies, is a sound engine for economic growth, but it does not supplant the creation of new enterprises. Nor does it reduce the 2 percent gap between economic growth and earnings and dividend growth.

Note also that earnings and dividends grow at a pace very similar to that of per capita GDP (with some slippage associated with the "entrepreneurial" stock rewards to management). Consider that per capita GDP is a measure of productivity (with slight differences for changes in the work force) and aggregate economic wealth per capita can grow only in close alignment with productivity growth. Productivity growth is also the key driver of per capita income and of per share earnings and dividends. Accordingly, no one should be surprised that *per capita GDP, per capita income, per share earnings, and per share dividends—all grow in reasonably close proportion to productivity growth.*

If earnings and dividends grow faster than productivity, the result is a migration from return on labor to return on capital; if earnings and dividends grow more slowly, by a margin larger than the stock awards to management, then the economy migrates from rewarding capital to rewarding labor. Either way, such a change in the orientation of the economy cannot continue indefinitely. **Figure 3** demonstrates the close link between the growth of real corporate earnings and dividends and the growth of real per capita GDP; note that all of these measures exhibit growth far below the growth of real GDP.

Figure 3. Link of U.S. Earnings and Dividends to Economic Growth, 1802–2001



Note: Real GDP, real per capita GDP, and real stock prices were all constructed so that the series are on a common basis of January 1802 = 100.

A Global Laboratory

Is the United States unique? For an answer, we compared dividend growth, price growth, and total return with data on GDP growth and per capita GDP growth for the 16 countries covered by Dimson, Marsh, and Staunton (2002) spanning the 20th century.[2] The GDP data came from Maddison's (1995, 2001) world GDP survey for 1900–1998 and International Finance Corporation data for 1998–2000. The interrelationships of the data shown in **Table 1** are complex:

- The first column contains the real return (in U.S. dollars) of each national stock market.
- The second is real per share dividend growth.
- The third is real aggregate GDP growth for each nation (measured in U.S. dollars).
- The fifth is growth of real per capita GDP (measured in U.S. dollars).
- Thus, the fourth column measures the gap between growth in per share dividends and aggregate GDP—an excellent measure of the leakage that occurs between macroeconomic growth and the growth of stock prices.
- The last column represents the gap between the growth in per share dividends and per capita GDP.

For the full 16-nation sample in Table 1, the average gap between dividend growth and the growth in aggregate GDP is a startling 3.3 percent. The annual shortfall between dividend growth and per capita GDP growth is still 2.4 percent.

The 20th century was not without turmoil. Therefore, we divided the 16 nations into two groups according to the degree of devastation visited upon them by the era's calamities. The first group suffered substantial destruction of the countries' productive physical capital at least once during the century; the second group did not.

The nine nations in Group 1—Belgium, Denmark, France, Germany, Italy, Japan, the Netherlands, Spain, and the United Kingdom—were devastated by one or both of the two world wars or by civil war. The remaining seven—Australia, Canada, Ireland, South Africa, Sweden, Switzerland, and the United States—suffered relatively little direct damage. Even in this fortunate group, Table 1 shows dividend growth that is 2.3 percent less than GDP growth and 1.1 percent less than per capita GDP growth, on average. These gaps are close to the 2.7 percent and 1.4 percent figures observed in the United States during the 20th century.

The data for nations that were devastated during World Wars I and II and the Spanish Civil War are even more striking: The good news is that the economies in Group 1 repaired the devastations wrought by the 20th century; they enjoyed overall GDP growth and per capita GDP growth that rivaled the growth of the less-scarred Group 2 nations. The bad news is that the same cannot be said for per share equity performance; a 4.1 percent slippage occurred between the growth of their economies and per share corporate payouts. The

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Table 1. Dilution of GDP Growth as It Flows Through to Dividend Growth: 16 Countries, 1900–2000

Country	Constituents of Real Stock Returns		Real GDP Growth	Dilution in Dividend Growth (vis-à-vis GDP growth)	Real per Capita GDP Growth	Dilution in Dividend Growth (vis-à-vis per capita GDP growth)
	Real Return	Dividend Growth				
Australia	7.5%	0.9%	3.3%	–2.4%	1.6%	–0.7%
Belgium	2.5	–1.7	2.2	–3.9	1.8	–3.5
Canada	6.4	0.3	4.0	–3.7	2.2	–1.9
Denmark	4.6	–1.9	2.7	–4.6	2.0	–3.9
France	3.6	–1.1	2.2	–3.3	1.8	–2.9
Germany	3.6	–1.3	2.6	–3.9	1.6	–2.9
Ireland	4.8	–0.8	2.3	–3.1	2.1	–2.9
Italy	2.7	–2.2	2.8	–5.0	2.2	–4.4
Japan	4.2	–3.3	4.2	–7.5	3.1	–6.4
Netherlands	5.8	–0.5	2.8	–3.3	1.7	–2.2
South Africa	6.8	1.5	3.4	–1.9	1.2	0.3
Spain	3.6	–0.8	2.7	–3.5	1.9	–2.7
Sweden	7.6	2.3	2.5	–0.2	2.0	0.3
Switzerland	5.0	0.1	2.5	–2.4	1.7	–1.6
United Kingdom	5.8	0.4	1.9	–1.5	1.4	–1.0
United States	6.7	0.6	3.3	–2.7	2.0	–1.4
Full-sample average	5.1	–0.5	2.8	–3.3	1.9	–2.4
War-torn Group 1 average	4.0	–1.4	2.7	–4.1	1.9	–3.3
Non-war-torn Group 2 average	6.4	0.7	3.0	–2.3	1.8	–1.1

creation of new enterprises in the wake of war was an even more important engine for economic recovery than in the Group 2 nations.

Thus, in Group 2 "normal nations" (i.e., those untroubled by war, political instability, and government confiscation of wealth), the natural ongoing capitalization of new technologies apparently produces a net dilution of outstanding shares of slightly more than 2 percent a year. The Group 1 nations scarred badly by war represent a more fascinating phenomenon; they can be thought of as experiments of nature in which physical capital is devastated and must be rebuilt. Fortunately, destroying a nation's intellectual, cultural, and human capital is much harder than destroying its economy; within little more than a generation, the GDP and per capita GDP of war-torn nations catch up with, and in some cases surpass, those of the undamaged nations. Unfortunately, the effort requires a high rate of equity recapitalization, which is reflected in the substantial dilution seen in Table 1 for the war-torn countries. This recapitalization savages existing shareholders.

In short, the U.S. experience was not unique. Around the world, every one of these countries except Sweden experienced dividend growth sharply slower than GDP growth, and only two countries experienced dividend growth even slightly faster than per capita GDP growth. The U.S. experience was better than most and was similar to that of the other nations that were not devastated by war.

The data for the individual countries in Table 1 show that the average real growth in dividends was negative for most countries. It also shows that dilution of GDP growth (the fourth column) was substantial for all the countries studied and that dilution of per capita GDP growth (the last column) was substantial for most countries but fit dividend growth with much less "noise" than did the dilution of overall GDP growth.

This analysis has disturbing implications for "paradigmistas" convinced of the revolutionary nature of biotechnology, Internet, and telecommunications/broadband companies. A rapid rate of technological change may, in effect, turn "normal" Group 2 nations into strife-torn Group 1 nations: An increased rate of obsolescence effectively destroys the economic value of plant and equipment as surely as bombs and bullets, with the resultant dilution of per share payouts happening much faster than the technology-driven acceleration of economic growth—if such acceleration exists. How many of the paradigmistas truly believe that the tech revolution will benefit the shareholders of existing enterprises remotely as much as it can benefit the entrepreneurs creating the new enterprises that make up the vanguard of this revolution?

Whatever the true nature of the interaction of technological progress and per share earnings, dividends, and prices, it will come as an unpleasant surprise to many that even in the Group 2 nations, average real per share dividend growth was only 0.66 percent a year (rounded in Table 1 to 0.7 percent); for the war-torn Group 1 nations, it was disturbingly negative.

In short, the equity investor in a nation blessed by prolonged peace cannot expect a real return greatly in excess of the much-maligned dividend yield; the investor cannot expect to be rescued by more rapid economic growth. Not only is outsized economic growth unlikely to occur, but even if it does, its benefits will be more than offset by the dilution of the existing investor's ownership interest by technology-driven increased capital needs.

Big Lie #2: Stock Buybacks

Stock buybacks are attractive to companies and beneficial to investors. They are a tax-advantaged means of providing a return on shareholder capital and preferable to dividends, which are taxed twice. Buybacks have enormous appeal. But contrary to popular belief, they did not occur in any meaningful way in the 1990s.

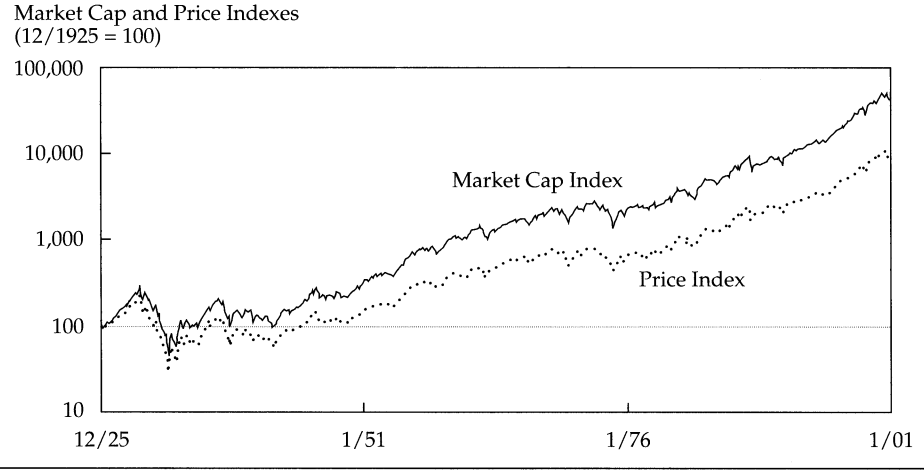
To support this contention, we begin with a remarkably simple measure of slippage in per share earnings and dividend growth: the ratio of the proportionate increase in market capitalization to the proportionate increase in stock price. For example, if over a given period, the market cap increases by a factor of 10 and the cap-weighted price index increases by a factor of 5, a 100 percent net share issuance has taken place in the interim. Formally,

$$\text{Net dilution} = \left(\frac{1+c}{1+r}\right) - 1,$$

where c is capitalization increase and r is price return. This relationship has the advantage of factoring out valuation changes, which are embedded in both the numerator and denominator, and neutralizing the impact of stock splits. Furthermore, it holds only for universal market indexes, such as the CRSP 1–10 or the Wilshire 5000, because less inclusive indexes can vary the ratio simply by adding or dropping securities. **Figure 4** contains plots of the total market cap and price indexes of the CRSP 1–10 beginning at the end of 1925.

The CRSP data contained NYSE-listed stocks until 1962. Even the CRSP data, however, can involve adding securities: CRSP added the Amex stocks in July 1962 and the Nasdaq stocks in July 1972, which created artificial discontinuities on those dates. The adjustment for these shifts is evident in **Figure 5**, for which we held the dilution ratio constant during the two months in question.[3] Note how market cap slowly and gradually pulls away from market price. The gap does not look large in Figure 4, but by the end of 2001, the cap index had grown 5.49 times larger than the price index, suggesting that for every share of stock extant in 1926, 5.49 shares existed in late 2001. The implication is that net new share issuance occurred at an annualized rate of 2.3 percent a year. Note that this rate is identical to the average dilution for non-war-torn countries during the 20th century given in Table 1. To give a better idea of how this dilution has proceeded over the past 75 years, Figure 5 provides a dilution index, defined as the ratio of capitalization growth to price index growth.

Figure 4. CRSP 1–10 Market Cap and Price Indexes, 31 December 1925–June 2002



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Figure 5. Cumulative Excess Growth of Market Cap Relative to Price Index, 31 December 1925 through June 2002

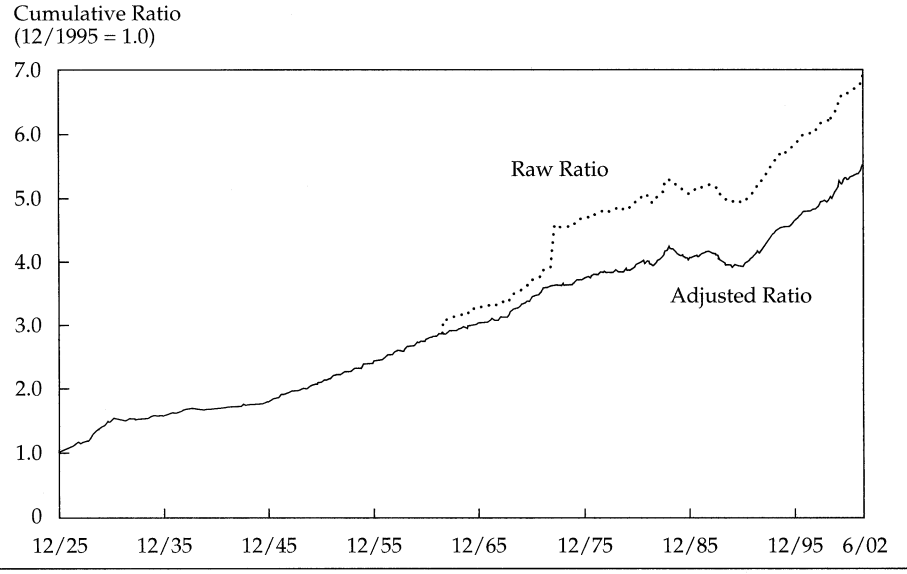
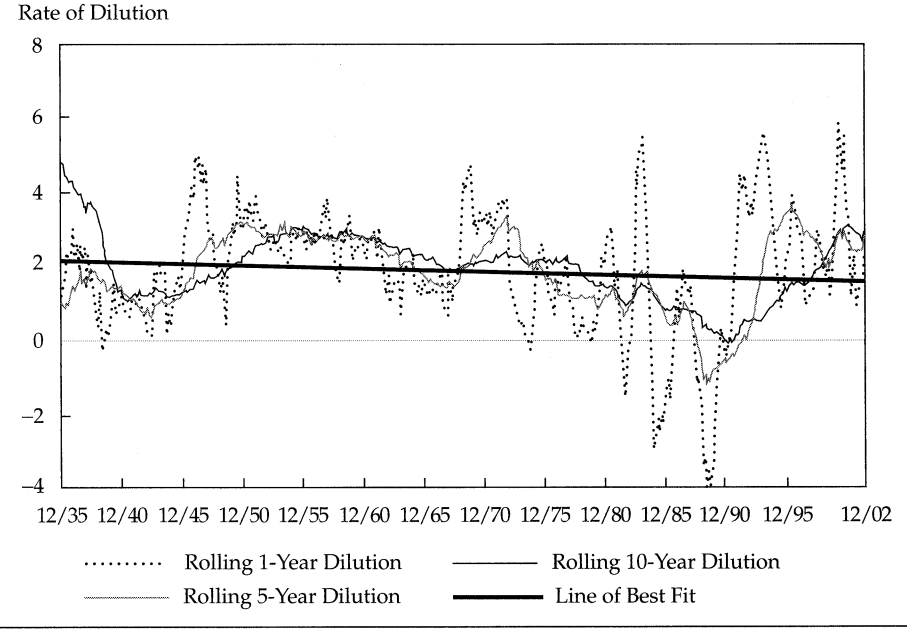


Figure 5 traces the growth in the ratio of the capitalization of the CRSP 1–10 Index as compared with the market-value-weighted price appreciation of these same stocks. The fact that this line rises nearly monotonically shows clearly that new-share issuance almost always sharply exceeds stock buybacks. The notable exception occurred in the late 1980s, when buybacks modestly outpaced new share issuance (evident from the fact that the line falls slightly during these "Milken years"). This development probably played a key role in precipitating the popular illusion that buybacks were replacing dividends. For a time, they did. But that stock buybacks were an important force in the 1990s is simply a myth. And belief in the myth may have been an important force in the bull market of the 1990s.

Figure 6 shows the rolling 1-year, 5-year, and 10-year dilution effect on existing equity shareholders as a consequence of a growth in the aggregate

Figure 6. Annualized Rate of Shareholder Dilution, 31 December 1935 through June 2002



supply of equity shares. Keep in mind that every 1 percent rise in equity capital is a 1 percent rise in market cap in which existing shareholders did not (could not) participate. Aside from the 1980s, this dilution effect on shareholders was essentially never negative—not even on a one-year basis. One can see how the myth of stock buybacks gained traction after the 1980s; even the 10-year average rate of dilution briefly dipped negative in the late 1980s. But then, during the late 1990s, stock buybacks were outstripped by new share issuance at a pace that was only exceeded in the IPO binge of 1926–1930. These conclusions hold true whether one is looking at net new share issuance on a 1-year, 5-year, or 10-year basis.

Those who argue that stock buybacks will allow future earnings growth to exceed GDP growth can draw scant support from history. Investors did see enormous earnings growth, far faster than real economic growth, from 1990 to 2000. But Figure 3 shows how tiny that surge of growth was in the context of 130 years of earnings history. Much of the earnings surge of the 1990s was dubious, at best.

The Eye of the Storm?

The big question today is whether the markets are likely to rebound into a new bull market or have merely been in the eye of the storm. We think the markets are in the eye.

The rapid earnings growth of the 1990s, which many pointed to as "proof" of a new paradigm, had several interesting characteristics:

1. A trough in earnings in the 1990 recession transformed into a peak in earnings in the 2000 bubble. Measuring growth from trough to peak is an obvious error; extrapolating that growth is even worse. This decade covered a large chunk of the careers of most people on Wall Street, many of whom have come to believe that earnings can grow very fast for a very long time. Part of conventional wisdom now is that earnings growth can outstrip macroeconomic growth.
2. Influenced by the new paradigm, analysts frequently ignored write-offs to focus increasingly on operating earnings. This practice is acceptable if write-offs are truly "extraordinary items," but it is not acceptable if write-offs become a recurring annual or biannual event, as was commonplace in the 1990s. Furthermore, what are extraordinary items for a single company are entirely ordinary for the economy as a whole. In some companies and some sectors, write-offs are commonplace. The focus on operating earnings for the broad market averages is misguided at best and deceptive at worst.
3. Those peak earnings of 1999–2000 consisted of three dubious components. The first is an underrecognition of the impact of stock options, which various Wall Street strategists estimated at 10–15 percent of earnings. The second is pension expense (or pension "earnings") based on assumptions of a 9.5 percent return, which were realistic then but are no longer; this factor pumped up earnings by approximately 15 percent at the peak and 20–30 percent from current depressed levels. The third component is Enron-style "earnings management," which various observers have estimated to be 5–10 percent of the peak earnings. (We suspect this percentage will turn out to be conservative.)

If these three sources of earnings overstatement (aggressive pension accounting, failure to expense management stock options, and outright fraud) are removed, the $54 peak earnings per share for the S&P 500 Index in 2000 turn out to be closer to $36. This figure implies normalized earnings a notch lower still. If the normalized earnings for the S&P 500 are in the $30–$36 range, as we suspect is the case, then the market at mid-year 2003 was still at a relatively rich 27–32 times normalized earnings. Using Shiller's (2000) valuation model (real S&P 500 level divided by 10-year average of real reported earnings) confirms this analysis. Shiller's model pegs the current multiple at nearly 30 times normalized earnings in mid-2003.

In principle, several conditions could allow earnings growth to exceed GDP growth. Massive stock buybacks are one. But we have demonstrated that buybacks in the 20th century were far more smoke than fire. Buybacks have been much touted as the basis for sustained earnings growth at unprecedented rates, but they simply do not show up in the data on market capitalization relative to market index price levels. Cross-holdings could also offer an interesting complication. But again, their impact does not show up in the objective shareholder dilution data. We have demonstrated that buybacks and cross-holdings do not yet show any signs of offsetting the historical 2 percent dilution, but the exploration of the possible impact of buybacks and cross-holdings is beyond the scope of this study.

Conclusion

Expected stock returns would be agreeable if dividend growth, and thus price growth, proceeded at the same rate as, or a higher rate than, aggregate economic growth. Unfortunately, dividends do not

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grow at such a rate: When we compared the Dimson et al. 20th century dividend growth series with aggregate GDP growth, we found that even in nations that were not savaged by the century's tragedies, dividends grew 2.3 percent more slowly, on average, than GDP. Similarly, by measuring the gap between the growth of market cap and share prices in the CRSP database, we found that between 1926 and the present, a 2.3 percent net annual dilution has occurred in the outstanding number of shares in the United States.

Two independent analytical methods point to the same conclusion: In stable nations, a roughly 2 percent net annual creation of new shares—the Two Percent Dilution—leads to a separation between long-term economic growth and long-term growth in dividends per share, earnings per share, and share price.

The markets are probably in the eye of a storm and can expect further turmoil as the rest of the storm passes over. If normalized S&P 500 earnings are $30–$36 per share, if payout ratios on those normalized earnings are at the low end of the historical range (implying lower-than-normal future earnings growth), if normal earnings growth is really only about 1 percent a year above inflation, if stock buybacks have been little more than an appealing fairy tale, if the credibility of earnings is at an all-time low, and if demographics suggest Baby Boomer dis-saving in the next 20 years, then we have a problem.

The authors would like to acknowledge the help, suggestions, and encouragement of Cliff Asness, Peter Bernstein, and Max Darnell.

Notes

1. In calculating "trend growth," we used a loglinear line of best fit to minimize the impact of distortions from an unusually high or low starting or ending date. The loss years of 1932 and 1933 were excluded because of loglinear calculation.
2. The Dimson et al. book is a masterwork. If you do not have a copy, you should.
3. We assumed the dilution factor to be zero in those two months. If a massive stock buyback or a massive new IPO occurred during one of these two months, we may have missed it. But net buybacks or net new share issuance during months in which the "index" saw a major reconstitution would be difficult to measure.

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Equity analysts: Still too bullish

After almost a decade of stricter regulation, analysts' earnings forecasts continue to be excessively optimistic.

Marc H. Goedhart, Rishi Raj, and Abhishek Saxena

No executive would dispute that analysts' forecasts serve as an important benchmark of the current and future health of companies. To better understand their accuracy, we undertook research nearly a decade ago that produced sobering results. Analysts, we found, were typically overoptimistic, slow to revise their forecasts to reflect new economic conditions, and prone to making increasingly inaccurate forecasts when economic growth declined.[1]

Alas, a recently completed update of our work only reinforces this view—despite a series of rules and regulations, dating to the last decade, that were intended to improve the quality of the analysts' long-term earnings forecasts, restore investor confidence in them, and prevent conflicts of interest.[2] For executives, many of whom go to great lengths to satisfy Wall Street's expectations in their financial reporting and long-term strategic moves, this is a cautionary tale worth remembering.

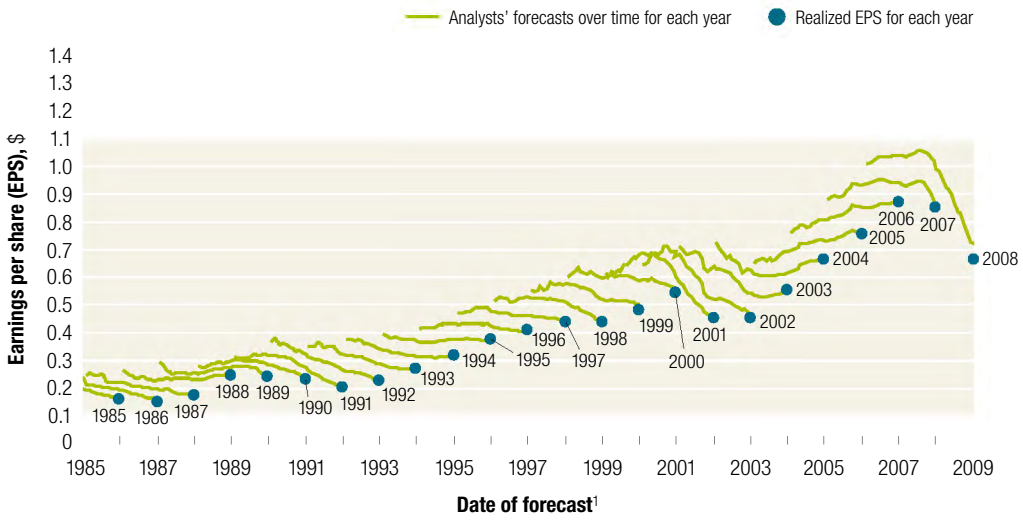
Exceptions to the long pattern of excessively optimistic forecasts are rare, as a progression of consensus earnings estimates for the S&P 500 shows (Exhibit 1). Only in years such as 2003 to 2006, when strong economic growth generated actual earnings that caught up with earlier predictions, do forecasts actually hit the mark.

Exhibit 1

Off the mark

With few exceptions, aggregate earnings forecasts exceed realized earnings per share.

S&P 500 companies



[1]Monthly forecasts.

