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Criteria | Corporates | Utilities:

Key Credit Factors For The Regulated Utilities Industry

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*(**Editor's Note:** This criteria article supersedes "Key Credit Factors: Business And Financial Risks In The Investor-Owned Utilities Industry," published Nov. 26, 2008, "Assessing U.S. Utility Regulatory Environments," Nov. 7, 2007, and "Revised Methodology For Adjusting Amounts Reported By U.K. GAAP Water Companies For Infrastructure Renewals Accounting," Jan. 27, 2010.)*

Standard & Poor's Ratings Services is refining and adapting its methodology and assumptions for its Key Credit Factors: Criteria For Regulated Utilities. We are publishing these criteria in conjunction with our corporate criteria (see "Corporate Methodology, published Nov. 19, 2013). This article relates to our criteria article, "Principles Of Credit Ratings," Feb. 16, 2011.

This criteria article supersedes "Key Credit Factors: Business And Financial Risks In The Investor-Owned Utilities Industry," Nov. 26, 2008, "Criteria: Assessing U.S. Utility Regulatory Environments," Nov. 7, 2007, and "Revised Methodology For Adjusting Amounts Reported By U.K. GAAP Water Companies For Infrastructure Renewals Accounting," Jan. 27, 2010.

SCOPE OF THE CRITERIA

These criteria apply to entities where regulated utilities represent a material part of their business, other than U.S. public power, water, sewer, gas, and electric cooperative utilities that are owned by federal, state, or local governmental bodies or by ratepayers. A regulated utility is defined as a corporation that offers an essential or near-essential infrastructure product, commodity, or service with little or no practical substitute (mainly electricity, water, and gas), a business model that is shielded from competition (naturally, by law, shadow regulation, or by government policies and oversight), and is subject to comprehensive regulation by a regulatory body or implicit oversight of its rates (sometimes referred to as tariffs), service quality, and terms of service. The regulators base the rates that they set on some form of cost recovery, including an economic return on assets, rather than relying on a market price. The regulated operations can range from individual parts of the utility value chain (water, gas, and electricity networks or "grids," electricity generation, retail operations, etc.) to the entire integrated chain, from procurement to sales to the end customer. In some jurisdictions, our view of government support can also affect the final rating outcome, as per our government-related entity criteria (see "General Criteria: Rating Government-Related Entities: Methodology and Assumptions," Dec. 9, 2010).

SUMMARY OF THE CRITERIA

Standard & Poor's is updating its criteria for analyzing regulated utilities, applying its corporate criteria. The criteria for evaluating the competitive position of regulated utilities amend and partially supersede the "Competitive Position" section of the corporate criteria when evaluating these entities. The criteria for determining the cash flow leverage

assessment partially supersede the "Cash Flow/Leverage" section of the corporate criteria for the purpose of evaluating regulated utilities. The section on liquidity for regulated utilities partially amends existing criteria. All other sections of the corporate criteria apply to the analysis of regulated utilities.

IMPACT ON OUTSTANDING RATINGS

These criteria could affect the issuer credit ratings of about 5% of regulated utilities globally due primarily to the introduction of new financial benchmarks in the corporate criteria. Almost all ratings changes are expected to be no more than one notch, and most are expected to be in an upward direction.

EFFECTIVE DATE AND TRANSITION

These criteria are effective immediately on the date of publication.

METHODOLOGY

Part I--Business Risk Analysis

Industry risk

Within the framework of Standard & Poor's general criteria for assessing industry risk, we view regulated utilities as a "very low risk" industry (category '1'). We derive this assessment from our view of the segment's low risk ('2') cyclicality and very low risk ('1') competitive risk and growth assessment.

In our view, demand for regulated utility services typically exhibits low cyclicality, being a function of such key drivers as employment growth, household formation, and general economic trends. Pricing is non-cyclical, since it is usually based in some form on the cost of providing service.

Cyclicality

We assess cyclicality for regulated utilities as low risk ('2'). Utilities typically offer products and services that are essential and not easily replaceable. Based on our analysis of global Compustat data, utilities had an average peak-to-trough (PTT) decline in revenues of about 6% during recessionary periods since 1952. Over the same period, utilities had an average PTT decline in EBITDA margin of about 5% during recessionary periods, with PTT EBITDA margin declines less severe in more recent periods. The PTT drop in profitability that occurred in the most recent recession (2007-2009) was less than the long-term average.

With an average drop in revenues of 6% and an average profitability decline of 5%, utilities' cyclicality assessment calibrates to low risk ('2'). We generally consider that the higher the level of profitability cyclicality in an industry, the higher the credit risk of entities operating in that industry. However, the overall effect of cyclicality on an industry's risk profile may be mitigated or exacerbated by an industry's competitive and growth environment.

Competitive risk and growth

We view regulated utilities as warranting a very low risk ('1') competitive risk and growth assessment. For competitive risk and growth, we assess four sub-factors as low, medium, or high risk. These sub-factors are:

- Effectiveness of industry barriers to entry;
- Level and trend of industry profit margins;
- Risk of secular change and substitution by products, services, and technologies; and
- Risk in growth trends.

Effectiveness of barriers to entry--low risk

Barriers to entry are high. Utilities are normally shielded from direct competition. Utility services are commonly naturally monopolistic (they are not efficiently delivered through competitive channels and often require access to public thoroughfares for distribution), and so regulated utilities are granted an exclusive franchise, license, or concession to serve a specified territory in exchange for accepting an obligation to serve all customers in that area and the regulation of its rates and operations.

Level and trend of industry profit margins--low risk

Demand is sometimes and in some places subject to a moderate degree of seasonality, and weather conditions can significantly affect sales levels at times over the short term. However, those factors even out over time, and there is little pressure on margins if a utility can pass higher costs along to customers via higher rates.

Risk of secular change and substitution of products, services, and technologies--low risk

Utility products and services are not overly subject to substitution. Where substitution is possible, as in the case of natural gas, consumer behavior is usually stable and there is not a lot of switching to other fuels. Where switching does occur, cost allocation and rate design practices in the regulatory process can often mitigate this risk so that utility profitability is relatively indifferent to the substitutions.

Risk in industry growth trends--low risk

As noted above, regulated utilities are not highly cyclical. However, the industry is often well established and, in our view, long-range demographic trends support steady demand for essential utility services over the long term. As a result, we would expect revenue growth to generally match GDP when economic growth is positive.

B. Country risk

In assessing "country risk" for a regulated utility, our analysis uses the same methodology as with other corporate issuers (see "Corporate Methodology").

C. Competitive position

In the corporate criteria, competitive position is assessed as ('1') excellent, ('2') strong, ('3') satisfactory, ('4') fair, ('5') weak, or ('6') vulnerable.

The analysis of competitive position includes a review of:

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

19 In the corporate criteria we assess the strength of each of the first three components. Each component is assessed as either: (1) strong, (2) strong/adequate, (3) adequate, (4) adequate/weak, or (5) weak. After assessing these components, we determine the preliminary competitive position assessment by ascribing a specific weight to each component. The applicable weightings will depend on the company's Competitive Position Group Profile. The group profile for regulated utilities is "National Industries & Utilities," with a weighting of the three components as follows: competitive advantage (60%), scale, scope, and diversity (20%), and operating efficiency (20%). Profitability is assessed by combining two sub-components: level of profitability and the volatility of profitability.

20 "Competitive advantage" cannot be measured with the same sub-factors as competitive firms because utilities are not primarily subject to influence of market forces. Therefore, these criteria supersede the "competitive advantage" section of the corporate criteria. We analyze instead a utility's "regulatory advantage" (section 1 below).

Assessing regulatory advantage

21 The regulatory framework/regime's influence is of critical importance when assessing regulated utilities' credit risk because it defines the environment in which a utility operates and has a significant bearing on a utility's financial performance.

22 We base our assessment of the regulatory framework's relative credit supportiveness on our view of how regulatory stability, efficiency of tariff setting procedures, financial stability, and regulatory independence protect a utility's credit quality and its ability to recover its costs and earn a timely return. Our view of these four pillars is the foundation of a utility's regulatory support. We then assess the utility's business strategy, in particular its regulatory strategy and its ability to manage the tariff-setting process, to arrive at a final regulatory advantage assessment.

23 When assessing regulatory advantage, we first consider four pillars and sub-factors that we believe are key for a utility to recover all its costs, on time and in full, and earn a return on its capital employed:

24 Regulatory stability:

- Transparency of the key components of the rate setting and how these are assessed
- Predictability that lowers uncertainty for the utility and its stakeholders
- Consistency in the regulatory framework over time

25 Tariff-setting procedures and design:

- Recoverability of all operating and capital costs in full
- Balance of the interests and concerns of all stakeholders affected
- Incentives that are achievable and contained

26 Financial stability:

- Timeliness of cost recovery to avoid cash flow volatility
- Flexibility to allow for recovery of unexpected costs if they arise
- Attractiveness of the framework to attract long-term capital
- Capital support during construction to alleviate funding and cash flow pressure during periods of heavy investments

27 Regulatory independence and insulation:

- Market framework and energy policies that support long-term financeability of the utilities and that is clearly enshrined in law and separates the regulator's powers
- Risks of political intervention is absent so that the regulator can efficiently protect the utility's credit profile even during a stressful event

We have summarized the key characteristics of the assessments for regulatory advantage in table 1.

Table 1

Preliminary Regulatory Advantage Assessment

Qualifier	What it means	Guidance
Strong	The utility has a major regulatory advantage due to one or a combination of factors that support cost recovery and a return on capital combined with lower than average volatility of earnings and cash flows.	The utility operates in a regulatory climate that is transparent, predictable, and consistent from a credit perspective.
	There are strong prospects that the utility can sustain this advantage over the long term.	The utility can fully and timely recover all its fixed and variable operating costs, investments and capital costs (depreciation and a reasonable return on the asset base).
	This should enable the utility to withstand economic downturns and political risks better than other utilities.	The tariff set may include a pass-through mechanism for major expenses such as commodity costs, or a higher return on new assets, effectively shielding the utility from volume and input cost risks.
		Any incentives in the regulatory scheme are contained and symmetrical.
		The tariff set includes mechanisms allowing for a tariff adjustment for the timely recovery of volatile or unexpected operating and capital costs.
		There is a track record of earning a stable, compensatory rate of return in cash through various economic and political cycles and a projected ability to maintain that record.
		There is support of cash flows during construction of large projects, and pre-approval of capital investment programs and large projects lowers the risk of subsequent disallowances of capital costs.
		The utility operates under a regulatory system that is sufficiently insulated from political intervention to efficiently protect the utility's credit risk profile even during stressful events.
Adequate	The utility has some regulatory advantages and protection, but not to the extent that it leads to a superior business model or durable benefit.	It operates in a regulatory environment that is less transparent, less predictable, and less consistent from a credit perspective.
	The utility has some but not all drivers of well-managed regulatory risk. Certain regulatory factors support the business's long-term stability and viability but could result in periods of below-average levels of profitability and greater profit volatility. However, overall these regulatory drivers are partially offset by the utility's disadvantages or lack of sustainability of other factors.	The utility is exposed to delays or is not, with sufficient certainty, able to recover all of its fixed and variable operating costs, investments, and capital costs (depreciation and a reasonable return on the asset base) within a reasonable time.
		Incentive ratemaking practices are asymmetrical and material, and could detract from credit quality.
		The utility is exposed to the risk that it doesn't recover unexpected or volatile costs in a full or less than timely manner due to lack of flexible reopeners or annual revenue adjustments.
		There is an uneven track record of earning a compensatory rate of return in cash through various economic and political cycles and a projected ability to maintain that record.

Table 1

Preliminary Regulatory Advantage Assessment (cont.)

		There is little or no support of cash flows during construction, and investment decisions on large projects (and therefore the risk of subsequent disallowances of capital costs) rest mostly with the utility.
		The utility operates under a regulatory system that is not sufficiently insulated from political intervention and is sometimes subject to overt political influence.
Weak	The utility suffers from a complete breakdown of regulatory protection that places the utility at a significant disadvantage.	The utility operates in an opaque regulatory climate that lacks transparency, predictability, and consistency.
	The utility's regulatory risk is such that the long-term cost recovery and investment return is highly uncertain and materially delayed, leading to volatile or weak cash flows. There is the potential for material stranded assets with no prospect of recovery.	The utility cannot fully and/or timely recover its fixed and variable operating costs, investments, and capital costs (depreciation and a reasonable return on the asset base).
		There is a track record of earning minimal or negative rates of return in cash through various economic and political cycles and a projected inability to improve that record sustainably.
		The utility must make significant capital commitments with no solid legal basis for the full recovery of capital costs.
		Ratemaking practices actively harm credit quality.
		The utility is regularly subject to overt political influence.

After determining the preliminary regulatory advantage assessment, we then assess the utility's business strategy. Most importantly, this factor addresses the effectiveness of a utility's management of the regulatory risk in the jurisdiction(s) where it operates. In certain jurisdictions, a utility's regulatory strategy and its ability to manage the tariff-setting process effectively so that revenues change with costs can be a compelling regulatory risk factor. A utility's approach and strategies surrounding regulatory matters can create a durable "competitive advantage" that differentiates it from peers, especially if the risk of political intervention is high. The assessment of a utility's business strategy is informed by historical performance and its forward-looking business objectives. We evaluate these objectives in the context of industry dynamics and the regulatory climate in which the utility operates, as evaluated through the factors cited in paragraphs 24-27.

We modify the preliminary regulatory advantage assessment to reflect this influence positively or negatively. Where business strategy has limited effect relative to peers, we view the implications as neutral and make no adjustment. A positive assessment improves the preliminary regulatory advantage assessment by one category and indicates that management's business strategy is expected to bolster its regulatory advantage through favorable commission rulings beyond what is typical for a utility in that jurisdiction. Conversely, where management's strategy or businesses decisions result in adverse regulatory outcomes relative to peers, such as failure to achieve typical cost recovery or allowed returns, we adjust the preliminary regulatory advantage assessment one category worse. In extreme cases of poor strategic execution, the preliminary regulatory advantage assessment is adjusted by two categories worse (when possible; see table 2) to reflect management decisions that are likely to result in a significantly adverse regulatory outcome relative to peers.

Table 2

Determining The Final Regulatory Advantage Assessment

	--Strategy modifier--			
Preliminary regulatory advantage score	**Positive**	**Neutral**	**Negative**	**Very negative**
Strong	Strong	Strong	Strong/Adequate	Adequate
Strong/Adequate	Strong	Strong/Adequate	Adequate	Adequate/Weak
Adequate	Strong/Adequate	Adequate	Adequate/Weak	Weak
Adequate/Weak	Adequate	Adequate/Weak	Weak	Weak
Weak	Adequate/Weak	Weak	Weak	Weak

Scale, scope, and diversity

We consider the key factors for this component of competitive position to be primarily operational scale and diversity of the geographic, economic, and regulatory foot prints. We focus on a utility's markets, service territories, and diversity and the extent that these attributes can contribute to cash flow stability while dampening the effect of economic and market threats.

A utility that warrants a Strong or Strong/Adequate assessment has scale, scope, and diversity that support the stability of its revenues and profits by limiting its vulnerability to most combinations of adverse factors, events, or trends. The utility's significant advantages enable it to withstand economic, regional, competitive, and technological threats better than its peers. It typically is characterized by a combination of the following factors:

- A large and diverse customer base with no meaningful customer concentration risk, where residential and small to medium commercial customers typically provide most operating income.
- The utility's range of service territories and regulatory jurisdictions is better than others in the sector.
- Exposure to multiple regulatory authorities where we assess preliminary regulatory advantage to be at least Adequate. In the case of exposure to a single regulatory regime, the regulatory advantage assessment is either Strong or Strong/Adequate.
- No meaningful exposure to a single or few assets or suppliers that could hurt operations or could not easily be replaced.

A utility that warrants a Weak or Weak/Adequate assessment lacks scale, scope, and diversity such that it compromises the stability and sustainability of its revenues and profits. The utility's vulnerability to, or reliance on, various elements of this sub-factor is such that it is less likely than its peers to withstand economic, competitive, or technological threats. It typically is characterized by a combination of the following factors:

- A small customer base, especially if burdened by customer and/or industry concentration combined with little economic diversity and average to below-average economic prospects;
- Exposure to a single service territory and a regulatory authority with a preliminary regulatory advantage assessment of Adequate or Adequate/Weak; or
- Dependence on a single supplier or asset that cannot easily be replaced and which hurts the utility's operations.

We generally believe a larger service territory with a diverse customer base and average to above-average economic growth prospects provides a utility with cushion and flexibility in the recovery of operating costs and ongoing investment (including replacement and growth capital spending), as well as lessening the effect of external shocks (i.e.,

extreme local weather) since the incremental effect on each customer declines as the scale increases.

We consider residential and small commercial customers as having more stable usage patterns and being less exposed to periodic economic weakness, even after accounting for some weather-driven usage variability. Significant industrial exposure along with a local economy that largely depends on one or few cyclical industries potentially contributes to the cyclicality of a utility's load and financial performance, magnifying the effect of an economic downturn.

A utility's cash flow generation and stability can benefit from operating in multiple geographic regions that exhibit average to better than average levels of wealth, employment, and growth that underpin the local economy and support long-term growth. Where operations are in a single geographic region, the risk can be ameliorated if the region is sufficiently large, demonstrates economic diversity, and has at least average demographic characteristics.

The detriment of operating in a single large geographic area is subject to the strength of regulatory assessment. Where a utility operates in a single large geographic area and has a strong regulatory assessment, the benefit of diversity can be incremental.

Operating efficiency

We consider the key factors for this component of competitive position to be:

- Compliance with the terms of its operating license, including safety, reliability, and environmental standards;
- Cost management; and
- Capital spending: scale, scope, and management.

Relative to peers, we analyze how successful a utility management achieves the above factors within the levels allowed by the regulator in a manner that promotes cash flow stability. We consider how management of these factors reduces the prospect of penalties for noncompliance, operating costs being greater than allowed, and capital projects running over budget and time, which could hurt full cost recovery.

The relative importance of the above three factors, particularly cost and capital spending management, is determined by the type of regulation under which the utility operates. Utilities operating under robust "cost plus" regimes tend to be more insulated given the high degree of confidence costs will invariably be passed through to customers. Utilities operating under incentive-based regimes are likely to be more sensitive to achieving regulatory standards. This is particularly so in the regulatory regimes that involve active consultation between regulator and utility and market testing as opposed to just handing down an outcome on a more arbitrary basis.

In some jurisdictions, the absolute performance standards are less relevant than how the utility performs against the regulator's performance benchmarks. It is this performance that will drive any penalties or incentive payments and can be a determinant of the utilities' credibility on operating and asset-management plans with its regulator.

Therefore, we consider that utilities that perform these functions well are more likely to consistently achieve determinations that maximize the likelihood of cost recovery and full inclusion of capital spending in their asset bases. Where regulatory resets are more at the discretion of the utility, effective cost management, including of labor, may allow for more control over the timing and magnitude of rate filings to maximize the chances of a constructive outcome such as full operational and capital cost recovery while protecting against reputational risks.

A regulated utility that warrants a Strong or Strong/Adequate assessment for operating efficiency relative to peers generates revenues and profits through minimizing costs, increasing efficiencies, and asset utilization. It typically is characterized by a combination of the following:

- High safety record;
- Service reliability is strong, with a track record of meeting operating performance requirements of stakeholders, including those of regulators. Moreover, the utility's asset profile (including age and technology) is such that we have confidence that it could sustain favorable performance against targets;
- Where applicable, the utility is well-placed to meet current and potential future environmental standards;
- Management maintains very good cost control. Utilities with the highest assessment for operating efficiency have shown an ability to manage both their fixed and variable costs in line with regulatory expectations (including labor and working capital management being in line with regulator's allowed collection cycles); or
- There is a history of a high level of project management execution in capital spending programs, including large one-time projects, almost invariably within regulatory allowances for timing and budget.

A regulated utility that warrants an Adequate assessment for operating efficiency relative to peers has a combination of cost position and efficiency factors that support profit sustainability combined with average volatility. Its cost structure is similar to its peers. It typically is characterized by a combination of the following factors:

- High safety performance;
- Service reliability is satisfactory with a track record of mostly meeting operating performance requirements of stakeholders, including those of regulators. We have confidence that a favorable performance against targets can be mostly sustained;
- Where applicable, the utility may be challenged to comply with current and future environmental standards that could increase in the medium term;
- Management maintains adequate cost control. Utilities that we assess as having adequate operating efficiency mostly manage their fixed and variable costs in line with regulatory expectations (including labor and working capital management being mostly in line with regulator's allowed collection cycles); or
- There is a history of adequate project management skills in capital spending programs within regulatory allowances for timing and budget.

A regulated utility that warrants a weak or weak/adequate assessment for operating efficiency relative to peers has a combination of cost position and efficiency factors that fail to support profit sustainability combined with below-average volatility. Its cost structure is worse than its peers. It typically is characterized by a combination of the following:

- Poor safety performance;
- Service reliability has been sporadic or non-existent with a track record of not meeting operating performance requirements of stakeholders, including those of regulators. We do not believe the utility can consistently meet performance targets without additional capital spending;
- Where applicable, the utility is challenged to comply with current environmental standards and is highly vulnerable to more onerous standards;
- Management typically exceeds operating costs authorized by regulators;
- Inconsistent project management skills as evidenced by cost overruns and delays including for maintenance capital spending; or
- The capital spending program is large and complex and falls into the weak or weak/adequate assessment, even if

operating efficiency is generally otherwise considered adequate.

Profitability

45 A utility with above-average profitability would, relative to its peers, generally earn a rate of return at or above what regulators authorize and have minimal exposure to earnings volatility from affiliated unregulated business activities or market-sensitive regulated operations. Conversely, a utility with below-average profitability would generally earn rates of return well below the authorized return relative to its peers or have significant exposure to earnings volatility from affiliated unregulated business activities or market-sensitive regulated operations.

47 The profitability assessment consists of "level of profitability" and "volatility of profitability."

Level of profitability

48 Key measures of general profitability for regulated utilities commonly include ratios, which we compare both with those of peers and those of companies in other industries to reflect different countries' regulatory frameworks and business environments:

- EBITDA margin,
- Return on capital (ROC), and
- Return on equity (ROE).

49 In many cases, EBITDA as a percentage of sales (i.e., EBITDA margin) is a key indicator of profitability. This is because the book value of capital does not always reflect true earning potential, for example when governments privatize or restructure incumbent state-owned utilities. Regulatory capital values can vary with those of reported capital because regulatory capital values are not inflation-indexed and could be subject to different assumptions concerning depreciation. In general, a country's inflation rate or required rate of return on equity investment is closely linked to a utility company's profitability. We do not adjust our analysis for these factors, because we can make our assessment through a peer comparison.

50 For regulated utilities subject to full cost-of-service regulation and return-on-investment requirements, we normally measure profitability using ROE, the ratio of net income available for common stockholders to average common equity. When setting rates, the regulator ultimately bases its decision on an authorized ROE. However, different factors such as variances in costs and usage may influence the return a utility is actually able to earn, and consequently our analysis of profitability for cost-of-service-based utilities centers on the utility's ability to consistently earn the authorized ROE.

51 We will use return on capital when pass-through costs distort profit margins--for instance congestion revenues or collection of third-party revenues. This is also the case when the utility uses accelerated depreciation of assets, which in our view might not be sustainable in the long run.

Volatility of profitability

52 We may observe a clear difference between the volatility of actual profitability and the volatility of underlying regulatory profitability. In these cases, we could use the regulatory accounts as a proxy to judge the stability of earnings.

53 We use actual returns to calculate the standard error of regression for regulated utility issuers (only if there are at least

seven years of historical annual data to ensure meaningful results). If we believe recurring mergers and acquisitions or currency fluctuations affect the results, we may make adjustments.

Part II--Financial Risk Analysis

D. Accounting

54 Our analysis of a company's financial statements begins with a review of the accounting to determine whether the statements accurately measure a company's performance and position relative to its peers and the larger universe of corporate entities. To allow for globally consistent and comparable financial analyses, our rating analysis may include quantitative adjustments to a company's reported results. These adjustments also align a company's reported figures with our view of underlying economic conditions and give us a more accurate portrayal of a company's ongoing business. We discuss adjustments that pertain broadly to all corporate sectors, including this sector, in "Corporate Methodology: Ratios And Adjustments." Accounting characteristics and analytical adjustments unique to this sector are discussed below.

Accounting characteristics

55 Some important accounting practices for utilities include:

- For integrated electric utilities that meet native load obligations in part with third-party power contracts, we use our purchased power methodology to adjust measures for the debt-like obligation such contracts represent (see below).
- Due to distortions in leverage measures from the substantial seasonal working-capital requirements of natural gas distribution utilities, we adjust inventory and debt balances by netting the value of inventory against outstanding short-term borrowings. This adjustment provides an accurate view of the company's balance sheet by reducing seasonal debt balances when we see a very high certainty of near-term cost recovery (see below).
- We deconsolidate securitized debt (and associated revenues and expenses) that has been accorded specialized recovery provisions (see below).
- For water utilities that report under U.K. GAAP, we adjust ratios for infrastructure renewals accounting, which permits water companies to capitalize the maintenance spending on their infrastructure assets (see below). The adjustments aim to make those water companies that report under U.K. GAAP more comparable to those that report under accounting regimes that do not permit infrastructure renewals accounting.

56 In the U.S. and selectively in other regions, utilities employ "regulatory accounting," which permits a rate-regulated company to defer some revenues and expenses to match the timing of the recognition of those items in rates as determined by regulators. A utility subject to regulatory accounting will therefore have assets and liabilities on its books that an unregulated corporation, or even regulated utilities in many other global regions, cannot record. We do not adjust GAAP earnings or balance-sheet figures to remove the effects of regulatory accounting. However, as more countries adopt International Financial Reporting Standards (IFRS), the use of regulatory accounting will become more scarce. IFRS does not currently provide for any recognition of the effects of rate regulation for financial reporting purposes, but it is considering the use of regulatory accounting. We do not anticipate altering our fundamental financial analysis of utilities because of the use or non-use of regulatory accounting. We will continue to analyze the effects of regulatory actions on a utility's financial health.

Purchased power adjustment

57 We view long-term purchased power agreements (PPA) as creating fixed, debt-like financial obligations that represent substitutes for debt-financed capital investments in generation capacity. By adjusting financial measures to incorporate PPA fixed obligations, we achieve greater comparability of utilities that finance and build generation capacity and those that purchase capacity to satisfy new load. PPAs do benefit utilities by shifting various risks to the electricity generators, such as construction risk and most of the operating risk. The principal risk borne by a utility that relies on PPAs is recovering the costs of the financial obligation in rates. (See "Standard & Poor's Methodology For Imputing Debt for U.S. Utilities' Power Purchase Agreements," May 7, 2007, for more background and information on the adjustment.)