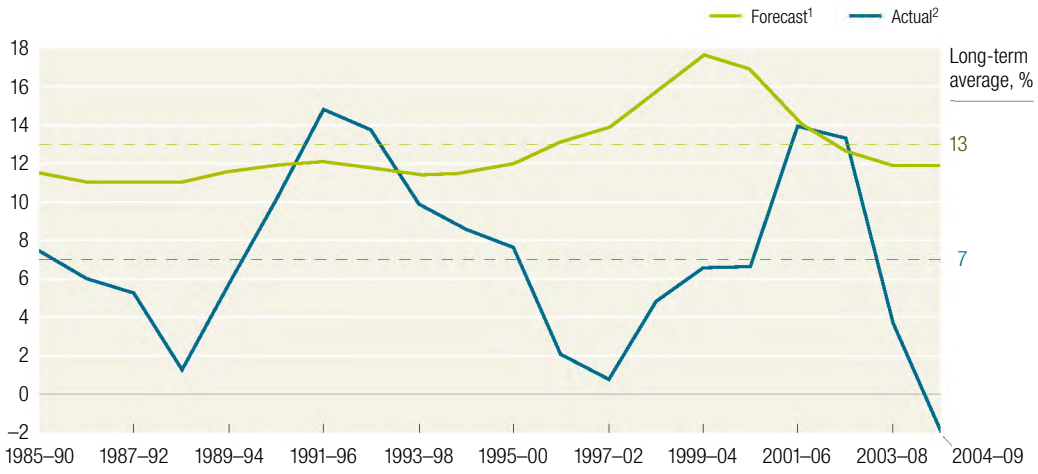
Source: Thomson Reuters I/B/E/S Global Aggregates; McKinsey analysis

Exhibit 2

Overoptimistic

Actual growth surpassed forecasts only twice in 25 years—both times during the recovery following a recession.

Earnings growth for S&P 500 companies, 5-year rolling average, %



[1]Analysts' 5-year forecasts for long-term consensus earnings-per-share (EPS) growth rate. Our conclusions are same for growth based on year-over-year earnings estimates for 3 years.
[2]Actual compound annual growth rate (CAGR) of EPS; 2009 data are not yet available, figures represent consensus estimate as of Nov 2009.

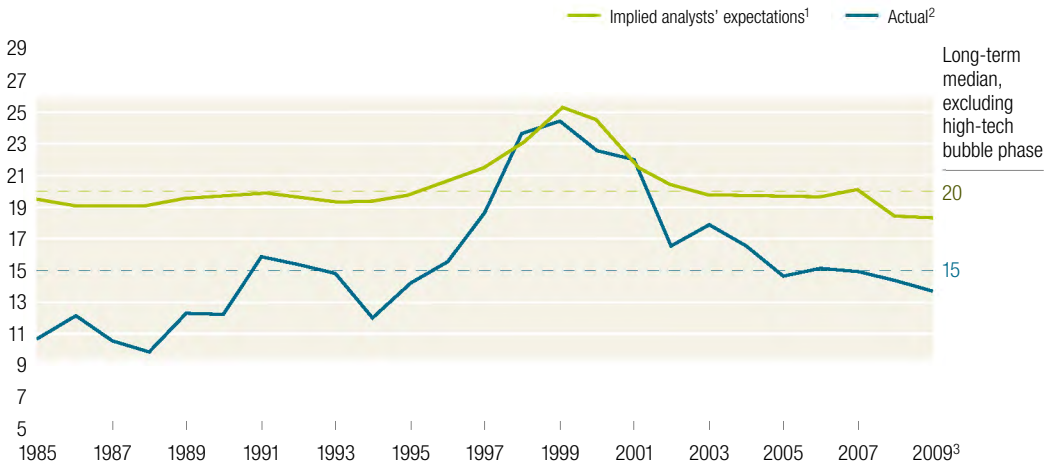
Source: Thomson Reuters I/B/E/S Global Aggregates; McKinsey analysis

Exhibit 3

Less giddy

Capital market expectations are more reasonable.

Actual P/E ratio vs P/E ratio implied by analysts' forecasts, S&P 500 composite index



[1]P/E ratio based on 1-year-forward earnings-per-share (EPS) estimate and estimated value of S&P 500. Estimated value assumes: for first 5 years, EPS growth rate matches analysts' estimates then drops smoothly over next 10 years to long-term continuing-value growth rate; continuing value based on growth rate of 6%; return on equity is 13.5% (long-term historical median for S&P 500), and cost of equity is 9.5% in all periods.
[2]Observed P/E ratio based on S&P 500 value and 1-year-forward EPS estimate.
[3]Based on data as of Nov 2009.

Source: Thomson Reuters I/B/E/S Global Aggregates; McKinsey analysis

This pattern confirms our earlier findings that analysts typically lag behind events in revising their forecasts to reflect new economic conditions. When economic growth accelerates, the size of the forecast error declines; when economic growth slows, it increases.[3] So as economic growth cycles up and down, the actual earnings S&P 500 companies report occasionally coincide with the analysts' forecasts, as they did, for example, in 1988, from 1994 to 1997, and from 2003 to 2006.

Moreover, analysts have been persistently overoptimistic for the past 25 years, with estimates ranging from 10 to 12 percent a year,[4] compared with actual earnings growth of 6 percent.[5] Over this time frame, actual earnings growth surpassed forecasts in only two instances, both during the earnings recovery following a recession (Exhibit 2). On average, analysts' forecasts have been almost 100 percent too high.[6]

Capital markets, on the other hand, are notably less giddy in their predictions. Except during the market bubble of 1999–2001, actual price-to-earnings ratios have been 25 percent lower than implied P/E ratios based on analyst forecasts (Exhibit 3). What's more, an actual forward P/E ratio[7] of the S&P 500 as of November 11, 2009—14—is consistent with long-term earnings growth of 5 percent.[8] This assessment is more

reasonable, considering that long-term earnings growth for the market as a whole is unlikely to differ significantly from growth in GDP,[9] as prior McKinsey research has shown.[10] Executives, as the evidence indicates, ought to base their strategic decisions on what they see happening in their industries rather than respond to the pressures of forecasts, since even the market doesn't expect them to do so.

[1] Marc H. Goedhart, Brendan Russell, and Zane D. Williams, "Prophets and profits," mckinseyquarterly.com, October 2001.
[2] US Securities and Exchange Commission (SEC) Regulation Fair Disclosure (FD), passed in 2000, prohibits the selective disclosure of material information to some people but not others. The Sarbanes–Oxley Act of 2002 includes provisions specifically intended to help restore investor confidence in the reporting of securities' analysts, including a code of conduct for them and a requirement to disclose knowable conflicts of interest. The Global Settlement of 2003 between regulators and ten of the largest US investment firms aimed to prevent conflicts of interest between their analyst and investment businesses.
[3] The correlation between the absolute size of the error in forecast earnings growth (S&P 500) and GDP growth is –0.55.
[4] Our analysis of the distribution of five-year earnings growth (as of March 2005) suggests that analysts forecast growth of more than 10 percent for 70 percent of S&P 500 companies.
[5] Except 1998–2001, when the growth outlook became excessively optimistic.
[6] We also analyzed trends for three-year earnings-growth estimates based on year-on-year earnings estimates provided by the analysts, where the sample size of analysts' coverage is bigger. Our conclusions on the trend and the gap vis-à-vis actual earnings growth does not change.
[7] Market-weighted and forward-looking earnings-per-share (EPS) estimate for 2010.
[8] Assuming a return on equity (ROE) of 13.5 percent (the long-term historical average) and a cost of equity of 9.5 percent—the long-term real cost of equity (7 percent) and inflation (2.5 percent).
[9] Real GDP has averaged 3 to 4 percent over past seven or eight decades, which would indeed be consistent with nominal growth of 5 to 7 percent given current inflation of 2 to 3 percent.
[10] Timothy Koller and Zane D. Williams, "What happened to the bull market?" mckinseyquarterly.com, November 2001.

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FORTUNE

9% Forever?

That's economist Roger Ibbotson's forecast for stock market returns. HE'S BEEN RIGHT--very right--in the past. So how come some people think we shouldn't believe him anymore?

By JUSTIN FOX
December 26, 2005

(FORTUNE Magazine) – In May 1974, in the depths of the worst bear market since the 1930s, two young men at a University of Chicago conference made a brash prediction: The Dow Jones industrial average, floundering in the 800s at the time, would hit 9,218 at the end of 1998 and get to 10,000 by November 1999.

You probably have a good idea how things turned out: At the end of 1998, the Dow was at 9,181, just 37 points off the forecast. It hit 10,000 in March 1999, seven months early. Those two young men in Chicago in 1974 had made one of the most spectacular market calls in history.

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What became of them after that? One, Rex Sinquefield, went on to found a mutual fund company that now manages more than $80 billion. The other, Roger Ibbotson, kept making market forecasts, forecasts of long-run stock and bond returns that have become deeply woven into the fabric of American life. Simply put, if you believe that stocks are fated to return 10% on average over the long haul, Ibbotson is probably the reason why.

It's hard to overestimate the influence of those numbers. The forecasts and historical return data churned out by Ibbotson Associates transformed the pension fund business in the late 1970s and 1980s, leading managers to make an epic shift out of bonds and into stocks. They formed the inescapable backdrop to the 1990s personal investing boom, as brokers, financial planners, and journalists endlessly repeated the Ibbotson mantra of double-digit stock market returns as far as the eye could see. Lately the Ibbotson forecasts have been finding their way into 401(k)s, as Ibbotson and other firms using similar methods build portfolios for those who opt not to build their own. Ibbotson even sells hundreds of thousands of charts each year showing how stocks build wealth over time--and beat the crap out of bonds.

All this means it's of more than academic interest that an academic debate has been raging for years now over the theories upon which Ibbotson and Sinquefield based their forecast in 1974, and which Ibbotson has followed since. Ibbotson, now 62, has taken some of the criticism to heart, and in the process ratcheted down his long-run forecast for stock returns from more than 10% a year to 9.27%. That alone was something of a shock for many of his clients, Ibbotson says. But a few critics think the real number may turn out to be just 5% or 6%. In that case stocks would barely outperform government bonds--an eventuality that would entirely rearrange the investing world yet again.

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The most important thing to understand about the forecast that Roger Ibbotson and Rex Sinquefield churned out in 1974 is that it wasn't an attempt to outsmart or outguess the market as Wall Street seers had traditionally done. Instead, Ibbotson and Sinquefield were simply trying to use the information already embedded in stock prices to, as they put it, "uncover the market's 'consensus' forecast." Their tools were a half-century of historical data and the bold new philosophy of stock market behavior that they had internalized as students at the University of Chicago's Graduate School of Business.

They did it at a time when theories batted about in Chicago classrooms really were changing the world, or were about to. In the early 1970s, Ibbotson says, "everything was going on at the University of Chicago." The professors on his Ph.D. dissertation committee included two future Nobel Prize winners (Merton Miller and Myron Scholes), another who would have won if he hadn't died before the Nobel committee got to him (Fischer Black), yet another whom many colleagues think should win the Nobel (Eugene Fama), and a father of Reagan-era supply-side economics (Arthur Laffer).

Not counting the Black-Scholes options-pricing formula and the Laffer curve, which don't have major roles in this drama, the biggest ideas at the Chicago Business School in the early 1970s were the efficient-market hypothesis and the capital asset pricing model. The gist of the efficient-market idea, as articulated in the 1960s by Eugene Fama, is that today's price is the best possible measure of a stock's value, and that nobody can reliably predict which way prices will be headed tomorrow. The capital asset model says that you nonetheless can predict long-run stock returns because they are a reward for taking risks, and those risks can be measured. While CAPM, as it is known, was devised elsewhere, Chicago's Fischer Black was among its most fervent adherents.

Ibbotson arrived on campus in 1968. He was a kid from the Chicago suburbs who studied math and physics at Purdue and got an MBA at Indiana University. After struggling in the workforce, he went to Chicago to earn a Ph.D. in finance and hit his stride. While still a student, he got a job managing the university's bond portfolio. Meanwhile his friend Sinquefield, a 1972 MBA working at a Chicago bank, was launching one of the first S&P 500 index funds for institutional investors (this when Vanguard was still but a gleam in Jack Bogle's eye). Chicago really was a heady place for young finance geeks in those days.

Ibbotson and Sinquefield both needed up-to-date historical data on security prices for their work, and both knew that the professors who ran the Chicago business school's Center for Research in Security Prices (CRSP) were in no hurry to repeat the epic number-crunching exercise they had undertaken in the early 1960s to build a database of stock prices going back to 1925. So the two men took on the job of updating the CRSP (pronounced "crisp") stock database and assembling a similar price history for bonds and Treasury bills.

They presented their preliminary findings in May 1974 at one of the twice-yearly seminars that CRSP hosted to share the latest academic research with bankers, mutual fund managers, and the like. "Just getting the data was a coup," Ibbotson says. Then there was the forecast, suggested to them by Fischer Black. Black thought of using the data to calculate the additional return that investors had historically received for investing in risky stocks rather than in relatively safe government bonds. According to CAPM theory, this "risk premium" reflects something real and durable about the rewards investors demand for taking the chance of losing money. Real and durable enough, it seemed in 1974, to build a stock market prediction on.

Once Ibbotson and Sinquefield figured out the historical risk premium, all they had to do was add it to the prevailing risk-free interest rate (Treasury bonds or bills, depending on one's planning horizon) to get the "consensus" forecast of market returns. Actually they made it a little more complicated than that: When they finally published their work in 1976, they presented their forecast as the middle point of a wide range of different possible results. The mean forecast for the 25 years through 2000 was for 13% annual stock market returns, with 95% confidence that the return would be between 5.2% and 21.5%. (The actual return was 15%.)

"In some ways it was the first scientific forecast of the market," Ibbotson says proudly. Not everyone saw it that way at the time; some skeptics complained it was just a gussied-up extrapolation of the past into the future. But there turned out to be a ravenous hunger for such data. Both researchers were swamped with requests for more information and advice. For a while Ibbotson, by this time a very junior professor of finance at Chicago, just let the letters pile up unopened in a drawer in his office. In 1977 he decided to make a business out of his research project and started Ibbotson Associates. He also kept teaching at Chicago--until 1984, when his wife, health economist Jody Sindelar, got a job at Yale and he wangled an appointment there as a finance professor. Since then he's left the day-to-day management of the company, still based in Chicago, in the hands of others, while he remains its public face and chief researcher. Sinquefield, meanwhile, launched small-cap index fund manager Dimensional Fund Advisors with another Chicago finance graduate, David Booth, in 1981.

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While Ibbotson Associates grew and prospered in the 1980s and 1990s, however, the theories upon which its forecasts are based began to crumble in the face of contradictory evidence. The initial onslaught came from skeptics of the efficient-market hypothesis like Ibbotson's Yale colleague Robert Shiller, who argued that investor mood swings drove stock prices too high or too low for years on end. The experience of the late 1990s confirmed to many that there was something to this. But Ibbotson says he can't base his forecasts on such arguments. "It's not that I believe markets are so efficient," Ibbotson says. "It's just that I don't want to use a mispricing to make predictions." He's trying to divine a middle-of-the-road consensus, not trot out a CNBC-style market call. Fair enough.

A harder-to-dismiss critique came from Mr. Efficient Markets himself, Ibbotson's dissertation advisor Eugene Fama. In a series of papers written with Dartmouth's Kenneth French, Fama has argued that the capital asset pricing model, or at least its 1970s corollary that the risk premium is constant, doesn't match the facts. "My own view is that the risk premium has gone down over time basically because we've convinced people that it's there," Fama says. Ibbotson's stock market forecasting model is thus a victim of its own success.

Ibbotson agrees that Fama has a point, and that he can no longer bank on the historical equity premium to predict future returns. The alternative he has come up with is an estimate based on fundamentals. He takes the 10.31% annual return on stocks from 1925 through the present and strips out the tripling of the market's price/earnings ratio that's occurred since then. "We think of that as a windfall that you shouldn't get again," he says. The drivers of stock returns that remain are dividends, earnings growth, and inflation. Make a forecast of future inflation using current bond yields, assume that dividend and earnings growth history will repeat themselves, and you get a long-run equity-return forecast of 9.27%. When Ibbotson and his company's director of research, Peng Chen, first ran the numbers in 2001, the gap between the new forecast and the one using the equity premium method was more than a percentage point. Because P/Es have dropped since then, the gap has

shrunk. But Ibbotson's revised forecasting method doesn't insulate him from criticism any more than the old way. In fact, it invites new criticism.

The most persistent challenger has been Rob Arnott, a Pasadena money manager and editor of the Financial Analysts Journal, who thinks future equity returns could be below 6%. (See "Dueling Market Forecasts" chart.) The big difference between his forecast and Ibbotson's is that Arnott uses the current dividend yield (1.76%) as a starting point, while Ibbotson goes with the much higher long-term average yield (4.23%). Ibbotson believes the historical number provides a better picture of what investors think is ahead. He still relies on the assumption that markets are efficient, so current dividend yields must be low for a reason--his guess is that investors are expecting big growth in earnings (and dividends) in the future. Arnott, whose research has shown that low yields in the past were followed by slow earnings growth, thinks that's balderdash. "One of my biggest beefs with the academic community is the notion that theory is fact," he complains. "When they find evidence that contradicts the theory, instead of saying, 'Wonderful, let's improve the theory,' they throw it out because it conflicts with theory."

But the theoretical assumption that the market knows best is central to Ibbotson's whole forecasting endeavor, something even Arnott acknowledges. "In a sense Ibbotson is trying to infer what the consensus view is," Arnott says. "I'm trying to profit from that consensus." What Ibbotson is telling us is that the market still believes stocks will handily outperform bonds over the long haul. And if the market turns out to be wrong about that, it won't just be Roger Ibbotson who feels the pain.

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UTILITY STOCKS AND THE SIZE EFFECT: AN EMPIRICAL ANALYSIS

Annie Wong*

I. Introduction

The objective of this study is to examine whether the firm size effect exists in the public utility industry. Public utilities are regulated by federal, municipal, and state authorities. Every state has a public service commission with board and varying powers. Often their task is to estimate a fair rate of return to a utility's stockholders in order to determine the rates charged by the utility. The legal principles underlying rate regulation are that "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks," and that the return to a utility should be sufficient to "attract capital and maintain credit worthiness." However, difficulties arise from the ambiguous interpretation of the legal definition of *fair and reasonable rate of return* to an equity owner.

Some finance researchers have suggested that the Capital Asset Pricing Model (CAPM) should be used in rate regulation because the CAPM beta can serve as a risk measure, thus making risk comparisons possible. This approach is consistent with the spirit of a Supreme Court ruling that equity owners sharing similar level of risk should be compensated by similar rate of return.

The empirical studies of Banz (1981) and Reinganum (1981) showed that small firms tend to earn higher returns than large firms after adjusting for beta. This phenomenon leads to the proposition that firm size is a proxy for omitted risk factors in determining stock returns. Barry and Brown (1984) and Brauer (1986) suggested that the omitted risk factor could be the differential information environment between small and large firms. Their argument is based on the fact that investors often have less publicly available information to assess the future cash flows of small firms than that of large firms. Therefore, an additional risk premium should be included to determine the appropriate rate of return to shareholders of small firms.

The samples used in prior studies are dominated by industrial firms, no one has examined the size effect in public utilities. The objective of this study is to extend the empirical findings of the existing studies by investigating whether the size effect is also present in the utility industry. The findings of this study have important implications for investors, public utility firms, and state regulatory agencies. If the size effect does exist in the utility industry, this would suggest that the size factor should be considered when the CAPM is being used to determine the fair rate of return for public utilities in regulatory proceedings.

II. Information Environment of Public Utilities

In general, utilities differ from industriales in that utilities are heavily regulated and they follow similar accounting procedures. A public utility's financial reporting is mainly regulated by the Securities and Exchange Commission (SEC) and the Federal Energy Regulatory Commission (FERC). Under the Public Utility Holding Company Act of 1935, the SEC is empowered to regulate the holding company systems of electric and gas utilities. The Act requires registration of public utility holding companies with the SEC. Only under strict conditions would the purchase, sale or issuance of securities by these holding companies be permitted. The purpose of the Act is to keep the SEC and investors informed of the financial conditions of these firms. Moreover, the FERC is in charge of the interstate operations of electric and gas companies. It requires utilities to follow the accounting procedures set forth in its Uniform Systems of Accounts. In particular, electric and gas utilities must request their Certified Public Accountants to certify that certain schedules in the financial reports are in conformity with the Commission's accounting requirements. These detailed reports are submitted annually and are open to the public.

*Western Connecticut State University. The author thanks Philip Perry, Robert Hagerman, Eric Press, the anonymous referee, and Clay Singleton for their helpful comments.

The FERC requires public utilities to keep accurate records of revenues, operating costs, depreciation expenses, and investment in plant and equipment. Specific financial accounting standards for these purposes are also issued by the Financial Accounting Standards Board (FASB). Uniformity is required so that utilities are not subject to different accounting regulations in each of the states in which they operate. The ultimate objective is to achieve comparability in financial reporting so that factual matters are not hidden from the public view by accounting flexibility.

Other regulatory reports tend to provide additional financial information about utilities. For example, utilities are required to file the FERC Form No. 1 with the state commission. This form is designed for state commissions to collect financial and operational information about utilities, and serves as a source for statistical reports published by state commissions.

Unlike industriales, a utility's earnings are predetermined to a certain extent. Before allowed earnings requests are approved, a utility's performance is analyzed in depth by the state commission, interest groups, and other witnesses. This process leads to the disclosure of substantial amount of information.

III. Hypothesis and Objective

Due to the Act of 1935, the Uniform Systems of Accounts, the uniform disclosure requirements, and the predetermined earnings, all utilities are reasonably homogeneous with respect to the information available to the public. Barry and Brown (1984) and Brauer (1986) suggested that the difference of risk-adjusted returns between small and large firms is due to their differential information environment. Assuming that the differential information hypothesis is true, then uniformity of information availability among utility firms would suggest that the size effect should not be observed in the public utility industry. The objective of this paper is to provide a test of the size effect in public utilities.

IV. Methodology

1. Sample and Data

To test for the size effect, a sample of public utilities and a sample of industriales matched by equity value are formed so that their results can be compared. Companies in both samples are listed on the Center for Research in Security Prices (CRSP) Daily and Monthly Returns files. The utility sample includes 152 electric and gas companies. For each utility in the sample, two industrial firms with similar firm size (one is slightly larger and the other is slightly smaller than the utility) are selected. Thus, the industrial sample includes 304 non-regulated firms.

The size variable is defined as the natural logarithm of market value of equity at the beginning of each year. Both the equally-weighted and value-weighted CRSP indices are employed as proxies for the market returns. Daily, weekly and monthly returns are used. The Fama-MacBeth (1973) procedure is utilized to examine the relation between risk-adjusted returns and firm size.

2. Research Design

All utilities in the sample are ranked according to the equity size at the beginning of the year, and the distribution is broken down into deciles. Decile one contains the stocks with the lowest market values while decile ten contains those with the highest market values. These portfolios are denoted by MV_1, MV_2, ..., and MV_{10}, respectively.

The combinations of the ten portfolios are updated annually. In the year after a portfolio is formed, equally-weighted portfolio returns are computed by combining the returns of the component stocks within the portfolio. The betas for each portfolio at year t, $\hat{\beta}_{pt}$'s, are estimated by regressing the previous five years of portfolio returns on market returns:

$$\tilde{R}_{pt} = \alpha_p + \hat{\beta}_{pt}\tilde{R}_{mt} + \tilde{U}_{pt} \qquad (1)$$

where

R_{pt} = periodic return in year t on portfolio p

R_{mt} = periodic market return in year t

U_{pt} = disturbance term.

Banz (1981) applied both the ordinary and generalized least squares regressions to estimate β; and concluded that the results are essentially identical (p.8). Since adjusting for heteroscedasticity does not necessarily lead to more efficient estimators, the ordinary least squares procedures are used in this study to estimate β in equation (1).

The following cross-sectional regression is then run for the portfolios to estimate γ_{it}, i = 0, 1, and 2:

$$R_{pt} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{pt} + \gamma_{2t}\hat{S}_{pt} + U_{pt} \qquad (2)$$

where

$\hat{\beta}_{pt}$ = estimated beta for portfolio p at year t, t=1968, ..., 1987

$\hat{S}_{pt}$ = mean of the logarithm of firm size in portfolio p at the beginning of year t

U_{pt} = disturbance term.

Depending on whether daily, weekly or monthly returns are used, a portfolio's average return changes periodically while its beta and size only change once a year. The γ_1 and γ_2 coefficients are estimated over the following four subperiods: 1968-72, 1973-77, 1978-82 and 1983-1987. If portfolio betas can fully account for the differences in returns, one would expect the average coefficient for the beta variable to be positive and for the size variable to be zero. A t-statistic will be used to test the hypothesis. The coefficients of a matched sample are also examined so that the results between industrial and utility firms can be compared.

V. Analysis of Results

1. Equity Value of the Utility Portfolios

The mean equity values of the ten size-based utility portfolios are reported in Table 1. Panels A and B present the average firm size of these portfolios at the beginning and end of the test period, 1968-1987. The first interesting observation from Table 1 is that the difference in magnitude between the smallest and the largest market value utility portfolios is tremendous. In Panel A, the average size of MV_1 is about $31 million while that of MV_{10} is over $1.4 billion. In Panel B, that is twenty years later, they are $62 million and $5.2 billion, respectively. Another interesting finding is that there is a substantial increase in average firm size from MV_9 to MV_{10}. Since these two findings are consistent over the entire test period, the average portfolio market values for interim years are not reported. These results are similar to the empirical evidence provided by Reinganum (1981).

The utility sample in this study contains 152 firms whereas Reinganum's sample contains 535 firms that are mainly industrial companies. Two conclusions may be drawn from the results of the Reinganum study and this one. First, utilities and industriales are similar in the sense that their market values vary over a wide spectrum. Second, the fact that there is a huge jump in firm size from MV_9 to MV_{10} indicates that the distribution of firm size is positively skewed. To correct for the skewness problem, the natural logarithm of the mean equity value of each portfolio is calculated. This variable is then used in later regressions instead of the actual mean equity value.

2. Betas of the Utility and Industrial Samples

The betas based on monthly, weekly and daily returns are reported for the utility and industrial samples. For simplicity, they will be referred to as monthly, weekly, and daily betas. In all cases, five years of returns are used to estimate the systematic risk. The betas estimated over the 1963-67 time period are used to proxy for the betas in 1968, which is the beginning of the test period. By the same token, the betas obtained from the time period 1982-86 are used as proxies for the betas in 1987, which is the end of the test period.

The betas from using the equally-weighted and value-weighted indices are calculated in order to check whether the results are affected by the choice of market index. Since the results are similar, only those obtained from the equally-weighted index are reported and analyzed.

Table 2 reports the monthly, weekly and daily betas of the two samples at the beginning and end of the test period. Panel A shows the various betas of the industrial portfolios. Two conclusions may be drawn. First, in the 1960's, smaller market value portfolios tend to have relatively larger betas. This is consistent with the empirical findings by Banz (1981) and Reinganum (1981). Second, this trend seems to vanish in the 1980's, especially when weekly and daily returns are used.

The betas of the utility portfolios are presented in Panel B. The table shows that none of the utility betas are greater than 0.71. A comparison between Panels A and B reveals that utility portfolios are relatively less risky than industrial portfolios after controlling for firm size. The comparison also reveals that, unlike industrial stocks, betas of the utility portfolios are not related to the market values of equity.

The negative correlation between firm size and beta in the industrial sample may introduce a multicolinearity problem in estimating equation (2). Banz (p.11) had addressed this issue and concluded that the test results are not sensitive to the

multicolinearity problem. For the utility sample, this problem does not exist.

3. Tests on the Coefficients of Beta and Size

The beta and firm size are used to estimate γ_1 and γ_2 in equation (2). A t-statistic is used to test if the mean values of the gammas are significantly different from zero. The tests were performed for four 5-year periods which are reported in Table 3. The mean of the gammas and their t-statistic are presented in Panel A for the utilities and in Panel B for the industrial firms.

The empirical results for the utility sample are reported in Panel A of Table 3. When monthly returns are used, 60 regressions were run to obtain 60 pairs of gammas for each of the 5-year periods. When daily returns are used, over 1200 regressions were run for each period to obtain the gammas. The results are similar: in all of the time periods tested, none of the average coefficients for beta and size are significantly different from zero. When weekly returns are used, 260 pairs of gammas were obtained. The average coefficients for beta are not significant in any test period, and the average coefficients for size are not significant in three of the test periods. For the test period of 1978-82, the average coefficient for size is significantly negative at a 5% level.

The test results for the industrial sample are reported in Panel B of Table 3. When monthly returns are used, the average coefficient estimates for size and beta are significant and have the expected sign only in the 1983-87 test period. When weekly returns are used, only the size variable is significantly negative in the 1978-82 period. When daily returns are used, the coefficient estimates for betas and size are not significant at any conventional level.

According to the CAPM, beta is the sole determinant of stock returns. It is expected that the coefficient for beta is significantly positive. However, the empirical findings reported in this study and in Fama and French (1992) only provide weak support for beta in explaining stock returns. The empirical findings in this study also suggest that the size effect varies over time. It is not unusual to document the firm size effect at certain time periods but not at others. Banz (1981) found that the size effect is not stable over time with substantial differences in the magnitude of the coefficient of the size factor (p.9, Table 1). Brown, Kleidon and Marsh (1983) not only have shown that size effect is not constant over time but also have reported a reversal of the size anomaly for certain years.

The research design of this study allows us to keep the sample, test period, and methodology the same with the holding-period being the only variable. The size effect is documented for the industrial sample in one of the four test periods when monthly returns are used and in another when weekly returns are used. When daily returns are used, no size effect is observed. For the utility sample, the size effect is significant in only one test period when weekly returns are used. When monthly and daily returns are used, no size effect is found. Therefore, this study concludes that the size effect is not only time-period specific but also holding-period specific.

VI. Concluding Remarks

The fact that the two samples show different, though weak, results indicates that utility and industrial stocks do not share the same characteristics. First, given firm size, utility stocks are consistently less risky than industrial stocks. Second, industrial betas tend to decrease with firm size but utility betas do not. These findings may be attributed to the fact that all public utilities operate in an environment with regional monopolistic power and regulated financial structure. As a result, the business and financial risks are very similar among the utilities regardless of their sizes. Therefore, utility betas would not necessarily be expected to be related to firm size.

The objective of this study is to examine if the size effect exists in the utility industry. After controlling for equity values, there is some weak evidence that firm size is a missing factor from the CAPM for the industrial but not for the utility stocks. This implies that although the size phenomenon has been strongly documented for the industriales, the findings suggest that there is no need to adjust for the firm size in utility rate regulations.

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Table 1

Average Equity Size of the Utility Portfolios at the Beginning and End of the Test Period
(Dollar figures in millions)

	A: Beginning (1968)	B: End (1987)
MV_1	$31	$62
MV_2	$77	$177
MV_3	$113	$334
MV_4	$161	$475
MV_5	$220	$715
MV_6	$334	$957
MV_7	$437	$1,279
MV_8	$505	$1,805
MV_9	$791	$2,665
MV_{10}	$1,447	$5,399

Table 2

Betas of the Two Samples at the Beginning and End of the Test Period

	Monthly Betas		Weekly Betas		Daily Betas	
	1963-67	1982-86	1963-67	1982-86	1963-67	1982-86
Panel A: Industrial Firms						
MV_1	0.89	1.00	1.15	0.95	1.11	0.92
MV_2	0.94	0.87	1.07	1.01	1.14	1.01
MV_3	0.88	0.82	1.12	0.86	1.14	1.04
MV_4	0.69	0.74	1.00	0.83	1.03	0.86
MV_5	0.73	0.80	1.05	0.96	1.13	1.01
MV_6	0.66	0.82	1.03	1.01	1.05	1.04
MV_7	0.64	0.81	0.97	1.04	0.98	1.09
MV_8	0.62	0.75	0.97	1.11	1.00	1.20
MV_9	0.52	0.78	0.84	1.06	0.94	1.16
MV_{10}	0.43	0.65	0.78	1.01	0.86	1.22
Panel B: Public Utilities						
MV_1	0.30	0.37	0.31	0.43	0.30	0.40
MV_2	0.28	0.38	0.37	0.47	0.36	0.44
MV_3	0.22	0.42	0.33	0.42	0.31	0.49
MV_4	0.27	0.35	0.36	0.52	0.34	0.54
MV_5	0.25	0.45	0.37	0.61	0.35	0.62
MV_6	0.25	0.41	0.39	0.54	0.40	0.65
MV_7	0.20	0.35	0.34	0.54	0.37	0.63
MV_8	0.17	0.38	0.34	0.65	0.33	0.68
MV_9	0.19	0.34	0.35	0.60	0.34	0.71
MV_{10}	0.18	0.29	0.38	0.59	0.39	0.71

Table 3

Tests on the Mean Coefficients of Beta (γ_1) and Size (γ_2)

$$R_{pt} = \gamma_{ot} + \gamma_{1t}\hat{\beta}_{pt} + \gamma_{2t}\hat{S}_{pt} + U_{pt}$$

Returns Used:		Monthly (t-value)	Weekly (t-value)	Daily (t-value)
Panel A: Utility Sample				
1968-72	γ_1	-0.46% (-0.26)	-0.32% (-0.42)	-0.02% (-0.18)
	γ_2	-0.07% (-0.78)	-0.01% (-0.51)	-0.00% (-0.46)
1973-77	γ_1	-0.28% (-0.13)	0.14% (0.14)	-0.03% (-0.21)
	γ_2	-0.11% (-0.70)	-0.03% (-0.67)	-0.00% (-0.53)
1978-82	γ_1	0.55% (0.36)	0.54% (1.00)	0.05% (0.43)
	γ_2	-0.10% (-0.75)	-0.05% (-1.71)*	-0.01% (-1.60)
1983-87	γ_1	1.74% (1.28)	-0.24% (-0.51)	-0.02% (-0.18)
	γ_2	-0.16% (-1.54)	-0.03% (-0.86)	-0.01% (-0.63)
Panel B: Industrial Sample				
1968-72	γ_1	-0.36% (-0.27)	-0.28% (-0.55)	-0.02% (-0.32)
	γ_2	0.07% (0.43)	-0.01% (-0.19)	0.00% (0.51)
1973-77	γ_1	1.34% (0.64)	-0.23% (-0.31)	0.14% (1.45)
	γ_2	-0.01% (-0.06)	-0.04% (-0.85)	-0.00% (-0.64)
1978-82	γ_1	-0.84% (-0.28)	-0.56% (-0.91)	-0.09% (-0.81)
	γ_2	-0.29% (-0.75)	-0.01% (-1.72)*	-0.00% (-1.33)
1983-87	γ_1	2.51% (1.83)*	0.34% (0.64)	0.11% (1.40)
	γ_2	-0.25% (-1.90)*	-0.01% (-0.43)	0.00% (0.14)

* Significant at the 5% level based on a one-tailed test.

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ON COMPUTING MEAN RETURNS AND THE SMALL FIRM PREMIUM

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The mean return computational method has a substantial effect on the estimated small firm premium. The buy-and-hold method, which best mimics actual investment experience, produces an estimated small-firm premium only one-half as large as the arithmetic and re-balanced methods which are often used in empirical studies. Similar biases can be expected in mean returns when securities are classified by any variable related to trading volume.

1. Introduction

There is a potentially serious problem in estimating expected return differences between small and large firms. Even with exactly the same sample observations, the method used to compute sample mean returns can have a substantial effect on the estimates.

With an arithmetic computational method, daily returns on individual stocks are averaged across both firms and days to obtain the mean daily return on an equally-weighted portfolio; then the portfolio's mean daily return is compounded to obtain an estimate of the expected return over a longer interval. With a buy-and-hold method, individual stock returns are first obtained for the longer interval by linking together the daily individual returns; then an equally-weighted portfolio's mean return is computed by averaging the longer-term (individual) returns.

Defining a 'longer interval' as one year, the arithmetic method produces an average annual return difference of 14.9 percent between AMEX and NYSE stocks[1] over the 19 complete calendar years, 1963–1981 inclusive. The buy-and-hold method gives an annual return difference of only 7.45 percent. Assuming that annual returns are statistically independent, the arithmetic

*Comments and suggestions by Gordon Alexander, Kenneth French, Stephen Ross and the referee, Allan Kleidon, are gratefully acknowledged.

[1]The effect of smallness can be measured by the difference in returns of stock listed on the American Exchange (AMEX) and the New York Exchange (NYSE) because AMEX issues are, on average, much smaller than NYSE issues. Most of the results presented here are based on the AMEX–NYSE differential because it is convenient and easy to use. Some confirmatory results based directly on measured size will also be presented.

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method's return differential had an associated t-statistic of 3.07 while the buy-and-hold method yielded a t-statistic of 1.53.

Speculation on possible causes of the small firm premium has occupied the attention of many finance theorists over the past few years; but perhaps this attention has been premature. If the estimated small firm premium can be cut in half simply by compounding individual returns before averaging them, some consideration should be given to whether the magnitude of the true premium is really all that large. The various explanations for the premium offered so far would become more plausible if the premium is actually smaller than has been previously reported.

This paper investigates why the mean return computational method can be such a significant choice in some empirical research. The reason seems to be that individual asset returns are not as well-behaved as we might like. Individual assets do not trade continuously and there are significant trading costs. In some empirical studies, the effect of these factors might be safely ignored; but when the object of investigation is related to trading volume (and thus to trading frequency and trading costs), there can be measurement problems. Firm size is related to trading volume and it is used as an example throughout the paper. Other variables related to size and to trading, such as dividend yield, price/earnings ratio, and beta, could also present similar empirical difficulties. Section 2 gives a brief theoretical discussion of mean return computational methods and section 3 presents details of the empirical results for small firm premia.

2. Compounding and the bias in mean return calculation

2.1. Formulae for computing mean returns

To elucidate the differences in mean return computation and explain why they might produce different results, consider a sample of N securities, each having returns observed for T periods. Let R_{it} be the value relative (1 + return), of security i in period t. Suppose also that investment results are reviewed every τ periods. For example, if data were available daily but returns were to be reviewed every month, we would have $\tau \cong 21$ since there are usually about 21 trading days per month.

Two alternative methods of computing the mean equally-weighted return over the review period can be written algebraically as

$$\bar{R}_{\mathrm{AR}} = \left[\frac{1}{N \cdot \tau} \sum_i \sum_t R_{it}\right]^{\tau}, \tag{1}$$

$$\bar{R}_{\mathrm{BH}} = \frac{1}{N} \sum_i \left[\prod_t R_{it}\right], \tag{2}$$

where the subscripts 'AR' and 'BH' denote 'arithmetic' and 'buy-and-hold', respectively. These labels are intended to portray the sense of the computation method. The first method (1) is simply an arithmetic mean raised to the τth power while the second method gives the actual investment results an investor would achieve from buying equal dollar amounts of N securities and holding the shares for τ periods.

There is also a third possible definition of mean return,

$$\bar{R}_{RB}=\prod_t\left[\frac{1}{N}\sum_i R_{it}\right], \tag{3}$$

where the subscript 'RB' stands for 'rebalanced'. This would be the actual investment return (ignoring transactions costs) on a portfolio which begins with equal investments in the N securities and *maintains* equal investments by rebalancing at the end of each period, $t=1,\ldots,\tau$.

To compare results over different review periods, we must choose some typical and familiar calendar interval, say a year, and express the results as percentage returns over that common calendar interval. In the tables below, annualization is accomplished and reported for 'linked' returns; the review period returns within each calendar year are simply multiplied together (or linked) in order to obtain an annual return.[2] Linked annualization includes *every* daily observation in some review period during the year. This assures that in any comparison of the results across review periods, the observed differences are due to review period alone and cannot be ascribed to slightly different sample observations.

The next two subsections investigate some properties of these sample mean returns. Subsection 2.2 derives their expected values under the assumption of temporally independent individual asset returns. Subsection 2.3 then examines the effect of intertemporal dependence.

[2]The exact formulae for linked returns can be written as follows. Let $\bar{R}_m(y,\tau)$ denote the mean annualized linked return for year y ($y=1,\ldots,Y$) using a review period whose length is τ trading days and using method (m=BH, AR, RB), to compute the review period returns. Then,

$$\bar{R}_{BH}(y,\tau)=\prod_{j=(y-1)k_\tau+1}^{y\cdot k_\tau}\left[\frac{1}{N}\sum_i\prod_{t=(j-1)\tau+1}^{j\cdot\tau}(R_{it})\right],$$

$$\bar{R}_{AR}(y,\tau)=\prod_{j=(y-1)k_\tau+1}^{y\cdot k_\tau}\left[\frac{1}{N\cdot\tau}\sum_i\sum_{t=(j-1)\tau+1}^{j\cdot\tau}R_{it}\right]^\tau,$$

$$\bar{R}_{RB}(y,\tau)=\prod_{j=(y-1)k_\tau+1}^{y\cdot k_\tau}\left\{\prod_{t=(j-1)\tau+1}^{j\cdot\tau}\left[\frac{1}{N}\sum_i R_{it}\right]\right\},$$

where $k_\tau=T/(Y\cdot\tau)$ is the number of review periods per year and T is the total number of trading days in the entire sample. When returns are reviewed in natural calendar intervals such as months, the review period cannot be a fixed number of trading days and thus τ in the formulae above varies slightly with tbe actual number of trading days.

2.2. Sample mean return biases with temporal independence

Following Blume (1974), assume that each individual asset return is drawn from a stationary distribution with temporally independent disturbances; that is,

$$\tilde{R}_{it}=\mu_i+\tilde{\varepsilon}_{it}, \quad \forall i, \tag{4}$$

with $E(\tilde{R}_{it})=\mu_i$, a constant for all t, and where the unexpected return, $\tilde{\varepsilon}_{it}$, satisfies $\text{cov}(\tilde{\varepsilon}_{i,t}, \tilde{\varepsilon}_{i,t-j})=0$ for $j\neq 0$.

The expected value of the arithmetic mean (1) can be expressed as

$$E(\bar{R}_{AR})=E\left[\left(\frac{1}{N}\sum_i \mu_i+\tilde{h}\right)^{\tau}\right], \tag{5}$$

where

$$\tilde{h}\equiv\frac{1}{N\cdot\tau}\sum_i\sum_t \tilde{\varepsilon}_{it}$$

is the average disturbance on the equally-weighted portfolio over the sample review period τ.

The expected value of the buy-and-hold mean (2) is

$$E(\bar{R}_{BH})=\frac{1}{N}\sum_i\left[E\prod_t(\mu_i+\tilde{\varepsilon}_{it})\right]=\frac{1}{N}\sum_i(\mu_i^{\tau}). \tag{6}$$

This follows since the expectation can be taken inside the product with independent returns and since $E(\tilde{\varepsilon})=0$, by definition.

The rebalancing method (3) produces a mean return whose expectation is

$$E(\bar{R}_{RB})=\prod_t\left[\frac{1}{N}\sum_i\mu_i\right]=\left(\frac{1}{N}\sum_i\mu_i\right)^{\tau}, \tag{7}$$

where, again, the expectation can be taken inside the product because of time independence.

Expressions (5), (6) and (7) imply that the three different mean return definitions do not produce the same results. By Jensen's inequality,

$$E(\bar{R}_{AR})\geq E(\bar{R}_{RB}),^3$$

[3]Jensen's inequality for a random variable $\tilde{x}$ and a convex function $f(x)$ is $E[f(\tilde{x})]\geq f[E(x)]$. Let $\tilde{x}\equiv(1/N)\sum_i\mu_i+\tilde{h}$; then $f(\tilde{x})=\tilde{x}^{\tau}$ is convex since $\tau>1$. $E(\bar{R}_{AR})>E(\bar{R}_{RB})$ follows immediately from (5) and (7) since $E(\tilde{h})=0$.

with strict inequality if $\text{var}(\tilde{h}) > 0$, and

$$E(\bar{R}_{BH}) \geqq E(\bar{R}_{RB}),^4$$

with strict inequality if $N > 1$ and at least two assets have different returns. Since we generally have some randomness [$\text{var}(\tilde{h}) > 0$], and many securities, ($N > 1$), the rebalanced method generally should produce lower mean returns than either the arithmetic or the buy-and-hold method, provided that returns are temporally independent.

The relation between the buy-and-hold and arithmetic means is more complex; and, indeed, neither is invariably smaller than the other. The larger the cross-sectional dispersion of individual expected returns, the larger $E(\bar{R}_{BH})$ relative to $E(\bar{R}_{AR})$. But there is an offsetting influence: the larger the intertemporal dispersion of unexpected returns ($\tilde{h}$), the larger $E(\bar{R}_{AR})$ relative to $E(\bar{R}_{BH})$.[5] Their relation in a given sample depends, therefore, on the characteristics of the underlying individual returns.

2.3. Time series dependence and its effect on estimated expected returns

The effect of serial dependence is seen most easily by examining expected mean returns when the review period is doubled, say from daily to bi-daily or from bi-weekly to monthly. Assume first that returns are collected for the shorter review period and then let $\tau = 2$ (a doubling of the period). Over the doubled review period, the three mean returns are

$$\bar{R}_{AR} = \left[\frac{1}{N}\sum_i \left(\mu_i + \frac{\varepsilon_{i1} + \varepsilon_{i2}}{2}\right)\right]^2, \tag{8}$$

[4]Define $f(\mu_i) = \mu_i^\tau$, a convex function for $\tau > 1$. With $1/N$ used as a (pseudo) probability, $E(\bar{R}_{BH}) \geqq E(\bar{R}_{RB})$ follows immediately from (6) and (7). (Cf. footnote 3.) Strict inequality holds if at least two μ_i's are different. [This result was noted by Cheng and Deets in (1971).]

The inequality above grows with the cross-sectional dispersion in μ_i, ceteris paribus. To prove this, expand μ_i^τ in a Taylor series about $\bar{\mu} \equiv (1/N)\sum_i \mu_i$; the second-order term is a positive function of the cross-sectional variance in μ_i. If μ_i were cross-sectionally normally distributed, the variance *alone* would determine the size of the inequality.

[5]This can be confirmed by using a Taylor series expansion of $E(\bar{R}_{AR})$. Define $\bar{\mu} = (1/N)\sum_i \mu_i$; then

$$E(\bar{R}_{AR}) = \bar{\mu}^\tau E\left[1 + \frac{\tilde{h}^2}{2}(\tau)(\tau-1)\bar{\mu}^{-2} + \frac{\tilde{h}^3}{3!}(\tau)(\tau-1)(\tau-2)\bar{\mu}^{-3} + \ldots + \tilde{h}^\tau \bar{\mu}^{-\tau}\right].$$

Jensen's inequality (see footnote 4 above), implies that $E(\bar{R}_{BH}) > \bar{\mu}^\tau$ with the inequality being larger the larger the cross-sectional variance in μ_i. But the term in brackets just above shows that $E(\bar{R}_{AR})$ increases with the higher moments of $\tilde{h}$ (since $\bar{\mu}$ is strictly positive). For example, the second term in brackets involves the variance of $\tilde{h}$. Conceivably, this term could more than offset the cross-sectional variance in μ_i. If the unexpected arithmetic portfolio return h happens to be normally-distributed, the expression above simplifies to $E(\bar{R}_{AR}) = \bar{\mu}^\tau[1 + k \cdot \text{var}(\tilde{h})]$ with the constant $k > 0$. In this case, there is a simple and direct tradeoff between the cross-sectional variance in expected return, μ_i, and the variance of the unexpected portfolio return, $\tilde{h}$.

$$\bar{R}_{BH}=\frac{1}{N}\sum_i[(\mu_i+\varepsilon_{i1})(\mu_i+\varepsilon_{i2})], \tag{9}$$

$$\bar{R}_{RB}=\left[\frac{1}{N}\sum_i(\mu_i+\varepsilon_{i1})\right]\left[\frac{1}{N}\sum_i(\mu_i+\varepsilon_{i2})\right], \tag{10}$$

where $R_{it}=\mu_i+\varepsilon_{it}$ is the observed return on individual stock i ($i=1,\ldots,N$) in period t, and μ_i is i's single-period (i.e., shorter review period) expected return.

For notational convenience, define the cross-sectional averages

$$\bar{\mu}=\frac{1}{N}\sum_i\mu_i \quad \text{and} \quad \bar{\varepsilon}_t=\frac{1}{N}\sum_i\varepsilon_{it}.$$

Then the three mean returns have expected values,

$$E(\bar{R}_{AR})=\bar{\mu}^2+\tfrac{1}{2}(\sigma_{\bar{\varepsilon}}^2+\sigma_{\bar{\varepsilon}_1,\bar{\varepsilon}_2}), \tag{11}$$

$$E(\bar{R}_{BH})=\frac{1}{N}\sum_i\mu_i^2+\frac{1}{N}\sum_i\sigma_{\varepsilon_{i1},\varepsilon_{i2}}, \tag{12}$$

$$E(\bar{R}_{RB})=\bar{\mu}^2+\sigma_{\bar{\varepsilon}_1,\bar{\varepsilon}_2}, \tag{13}$$

where σ_x^2 is the variance of x and $\sigma_{x,y}$ is the covariance of x and y.

Even with serial dependence, the expected arithmetic mean still exceeds the expected rebalanced mean in all circumstances since,

$$E(\bar{R}_{AR}-\bar{R}_{RB})=\tfrac{1}{2}(\sigma_{\bar{\varepsilon}}^2-\sigma_{\bar{\varepsilon}_1,\bar{\varepsilon}_2})>0. \tag{14}$$

Comparing the buy-and-hold means and the rebalanced means, we have

$$E(\bar{R}_{BH}-\bar{R}_{RB})=\sigma_{\mu_i}^2+\left(\frac{1}{N}\sum_i\sigma_{\varepsilon_{i1},\varepsilon_{i2}}-\sigma_{\bar{\varepsilon}_1,\bar{\varepsilon}_2}\right).$$

With no serial dependence in the ε's, the term in parentheses is zero and the BH mean would exceed the RB mean by the cross-sectional variance in expected individual returns.