58 We calculate the present value (PV) of the future stream of capacity payments under the contracts as reported in the financial statement footnotes or as supplied directly by the company. The discount rate used is the same as the one used in the operating lease adjustment, i.e., 7%. For U.S. companies, notes to the financial statements enumerate capacity payments for the coming five years, and a thereafter period. Company forecasts show the detail underlying the thereafter amount, or we divide the amount reported as thereafter by the average of the capacity payments in the preceding five years to get an approximation of annual payments after year five.

59 We also consider new contracts that will start during the forecast period. The company provides us the information regarding these contracts. If these contracts represent extensions of existing PPAs, they are immediately included in the PV calculation. However, a contract sometimes is executed in anticipation of incremental future needs, so the energy will not flow until some later period and there are no interim payments. In these instances, we incorporate that contract in our projections, starting in the year that energy deliveries begin under the contract. The projected PPA debt is included in projected ratios as a current rating factor, even though it is not included in the current-year ratio calculations.

60 The PV is adjusted to reflect regulatory or legislative cost-recovery mechanisms when present. Where there is no explicit regulatory or legislative recovery of PPA costs, as in most European countries, the PV may be adjusted for other mitigating factors that reduce the risk of the PPAs to the utility, such as a limited economic importance of the PPAs to the utility's overall portfolio.The adjustment reduces the debt-equivalent amount by multiplying the PV by a specific risk factor.

61 Risk factors based on regulatory or legislative cost recovery typically range between 0% and 50%, but can be as high as 100%. A 100% risk factor would signify that substantially all risk related to contractual obligations rests on the company, with no regulatory or legislative support. A 0% risk factor indicates that the burden of the contractual payments rests solely with ratepayers, as when the utility merely acts as a conduit for the delivery of a third party's electricity. These utilities are barred from developing new generation assets, and the power supplied to their customers is sourced through a state auction or third parties that act as intermediaries between retail customers and electricity suppliers. We employ a 50% risk factor in cases where regulators use base rates for the recovery of the fixed PPA costs. If a regulator has established a separate adjustment mechanism for recovery of all prudent PPA costs, a risk factor of 25% is employed. In certain jurisdictions, true-up mechanisms are more favorable and frequent than the review of base rates, but still do not amount to pure fuel adjustment clauses. Such mechanisms may be triggered by financial thresholds or passage of prescribed periods of time. In these instances, a risk factor between 25% and 50% is

employed. Specialized, legislatively created cost-recovery mechanisms may lead to risk factors between 0% and 15%, depending on the legislative provisions for cost recovery and the supply function borne by the utility. Legislative guarantees of complete and timely recovery of costs are particularly important to achieving the lowest risk factors. We also exclude short-term PPAs where they serve merely as gap fillers, pending either the construction of new capacity or the execution of long-term PPAs.

62. Where there is no explicit regulatory or legislative recovery of PPA costs, the risk factor is generally 100%. We may use a lower risk factor if mitigating factors reduce the risk of the PPAs on the utility. Mitigating factors include a long position in owned generation capacity relative to the utility's customer supply needs that limits the importance of the PPAs to the utility or the ability to resell power in a highly liquid market at minimal loss. A utility with surplus owned generation capacity would be assigned a risk factor of less than 100%, generally 50% or lower, because we would assess its reliance on PPAs as limited. For fixed capacity payments under PPAs related to renewable power, we use a risk factor of less than 100% if the utility benefits from government subsidies. The risk factor reflects the degree of regulatory recovery through the government subsidy.

63. Given the long-term mandate of electric utilities to meet their customers' demand for electricity, and also to enable comparison of companies with different contract lengths, we may use an evergreening methodology. Evergreen treatment extends the duration of short- and intermediate-term contracts to a common length of about 12 years. To quantify the cost of the extended capacity, we use empirical data regarding the cost of developing new peaking capacity, incorporating regional differences. The cost of new capacity is translated into a dollars-per-kilowatt-year figure using a proxy weighted-average cost of capital and a proxy capital recovery period.

64. Some PPAs are treated as operating leases for accounting purposes--based on the tenor of the PPA or the residual value of the asset on the PPA's expiration. We accord PPA treatment to those obligations, in lieu of lease treatment; rather, the PV of the stream of capacity payments associated with these PPAs is reduced to reflect the applicable risk factor.

65. Long-term transmission contracts can also substitute for new generation, and, accordingly, may fall under our PPA methodology. We sometimes view these types of transmission arrangements as extensions of the power plants to which they are connected or the markets that they serve. Accordingly, we impute debt for the fixed costs associated with such transmission contracts.

66. Adjustment procedures:

- Data requirements:
- Future capacity payments obtained from the financial statement footnotes or from management.
- Discount rate: 7%.
- Analytically determined risk factor.

- Calculations:
- Balance sheet debt is increased by the PV of the stream of capacity payments multiplied by the risk factor.
- Equity is not adjusted because the recharacterization of the PPA implies the creation of an asset, which offsets the debt.
- Property, plant, and equipment and total assets are increased for the implied creation of an asset equivalent to the

debt.

- An implied interest expense for the imputed debt is determined by multiplying the discount rate by the amount of imputed debt (or average PPA imputed debt, if there is fluctuation of the level), and is added to interest expense.
- We impute a depreciation component to PPAs. The depreciation component is determined by multiplying the relevant year's capacity payment by the risk factor and then subtracting the implied PPA-related interest for that year. Accordingly, the impact of PPAs on cash flow measures is tempered.
- The cost amount attributed to depreciation is reclassified as capital spending, thereby increasing operating cash flow and funds from operations (FFO).
- Some PPA contracts refer only to a single, all-in energy price. We identify an implied capacity price within such an all-in energy price, to determine an implied capacity payment associated with the PPA. This implied capacity payment is expressed in dollars per kilowatt-year, multiplied by the number of kilowatts under contract. (In cases that exhibit markedly different capacity factors, such as wind power, the relation of capacity payment to the all-in charge is adjusted accordingly.)
- Operating income before depreciation and amortization (D&A) and EBITDA are increased for the imputed interest expense and imputed depreciation component, the total of which equals the entire amount paid for PPA (subject to the risk factor).
- Operating income after D&A and EBIT are increased for interest expense.

Natural gas inventory adjustment

67 In jurisdictions where a pass-through mechanism is used to recover purchased natural gas costs of gas distribution utilities within one year, we adjust for seasonal changes in short-debt tied to building inventories of natural gas in non-peak periods for later use to meet peak loads in peak months. Such short-term debt is not considered to be part of the utility's permanent capital. Any history of non-trivial disallowances of purchased gas costs would preclude the use of this adjustment. The accounting of natural gas inventories and associated short-term debt used to finance the purchases must be segregated from other trading activities.

68 Adjustment procedures:

- Data requirements:
- Short-term debt amount associated with seasonal purchases of natural gas devoted to meeting peak-load needs of captive utility customers (obtained from the company).

- Calculations:
- Adjustment to debt--we subtract the identified short-term debt from total debt.

Securitized debt adjustment

69 For regulated utilities, we deconsolidate debt (and associated revenues and expenses) that the utility issues as part of a securitization of costs that have been segregated for specialized recovery by the government entity constitutionally authorized to mandate such recovery if the securitization structure contains a number of protective features:

- An irrevocable, non-bypassable charge and an absolute transfer and first-priority security interest in transition property;
- Periodic adjustments ("true-up") of the charge to remediate over- or under-collections compared with the debt service obligation. The true-up ensures collections match debt service over time and do not diverge significantly in the short run; and,
- Reserve accounts to cover any temporary short-term shortfall in collections.

Full cost recovery is in most instances mandated by statute. Examples of securitized costs include "stranded costs" (above-market utility costs that are deemed unrecoverable when a transition from regulation to competition occurs) and unusually large restoration costs following a major weather event such as a hurricane. If the defined features are present, the securitization effectively makes all consumers responsible for principal and interest payments, and the utility is simply a pass-through entity for servicing the debt. We therefore remove the debt and related revenues and expenses from our measures. (See "Securitizing Stranded Costs," Jan. 18, 2001, for background information.)

Adjustment procedures:

- Data requirements:
- Amount of securitized debt on the utility's balance sheet at period end;
- Interest expense related to securitized debt for the period; and
- Principal payments on securitized debt during the period.

- Calculations:
- Adjustment to debt: We subtract the securitized debt from total debt.
- Adjustment to revenues: We reduce revenue allocated to securitized debt principal and interest. The adjustment is the sum of interest and principal payments made during the year.
- Adjustment to operating income after depreciation and amortization (D&A) and EBIT: We reduce D&A related to the securitized debt, which is assumed to equal the principal payments during the period. As a result, the reduction to operating income after D&A is only for the interest portion.
- Adjustment to interest expense: We remove the interest expense of the securitized debt from total interest expense.

- Operating cash flows:
- We reduce operating cash flows for revenues and increase for the assumed interest amount related to the securitized debt. This results in a net decrease to operating cash flows equal to the principal repayment amount.

Infrastructure renewals expenditure

In England and Wales, water utilities can report under either IFRS or U.K. GAAP. Those that report under U.K. GAAP are allowed to adopt infrastructure renewals accounting, which enables the companies to capitalize the maintenance spending on their underground assets, called infrastructure renewals expenditure (IRE). Under IFRS, infrastructure renewals accounting is not permitted and maintenance expenditure is charged to earnings in the year incurred. This difference typically results in lower adjusted operating cash flows for those companies that report maintenance expenditure as an operating cash flow under IFRS, than for those that report it as capital expenditure under U.K. GAAP. We therefore make financial adjustments to amounts reported by water issuers that apply U.K. GAAP, with the aim of making ratios more comparable with those issuers that report under IFRS and U.S. GAAP. For example, we deduct IRE from EBITDA and FFO.

IRE does not always consist entirely of maintenance expenditure that would be expensed under IFRS. A portion of IRE can relate to costs that would be eligible for capitalization as they meet the recognition criteria for a new fixed asset set out in International Accounting Standard 16 that addresses property, plant, and equipment. In such cases, we may refine our adjustment to U.K. GAAP companies so that we only deduct from FFO the portion of IRE that would not be capitalized under IFRS. However, the information to make such a refinement would need to be of high quality, reliable, and ideally independently verified by a third party, such as the company's auditor. In the absence of this, we assume

that the entire amount of IRE would have been expensed under IFRS and we accordingly deduct the full expenditure from FFO.

74 Adjustment procedures:

- Data requirements:
- U.K. GAAP accounts typically provide little information on the portion of capital spending that relates to renewals accounting, or the related depreciation, which is referred to as the infrastructure renewals charge. The information we use for our adjustments is, however, found in the regulatory cost accounts submitted annually by the water companies to the Water Services Regulation Authority, which regulates all water companies in England and Wales.

- Calculations:
- EBITDA: Reduced by the value of IRE that was capitalized in the period.
- EBIT: Adjusted for the difference between the adjustment to EBITDA and the reduction in the depreciation expense, depending on the degree to which the actual cash spending in the current year matches the planned spending over the five-year regulatory review period.
- Cash flow from operations and FFO: Reduced by the value of IRE that was capitalized in the period.
- Capital spending: Reduced by the value of infrastructure renewals spending that we reclassify to cash flow from operations.
- Free operating cash flow: No impact, as the reduction in operating cash flows is exactly offset by the reduction in capital spending.

E. Cash flow/leverage analysis

75 In assessing the cash flow adequacy of a regulated utility, our analysis uses the same methodology as with other corporate issuers (see "Corporate Methodology"). We assess cash flow/leverage on a six-point scale ranging from ('1') minimal to ('6') highly leveraged. These scores are determined by aggregating the assessments of a range of credit ratios, predominantly 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.

76 The corporate methodology provides 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.

77 If an industry's volatility levels are low, the threshold levels for the applicable ratios to achieve a given cash flow leverage assessment are less stringent, although the width of the ratio range is narrower. Conversely, if an industry has standard levels of volatility, the threshold levels for the applicable ratios to achieve a given cash flow leverage assessment may be elevated, but with a wider range of values.

78 We apply the "low-volatility" table to regulated utilities that qualify under the corporate criteria and with all of the following characteristics:

- A vast majority of operating cash flows come from regulated operations that are predominantly at the low end of the utility risk spectrum (e.g., a "network," or distribution/transmission business unexposed to commodity risk and with very low operating risk);
- A "strong" regulatory advantage assessment;

- An established track record of normally stable credit measures that is expected to continue;
- A demonstrated long-term track record of low funding costs (credit spread) for long-term debt that is expected to continue; and
- Non-utility activities that are in a separate part of the group (as defined in our group rating methodology) that we consider to have "nonstrategic" group status and are not deemed high risk and/or volatile.

78 We apply the "medial volatility" table to companies that do not qualify under paragraph 78 with:

- A majority of operating cash flows from regulated activities with an "adequate" or better regulatory advantage assessment; or
- About one-third or more of consolidated operating cash flow comes from regulated utility activities with a "strong" regulatory advantage and where the average of its remaining activities have a competitive position assessment of '3' or better.

80 We apply the "standard-volatility" table to companies that do not qualify under paragraph 79 and with either:

- About one-third or less of its operating cash flow comes from regulated utility activities, regardless of its regulatory advantage assessment; or
- A regulatory advantage assessment of "adequate/weak" or "weak."

Part III--Rating Modifiers

F. Diversification/portfolio effect

81 In assessing the diversification/portfolio effect on a regulated utility, our analysis uses the same methodology as with other corporate issuers (see "Corporate Methodology").

G. Capital structure

82 In assessing the quality of the capital structure of a regulated utility, we use the same methodology as with other corporate issuers (see "Corporate Methodology").

H. Liquidity

83 In assessing a utility's liquidity/short-term factors, our analysis is consistent with the methodology that applies to corporate issuers (See "Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers," Nov. 19, 2013) except for the standards for "adequate" liquidity set out in paragraph 84 below.

84 The relative certainty of financial performance by utilities operating under relatively predictable regulatory monopoly frameworks make these utilities attractive to investors even in times of economic stress and market turbulence compared to conventional industrials. For this reason, utilities with business risk profiles of at least "satisfactory" meet our definition of "adequate" liquidity based on a slightly lower ratio of sources to uses of funds of 1.1x compared with the standard 1.2x. Also, recognizing the cash flow stability of regulated utilities we allow more discretion when calculating covenant headroom. We consider that utilities have adequate liquidity if they generate positive sources over uses, even if forecast EBITDA declines by 10% (compared with the 15% benchmark for corporate issuers) before covenants are breached.

I. Financial policy

85 In assessing financial policy on a regulated utility, our analysis uses the same methodology as with other corporate issuers (see "Corporate Methodology").

J. Management and governance

86 In assessing management and governance on a regulated utility, our analysis uses the same methodology as with other corporate issuers (see "Corporate Methodology").

K. Comparable ratings analysis

87 In assessing the comparable ratings analysis on a regulated utility, our analysis uses the same methodology as with other corporate issuers (see "Corporate Methodology").

Appendix--Frequently Asked Questions

Does Standard & Poor's expect that the business strategy modifier to the preliminary regulatory advantage will be used extensively?

88 Globally, we expect management's influence will be neutral in most jurisdictions. Where the regulatory assessment is "strong," it is less likely that a negative business strategy modifier would be used due to the nature of the regulatory regime that led to the "strong" assessment in the first place. Utilities in "adequate/weak" and "weak" regulatory regimes are challenged to outperform due to the uncertainty of such regulatory regimes. For a positive use of the business strategy modifier, there would need to be a track record of the utility consistently outperforming the parameters laid down under a regulatory regime, and we would need to believe this could be sustained. The business strategy modifier is most likely to be used when the preliminary regulatory advantage assessment is "strong/adequate" because the starting point in the assessment is reasonably supportive, and a utility has shown it manages regulatory risk better or worse than its peers in that regulatory environment and we expect that advantage or disadvantage will persist. An example would be a utility that can consistently earn or exceed its authorized return in a jurisdiction where most other utilities struggle to do so. If a utility is treated differently by a regulator due to perceptions of poor customer service or reliability and the "operating efficiency" component of the competitive position assessment does not fully capture the effect on the business risk profile, a negative business strategy modifier could be used to accurately incorporate it into our analysis. We expect very few utilities will be assigned a "very negative" business strategy modifier.

Does a relatively strong or poor relationship between the utility and its regulator compared with its peers in the same jurisdiction necessarily result in a positive or negative adjustment to the preliminary regulatory advantage assessment?

89 No. The business strategy modifier is used to differentiate a company's regulatory advantage within a jurisdiction where we believe management's business strategy has and will positively or negatively affect regulatory outcomes beyond what is typical for other utilities in that jurisdiction. For instance, in a regulatory jurisdiction where allowed returns are negotiated rather than set by formula, a utility that is consistently authorized higher returns (and is able to earn that return) could warrant a positive adjustment. A management team that cannot negotiate an approved capital spending program to improve its operating performance could be assessed negatively if its performance lags behind peers in the same regulatory jurisdiction.

What is your definition of regulatory jurisdiction?

90 A regulatory jurisdiction is defined as the area over which the regulator has oversight and could include single or multiple subsectors (water, gas, and power). A geographic region may have several regulatory jurisdictions. For example, the Office of Gas and Electricity Markets and the Water Services Regulation Authority in the U.K. are considered separate regulatory jurisdictions. In Ontario, Canada, the Ontario Energy Board represents a single jurisdiction with regulatory oversight for power and gas. Also, in Australia, the Australian Energy Regulator would be considered a single jurisdiction given that it is responsible for both electricity and gas transmission and distribution networks in the entire country, with the exception of Western Australia.

Are there examples of different preliminary regulatory advantage assessments in the same country or jurisdiction?

91 Yes. In Israel we rate a regulated integrated power utility and a regulated gas transmission system operator (TSO). The power utility's relationship with its regulator is extremely poor in our view, which led to significant cash flow volatility in a stress scenario (when terrorists blew up the gas pipeline that was then Israel's main source of natural gas, the utility was unable to negotiate compensation for expensive alternatives in its regulated tariffs). We view the gas TSO's relationship with its regulator as very supportive and stable. Because we already reflected this in very different preliminary regulatory advantage assessments, we did not modify the preliminary assessments because the two regulatory environments in Israel differ and were not the result of the companies' respective business strategies.

How is regulatory advantage assessed for utilities that are a natural monopoly but are not regulated by a regulator or a specific regulatory framework, and do you use the regulatory modifier if they achieve favorable treatment from the government as an owner?

92 The four regulatory pillars remain the same. On regulatory stability we look at the stability of the setup, with more emphasis on the historical track record and our expectations regarding future changes. In tariff-setting procedures and design we look at the utility's ability to fully recover operating costs, investments requirements, and debt-service obligations. In financial stability we look at the degree of flexibility in tariffs to counter volume risk or commodity risk. The flexibility can also relate to the level of indirect competition the utility faces. For example, while Nordic district heating companies operate under a natural monopoly, their tariff flexibility is partly restricted by customers' option to change to a different heating source if tariffs are significantly increased. Regulatory independence and insulation is mainly based on the perceived risk of political intervention to change the setup that could affect the utility's credit profile. Although political intervention tends to be mostly negative, in certain cases political ties due to state ownership might positively influence tariff determination. We believe that the four pillars effectively capture the benefits from the close relationship between the utility and the state as an owner; therefore, we do not foresee the use of the regulatory modifier.

In table 1, when describing a "strong" regulatory advantage assessment, you mention that there is support of cash flows during construction of large projects, and preapproval of capital investment programs and large projects lowers the risk of subsequent disallowances of capital costs. Would this preclude a "strong" regulatory advantage assessment in jurisdictions where those practices are absent?

93 No. The table is guidance as to what we would typically expect from a regulatory framework that we would assess as "strong." We would expect some frameworks with no capital support during construction to receive a "strong" regulatory advantage assessment if in aggregate the other factors we analyze support that conclusion.

RELATED CRITERIA AND RESEARCH

- Corporate Methodology, Nov. 19, 2013
- Group Rating Methodology, Nov. 19, 2013
- Methodology: Industry Risk, Nov. 19, 2013
- Corporate Methodology: Ratios And Adjustments, Nov. 19, 2013
- Ratings Above The Sovereign--Corporate And Government Ratings: Methodology And Assumptions, Nov. 19, 2013
- Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers, Nov. 19, 2013
- Collateral Coverage And Issue Notching Rules For '1+' And '1' Recovery Ratings On Senior Bonds Secured By Utility Real Property, Feb. 14, 2013
- Methodology: Management And Governance Credit Factors For Corporate Entities and Insurers, Nov. 13, 2012
- General Criteria: Principles Of Credit Ratings, Feb. 16, 2011
- General Criteria: Rating Government-Related Entities: Methodology And Assumptions, Dec. 9, 2010

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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Corporate Methodology

*(**Editor's Note:** We've republished this article on Dec. 16, 2013 to make some adjustments to language. These adjustments have no impact on our ratings or the effective date of the criteria.)*

1. Standard & Poor's Ratings Services is updating its criteria 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," which we published on Feb. 16, 2011.

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," published Oct. 1, 2010, 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. Standard & Poor's 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 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," published Nov. 19, 2013).

SCOPE OF THE CRITERIA

8. This methodology applies to nonfinancial corporate issuer credit ratings globally. Please see "Criteria Guidelines For Recovery Ratings On Global Industrial Issuers' Speculative-Grade Debt," published Aug. 10, 2009, and "2008 Corporate Criteria: Rating Each Issue," published April 15, 2008, 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, transportation equipment leasing, auto rentals, 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, master limited partnerships, general partnerships of master limited partnerships, and other entities whose cash flows are primarily derived from partially owned equity holdings.

IMPACT ON OUTSTANDING RATINGS

9. We expect about 5% of corporate industrial companies and utilities ratings within the scope of the criteria to change. Of that number, we expect approximately 90% to receive a one-notch change, with the majority of the remainder receiving a two-notch change. We expect the ratio of upgrades to downgrades to be around 3:1.

EFFECTIVE DATE AND TRANSITION

10. These criteria are effective immediately on the date of publication. We intend to complete our review of all affected ratings within the next six months.

METHODOLOGY

A. Corporate Ratings Framework

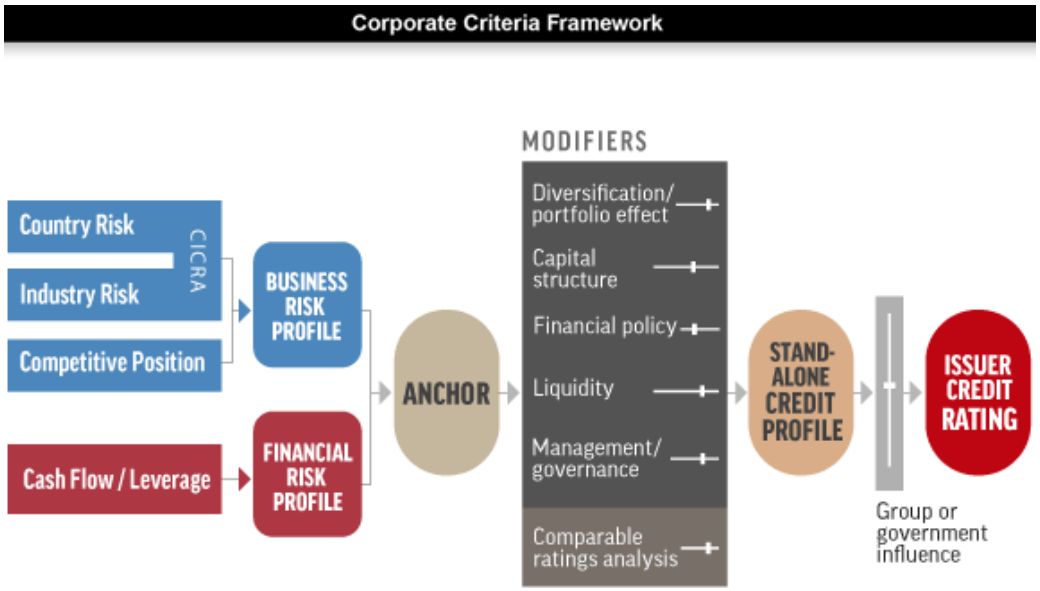
11. The corporate analytical methodology organizes the analytical process according to a common framework, and it divides the task into several factors so that Standard & Poor's considers all salient issues. First we analyze the company's business risk profile, then evaluate its financial risk profile, 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," published Nov. 19, 2013, and "Rating Government-Related Entities: Methodology And Assumptions," published Dec. 9, 2010, 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," published Nov. 19, 2013.

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
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," published Oct. 1, 2012. 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. 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 stronger business risk profiles 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," published Oct. 1, 2012, 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).

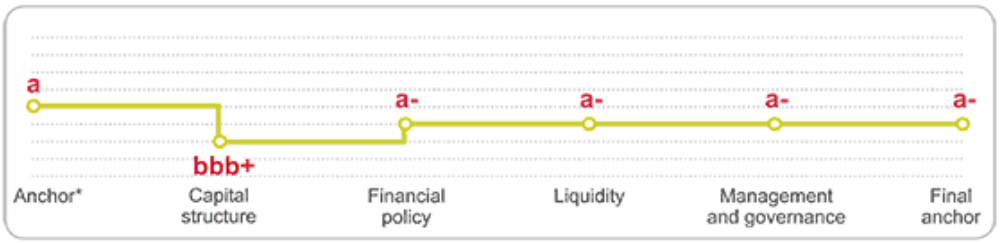
Table 5

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," published Nov. 19, 2013. 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," published Nov. 19, 2013.)

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," published Nov. 13, 2012.

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 Standard & Poor's believes affect the risks that entities face in their respective industries. (See "Methodology: Industry Risk," published Nov. 19, 2013.)

C. Country Risk

40. The analysis of country risk addresses the major factors that Standard & Poor's 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," published Nov. 19, 2013.)

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, 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. Standard & Poor's 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

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 8

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 adaptable 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 support 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.

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.

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 is revenue growth and/or result in a higher cost structure and less efficient operations relative to its peers'.

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," published Nov. 19, 2013, 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.

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. Industry KCF articles 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.

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 Standard & Poor's ratios and adjustments criteria (see "Corporate Methodology: Ratios And Adjustments," published Nov. 19, 2013). 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 to cash interest 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 interest to cash interest and EBITDA to interest, will be given greater importance as supplemental ratios. For the purposes of calculating the coverage ratios, "cash interest" includes only cash interest payments (i.e., interest excludes noncash interest payable on, for example, payment-in-kind [PIK] instruments) and does not include any Standard & Poor's adjusted interest on such items as leases, while "interest" is the income statement figure plus Standard & Poor's adjustments to interest (see "Corporate Methodology: Ratios And Adjustments," published Nov. 19, 2013).

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 Standard & Poor's, 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 Standard & Poor's 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. Standard & Poor's 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**	**Very positive**
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," published Nov. 19, 2013). 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 Standard & Poor's 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 companies that are owned 40% or more by a financial sponsor or a group of three or less financial sponsors and where we consider that the sponsor(s) exercise control of the company solely or together.

*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 companies that are owned 40% or more by a financial sponsor or a group of three or less financial sponsors and where we consider that the sponsor(s) exercise control of the company solely or together.

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.

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," published Nov. 19, 2013).

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," published Nov. 13, 2012).

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.

SUPERSEDED CRITERIA FOR ISSUERS WITHIN THE SCOPE OF THESE 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

- Methodology: Industry Risk, Nov. 19, 2013
- Corporate Criteria: Ratios And Adjustments, Nov. 19, 2013
- Country Risk Assessment Methodology And Assumptions, Nov. 19, 2013
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- Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings, Oct. 1, 2012
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- Stand-Alone Credit Profiles: One Component Of A Rating, Oct. 1, 2010
- Criteria Guidelines For Recovery Ratings On Global Industrial Issuers' Speculative-Grade Debt, Aug. 10, 2009
- 2008 Corporate Criteria: Rating Each Issue, April 15, 2008

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	GDP weighting (%)
South Africa	Africa	30.2
Egypt	Africa	28.0
Nigeria	Africa	23.5
Morocco	Africa	8.9

Table 26

Country And Regional Risk (cont.)		
Tunisia	Africa	5.4
Senegal	Africa	1.4
Mozambique	Africa	1.4
Zambia	Africa	1.2
Indonesia	Asia-Pacific	27.1
Taiwan	Asia-Pacific	20.1
Thailand	Asia-Pacific	14.4
Malaysia	Asia-Pacific	11.0
Philippines	Asia-Pacific	9.5
Vietnam	Asia-Pacific	7.1
Bangladesh	Asia-Pacific	6.8
Sri Lanka	Asia-Pacific	2.8
Laos	Asia-Pacific	0.4
Papua New Guinea	Asia-Pacific	0.4
Mongolia	Asia-Pacific	0.3
Australia	Australia NZ	88.2
New Zealand	Australia NZ	11.8
Guatemala	Central America	40.5
Costa Rica	Central America	30.2
Panama	Central America	29.3
India	Central Asia	86.5
Pakistan	Central Asia	9.3
Kazakhstan	Central Asia	4.2
Poland	Central Europe	46.3
Czech Republic	Central Europe	16.6
Hungary	Central Europe	11.3
Slovakia	Central Europe	7.7
Bulgaria	Central Europe	6.0
Croatia	Central Europe	4.6
Lithuania	Central Europe	3.8
Latvia	Central Europe	2.1
Estonia	Central Europe	1.6
China	East Asia	64.5
Japan	East Asia	23.6
Korea	East Asia	8.4
Hong Kong	East Asia	1.9
Singapore	East Asia	1.7
Greece	East Europe	77.5
Slovenia	East Europe	16.0
Cyprus	East Europe	6.5
Russia	Eastern Europe and Central Asia	80.4
Ukraine	Eastern Europe and Central Asia	10.8

Table 26

Country And Regional Risk (cont.)		
Belarus	Eastern Europe and Central Asia	4.8
Azerbaijan	Eastern Europe and Central Asia	3.2
Georgia	Eastern Europe and Central Asia	0.9
Brazil	Latin America	35.3
Mexico	Latin America	26.3
Argentina	Latin America	11.1
Colombia	Latin America	7.5
Venezuela	Latin America	6.0
Peru	Latin America	4.9
Chile	Latin America	4.8
Ecuador	Latin America	2.0
Uruguay	Latin America	0.8
El Salvador	Latin America	0.7
Paraguay	Latin America	0.6
Belize	Latin America	0.0
Turkey	Middle East	42.8
Saudi Arabia	Middle East	28.2
Israel	Middle East	9.4
Qatar	Middle East	7.2
Kuwait	Middle East	6.3
Oman	Middle East	3.4
Jordan	Middle East	1.5
Bahrain	Middle East	1.2
United States	North America	91.5
Canada	North America	8.5
Italy	Southern Europe	52.6
Spain	Southern Europe	40.4
Portugal	Southern Europe	7.0
Dominican Republic	The Caribbean	75.4
Jamaica	The Caribbean	19.2
Barbados	The Caribbean	5.4
Germany	Western Europe	28.7
United Kingdom	Western Europe	21.3
France	Western Europe	20.7
Netherlands	Western Europe	6.5
Belgium	Western Europe	3.9
Sweden	Western Europe	3.6
Switzerland	Western Europe	3.3
Austria	Western Europe	3.3
Norway	Western Europe	2.6
Denmark	Western Europe	1.9
Finland	Western Europe	1.8

Table 26

Country And Regional Risk (cont.)		
Ireland	Western Europe	1.8
Luxembourg	Western Europe	0.4
Iceland	Western Europe	0.1
Malta	Western Europe	0.1

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

Table 27

List Of Industries, Subsectors, And Standard Competitive Position Group Profiles (cont.)

	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

Table 27

List Of Industries, Subsectors, And Standard Competitive Position Group Profiles (cont.)		
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

Table 27

List Of Industries, Subsectors, And Standard Competitive Position Group Profiles (cont.)

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," published Nov. 19, 2013. **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%

Table 28

SER Calibration By Industry Based On EBITDA (cont.)

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%
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%

Table 29

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

Oil and gas integrated, exploration and production	=<4%	>4%-6%	>6%-8%	>8%-13%	>13%-22%	>22%
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.

Table 30

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%

Table 30

SER Calibration By Industry Based On Return On Capital (cont.)						
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%
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. In addition, share buybacks and potential M&A, both of which can represent very significant uses of cash, are important components 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 Standard & Poor's 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: share buybacks, net of any share issuance, and M&A. Discretionary cash flow is defined as cash flow from operating activities less capital expenditures and total dividends.

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): Standard & Poor's 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: Standard & Poor's 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.

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.

(Watch the related CreditMatters TV segment titled, "Standard & Poor’s Launches Its New Corporate Ratings Criteria," dated Nov. 19, 2013.)

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How Regulatory Advantage Scores Can Affect Ratings On Regulated Utilities

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How Regulatory Advantage Scores Can Affect Ratings On Regulated Utilities

For a regulated utility company, the regulatory regime in which it operates will influence its performance in profound ways. As such, Standard & Poor's Ratings Services' regulatory advantage assessment -- which informs both our business risk and financial risk scores -- is one of the most important factors in our credit analysis of regulated utilities. All else being equal, companies with lower regulatory advantage scores must have significantly lower debt leverage to qualify for the same financial risk assessment as those with stronger scores. Furthermore, although it is possible to achieve an "excellent" business risk profile with a less than strong regulatory advantage score, it requires stronger operating efficiency, scale scope and diversity, as well as profitability (both level and volatility).

While any particular regulatory decision or structure can have a financial impact on a utility, we don't analyze these factors in isolation. Rather, we consider the overall regime and compare it with other jurisdictions globally, and this broader assessment is what ultimately influences our rating opinions. Our criteria indicate the path to a rating for regulated utilities, and show how regulatory advantage (among other factors) could push a rating higher or lower.

Overview

- Our regulatory advantage assessment is a key factor in determining both the business risk and financial risk profiles of Canadian regulated utilities.
- Our view of a utility's regulatory regime also plays a big role in determining our expectations for credit metrics at similar rating levels.
- Given the allowed returns and funds from operations-to-debt in most Canadian regulatory jurisdictions, it is difficult to attain an 'a' category rating if we view the issuer's regulatory advantage as less than "strong."

The Regulatory Regime's Importance To The Ratings

Our assessment of a utility's regulatory regime rests on four pillars: regulatory stability, efficiency of tariff-setting procedures, financial stability, and regulatory independence (see "Key Credit Factors For The Regulated Utilities Industry," published Nov. 19, 2013, on RatingsDirect). We believe these factors strongly influence a utility's credit quality and its ability to recover its costs and earn a timely return. Through our assessment of these pillars, we form an opinion of the regulatory advantage that a utility enjoys because of the regulatory regime or regimes in which it operates. Regulatory advantage scores include "strong," "strong/adequate," "adequate," "adequate/weak," and "weak." Similar to the U.S., our assessments in Canada range from strong to adequate.

The regulatory advantage assessment is a significant contributor to the utility's preliminary competitive position score (accounting for 60% of this score, replacing the "competitive advantage" component that would apply for corporate issuers). The competitive position, along with country and industry risk, determines the utility's business risk profile. Other factors affecting the competitive position score include the company's operating efficiency (20%); and scale,

scope, and diversity (20%). Profitability (both level and volatility) can also affect the competitive position.

What Do Our Regulatory Assessments Mean?

A strong preliminary regulatory advantage assessment means we believe:

- The utility has a major regulatory advantage due to one or a combination of factors that support cost recovery and a return on capital combined with lower than average volatility of earnings and cash flows.
- There are strong prospects that the utility can sustain this advantage over the long term.
- This should enable the utility to withstand economic downturns and political risks better than other utilities

An adequate preliminary regulatory advantage assessment means we believe:

- The utility has some regulatory advantages and protection, but not to the extent that it leads to a superior business model or durable benefit.
- The utility has some but not all drivers of well-managed regulatory risk. Certain regulatory factors support the business's long-term stability and viability but could result in periods of below-average levels of profitability and greater profit volatility. However, overall these regulatory drivers are partially offset by the utility's disadvantages or lack of sustainability of other factors.

Once we've assessed the four pillars of the regulatory regime, we may modify the preliminary regulatory advantage score to reflect the utility's management of regulatory risk, if we think this has had and will continue to have a meaningful impact on regulatory outcomes (which we explain in paragraphs 29 and 30 of the "Key Credit Factors" article). In Canada, we have assessed this modifier as "neutral" for most companies we rate, so the preliminary and final regulatory advantage assessments under our criteria typically do not differ. For most jurisdictions in Canada, regulatory decisions are consistent and transparent for all companies within the jurisdiction and often based to a large extent on formulas. Therefore, management of regulatory risk has not had a material impact on rating outcomes to date, in our view.

While our final regulatory advantage assessment has a significant influence on a utility's business risk profile, it can have an even greater impact on its financial risk profile. As regulatory advantage declines, we expect higher cash flow volatility; as such, a utility's regulatory advantage score directly affects which of the three cash-flow volatility tables -- low, medial, or standard -- we'll use as a guideline when assessing the issuer's financial risk. Generally speaking, low cash-flow volatility allows for higher debt levels at the same rating category than medial volatility, and medial volatility allows for more debt than standard volatility (see tables 1 and 2). Using the low volatility table, for instance, we would consider an adjusted funds from operations (FFO)-to-debt ratio of 9%-13% to align with a "significant" financial risk profile, whereas we would consider this level of leverage "aggressive" under the medial table and "highly leveraged" under the standard table.

Table 1

Cash Flow-To-Leverage Analysis Ratios -- Low Volatility

	--Core ratios--	
	FFO/debt (%)	**Debt/EBITDA (x)**
Minimal	35+	Less than 2

Table 1

Cash Flow-To-Leverage Analysis Ratios -- Low Volatility (cont.)		
Modest	23-35	2-3
Intermediate	13-23	3-4
Significant	9-13	4-5
Aggressive	6-9	5-6
Highly leveraged	Less than 6	Greater than 6

FFO--Funds from operations.

Table 2

Cash Flow-To-Leverage Analysis Core Ratios -- Medial Volatility		
	--Core ratios--	
	FFO/debt (%)	**Debt/EBITDA (x)**
Minimal	50+	less than 1.75
Modest	35-50	1.75-2.50
Intermediate	23-35	2.5-3.5
Significant	13-23	3.5-4.5
Aggressive	9-13	4.5-5.5
Highly leveraged	Less than 9	Greater than 5.5

Under our criteria, we apply the low volatility table only if a utility has a strong regulatory advantage score. With a regulatory advantage less than strong, a company would need to maintain a higher adjusted FFO-to-debt ratio, in the range of 13%-23%, to warrant a "significant" financial risk profile score (see table 3) and achieve a similar rating outcome of 'a-'. This is highly unlikely, given the current allowed returns under most Canadian regulatory jurisdictions are based on similar formula.

Table 3

How Factors Can Affect The Final Rating				
Criteria factor	**Company A**	**Company B**	**Company C**	**Company D**
Regulatory advantage assessment	Strong	Strong/adequate	Adequate	Adequate/weak or weak
Business risk profile	Excellent	Excellent	Strong	Satisfactory
Cash flow volatility table*	Low volatility	Medial volatility	Medial volatility	Standard volatility
Weighted average forward looking adjusted FFO-to-debt (%)	9-13	9-13	9-13	9-13
Financial risk profile	Significant	Aggressive	Agressive	Highly leveraged
Anchor score	a-	bbb	bb+	b+
Possible rating outcomes after comparable ratings analysis	A, A-, BBB+	BBB+, BBB, BBB-	BBB-,BB+, BB	BB-, B+,B

*There are additional conditions that issuers must meet for us to apply the low and medial volatility tables. Our Key Credit Factors article outlines these in paragraphs 78 and 79. This chart is not a comprehensive representation of our criteria and is for illustrative purposes only.

Let's look at a hypothetical example to see how this dynamic could play out. Suppose that Company A had a "strong" regulatory advantage score, and with our assessment of other key credit factors had an excellent business risk profile. In addition, Company A's FFO-to-debt metric was a forecast 11%-12%, resulting in a significant financial risk profile

when using the low volatility table. The excellent business risk profile and significant financial risk profile for Company A would yield an 'a-' anchor score (see table 4).

Table 4

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-

Now suppose Company B has a regulatory advantage score of strong/adequate based on our perception of regulatory risk. Also suppose that other key credit factors (such as scale, scope, and diversity; operating efficiency; and profitability) allowed it to achieve an excellent business risk profile. The low volatility table would not apply because Company B does not have a strong regulatory advantage score. We'll assume that the company satisfies the conditions for the use of the medial table (see sidebar 2). Finally, suppose we forecast an FFO-to-debt metric of 11%-12% for the company. Based on the medial table, Company B would have an aggressive financial risk profile at this leverage level, which, combined with the excellent business risk profile, would result in an anchor of 'bbb'. So while Company A and Company B appear similar, their regulatory advantage scores cause them to end up with different anchor outcomes, of 'a-' and 'bbb', respectively.

In Canada, although Maritime Electric Inc. (MEI) has an excellent business risk profile, we apply the medial table because we view the regulatory framework in the Province of Prince Edward Island as less than strong. Under the medial volatility table, MEI's expected adjusted FFO-to-debt of 11%-13% falls within the aggressive range resulting in an anchor score of 'bbb'. Under the low volatility table, for a company such as PowerStream Inc. with a strong regulatory advantage, similar forecast metrics would qualify as significant and lead to an anchor score of 'a-'.

When Do We Use The Low Volatility And Medial Volatility Tables?

Our criteria clearly states that to apply the low volatility table, the preliminary regulatory advantage assessment must be strong and the utility must also exhibit the following characteristics:

- A vast majority of operating cash flows come from regulated operations that are predominantly at the low end of the utility risk spectrum (e.g., a "network," or distribution/transmission business unexposed to commodity risk and with very low operating risk);
- An established track record of stable credit measures that is expected to continue;
- A demonstrated long-term track record of low funding costs (credit spread) for long-term debt that is expected to continue; and
- Non-utility activities that are in a separate part of the group

To apply the medial volatility table, the company must have a majority of operating cash flow from regulated activities with an adequate or better regulatory advantage assessment or about one-third or more of consolidated operating cash flow from regulated utility activities with a 'strong' regulatory advantage, and where the average of its remaining activities have a competitive position of 3 or better (paragraph 79 of the Key Credit Factors article).

In the hypothetical scenario, for Company B to attain an 'A' category rating, given a strong/adequate regulatory assessment and therefore higher regulatory risk, we would expect to see stronger sustained cash flows, with an adjusted FFO-to-debt ratio firmly in the 13%-23% range (not 9%-13%).

Overall, regulatory advantage factors into our ratings in two key ways:

- In the context of the business risk profile score, the regulatory advantage assessment accounts for 60% of the competitive position score. In this way, regulatory advantage is a significant determinant of whether a regulated utility can achieve an excellent business risk profile score.
- The regulatory advantage assessment also determines the cash volatility table we apply when determining the utility's financial risk profile. In particular, under our criteria, we will not use the low volatility table for a regulated utility unless it has a strong regulatory advantage score.

Related Criteria And Research

Related Criteria

- Key Credit Factors For The Regulated Utilities Industry, Nov. 19, 2013
- Corporate Methodology, Nov. 19, 2013

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Assessing U.S. Investor-Owned Utility Regulatory Environments

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Assessing U.S. Investor-Owned Utility Regulatory Environments

Regulatory advantage is the most heavily weighted factor when S&P Global Ratings analyzes a regulated utility's business risk profile. One significant aspect of regulatory risk that influences credit quality is the regulatory environment in the jurisdictions where a utility operates. A utility management team's skill in dealing with regulatory risk can sometimes overcome a difficult regulatory environment. Conversely, companies' regulatory risk can increase even with supportive regulatory regimes if management fails to devote the necessary time and resources to the important task of managing regulatory risk. We modify our assessment of regulatory advantage to account for this dynamic in our ratings methodology (for the criteria we use to rate utilities, see "Corporate Methodology," and "Key Credit Factors For The Regulated Utilities Industry," published Nov. 19, 2013, on RatingsDirect.)

There are specific factors we use in the U.S. to assess the credit implications of the numerous regulatory jurisdictions here that help us determine the "preliminary regulatory advantage" in our credit analysis of each investor-owned regulated utility. We organize the subfactors of regulatory advantage into four categories:

- Regulatory stability,
- Tariff-setting procedures and design,
- Financial stability, and
- Regulatory independence and insulation.

Regulatory Stability

The foundation of our opinion of a jurisdiction is the stability of its approach to regulating utilities, encompassing transparency, predictability, and consistency. Given the maturity of the U.S. investor-owned utility industry, the long history of utility regulation (going back to the early 20th century) and the well-established constitutional protections accorded to utility investments, we emphasize the principle of consistency when weighing regulatory stability. We also incorporate the degree to which the regulatory framework either explicitly or implicitly considers credit quality in its design.

Regulatory Change Can Bring Stability, Or Take It Away

While stability is one of the four pillars of our approach to evaluating regulatory risk, experience shows us that it's not an absolute positive or negative for creditors. Change can boost or lessen risk, and any improvement in a regulatory regime will overcome any negative connotations of instability. A good example is Michigan, which in about 2008 revamped its whole approach to utility regulation. As implemented in subsequent years by the Michigan Public Service Commission, the reforms have almost completely transformed the regulatory environment in that state.

However, during any period of change, we see the uncertainties surrounding the process and the outcome as possible major causes of risk. A more recent and still ongoing example is New York, where the Public Service Commission's (NYPSC) Reforming the Energy Vision (REV) proceeding is possibly revving up risk for utilities. While the NYPSC seemed at first to be focusing more on high-minded policy questions than on making a lot of changes to day-to-day operations, the current phase could eventually disrupt the way utilities make money and affect their ability to earn the authorized return. If the end result is greater operating risk with no opportunity to earn greater returns, our assessment of the regulatory environment could change.

Durability of regulatory system

An established, dependable approach to regulating utilities is a hallmark of a credit-supportive jurisdiction. Creditors lend capital to utilities over long periods to fund the development of long-lived assets. A firm understanding of the basic "rules" that will govern how the utility will recover its costs, including servicing its debt and the return on its capital over an extended period, is essential to accurately assess credit risk. Major or frequent changes to the regulatory model invariably raise risk due to the possibility of future changes. Steady application of transparent, comprehensible policies and practices lowers risk.

How long a regulatory framework has been in place is the most important factor in this area. We view jurisdictions as most supportive when there have been no major changes or where the approach has been consistent for a long time and is not prone to further changes. Jurisdictions that have undergone a major, fundamental change in the regulatory paradigm that seems to be working well are a little less supportive, and less so a jurisdiction that is transitioning to a new regulatory approach. Credit risk rises if the transition attracts political attention. The less-supportive jurisdictions are those that frequently alter the basic regulatory approach. We also view the framework's development less favorably if policy disputes or legal actions cause contention, indicating that the political consensus regarding utility regulation is fragile.

Some jurisdictions permit competitive markets to prevail for some important functions of the delivery of utility services, notably wholesale markets for electricity and retail markets for electric or gas service. In others, vertical integration is the norm. A jurisdiction's credit-supportiveness is more prone to suffer if market forces directly influence major cost items that utilities could otherwise control through cost-based regulation because of the potential volatility it creates. The risk inherent in a market-based model is straightforward: utility rates are more volatile when markets influence them rather than fully embedded costs, and regulators are apt to resist full and timely recovery when market price changes are abrupt and substantial (and perhaps misunderstood). We observe less support for credit quality in jurisdictions that are in the midst of deregulating important parts of the utility framework. The uncertainty of the timing

of reaching the outcome--and what the result will be--is a negative factor from a credit perspective. Utilities are also prone to financial stress when the transition to competition causes potential "rate shock" for customers that regulators could resist.

Transparency of regulatory framework and attitude toward credit quality

We believe regulation works best when it is rule-based. Creditor interests are better protected by the presence of and adherence to a pre-set code of rules and procedures that we can look to when assessing risk. Risk is lower when the rules are more transparent and when they take into account a utility's financial integrity. We regard jurisdictions that require regulators to protect utilities' financial soundness and have transparent policies and procedures as the most credit-supportive. We ascribe higher risk in jurisdictions where policies and procedures support financial integrity, but where inconsistency can selectively arise. We believe a jurisdiction provides even less support when transparency merely exists. We see less support when any of these credit factors are absent, or if the regulator's record on following precedent is poor.

Tariff-Setting Procedures

We review rate decisions as part of our surveillance on each U.S. utility. We focus on the jurisdiction's overall approach to setting rates and the process it uses to establish base rates (practices pertaining to separate tariff provisions for large expenses are in the "Financial Stability" part of our analysis). We focus on whether base rates, over time, fairly reflect a utility's cost structure and allow a fair opportunity to earn a compensatory return that provides creditors with a financial cushion that supports credit quality. If the process is geared toward an incentive-based system, our analysis centers on the risks related to the incentive mechanisms. If the jurisdiction has vertically integrated utilities, we review the resource procurement process and assess how it affects regulatory risk.

Rate Cases Can Affect Creditworthiness

Although not common, rate case outcomes can sometimes lead directly to a change in our opinion of creditworthiness. Often it's a case that takes on greater importance because of the issues being litigated. For example, in 2010, we downgraded Florida Power & Light and its affiliates following a Florida Public Service Commission rate ruling that attracted attention due to drastic changes to settled practices on rate case particulars like depreciation rates. More recently, in June 2016, we downgraded Central Hudson Electric & Gas due to our revised opinion of regulatory risk. While that reflected the company's own management of regulatory risk, it was prompted in part by other rate case decisions in New York that highlighted the overall risk in the state.

Sometimes change comes from outside the usual rate case process. The aforementioned improvement in Michigan (see the previous sidebar) came from legislative changes that reformed rate case procedures such as interim rate increases and time limits on rate decisions. In March 2016, we affirmed our ratings on Entergy Corp. and kept the outlook positive based on the prospect of lower regulatory risk as the company pursues strategic changes in its various jurisdictions. For instance, legislation in Arkansas allowing for formula rates could better enable Entergy to manage regulatory lag and earn its authorized return.

Ability to timely recover costs

We review authorized returns and capital structures in our analysis, but we focus mainly on actual earned returns. Examples abound of utilities with healthy authorized returns that have no meaningful expectation of earning those returns due to, for example, rate case lag (i.e., the relationship between approved rates and the age of the costs used to set those rates) or expense disallowances. Also, the stability of the returns is as important as the absolute level of financial returns, and we note the equity component in the capital structure used to generate the revenue requirement in rate proceedings. Higher authorized and earned returns and thicker equity ratios translate into better credit measures and a more comfortable equity cushion for creditors. We consider a regulatory approach that allows utilities the opportunity to consistently earn a reasonable return as a positive credit factor.

A very credit-supportive jurisdiction is one in which all of the utilities it regulates consistently earn above-average returns. We assess jurisdictions lower if only some of them do, and lower still if the earnings records are below average or highly variable from year to year. We deem jurisdictions as weaker when all utilities earn well-below-average returns, and we consider jurisdictions where all utilities consistently earn exceedingly poor returns, including years with negative returns, as weakest.

We consider "regulatory lag" along with the record of earned returns to assess timeliness. Credit-supportive jurisdiction typically have a track record of little regulatory lag, indicating that responsibility for a poor or uneven earnings history lies more with management than its regulators. In addition to the regulator's efficiency in completing rate cases, we consider the obsolescence of the costs on which the rates are based, the timing of interim rates, and other practices (such as allowing rates to automatically change in a future period based on inflation) that affect a utility's ability to earn its authorized return.

If a jurisdiction uses incentives as the primary ratemaking tool and institutes a comprehensive incentive program that allows revenues and costs to diverge, we evaluate the incentive mechanisms' effect on a utility's earnings capability and stability. A common approach features an extended period between base rate reviews, during which rates change according to a formula based on inflation, a predetermined productivity factor, and capital spending. An incentive-based program can be close to credit-neutral compared with systems that permit more frequent and dynamic rate changes if the risk is symmetrical (i.e., an equal opportunity to earn over or under the authorized return and equivalent reward or penalty for doing so) and limited (a maximum or minimum earnings band). The effect on regulatory risk depends on whether we believe the efficiency targets are realistic and achievable, the regulator's treatment of disparities in actual versus authorized spending, and the framework's flexibility to adjust returns for capital market conditions. If there are operating standards, we determine whether they fairly reward or punish utilities if performance deviates from expectations.