However, with negative serial dependence in unexpected individual returns (ε_{i1} and ε_{i2}) or positive dependence in portfolio returns ($\bar{\varepsilon}_1$ and $\bar{\varepsilon}_2$), the rebalanced mean would become larger; enough such dependence could conceivably render it larger that the buy-and-hold mean. Since the expected arithmetic mean exceeds the expected rebalanced mean, it too could be larger than the BH mean with enough serial dependence of the right type.

There is some reason to anticipate just this type of serial dependence because of the intertemporal characteristics of individual returns. Scholes and Williams (1977, pp. 313–314) explain that because of non-synchronous trading individual assets display first-order *negative* serial dependence while diversified portfolios display *positive* dependence. A difference in the sign of serial dependence between individual assets and portfolios is relevant here because buy-and-hold (BH) means are mainly affected by individual asset serial dependence [see (12)], while the arithmetic (AR) and rebalanced (RB) means are affected by portfolio serial dependence [see (11) and (13)]. The Scholes/Williams explanation implies that BH means would tend to fall as review period lengthens while the AR and RB means would tend to rise.

There is also negative serial dependence induced in very short-term returns because of the institutional arrangement of trading. Neiderhoffer and Osborne (1966) pointed out that negative serial dependence should be anticipated when a market maker is involved in most transactions (because successive transactions are conducted at either the bid or the asked price).[6]

First-order negative serial dependence in individual returns has the effect of widening the disparity between the buy-and-hold mean and the arithmetic and rebalanced means as the review period lengthens. This follows from the fact that a doubling of the review period introduces serial covariance terms in *addition* to those already present. However, the marginal effect of lengthening the review period should probably diminish as the review period becomes longer; the effect on measured mean return should be greater when changing from, say, a daily to a weekly review period than from a monthly to an annual period. The exact impact of serial dependence can, of course, only be determined empirically and we now turn to an examination of the data.

3. The empirical small firm premium

3.1. Results

In the previous section, we found that the computational formula for sample mean returns can affect the estimated expected return. The buy-and-hold (BH) mean (2) gives an unbiased estimate of the holding period return on a realistic portfolio. The rebalanced (RB) mean (3), gives an unbiased estimate of return for its strategy but it is not realistic if the period is short since rebalancing is so costly. Except under a fortuitous combination of circumstances, the arithmetic (AR) mean (3) gives a biased estimate of *both* the rebalanced and the buy-and-hold investment returns.

[6]A paper by Blume and Stambaugh (1983), which came to my attention after the first version of this paper was written, investigates this explanation for serial dependence in detail. They find empirical results very similar to those reported here. See also Cohen et al. (1979).

Although the arithmetic and rebalanced methods of calculating the mean return probably do not portray realistic investment experience, the small-firm premium is calculated as the *difference* between the two mean returns and one might hope that the improper portrayal in these methods would cancel. Unfortunately, this is not likely for several reasons. The intertemporal variance in the portfolio disturbance, $\tilde{h}$, and the cross-sectional variance in individual security expected returns, μ_i, will not be the same in samples of large and small firms. The disturbance, $\tilde{h}$, will almost certainly have a larger variance for portfolios of small firms while the cross-sectional variances of μ_i within large- and small-firm portfolios could conceivably differ in either direction. Furthermore, serial dependence has an effect which is stronger for stocks with lower trading volumes and thus with less synchronous trading and with larger bid/ask spreads.

Empirical evidence is reported in table 1. Small Firm Premia (AMEX–NYSE) are given for the 19 complete calendar years, 1963–1981, according to the method of computation and the 'review' period. As explained earlier, the 'review' period refers to the rebalancing interval for buy-and-hold returns. For example, with a monthly review period, an equal allocation is made to stocks listed on the first day of the month and the original positions are held until the end of the month. This is repeated for each calendar month of the sample. The daily rebalancing method uses the same available returns, but it re-initializes equal positions every day during the month. The arithmetic method simply averages the same available returns during the month.

In order to compare results across the different review periods, returns are annualized by linking together the review period returns obtained during the calendar year.[7] Thus, there are 19 annual observations (one for each calendar year, 1963–81), regardless of the review period.[8] Means and t-statistics are calculated from the 19 annual returns differences between exchanges; t-

[7]See footnote 2 for exact computational formulae.

[8]Daily and bi-daily returns are over trading day intervals, while weekly and longer returns use actual calendar intervals. In the weekly case, the first week of the year ends on the same day of the week as the last trading day of the previous year, say Thursday for a given year. Then weekly returns are computed from Thursday to Thursday during that year. If the year does not terminate on a Thursday trading day, the last 'weekly' return of the year is over the remaining fraction of a calendar week. This method of year-end padding was used to ensure that every daily return during a year was included, regardless of the review period. Only the bi-daily, weekly, and bi-weekly returns are subject to such padding because the other intervals are evenly divisible into years.

Weekly returns are not always for five trading day intervals. During 1968, the exchanges were closed on Wednesdays for part of the year so that a week was composed of only four trading days. Holidays are also a problem for weekly returns; if the calendar week ended on a holiday, the return was computed through the next trading day. Then the subsequent week's return covered four trading days. Bi-weekly returns were treated identically to weekly returns with respect to year-end padding, holidays, and exchange closings.

Table 1
The small firm premium as measured by the difference in returns between American Exchange and New York Exchange listed stocks, 1963–1981 (basic data are daily, January 2, 1963 — December 31, 1981).

Review period[a] (number of review periods in sample)	Return computation method[b]		
	Buy-and-hold (BH)	Arithmetic (AR)	Daily rebalancing (RB)
	AMEX–NYSE mean return differential (% per annum)[c]		
Daily (4767)	14.9 (3.16) [7.76]	14.9 (3.16) [7.76]	14.9 (3.16) [7.76]
Bi-daily (2389)	12.3 (2.64) [5.58]	14.9 (3.16) [7.06]	14.8 (3.15) [7.01]
Weekly (992)	9.81 (2.16) [3.35]	14.8 (3.15) [5.64]	14.7 (3.14) [5.62]
Bi-weekly (498)	8.27 (1.84) [2.46]	14.9 (3.14) [5.09]	14.7 (3.13) [5.07]
Monthly (228)	7.06 (1.58) [1.82]	14.9 (3.14) [4.40]	14.7 (3.11) [4.38]
Quarterly (76)	6.42 (1.43) [1.67]	15.0 (3.15) [3.88]	14.8 (3.12) [3.85]
Annual (19)	7.45 (1.53) [1.53]	15.1 (3.10) [3.10]	14.9 (3.07) [3.07]

[a]For the daily and bi-daily cases, one- and two-trading-day intervals were used respectively. For all other cases, actual calendar intervals were used. (In the weekly and bi-weekly cases, a residual interval was necessary to fill out each calendar year). All returns were compounded to an annual basis by linking successive observations within each year (see footnote 2 of the text).

[b]The computation method follows expressions (1), (2) and (3) of the text. For interested readers, the author will gladly supply a mimeographed sheet containing details on the treatment of delisting and listing securities. The main feature of the treatment of new listings and delistings was to assure that all three mean return methods employed exactly the same sample observations.

[c]*t*-statistics based on the 19 annual (linked) observations are in parentheses; *t*-statistics based on the review period returns as independent observations are given in brackets. To understand the difference in the two reported *t*-statistics, consider the example of the daily review period of which there are 4767 in the sample. The *t*-statistic in brackets is calculated from these 4767 (daily) observations (mean *daily* return divided by standard error of mean daily return). The *t*-statistic in brackets is calculated from 19 annual observations; each annual observation having been calculated by linking together approximately 250 (4767/19) daily observations observed during that year. In calculating the review-period-based *t*-statistics for the weekly and bi-weekly cases, ten days were omitted; these ten days were the reminders of partial weeks at year end. It turned out that in 10 years of the 19, the year was exactly 52 weeks plus one trading day long. An earlier version of the paper, available on request, details the effect of omitting these single-day partial weeks. N.B. This is an issue only for the bracketed *t*-statistics. The linked annual returns include *every* sample day.

statistics are also given based on review period returns taken as independent observations.[9]

The results most like actual investment experience are those in the first column, buy-and-hold returns. Most actual portfolios pursue a buy-and-hold strategy within a given review period with only minor modifications induced by new information about particular individual issues. The results are frequently expressed on an annual percentage basis by comparing wealth levels at the ends of successive years, i.e., after linking sub-year results.

The review period seems to have little effect on the AR and RB means. The annual average difference in returns between AMEX and NYSE issues is about fifteen percent. But for the BH means, the review period has a large impact. Monthly and longer review periods give an AMEX–NYSE return differential of only around seven percent (and the t-statistic does not indicate an overwhelming probability that the differential is even positive). The drop in the BH mean with lengthening review period is statistically significant and so is the difference between the BH and the other means.[10]

[9]Note that the t-statistics in these tables are based on the assumption that the annual returns (t-statistics in parentheses) and review period returns (t-statistics in brackets) are temporally independent. The results indicate that the AR and RB returns are, in fact, close to independent while there is negative serial dependence in the BH returns. This implies that the t-statistics for the BH means are actually *understated.*

[10]A statistical test of the significance of the review period can he conducted by considering each year's mean difference, AMEX–NYSE, as an independent observation. Let $D_{m,y,\tau}$ be the difference for year y, review period τ, and the method m (m=BH, AR, RB). Then the time series mean of $D_{m,y,\tau}-D_{m,y,\tau'}$ ($\tau\neq\tau'$) can be tested for significance under the presumption that the years constitute independent observations. t-statistics for the AR and RB means, for all combinations of τ and τ', never indicated significance. Of the 42 combinations (21 for each mean AR and RB) none exceeded 2.0, five exceeded 1.5, and 28 were less than 1.0. In contrast, the t-statistics for the BH mean comparisons across review periods are given below:

Review period τ'	Review period τ					
	Daily	Bi-daily	Weekly	Bi-weekly	Monthly	Quarterly
Bi-daily	6.21					
Weekly	6.75	6.82				
Bi-weekly	7.67	8.37	10.8			
Monthly	8.11	8.89	11.3	9.82		
Quarterly	8.10	7.68	8.65	6.49	3.27	
Annual	5.08	4.42	2.81	1.04	−0.532	−1.67

All BH means are significantly different across-review periods except the annual mean versus the bi-weekly, monthly and quarterly means. Note that these table entries are not statistically independent of one another (they were all calculated from the same underlying data).

A similar procedure can be employed to test the statistical significance of mean computational method. The difference $D_{m,y,\tau}-D_{m',y,\tau}$ ($m\neq m'$) forms another time series across years. Based on 19 annual observations, t-statistics for the significance of this difference from zero are as follows:

Given that the BH results in table 1 are most likely to portray actual investment experience, we now turn to the interesting econometric question: What explains the observed pattern of means? To aid in answering this question, the mean returns for each exchange are presented separately in table 2. Notice that the pattern is not predicted by the expected values of the mean returns derived in section 2.2 under the assumption of temporally independent returns. With serial independence, the BH expected mean should be greater than the RB expected mean. The empirical results in table 2 show, however, that serial dependence must be present since $\bar{R}_{BH}$ falls below $\bar{R}_{RB}$ as the review period lengthens.

The arithmetic (AR) mean is larger than the rebalanced (RB) mean as was expected with or without serial dependence. However, these two means are very close and this suggests that serial dependence in *portfolio* returns is not much of an influence [Cf. eq. (14)]. Indeed, the strikingly different behavior of the BH means from the other two means indicates that negative serial dependence in individual securities is the dominant influence on the results.

In order to be certain that the AMEX–NYSE comparison measures the small firm effect properly, table 3 is presented. It contains results for the annual review period and for portfolios classified directly by size. Firm size was calculated as market capitalization (market price times number shares), at the end of each year, 1962–1980. Firms were assigned to fractiles based on market capitalization and their returns were calculated for the following year according to three mean return methods, BH, AR, and RB.

Not surprisingly, the results are consistent with the AMEX corresponding to lower size quintiles and the NYSE to higher quintiles. The overall implication is identical: viz., the estimated small firm premium is much smaller and less significant when mean returns are computed with the buy-

Review period τ	m=AR, m'=BH	m=RB, m'=BH	m=AR, m'=RB
	t-statistic for difference		
Bi-daily	6.82	6.30	1.47
Weekly	7.33	6.80	1.59
Bi-weekly	8.14	7.59	1.74
Monthly	8.44	7.90	2.17
Quarterly	8.21	7.69	2.72
Annual	5.85	5.48	3.16

No statistic was computed in the daily case because all three means are identical by construction in that case. Notice that the BH means are significantly smaller than the other two means for all review periods.

Although the difference between the AR and RB small firm premium is very small (cf. table 1), the AR mean premium is always larger and is significantly larger for monthly, quarterly and annual review periods. This is predicted by eq. (14); the AR mean grows with review period relative to the RB mean.

Table 2
Mean returns on NYSE and AMEX listed securities, 1963–1981.[a]

Review period	Buy-and-hold (BH)		Arithmetic (AR)		Daily rebalancing (RB)	
	NYSE	AMEX	NYSE	AMEX	NYSE	AMEX
	Mean returns (% per Annum)					
Daily	17.24	32.09	17.24	32.09	17.24	32.09
	(2.94)	(3.29)	(2.94)	(3.29)	(2.94)	(3.29)
	[5.09]	[7.72]	[5.09]	[7.72]	[5.09]	[7.72]
Bi-daily	16.93	29.23	17.53	32.42	17.24	32.09
	(2.89)	(3.03)	(2.98)	(3.31)	(2.94)	(3.29)
	[4.59]	[6.25]	[4.76]	[6.96]	[4.68]	[6.88]
Weekly	16.38	26.19	17.79	32.61	17.26	31.99
	(2.80)	(2.78)	(3.02)	(3.34)	(2.94)	(3.28)
	[4.47]	[5.32]	[4.81]	[6.44]	[4.68]	[6.32]
Bi-weekly	15.86	24.14	17.95	32.83	17.29	32.08
	(2.72)	(2.58)	(3.05)	(3.36)	(2.95)	(3.28)
	[4.29]	[4.66]	[4.71]	[5.85]	[4.58]	[5.74]
Monthly	15.34	22.39	18.07	32.96	17.34	32.08
	(2.65)	(2.42)	(3.07)	(3.36)	(2.95)	(3.28)
	[3.11]	[3.08]	[3.67]	[4.54]	[3.51]	[4.41]
Quarterly	15.01	21.42	18.17	33.17	17.38	32.19
	(2.63)	(2.33)	(3.09)	(3.38)	(2.96)	(3.29)
	[2.73]	[2.62]	[3.22]	[3.84]	[3.09]	[3.73]
Annual	15.18	22.63	17.96	33.07	17.16	32.03
	(2.69)	(2.39)	(3.11)	(3.36)	(2.98)	(3.27)
	[2.69]	[2.39]	[3.11]	[3.36]	[2.98]	[3.27]

[a]See footnotes to table 1.

and-hold method than when means are computed with the AR and RB methods.

3.2. *Implications for previous research and for the 'risk-adjusted' small firm premium*

The implications of these findings for previously-published estimates of the small firm premium are: if the basic data were very short-term and arithmetic or rebalanced means were used, the estimated premium overstates the reward investors can expect from a buy-and-hold position in small firms. Papers by Reinganum (1981a, b, 1982) and Roll (1981) used daily data and arithmetic mean returns. Reinganum's (1982) paper gives monthly and quarterly returns but these were computed with the daily rebalancing method since the author states that '... these holding period returns are created by compounding the daily *portfolio* returns' (p. 34, emphasis added).

Table 3
Mean returns and small firm premia for portfolios classified by size[a] at year-end, 1963–1981, annual review period.

Size quintile	Return computation method[b]		
	Buy-and-hold (BH)	Arithmetic (AR)	Daily rebalancing (RB)
	Mean return (% per annum)[c]		
Smallest	27.9	46.0	44.9
	(2.42)	(3.68)	(3.61)
2	21.1	27.6	26.6
	(2.51)	(3.15)	(3.04)
3	17.1	20.7	19.7
	(2.41)	(2.86)	(2.73)
4	14.6	16.9	16.1
	(2.53)	(2.89)	(2.75)
Largest	10.8	12.2	11.5
	(2.50)	(2.85)	(2.68)
	Small firm premium, smallest–largest quintile (% per annum)		
	17.1	33.9	33.4
	(1.88)	(3.47)	(3.46)
	Small firm premium, smallest–largest decile (% per annum)		
	22.8	49.1	48.3
	(2.07)	(3.84)	(3.83)

[a]Firms are included in the *k*th size fractile if the closing price times the number of outstanding shares is ranked in that fractile among all listed AMEX and NYSE firms.
[b]The computation method follows expressions (1), (2) and (3) of the text. An unpublished appendix (available from the author) contains details on the treatment of listing and delisting.
[c]*t*-statistics based on 19 annual observations are in parentheses.

Papers with monthly returns are apparently much less subject to mean return estimation problems. Tables 1 and 2 show that there is little additional discrepancy between the BH and other means in going from monthly to annual data. The well-known paper by Banz (1981) used monthly data as did earlier papers on the closely-related stock price effect [Blume and Husic (1973), Bachrach and Galai (1979)]. Thus, it seems unlikely that the results presented in those papers will be much affected by the problem investigated here. In a more recent paper, Reinganum, (1983) used the buy-and-hold method and found results close to those reported above. Reinganum did not, however, contrast the buy-and-hold with other mean returns.

It is important to ascertain whether the *risk-adjusted* small firm premium is attributable solely to econometric problems. Is underestimation of risk for small firms [Roll (1981), Reinganum (1982)], combined with overestimation of expected returns, sufficient to induce the observed risk-adjusted premium; or is the premium really evidence of a misspecified capital asset pricing model (CAPM), perhaps because of omitted factors in the single index CAPM?

This is tantamount to asking whether the implicit CAPM market risk premium $\hat{p}$ ($\hat{p} \equiv \hat{\mathrm{E}}(R_{\mathrm{small}} - R_{\mathrm{large}})/(\hat{\beta}_{\mathrm{small}} - \hat{\beta}_{\mathrm{large}})$), is in a reasonable range. $\hat{p}$ was computed by Reinganum (1983) as 37.5 percent per annum using (a) buy-and-hold means on the smallest and largest deciles of NYSE and AMEX stocks, (b) Dimson's (1979) aggregated coefficient betas, (c) the value-weighted C.R.S.P. index and (d) daily data for 1963–1980. The return on the value-weighted index during this period was only about 9.5 percent, so $\hat{p}$ is grossly too large, thereby indicating a substantial risk-adjusted small firm premium.

The main problem with such a test was described some time ago [Roll (1977)]. Even if we make the dubious assumption that the value-weighted C.R.S.P. index is ex-ante mean/variance efficient, there is no necessity in the generalized Black (1972) C.A.P.M. that $\mathrm{E}(\hat{p}) = \mathrm{E}(R_M - R_F)$. Instead, the model requires that $\mathrm{E}(\hat{p}) = \mathrm{E}(R_M - R_Z)$ where Z is M's 'zero-beta' portfolio. Depending upon M's position on the efficient frontier, $\mathrm{E}(R_Z)$ can be negative and large.

To illustrate the difference in inferences that can be obtained with a different index, I recomputed $\hat{p}$ using (a) buy-and-hold annual means on the smallest and largest deciles of NYSE and AMEX stocks, (b) simple OLS beta coefficients estimated from annual returns,[11] (c) the *equally*-weighted C.R.S.P. index, and (d) annual data for 1963–1981.

The beta estimates (t-statistics) were $\beta_{\mathrm{small}} = 1.78$ (5.59), $\beta_{\mathrm{large}} = 0.598$ (8.60). Using the estimated premium $\mathrm{E}(R_{\mathrm{small}} - R_{\mathrm{large}}) = 22.8\%$ from table 3, we have $\hat{p} = 19.3$ percent. The actual ex post return on this market index was 15.3 percent, so $\hat{p}$ is still somewhat too high (thus indicating a risk-adjusted small-firm premium). Nevertheless, the discrepancy between a $\hat{p}$ of 19.3 and a market return of 15.3 is much less aberrant than the difference Reinganum (1983) reports between $\hat{p} = 37.5$ and $\bar{R}_M = 9.5$ percent.

It still seems that investigation of the observed small firm premium in the context of a more general asset pricing model would be a worthwhile endeavor; but estimation problems in expected returns and in simple risk parameters can explain much of the apparent anomaly.

[11]Instead of the Dimson aggregated coefficient betas, I used betas from annual data because of the now well-documented annual seasonal [Keim (1983), Roll (1983)], which has the potential to induce biases into any betas, including the Dimson type, when they are computed from non-yearly data.

5. Conclusion

Computing mean returns in order to estimate investment experience is not as easy as it sounds. Common stock data have serial dependence which, though seemingly slight, substantially affects the estimates obtained under alternate mean return computational methods. Investment experience is best portrayed by buy-and-hold portfolio returns but scholars often use arithmetic or rebalanced portfolio returns because they are easier to compute.

Perhaps this makes little difference for some studies; but if serial dependence differs systematically with the item being investigated, the computational method can be quite material.

For the small firm premium, as measured by the difference in mean returns of American Exchange and New York Exchange listed stocks, the buy-and-hold mean return difference is only about $7\frac{1}{2}$ percent per annum (for 1963–81) while the rebalanced and arithmetic methods produce annual return differences *with the same stocks and time periods* of over 14 percent. The annual difference in returns between the smallest and largest size quintiles (deciles) is about 34 (49.1) percent using the rebalanced and arithmetic methods and about 17 (22.8) percent using the buy-and-hold method.

The annual small-firm premium is only marginally significant at usual significance levels if mean returns are measured with the buy-and-hold method.

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The Size Premium in the Long Run

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Abstract

Contrary to the usual practice of including a size premium in a small firm's cost-of-equity estimation, this paper shows that there should not be such a premium in the long run because firm size is a changing characteristic. By tracking the return performance of firms in the same size group for a longer horizon, I find that the size premium wears off just after two years. This is much shorter than the general assumption used in the cost-of-equity estimation, so the role of the size premium in it should be reconsidered.

Keywords: Cost of Equity Capital, Size Premium, Size Effect, Regime Switching
JEL Classification: G12, G14

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1 Introduction

In the field of business valuation, practitioners usually include a size premium in a small firm's cost-of-equity estimation to account for a risk source or risk sources that cannot be captured by usual risk factors.[1] That is, on top of the cost of equity a small firm gets from the estimation by the CAPM or other models, it is usually offered an extra premium to compensate for the higher risk it is taking.[2] This paper aims to examine its validity, and the finding suggests that this commonly accepted size premium is not appropriate.

Since Banz (1981) and Reinganum (1981) both demonstrated that small size firms on the New York Stock Exchange usually outperform big firms than what the asset-pricing model of Sharpe (1964), Lintner (1965) and Black (1972) would suggest, the existence of the size effect has come into consideration by standard practice in the finance industry and soon became one of the most exploited concepts in modern finance. This size anomaly leads to an assumption that it might stem from a risk source or risk sources which cannot be explained by the market factor. Berk (1995) explains in theory that market value is inversely correlated with unmeasured risk because investors pay a lower price for a company's stock if it bears a higher risk than its CAPM beta could measure. The seminal works of Fama and French (1993), and Fama and French (1995) also acknowledge another kind of size effect in which

[1] Although there are many ways to define the size of a company, I stick to the most popular criteria, the market value of its equity, to proceed the discussion.

[2] Other than the CAPM, the build-up method and the Fama-French 3-factor model are also popular approaches in business valuation. The build-up method is advocated by the Ibbotson Associates, now a part of Morningstar, Inc., which aims to break down the expected return of a firm into a risk-free rate, a premium for equity risk, a risk premium attributable to this company by the industry it is in, and another risk premium for smaller size if applicable. This size premium is added in practice no matter whether the CAPM model or the build-up method is used. Please see Pratt and Grabowski (2008) Chapter 12 for a thorough discussion. Such a size premium is not required in the Fama-French 3-factor model because size is a risk factor embedded in it already.

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small firms usually outperform big firms in realize returns and they use the return differential between small and big stork portfolios (I call it “small stock premium" hereafter for convenience) as a risk factor (also known as *SMB*). If the CAPM holds well, the small stock premium should be proportional to the difference between the CAPM betas of small and big stock portfolios in cross section, and the size premium should not exist. However, empirical evidence shows that the small stock premium is usually much bigger than the CAPM could explain because small firms usually have a significant size premium, which links these two different perspectives of size anomalies together.