There is a muted effect on regulatory risk in jurisdictions where incentives are not central, but are instead used only to augment cost-of-service regulation. A moderate amount of incentives that carry symmetrical risks can even modestly support better credit quality. For example, a fuel-adjustment and purchased-power clause with a sharing mechanism that affects less than 10% of the total fuel costs and cuts both ways when commodity markets change can modestly reduce risk by offering the utility a mild incentive for effective procurement and efficient operations, without unduly exposing it to commodity price risk.

We typically view jurisdictions as credit-supportive if regulators use symmetrical incentive mechanisms sparingly in the rate-setting process. When incentives play a larger role in the rate-setting approach, but are well-designed to evenly allocate risk, we see less support for credit quality. We regard still lower jurisdictions where incentives dominate and are poorly designed. Jurisdictions where incentives significantly degrade risk and are part of a comprehensive incentive regime harbor the most risk for creditors.

Financial Stability

When we evaluate U.S utility regulatory environments, we consider financial stability to be of substantial importance. Cash takes precedence in credit analysis. A regulatory jurisdiction that recognizes the significance of cash flow in its decision-making is one that will appeal to creditors.

Creative Ratemaking Can Help...If Used Correctly

The ability of financial stability factors to help a utility maintain and smooth its cash flow gives prominence to this area of our analysis. In addition to the near-ubiquitous fuel clauses, we see utilities give more attention to obtaining so-called "disc" mechanisms (DSIC, for distribution system investment charge, is a common acronym for this kind of rate adjustment) that accelerate and stabilize cash flow realization when a utility pursues a strategy of boosting rate base to fuel earnings growth.

For instance, Duquesne Light recently filed for a DSIC mechanism in Pennsylvania in conjunction with a long-term plan to improve its distribution system. Approval, requested for October, would enhance our view of Duquesne's ability to manage regulatory risk, because it would consequently be joining the other Pennsylvania utilities that already benefit from this mechanism. On the other end of the spectrum, Mississippi Power's ongoing travails in obtaining rate relief for its Kemper coal-fired plant, which has experienced significant cost and schedule problems, points to how regulatory risk can deteriorate under stress when well-established procedures for handling large and risky capital projects are absent or not followed.

Treatment of significant expenses

When utilities have major expenses such as fuel and purchased power/gas/water, the presence of separate tariff provisions to facilitate full and contemporaneous recovery is the most prominent factor in this part of our analysis. The timely adjustment of rates in response to changing commodity prices and other expenses that are largely out of management's control is a key feature of a credit-supportive regulatory jurisdiction. The analysis centers on the special tariff mechanisms to determine their effectiveness in producing the cash flow stability they are designed to achieve. The frequency of rate adjustments, the ability to quickly react to unusual market volatility, and the control of opportunities to engage in hindsight disallowances of costs could affect our analysis almost as much as whether the tariff provisions exist at all. The record of disallowances plays a part when we assess regulatory advantage.

We consider jurisdictions to be very credit-supportive if utilities can recover all high-expense items through an automatic tariff clause that is based on projected costs, adjusts frequently, and has no record of any significant disallowances. We see more risk if separate mechanisms exist, but lack some of the above features. We view jurisdictions that lack independent rate mechanisms for large expenses and have a record of significant disallowances

as weakest.

Treatment of capital spending

When applicable, a jurisdiction's willingness to support large capital projects with cash during construction is an important aspect of our analysis. This is especially true when the project represents a major addition to rate base and entails long lead times and technological risks that make it susceptible to construction delays. Broad support for all capital spending is the most credit-sustaining. Support for only specific types of capital spending, such as specific environmental projects or system integrity plans, is less so, but still favorable for creditors. Allowance of a cash return on construction work-in-progress or similar ratemaking methods historically were extraordinary measures for use in unusual circumstances, but when construction costs are rising, cash flow support could be crucial to maintain credit quality through the spending program. Even more favorable are those jurisdictions that present an opportunity for a higher return on capital projects as an incentive to investors.

Very supportive jurisdictions offer a separate recovery mechanism for all capital spending, a mandated current cash return during construction, and a bonus return for some or all capital projects. We deem a jurisdiction weaker if there is a separate mechanism for only certain kinds of spending and the cash return and higher return are subject to the regulator's discretion. We view jurisdictions that don't allow separate recovery or a current return as being lower on the scale. We assess a jurisdiction as weaker still when it doesn't have independent rate mechanisms for capital projects, and we view it as most risky when full recovery occurs only after a utility's assets become operational.

Cash-smoothing mechanisms

We have a more positive view of jurisdictions that use innovative regulatory provisions that help to smooth cash flow from period to period. For a jurisdiction that focuses on incentives in its basic approach to ratemaking, through multiyear rate plans or a formula rate plan, we view the availability of "reopeners" (to adjust rates for unexpected events out of the utility's control) as key to this part of our analysis. The utility's ability to petition for a rate increase when unexpected or uncontrollable costs arise in the midst of a long-term rate plan is a critical risk mitigant.

Other examples of risk-dampening regulatory policies include hedging program approvals, and decoupling (the separation of a utility's profits from sales) or weather-related mechanisms. If a utility seeks approval of a hedging program to manage exposure to commodity prices, it can reduce risk if there's a clearly stated hedging policy that its regulator has endorsed, and a track record of activity that conforms to the policy that has not been subject to regulatory second-guessing. A well-designed decoupling or weather-normalization mechanism that efficiently adjusts rates to offset the sales effect of economic conditions, customer usage trends, or weather will soften earnings and cash flow volatility to the benefit of creditors. If applicable, we view a record of regulatory responsiveness to extreme events for utilities that are prone to violent or disruptive weather (like hurricanes) as favorable for credit quality.

A jurisdiction is more credit-supportive if it makes extensive use of extraordinary and credit-supportive rate mechanisms. Also favorable are jurisdictions that use innovative mechanisms selectively, or have regulators that are receptive to reopeners where incentives are the main ratemaking method.

Regulatory Independence And Insulation

The role of politics in U.S. utility regulation is often misunderstood. In most jurisdictions, the regulator's function is to set and regulate rates and service standards with due regard not only for the interests of those who advance the capital needed to provide safe and reliable utility service, but for other constituents as well. Creditors should recognize that utility regulation harbors political as well as economic risks. Therefore, how politics could influence regulation helps us evaluate a regulatory environment.

Political Influence On Utility Regulation Can Yield Unexpected Results

This is often the most variable area of our analysis and the most difficult to assess. The most dramatic, fairly recent reminder of how political forces can influence regulatory risk was last year's unexpected reversal by the popularly elected Mississippi Supreme Court of a significant rate increase granted for Mississippi Power to help pay for a major power plant under construction. Regulators, who were ordered to roll back rates and issue refunds, struggled to make decisions amid the strained political atmosphere and extra scrutiny that the Court's action had created. The episode also highlighted the greater regulatory risk that attends jurisdictions that expose regulators (and in this case the appellate court) to direct political accountability.

Another more recent example of political influence on regulation underscores the complexity of this area of analysis, because it featured many participants at both the federal and state level. Electric utilities in Ohio had a credible strategy for dealing with rising competitive risks in their merchant generation portfolios by offering the output to retail customers at pre-set prices on a long-term basis, which the state regulator approved. The federal regulator (Federal Energy Regulatory Commission, or FERC), responding to complaints by other generators that the plan would inhibit the operation of the competitive electricity market, essentially overruled the Ohio regulators and blocked the utilities from pursing the strategy that would have reduced its risk profile. It essentially decided that its political interest in and ideological commitment to efficient electricity markets overrode the state's political interest in stable electric rates. The saga is still continuing with attempts to bypass the FERC's ruling through other means, but no matter what the ultimate result, we see how political considerations can increase risk.

Political independence of regulator

The primary factor in this part of our analysis is the regulators' (and, when relevant, the judicial body that reviews the regulators' decisions) political independence. We think it's more credit-supportive when the regulator is substantially independent of the political process. Jurisdictions are somewhat less favorable when insulation is strong, such as when the executive branch of government appoints regulators subject to legislative approval. We consider jurisdictions to be further down the scale when the same voters who pay utility bills directly elect the regulators, but institutional efforts have been made to erect some shield for regulators from transient political concerns. We view jurisdictions that arrange for direct political accountability of regulators that persistently influences regulatory decisions as less supportive.

Record of direct political intervention

The overall atmosphere that a regulator operates in can affect its ability to deliver sound, fair, and timely rate decisions and set prudent regulatory policies that assist utilities in managing business and financial risk. In this part of our

evaluation, we may consider the tone that politicians set, the history of political insulation given to the regulatory body and the courts that review its actions, and the behavior of important constituencies that intervene in utility proceedings. We also track the public visibility of utility issues, because we believe that the likelihood of constructive regulatory behavior increases with the comparative obscurity of utility issues.

We view a jurisdiction as having a lower risk if the regulatory environment is marked by cooperative attitudes and constructive interventions in important matters before the regulator. We assess a jurisdiction lower when the atmosphere is more combative and restricts the regulator's ability to act in the long-term best interests of all parties. We consider jurisdictions as weaker if the regulatory environment is so infused with short-term political influence over regulatory decisions that the regulator can't effectively consider investor interests in its decisions.

Related Criteria And Research

Related Criteria

- Criteria | Corporates | General: Corporate Methodology, Nov. 19, 2013
- Criteria | Corporates | Utilities: Key Credit Factors For The Regulated Utilities Industry, Nov. 19, 2013

Essentials of Managerial Finance

Ninth Edition

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Chicago Fort Worth San Francisco Philadelphia
Montreal Toronto London Sydney Tokyo

units sold) is highest for Firm C and lowest for Firm A. The reverse holds true when output rises to 200,000 units.

	Average Cost Per Unit	
	40,000 Units	200,000 Units
Firm A	$2.00	$1.60
Firm B	2.20	1.40
Firm C	2.50	1.30

These results have important implications. At a high volume of operations, say 200,000 units per period, Firm C has a substantial cost savings over the other two firms, particularly over Firm A. Firm C could cut the price of its product to $1.50 per unit and still have a profit margin in excess of 13 percent ($0.20/$1.50); at that same price level, Firm A would be losing 10 cents on each unit produced.

The competitive advantage of high-volume, low-unit-cost operations may be made clear by an actual example. IBM introduced its personal computer (the PC) in 1981. By 1989, volume was up to 9 million units per year. Because of the low costs associated with higher volumes, IBM had been able to cut PC prices by 70 percent, in spite of continued general inflation. Those price cuts put great pressure on IBM's low-volume, high-cost competitors, driving some of them out of business and further increasing IBM's market position, sales volume, and total profits. This example demonstrates the extreme importance of the relationship between market position, volume, costs, and profits, and the need to take this relationship into account in strategic planning. High-cost, low-volume producers have a hard time surviving against low-cost, high-volume competitors.

Degree of Operating Leverage

Operating leverage can be defined more precisely in terms of the way a given change in volume affects earnings before interest and taxes (EBIT). To measure the effect of a change in volume on profitability, we calculate the **degree of operating leverage (DOL)**, defined as the ratio of the percentage change in EBIT to the percentage change in sales:

degree of operating leverage (DOL) The ratio of the percentage change in EBIT to the percentage change in sales.

$$\text{Degree of operating leverage} = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in sales}}.$$

For Firm B in Figure 9-3, the degree of operating leverage (DOL_B) for a change in units of output from 100,000 to 120,000 is 2.0:

$$DOL_B = \frac{\frac{\Delta EBIT}{EBIT}}{\frac{\Delta Q}{Q}} \qquad (9\text{-}4)$$

$$= \frac{\frac{\$56{,}000 - \$40{,}000}{\$40{,}000}}{\frac{120{,}000 - 100{,}000}{100{,}000}} = \frac{\frac{\$16{,}000}{\$40{,}000}}{\frac{20{,}000}{100{,}000}}$$

$$= \frac{40\%}{20\%} = 2.0.$$

Here Q is the quantity of output in units and ΔQ is the increase in output.

The degree of operating leverage can also be calculated as[2]

$$\text{DOL} = \frac{Q(P - V)}{Q(P - V) - F} \tag{9-4a}$$

For Firm B, we can calculate the degree of operating leverage at 100,000 units, using Equation 9-4a, as 2.0:

$$\text{DOL}_B = \frac{100{,}000(\$2 - \$1.20)}{100{,}000(\$2 - \$1.20) - \$40{,}000}$$

$$= \frac{\$80{,}000}{\$40{,}000}$$

$$= 2.0,$$

which is the same as the value found using Equation 9-4.

The DOL of 2.0 indicates that, if units sold increase by, say, 20 percent, from 100,000 to 120,000 units, operating profits will increase by $2.0 \times 20\% = 40\%$. This can be confirmed by reference to the tabular data in Figure 9-3 and noting that $(1 + 40\%) \times \$40{,}000 = 1.40 \times \$40{,}000 = \$56{,}000$.

It should also be noted that the degree of operating leverage for a given firm depends on the base level used in the DOL calculation. In our example, we calculated DOL_B for Firm B at a sales level of 100,000 units. Had we examined DOL_B at sales of 60,000 units, DOL_B would have been 6.0:

$$\text{DOL}_B = \frac{60{,}000(\$2 - \$1.20)}{60{,}000(\$2 - \$1.20) - \$40{,}000} = 6.0.$$

---

[2]Equation 9-4a is developed from 9-4 as follows. The change in units of output is defined as ΔQ. Since both price and fixed costs are constant, the change in EBIT is $\Delta Q(P - V)$, where P is the price per unit and V is the variable cost per unit. The initial EBIT is $Q(P - V) - F$, so the percentage change in EBIT is

$$\%\Delta\text{EBIT} = \frac{\Delta Q(P - V)}{Q(P - V) - F}$$

The percentage change in output is $\Delta Q/Q$, so the ratio of the percentage change in EBIT to the percentage change in output is:

$$\text{DOL} = \frac{\frac{\Delta Q(P - V)}{Q(P - V) - F}}{\frac{\Delta Q}{Q}} = \left(\frac{\Delta Q(P - V)}{Q(P - V) - F}\right)\left(\frac{Q}{\Delta Q}\right)$$

$$= \frac{Q(P - V)}{Q(P - V) - F}$$

Thus, from a base of 60,000 units, a 33.3 percent increase in sales, from 60,000 to 80,000 units, would have led to a 6 × 33.3% = 200% increase in operating profits, or from $8,000 to $8,000 + 2.0($8,000) = $24,000.

Using Equation 9-4, the degree of operating leverage at 100,000 units is 1.67 for Firm A and 2.5 for Firm C. Thus, for a 10 percent change in volume, Firm A, the company with the least operating leverage, will experience a profit gain of only 16.7 percent, while Firm C, the one with the most leverage, will enjoy a 25 percent profit gain. Clearly, the profits of Firm C, which has higher fixed costs and a higher degree of operating leverage, are more sensitive to changes in sales volume than are those of Firm A, with its lower fixed costs and lower DOL. *Thus, the higher the degree of operating leverage, the more profits will fluctuate, in both an upward and a downward direction, in response to changes in sales volume.*

A firm's degree of operating leverage has a number of important implications. First, Firm C's high degree of operating leverage suggests that it could make gains from increasing its sales volume even if it had to lower its price to do so. Suppose Firm C could increase its quantity sold from 100,000 units to 120,000 units by cutting the price per unit from $2 to $1.90. Its EBIT would then be $48,000:

$$\begin{aligned} \text{EBIT} &= PQ - VQ - F \qquad (9\text{-}5) \\ &= \$1.90(120{,}000) - \$1(120{,}000) - \$60{,}000 \\ &= \$228{,}000 - \$120{,}000 - \$60{,}000 \\ &= \$48{,}000. \end{aligned}$$

Thus, Firm C could increase its earnings from operations from $40,000 at a volume of 100,000 units to $48,000 at a volume of 120,000 units by lowering its price from $2.00 to $1.90. This demonstrates that a firm with a high degree of operating leverage and consequently low variable costs per unit, like IBM, will be inclined to follow an aggressive price policy, particularly if its competitors have higher costs and thus cannot respond to price cuts.

At the same time, though, Firm C's high degree of operating leverage also indicates that the company would be subject to large swings in profits if its volume fluctuates. Thus, if Firm C's industry is one whose sales are greatly affected by changes in the overall level of economic activity (as, for example, such durable goods industries as machine tools, steel, and autos are), then its profits will be subject to wide fluctuations. Hence, while Firm C's profit potential is increased by its greater use of operating leverage, the riskiness of its earnings stream is also higher.

Concept Review

What does the term "high degree of operating leverage" imply, and what are some implications of having a high degree of leverage?

Give the general equation used to calculate the degree of operating leverage.

REFRESHER READING • 2019 • LEVEL I

Corporate Finance

Measures of Leverage

by Pamela Peterson Drake, PhD, CFA, Raj Aggarwal, PhD, CFA, Cynthia Harrington, CFA, and Adam Kobor, PhD, CFA

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LEARNING OUTCOMES

Mastery	*The candidate should be able to:*
☐	**a.** define and explain leverage, business risk, sales risk, operating risk, and financial risk and classify a risk;
☐	**b.** calculate and interpret the degree of operating leverage, the degree of financial leverage, and the degree of total leverage;
☐	**c.** analyze the effect of financial leverage on a company's net income and return on equity;
☐	**d.** calculate the breakeven quantity of sales and determine the company's net income at various sales levels;
☐	**e.** calculate and interpret the operating breakeven quantity of sales.

INTRODUCTION 1

This reading presents elementary topics in leverage. **Leverage** is the use of fixed costs in a company's cost structure. Fixed costs that are operating costs (such as depreciation or rent) create operating leverage. Fixed costs that are financial costs (such as interest expense) create financial leverage.

Analysts refer to the use of fixed costs as leverage because fixed costs act as a fulcrum for the company's earnings. Leverage can magnify earnings both up and down. The profits of highly leveraged companies might soar with small upturns in revenue. But the reverse is also true: Small downturns in revenue may lead to losses.

Analysts need to understand a company's use of leverage for three main reasons. First, the degree of leverage is an important component in assessing a company's risk and return characteristics. Second, analysts may be able to discern information about a company's business and future prospects from management's decisions about the use of operating and financial leverage. Knowing how to interpret these signals also helps the analyst evaluate the quality of management's decisions. Third, the valuation of a

company requires forecasting future cash flows and assessing the risk associated with those cash flows. Understanding a company's use of leverage should help in forecasting cash flows and in selecting an appropriate discount rate for finding their present value.

The reading is organized as follows: Section 2 introduces leverage and defines important terms. Section 3 illustrates and discusses measures of operating leverage and financial leverage, which combine to define a measure of total leverage that gauges the sensitivity of net income to a given percent change in units sold. This section also covers breakeven points in using leverage and corporate reorganization (a possible consequence of using leverage inappropriately). A summary and practice problems conclude this reading.

2 LEVERAGE

Leverage increases the volatility of a company's earnings and cash flows and increases the risk of lending to or owning a company. Additionally, the valuation of a company and its equity is affected by the degree of leverage: The greater a company's leverage, the greater its risk and, hence, the greater the discount rate that should be applied in its valuation. Further, highly leveraged (levered) companies have a greater chance of incurring significant losses during downturns, thus accelerating conditions that lead to financial distress and bankruptcy.

Consider the simple example of two companies, Impulse Robotics, Inc., and Malvey Aerospace, Inc. These companies have the following performance for the period of study:[1]

Exhibit 1 Impulse Robotics and Malvey Aerospace

	Impulse Robotics	Malvey Aerospace
Revenues	$1,000,000	$1,000,000
Operating costs	700,000	750,000
Operating income	$300,000	$250,000
Financing expense	100,000	50,000
Net income	$200,000	$200,000

These companies have the same net income, but are they identical in terms of operating and financial characteristics? Would we appraise these two companies at the same value? Not necessarily.

The risk associated with future earnings and cash flows of a company are affected by the company's cost structure. The **cost structure** of a company is the mix of variable and fixed costs. **Variable costs** fluctuate with the level of production and sales. Some examples of variable costs are the cost of goods purchased for resale, costs of materials or supplies, shipping charges, delivery charges, wages for hourly employees, sales commissions, and sales or production bonuses. **Fixed costs** are expenses that are the same regardless of the production and sales of the company. These costs include depreciation, rent, interest on debt, insurance, and wages for salaried employees.

1 We are ignoring taxes for this example, but when taxes are included, the general conclusions remain the same.

Suppose that the cost structures of the companies differ in the manner shown in Exhibit 2.

Exhibit 2 Impulse Robotics and Malvey Aerospace

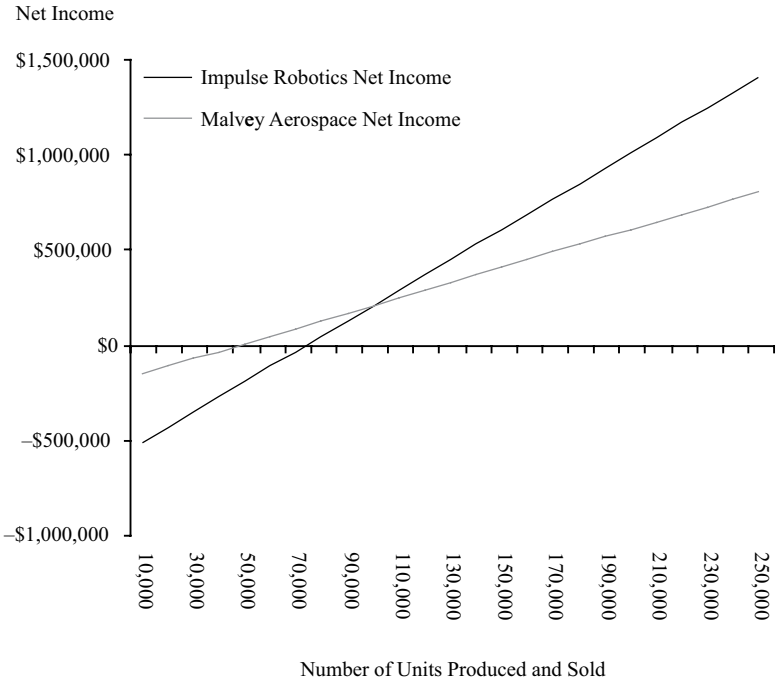
	Impulse Robotics	Malvey Aerospace
Number of units produced and sold	100,000	100,000
Sales price per unit	$10	$10
Variable cost per unit	$2	$6
Fixed operating cost	$500,000	$150,000
Fixed financing expense	$100,000	$50,000

The risk associated with these companies is different, although, as we saw in Exhibit 1, they have the same net income. They have different operating and financing cost structures, resulting in differing volatility of net income.

For example, if the number of units produced and sold is different from 100,000, the net income of the two companies diverges. If 50,000 units are produced and sold, Impulse Robotics has a loss of $200,000 and Malvey Aerospace has $0 earnings. If, on the other hand, the number of units produced and sold is 200,000, Impulse Robotics earns $1 million whereas Malvey Aerospace earns $600,000. In other words, the variability in net income is greater for Impulse Robotics, which has higher fixed costs in terms of both fixed operating costs and fixed financing costs.

Impulse Robotics' cost structure results in more leverage than that of Malvey Aerospace. We can see this effect when we plot the net income of each company against the number of units produced and sold, as in Exhibit 3. The greater leverage of Impulse Robotics is reflected in the greater slope of the line representing net income. This means that as the number of units sold changes, Impulse Robotics experiences a greater change in net income than does Malvey Aerospace for the same change in units sold.

Exhibit 3 Net Income for Different Numbers of Units Produced and Sold



Companies that have more fixed costs relative to variable costs in their cost structures have greater variation in net income as revenues fluctuate and, hence, more risk.

3 BUSINESS RISK AND FINANCIAL RISK

Risk arises from both the operating and financing activities of a company. In the following, we address how that happens and the measures available to the analyst to gauge the risk in each case.

3.1 Business Risk and Its Components

Business risk is the risk associated with operating earnings. Operating earnings are risky because total revenues are risky, as are the costs of producing revenues. Revenues are affected by a large number of factors, including economic conditions, industry dynamics (including the actions of competitors), government regulation, and demographics. Therefore, prices of the company's goods or services or the quantity of sales may be different from what is expected. We refer to the uncertainty with respect to the price and quantity of goods and services as **sales risk**.

Operating risk is the risk attributed to the operating cost structure, in particular the use of fixed costs in operations. The greater the fixed operating costs relative to variable operating costs, the greater the operating risk. Business risk is therefore the combination of sales risk and operating risk. Companies that operate in the same line of business generally have similar business risk.

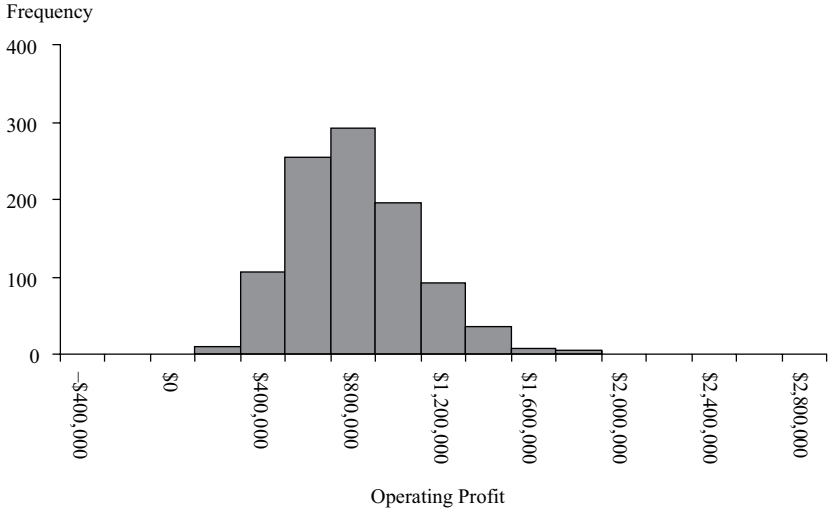
3.2 Sales Risk

Consider Impulse Robotics once again. Suppose that the forecasted number of units produced and sold in the next period is 100,000 but that the standard deviation of the number of units sold is 20,000. And suppose the price that the units sell for is expected to be $10 per unit but the standard deviation is $2. Contrast this situation with that of a company named Tolley Aerospace, Inc., which has the same cost structure but a standard deviation of units sold of 40,000 and a price standard deviation of $4.

If we assume, for simplicity's sake, that the fixed operating costs are known with certainty and that the units sold and price per unit follow a normal distribution, we can see the impact of the different risks on the operating income of the two companies through a simulation; the results are shown in Exhibit 4. Here, we see the differing distributions of operating income that result from the distributions of units sold and price per unit. So, even if the companies have the same cost structure, differing *sales risk* affects the potential variability of the company's profitability. In our example, Tolley Aerospace has a wider distribution of likely outcomes in terms of operating profit. This greater volatility in operating earnings means that Tolley Aerospace has more sales risk than Impulse Robotics.