Besides serving as a measure of an alternative risk source, the idea of the existence of a small stock premium is often used in forming a trading strategy. Since the commence of the Dimensional Fund Advisors (DFA hereafter) in 1981, the strategy of overweighing small-cap stocks to exploit this small stock premium has been utilized extensively. This same concept is also used to construct ETFs featuring size as an important characteristic. There are currently at least 6 micro-cap and 40 small-cap ETFs trading on the U.S. stock exchanges.[3] The main attraction of these ETFs is to exploit their potentially higher returns over big firms or the market.

With all the acknowledgement from both academics and practitioners, however, there lies an inconsistency between these applications of the size effect. The usage of the SMB factor requires yearly rebalancing of the size portfolios, and a trading strategy related to firm size demands probably even more frequent position adjustments. However, the size premium added to a small firm’s cost-of-equity estimation is based

[3]Size is an important characteristic of these ETFs. However, it may not be the “only" characteristic. For example, the Vanguard Group, a U.S. investment management company, has three ETFs related to small-cap firms. Their exchange ticker symbols are VB, VBR, and VBK, which account for a total of $2.79 billion capital at the end of 2007. VBK is the combination of small-cap and growth stocks, while VBR is a small-cap and value stock ETF.

on the assumption that a firm will carry this extra premium in its discount factor moving forward for an extended period of time. Fama and French (2007) explain that the small stock premium comes from small firms gaining market capitalization and subsequently becoming bigger firms, but a firm's size behaves more like a long-lasting characteristic in the size premium application, which contradicts the empirical evidence. Although we do not know for certain which small firm will move to a bigger size group because of its own success, we do know that firms shift between different size groups in subsequent years after they were first assigned to a certain size rank. The size premium of a firm should be time-varying even if the CAPM beta of the size portfolio is time-invariant, so the cost of equity capital estimation could or should be adjusted accordingly if size has to be taken into consideration.

The existence of the size effect is not always perceived with full faith. This issue has to be addressed first, otherwise the debate of the application of the size premium will become a vain attempt. In the early 1980s when a fierce debate was conducted about the existence and the explanation of the size effect, Roll (1983) and Blume and Stambaugh (1983) both question the empirical importance of this phenomenon because the magnitude of the size effect is too sensitive to the technique used to evaluate the risk-adjusted return. Keim (1983) and Reinganum (1983) show that most of the risk-adjusted abnormal return to small firms occurs in the first two weeks in January, thus makes this effect easily exploited. It was the evaluation and the existence of the size premium being challenged, but the small stock premium was mostly untouched. Fiercer challenges came in the late 1990s, when Booth, Keim, and Ziemba (2000) argue that the January effect is not significantly different from zero in the returns to the DFA 9-10 portfolio over the period 1982-1995,[4] and Horowitz,

[4]The DFA 9-10 portfolio includes stocks with the lowest 20% market capitalization according to NYSE breakpoints.

Loughran, and Savin (2000b) also claim that the size effect ceases to exist after it was made well known because its benefit has already been exploited. Small firms do not have higher returns over big firms from the early 1980s to the mid-to-late 1990s, so the existence of the size effect is in doubt and deserves a thorough examination.

In this paper I will show that the size effect in the traditional definition is still intact given a longer sample period. The disappearance of the size effect in the 1980s and 1990s probably stems from a sample selection bias because the effect re-emerged in the late 1990s. I also examine whether this sample selection anomaly is a recurring scenario with a longer history of stock prices and find that the similar event occurred from the 1940s to 1960s.

However, an analysis of the evolution of the size premium will show that it is inappropriate to attach a fixed amount of premium to the cost of equity of a firm simply because of its current market capitalization. For a small stock portfolio which does not rebalance since the day it was constructed, its annual return and the size premium are all declining over years instead of staying at a relatively stable level. This confirms that a small firm should not be expected to have a higher size premium going forward sheerly because it is small now.

The paper proceeds as follows. Section 2 introduces the data used in this study. All NYSE, AMEX and NASDAQ operating firms are included and they are sorted by their respective market capitalization to form size portfolios. I also examine whether the size effect disappeared during the 1980s and 1990s and discuss its possible impact in this section. Section 3 offers a forward looking perspective of the size effect in response to the assumption of Fama and French (2007) that the small stock premium mainly resulted from firms moving between different size groups. We can also see the evolution of the size premium of the small stock portfolio and find evidence to con-

clude that a small firm does not always have a larger size premium simply because of its current size. Section 4 provides a method to separate the size premium into different regimes with macroeconomic variables, which shows that it is also very difficult to estimate the size premium with a time-varying estimation. Section 5 offers concluding remarks.

2 Data Description and the Evidence of the Existence of the Size Effect

2.1 Data Description

Monthly stock return data used in this research are collected from the University of Chicago Center for Research in Security Prices (CRSP) database. All NYSE, AMEX and NASDAQ operating firms are included when they are available on the CRSP tape.[5] Unlike Fama and French (1992), this study does not exclude financial firms from the sample because financial leverage is not in discussion. Since the market capitalization of a firm is the only firm characteristic covered in this paper and I also do not incorporate the Compustat database for the book equity data of companies, the number of firms each year is also greater than research considering both size and book-to-market equity characteristics. This choice of sample also prevents the potential survival bias generated by the Compustat database, please see the discussion in Kothari, Shanken, and Sloan (1995). The sample period is from December 1925 to December 2008.

The market portfolio return used in this paper is the CRSP value-weighted return on all NYSE, AMEX, and NASDAQ stocks, and the risk free rate is the total return on 30-day Treasury bill calculated by Ibbotson Associates.

To sort firms into different deciles according to their relative size, I follow the Fama and French (1992, 1993) tradition to use a firm's market equity at the end of June each year as the measure of its size. A firm has to be on the CRSP tape in

[5] American Depository Receipts, closed-end funds, Real Estate Investment Trusts, and companies incorporated outside the U.S. are excluded, which means only firms with CRSP share code 12 or less are included in this research.

June of year t to be included in a size portfolio from July of year t to June of year $t+1$ and years after that.[6] All NYSE listed firms are ranked each year according to their June market value, then these firms are allocated equally into 10 size portfolios on the basis of their relative size, so each portfolio has the same number of NYSE firms. The breakpoints between size portfolios are extracted from these NYSE firms, and AMEX and NASDAQ firms are inserted into these portfolios according to their market capitalization relative to the portfolio breakpoints. The first decile (portfolio 1) contains the smallest firms and the 10th decile (portfolio 10) includes the largest firms. In December 2008, Portfolio 1 has 1,895 firms and portfolio 10 has 158.

2.2 Does the Size Effect Still Exist?

In response to the question raised by Horowitz, Loughran, and Savin (2000b) about whether the size effect still exists, some basic statistics are presented in Table 1 to show that the effect did disappear during the 1980s and the early 1990s, but it was intact in most of the other sample periods. The statistics from the full sample are shown in Panel A. They are consistent with early findings on the size effect: big firms report lower returns than small firms, and the CAPM beta is also negatively related to size. The size premiums in the last row of each panel are calculated as follows:

$$\begin{aligned} SP_{i,t} &= R_{i,t} - \left(R_{f,t} + \beta_i (R_{m,t} - R_{f,t})\right), \text{ and} \\ SP_i &= \frac{1}{T}\sum_{t=1}^{T} SP_{i,t} \qquad i = 1, \ldots 10. \end{aligned} \tag{1}$$

[6] Instead of the usual one-year holding period immediately following the size sorting date, I also extend the holding period to longer time spans to see how persistent the size premium is for the same group of firms.

where SP_i represents the average size premium of portfolio i which is shown in the table, $R_{i,t}$ and $R_{m,t}$ are monthly returns on size portfolio i and the market portfolio, respectively. R_f is the risk-free rate. β_i is the CAPM beta estimated by regressing $(R_i - R_f)$ on $(R_m - R_f)$ with the matching sample period. This size premium captures the part of the size portfolio return which cannot be explained by the CAPM. Practitioners usually add it to the cost-of-equity estimation of small-cap firms to compensate for their higher risks. Another way to estimate the size premium is through the estimation of the CAPM alpha. However, I will not adopt this approach because the sample period used by the regression to estimate CAPM coefficients and the one used by the realized return in equation (1) do not always match in this article.

[Insert Table 1 here.]

Panel B displays the statistics of the same variables with the sample period before June 1980, roughly when the size effect was made well known by academia. Although the statistics in the first two panels are not exactly the same, they look very much alike.

Panel C of Table 1 is consistent with the assertion of Horowitz, Loughran, and Savin (2000a) that there is no significant difference between the performance of different size portfolios during the period from 1980 to 1996.[7] The average returns on different size portfolios are no longer negatively related to their market capitalizations. From portfolio 1 to 4, the four smallest size portfolios, the average returns are increasing instead of moving in the opposite direction shown in the early years. The pattern of size premiums is also different from the ones shown in the previous two

[7]This period can be extended to 1998 and the results are still in the similar pattern to what one would get with sample period from 1980 to 1996, so this longer sub-sample period is chosen instead of the one used by Horowitz, Loughran, and Savin (2000a).

panels. For instance, portfolio 1 and 2 did not have the largest size premiums, they had biggest size “discounts" instead.

It is often suggested that pricing anomalies may disappear after they were made known to the public by researchers or financial practitioners if these anomalies were easily exploited. Horowitz, Loughran, and Savin (2000a) show that simply adding $0.125 to the December 31 price of small stocks can easily lower their average January returns from over 8% to -0.37% during the 1982-1997 span. Since Keim (1983) and Reinganum (1983) showed that most of the size premiums to small firms occurred during the first two weeks in January, it is no surprise that the January effect could be totally wiped out just by informed investors flocking into the market to buy small firm stocks in December, and so goes the size premium.

Sixteen years of time is not short, but the recent development shows that the result in Panel C is more likely to be an aberration from the formerly established rule than a new norm. Panel D presents the statistics from the past 10 years and shows that the negative relation between firm size and equity return has been restored, with only a few exceptions from some mid-cap size portfolios. The inconsistency of the mid-cap portfolios probably arises because the sample period is too short to offer a robust pattern between a firm’s size and its return. It has to be noted that the realized equity premium of the U.S. market during these 10 years is slightly below zero, which is significantly lower than the historical standard. This might contribute to the flat security market line, where the beta of size portfolios seems independent of their respective average return.

Another serious threat generated by the data from the 1980s and 1990s is that the return differential between small and big firm size portfolios, also known as SMB in the Fama-French 3-factor model, may have an insignificant or even a negative price

of risk. This implies that the SMB factor is either meaningless or has a negative effect on the stock return. We can use a simple cross-sectional regression to show how and why this matters.

[Insert Table 2 here.]

Table 2 displays price-of-risk estimations of the popular Fama-French factors with different sample periods. Following the Fama and MacBeth (1973) procedures, in each sub-sample period I run time-series regressions of each test portfolio return in excess of the risk-free rate ($R^e_{it} = R_{it} - R_{ft}$) on the excess market return ($R^e_{mt} = R_{mt} - R_{ft}$), the returns on the small size portfolios minus the returns on the big size portfolio (SMB), and the differential between the returns on high and low book-to-market equity firms (HML).[8]

$$R^e_{it} = \alpha_i + \beta_i R^e_{mt} + s_i SMB_t + h_i HML_t + \varepsilon_{it} \qquad t = 1, 2, \ldots, T, \forall i. \tag{2}$$

The test portfolios include 5-by-5 portfolios formed on book-to-market equity and size, and 17 industry portfolios.[9] Since there are missing observations in the return series of the portfolio with the highest book-to-market equity and the largest size, it is taken out of the test portfolios. These portfolios are chosen because they cover different aspects of security characteristics.

The next step is to regress the expected returns of test portfolios from each sample period on their respective risk loading estimates from the time-series regression. I

[8]Please refer to Fama and French (1993) for the detailed definition of SMB and HML. Data on these two variables are obtained from Professor Kenneth French's website at Dartmouth University.

[9]All the portfolio data are also acquired from French's website.

take the average return of each portfolio from the corresponding sample period as their return expectation. The cross-sectional regression is:

$$E_T(R_i^e) = \beta_i \lambda_1 + s_i \lambda_2 + h_i \lambda_3 + a_i, \qquad i = 1, 2, \ldots, N. \tag{3}$$

where λ_2 is the price of the risk represented by the size factor SMB. During the period from 1980 to 1998, the price of SMB is insignificantly different from zero and its magnitude is also comparably smaller than it is in the other sub-periods. The number is 0.29 before 1980 and 0.20 after 1998, but it is only 0.07 from July 1980 to June 1998. The other parameters do not change as dramatically over different sub-periods. The price of a risk factor being equal to zero discredits its explanatory power to the cross-sectional variability of returns, and this is exactly the case for the SMB factor from 1980 to 1998.

It may be too early to say that the explanatory power of the SMB factor fully recovers in the post-1996 or the post-1998 period, but it is clear that the zero or slightly negative SMB price during the 1980s and 1990s is not necessary a lasting problem.

2.3 Regime Shifts of the small stock premium

As mentioned earlier, the size premium and the small stock premium are related because the risk-adjusted abnormal return of small firms is an important part of the return differential between small and big stock portfolios. According to Table 1 Panel A, the small stock premium of portfolio 1 is 3.39%, which accounts for half of the return difference between portfolio 1 and 10. Since the size premium is highly dependent on the asset pricing model and the sample period it is using, I will focus

on the possible structural change or regime shift of the small stock premium in this section first.

Although the differential between the returns on size portfolio 1 and portfolio 10 is different from the definition of the SMB factor in the Fama and French 3-factor model, I will borrow this acronym to represent the small stock premium for the following discussion. Motivated by the earlier discussion of the disappearance of the small stock premium in the 1980s and 1990s and the reappearance in the following years, I believe that there may exist structural changes or regime shifts of the expected mean of SMB. Panel A of Figure 1 exhibits the annual return differential between portfolio 1 and portfolio 10, in which we see annual SMB alternates between high and low values but certain persistency exists. From 1984 to 1998, the supposedly positive SMB is negative in most years except in 1988 and 1991 to 1993. The sample average of the equity risk premium during these 15 years is 10.53%, which is well above the historical average. Big firms performed exceptionally well while small firms did not during this period, so the disappearance of SMB should certainly came from the size premium, or lack thereof.

[Insert Figure 1 here.]

Assuming that the expected mean and variance of SMB can be expressed by a two state Markov-switching model, so the state variable S_t, which governs the regime shift, takes a value of 1 or 2. When $S_t = 1$, the expected mean of SMB_t is in the state of a low value, while $S_t = 2$ represents the state when the expected mean of SMB_t is high.

$$y_t = \mu_k + \sigma_k \varepsilon_t \qquad \varepsilon_t \sim N(0,1). \tag{4}$$

where y_t represents SMB_t, μ_k and σ_k are state-dependent mean and standard deviation of SMB_t. k=1 or 2, which identifies the state SMB_t is in at time t.

The state variable S_t is assumed to follow a 2-state first-order Markov process with fixed transition probabilities as follows:

$$\begin{aligned} p &= \Pr(S_t = 1 | S_{t-1} = 1) \\ 1-p &= \Pr(S_t = 2 | S_{t-1} = 1) \\ q &= \Pr(S_t = 2 | S_{t-1} = 2) \\ 1-q &= \Pr(S_t = 1 | S_{t-1} = 2) \end{aligned} \tag{5}$$

The mean and variance of SMB are determined by the current state, and the state variable S_t is not dependent on the past information beyond one period.

SMB_t under each state is assumed to follow the normal distribution and the parameters of the distribution function are only contingent on the state k, so

$$f(y_t | S_t = k) = \frac{1}{\sqrt{2\pi\sigma_k^2}} \exp\left(\frac{-(y_t - \mu_k)^2}{2\sigma_k^2}\right) \tag{6}$$

for $k = 1, 2$. The log-likelihood function is

$$\ln \mathscr{L}(y_1, y_2, \ldots, y_T; \theta) = \sum_{t=1}^{T} \ln[\Pr(S_t = 1) f(y_t | S_t = 1) + \Pr(S_t = 2) f(y_t | S_t = 2)] \tag{7}$$

and the regime probability $\Pr(S_t = k)$ can be estimated with the following recursive representation proposed by Gray (1996):

$$\Pr(S_t = 1) = (1-q)\left[\frac{f(y_{t-1} | S_{t-1} = 2)\Pr(S_{t-1} = 2)}{f(y_{t-1} | S_{t-1} = 1)\Pr(S_{t-1} = 1) + f(y_{t-1} | S_{t-1} = 2)\Pr(S_{t-1} = 2)}\right]$$

$$+p\left[\frac{f(y_{t-1}|S_{t-1}=1)\Pr(S_{t-1}=1)}{f(y_{t-1}|S_{t-1}=1)\Pr(S_{t-1}=1)+f(y_{t-1}|S_{t-1}=2)\Pr(S_{t-1}=2)}\right] \quad (8)$$

where the lowercase p and q are the transition probabilities defined in equation (5) and $\Pr(S_t = 2) = 1 - \Pr(S_t = 1)$.

Table 3 presents the estimation results of the above Markov-switching model along with an unconditional normal distribution model as its comparison. The sample period is from July 1940 to December 2008 instead of starting from July 1926 because it has to be trimmed short in the following sections to accommodate the portfolio positions with longer holding periods. According to the log-likelihood values, AIC, and BIC statistics of these two models, the Markov-switching model fits the sample better than the model with the assumption that SMB follows an unconditional normal distribution. The expected mean of the low SMB state is insignificantly different from zero, which explains why SMB can disappear over an extended period. The average annualized returns under two different states are -2.67% and 44.97%.

[Insert Table 3 here.]

Panel B of Figure 1 displays the smoothed probability in state 2 (high SMB state). Table 3 also shows the transition probabilities p and q, which are 0.9579 and 0.8090, respectively. These results imply that the low SMB regime is more persistent than the high SMB regime. On average the high SMB regime lasts for 5.2 months, and the low SMB regime keeps at the same state for 23.8 months. If the true data generating process of SMB follows the description of this Markov-switching model, it is no surprise that the small stock premium could disappear over a long period during the 1980s and most of the 1990s then resurfaces in recent years.

From Figure 1 we can also see that SMB is persistently low from 1946 to 1963, which indicates that the experience from the 1980s and 90s indeed has a predecessor. Repeat the same exercise done in Table 1 for this period, we can find that portfolio 1 has an average size premium at -1.77% per annum, while portfolio 10 has a slightly positive 0.42% average size premium. The average of SMB from 1946 to 1963 is -0.74%, which mostly stems from the low size premium of small stocks instead of the difference between their respective CAPM projections.[10] These results show that the temporary disappearance of the size effect is a recurring event. However, when we look at a longer time span, the small stock premium could still hold true at least on average.

[10]CAPM beta is still negatively related to firm size during this period, but the slope of the security market line calculated with returns on size portfolios and their respective betas is smaller than it is calculated with the full sample.

3 Size as a Genetic Code or a Short-Lived Characteristic?

If the size premium ceases to exist like Horowitz, Loughran, and Savin (2000b) assert, or its magnitude has no relation to firm size, there is no need to give a “premium" to a small firm when estimating its cost of equity capital. In fact, given what we see in Panel C of Table 1 we might have to give small-cap firms a discount if the negative size premium of portfolio 1 remains. The data from the last 10 years seem to restore the order of the size premium and the necessity to add it to small firms, but I will show in this section that it still remains to be proved whether a small-cap firm should require this size premium in its cost-of-equity estimation.

3.1 Design of the t+j Portfolio

Fama and French (2007) find that the return differential between small and big firms is mainly driven by small-cap firms moving up the size rank to become large-cap firms. This perspective changes the assumption of the size premium a small firm should get in the long run. The logic is simple: a small firm becomes a big firm because its market capitalization increases faster than its peer, which usually results from its fast growing price. However, small firms cannot keep the higher average return of old once they become big firms, otherwise the small stock premium will turn into a big stock premium. Although this is mainly an explanation of the small stock premium instead of the size premium, the discussion in the previous section shows that these two premiums are related.

Since the Fama-French size portfolios are constructed in each June and are held for a whole year until they are rebalanced in June next year, their finding implies that some firms are likely to switch to different size groups sooner than a year, especially for the small firms to become big firms. The usual practice of the size premium estimation is to calculate it with annually rebalanced size portfolios,[11] then we add this number to a firm's cost of equity for the following years to discount its future cash flows to the present value. We know this is probably a proper assessment of the discount factor for the first year, but is it still proper if an originally small firm becomes a big firm from the second year on and does not warrant such a premium hereafter?

To investigate whether the size premium is changing over time and how it evolves, I design the following $t+j$ size portfolio approach. In the traditional size portfolio formation, securities are assigned to each portfolio in June and the portfolios are held from July to June next year under a buy-and-hold strategy. In the $t+j$ size portfolio approach I also choose to sort securities in June of each year t, but instead of holding the portfolios for the following year, I also look at the monthly returns for an one-year holding period from July of year $t+j$-1 to June of year $t+j$, where $j = 2,\ldots,15$.[12] All the firms are identified and tracked by their CRSP permanent number. If a firm goes bankrupt or is merged by another firm in the following years, then it is taken out of the portfolio once it is off the CRSP tape. Otherwise it keeps in the same $t+j$ size portfolio as assigned in the initial sorting date no matter how big or how small its market capitalization becomes.

[11]For getting the size premium estimation, some practitioners rebalance the size portfolios more frequently. For example, Ibbotson Associates sorts and assigns all eligible companies to different size portfolios with the closing price and shares outstanding data for the last trading day of March, June, September and December instead of June each year.

[12]This approach reduces to the traditional size portfolio formation when $j = 1$.

For example, the firms in t+2 portfolios from July 1989 to June 1990 were sorted and assigned to different size portfolios in June 1988; the same composition of firms is used in t+1 portfolios from July 1988 to June 1989, which are 12 months immediately after the sorting date. The t+3 portfolios in July 1990 also consist of the same firms, except for those were delisted during the first two years. There is also another set of t+2 portfolios from July 1988 to June 1989, each consists firms sorted by their June 1987 size. We can string together all the t+2 portfolios to see how firms perform a year after its original sorting date for a whole year. The same process is done for all t+j size portfolios. This approach allows us to follow the average performance of firms j years after they were assigned to a specific size group.

If a firm's size behaves as a characteristic and this attribute follows the firm for an extended period of time, return patterns among different t+j size portfolios should not change much for different j. On the other hand, if a small firm deserves a lower size premium after it becomes a bigger firm, the size premium in the following years will decrease accordingly. By tracking the historical performance of firms sorted by size, we can get a better idea on how the size premium of a firm behaves and whether it is a good indicator of an extra risk source.

3.2 Size Premium is Changing Over Time

Practitioners usually consider a fixed size premium for a firm for subsequent years, which implies that either firms will not migrate to other size groups, or they will still demand the same size premium even after they switch to different size groups. To make a valid comparison between different t+j portfolios, I change the starting date of all portfolios from July 1926 to July 1940 to accommodate the t+15 portfolios,

which have companies being sorted in June 1926 but will not report the first return observation until July 1940.[13]

Table 4 presents the average size premiums of different $t+j$ size portfolios in reference to the respective CAPM projected returns on the traditional size portfolios. The "traditional" size portfolio means that firms are sorted and assigned to different size portfolios according to their June market capitalization, and the portfolios are held from July of the same year to June next year. The definition of the average size premium of a $t+j$ size portfolio is

$$\begin{aligned} SP_{i,t}^{t+j} &= R_{i,t}^{t+j} - \left(R_{f,t} + \beta_i (R_{m,t} - R_{f,t})\right), \text{ and} \\ SP_{i}^{t+j} &= \frac{1}{T}\sum_{t=1}^{T} SP_{i,t}^{t+j}, \end{aligned} \tag{9}$$

where $R_{i,t}^{t+j}$ represents the time t return on the $t+j$ portfolio of firms in the ith size group, and β_i is the same as in equation (1).

[Insert Table 4 here.]

The first decile size portfolio, which contains firms with the lowest market capitalizations among all listed firms on the sorting date, usually has a large and significant CAPM alpha and a beta too low to project the realized return. Table 1 shows that portfolio 1 has a size premium of 3.39% per annum with the sample period from July 1926 to December 2008. The corresponding number in Table 4 is the average size premium of the $t+1$ portfolio for portfolio 1. Although the benchmark is still calculated with the same beta, it drops to 1.49% because the sample period here does not start until July 1940. The difference reflects a large historical size premium for the

[13]The security return data on CRSP tape start from December 1925, so June 1926 becomes the first available sorting date.

small firms from 1926 to 1940. The premiums change a lot with different sample periods, but the pattern is nevertheless revealing. The smallest firms still get a bigger size premium, while the biggest firms even get a size discount.

If firms are supposed to be awarded a fixed size premium for years, we should see the numbers in Table 4 remain stable over different $t+j$ portfolios within each size group. The result is apparently contrary to this hypothesis. The size premium of portfolio 1 drops dramatically two years after the initial sorting date and becomes insignificantly different from zero in the third year. After that the small firms get a discount and such a discount gradually becomes significantly different from zero. On the other hand, portfolio 10 sees its size premium going up from the negative value in the first two years to a positive but insignificant number for the most part of the following eight years. Most of the size portfolios have a declining size premium after the sorting date except for portfolio 10, which reflects the fact that returns on different size portfolios tend to converge to the same number over years. Table 5 shows that the difference in average returns on different size portfolios gradually becomes insignificant as sorting dates pass by.

[Insert Table 5 here.]

If history can be any guide to the future performance, we are likely to over-estimate the cost of equity capital of small firms and under-estimate the cost of equity of big firms by the current treatment of the size premium.

3.3 Robustness Check

We have seen in Table 1 that the historical averages of both the size premium and the small stock premium are sensitive to the choice of the sample period, but the

pattern remains unchanged if given a long enough horizon. Here I will verify that the findings in this section are not sensitive to different breakpoints of size groups.

Fama and French (2007) divide firms into two groups in terms of size to explain the cause of the Fama-French SMB factor, so I also divide all the acting firms into two groups according to the NYSE median market-cap breakpoint in each June.

For better examining the relation between firm size and the corresponding return performance, I also rank firms according to their size each June and form three portfolios with firms of their size in the bottom 30%, middle 40%, and top 30% (S-30%, M-40% and B-30% hereafter) by the NYSE market-cap breakpoints.

The size premiums calculated with new breakpoints are displayed in Table 6. The big size portfolios (Big or B-30%) all have very small and insignificant size premiums like the size premium of portfolio 10 reported in Table 4. Please be noted that I still use the traditional size portfolio approach (it is equivalent to the t+1 portfolio here) with the new breakpoints and the sample period from 1926 to 2008 to estimate CAPM betas. The size premiums of "Small" and "S-30%" size portfolios are significant through t+1 to t+4 or t+5 portfolios, respectively, and they are also declining as j goes up. Ten or seven years after the initial sorting dates, these two small size portfolios even have a discount. These characteristics are all consistent with the pattern shown in portfolio 1 in Table 4.

[Insert Table 6 here.]

Comparing Table 6 to Table 4, it is apparent that the size premium for small stocks in the traditional sense does exist no matter how many size groups the stocks

are divided into, but it fades out gradually if the same composition of firms is held longer than a year.[14]

If a group of firms have the same stream of expected future cash flows, it is possible that the firm with a higher risk is going to be priced lower. Such a firm may end up having a higher return because it is more likely to have a higher dividend yield. However, small firms do not only gather higher returns through higher dividend yields, they usually have higher capital appreciation rates too. Fama and French (2007) explain that migration of stocks across size groups is the cause of the small stock premium.[15] Once a small firm's market capitalization increases and it is qualified as a big firm, a size premium should not apply anymore. According to Table 4 and 6, small firms did have higher size premiums when they were first assigned to the small size portfolio, but this effect does not persist. A firm which belongs to portfolio 1 sees its size premium turns into a discount after a few years if it is still expected to be compensated as a small stock. It is probably reasonable for a small firm to get a larger discount factor than the CAPM suggests because it bears higher risks than the model can explain for the time being, but the usual practice could very likely over-compensate the risks a small firm is bearing.

If the size effect has to be considered in the cost-of-equity estimation, we should search for the root of this short-lived premium and identify the risk source it represents. This is just as important as how much it is, if not more important.

[14]The small stock premium fades away until it is barely noticeable. However, the size premium for small stocks sometimes becomes a size discount if the same composition of stocks is held for a few years.

[15]In their article Fama and French use "size premium" to refer to the fact that small-cap firms have higher returns than big-cap firms without risk adjustment, which is equivalent to the "small stock premium" used in this paper. As shown earlier that these two premiums are related.

4 Size Premium under Different Economic Situations

Section 3 shows that a small firm can have a higher size premium only in the short run. Over a longer time span, a firm's size and even its sensitivity to risk are all subject to change, and its size premium changes accordingly.[16] In light of these results, I propose not to include a fixed size premium in the long-term cost-of-equity estimation. However, the size premium, no matter how short-lived it is, still appears to exist in the first few years for small firms. Take the popular discounted cash flow method as an example, the first few years matter the most if given a steady stream of future cash flows. By excluding the size premium from the cost-of-equity estimation, one might argue that we are also likely to understate the risk a small firm is taking.

The simplest way to resolve this conundrum seems to apply a time-varying cost of equity by adding different size premiums to the estimation according to the results in Table 4. The short-term size effect is thus accounted for, and the long-term size premium is also no longer permanent. However, Table 4 only displays the standard deviation of the average of the size premium, the variation of the annual size premium per se is much larger. If the size premium swings between high and low levels like the two-regime small stock premium model shown in section 2.3, adding an average size premium into the short-term cost-of-equity estimation may not help the matter. We could easily over-estimate the cost of equity of small firms in one period and suppress their value, while under-estimate the cost of equity in another period

[16] CAPM betas of all size groups are monotonically decreasing from t+1 through t+15 portfolios. These results are not shown in the tables, but they are available upon request. In this paper I use the traditional size portfolios with the full sample (July 1926 to December 2008) to estimate CAPM betas to get a consistent benchmark in all cases but ones in Table 1.

and bring the price to an un-deserving high level. In this section I will examine the likelihood of this scenario.

The concept of connecting financial distress to firm size has been discussed in the asset pricing literature to explain the anomalous cross-sectional pattern of stock returns. Queen and Roll (1987) find that a firm's unfavorable mortality rate is a decreasing function of its size, and Campbell, Hilscher, and Szilagyi (2008) further show that size has a negative relation with the excess return between safe and distress stocks. I will examine from a different angle to see whether economic distress has an effect on the size premiums.

I divide the sample period into several two-regime scenarios according to different macroeconomic variables related to distress and calculate the size effect under each regime. There are two reasons for this experiment: the first is that only the systematic risk should be taken into account when pricing a firm or an asset. If small firms are supposed to be awarded a higher premium sheerly because of their failure risk, then we should be able to distinguish different patterns of their size premium under different economic situations. Second, in light of the success of a simple Markov-switching model used on the small stock premium in section 2, it is natural to try a two-regime model on the size premium as well. However, the estimation of the size premium is highly contingent on the choice of the asset pricing model and the sample period, so I do not investigate the possible regime shifts of the size premium directly. Instead, I will try to explore the relation between the size premium and three different candidates of macroeconomic variables. If the size premium is at least partly driven by systematic risk sources, its magnitude should vary as the economic environment changes.

4.1 Identifying the States of Economy

The first state variable is an indicator variable which identifies the economic status during a business cycle: a dummy variable which equals 1 for months in the expansion period and 0 for months in the contraction period.[17] When in distress, smaller firms usually get hit harder because they have thinner cushion in common equity and their ability to raise capital via new debts, bank loans, or even government bailouts is also poorer than big firms. On the other hand, small firms which survive the storm can often see a sudden boom in their stock returns, as were evidenced by their bigger beta.[18] Whether the bigger volatility in the stock return for the small stock portfolio can translate to separate size premiums is the focus of the investigation. According to NBER's Business Cycle Dating Committee, there are 14 business cycles since 1926 to date with the shortest contraction period being 6 months and the shortest expansion period being 24 months.

The second indicator is the market trend, which is similar to the idea of the business cycle. I distinguish the bull and bear markets by a Markov-switching model on the CRSP value-weighted market portfolio return with the similar procedure laid

[17]NBER's Business Cycle Dating Committee publishes the U.S. business cycle peak and trough months on the NBER website. Their latest announcement on 12/01/2008 declares that the previous expansion period peaked in December 2007 and a recession soon followed. The conclusion of the current recession has not yet been determined as the writing of this paper. I assume all of year 2008 fell into the contraction period to make the sample period consistent with other state variables.

[18]Fama and French (1993) point out that small firms do not participate in the economic boom of the middle and late 1980s for an unknown reason. This finding is consistent with the argument of the disappearance of the size effect in the 1980s and 1990s. Indeed, the small stock premium was -10.4% per annum from December 1982 to July 1990, the expansion period right after the longest recession since the Great Depression. However, small firms greatly outperform big firms during the economic booms after the Great Depression or the recession caused by 1973 oil crisis, with average small stock premiums at 55.9% and 23.1%, respectively. It is probably premature to judge the experience in the 1980s as a new norm or just an anomaly. Nonetheless, the magnitude of SMB during the expansion periods in the middle 1930s and the late 1980s could counter the argument raised by Fama and French (1993).

out in section 2.3.[19] Regime 1 represents the state of the bear market with a lower mean return and higher volatility; regime 2 indicates the bull market with a higher mean return and lower volatility. An indicator variable is used to represent the bull market with its value being equal to 1 when the regime 2 smoothed inference of the month is greater than 0.5, and 0 otherwise. The reason to use a dummy to identify the market trend instead of the realized market return is to filter out noise. When we apply the size premium on the cost of equity capital estimation, we look for the long-term performance instead of the short-term disturbance. Looking too much into the day-to-day or month-to-month performance will mix up true trend and noise. For instance, even during the huge market downturn in the Great Depression, when the Dow Jones Industrial Average (DJIA) dropped from then historical high of 381.17 on 9/3/1929 to the following lowest point of 41.22 on 7/8/1932, we can still see the market posted double digit gains on return during the process. In February and June 1931, the monthly returns derived from the DJIA were 12.40% and 16.90%, respectively. These were great rallies even in any bull market, but they still cannot stop the free fall of the stock market and the investment environment would not be changed simply because of a sudden spark of life. Since the cost of equity capital and the size premium are all about the long term prospect of the firm, it is more fitting to examine the general market trend in this simple fashion.

The third indicator is the credit spread between AAA and BAA corporate bond rates. The data are obtained from the Federal Reserve Bank of St. Louis website. Although we cannot link a firm's size directly to its credit rating, large firms usually get better ratings and lower borrowing rates.[20] When there is abundant credit

[19]There is no consensus on the definition of bear or bull markets other than a general description. Here I adopt the market trend definition of the model 1 in Chen (2009).

[20]According to the summary statistics provided by Altman and Rijken (2004), firm's credit rating is negatively related to the market value of equity. I also compare the average market values between

floating in the market, the credit spread tends to narrow down because banks and funds compete against each other for an investment opportunity without thinking too much about the risk. This process will eventually drive the spread down. On the other hand, the credit spread increases when the credit market is in a dire condition and investors take default risks more seriously. Every banker will think twice before lending money out. When the credit spread is high, it is more likely that small firms endure a higher borrowing cost than big firms, therefore their failure risk induced by the poorer credit rating is also higher. I continue to apply the same technique previously used in the market trend indicator to separate the credit spreads into two different states, and then convert the smoothed inference into a dummy variable using the 0.50 threshold.

The transition probabilities of staying in the same state for the Markov-switching model of the market trend are 0.892 (bear market) and 0.963 (bull market); they are 0.987 (low credit spread) and 0.974 (high credit spread) for the credit spread. The common feature of these macroeconomic variables is that the states defined by them are all very persistent, so we can link these variables with the shift of the size premium over a longer span instead of the month-by-month movement. Once the state variable of the market trend shifts to the bull market state, it would stay put for 27 months on average, and a credit spread dummy remains in the state of a lower mean value for 78 months.

[Insert Figure 2 here.]

firms with investment grade ratings and with non-investment grade ratings over the past 15 years. The average size of firms with better credit is 9 to 10 times bigger than the size of poorer rating firms. The sample includes all firms in the Compustat database from 1994 to 2008.

Figure 2 illustrates three different dummy variables on the right-hand side and their original data on the left.[21] It has to be noted that these state variables are all asymmetrical. We see expansion periods more often than contraction periods, longer bull markets than bear markets, and more days with low credit spreads than days with high ones. Over the total 822 observations, there are 698 months identified as in the expansion period, 646 months in the bull market, and 552 months in the low credit spread regime.

4.2 The Size Premium under Different Economic Environments

These state variables do not highly coincide with each other, but they are all capable of separating the size premium of small stocks under different states. I also use the $t+j$ portfolio approach to see whether these states can identify the size effect of stocks over the long run. Table 7 and 8 present the size premiums of the first and the 10th size portfolios under different economic situations.

[Insert Table 7 here.]

[Insert Table 8 here.]

The first column of Table 7 or 8 shows the same average size premiums as the corresponding column in Table 4. Through the second column to the last, the average size premiums under different states of the same macroeconomic variable are paired with each other. The second and third columns are the average size premiums in the expansion or contraction state identified by the business cycle dummy; the fourth and fifth columns show the averages during bull or bear markets from the market

[21] I use the GDP growth rate for the business cycle dummy as its “original data". However, it is well known that the Business Cycle Dating Committee of the NBER does not determine the peaks and troughs by the GDP data alone.

trend dummy; and the last two columns are average size premiums in the high or low state of the credit spread dummy.

The last row of each table shows the number of observations in a specific state. These three dummy variables post asymmetric states as earlier mentioned, but the credit spread dummy is significantly different from the others because the state brings the higher average returns has a lot less observations than the state brings the higher return for the other two dummy variables.[22]

Small stocks usually have a high and significant size premium, and this premium is even more pronounced in the expansion period or the high credit spread period, and interestingly, during the bear market. Portfolio 1 has a positive premium for most of the $t+j$ portfolios during the market downturn because the market trend dummy successfully identifies the low return period of the market, which in turn drives the benchmark even lower than the drop of the realized return on small stocks. The time series dynamics of the size premium revealed by the $t+j$ portfolio approach present a different scenario for the business cycle dummy. It is indecisive whether a small firm has a greater size premium during the expansion or contraction period.

Table 8 displays the size premium, or more precisely, the size discount of portfolio 10. Large firms usually can be explained well by the CAPM or other asset pricing models, so the common practice does not require a size premium on them. Even under different states, the size premiums are still small in magnitude comparing to the corresponding statistics of portfolio 1. If we focus on the first few $t+j$ portfolios, the business cycle does not seem to play an important role. The average size premi-

[22]The state generates the higher average return does not necessarily have the higher size premium. The latter also depends on the sensitivity to the market risk and the market return under this “unfavorable" state.

ums under different regimes of the market trends or credit spreads are much more different, but they are still not as pronounced as their counterparts in portfolio 1.

A one-sided t test on unequal sized variables is also applied here to compare the difference between average size premiums under different economic states. The size premiums in Table 7 and 8 are shown in **boldface fonts** if the difference is significant at the 10 percent level. We cannot reject the null hypothesis that none of the size premium pairs of portfolio 1 or 10 are significantly different during different periods of business cycles. The same test for different market trends shows the similar result for the first nine years for portfolio 1 and the first two years for portfolio 10. The state variable derived from the credit spread data is the most successful of all. The difference of the average size premiums of $t+j$ portfolios is significant at 10 percent level for most of the cases for portfolio 1, and it is also significant for the first 6 years for portfolio 10.

The size premium a small firm should demand for bearing higher risks is limited only in the first few years and its magnitude is difficult to predict. The empirical results imply that we should be very careful to identify the risks a firm is bearing instead of taking it only by the firm's current size. If there are other systematic risks which is related to size, we should reconsider whether that is the cause of a firm being riskier than the others and assign the specific risk premium to it accordingly.

5 Conclusion

This study verifies the existence of the size effect of annually rebalanced size portfolios with a longer sample period, but suggests not to include the size premium in the cost-of-equity estimation of small firms because this effect is only short-lived.

The assertion of the disappearance of the size effect in the 1980s and 90s was just a result of sample selection. Similar events of temporary disappearance of the size effect from different periods were found but they have never been proved permanent. Suffice it to say that the size effect did not simply disappear because it was revealed by academics and exploited by practitioners. It is shown in section 2 that the small stock premium can be better captured by a two-state Markov-switching model rather than the usual stationary normal distribution assumption. This empirical evidence is consistent with the story of the temporary disappearance of the size effect in the 1980s and 1990s.

Using the $t+j$ portfolio approach designed for this study, I demonstrate that the small stock premium declines if we hold the size portfolio longer than the usual one-year holding period rule. This can be considered as evidence of Fama and French (2007)'s finding that the size premium stems from small firms moving up the size rank to become big firms. Since firms move between size groups, the size premium should not be considered as a constant and it has to reflect the new size group they are currently in. The popular perception of a fixed size premium used by practitioners in the cost-of-equity estimation is obviously mistaken. I track the size premiums of different size portfolios for the subsequent 15 years after their formation date and find that most of the premiums converge toward zero, so firms should not be awarded a size premium for a long-term estimation.

If the size premium of a firm is estimated with the assumption that a firm moves from one size group to another all the time, it should be time-varying as well. The average size premium of portfolio 1, which includes all NYSE, NASDAQ and AMEX firms with market capitalization less than the first decile market-cap breakpoint of all NYSE listed firms, is 1.49% for the first year after its creation for the past 68 years. The same composition of firms still merit an average of 1.02% premium in the following year, but it declines rapidly after that. Adding a fixed size premium according to a firm's current size could very well overstate the relation between a firm's size and the risk it is bearing.

Certain macroeconomic variables can help us to distinguish the possible regimes of the size premium. These variables include the business cycle, the market trend, and the credit spread. However, the decision to distinguish the size premium of a firm under the assumption of one specific state is very difficult to make given how highly volatile the monthly size premium is. Adding a naive size premium to a firm's cost of equity capital estimation still potentially introduces more errors no matter this size premium is fixed or time-varying.

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Figure 1: The return difference between the first and the 10th decile size portfolios and the smoothed probability of the high small stock premium regime. Panel A shows the annual portfolio return difference between small and big stocks. It is apparent that big firms outperform small firms most of the time from the mid-1980s to late 1990s. This account for the "disappearance" of the size effect in that time span. Similar situation also happened in the 1950s and late 1960s to early 1970s. The smoothed inference of the high SMB regime is shown in Panel B.

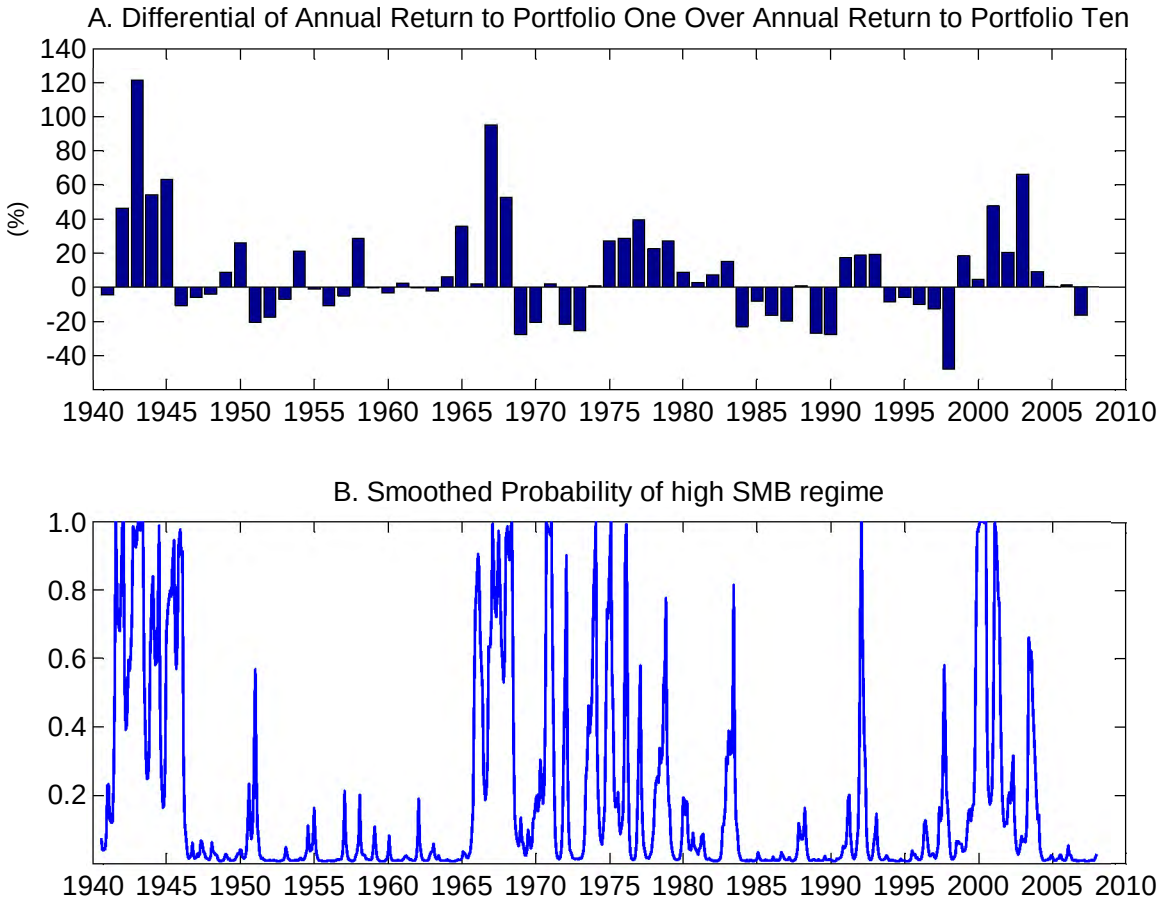


Figure 2: Three different dummy variables indicates three different economic environments. The first row includes the GDP growth rate of the U.S. and the business cycle dummy. The second row presents the CRSP monthly return and the market trend dummy variable derived from the smoothed probability of the bull market regime. The third row contains the credit spread and the high credit spread dummy also generated from the smoothed inference of a two-state Markov-switching model.

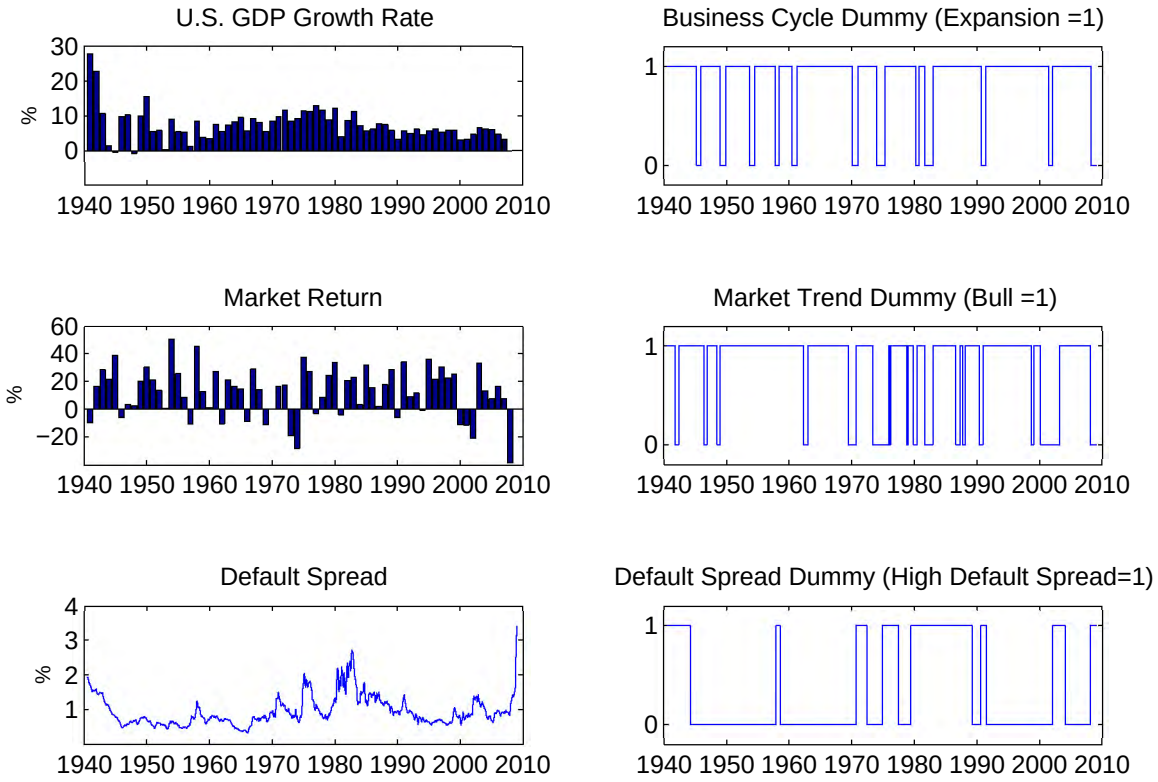


Table 1: **Returns on Size Portfolios and Size Premiums in Reference to CAPM**

Panel A. Full Sample (1926.7 to 2008.12)

	1 (Small)	2	3	4	5	6	7	8	9	10 (Big)
Mean Return	17.36	14.79	14.52	14.37	13.68	13.22	12.75	12.16	11.66	10.14
Standard Dev.	35.46	30.86	28.39	26.58	25.08	23.68	22.77	21.82	20.24	17.80
β	1.46	1.40	1.34	1.27	1.25	1.20	1.16	1.13	1.05	0.93
Size Premium	3.39	1.21	1.37	1.70	1.21	1.08	0.85	0.53	0.54	-0.10

Panel B. 1926.7 to 1980.6

	1 (Small)	2	3	4	5	6	7	8	9	10 (Big)
Mean Return	20.44	16.19	15.61	15.23	14.14	13.84	12.58	12.22	11.45	9.70
Standard Deviation	41.17	34.89	31.96	29.55	27.82	26.30	25.13	23.80	22.12	19.04
CAPM β	1.60	1.48	1.41	1.32	1.29	1.24	1.19	1.14	1.07	0.93
Size Premium	5.14	1.79	1.80	2.11	1.30	1.38	0.50	0.54	0.33	-0.29

Panel C. 1980.7 to 1998.6

	1 (Small)	2	3	4	5	6	7	8	9	10 (Big)
Mean Return	12.93	14.50	15.96	16.52	17.23	16.96	17.16	15.94	16.84	17.40
Standard Dev.	17.63	17.89	17.77	17.66	17.16	16.24	16.09	15.58	15.32	14.32
β	0.95	1.07	1.10	1.10	1.09	1.05	1.08	1.04	1.04	0.96
Size Premium	-2.99	-2.61	-1.40	-0.90	-0.08	0.01	-0.03	-0.93	0.01	1.31

Panel D. 1998.7 to 2008.12

	1 (Small)	2	3	4	5	6	7	8	9	10 (Big)
Mean Return	9.14	8.05	6.48	6.26	5.23	3.61	6.03	5.36	3.87	-0.03
Standard Dev.	25.11	26.08	23.24	22.94	21.33	19.83	19.57	20.24	17.13	16.10
β	1.06	1.21	1.15	1.13	1.13	1.08	1.08	1.14	0.98	0.92
Size Premium	7.47	6.59	4.95	4.68	3.66	1.97	4.38	3.80	2.07	-1.92

All securities in NYSE, AMEX and NASDAQ are sorted at the end of June of each year t and are assigned to ten different size portfolios according to NYSE breakpoints. The size portfolios are constructed with securities in each size group with their respective market cap as weights and are held from July of year t through June of year $t+1$.