Exhibit 4 Operating Income Simulations for Impulse Robotics and Tolley Aerospace

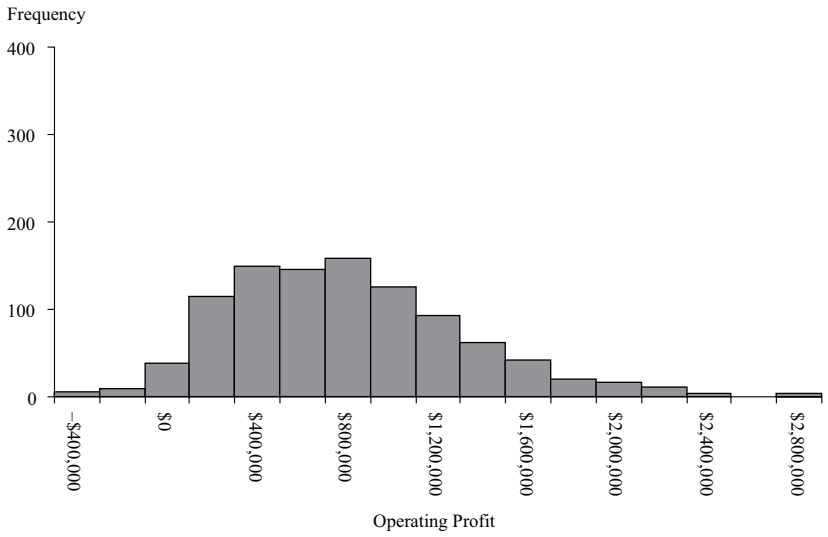
Panel A: Impulse Robotics



(continued)

Exhibit 4 (Continued)

Panel B: Tolley Aerospace



3.3 Operating Risk

The greater the fixed component of costs, the more difficult it is for a company to adjust its operating costs to changes in sales. The mixture of fixed and variable costs depends largely on the type of business. Even within the same line of business, companies can vary their fixed and variable costs to some degree. We refer to the risk arising from the mix of fixed and variable costs as **operating risk**. The greater the fixed operating costs relative to variable operating costs, the greater the operating risk.

Next, we look at how operating risk affects the variability of cash flows. A concept taught in microeconomics is **elasticity**, which is simply a measure of the sensitivity of changes in one item to changes in another. We can apply this concept to examine how sensitive a company's operating income is to changes in demand, as measured by unit sales. We will calculate the operating income elasticity, which we refer to as the **degree of operating leverage** (DOL). DOL is a quantitative measure of operating risk as it was defined earlier.

The degree of operating leverage is the ratio of the percentage change in operating income to the percentage change in units sold. We will simplify things and assume that the company sells all that it produces in the same period. Then,

$$\text{DOL} = \frac{\text{Percentage change in operating income}}{\text{Percentage change in units sold}} \quad (1)$$

For example, if DOL at a given level of unit sales is 2.0, a 5 percent increase in unit sales from that level would be expected to result in a (2.0)(5%) = 10 percent increase in operating income. As illustrated later in relation to Exhibit 6, a company's DOL is dependent on the level of unit sales being considered.

Returning to Impulse Robotics, the price per unit is $10, the variable cost per unit is $2, and the total fixed operating costs are $500,000. If Impulse Robotics' output changes from 100,000 units to 110,000 units—an increase of 10 percent in the number of units sold—operating income changes from $300,000 to $380,000:[2]

Exhibit 5 Operating Leverage of Impulse Robotics

Item	Selling 100,000 Units	Selling 110,000 Units	Percentage Change
Revenues	$1,000,000	$1,100,000	+10.00
Less variable costs	200,000	220,000	+10.00
Less fixed costs	500,000	500,000	0.00
Operating income	$300,000	$380,000	+26.67

Operating income increases by 26.67 percent when units sold increases by 10 percent. What if the number of units *decreases* by 10 percent, from 100,000 to 90,000? Operating income is $220,000, representing a *decline* of 26.67 percent.

What is happening is that for a 1 percent change in units sold, the operating income changes by 2.67 times that percentage, in the same direction. If units sold increases by 10 percent, operating income increases by 26.7 percent; if units sold decreased by 20 percent, operating income would decrease by 53.3 percent.

We can represent the degree of operating leverage as given in Equation 1 in terms of the basic elements of the price per unit, variable cost per unit, number of units sold, and fixed operating costs. Operating income is revenue minus total operating costs (with variable and fixed cost components):

$$\begin{aligned}\text{Operating income} = &\left[\begin{pmatrix}\text{Price}\\ \text{per unit}\end{pmatrix}\begin{pmatrix}\text{Number of}\\ \text{units sold}\end{pmatrix}\right]\\ &-\left[\begin{pmatrix}\text{Variable cost}\\ \text{per unit}\end{pmatrix}\begin{pmatrix}\text{Number of}\\ \text{units sold}\end{pmatrix}\right]-\left[\begin{matrix}\text{Fixed operating}\\ \text{costs}\end{matrix}\right]\end{aligned}$$

or

$$\text{Operating income} = \underbrace{\begin{pmatrix}\text{Number of}\\ \text{units sold}\end{pmatrix}\left[\begin{pmatrix}\text{Price}\\ \text{per unit}\end{pmatrix}-\begin{pmatrix}\text{Variable cost}\\ \text{per unit}\end{pmatrix}\right]}_{\text{Contribution margin}}-\left[\begin{matrix}\text{Fixed operating}\\ \text{costs}\end{matrix}\right]$$

The **per unit contribution margin** is the amount that each unit sold contributes to covering fixed costs—that is, the difference between the price per unit and the variable cost per unit. That difference multiplied by the quantity sold is the **contribution margin**, which equals revenue minus variable costs.

2 We provide the variable and fixed operating costs for our sample companies used in this reading to illustrate the leverage and breakeven concepts. In reality, however, the financial analyst does not have these breakdowns but rather is faced with interpreting reported account values that often combine variable and fixed costs and costs for different product lines.

How much does operating income change when the number of units sold changes? Fixed costs do not change; therefore, operating income changes by the contribution margin. The percentage change in operating income for a given change in units sold simplifies to

$$\text{DOL} = \frac{Q(P - V)}{Q(P - V) - F} \tag{2}$$

where Q is the number of units, P is the price per unit, V is the variable operating cost per unit, and F is the fixed operating cost. Therefore, $P - V$ is the per unit contribution margin and $Q(P - V)$ is the contribution margin.

Applying the formula for DOL using the data for Impulse Robotics, we can calculate the sensitivity to change in units sold from 100,000 units:

$$\text{DOL}_{@\,100{,}000\,\text{units}} = \frac{100{,}000(\$10 - \$2)}{100{,}000(\$10 - \$2) - \$500{,}000} = 2.67$$

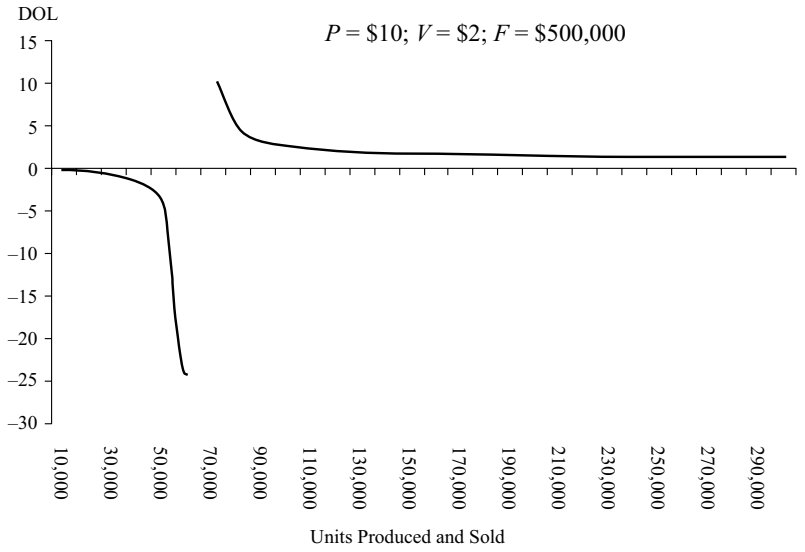
A DOL of 2.67 means that a 1 percent change in units sold results in a 1% × 2.67 = 2.67% change in operating income; a DOL of 5 means that a 1 percent change in units sold results in a 5 percent change in operating income, and so on.

Why do we specify that the DOL is at a particular quantity sold (in this case, 100,000 units)? Because the DOL is different at different numbers of units produced and sold. For example, at 200,000 units,

$$\text{DOL}_{@\,200{,}000\,\text{units}} = \frac{200{,}000(\$10 - \$2)}{200{,}000(\$10 - \$2) - \$500{,}000} = 1.45$$

We can see the sensitivity of the DOL for different numbers of units produced and sold in Exhibit 6. When operating profit is negative, the DOL is negative. At positions just below and just above the point where operating income is $0, operating income is at its most sensitive on a percentage basis to changes in units produced and sold. At the point at which operating income is $0 (at 62,500 units produced and sold in this example), the DOL is undefined because the denominator in the DOL calculation is $0. After this point, the DOL gradually declines as more units are produced and sold.

Exhibit 6 Impulse Robotics' Degree of Operating Leverage for Different Number of Units Produced and Sold



We will now look at a similar situation in which the company has shifted some of the operating costs away from fixed costs and into variable costs. Malvey Aerospace has a unit sales price of $10, a variable cost of $6 a unit, and $150,000 in fixed costs. A change in units sold from 100,000 to 110,000 (a 10 percent change) changes operating profit from $250,000 to $290,000, or 16 percent. The DOL in this case is 1.6:

$$\text{DOL @ } 100{,}000 \text{ units} = \frac{100{,}000(\$10 - \$6)}{100{,}000(\$10 - \$6) - \$150{,}000} = 1.6$$

and the change in operating income is 16 percent:

$$\text{Percentage change in operating income} = (\text{DOL})\left(\text{Percentage change in units sold}\right) = (1.6)(10\%) = 16\%$$

We can see the difference in leverage in the case of Impulse Robotics and Malvey Aerospace companies in Exhibit 7. In Panel A, we see that Impulse Robotics has higher operating income than Malvey Aerospace when both companies produce and sell more than 87,500 units, but lower operating income than Malvey when both companies produce and sell less than 87,500 units.[3]

Exhibit 7 Profitability and the DOL for Impulse Robotics and Malvey Aerospace

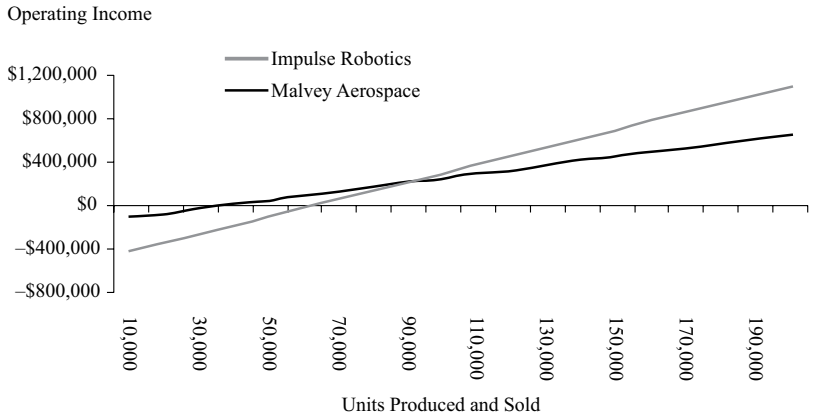
Impulse Robotics: $P = \$10$; $V = \$2$; $F = \$500{,}000$
Malvey Aerospace: $P = \$10$; $V = \$6$; $F = \$150{,}000$

(continued)

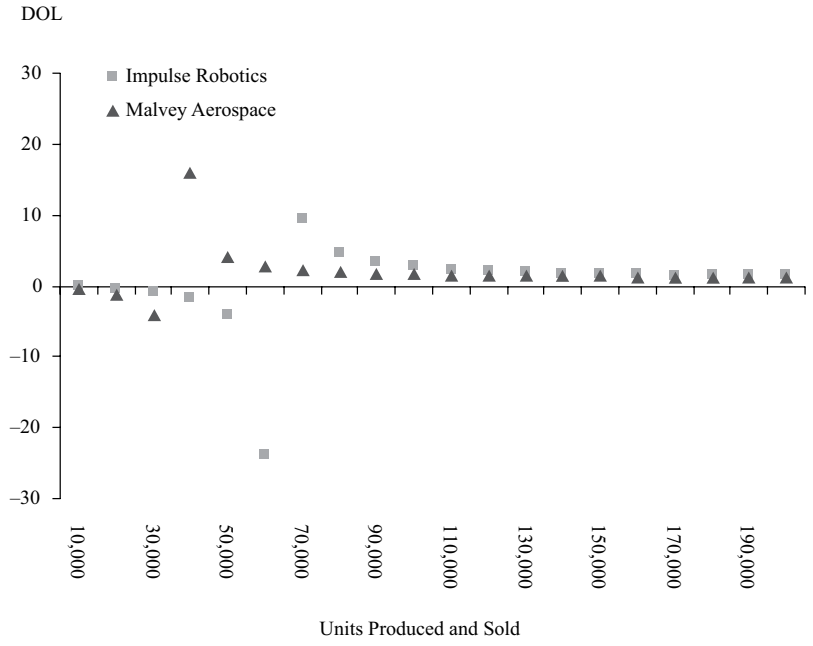
3 We can calculate the number of units that produce the same operating income for these two companies by equating the operating incomes and solving for the number of units. Let X be the number of units. The X at which Malvey Aerospace and Impulse Robotics generate the same operating income is the X that solves the following: $10X - 2X - 500{,}000 = 10X - 6X - 150{,}000$; that is, $X = 87{,}500$.

Exhibit 7 (Continued)

Panel A: Operating Income and Number of Units Produced and Sold



Panel B: Degree of Operating Leverage (DOL)



This example confirms what we saw earlier in our reasoning of fixed and variable costs: The greater the use of fixed, relative to variable, operating costs, the more sensitive operating income is to changes in units sold and, therefore, the more operating risk. Impulse Robotics has more operating risk because it has more operating leverage. However, as Panel B of Exhibit 7 shows, the degrees of operating leverage are similar for the two companies for larger numbers of units produced and sold.

Both sales risk and operating risk influence a company's business risk. And both sales risk and operating risk are determined in large part by the type of business the company is in. But management has more opportunity to manage and control operating risk than sales risk.

Suppose a company is deciding which equipment to buy to produce a particular product. The sales risk is the same no matter what equipment is chosen to produce the product. But the available equipment may differ in terms of the fixed and variable operating costs of producing the product. Financial analysts need to consider how the operating cost structure of a company affects the company's risk.

EXAMPLE 1

Calculating the Degree of Operating Leverage

Arnaud Kenigswald is analyzing the potential impact of an improving economy on earnings at Global Auto, one of the world's largest car manufacturers. Global is headquartered in Berlin. Two Global Auto divisions manufacture passenger cars and produce combined revenues of €93 billion. Kenigswald projects that sales will improve by 10 percent due to increased demand for cars. He wants to see how Global's earnings might respond given that level of increase in sales. He first looks at the degree of leverage at Global, starting with operating leverage.

Global sold 6 million passenger cars in 2009. The average price per car was €24,000, fixed costs associated with passenger car production total €15 billion per year, and variable costs per car are €14,000. What is the degree of operating leverage of Global Auto?

Solution:

$$\text{DOL @ 6 million units} = \frac{6 \text{ million } (€24{,}000 - €14{,}000)}{6 \text{ million } (€24{,}000 - €14{,}000) - €15 \text{ billion}} = 1.333$$

For a 10 percent increase in cars sold, operating income increases by 1.333 × 10% = 13.33%.

Industries that tend to have high operating leverage are those that invest up front to produce a product but spend relatively little on making and distributing it. Software developers and pharmaceutical companies fit this description. Alternatively, retailers have low operating leverage because much of the cost of goods sold is variable.

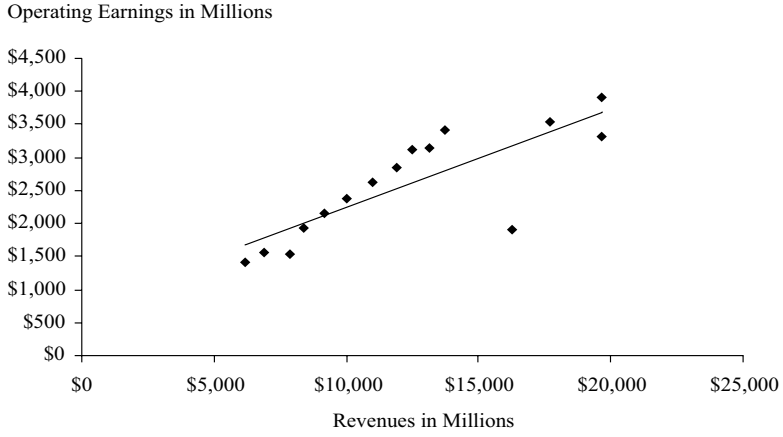
Because most companies produce more than one product, the ratio of variable to fixed costs is difficult to obtain. We can get an idea of the operating leverage of a company by looking at changes in operating income in relation to changes in sales for the entire company. This relation can be estimated by regressing changes in operating income (the variable to be explained) on changes in sales (the explanatory variable) over a recent time period.[4] Although this approach does not provide a precise measure of operating risk, it can help provide a general idea of the amount of operating leverage present. For example, compare the relation between operating earnings and revenues for Abbott Laboratories, a pharmaceutical company, and Wal-Mart Stores, a discount retailer, as shown in Exhibit 8. Note that the slope of the least-squares regression line is greater for Abbott (with a slope coefficient of 0.1488) than for Wal-Mart (with a slope coefficient of 0.0574). (A visual comparison of slopes should not be relied upon because the scales of the *x*- and *y*-axes are different in diagrams for the two regressions.) We can see that operating earnings are more sensitive to changes in revenues for the higher-operating-leveraged Abbott Laboratories as compared to the lower-operating-leveraged Wal-Mart Stores.

4 A least-squares regression is a procedure for finding the best-fitting line (called the least squares regression line) through a set of data points by minimizing the squared deviations from the line.

Exhibit 8 Relation between Operating Earnings and Revenues

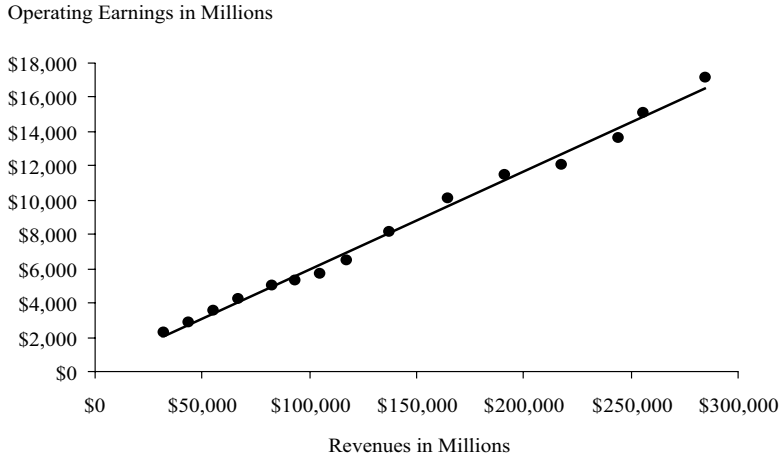
Panel A: Abbott Laboratories Operating Earnings and Revenues, 1990–2004

Estimated regression: Operating earnings = $754.77 + 0.1488 Revenues
R^2 = 66.25%



Panel B: Wal-Mart Stores Operating Earnings and Revenues, 1990–2004

Estimated regression: Operating earnings = $152.762 + 0.0574 Revenues
R^2 = 99.38%



Sources: Abbott Laboratories 10-K filings and Wal-Mart Stores 10-K filings, various years.

3.4 Financial Risk

We can expand on the concept of risk to accommodate the perspective of owning a security. A security represents a claim on the income and assets of a business; therefore, the risk of the security goes beyond the variability of operating earnings to include how the cash flows from those earnings are distributed among the claimants—the creditors and owners of the business. The risk of a security is therefore affected by both business risk and financial risk.

Financial risk is the risk associated with how a company finances its operations. If a company finances with debt, it is legally obligated to pay the amounts that make up its debts when due. By taking on fixed obligations, such as debt and long-term leases, the company increases its financial risk. If a company finances its business with common equity, generated either from operations (retained earnings) or from issuing new common shares, it does not incur fixed obligations. The more fixed-cost financial obligations (e.g., debt) incurred by the company, the greater its financial risk.

We can quantify this risk in the same way we did for operating risk, looking at the sensitivity of the cash flows available to owners when operating income changes. This sensitivity, which we refer to as the **degree of financial leverage** (DFL), is

$$\text{DFL} = \frac{\text{Percentage change in net income}}{\text{Percentage change in operating income}} \quad (3)$$

For example, if DFL at a given level of operating income is 1.1, a 5 percent increase in operating income would be expected to result in a (1.1)(5%) = 5.5 percent increase in net income. A company's DFL is dependent on the level of operating income being considered.

Net income is equal to operating income, less interest and taxes.[5] If operating income changes, how does net income change? Consider Impulse Robotics. Suppose the interest payments are $100,000 and, for simplicity, the tax rate is 0 percent: If operating income changes from $300,000 to $360,000, net income changes from $200,000 to $260,000:

Exhibit 9 Financial Risk of Impulse Robotics (1)

	Operating Income of $300,000	Operating Income of $360,000	Percentage Change
Operating income	$300,000	$360,000	+20
Less interest	100,000	100,000	0
Net income	$200,000	$260,000	+30

A 20 percent increase in operating income increases net income by $60,000, or 30 percent. What if the fixed financial costs are $150,000? A 20 percent change in operating income results in a 40 percent change in the net income, from $150,000 to $210,000:

Exhibit 10 Financial Risk of Impulse Robotics (2)

	Operating Income of $300,000	Operating Income of $360,000	Percentage Change
Operating income	$300,000	$360,000	+20
Less interest	150,000	150,000	0
Net income	$150,000	$210,000	+40

5 More complex entities than we have been using for our examples may also need to account for other income (losses) and extraordinary income (losses) together with operating income as the basis for earnings before interest and taxes.

Using more debt financing, which results in higher fixed costs, increases the sensitivity of net income to changes in operating income. We can represent the sensitivity of net income to a change in operating income, continuing the notation from before and including the fixed financial cost, C, and the tax rate, t, as

$$\text{DFL} = \frac{\left[Q(P-V)-F\right](1-t)}{\left[Q(P-V)-F-C\right](1-t)} = \frac{\left[Q(P-V)-F\right]}{\left[Q(P-V)-F-C\right]} \quad (4)$$

As you can see in Equation 4, the factor that adjusts for taxes, $(1 - t)$, cancels out of the equation. In other words, the DFL is not affected by the tax rate.

In the case in which operating income is $300,000 and fixed financing costs are $100,000, the degree of financial leverage is

$$\underset{\$300{,}000 \text{ operating income}}{\text{DFL @}} = \frac{\$300{,}000}{\$300{,}000 - \$100{,}000} = 1.5$$

If, instead, fixed financial costs are $150,000, the DFL is equal to 2.0:

$$\underset{\$300{,}000 \text{ operating income}}{\text{DFL @}} = \frac{\$300{,}000}{\$300{,}000 - \$150{,}000} = 2.0$$

Again, we need to qualify our degree of leverage by the level of operating income because DFL is different at different levels of operating income.

The greater the use of financing sources that require fixed obligations, such as interest, the greater the sensitivity of net income to changes in operating income.

EXAMPLE 2

Calculating the Degree of Financial Leverage

Global Auto also employs debt financing. If Global can borrow at 8 percent, the interest cost is €40 billion. What is the degree of financial leverage of Global Auto if 6 million cars are produced and sold?

Solution:

At 6 million cars produced and sold, operating income = €45 billion. Therefore:

$$\underset{€45 \text{ billion operating income}}{\text{DFL @}} = \frac{€45 \text{ billion}}{€45 \text{ billion} - €40 \text{ billion}} = 9.0$$

For every 1 percent change in operating income, net income changes 9 percent due to financial leverage.

Unlike operating leverage, the degree of financial leverage is most often a choice by the company's management. Whereas operating costs are very similar among companies in the same industry, competitors may decide on differing capital structures.

Companies with relatively high ratios of tangible assets to total assets may be able to use higher degrees of financial leverage than companies with relatively low ratios because the claim on the tangible assets that lenders would have in the event of a default may make lenders more confident in extending larger amounts of credit. In general, businesses with plants, land, and equipment that can be used to collateralize borrowings and businesses whose revenues have below-average business cycle sensitivity may be able to use more financial leverage than businesses without such assets and with relatively high business cycle sensitivity.

Using financial leverage generally increases the variability of return on equity (net income divided by shareholders' equity). In addition, its use by a profitable company may increase the level of return on equity. Example 3 illustrates both effects.

EXAMPLE 3

The Leveraging Role of Debt

Consider the Capital Company, which is expected to generate $1,500,000 in revenues and $500,000 in operating earnings next year. Currently, the Capital Company does not use debt financing and has assets of $2,000,000.

Suppose Capital were to change its capital structure, buying back $1,000,000 of stock and issuing $1,000,000 in debt. If we assume that interest on debt is 5 percent and income is taxed at a rate of 30 percent, what is the effect of debt financing on Capital's net income and return on equity if operating earnings may vary as much as 40 percent from expected earnings?

Exhibit 11 Return on Equity of Capital Company

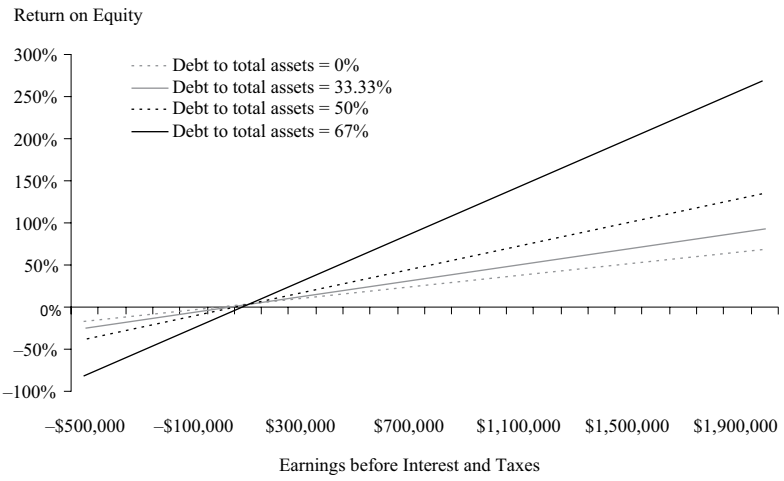
No Debt (Shareholders' Equity = $2 million)	Expected Operating Earnings, Less 40%	Expected Operating Earnings	Expected Operating Earnings, Plus 40%
Earnings before interest and taxes	$300,000	$500,000	$700,000
Interest expense	0	0	0
Earnings before taxes	$300,000	$500,000	$700,000
Taxes	90,000	150,000	210,000
Net income	$210,000	$350,000	$490,000
Return on equity[1]	10.5%	17.5%	24.5%

Debt to Total Assets = 50%; (Shareholders' Equity = $1 million)	Expected Operating Earnings, Less 40%	Expected Operating Earnings	Expected Operating Earnings, Plus 40%
Earnings before interest and taxes	$300,000	$500,000	$700,000
Interest expense	50,000	50,000	50,000
Earnings before taxes	$250,000	$450,000	$650,000
Taxes	75,000	135,000	195,000
Net income	$175,000	$315,000	$455,000
Return on equity	17.5%	31.5%	45.5%

[1] Recall that ROE is calculated as net income/shareholders' equity.

Depicting a broader array of capital structures and operating earnings, ranging from an operating loss of $500,000 to operating earnings of $2,000,000, Exhibit 12 shows the effect of leverage on the return on equity for Capital Company:

Exhibit 12 Return on Equity of Capital Company for Different Levels of Operating Earnings and Different Financing Choices



Business is generally an uncertain venture. Changes in the macroeconomic and competitive environments that influence sales and profitability are typically difficult to discern and forecast. The larger the proportion of debt in the financing mix of a business, the greater is the chance that it will face default. Similarly, the greater the proportion of debt in the capital structure, the more earnings are magnified upward in improving economic times. The bottom line? Financial leverage tends to increase the risk of ownership for shareholders.

3.5 Total Leverage

The degree of operating leverage gives us an idea of the sensitivity of operating income to changes in revenues. And the degree of financial leverage gives us an idea of the sensitivity of net income to changes in operating income. But often we are concerned about the combined effect of both operating leverage and financial leverage. Owners are concerned about the combined effect because both factors contribute to the risk associated with their future cash flows. And financial managers, making decisions intended to maximize owners' wealth, need to be concerned with how investment decisions (which affect the operating cost structure) and financing decisions (which affect the capital structure) affect lenders' and owners' risk.

Look back at the example of Impulse Robotics. The sensitivity of owners' cash flow to a given change in units sold is affected by both operating and financial leverage. Consider using 100,000 units as the base number produced and sold. A 10 percent increase in units sold results in a 27 percent increase in operating income and a 40 percent increase in net income; a like decrease in units sold results in a similar decrease in operating income and net income.

Exhibit 13 Total Leverage of Impulse Robotics

	Units Produced and Sold:		
	90,000	**100,000**	**110,000**
Revenues	$900,000	$1,000,000	$1,100,000
Less variable costs	180,000	200,000	220,000
Less fixed costs	500,000	500,000	500,000
Operating income	$220,000	$300,000	$380,000
Less interest	100,000	100,000	100,000
Net income	$120,000	$200,000	$280,000
Relative to 100,000 units produced and sold			
Percentage change in units sold	−10%		+10%
Percentage change in operating profit	−27%		+27%
Percentage change in net income	−40%		+40%

Combining a company's degree of operating leverage with its degree of financial leverage results in the **degree of total leverage** (DTL), a measure of the sensitivity of net income to changes in the number of units produced and sold. We again make the simplifying assumption that a company sells all that it produces in the same period:

$$\text{DTL} = \frac{\text{Percentage change in net income}}{\text{Percentage change in the number of units sold}} \quad (5)$$

or

$$\text{DTL} = \frac{Q(P-V)}{Q(P-V)-F} \times \frac{\left[Q(P-V)-F\right]}{\left[Q(P-V)-F-C\right]} \quad (6)$$

$$\text{DOL} \times \text{DFL}$$

$$= \frac{Q(P-V)}{Q(P-V)-F-C}$$

Suppose

Number of units sold	=	Q	=	100,000
Price per unit	=	P	=	$10
Variable cost per unit	=	V	=	$2
Fixed operating cost	=	F	=	$500,000
Fixed financing cost	=	C	=	$100,000

Then,

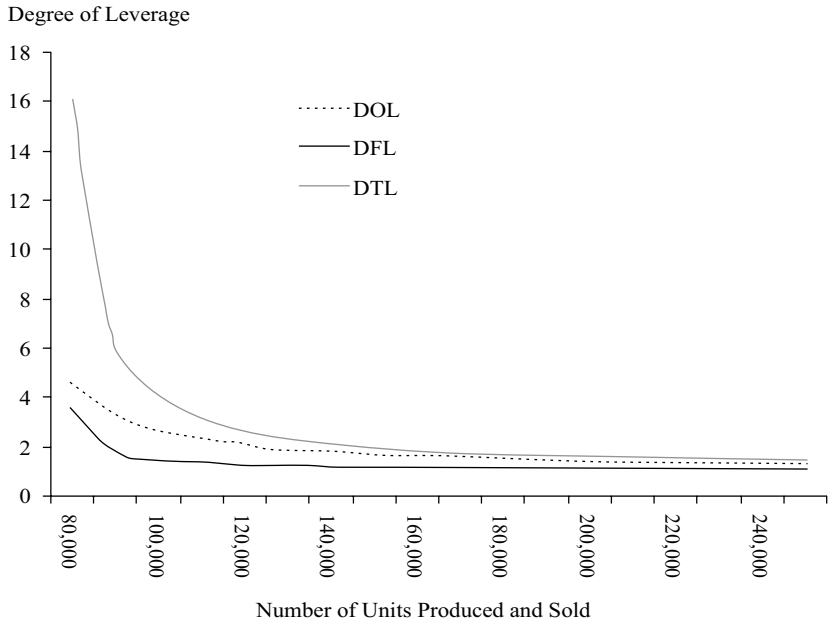
$$\text{DTL} = \frac{100{,}000(\$10-\$2)}{100{,}000(\$10-\$2)-\$500{,}000-\$100{,}000} = 4.0$$

which we could also have determined by multiplying the DOL, 2.67, by the DFL, 1.5. This means that a 1 percent increase in units sold will result in a 4 percent increase in net income; a 50 percent increase in units produced and sold results in a 200 percent increase in net income; a 5 percent decline in units sold results in a 20 percent decline in income to owners; and so on.

Because the DOL is relative to the base number of units produced and sold and the DFL is relative to the base level of operating earnings, DTL is different depending on the number of units produced and sold. We can see the DOL, DFL, and DTL for Impulse Robotics for different numbers of units produced and sold, beginning at the number of units for which the degrees are positive, in Exhibit 14.

Exhibit 14 DOL, DFL, and DTL for Different Numbers of Units Produced and Sold

P = \$10, V = \$2, F = \$500,000, C = \$100,000



In the case of operating leverage, the fixed operating costs act as a fulcrum. The greater the proportion of operating costs that are fixed, the more sensitive operating income is to changes in sales. In the case of financial leverage, the fixed financial costs, such as interest, act as a fulcrum. The greater the proportion of financing with fixed cost sources, such as debt, the more sensitive cash flows available to owners are to changes in operating income. Combining the effects of both types of leverage, we see that fixed operating and financial costs together increase the sensitivity of earnings to owners.

EXAMPLE 4

Calculating the Degree of Total Leverage

Continuing from Example 2, Global Auto's total leverage is

$$\underset{\text{6 million units}}{\text{DTL @}} = \underset{\text{6 million units}}{\text{DOL @}} \times \underset{\text{€45 billion operating income}}{\text{DFL @}}$$

$$\underset{\text{6 million units}}{\text{DTL @}} = \frac{\text{6 million}(\text{€24,000} - \text{€14,000})}{\text{6 million}(\text{€24,000} - \text{€14,000}) - \text{€15 billion}} \times \frac{\text{€45 billion}}{\text{€45 billion} - \text{€40 billion}}$$

$$\underset{\text{6 million units}}{\text{DTL @}} = 1.333 \times 9.0 = 12$$

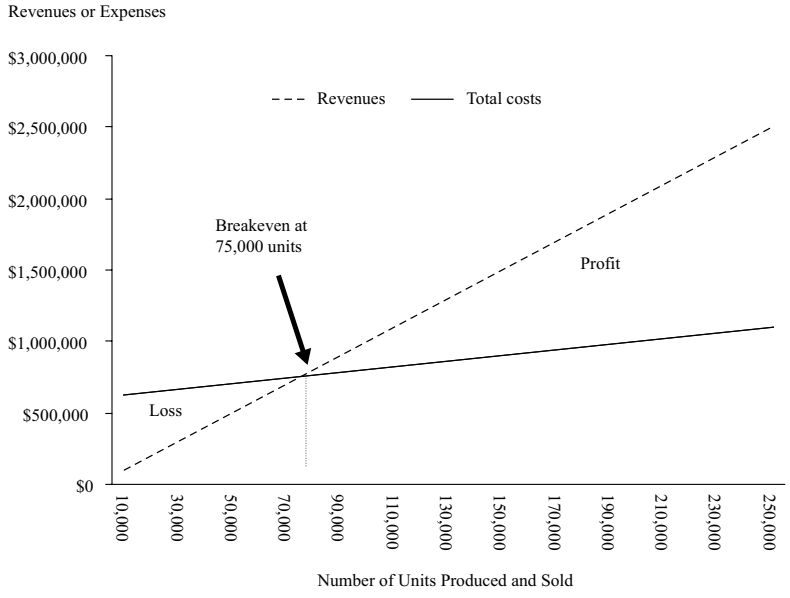
Given Global Auto's operating and financial leverage, a 1 percent change in unit sales changes net income by 12 percent.

3.6 Breakeven Points and Operating Breakeven Points

Looking back at Exhibit 3, we see that there is a number of units at which the company goes from being unprofitable to being profitable—that is, the number of units at which the net income is zero. This number is referred to as the breakeven point. The **breakeven point**, Q_{BE}, is the number of units produced and sold at which the company's net income is zero—the point at which revenues are equal to costs.

Plotting revenues and total costs against the number of units produced and sold, as in Exhibit 15, indicates that the breakeven is at 75,000 units. At this number of units produced and sold, revenues are equal to costs and, hence, profit is zero.

Exhibit 15 Impulse Robotics Breakeven



We can calculate this breakeven point for Impulse Robotics and Malvey Aerospace. Consider that net income is zero when the revenues are equal to the expenses. We can represent this equality of revenues and costs (summing variable operating costs, fixed operating costs, and fixed financing costs) by the following equation:

$$PQ = VQ + F + C$$

where

P = the price per unit
Q = the number of units produced and sold
V = the variable cost per unit
F = the fixed operating costs
C = the fixed financial cost

Therefore,

$$PQ_{BE} = VQ_{BE} + F + C$$

and the breakeven number of units, Q_{BE}, is[6]

$$Q_{BE} = \frac{F + C}{P - V} \quad (7)$$

In the case of Impulse Robotics and Malvey Aerospace, Impulse Robotics has a higher breakeven point. Using numbers taken from Exhibit 2:

$$\text{Impulse Robotics: } Q_{BE} = \frac{\$500{,}000 + \$100{,}000}{\$10 - \$2} = 75{,}000 \text{ units}$$

$$\text{Malvey Aerospace: } Q_{BE} = \frac{\$150{,}000 + \$50{,}000}{\$10 - \$6} = 50{,}000 \text{ units}$$

This means that Impulse Robotics must produce and sell more units to achieve a profit. So, while the higher-leveraged Impulse Robotics has a greater breakeven point relative to Malvey Aerospace, the profit that Impulse Robotics generates beyond this breakeven point is greater than that of Malvey Aerospace. Therefore, leverage has its rewards in terms of potentially greater profit, but it also increases risk.

In addition to the breakeven point specified in terms of net income, Q_{BE}, we can also specify the breakeven point in terms of operating profit, which we refer to as the **operating breakeven** point, Q_{OBE}. Revenues at the operating breakeven point are set equal to operating costs at the operating breakeven point to solve for the operating breakeven number of units, Q_{OBE}. The expression shows Q_{OBE} as equal to fixed operating costs divided by the difference between price per unit and variable cost per unit:

$$PQ_{OBE} = VQ_{OBE} + F$$

$$Q_{OBE} = \frac{F}{P - V}$$

For the two companies in our example, Impulse Robotics and Malvey Aerospace, the operating breakevens are 62,500 and 37,500 units, respectively:

$$\text{Impulse Robotics: } Q_{OBE} = \frac{\$500{,}000}{\$10 - \$2} = 62{,}500 \text{ units}$$

$$\text{Malvey Aerospace: } Q_{OBE} = \frac{\$150{,}000}{\$10 - \$6} = 37{,}500 \text{ units}$$

Impulse Robotics has a higher operating breakeven point in terms of the number of units produced and sold.

6 You will notice that we did not consider taxes in our calculation of the breakeven point. This is because at the point of breakeven, taxable income is zero.

EXAMPLE 5

Calculating Operating Breakeven and Breakeven Points

Continuing with his analysis, Kenigswald considers the effect of a possible downturn on Global Auto's earnings. He divides the fixed costs of €15 billion by the per unit contribution margin:

$$Q_{OBE} = \frac{€15 \text{ billion}}{€24{,}000 - €14{,}000} = 1{,}500{,}000 \text{ cars}$$

The operating breakeven for Global is 1,500,000 cars, or €36 billion in revenues. We calculate the breakeven point by dividing fixed operating costs, plus interest costs, by the contribution margin:

$$Q_{BE} = \frac{€15 \text{ billion} + €40 \text{ billion}}{€24{,}000 - €14{,}000} = \frac{€55 \text{ billion}}{€10{,}000} = 5{,}500{,}000 \text{ cars}$$

Considering the degree of total leverage, Global's breakeven is 5.5 million cars, or revenues of €132 billion.

We can verify these calculations by constructing an income statement for the breakeven sales (in € billions):

	1,500,000 Cars	5,500,000 Cars
Revenues (= $P \times Q$)	€36	€132
Variable operating costs (= $V \times Q$)	21	77
Fixed operating costs (F)	15	15
Operating income	**€ 0**	€ 40
Fixed financial costs (C)	40	40
Net income	–€40	**€ 0**

As business expands or contracts beyond or below breakeven points, fixed costs do not change. The breakeven points for companies with low operating and financial leverage are less important than those for companies with high leverage. Companies with greater total leverage must generate more revenue to cover fixed operating and financing costs. The farther unit sales are from the breakeven point for high-leverage companies, the greater the magnifying effect of this leverage.

3.7 The Risks of Creditors and Owners

As we discussed earlier, business risk refers to the effect of economic conditions as well as the level of operating leverage. Uncertainty about demand, output prices, and costs are among the many factors that affect business risk. When conditions change for any of these factors, companies with higher business risk experience more volatile earnings. Financial risk is the additional risk that results from the use of debt and preferred stock. The degree of financial risk grows with greater use of debt. Who bears this risk?

The risk for providers of equity and debt capital differs because of the relative rights and responsibilities associated with the use of borrowed money in a business. Lenders have a prior claim on assets relative to shareholders, so they have greater security. In return for lending money to a business, lenders require the payment of interest and principal when due. These contractual payments to lenders must be made

regardless of the profitability of the business. A business must satisfy these claims in a timely fashion or face the pain of bankruptcy should it default. In return for their higher priority in claims, lenders get predefined yet limited returns.

In contrast, equity providers claim whatever is left over after all expenses, including debt service, have been paid. So, unlike the fixed and known commitments to the lenders, what is left over for the owners may be a great deal or may be nothing. In exchange for this risk, providers of equity capital exercise the decision-making power over the business, including the right to hire, guide, and if necessary, fire managers. In public companies, ownership rights are usually exercised through an elected board of directors. They undertake the decisions over what portion of the business's earnings should be paid out as dividends for common shareholders.

Legal codes in most countries provide for these rights, as well as conditions for companies to file for bankruptcy (with reference to businesses, often called insolvency). A number of bankruptcy codes provide in some form for two categories of bankruptcies. One form provides for a temporary protection from creditors so that a viable business may reorganize. In the United States, the US Bankruptcy Code sets the terms for the form of negotiated **reorganization** of a company's capital structure that allows it to remain a going concern in Chapter 11.[7] For businesses that are not viable, the second form of bankruptcy process allows for the orderly satisfaction of the creditors' claims. In the United States, this form of bankruptcy is referred to as **liquidation**.[8] Whereas both types of bankruptcy lead to major dislocations in the rights and privileges of owners, lenders, employees, and managers, it is in this latter category of bankruptcy that the original business ceases to exist.

The difference between a company that reorganizes and emerges from bankruptcy and one that is liquidated is often the difference between operating and financial leverage. Companies with high operating leverage have less flexibility in making changes, and bankruptcy protection does little to help reduce operating costs. Companies with high financial leverage use bankruptcy laws and protection to change their capital structure and, once the restructuring is complete, can emerge as ongoing concerns.

EXAMPLE 6

Chapter 11 Reorganization and Owens Corning

The world's largest manufacturer of glass fiber insulation, Owens Corning Corporation of Toledo, Ohio, filed for Chapter 11 bankruptcy on 5 October 2000, as it faced growing asbestos liability claims. With revenues exceeding $6 billion per year, Owens Corning was one of the largest corporations ever afforded bankruptcy protection by the US courts.

From 1952 to 1972, Owens Corning produced an asbestos-containing high-temperature pipe coating called Kaylo, and at the time of its bankruptcy filing, it had received more than 460,000 asbestos personal injury claims and had paid or agreed to pay more than $5 billion for asbestos-related awards and settlements, legal expenses, and claims processing fees. While the company had assets of $7 billion and liabilities of $5.7 billion, the trust fund it set aside to pay those claims appeared inadequate.

7 US Code, Title 11—Bankruptcy, Chapter 11—Reorganization. Companies filing for bankruptcy under this code are referred to as having filed for Chapter 11 bankruptcy.
8 US Code, Title 11—Bankruptcy, Chapter 7—Liquidation.

The company's stock traded at between $15 and $25 per share in the year prior to the announcement; the price fell to $1 per share when Owens Corning declared bankruptcy and admitted that it had been overwhelmed by the asbestos liabilities.

EXAMPLE 7

Chapter 7 and Webvan Do Not Deliver

Since the peak of the NASDAQ in March of 2000, many technology companies have found either that they cannot raise enough capital to implement their business plans or that they have an untenable business plan. Some have simply shut their doors and gone out of business, while others have filed for bankruptcy. Either way, these companies have left many unsatisfied creditors.

For example, Webvan.com was a start-up company in the late 1990s that raised over $1.2 billion in equity, $375 million of which came from an IPO in November 1999. It had very ambitious business plans to build a series of warehouses and deliver groceries to fulfill customer orders placed over the internet. Webvan.com, however, faced a number of challenges, including a downturn in the economy, and quickly ran through its capital.

Webvan.com filed for Chapter 11 bankruptcy protection in July 2001 and reported that it owed $106 million to creditors. By the time it began liquidation under Chapter 7 in January 2002, it reported that the value of its liquidated assets totaled only $25 million, leaving its creditors to receive pennies on the dollar and its investors to receive little or nothing for their $1.2 billion investment in the company.

Whereas the ability to file for bankruptcy is important to the economy, the goal of most investors is to avoid ownership of companies that are heading toward this extreme step, as well as to be able to evaluate opportunities among companies already in bankruptcy. Under both Chapter 7 and Chapter 11, providers of equity capital generally lose all value during the bankruptcy. On the other hand, debtholders typically receive at least a portion of their capital, but the payments of principal and interest are delayed during the period of bankruptcy protection.

SUMMARY

In this reading, we have reviewed the fundamentals of business risk, financial risk, and measures of leverage.

- Leverage is the use of fixed costs in a company's cost structure. Business risk is the risk associated with operating earnings and reflects both sales risk (uncertainty with respect to the price and quantity of sales) and operating risk (the risk related to the use of fixed costs in operations). Financial risk is the risk associated with how a company finances its operations (i.e., the split between equity and debt financing of the business).

- The degree of operating leverage (DOL) is the ratio of the percentage change in operating income to the percentage change in units sold. We can use the following formula to measure the degree of operating leverage:

$$\text{DOL} = \frac{Q(P - V)}{Q(P - V) - F}$$

- The degree of financial leverage (DFL) is the percentage change in net income for a one percent change in operating income. We can use the following formula to measure the degree of financial leverage:

$$\text{DFL} = \frac{\left[Q(P - V) - F\right](1 - t)}{\left[Q(P - V) - F - C\right](1 - t)} = \frac{\left[Q(P - V) - F\right]}{\left[Q(P - V) - F - C\right]}$$

- The degree of total leverage (DTL) is a measure of the sensitivity of net income to changes in unit sales, which is equivalent to DTL = DOL × DFL.
- The breakeven point, Q_{BE}, is the number of units produced and sold at which the company's net income is zero, which we calculate as

$$Q_{\text{BE}} = \frac{F + C}{P - V}$$

- The operating breakeven point, Q_{OBE}, is the number of units produced and sold at which the company's operating income is zero, which we calculate as

$$Q_{\text{OBE}} = \frac{F}{P - V}$$

PRACTICE PROBLEMS

1 If two companies have identical unit sales volume and operating risk, they are *most likely* to also have identical:

A sales risk.

B business risk.

C sensitivity of operating earnings to changes in the number of units produced and sold.

2 Degree of operating leverage is *best* described as a measure of the sensitivity of:

A net earnings to changes in sales.

B fixed operating costs to changes in variable costs.

C operating earnings to changes in the number of units produced and sold.

3 The Fulcrum Company produces decorative swivel platforms for home televisions. If Fulcrum produces 40 million units, it estimates that it can sell them for $100 each. Variable production costs are $65 per unit and fixed production costs are $1.05 billion. Which of the following statements is *most accurate*? Holding all else constant, the Fulcrum Company would:

A generate positive operating income if unit sales were 25 million.

B have less operating leverage if fixed production costs were 10 percent greater than $1.05 billion.

C generate 20 percent more operating income if unit sales were 5 percent greater than 40 million.

4 The business risk of a particular company is *most accurately* measured by the company's:

A debt-to-equity ratio.

B efficiency in using assets to generate sales.

C operating leverage and level of uncertainty about demand, output prices, and competition.

5 Consider two companies that operate in the same line of business and have the same degree of operating leverage: the Basic Company and the Grundlegend Company. The Basic Company and the Grundlegend Company have, respectively, no debt and 50 percent debt in their capital structure. Which of the following statements is *most accurate*? Compared to the Basic Company, the Grundlegend Company has:

A a lower sensitivity of net income to changes in unit sales.

B the same sensitivity of operating income to changes in unit sales.

C the same sensitivity of net income to changes in operating income.

6 Myundia Motors now sells 1 million units at ¥3,529 per unit. Fixed operating costs are ¥1,290 million and variable operating costs are ¥1,500 per unit. If the company pays ¥410 million in interest, the levels of sales at the operating breakeven and breakeven points are, respectively:

A ¥1,500,000,000 and ¥2,257,612,900.

B ¥2,243,671,760 and ¥2,956,776,737.

C ¥2,975,148,800 and ¥3,529,000,000.

7 Juan Alavanca is evaluating the risk of two companies in the machinery industry: The Gearing Company and Hebelkraft, Inc. Alavanca used the latest fiscal year's financial statements and interviews with managers of the respective companies to gather the following information:

	The Gearing Company	Hebelkraft, Inc.
Number of units produced and sold	1 million	1.5 million
Sales price per unit	$200	$200
Variable cost per unit	$120	$100
Fixed operating cost	$40 million	$90 million
Fixed financing expense	$20 million	$20 million

Based on this information, the breakeven points for The Gearing Company and Hebelkraft, Inc. are:

A 0.75 million and 1.1 million units, respectively.

B 1 million and 1.5 million units, respectively.

C 1.5 million and 0.75 million units, respectively.

The following information relates to Questions 8–16

Mary Benn, CFA, is a financial analyst for Twin Fields Investments, located in Storrs, Connecticut, USA. She has been asked by her supervisor, Bill Cho, to examine two small Japanese cell phone component manufacturers: 4G, Inc. and Qphone Corp. Cho indicates that his clients are most interested in the use of leverage by 4G and Qphone. Benn states, "I will have to specifically analyze each company's respective business risk, sales risk, operating risk, and financial risk." "Fine, I'll check back with you shortly," Cho, answers.

Benn begins her analysis by examining the sales prospects of the two firms. The results of her sales analysis appear in Exhibit 1. She also expects very little price variability for these cell phones. She next gathers more data on these two companies to assist her analysis of their operating and financial risk.

When Cho inquires as to her progress Benn responds, "I have calculated Qphone's degree of operating leverage (DOL) and degree of financial leverage (DFL) at Qphone's 2009 level of unit sales. I have also calculated Qphone's breakeven level for unit sales. I will have 4G's leverage results shortly."

Cho responds, "Good, I will call a meeting of some potential investors for tomorrow. Please help me explain these concepts to them, and the differences in use of leverage by these two companies. In preparation for the meeting, I have a number of questions":

- "You mentioned business risk; what is included in that?"
- "How would you classify the risk due to the varying mix of variable and fixed costs?"
- "Could you conduct an analysis and tell me how the two companies will fare relative to each other in terms of net income if their unit sales increased by 10 percent above their 2009 unit sales levels?"
- "Finally, what would be an accurate verbal description of the degree of total leverage?"

The relevant data for analysis of 4G is contained in Exhibit 2, and Benn's analysis of the Qphone data appears in Exhibit 3:

Exhibit 1 Benn's Unit Sales Estimates for 4G, Inc. and Qphone Corp.

Company	2009 Unit Sales	Standard Deviation of Unit Sales	2010 Expected Unit Sales Growth Rate (%)
4G, Inc.	1,000,000	25,000	15
Qphone Corp.	1,500,000	10,000	15

Exhibit 2 Sales, Cost, and Expense Data for 4G, Inc. (At Unit Sales of 1,000,000)

Number of units produced and sold	1,000,000
Sales price per unit	¥108
Variable cost per unit	¥72
Fixed operating cost	¥22,500,000
Fixed financing expense	¥9,000,000

Exhibit 3 Benn's Analysis of Qphone (At Unit Sales of 1,500,000)

Degree of operating leverage	1.40
Degree of financial leverage	1.15
Breakeven quantity (units)	571,429

8 Based on Benn's analysis, 4G's sales risk relative to Qphone's is *most likely* to be:

A lower.