β's are estimated with regression of monthly portfolio returns in excess of the Ibbotson Associates risk free rate on the CRSP value-weighted market returns in excess of the same risk free rate.

The size premium is calculated by subtracting the product of the CAPM beta and the equity premium from the size portfolio returns in excess of the risk free rate. All the equity risk premiums in different panels are estimated from their respective sample periods.

Returns, standard deviations and size premiums are all annualized and in percentage points.

Table 2: **Prices of Fama-French Risk Factors**

	1926.7-2007.12	1926.7-1980.6	1980.7-1998.6	1998.7-2007.12
$R_m - R_f$	0.64 (0.17)	0.70 (0.23)	0.84 (0.29)	-0.04 (0.44)
SMB	0.24 (0.11)	0.29 (0.14)	-0.04 (0.17)	0.47 (0.37)
HML	0.38 (0.12)	0.41 (0.15)	0.41 (0.18)	0.24 (0.35)

I calculate the price of risk of the Fama-French (1993) three factors with Fama and MacBeth (1973)'s two-pass regression approach. These data are retrieved from Professor French's website at Dartmouth. Test portfolios are obtained from 25 portfolios formed on size and book-to-market equity and 17 industry portfolios. Since there exist missing values in one of the 25 size/BM portfolio, it is taken out of the portfolio set. The returns on the remaining 41 test portfolios are named as R_{it}, $i = 1,2,\ldots,N, N = 41$.

First we find beta estimates from the time-series regressions,

$$R^e_{it} = \alpha_i + \beta_i R^e_{mt} + s_i SMB_t + h_i HML_t + \varepsilon_{it} \qquad t = 1,2,\ldots,T, \forall i.$$

where $R^e_{it} = R_{it} - R_{ft}$ and $R^e_{mt} = R_{mt} - R_{ft}$.

Then estimate the factor risk premiums λ from a cross-sectional regression,

$$E_T(R^e_i) = \beta_i \lambda_1 + s_i \lambda_2 + h_i \lambda_3 + a_i, \qquad i = 1,2,\ldots,N.$$

Since the pricing errors a_i are likely to be correlated, we follow Cochrane (2005)'s suggestion to run a GLS cross-sectional regression and the estimations of the price of risk are

$$\begin{aligned} \hat{\lambda} &= (\beta \Sigma^{-1} \beta)^{-1} \beta \Sigma^{-1} E_T(R^e), \text{and} \\ \sigma^2(\hat{\lambda}) &= \frac{1}{T}\left[(\beta \Sigma_f^{-1} \beta)^{-1} + \Sigma_f\right] \end{aligned}$$

where β is an N-by-3 matrix with $[\beta_i \ s_i \ h_i]$ in each row, $\lambda = [\lambda_1 \ \lambda_2 \ \lambda_3]$, f is a T-by-3 matrix of the risk factors, R^e_{mt}, SMB, HML.

The sample period is broken down like in Table 1. The parameter estimates in each subperiod use only observations from that subperiod. Standard deviations of λ estimates are reported in parentheses.

The insignificance of parameters in the subperiod from July 1996 to December 2007 probably results from sample selection and short sample period. The most interesting finding is on λ_2, the price of the risk factor SMB. During the sample period from July 1980 to June 1996, the price of this factor is not only insignificant but also much smaller in its value.

Table 3: **Regime Switching Model of the return difference between the 1st and 10th decile Size Portfolios**

	Regime Switching Model			Unconditional Normal Dist	
	Parameter	Standard Deviation		Parameter	Standard Deviation
μ_1	-0.002436	0.00189	μ	0.004590	0.001825
μ_2	0.036465	0.01184			
σ_1^2	0.001263	0.00013	σ^2	0.052284	0.000136
σ_2^2	0.008167	0.00179			
p	0.9579	0.01991			
q	0.8090	0.11592			
Log-Likelihood Value	1367.73901			1257.87773	
AIC	-2723.47802			-2511.75546	
BIC	-2695.20758			-2502.33198	

Table 4: **Size Premium of *t+j* Decile Size Portfolio**

	Small	2	3	4	5	6	7	8	9	Big
t+1	1.49	0.57	0.94	1.26	0.87	0.48	1.02	0.48	0.50	-0.19
	(0.56)	(0.42)	(0.34)	(0.31)	(0.26)	(0.22)	(0.18)	(0.16)	(0.12)	(0.11)
t+2	1.02	1.70	1.63	1.50	1.16	0.53	0.36	0.84	0.36	-0.14
	(0.52)	(0.40)	(0.33)	(0.29)	(0.25)	(0.21)	(0.18)	(0.15)	(0.13)	(0.11)
t+3	-0.67	1.33	1.51	0.77	1.46	0.47	0.34	0.52	0.17	0.03
	(0.48)	(0.39)	(0.32)	(0.29)	(0.25)	(0.22)	(0.18)	(0.15)	(0.13)	(0.12)
t+4	-1.60	1.96	0.79	1.69	0.82	-0.04	0.59	0.37	0.40	0.10
	(0.45)	(0.37)	(0.32)	(0.29)	(0.25)	(0.22)	(0.18)	(0.16)	(0.12)	(0.12)
t+5	-0.83	1.42	1.26	0.58	-0.44	0.73	0.88	0.53	0.27	0.10
	(0.44)	(0.37)	(0.31)	(0.27)	(0.24)	(0.20)	(0.19)	(0.15)	(0.12)	(0.12)
t+6	-0.18	0.43	0.91	0.38	0.29	0.90	0.49	0.77	0.18	0.14
	(0.44)	(0.36)	(0.30)	(0.27)	(0.23)	(0.21)	(0.19)	(0.14)	(0.13)	(0.12)
t+7	-1.57	0.51	0.43	0.27	0.66	0.89	-0.78	0.12	0.50	0.29
	(0.43)	(0.35)	(0.30)	(0.26)	(0.24)	(0.21)	(0.17)	(0.15)	(0.14)	(0.12)
t+8	-1.31	-0.54	0.86	0.99	0.19	0.12	0.34	0.27	0.64	0.11
	(0.42)	(0.33)	(0.30)	(0.25)	(0.23)	(0.20)	(0.18)	(0.14)	(0.13)	(0.13)
t+9	-1.38	-0.46	0.43	-0.02	0.98	0.01	1.27	-0.42	0.47	0.16
	(0.39)	(0.32)	(0.30)	(0.26)	(0.24)	(0.21)	(0.20)	(0.17)	(0.14)	(0.13)
t+10	-1.61	-0.72	-0.65	1.22	-0.08	0.33	-1.02	-0.26	0.76	0.20
	(0.38)	(0.31)	(0.30)	(0.25)	(0.23)	(0.21)	(0.20)	(0.19)	(0.13)	(0.14)
t+11	-1.30	-0.62	-0.76	0.05	0.12	0.18	-0.36	0.56	-0.12	0.31
	(0.39)	(0.31)	(0.28)	(0.26)	(0.24)	(0.20)	(0.21)	(0.17)	(0.13)	(0.14)
t+12	-1.62	-1.60	-0.83	1.11	0.12	0.37	0.14	-0.21	-0.17	0.33
	(0.39)	(0.30)	(0.30)	(0.26)	(0.23)	(0.21)	(0.20)	(0.16)	(0.14)	(0.14)
t+13	-1.40	-2.30	-0.20	0.72	0.36	-0.04	-0.62	-0.51	-0.26	0.35
	(0.38)	(0.31)	(0.30)	(0.26)	(0.25)	(0.21)	(0.19)	(0.18)	(0.15)	(0.14)
t+14	-2.64	-1.08	-1.22	0.90	-0.45	-1.08	-0.91	-0.84	-0.26	0.42
	(0.38)	(0.31)	(0.31)	(0.27)	(0.25)	(0.22)	(0.21)	(0.19)	(0.15)	(0.15)
t+15	-3.14	-0.86	-1.50	-0.01	-1.02	-1.29	-0.83	-0.81	-1.21	0.68
	(0.39)	(0.31)	(0.30)	(0.26)	(0.24)	(0.24)	(0.23)	(0.20)	(0.16)	(0.15)

Standard deviations of mean returns (or return differential in the last column) are in the parentheses.

CAPM betas used in this table are estimated with full sample period (July 1926 to December 2008) instead of the trimmed sample period (July 1940 to December 2008) for the $t+j$ portfolios. The size premium of the $t+1$ portfolios here and the size premium of the Panel A of Table 1 should be the same if given the same length of sample.

Table 5: **Average Returns on *t+j* Decile Size Portfolio and Decile 1- Decile 10 Return Difference**

	Small	2	3	4	5	6	7	8	9	Big	1-10
t+1	16.17	14.85	14.78	14.61	14.02	13.29	13.58	12.76	12.27	10.68	5.49
	(0.81)	(0.74)	(0.69)	(0.67)	(0.63)	(0.60)	(0.59)	(0.57)	(0.53)	(0.49)	(0.63)
t+2	15.71	15.98	15.47	14.84	14.30	13.33	12.92	13.13	12.13	10.73	4.97
	(0.80)	(0.74)	(0.69)	(0.67)	(0.63)	(0.60)	(0.60)	(0.57)	(0.54)	(0.48)	(0.60)
t+3	14.01	15.61	15.35	14.12	14.61	13.27	12.89	12.81	11.94	10.90	3.12
	(0.79)	(0.75)	(0.69)	(0.66)	(0.63)	(0.62)	(0.59)	(0.57)	(0.53)	(0.48)	(0.58)
t+4	13.08	16.23	14.64	15.03	13.97	12.77	13.14	12.66	12.17	10.97	2.12
	(0.78)	(0.73)	(0.69)	(0.66)	(0.65)	(0.61)	(0.59)	(0.55)	(0.53)	(0.48)	(0.56)
t+5	13.85	15.69	15.10	13.93	12.71	13.53	13.43	12.81	12.04	10.97	2.88
	(0.78)	(0.73)	(0.70)	(0.66)	(0.64)	(0.60)	(0.58)	(0.56)	(0.53)	(0.47)	(0.55)
t+6	14.50	14.71	14.76	13.72	13.44	13.71	13.04	13.06	11.95	11.01	3.49
	(0.78)	(0.74)	(0.69)	(0.65)	(0.62)	(0.60)	(0.59)	(0.56)	(0.53)	(0.47)	(0.55)
t+7	13.12	14.79	14.27	13.61	13.80	13.70	11.77	12.41	12.27	11.15	1.96
	(0.79)	(0.73)	(0.68)	(0.63)	(0.63)	(0.60)	(0.59)	(0.56)	(0.53)	(0.47)	(0.56)
t+8	13.38	13.73	14.70	14.34	13.34	12.92	12.89	12.55	12.41	10.98	2.40
	(0.78)	(0.72)	(0.68)	(0.64)	(0.63)	(0.61)	(0.58)	(0.55)	(0.52)	(0.47)	(0.55)
t+9	13.30	13.82	14.27	13.33	14.13	12.82	13.82	11.86	12.24	11.03	2.27
	(0.76)	(0.70)	(0.69)	(0.64)	(0.63)	(0.60)	(0.59)	(0.55)	(0.53)	(0.46)	(0.51)
t+10	13.08	13.56	13.20	14.57	13.07	13.13	11.54	12.03	12.53	11.07	2.00
	(0.75)	(0.69)	(0.69)	(0.64)	(0.63)	(0.59)	(0.59)	(0.55)	(0.53)	(0.46)	(0.50)
t+11	13.38	13.65	13.09	13.40	13.27	12.99	12.19	12.85	11.65	11.18	2.20
	(0.74)	(0.70)	(0.68)	(0.63)	(0.63)	(0.58)	(0.58)	(0.54)	(0.53)	(0.46)	(0.49)
t+12	13.06	12.68	13.02	14.46	13.27	13.18	12.69	12.08	11.60	11.20	1.87
	(0.74)	(0.68)	(0.69)	(0.63)	(0.63)	(0.59)	(0.56)	(0.55)	(0.53)	(0.46)	(0.50)
t+13	13.28	11.97	13.65	14.07	13.51	12.77	11.93	11.78	11.51	11.21	2.07
	(0.74)	(0.68)	(0.69)	(0.62)	(0.61)	(0.59)	(0.58)	(0.54)	(0.53)	(0.46)	(0.49)
t+14	12.04	13.19	12.62	14.25	12.70	11.72	11.65	11.45	11.51	11.28	0.76
	(0.73)	(0.67)	(0.67)	(0.62)	(0.62)	(0.59)	(0.59)	(0.55)	(0.52)	(0.46)	(0.48)
t+15	11.54	13.42	12.34	13.34	12.12	11.52	11.72	11.48	10.56	11.55	-0.01
	(0.74)	(0.66)	(0.66)	(0.63)	(0.60)	(0.59)	(0.58)	(0.53)	(0.52)	(0.46)	(0.50)

Standard deviations of mean returns (or return differential in the last column) are in the parentheses.

Table 6: **Robustness Check: Size Premium of Different Size Portfolios in Reference to CAPM Projected Return**

	Small	Big	S-30%	M-40%	B-30%
t+1	0.96	0.02	0.91	0.91	-0.05
	(0.32)	(0.05)	(0.40)	(0.21)	(0.06)
t+2	1.51	0.05	1.60	0.77	0.02
	(0.31)	(0.05)	(0.38)	(0.20)	(0.07)
t+3	1.09	0.11	0.94	0.70	0.08
	(0.30)	(0.06)	(0.36)	(0.19)	(0.08)
t+4	0.99	0.14	0.72	0.65	0.13
	(0.28)	(0.07)	(0.35)	(0.18)	(0.08)
t+5	0.44	0.20	0.95	0.46	0.15
	(0.26)	(0.07)	(0.34)	(0.17)	(0.08)
t+6	0.30	0.23	0.49	0.52	0.21
	(0.25)	(0.07)	(0.32)	(0.17)	(0.09)
t+7	0.03	0.24	-0.10	0.07	0.28
	(0.24)	(0.07)	(0.30)	(0.17)	(0.09)
t+8	0.17	0.20	-0.25	0.37	0.19
	(0.23)	(0.08)	(0.30)	(0.16)	(0.09)
t+9	0.10	0.21	-0.31	0.52	0.15
	(0.23)	(0.09)	(0.29)	(0.16)	(0.10)
t+10	-0.22	0.17	-1.05	-0.14	0.26
	(0.22)	(0.09)	(0.27)	(0.16)	(0.10)
t+11	-0.35	0.22	-1.04	-0.30	0.24
	(0.21)	(0.09)	(0.26)	(0.16)	(0.10)
t+12	-0.28	0.21	-1.30	0.23	0.18
	(0.21)	(0.10)	(0.27)	(0.16)	(0.11)
t+13	-0.28	0.13	-1.16	-0.02	0.16
	(0.21)	(0.10)	(0.26)	(0.16)	(0.11)
t+14	-0.50	0.07	-1.52	-0.55	0.21
	(0.21)	(0.11)	(0.26)	(0.16)	(0.12)
t+15	-0.97	0.10	-1.68	-0.87	0.22
	(0.20)	(0.12)	(0.26)	(0.17)	(0.12)

Standard deviations of mean returns (or return differential in the last column) are in the parentheses.

Table 7: **Average Size Premium of Portfolio 1 under Different Economic Environments**

	Total	Expansion	Contraction	Bull Mkt	Bear Mkt	High CS	Low CS
t+1	1.49	2.07	-1.78	0.65	4.57	**5.45**	**-0.45**
	(0.56)	(0.61)	(1.42)	(0.57)	(1.57)	**(1.15)**	**(0.62)**
t+2	1.02	1.36	-0.86	0.15	4.24	**4.57**	**-0.71**
	(0.52)	(0.56)	(1.35)	(0.53)	(1.47)	**(1.01)**	**(0.60)**
t+3	-0.67	-0.70	-0.47	-1.08	0.84	2.17	-2.06
	(0.48)	(0.52)	(1.30)	(0.50)	(1.32)	(0.90)	(0.57)
t+4	-1.60	-1.51	-2.09	-2.13	0.35	**2.62**	**-3.67**
	(0.45)	(0.48)	(1.30)	(0.47)	(1.23)	**(0.83)**	**(0.54)**
t+5	-0.83	-0.82	-0.87	-1.33	1.02	**3.34**	**-2.87**
	(0.44)	(0.48)	(1.19)	(0.45)	(1.24)	**(0.79)**	**(0.53)**
t+6	-0.18	-0.23	0.06	-0.72	1.80	**3.18**	**-1.83**
	(0.44)	(0.47)	(1.17)	(0.45)	(1.21)	**(0.75)**	**(0.54)**
t+7	-1.57	-1.67	-0.97	-1.26	-2.70	**2.56**	**-3.59**
	(0.43)	(0.46)	(1.16)	(0.43)	(1.24)	**(0.72)**	**(0.53)**
t+8	-1.31	-1.27	-1.51	-1.30	-1.32	**1.60**	**-2.73**
	(0.42)	(0.44)	(1.28)	(0.43)	(1.14)	**(0.72)**	**(0.51)**
t+9	-1.38	-1.25	-2.12	-1.93	0.64	**3.54**	**-3.79**
	(0.39)	(0.42)	(1.13)	(0.42)	(1.01)	**(0.68)**	**(0.48)**
t+10	-1.61	-1.47	-2.36	**-2.99**	**3.48**	**2.38**	**-3.56**
	(0.38)	(0.40)	(1.13)	**(0.40)**	**(1.03)**	**(0.65)**	**(0.47)**
t+11	-1.30	-1.21	-1.83	**-2.64**	**3.61**	**1.22**	**-2.54**
	(0.39)	(0.41)	(1.17)	**(0.40)**	**(1.03)**	**(0.65)**	**(0.48)**
t+12	-1.62	-1.80	-0.61	**-2.60**	**1.97**	**1.23**	**-3.01**
	(0.39)	(0.41)	(1.13)	**(0.41)**	**(1.06)**	**(0.69)**	**(0.47)**
t+13	-1.40	-1.22	-2.42	-2.20	1.55	0.35	-2.25
	(0.38)	(0.40)	(1.16)	(0.40)	(1.03)	(0.68)	(0.47)
t+14	-2.64	-2.33	-4.37	-3.39	0.11	**0.33**	**-4.09**
	(0.38)	(0.40)	(1.12)	(0.39)	(1.04)	**(0.67)**	**(0.46)**
t+15	-3.14	-3.20	-2.82	**-4.41**	**1.53**	**1.30**	**-5.32**
	(0.39)	(0.42)	(1.12)	**(0.39)**	**(1.12)**	**(0.74)**	**(0.45)**
Number of Observations	822	698	124	646	176	270	552

The standard deviation of the average size premium is in the parenthesis.

The first column shows the average size premium of the first decile size portfolio, which is the same as the first column of Table 4.

The number of observations in each state is in the last row of the table. The second and third columns are the expansion and contraction states; the fourth and fifth columns are the bull and bear market states; and the last two columns are the high and low credit spread states.

The size premiums are shown in **boldface fonts** if the difference is significant at the 10 percent level using a one-sided t test.

Table 8: **Average Size Premium of Portfolio 10 under Different Economic Environments**

	Total	Expansion	Contraction	Bull Mkt	Bear Mkt	High CS	Low CS
t+1	-0.19	-0.17	-0.27	-0.29	0.21	**-1.10**	**0.26**
	(0.11)	(0.12)	(0.29)	(0.11)	(0.32)	**(0.20)**	**(0.13)**
t+2	-0.14	-0.14	-0.12	-0.39	0.80	**-1.10**	**0.34**
	(0.11)	(0.12)	(0.29)	(0.11)	(0.34)	**(0.20)**	**(0.13)**
t+3	0.03	0.03	0.05	**-0.34**	**1.38**	**-0.87**	**0.47**
	(0.12)	(0.12)	(0.30)	**(0.11)**	**(0.35)**	**(0.20)**	**(0.14)**
t+4	0.10	0.04	0.43	**-0.33**	**1.66**	**-0.63**	**0.45**
	(0.12)	(0.13)	(0.31)	**(0.11)**	**(0.35)**	**(0.21)**	**(0.14)**
t+5	0.10	-0.03	0.85	**-0.42**	**2.02**	**-0.73**	**0.51**
	(0.12)	(0.13)	(0.32)	**(0.11)**	**(0.36)**	**(0.21)**	**(0.14)**
t+6	0.14	0.00	0.95	**-0.43**	**2.22**	**-0.59**	**0.50**
	(0.12)	(0.13)	(0.33)	**(0.11)**	**(0.38)**	**(0.21)**	**(0.15)**
t+7	0.29	0.11	1.29	**-0.37**	**2.68**	-0.29	0.57
	(0.12)	(0.13)	(0.34)	**(0.12)**	**(0.39)**	(0.22)	(0.15)
t+8	0.11	-0.08	1.17	**-0.49**	**2.30**	-0.55	0.43
	(0.13)	(0.14)	(0.33)	**(0.12)**	**(0.42)**	(0.22)	(0.16)
t+9	0.16	0.01	1.03	**-0.52**	**2.67**	-0.60	0.54
	(0.13)	(0.14)	(0.32)	**(0.12)**	**(0.44)**	(0.21)	(0.17)
t+10	0.20	0.03	1.16	**-0.45**	**2.60**	-0.51	0.55
	(0.14)	(0.15)	(0.34)	**(0.12)**	**(0.46)**	(0.22)	(0.17)
t+11	0.31	0.12	1.37	**-0.45**	**3.10**	-0.38	0.65
	(0.14)	(0.16)	(0.36)	**(0.12)**	**(0.49)**	(0.22)	(0.18)
t+12	0.33	0.20	1.08	**-0.43**	**3.11**	-0.37	0.67
	(0.14)	(0.16)	(0.37)	**(0.13)**	**(0.49)**	(0.23)	(0.18)
t+13	0.35	0.18	1.27	**-0.42**	**3.15**	-0.25	0.64
	(0.14)	(0.16)	(0.39)	**(0.13)**	**(0.48)**	(0.24)	(0.18)
t+14	0.42	0.21	1.55	**-0.28**	**2.96**	-0.14	0.68
	(0.15)	(0.16)	(0.38)	**(0.13)**	**(0.51)**	(0.24)	(0.19)
t+15	0.68	0.49	1.76	**-0.13**	**3.67**	-0.03	1.03
	(0.15)	(0.16)	(0.39)	**(0.13)**	**(0.53)**	(0.24)	(0.19)
Number of Observations	822	698	124	646	176	270	552

The standard deviation of the average size premium is in the parenthesis.

The first column shows the average size premium of the 10th decile size portfolio, which is the same as the last column of Table 4.

Column 2 to column 7 use the same dummy variables to separate different states as the corresponding columns in Table 7.

The size premiums are shown in **boldface fonts** if the difference is significant at the 10 percent level using a one-sided t test.

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26 Western Water And Sewer Issuers Are Upgraded On Revised Criteria

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Issuer Review

26 Western Water And Sewer Issuers Are Upgraded On Revised Criteria

Standard & Poor's Ratings Services has raised its ratings on 26 municipal waterworks, sanitary sewer, and/or drainage utility revenue bonds (see table 1). The upgrades are primarily based on our recent criteria revision (see the article, "Standard & Poor's Revises Criteria For Rating Water, Sewer, And Drainage Utility Revenue Bonds," dated Sept. 15, 2008, on RatingsDirect). In all cases, the rating outlook is stable.