B equal.

C higher.

9 What is the *most appropriate* response to Cho's question regarding the components of business risk?

A Sales risk and financial risk.

B Operating risk and sales risk.

C Financial risk and operating risk.

10 The *most appropriate* response to Cho's question regarding the classification of risk arising from the mixture of variable and fixed costs is:

A sales risk.

B financial risk.

C operating risk.

11 Based on the information in Exhibit 2, the degree of operating leverage (DOL) of 4G, Inc., at unit sales of 1,000,000, is *closest* to:

A 1.60.

B 2.67.

C 3.20.

12 Based on the information in Exhibit 2, 4G, Inc.'s degree of financial leverage (DFL), at unit sales of 1,000,000, is *closest* to:

A 1.33.

B 2.67.

C 3.00.

13 Based on the information in Exhibit 1 and Exhibit 3, Qphone's expected percentage change in operating income for 2010 is *closest* to:

A 17.25%.

B 21.00%.

C 24.30%.

14 4G's breakeven quantity of unit sales is *closest* to:

A 437,500 units.

B 625,000 units.

C 875,000 units.

15 In response to Cho's question regarding an increase in unit sales above 2009 unit sales levels, it is *most likely* that 4G's net income will increase at:

A a slower rate than Qphone's.

B the same rate as Qphone's.

C a faster rate than Qphone's.

16 The *most appropriate* response to Cho's question regarding a description of the degree of total leverage is that degree of total leverage is:

A the percentage change in net income divided by the percentage change in units sold.

B the percentage change in operating income divided by the percentage change in units sold.

C the percentage change in net income divided by the percentage change in operating income.

SOLUTIONS

1 C is correct. The companies' degree of operating leverage should be the same, consistent with C. Sales risk refers to the uncertainty of the number of units produced and sold and the price at which units are sold. Business risk is the joint effect of sales risk and operating risk.

2 C is correct. The degree of operating leverage is the elasticity of operating earnings with respect to the number of units produced and sold. As an elasticity, the degree of operating leverage measures the sensitivity of operating earnings to a change in the number of units produced and sold.

3 C is correct. Because DOL is 4, if unit sales increase by 5 percent, Fulcrum's operating earnings are expected to increase by 4 × 5% = 20%. The calculation for DOL is:

$$\text{DOL} = \frac{(40 \text{ million})(\$100 - \$65)}{\left[(40 \text{ million})(\$100 - \$65)\right] - \$1.05 \text{ billion}}$$

$$= \frac{\$1.400 \text{ billion}}{\$1.400 \text{ billion} - \$1.05 \text{ billion}} = \frac{\$1.4}{\$0.35} = 4$$

4 C is correct. Business risk reflects operating leverage and factors that affect sales (such as those given).

5 B is correct. Grundlegend's degree of operating leverage is the same as Basic Company's, whereas Grundlegend's degree of total leverage and degree of financial leverage are higher.

6 B is correct.

$$\text{Operating breakeven units} = \frac{¥1{,}290 \text{ million}}{(¥3{,}529 - ¥1{,}500)} = 635{,}781.173 \text{ units}$$

$$\text{Operating breakeven sales} = ¥3{,}529 \times 635{,}781.173 \text{ units} = ¥2{,}243{,}671{,}760$$

or

$$\text{Operating breakeven sales} = \frac{¥1{,}290 \text{ million}}{1 - (¥1{,}500/¥3{,}529)} = ¥2{,}243{,}671{,}760$$

$$\text{Total breakeven} = \frac{¥1{,}290 \text{ million} + ¥410 \text{ million}}{(¥3{,}529 - ¥1{,}500)} = \frac{¥1{,}700 \text{ million}}{¥2{,}029}$$

$$= 837{,}851.1582 \text{ units}$$

$$\text{Breakeven sales} = ¥3{,}529 \times 837{,}851.1582 \text{ units} = ¥2{,}956{,}776{,}737$$

or

$$\text{Breakeven sales} = \frac{¥1{,}700 \text{ million}}{1 - (¥1{,}500/¥3{,}529)} = ¥2{,}956{,}776{,}737$$

7 A is correct. For The Gearing Company,

$$Q_{BE} = \frac{F + C}{P - V} = \frac{\$40 \text{ million} + \$20 \text{ million}}{\$200 - \$120} = 750{,}000$$

For Hebelkraft, Inc.,

$$Q_{BE} = \frac{F + C}{P - V} = \frac{\$90 \text{ million} + \$20 \text{ million}}{\$200 - \$100} = 1{,}100{,}000$$

8 C is correct. Sales risk is defined as uncertainty with respect to the price or quantity of goods and services sold. 4G has a higher standard deviation of unit sales than Qphone; in addition, 4G's standard deviation of unit sales stated as a fraction of its level of unit sales, at 25,000/1,000,000 = 0.025, is greater than the comparable ratio for Qphone, 10,000/1,500,000 = 0.0067.

9 B is correct. Business risk is associated with operating earnings. Operating earnings are affected by sales risk (uncertainty with respect to price and quantity), and operating risk (the operating cost structure and the level of fixed costs).

10 C is correct. Operating risk refers to the risk arising from the mix of fixed and variable costs.

11 B is correct. $\text{DOL} = \dfrac{Q(P-V)}{Q(P-V)-F}$

$$\underset{1{,}000{,}000 \text{ units}}{\text{DOL @}} = \frac{1{,}000{,}000(¥108 - ¥72)}{1{,}000{,}000(¥108 - ¥72) - ¥22{,}500{,}000} = 2.67$$

12 C is correct. Degree of financial leverage is

$$\text{DFL} = \frac{\left[Q(P-V)-F\right]}{\left[Q(P-V)-F-C\right]}$$

$$= \frac{1{,}000{,}000(¥108 - ¥72) - ¥22{,}500{,}000}{1{,}000{,}000(¥108 - ¥72) - ¥22{,}500{,}000 - ¥9{,}000{,}000} = 3.00$$

13 B is correct. The degree of operating leverage of Qphone is 1.4. The percentage change in operating income is equal to the DOL times the percentage change in units sold, therefore:

$$\underset{\text{in operating income}}{\text{Percentage change}} = (\text{DOL})\left(\underset{\text{in units sold}}{\text{Percentage change}}\right) = (1.4)(15\%) = 21\%$$

14 C is correct. The breakeven quantity is computed

$$Q_{\text{BE}} = \frac{F+C}{P-V} = \frac{(¥22{,}500{,}000 + ¥9{,}000{,}000)}{(¥108 - ¥72)} = 875{,}000$$

15 C is correct. 4G, Inc.'s degree of total leverage can be shown to equal 8, whereas Qphone Corp.'s degree of total leverage is only DOL × DFL = 1.4 × 1.15 = 1.61. Therefore, a 10 percent increase in unit sales will mean an 80 percent increase in net income for 4G, but only a 16.1 percent increase in net income for Qphone Corp. The calculation for 4G, Inc.'s DTL is

$$\text{DTL} = \frac{Q(P-V)}{Q(P-V)-F-C}$$

$$= \frac{1{,}000{,}000(¥108 - ¥72)}{1{,}000{,}000(¥108 - ¥72) - ¥22{,}500{,}000 - ¥9{,}000{,}000} = 8.00$$

16 A is correct. Degree of total leverage is defined as the percentage change in net income divided by the percentage change in units sold.

The Impact of the Degrees of Operating and Financial Leverage on Systematic Risk of Common Stock

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Source: *The Journal of Financial and Quantitative Analysis*, Vol. 19, No. 1 (Mar., 1984), pp. 45-57
Published by: Cambridge University Press on behalf of the University of Washington School of Business Administration
Stable URL: https://www.jstor.org/stable/2331000
Accessed: 23-01-2019 16:41 UTC

JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS VOL. 19, NO. 1, MARCH 1984

The Impact of the Degrees of Operating and Financial Leverage on Systematic Risk of Common Stock

Gershon N. Mandelker and S. Ghon Rhee*

I. Introduction

The capital asset pricing model postulates that the equilibrium return on any risky security is equal to the sum of the risk-free rate of return and a risk premium measured by the product of the market price of risk and the security's systematic risk. In the capital asset pricing model, beta as an index of systematic risk is the only security-specific parameter that affects the equilibrium return on a risky security.

The identification of the real determinants of the systematic risk of common stock has received a great deal of attention in the finance and accounting literature in recent years. A number of empirical studies have investigated the association between market-determined and accounting-determined risk measures (see [1], [2], [3], [12], [19], and [23]). These studies have increased our knowledge about correlations between betas of common stock and various accounting variables or accounting betas. The studies cited also have provided further insight into what forms of specification appear to best reduce the measurement errors in estimating accounting betas. In a review of their findings, Foster [10] concludes that the choice of accounting variables has not been guided by a theoretical model linking the firm's financing, investment, and production decisions with its common stock beta.

There have been limited efforts to utilize an empirical test design that is more consistent with the definition of beta in the framework of the capital asset pricing model. Under the presumption that the firm's asset structure and capital structure impact upon operating risk and financial risk, respectively, the separate effect of either financial leverage or operating leverage on beta of common stock has been examined. Hamada [13] reports that approximately one quarter of sys-

* University of Pittsburgh and University of Rhode Island, respectively. While retaining full responsibility for this paper, the authors would like to thank William Beranek, Dan Givoly, Jeffrey Jaffe, William Margrabe, and anonymous *JFQA* referees for their comments on earlier drafts of the paper. The authors also thank J. Rock Chung for his assistance in computer work. Financial support for this paper was provided by the Faculty Research Grant, University of Pittsburgh.

tematic risk is explained by financial leverage while Lev [16] provides empirical evidence that operating leverage, as measured by variable cost, is one of the real determinants of systematic risk. Two recent studies by Hill and Stone [14] and Chance [6] represent more refined applications of the risk decomposition of Hamada [13] and Rubinstein [20]. Hill and Stone develop an accounting analogue to Hamada and Rubinstein's formula to investigate the joint impact of operating risk and financial structure on systematic risk. Chance conducts a direct test of the Hamada and Rubinstein formula by controlling operating risk to preserve the assumption of homogeneous risk class. Their findings provide considerable empirical support for Hamada and Rubinstein's formula.

Recent research efforts further explore the risk decomposition of Hamada and Rubinstein by introducing the degrees of operating and financial leverage into a model that explains betas of common stock. Although the degrees of the two types of leverage are extensively discussed in standard finance textbooks in relation to their impact on the volatility of stockholders' returns or of earnings per share, their relationship with the systematic risk of common stock has not been fully resolved. A recent work by Brenner and Schmidt [5] further extends Rubinstein's analysis of the relationship between the characteristics of the firm's real assets and its common stock beta. They demonstrate how unit sales, fixed costs, contribution margin, and the covariance of sales with returns on the market portfolio affect systematic risk. Gahlon and Gentry [11] show that the beta of a common stock is a function of the degrees of operating and financial leverages, the coefficient of variation of the total revenue, and the coefficient of correlation between earnings after interest and taxes and returns on the market portfolio. Unfortunately, it is difficult to investigate the impact of two types of leverage on operating risk and financial risk in the framework of Gahlon and Gentry. This is so because the degrees of two types of leverage are introduced by an expansion of the coefficient of variation of earnings after interest and taxes. Nonetheless, theoretical analyses of Brenner and Schmidt and Gahlon and Gentry show much promise of enhancing our knowledge of the real determinants of beta.

As the degrees of two types of leverage are recognized in a model that identifies the real determinants of beta, this study explores two important empirical issues. First, we examine the joint impact of the degrees of operating and financial leverage on the systematic risk of common stock. Although Hamada and Rubinstein demonstrate that operating risk and financial risk constitute systematic risk, it is not obvious how operating leverage and financial leverage are related to operating risk and financial risk, respectively, in their risk decomposition. We demonstrate how the two types of leverage contribute to systematic risk of common stock. Second, we address the issue of "trade-offs" between operating leverage and financial leverage, while investigating their combined effects on the systematic risk of common stock. The interrelationship between operating and financial leverage is widely discussed in the literature as a means of stabilizing the relative riskiness of stockholders' investment. For example, Van Horne ([24], p. 784) states that:

> Operating and financial leverage can be combined in a number of different ways to

obtain a desirable amount of risk of *common stock*. High operating *leverage* can be offset with low financial *leverage* and vice versa.[1]

The trade-off option enables the firm to make asset (capital) structure decisions irrespective of their impact on systematic risk since the resultant change in the degree of operating (financial) leverage can be offset by an adjustment in the degree of financial (operating) leverage. This trade-off hypothesis has remained a conjectural matter despite its practical implications for management since it has not been substantiated by empirical evidence. This study provides empirical evidence on this hypothesis.

II. The Association between Systematic Risk and the Degrees of Operating and Financial Leverage

Hamada [13] and more recently Rubinstein [20] deserve credit for their efforts of decomposing systematic risk into operating risk and financial risk as indicated below

$$\beta = \beta^* + \beta^*(1 - \tau)D/E , \tag{1}$$

where β = the levered firm's common stock beta,
β^* = the unlevered firm's common stock beta,
τ = the corporate income tax rate,
D = the market value of debt, and
E = the market value of common equity.

β^* measures operating risk while $\beta^*(1 - \tau)D/E$ represents the financial risk of common stock. Rubinstein suggests that operating risk reflects the combined effects of the degree of operating leverage, the pure systematic influence of economy-wide events, and the uncertainty associated with the firm's operating efficiency. Financial leverage magnifies this operating risk to produce financial risk.

For an investigation of the association between systematic risk and the degrees of operating and financial leverage, an alternative to the Hamada and Rubinstein formula is necessary for the following reasons. First, equation (1) does not explicitly introduce the degrees of two types of leverage in its expression. Second, Hill and Stone [14] ably document various econometric problems caused by a nonlinear multiplicative effect of financial structure on operating risk as measured by β^*. Third, equation (1) assumes that corporate debt is risk free. Although this assumption is consistent with Modigliani and Miller's [18] tax correction model, equation (1) must be modified to allow risky debt. With the introduction of risky debt, equation (1) is rewritten as

$$\beta = [1 + (1 - \tau)D/E]\beta^* - (1 - \tau)(D/E)\beta_d \tag{2}$$

[1] The words printed in italics are changed from the original statement.

where β_d denotes beta of risky corporate debt.[2] After a slight rearrangement, we write equation (2) as

$$\beta = \beta^* + (1 - \tau)\left(\beta^* - \beta_d\right)D/E \,. \tag{3}$$

Financial risk as measured by $(1 - \tau)(\beta^* - \beta_d)D/E$ causes additional econometric problems associated with a multiplicative effect of financial structure on the beta of risky debt. Although it is not an impossible task to resolve these problems when investigating the real determinants of beta using equation (3), an alternative beta formula is derived to serve our purpose. This formula explicitly incorporates the degrees of operating leverage and financial leverage. By definition, the beta of common stock j is

$$\beta_j = \operatorname{Cov}\left(\tilde{R}_{jt}, \tilde{R}_{mt}\right) \Big/ \sigma^2\left(\tilde{R}_{mt}\right) \tag{4}$$

where $\tilde{R}_{jt}$ = the rate of return on common stock j for the period from $t - 1$ to t,

$\tilde{R}_{mt}$ = the rate of return on the market portfolio for the period from $t - 1$ to t,

$\operatorname{Cov}(\cdot)$ and $\sigma^2(\cdot)$ denote the covariance and variance operators, respectively.

Suppose that $\tilde{R}_{jt} = (\tilde{\Pi}_{jt}/E_{jt-1}) - 1$ where $\tilde{\Pi}_{jt}$ denotes earnings after interest and taxes at t and E_{jt-1} represents the market value of common equity at $t - 1$. Substitution of this definition of $\tilde{R}_{jt}$ into equation (4) yields

$$\begin{aligned} \beta_j &= \operatorname{Cov}\left[\left(\tilde{\Pi}_{jt}/E_{jt-1}\right) - 1, \tilde{R}_{mt}\right] \Big/ \sigma^2\left(\tilde{R}_{mt}\right) \\ &= \operatorname{Cov}\left(\tilde{\Pi}_{jt}/E_{jt-1}, \tilde{R}_{mt}\right) \Big/ \sigma^2\left(\tilde{R}_{mt}\right) . \end{aligned} \tag{5}$$

We can rearrange equation (5) by multiplying the first argument of the covariance by Π_{jt-1}/Π_{jt-1} and subtracting a constant from it

$$\beta_j = \left(\Pi_{jt-1}/E_{jt-1}\right) \operatorname{Cov}\left[\left(\tilde{\Pi}_{jt}/\Pi_{jt-1}\right) - 1, \tilde{R}_{mt}\right] \Big/ \sigma^2\left(\tilde{R}_{mt}\right) . \tag{6}$$

[2] Proposition II of Modigliani and Miller [17], [18] can be expressed as indicated below in the presence of corporate income taxes and risky debt

$$E\left(\tilde{R}\right) = E\left(\tilde{R}^*\right) + (1 - \tau)\left[E\left(\tilde{R}^*\right) - E\left(\tilde{R}_d\right)\right]D/E \,, \tag{a}$$

where $\tilde{R}$ = the rate of return on the levered firm's common stock,
$\tilde{R}^*$ = the rate of return on the unlevered firm's common stock, and
$\tilde{R}_d$ = the rate of return on risky debt.
According to the capital asset pricing model, $E(\tilde{R}) = R_f + [E(\tilde{R}_m) - R_f]\beta$, $E(\tilde{R}^*) = R_f + [E(\tilde{R}_m) - R_f]\beta^*$, and $E(\tilde{R}_d) = R_f + [E(\tilde{R}_m) - R_f]\beta_d$, where R_f = the rate of return on a risk-free asset. Substitution of these expressions into (a) yields

$$\beta = [1 + (1 - \tau)D/E]\beta^* - (1 - \tau)(D/E)\beta_d \,.$$

The degree of financial leverage (DFL) is defined as the percentage change in Π that results from a percentage change in X, where X denotes earnings before interest and taxes. Thus,

$$\text{(7)} \qquad \text{DFL} = \left[\left(\tilde{\Pi}_{jt}/\Pi_{jt-1}\right)-1\right]/\left[\left(\tilde{X}_{jt}/X_{jt-1}\right)-1\right] .$$

Solving for $(\tilde{\Pi}_{jt}/\Pi_{jt-1}) - 1$, we have

$$\text{(8)} \qquad \left(\tilde{\Pi}_{jt}/\Pi_{jt-1}\right)-1 = (\text{DFL})\left[\left(\tilde{X}_{jt}/X_{jt-1}\right)-1\right] .$$

The degree of operating leverage (DOL) is measured by the percentage change in X that is associated with a given percentage change in the units produced and sold.[3] Let Q denote the number of units. Thus,

$$\text{(9)} \qquad \text{DOL} = \left[\left(\tilde{X}_{jt}/X_{jt-1}\right)-1\right]/\left[\left(\tilde{Q}_{jt}/Q_{jt-1}\right)-1\right] .$$

Solving for $(\tilde{X}_{jt}/X_{jt-1}) - 1$, we obtain

$$\text{(10)} \qquad \left(\tilde{X}_{jt}/X_{jt-1}\right)-1 = (\text{DOL})\left[\left(\tilde{Q}_{jt}/Q_{jt-1}\right)-1\right] .$$

Successive substitution of (10) into (8) and (8) into (6) yields

$$\text{(11)} \qquad \beta_j = (\text{DOL})\,(\text{DFL})\,\text{Cov}\left[\left(\Pi_{jt-1}/Q_{jt-1}\right)\left(\tilde{Q}_{jt}/E_{jt-1}\right), \tilde{R}_{mt}\right]/\sigma^2\left(\tilde{R}_{mt}\right) .$$

Let S denote sales in dollars. Thus, $S = pQ$ where p is the price per unit. By multiplying the first argument of the covariance in (11) by p/p, we obtain the desired result

$$\text{(12)} \qquad \beta_j = (\text{DOL})(\text{DFL})\beta_j^0 ,$$

where $\beta_j^0 = \text{Cov}[(\Pi_{jt-1}/S_{jt-1})(\tilde{S}_{jt}/E_{jt-1}), \tilde{R}_{mt}]/\sigma^2(\tilde{R}_{mt})$.[4] Note that Π_{jt-1}/S_{jt-1} represents the net profit margin at $t-1$ while $\tilde{S}_{jt}/E_{jt-1}$ measures the

[3] When the units produced and the units sold differ due to an uncertain demand for the products, stochastic cost-volume-profit analysis is introduced. (See [15] and [21].)

[4] It is important to note that both DOL and DFL are not random variables. For example, DOL as defined by (9) can be modified as

$$\text{(a)} \qquad \begin{aligned} \text{DOL} &= \left[\left(\tilde{X}_{jt}/X_{jt-1}\right)-1\right]/\left[\left(\tilde{Q}_{jt}/Q_{jt-1}\right)-1\right] \\ &= (p-v)Q_{jt-1}/\left[(p-v)Q_{jt-1}-F_{jt-1}\right] , \end{aligned}$$

where p = the price per unit,
v = the variable cost per unit, and
F = the total fixed costs.

Equation (a) represents another definition of DOL that indicates its nonrandomness. Likewise, DFL as defined by (7) can be rewritten as

$$\text{(b)} \qquad \begin{aligned} \text{DFL} &= \left[\left(\tilde{\Pi}_{jt}/\Pi_{jt-1}\right)-1\right]/\left[\left(\tilde{X}_{jt}/X_{jt-1}\right)-1\right] \\ &= \left[(p-v)Q_{jt-1}-F_{jt-1}\right]/\left[(p-v)Q_{jt-1}-F_{jt-1}-I_{jt-1}\right] , \end{aligned}$$

where I denotes interest expenses.

turnover of the firm's common equity for the period from $t - 1$ to t. The covariability of the product of these two terms with returns on the market portfolio represents the intrinsic business risk of common stock as measured by β_j^0. Further note that the unlevered firm, both operationally and financially, would have DOL = 1 and DFL = 1.[5] Therefore, this intrinsic business risk represents the systematic risk of common stock when the firm is completely unlevered. When the firm is only financially unlevered, its common stock beta, denoted by β^* in Hamada and Rubinstein's formula, is equivalent to (DOL)β_j^0. The role of DOL and DFL is clearly indicated by equation (12). Both DOL and DFL magnify intrinsic business risk of common stock.

Equation (12) is an alternative formula to the risk decomposition of Hamada and Rubinstein. Because it explicitly introduces the degrees of two types of leverage, its usefulness is obvious for an empirical investigation of the impact of DOL and DFL on systematic risk. A nonlinear multiplicative effect of financial structure on operating risk as well as on the beta of risky corporate debt can be avoided by a logarithmic transformation of equation (12). This formula remains valid regardless of whether coporate debt is risky or not.

III. Empirical Test Design and Results

A. Data and Estimation Procedures

This study is based on a sample of 255 manufacturing firms during the period from 1957 to 1976. When selecting these firms, we require that their financial data be on the Standard and Poor's Compustat Annual Data tape and that monthly stock price data be available on the Center for Research in Security Prices (CRSP) tape. Moody's Industrial Manuals (1957-1976) are used to verify some ambiguous or missing financial data.

The first stage of the analysis involves the estimation of the degrees of operating and financial leverage of the sample firms. Since the degree of leverage is built on the familiar concept of elasticity, we use the following time-series regressions

$$\text{(13)} \qquad \operatorname{Ln}\tilde{X}_{jt} = a_j + c_j \operatorname{Ln}\tilde{S}_{jt} + \tilde{u}_{jt} \qquad \begin{matrix} j = 1\text{-}255 \\ t = 1957\text{-}1976 \end{matrix}$$

$$\text{(14)} \qquad \operatorname{Ln}\tilde{\Pi}_{jt} = b_j + d_j \operatorname{Ln}\tilde{X}_{jt} + \tilde{\epsilon}_{jt} \qquad \begin{matrix} j = 1\text{-}255 \\ t = 1957\text{-}1976 \end{matrix}$$

where $\tilde{u}_{jt}$ and $\tilde{\epsilon}_{jt}$ are disturbance terms. The estimated regression coefficients, c_j and d_j, represent the degrees of operating leverage and financial leverage, respectively.[6] In estimating c_j, the independent variable should be the number of

[5] Alternative expressions for DOL and DFL as defined by (a) and (b) in footnote 4 become useful to show that the unlevered firm, both financially and operationally, would have DOL = 1 and DFL = 1. The operationally unlevered firm will have $F = 0$ and DOL becomes unity from (a). The financially unlevered firm will have $I = 0$ and DFL becomes unity from (b).

units produced and sold rather than annual sales in dollars. Because the quantity produced and sold is not available from the income statement, following Lev [16], we use annual sales as a proxy as indicated by (13).[7] Estimation procedures based on (13) and (14) rest on the restrictive, *ceteris paribus,* assumption of stationary elasticity over the estimation period. To examine the assumption of stationarity, the Chow [7] and Fisher [9] test is conducted for each firm based on regressions over two subperiods, t_I = 1957-1966 and t_{II} = 1967-1976. The test results indicate that we cannot reject the hypothesis that the degrees of two types of leverage are stable for approximately 90 percent of the firms at α = 5 percent. One possible option available would be to choose only those firms that pass the Chow-Fisher test but this would reduce the size of the sample. Since we employ a portfolio-grouping approach that should lessen the degree of nonstationarity of the coefficients, we decided not to eliminate any of the firms in our sample.[8,9]

The following market model is used to estimate the beta of each common stock. The measurement of monthly rates of return on the market portfolio is based on a value-weighted index of the New York Stock Exchange stocks compiled by CRSP.

$$\tilde{R}_{jt} = \alpha_j + \beta_j \tilde{R}_{mt} + \tilde{\nu}_{jt}, \quad \begin{matrix} j = 1\text{-}255 \\ t = 1\text{-}240 \end{matrix} \tag{15}$$

where $\tilde{\nu}_{jt}$ denotes a disturbance term. Table 1 summarizes estimates of beta, the degree of operating leverage, and the degree of financial leverage for 255 firms in the sample by industry. The 255 firms are distributed over 10 different industries under the 2-digit SIC Industry Code.