In our opinion, western region utilities included in this review tend to demonstrate strong financial metrics and management practices that mitigate several regionally specific challenges. Western states face a diminishing water supply, coupled with a rising population. Drought in the Colorado River Basin and court-ordered restrictions on water deliveries from the Sacramento-San Joaquin River Delta in California to protect fish and wildlife have necessitated alternative water solutions; the construction of desalination and reclaimed water plants and water banking programs are a few of the alternatives that have gained popularity. For example, the California Department of Water Resources created a drought water bank for 2009 to facilitate the transfer of water from local water districts willing to sell excess supply to those with short supply. Despite these endeavors, we believe conservation efforts will persist and mandatory water restrictions might still be needed. We, however, believe that a well-planned rate structure can mitigate cyclical revenue trends resulting from reduced water usage. In addition, we believe that the funding of capital programs for aging infrastructures in mature areas and new infrastructure for young growing communities will require proactive long-term planning.

In our opinion, stalled housing construction has been both a blessing and a burden for some systems. Slowed new construction has provided some capital expenditure relief for growth-pressured systems. It has also resulted in declining impact fee revenues.

We believe the utilities included in this review, in general, have either sufficient operating revenues to generate adequate debt service coverage and had been using impact fees to fund capital projects that are now on hold because of reduced growth demand or responded with budget adjustments or increased user rates. Notwithstanding these challenges, these issuers, in our view, have exhibited stable credit profiles and, in general, demonstrate one or more of the following credit characteristics:

- Strong financial metrics, including debt service coverage and cash reserves;
- Good economic fundamentals, such that we expect their respective utility system(s) to be able to handle such pressures as housing market vulnerabilities, employment softness, or cost-of-service inflation; and
- Solid management, which includes a demonstrated willingness to adjust rates, long-term planning to fund key service components like water supply or regulatory-driven capital expenditures, and the ability to serve the needs of a growing community.

It should be noted that without exception, municipally owned water, sewer, and drainage systems in the United States are monopolistic service providers that enjoy local rate autonomy in the provision of a relatively price inelastic service. These are characteristics that we believe help support credit quality. Only a few states require local rate increases by a state regulator such as a public service commission.

Although we have historically incorporated factors such as the service area economy and financial performance as components of our analysis, we now believe the sector's demonstrated stability in operations and financial

performance, as well as successful management of the requirements of the federal Safe Drinking Water Act of 1974 and Clean Water Act of 1972, and all of their respective amendments and state regulations, supports these rating actions.

Our criteria revision reflects our view that for general obligation ratings, a small and/or rural issuer does not necessarily have what we consider weaker credit quality than a larger or more-urban issuer. Although we assess these factors in our credit analysis for some revenue bond ratings, we believe many municipal systems still exhibit, in our view, strong and stable credit quality despite size or location constraints. While we believe that smaller or rural utility systems may not necessarily benefit from the economies of scale that can lead to more-efficient operations or lower costs, in our view, they can still have affordable rates, even in places with less-than-favorable household income and wealth levels.

As a result of our reexamination of these credit factors, we reviewed these issuers and raised our ratings. We expect to publish additional ratings adjustments on water and sewer ratings based on our criteria revisions. All of the systems in table 1 are water and sewer service providers unless noted otherwise.

Issuer Review

Table 1

Rating Changes

Issuer	New Rating	Previous Rating	Analyst	Comment
East Cherry Creek Vy Wtr & San Dist, CO	A+	A	Timothy Barrett	The district continues to demonstrate what we consider good financial performance, including strong coverage of debt service and strong liquidity. This is despite a slowdown in growth and related water tap fees, which accounted for roughly 15% of total water system revenues in fiscal 2007. Within the next year, we understand that the district will likely issue additional bonds for a water treatment plant that could bring coverage close to 1.25x debt service, but we expect liquidity to remain strong at more than a year's cash on hand.
Marin Municipal Water District, CA	AA+	AA	Timothy Barrett	The district provides water to residents of the southern and central portion of Marin County, located in the North San Francisco Bay Area. The district currently serves a population of approximately 183,000 through 61,054 service connections in the cities of Belvedere, Corte Madera, Fairfax, Larkspur, Mill Valley, Ross, Sausalito, San Anselmo, San Rafael, and Tiburon, as well as a large unincorporated area. We understand that the district is currently reviewing options to expand its water supply. This could be achieved through a new 5 mgd facility or through system enhancements. Despite the potential need for additional debt to fund increased water supply, we expect financial performance to remain strong, with management annually adjusting rates and targeting at least six months' operations in cash on hand.
Montrose, CO	A+	BBB+	Timothy Barrett	The utility system serves a population of 16,070 in western Colorado. Montrose provides water and sewer service to 7,109 and 7,198 customers, respectively. We understand that water and wastewater supply and capacity are sufficient for the near future, with the utility projecting supply to meet demand for a population of 40,000 and treatment capacity to be sufficient through 2020. Liquidity and coverage remain in our view very strong, despite the system's use of operations to fund capital needs. We understand that the city does not expect to issue additional debt.
Santa Ana Financing Authority, CA	AA	AA-	Timothy Barrett	Located about 33 miles southeast of Los Angeles, Santa Ana, with a population estimate of 364,000, is both Orange County's largest city and seat. The water system provides potable water to more than 49,000 customers. The customer base is very diverse and built out. We consider the system's financial performance to be very strong, with strong liquidity and coverage of debt service.
Helix Wtr Dist, CA	AA	A+	Ian Carroll	The water district serves eastern San Diego County with retail water services and benefits from a wealthy economic base. Financial performance has been in our view strong, with 3.25x coverage of debt service and 166 days' cash on hand. Operationally, the system relies on San Diego County Water Authority for about 80% of its water supply.

Hillsborough, CA	AAA	AA	Ian Carroll	Hillsborough's combined water and sewer utility maintained what we consider its strong financial performance in 2008 with 2.4x coverage and 678 days' cash on hand; the underlying economy is one of the wealthiest in the U.S., with incomes at 414% of the U.S. median. We understand that there is no plan to issue any additional debt.
Imperial Irrigation District, CA	AA-	A+	Ian Carroll	The district has maintained what we consider a good debt service coverage of more than 2x, in part due to rising sales of water to San Diego County Water Authority. In our view, cash was also strong at 395 days in 2007. The system's service area is in the imperial valley, an agricultural area east of San Diego and on the U.S.-Mexico border, but sales to the water authority mitigate the local economy's agricultural concentration.
Municipality of Anchorage (Sewer), AK	AA	A+	Ian Carroll	The city's wastewater enterprise had what we consider very strong coverage of annual debt service of more than 5x in 2007, based on audited financial statements and 215 days' cash on hand, following rate increases in the past few years. We expect finances to remain strong as long as the required treatment standard is not increased, which we believe would add considerable capital pressures.
Municipality of Anchorage (Water), AK	AA	AA-	Ian Carroll	We understand that the city's water utility has virtually unlimited supply by virtue of mountain snowfall. In our view, the enterprise's finances have been strong, with 1.8x coverage and 242 days' cash on hand. Capital needs, moreover, are what we consider minimal, which should allow for stable financial performance without the need for additional rate increases.
Orange County Water Dist, CA	AAA	AA+	Ian Carroll	The water district maintained what we consider very strong coverage, more than 2x in each of the past several years, as well as exceptional cash liquidity of 590 days, in 2007. The district's economy, moreover, does not present a challenge because the district participates in the Teeter plan. Income levels are 33% above the U.S. median. The district is responsible for the long-term viability of the groundwater basin and levies an assessment on its customers who pump from the ground.
Brea Public Finance Authority, CA	A+	A	Le T. Quach	The city of Brea's water rates are adjusted annually based on inflation, which has supported what we consider good coverage of annual debt service. The city projects coverage for fiscal 2008 to be a strong 1.6x. The city has historically funded its water capital improvements with cash, but expects to issue additional parity bonds this spring. Brea receives its water supply from Southern California Metropolitan Water District and California Domestic Water Co., a private company.
Oro Loma Sanitary District, CA	AA+	AA-	Le T. Quach	This wastewater treatment system benefits from what we consider a strong collections process, which allows it to collect a majority of its fees through annual property tax billings. In our view, the system has maintained very strong financial performance, with coverage of at least 5x annual debt service from fiscals 2005-2007. Based on audited results for fiscal 2008, this Bay Area district will end with a $28.6 million unreserved cash balance, equal to what we consider a strong 817 days' expenditures. The system projects that its capital needs will be funded by ongoing revenues.
Crescenta Vy Wtr Dist, CA	A+	A	Li Yang	Recent rate increases have contributed to what we consider the district's strong 4.3x coverage in fiscal 2008 for its outstanding water revenue debt. The first principal payments for the 2007 certificates of participation begin in fiscal 2009, and we expect coverage to be 1.5x excluding connection fees. The district currently maintains a five-year capital plan totaling roughly $9.9 million. We understand that the district is considering issuing additional debt.
East Vy Wtr Dist, CA	AA-	A	Li Yang	The district maintains what we consider a sizable capital plan, with the majority being used for constructing new treatment plants in order to meet federal water quality standards. The most recent rate increase of 12.5% became effective in fiscal 2009. We understand that future rate are increases possible, which would enable the district to maintain what we consider good debt service coverage levels.
Goleta Wtr Dist, CA	A+	A-	Li Yang	In our opinion, the district's financial performance has improved significantly in recent years due to increased water demand. In addition, water rates were raised in fiscal 2008, which has led to what we consider strong debt service coverage of 1.53x without connection fees. We expect coverage to remain at this level as the district does not plan to issue additional debt. Currently, the district maintains a five-year capital plan of approximately $5 million.
Lake Arrowhead Comnty Svcs Dist (water), CA	A+	A-	Matt Reining	In our opinion, the utility has shown good financial performance, while serving a mostly residential, resort community, with strong liquidity and good coverage. After a number of years of ongoing legal action regarding the district's use of water from Lake Arrowhead, the state issued a final order in 2006 allowing the district to use 1,566 acre feet per year, while also pointing to the need for outside sources given that the lake allowance supplies only 63% of recent average years' water usage. The district has met this need in the intermediate future with a 10-year contract with the Crestline-Lake Arrowhead Water Agency. Through rate increases, the district is generating revenue to cover the increase in water supply costs.

Los Angeles Cnty San Dist #14 (Lancaster), CA	A+	A-	Matt Reining	The district primarily serves the city of Lancaster, which has seen significant residential growth in recent years. Because of this growth, the district has a $295 million five-year capital improvement plan that includes more routine sewer and line improvements as well as a major plant expansion and treated water storage facility. The series 2005 bonds were issued to meet these capital financing needs; the district has used and we understand will use additional state loans. Based on audited 2007 results, the district had in our view a solid 1.2x debt service coverage with a strong 1.8x coverage including connection and developer fees. Although the district projects that connection fees will fall, given the local real estate slowdown, management believes that flexibility is built into its capital improvement plan and that it can adjust expenditures through modular plant expansion and section line construction.
Los Angeles Cnty San Dists Fincg Auth, CA	AA+	AA	Matt Reining	The sanitation districts serve a large and diverse customer base of approximately 5.2 million people, or roughly all of the non-City of Los Angeles portions of Los Angeles County. Organized as a partnership among 24 individual districts (each with individual debt and tax bases), the overall district functions as a single unified operating entity with a single management structure. The overall district provides main-line conveyance, treatment, and disposal of sewage, with local collections done by individual, local agencies. For residential usage, customers pay a fixed annual service charge as well as a modest portion of property tax. These service charges ranged from $78-$308 in fiscal 2008 and adopted service charge increases averaged 11% for fiscal 2009. Debt service coverage by each of the member districts allows for a 20% increase in revenues as needed for the step-up charges. Coverage by what we consider the stronger districts (taking into account the step-up) ranged from a good 1.4x to a very strong 8.7x in fiscal 2007, with strong cash levels ranging from 365 days to more than 4,000 days.
Arapahoe Cnty Water & Wastewater Authority, CA	AA-	A+	Misty Newland	The authority provides service to portions of Arapahoe and Douglas counties. In our view, proximity to Denver has driven expansion in these areas. Coverage and cash balances have been historically what we consider strong. Estimated coverage for fiscal 2008 is lower but still in our view strong at 3.4x due to a decline in tap fees and added debt service for series 2007 revenue bonds. We understand that future capital projects will include expansion of its water treatment plant and water acquisition, a portion of which would be funded with additional debt. The authority's additional bonds coverage test is 1.25x maximum annual debt service.
Olivenhain Mun Wtr Dist, CA	AA	AA-	Misty Newland	The district serves an affluent area in San Diego County, including part of the city of Encinitas. Financial management includes a 10-year operating and capital spending forecast. In addition, the district is proposing a rate structure that includes step-ups during drought conditions to offset revenue losses due to decreased consumption. The district has reserve targets for the operating, capital, and rate stabilization funds. The district is about 74% built-out and we expect will require additional capacity in the future, which we understand it plans to fund with system revenues and debt financing.
Manteca, CA	A+	A-	Shannon Groff	The city is located in the northern portion of the San Joaquin Valley between the cities of Stockton and Modesto and approximately 75 miles east of San Francisco. The city is located in the agriculturally rich San Joaquin Valley between Interstate 5 and State Highway 99. After determining that it was over-drafting its ground water resources, the city entered into an agreement with South San Joaquin Irrigation District for the provision of surface water. The city's current usage is 44% surface water and 56% ground water and future usage is projected at 53% surface water and 47% ground water. A recent rate study led the city to adopt rate increases of 5% each year from 2009-2013; the adopted plan will decrease fixed rates and increase water use charges.
Susanville, CA	A	BBB-	Lisa Schroeer	The moderately small system serves roughly 18,600 people in the seat of Lassen County. In our view, finances are good, and coverage has not fallen below the 1.25x target. We believe cash is very strong, with $2.2 million in fiscal 2007, and management has indicated that it intends to keep cash at this level. Finances should stay at what we consider good given the system's relatively small capital needs and recent rate increases. Management intends a recent rate increase to fund the system's capital needs, with an estimated revenue of $400,000 annually.
Los Angeles Cnty San Dist #20, CA	A	A-	Lisa Schroeer	The system serves the city of Palmdale and surrounding areas with roughly 110,000 people. In 2007, the district issued bonds to address environmental compliance issues. Management expects the project to be completed on time. Coverage was more than 2.0x with connection fee revenue and what we consider a still good 1.2x without it in 2007. Management indicated that approved rate increases are anticipated to be sufficient to cover any decline in connection fee revenue and expects 2008 coverage to be similarly strong. The district does have about $200 million in additional capital needs through 2014. Management anticipates using state loans in the upcoming year to address some of these needs and that it will meet all bond covenants. In our view, the district's strong cash position, with cash held in restricted funds but available for operations, mitigates some concerns over additional capital needs.

Clovis, CA	A+	A-	Lisa Schroeer	The system serves a population of roughly 90,000 in the city of Clovis. Previously a rapidly growing area, the city has had to curb its expectation for one-time revenues, but lower construction costs have provided additional financial flexibility not previously anticipated. Coverage is more than 1x without growth-related revenues, and management expects cash to stay strong. The city's capital plans are, in our view, minimal, but management noted that the city may need to contribute to projects necessary for the Fresno system, which the city currently uses for its treatment. Management indicated a willingness to raise rates to ensure a target level of coverage of 1.2x. Additionally, the city has a rate stabilization fund that can stabilize revenues as growth-related revenues drop off. The new rating reflects our expectation that the city will take into account the decrease in growth-related revenues and adjust its finances.
Weber Basin Wtr Conservancy Dist, UT	AA	AA-	Lisa Schroeer	This wholesale and retail utility, covering Weber and Davis counties, has customer cities that, in our opinion, are of strong credit quality. In addition, the district benefits from property tax revenues and a strong water supply. The district provides water to what we consider a strong economic area that ties into the broader Salt Lake economy.
Valley Sanitary District, CA	A+	A-	Lisa Schroeer	The district serves the city of Indio and surrounding areas. Coverage is more than 4x, even when excluding one-time development-generated revenue. User rates are rising to address additional costs and should help as connection fee revenue decreases. In our view, the district holds strong cash that it may partially use to address some treatment plan needs, but it has a policy to maintain at least six months' operations in cash on hand, which it is well above. Additional capital projects are related to growth, and we understand that the district is evaluating whether or not it is a prudent time, financially, to move forward. These are not currently need-based projects, which gives the district flexibility.

mgd--Million gallons per day. MSA--Metropolitan statistical area. MHEBI--Median household effective buying income.

Table 2

Selected Credit Ratios

Issuer	DSC (x)	Days' Cash	MHEBI (% of U.S.)	Debt to Plant (%)
East Cherry Creek Valley Water and Sanitation District, CO	2.4	537	104	33
Marin Municipal Water District, CA	2.0	238	156	19
Montrose, CO	4.3	876	83	21
Santa Ana Financing Authority, CA	3.9	187	101	30
Helix Wtr Dist, CA	3.3	166	114	11
Hillsborough, CA	2.4	678	414	85
Imperial Irrigation District, CA	2.1	395	75	39
Municipality of Anchorage (Sewer), AK	5.4	215	132	24
Municipality of Anchorage (Water), AK	1.8	242	132	35
Orange County Water Dist, CA	2.3	590	130	73
Brea Public Finance Authority, CA	1.7	212	132	30
Oro Loma Sanitary District, CA	6.4	935	128	8
Crescenta Vy Wtr Dist, CA	4.3	312	133	23
East Vy Wtr Dist, CA	1.7	339	97	24
Goleta Wtr Dist, CA	2.0	112	139	53
Lake Arrowhead Comnty Svcs Dist (water), CA	1.8	397	146	28
Los Angeles Cnty San Dist #14 (Lancaster), CA	1.2	2,493	96	134
Los Angeles Cnty San Dists Fincg Auth, CA	1.4 to 8.7	365 to 4,000	101	38
Arapahoe Cnty Water & Wastewater Authority, CO	7.9	799	127	69
Olivenhain Mun Wtr Dist, CA	4.0	399	145	20
Manteca, CA	5.46	1,977	109	71
Susanville, CA	1.3	289	85	123

Table 2

Selected Credit Ratios (cont.)				
Los Angeles Cnty San Dist #20, CA	1.2	833	101	303
Clovis, CA	2.2	1,000	100	154
Weber Basin Wtr Conservancy Dist, UT	3.2	696	122/104	31
Valley Sanitary District, CA	6.5	2,120	90	20

MHEBI--Median household effective buying income. DSC--Debt service coverage.

Table 3

Contact Information			
Credit analyst	**Location**	**Phone**	**E-mail**
Tim Barrett	New York	212-438-6327	timothy_barrett@standardandpoors.com
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SUMMARY OF COST OF EQUITY

(APLLYING COMMISSION'S PREFERRED APPROACH TO MR. WALKER'S PROXY GROUP)

Proxy Group DCF ROE	9.52%
Traditional CAPM ROE	8.81%
Zero Beta CAPM ROE	9.37%
Generic (Average) CAPM ROE	9.09%
2/3 DCF & 1/3 CAPM Weighting	9.38%
ROE of Proxy Group	9.38%

COMMISSION'S PREFERRED APPROACH

Company	Beta	Price	EPS 2021-23	DPS 2018	DPS 2019	DPS 2021-23	BPS 2018	BPS 2019	BPS 2021-23	# of Shares 2018	# of Shares 2021-23	DPS Growth 2021-23
American Water Works Company	0.60	$90.94	4.50	1.78	1.95	2.60	31.75	33.90	42.00	181.00	187.50	10.06%
American States Water Company	0.75	$63.83	2.50	1.08	1.16	1.50	15.20	15.95	17.35	36.80	37.50	8.95%
Aqua America Water	0.70	$34.19	1.95	0.85	0.91	1.25	11.00	12.00	14.50	178.25	180.00	11.16%
California Water Service Group	0.75	$44.03	1.90	0.75	0.78	1.02	14.45	15.00	16.70	48.50	50.00	9.35%
Middlesex Water Company	0.75	$49.62	2.20	0.91	0.96	1.11	14.85	15.15	16.75	16.50	17.00	4.96%
SJW	0.65	$58.60	3.45	1.12	1.20	1.45	22.60	23.40	24.55	21.00	23.00	6.51%
York Water	0.80	$32.15	1.60	0.70	0.75	1.00	10.00	10.90	11.70	13.00	12.80	10.06%
Median Beta	***0.75***											
Average	***0.71***										Median	**9.35%**
											Average	**8.72%**

COMMISSION'S PREFERRED APPROACH

Company	Retention Rate 2021	Return on Equity 2021	B x R	Increase in Shares	MBR 2016	MBR-1 V Factor	(Accretion /dilutive) Growth S x V	Sustainable Growth	Long-Form ROE
American Water Works Company	42.22%	11.10%	4.69%	0.89%	2.86	1.86	1.65%	6.34%	8.67%
American States Water Company	40.00%	14.61%	5.84%	0.47%	4.20	3.20	1.51%	7.36%	9.19%
Aqua America Water	35.90%	13.87%	4.98%	0.24%	3.11	2.11	0.52%	5.50%	8.58%
California Water Service Group	46.32%	11.58%	5.36%	0.76%	3.05	2.05	1.56%	6.93%	8.76%
Middlesex Water Company	49.55%	13.35%	6.62%	0.75%	3.34	2.34	1.75%	8.37%	10.05%
SJW	57.97%	14.17%	8.21%	2.30%	2.59	1.59	3.66%	11.88%	13.56%
York Water	37.50%	13.84%	5.19%	0.00%	3.22	2.22	0.00%	5.19%	7.83%
Average	***44.21%***	***13.22%***	***5.84%***	***0.77%***	***319.55%***	***219.55%***	***1.52%***	***7.36%***	***9.52%***
Median	***42.22%***	***13.84%***	***5.36%***	***0.75%***	***310.82%***	***210.82%***	***1.56%***	***6.93%***	***8.76%***

Mr. Walker's Proxy Group
Three Month Average Price Data

Company	One-month Price	Oct-18 High	Oct-18 Low	Nov-18 High	Nov-18 Low	Dec-18 High	Dec-18 Low
American Water Works Company	$90.94	92.79	86.76	95.41	86.60	98.18	85.89
American States Water Company	$63.83	63.20	58.48	68.51	60.01	69.61	63.15
Aqua America Water	$34.19	38.23	32.22	34.48	32.09	35.96	32.16
California Water Service Group	$44.03	43.55	40.10	46.79	41.32	49.07	43.38
Middlesex Water Company	$49.62	48.64	43.66	52.82	43.12	60.31	49.17
SJW	$58.60	65.00	57.41	65.84	53.24	58.32	51.82
York Water	$32.15	32.53	30.03	33.69	30.69	36.10	29.88

Data Source

Capital IQ

INPUTS AND CALCULATIONS FOR CAPM

Merrill Lynch Cost of Market[1]

	Implied	Required
Oct-18	10.90%	11.10%
Nov-18	11.00%	11.20%
Dec-18	11.10%	11.10%

Merrill Lynch Cost of Market 11.07%

Treasury Rates[2]

	10 year	30 year
Oct-18	3.15%	3.34%
Nov-18	3.12%	3.36%
Dec-18	2.83%	3.10%

Risk-Free Rate (10/18-12/18) 3.15%

Market Risk Premium (10/18-12/18) 7.92%

Proxy Group Beta 0.71

Traditional CAPM Calculation
Risk Free Rate + (Beta * (Market Return - Risk Free Rate)

Traditional CAPM ROE 8.81%

Zero Beta CAPM Calculation
Risk Free Rate + (0.75*Beta * (Market Return - Risk Free Rate))+(0.25*(Market Return - Risk Free Rate))

Zero Beta CAPM ROE 9.37%

Merrill Lynch cost of market figure is average of Implied and Required Returns for the 3 months ending December 2018 (Nov-Dec-Jan 2018 Editions)

Federal Reserve Statistical Release, FRB: Federal Reserve Statistical Release H.15 - Historical Data
Website : 'http://federalreserve.gov/releases/h15/

Suez Water New York

Summary of Cost of Capital per Staff

For the Rate Year Ending March 31, 2021

Capital Structure	Capital	Percent	Cost Rate	Weighted Cost	Pre-tax Weighted Cost
Long-term debt	$366,993,891	53.98%	4.51%	2.43%	2.43%
Customer Deposit	$123,509	0.02%	2.45%	0.00%	0.00%
Common Equity	312,729,637	46.00%	8.35%	3.84%	5.31%
Total	$679,847,038	100.00%		6.28%	7.74%

Suez Water New York

Capital Structure per Company

For the Rate Year Ending March 31, 2021

Capital Structure	Capital	Percent	Cost Rate	Weighted Cost	Pre-tax Weighted Cost
Long-term debt	$342,477,897	50.00%	4.59%	2.30%	2.30%
Customer Deposit	$0	0.00%	0.00%	0.00%	0.00%
Common Equity	342,477,897	50.00%	10.00%	5.00%	6.91%
Total	$684,955,793	100.00%		7.30%	9.20%