B. Regression Results

We investigate the combined effects of the degrees of two types of leverage on systematic risk by using the following equation

$$\text{Ln}\,\beta_p = \gamma_0 + \gamma_1 \text{Ln}\,\text{DOL}_p + \gamma_2 \text{Ln}\,\text{DFL}_p + e_p \quad (p = 1\text{-}51) \tag{16}$$

where β_p, DOL_p, and DFL_p are portfolio means of beta, the degree of operating leverage, and the degree of financial leverage. A portfolio-grouping approach is

[6] When negative earnings are observed for either X or Π, the following regressions are run without a logarithmic transformation

$$\tilde{X}_{jt} = \phi_1 + \phi_2 \tilde{S}_{jt} + \tilde{\delta}_{jt}, \quad \text{and}$$

$$\tilde{\Pi}_{jt} = \psi_1 + \psi_2 x_{jt} + \zeta_{jt}.$$

After ϕ_2 and ψ_2 are estimated, $\hat{c}_j$ in (13) is approximated by $\phi_2(\bar{S}_j/\bar{X}_j)$ and $\hat{d}_j$ in (14) is approximated by $\psi_2(\bar{X}_j/\bar{\Pi}_j)$ where $\bar{S}_j$, $\bar{X}_j$, and $\bar{\Pi}_j$ denote the 20-year average values of $\tilde{S}_{jt}$, $\tilde{X}_{jt}$, and $\tilde{\Pi}_{jt}$.

[7] Lev [16] uses the annual sales as a proxy for the units produced and sold.

[8] In his examination of the assumption of stationarity, Lev [16] compares the estimates from regressions for the whole period and a subperiod and concludes that the differences in estimated coefficients are minimal. He does not use any statistical test to support his findings.

[9] When those firms that did not pass the Chow-Fisher test were excluded from our sample, we found that the overall results did not improve much from what is reported in the empirical portion of this paper.

TABLE 1
Estimates of Average Beta, DOL, and DFL by Industry

Industry Code		Number of Firms	Beta	DOL*	DFL*
2000	(Food and Kindred)	32	0.94	0.96	1.02
2600	(Paper & Allied Products)	13	1.05	0.91	1.06
2800	(Chemical)	36	1.13	0.91	1.01
2900	(Petro-Chemical)	20	0.96	1.08	0.79
3200	(Glass & Cement Gypsum)	10	1.04	0.91	1.05
3300	(Steel)	21	1.11	0.73	1.03
3500	(Machinery)	40	1.20	1.01	1.00
3600	(Appliances)	24	1.34	1.09	0.99
3700	(Auto)	24	1.09	0.99	1.02
4900	(Utilities)	35	0.72	0.85	0.87

* DOL = the Degree of Operating Leverage.
* DFL = the Degree of Financial Leverage.

employed to reduce the errors-in-variables bias.[10] Under this grouping procedure, we rank the sample firms on the basis of the size of DOL in ascending order. We place the first five securities in portfolio 1, the next five in portfolio 2, and the last five securities in portfolio 51. The average β, DOL, and DFL are calculated for each portfolio, respectively. The same procedures are used to form 51 portfolios based upon the size of DFL. We also group the sample firms on the basis of the size of β to investigate whether or not firms with higher betas show greater trade-offs between DOL and DFL than firms with lower betas.

One has to recognize a potential selection bias because the grouping and cross-sectional regressions are performed in the same study period. To correct this bias, we introduce instrumental variables which should be highly correlated with the two independent variables but which can be observed independently of the two.[11] The natural candidates for our purpose would be operating leverage and financial leverage measured in book values. Out of several proxies available, we choose the 20-year average of the ratio of net fixed assets to total assets and the ratio of total debt to total assets as appropriate instrumental variables for DOL and DFL, respectively.

Table 2 presents test results of the hypothesis that both DOL and DFL have positive effects on the beta of common stock. The table presents the cross-sectional regression estimates based on three sets of data. Each data set has 51 portfolios that are formed from rankings of two instrumental variables for DOL and DFL, and beta, respectively. For each set of data, three regression results are reported. The coefficients in the first lines in each panel show the association between the portfolio's beta and both DOL and DFL. The second and third lines report the results when either DOL or DFL is suppressed.

The empirical results are consistent with the hypothesized relationship: regression coefficients of DOL and DFL are consistently positive, suggesting that both are positively associated with the relative riskiness of common stock. The explanatory power of both operating and financial leverage is quite high, ranging

[10] See [4], [8], and [2] for details about such grouping procedures and their statistical merits.
[11] See [22], p. 445.

from 38 percent to 48 percent. The bottom two panels of Table 2 present a summary of results of the regressions without introducing instrumental variables. The estimates of DOL and DFL from (13) and (14) are used for ranking common stocks in the sample, as discussed earlier. Observe that the overall results are similar to those obtained by using instrumental variables. The values of R^2 are smaller than those reported in the top two panels.

TABLE 2

Regression Results at Portfolio Level

$$\ln \beta_p = \gamma_0 + \gamma_1 \ln \mathrm{DOL}_p + \gamma_2 \ln \mathrm{DFL}_p + e_p$$

	γ_0	γ_1	γ_2	R^2	F-statistic
I. Portfolios Formed Based upon Rankings of Instrumental Variable for DOL	.09 (4.23)†	.32 (2.50)†	1.30 (5.47)†	.43	18.70†
	.06 (2.35)*	.35 (2.17)*	–	.09	4.72*
	.07 (3.37)†	–	1.33 (5.31)†	.36	28.15†
II. Portfolios Formed Based upon Rankings of Instrumental Variable for DFL	.09 (4.58)†	.37 (3.37)†	.94 (4.10)†	.38	15.33†
	.07 (3.21)†	.41 (3.25)†	–	.17	10.56†
	.06 (3.29)†	–	1.00 (3.99)†	.24	15.96†
III. Portfolios Formed Based upon Rankings of Beta	.12 (3.87)†	.73 (3.80)†	1.98 (5.62)†	.48	22.28†
	.07 (1.87)*	.69 (2.82)†	–	.14	7.97†
	.07 (2.23)†	–	1.93 (4.86)†	.33	23.66†
IV. Portfolios Formed Based upon Rankings of DOL	.07 (4.53)†	.14 (3.06)†	.37 (1.71)*	.17	4.99*
	.06 (4.12)†	.11 (2.61)†	–	.12	6.81†
	.05 (3.35)†	–	.16 (.73)	.01	.53
V. Portfolios Formed Based upon Rankings of DFL	.07 (4.26)†	.14 (1.15)†	4.32 (4.93)†	.34	12.26†
	.04 (2.32)*	−.05 (.37)	–	.003	.13
	.06 (4.25)†	–	.40 (4.80)†	.32	23.05†

Figures in parentheses are t-values.
† Statistically significant at $\alpha = 1$ percent.
* Statistically significant at $\alpha = 5$ percent.

From Panel IV of Table 2, we note that DOL shows a higher explanatory power relative to DFL, 12 percent versus 1 percent, when the magnitude of DOL is used for rankings of common stocks to form portfolios. On the other hand, the

regression results in the last panel show that DFL demonstrates much higher explanatory power than does DOL, 32 percent versus 0.3 percent, when the magnitude of DFL is used for rankings of common stocks to form portfolios. Considering the ranking method employed, it is not surprising. For example, when ranking is done according to DFL, we have 51 portfolios, each with various levels of DOL. Therefore, when DOL is used as an independent variable in the regression, we would indeed expect it to have a small explanatory power. A similar phenomenon would be observed when ranking is done on the basis of DOL while DFL is used as an independent variable in the regression. As reported in the top two panels of Table 2, however, the same phenomena do not occur when instrumental variables are used for rankings of common stocks. When regression coefficients are estimated using 51 portfolios formed based upon rankings of beta, we find that DFL alone can explain as much as 33 percent of cross-sectional variation of betas and DOL alone explains 14 percent.[12] Because of limited data, we have not included an independent variable representing the intrinsic business risk of common stock. The estimates of the intercept that are significant in all regressions appear to capture the influence of this omitted variable. Furthermore, the intercept's estimates seem to be stable from one regression to another.

C. Tests of the Trade-Off Hypothesis between Operating Leverage and Financial Leverage

The second hypothesis to be examined is the relationship between DOL and DFL. It has been proposed in the literature that management tries to stabilize the level of the beta of common stock. Frequent changes in the beta of common stock, so it is argued, impose transaction costs on stockholders because they have to rebalance their portfolios to maintain them at a desired level of risk. The degree of operating leverage is an important factor to be considered in the firm's asset structure decisions. By changing from a labor-intensive manufacturing process to a capital-intensive one, a significant change would occur in the cost structure of the firm. A rise in fixed costs and a simultaneous decline in variable cost per unit increase the degree of operating leverage and thereby increase the relative riskiness of common stocks. However, the firm's decision on the operating leverage can be offset by its decision on its financial leverage. To save portfolio revision costs to the stockholders, the two types of leverage can be chosen so that changes in the level of beta are minimized. If the level of intrinsic business risk is constant, a change in DOL can be offset by a change in DFL and vice versa. Therefore, one would expect a cross-sectional negative correlation between DOL and DFL.

[12] When the cross-sectional regression is performed at the level of the individual firm, the following results are obtained

$$\underset{}{\text{Ln}\beta_i} = \underset{(3.30)}{.05} + \underset{(3.13)}{.14\,\text{Ln DOL}_i} + \underset{(4.92)}{.44\,\text{Ln DFL}_i} \quad R^2 = .1081$$

where figures in parentheses are t-values. They are statistically significant at $\alpha = 1$ percent. The smaller R^2 reported for the regression can be attributed to measurement errors of variables at the level of the individual firm.

Table 3 presents the estimated correlation coefficients for the 51 portfolios formed from rankings of operating leverage, financial leverage, and beta, respectively. As expected, we observe consistent negative correlations between DOL and DFL. Negative correlations are particularly pronounced when either operating leverage or financial leverage is used for ranking. The respective correlations are $\rho(DOL_p, DFL_p) = -.30$ and $-.32$ for the whole sample. These correlations are significant at $\alpha = 1$ percent. When portfolios are formed on the basis of the rankings of beta, we observe a negative and nonsignificant correlation between the two types of leverage, $\rho(DOL_p, DFL_p) = -.05$, for the whole sample. To investigate why this happens, we divide the portfolios into two subgroups, one group with low betas and another with high betas. It appears that firms with high betas engage in trade-offs more actively than do firms with low betas.

TABLE 3
Test Results of the Trade-off Hypothesis

		Number of Portfolios	Beta	DOL	DFL	$\rho(DOL_p, DFL_p)$
Operating Leverage	Low	25	1.02 [.10]	.73 [.17]	.99 [.07]	−.26 (1.26)
	High	26	1.09 [.11]	1.16 [.21]	.97 [.06]	−.23 (1.18)
	Whole	51	1.06 [.11]	.95 [.28]	.98 [.06]	−.30 (2.19)†
Financial Leverage	Low	25	1.00 [.12]	.97 [.10]	.88 [.13]	−.32 (1.61)#
	High	26	1.10 [.10]	.93 [.13]	1.08 [.08]	−.31 (1.59)#
	Whole	51	1.06 [.12]	.95 [.11]	.98 [.14]	−.32 (2.39)†
Beta	Low	25	.85 [.14]	.89 [.10]	.94 [.06]	−.08 (.37)
	High	26	1.25 [.17]	1.00 [.14]	1.01 [.06]	−.49 (2.73)†
	Whole	51	1.06 [.25]	.95 [.13]	.98 [.07]	−.05 (.35)

Figures in parentheses are t-values.
† Statistically significant at $\alpha = 1$ percent.
# Statistically significant at $\alpha = 10$ percent.
Figures in brackets are cross-sectional standard deviations.

The average DOL and DFL of the two subgroups also provide some evidence of balancing activities between the degrees of two types of leverage. For portfolios formed based upon rankings of DOL, it appears that low DOL is combined with high DFL, .73 versus .99, and vice versa, 1.16 versus .97. The same

trend can be observed for portfolios formed from rankings of DFL. Low DFL is combined with high DOL, .88 versus .97, and vice versa, 1.08 versus .93.

III. Summary

The unique aspect of this study is its explicit introduction of the degrees of operating leverage and financial leverage in investigating the joint impact of both asset structure and capital structure on systematic risk. In this study, we recognize the role of DOL and DFL in magnifying the intrinsic business risk of common stock. This study isolates the degree of operating leverage from operating risk to highlight the joint impact of DOL and DFL on the systematic risk of common stock and to test the trade-off hypothesis between the two.

Our empirical findings suggest that the degrees of operating and financial leverage explain a large portion of the variation in beta. The conjecture that firms engage in trade-offs between DOL and DFL seems to have gained strong empirical evidence in our study. We found a significant correlation between the two types of leverage.

If corroborated by future studies, these findings may help us in prediction of corporate behavior. For example, a new technological breakthrough that requires new capital investment, shifting the firm to a higher degree of operating leverage, may signal an offsetting shift in the degree of financial leverage. The findings of this study also may clarify to management that indeed such a policy is widely followed and may help it understand why it is so. Corporate managers then will have to sacrifice less of their time pondering it. Another practical merit of this study is that it can help us in formulating prediction models for the betas of common stock and the firm. Given the significant joint impact of the two types of leverage, beta forecasting models can be improved in accuracy.

There are many issues to which this study and follow-up studies in this direction may contribute to our understanding of corporate financing and investment decisions. We are engaged in examining further aspects of the issues. One direction we are pursuing is to introduce the instrinsic business risk of common stock into the empirical model along with DOL and DFL. Another direction is an investigation of changes over time in both DOL and DFL and the relationship between the two changes. A further investigation is warranted on changes of beta over time and corresponding changes in the degrees of operating and financial leverage.

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Review of Quantitative Finance and Accounting, 2 (1992): 187-203

Adjusted Accounting Beta, Operating Leverage and Financial Leverage as Determinants of Market Beta: A Synthesis and Empirical Evaluation

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Abstract. This article reexamines and synthesizes two streams of research dealing with the relationship between market beta and accounting risk measures. It is shown that, with some minor rearrangement the Mandelker and Rhee (1984) model can be shown to be as a decomposition of the familiar accounting beta (Beaver, Kettler and Scholes (1970)) into operating leverage, financial leverage, and an adjusted accounting beta. The adjusted accounting beta can be further decomposed into productivity gains and the relative cyclical sensitivity of the accounting flows of the firm. Empirical estimates of this extension made using three accounting flow measures in addition to earnings show that the intrinsic business risk factor not identified in the original Mandelker and Rhee model is the most significant explanatory factor related to market beta.

Key words: Accounting beta; financial leverage; market beta; operating leverage.

1. Introduction

In the past two decades, a number of finance and accounting researchers have atempted to identify the real determinants of the systematic risk of common stock. Pioneering studies by Hamada (1972) and Rubinstein (1973), which decomposed market beta into the constituent operating and financial risk components opened the way to subsequent researchers who have substituted accounting (firm-specific) variables for the market determined parameters of the original decomposition. Studies that can be classified in this category include Mandelker and Rhee (1984), Gahlon and Gentry (1982), Hill and Stone (1980) and Lev (1974).

The substitution of accounting risk measures for theoretical economic concepts in the decompositon of systematic risk is understandable for two reasons. First, Hill and Stone (1980) demonstrated that various econometric problems arise in the estimation of the non-linear multiplicative relationship in the Hamada-Rubinstein model. Second, expressing the exogenous variables in accounting terms is likely to be useful because the accounting reports provide an overview of the financial and operational status of the reporting entity. While it is recognized that market beta is not determined by accounting data, it is reasonable to presume that accounting data do reflect the underlying economic phenomena that are the real determinants of beta.

Specifically, factors such as the firm's competitive strategy, its position within an industry, the barriers to entry into the industry, and the bargaining power of the firm relative to its customers and suppliers all affect a firm's systematic risk. However, these economic concepts are either not observable directly, or are difficult to measure quantitatively in

a routine manner. These reasons suggest a need for proxies that are measurable and also readily available. Since it is well established that stock prices respond to reported accounting data, it follows that the accounting data do reflect (even if imperfectly) the underlying economic factors that drive stock prices. Thus, an empirical analysis of the relationship between the accounting risk measures and market beta in a theoretically plausible and comprehensive model should be helpful to users of financial statements and to management.

The empirical demonstration of the stability of such models over different time periods and using different techniques should provide some assurance that the accounting-based data provide a sufficient proxy for the underlying economic concepts. Such comprehensive models should be useful to management in evaluating the possible effect of their strategic decisions on the risk of the firm. The models should also be useful to other users of the financial statements because they may provide clues to reasons for possible changes in the market risk of a given security.

The objective of this study is to extend a model developed by Mandelker and Rhee (1984) into a comprehensive structure which relates a firm's operating, financing and strategic decisions to its systematic risk. In doing so, a link is established between studies such as Beaver, Kettler and Scholes (1970), which hypothesized a direct linear relationship between accounting beta and market beta, and the earlier cited studies which related a firm's systematic risk to its financing, investment, and production decisions.[1]

The rest of this article is organized as follows. The extension of the Mandelker-Rhee model, the focus of this article, is outlined in Section 2. Section 3 presents the empirical model estimated, the sample selection criteria and operational procedures adopted in the study. The empirical results and the conclusions of this article are discussed in the last two sections.

2. Extension of Mandelker-Rhee Model

To demonstrate how the parameters identified in the MR model relate to the concept of accounting beta, it is convenient to adopt the linear relationship between market beta and accounting beta postulated by Beaver, et al. (1970).[2] That is:

$$\beta_{Li}^{M} \equiv \frac{\text{Cov}\,(\tilde{R}_{it}, \tilde{R}_{mt})}{\sigma^2(\tilde{R}_{mt})} \tag{1}$$

$$= \frac{\text{Cov}\,(\tilde{Z}_{it}, \tilde{Z}_{mt})}{\sigma^2(\tilde{Z}_{mt})} \equiv \beta_{Li}^{A}, \tag{2}$$

where

β_{Li}^{M} = the market beta (*MBETA*) of a financially-leveraged firm;

β_{Li}^{A} = the accounting beta (*ABETA*) of the same firm;

$E(\tilde{R}_{it})$ = expected rate of return on stock i at time t;

$E(\tilde{Z}_{it}) = E(\tilde{X}_{Lit})/V_{it-1}$
= price-deflated "pure earnings" of firm i at time t;

$\tilde{Z}_{mt} = (1/n) \sum_{i=1}^{n} \tilde{X}_{Lit}/V_{it-1}$

$\tilde{X}_{Lit}$ = "pure earnings" per share of financially-leveraged firm i at time t

V_{it-1} = price of common stock of firm i at beginning of period t.

It can be shown that, with repetitive substitution and factoring out of some of the nonrandom variables, a version of the Mandelker and Rhee (1984) model can be derived as:[3]

$$\beta_{Li}^{M} = DFL_i * DOL_i * \text{COV}\left[\frac{\tilde{g}_{si}}{\tilde{g}_{xi}} * \tilde{Z}_{it}, \tilde{Z}_{mt}\right] / \sigma^2(\tilde{Z}_{mt}) \quad (3a)$$

$$= DFL_i * DOL_i * IBR_i, \quad (3b)$$

where

IBR_i = Intrinsic Business Risk

DFL_i = Degree of financial leverage
$= (\Delta X_{Lit}/X_{Lit-1})/(\Delta X_{Uit}/X_{Uit-1})$

DOL_i = Degree of operating leverage
$= (\Delta X_{Uit}/X_{Uit-1})/(\Delta S_{it}/S_{it-1})$

S_i = Sales of firm i

$\tilde{g}_{xi} = (\Delta \tilde{X}_{Lit}/X_{Lit-1})$
= expected growth in "pure earnings" from t − 1 to t;

$\tilde{g}_{si} = (\Delta \tilde{S}_{Lit}/S_{Lit-1})$
= expected growth in sales from period t − 1 to t;

and the subscripts 'L' and 'U' refer to firm 'i' with and without financial leverage.[4]

From equation (3a), if $\tilde{Z}_{it}^{*}$ is used to denote $(\tilde{g}_{si}/\tilde{g}_{xi}) * \tilde{Z}_{it}$, then the IBR_i term can be presented in a fashion which facilitates comparison with accounting beta (*ABETA*) as defined in equation (2). That is:[5]

$$IBR_i = \frac{\text{Cov}(\tilde{Z}_{it}^{*}, \tilde{Z}_{mt})}{\sigma^2(\tilde{Z}_{mt})} \quad (4)$$

$$= (\tilde{g}_{si}/\tilde{g}_{xi}) * ABETA. \quad (5)$$

Expression (4) shows that *IBR* (within the extended Mandelker-Rhee model) differs from *ABETA* only by the multiplicative effect of the ratio $\tilde{g}_s/\tilde{g}_x$. Thus, if the growth rate of sales and *pure earnings* were equal, *IBR* would equal *ABETA*. A sufficient condition for that to occur is for both the fixed operating charges (FC_i) and interest expense (I_i) to equal zero, implying that $DFL = DOL = 1$. On the other hand, if $\tilde{g}_s > \tilde{g}_x$, then $IBR > \beta^A_{Li}$ and $(DOL * DFL) < IBR$ given equation (5). The converse would hold if $\tilde{g}_{si} < \tilde{g}_{xi}$.

Note that the ratio $\tilde{g}_{si}/\tilde{g}_{xi}$ can be conceptualized as measuring changes in productivity over time. The growth rate of *pure earnings* will be higher than the growth rate of sales only if investments undertaken result in a lesser rate of growth in total costs relative to total sales. Thus, an alternative form of equation (3b) can be written as:

$$\beta^A_{Li} = DFL_i * DOL_i * PRDG_i * ABETA_i, \tag{6}$$

where

$PRDG = \tilde{g}_s/\tilde{g}_x$

= Productivity Gains.

This development has important implications for an understanding of the link between market beta and a firm's production, financing and strategic decisions. As indicated by MR and earlier researchers, DOL_i captures the effects of a firm's choice of a production system, while DFL_i reflects the firm's financial structure. In the original Mandelker-Rhee model, IBR_i was perceived to be the residual risk which remains even after operating and financial leverage have been accounted for. In the extended model of equation (6), it is shown that this intrinsic risk term can be decomposed into two terms: $ABETA_i$ and *PRDG*. To the extent that aggregate corporate profits (and related accounting flows) are responsive to the swings of the business cycle, $ABETA_i$ reflects the cyclicality of a firm's accounting flows relative to those of other firms in the economy. Actions taken by management to diversify across different industries or product lines will affect systematic market risk to the extent that they reduce or increase the cyclicality of the net flows.[6]

In addition, the nature of the investments undertaken by management affects systematic risk through the effect on *PRDG*. Cost reduction investments may reduce risk since it may increase the denominator ($\tilde{g}_x$) in the *PRDG* term more than the numerator ($\tilde{g}_s$). On the other hand, investments undertaken to expand market share or create new products may increase risk in the early years of the new products if the resulting $\tilde{g}_s$ is greater than $\tilde{g}_x$. However, the relationship between $ABETA_i$, $PRDG_i$, DOL_i and DFL_i is multiplicative, so the effect of changes in any one of them is jointly dependent on the levels of the other factors.

This extension of the Mandelker-Rhee model also shows the primary difficulty with their empirical findings. Mandelker and Rhee assumed that IBR_i could be embedded in the intercept and error terms. It is obvious, however, that IBR_i is unlikely to be constant across all firms and that it might constitute an important omitted variable in the empirical model estimated by MR. A reevaluation of their estimates with the specific identification of IBR_i, therefore, may be an important step in validating their model.

3. Methodology of Study

3.1. Theoretical Model Estimated

Given the multiplicative model in equation (3b), the cross-sectional model estimated (after a log transformation) can be written as:

$$\ln MBETA_i = \alpha_0 + \alpha_1 \ln(IBR_i) + \alpha_2 \ln(DFL_i) + \alpha_3 \ln(DOL_i) + \epsilon_i \quad (7)$$

To estimate *IBR*, it was necessary to first estimate $\tilde{Z}_{it}^*$. This was done by running two separate regressions for each firm to estimate $\tilde{g}_s$ and $\tilde{g}_x$. Both regressions used the exponential growth model to identify the compound growth rates, i.e.,

$$\ln S_{it} = \alpha_0 + g_{si}t + e_t \quad (8a)$$

$$\ln X_{Lit} = \alpha_0 + g_{xi}t + e_t, \quad (8b)$$

where t = time period.

Accounting betas were computed iteratively for each flow in the usual manner, i.e.:

$$Z_{it} = b_0 + b_1 Z_{mt} + a_t, \quad (9)$$

where b_1 = the accounting beta (*ABETA*).

IBR was then derived as (g_s/g_x) * *ABETA*. To estimate *DFL*, *DOL* and *MBETA* (market beta) for the individual firms, three successive time series regressions were run for each firm. Since both *DOL* and *DFL* involve elasticity concepts, the log-linear regression approach used by Mandelker and Rhee (1984) was adopted here as well.

Vasichek's (1973) Bayesian adjustment procedure was applied to derive both the *MBETA* and *IBR* terms. The objective was to correct for the well known nonstationarity of betas. The procedure here is analogous to that applied by Ismail and Kim (1989) in a similar context. In general, the findings reported in this article were not materially affected by the Bayesian adjustment except for a slight improvement in the fit of the regression models.

3.2. Alternative Accounting Flows

For the purposes of this study, accounting earnings is presumed to provide only a noisy proxy for $\tilde{X}_{Lit}$. Since investors have access to other accounting flows, we presume that other such information will be used in forming an evaluation of the construct. The four accounting flows used in the earlier study by Ismail and Kim (1989) have been adopted in this study. These are Net Income from Operations (NIOP), Funds Flow from Operations (FFOP), Working Capital from Operations (WCOP) and Cash Flow from Operations (CFOP). The operational definitions of these variables are provided in Appendix I.

Several reasons can be advanced to justify the consideration of these other accounting flows. First, cash flow volatility, for instance, has been shown to more highly correlated with market beta then earnings volatility (Ismail and Kim, (1989)). In addition, although

financial and operating leverage has so far been almost exclusively related to earnings (or to ratios derived from the balance sheet), the three additional accounting flows can conceptually be substituted for earnings in such contexts.

Bowen et al. (1986), for example, found that FFOP (net income plus depreciation) had higher predictive value than any of the other three accounting flows in the forecast of future cash flows. Since a firm's expected future cash flow is a relevant informtion variable in the valuation of the firm, any other information variable useful in predicting such future cash flows is a potentially important variable. All such variables might be useful, not only on a net (after interest and tax) basis, but also in an unlevered version (i.e., before deducting preferred dividends and after tax interest expense). The magnitude of both preferred dividends and after tax interest relative to the net accounting flow may be an important feature in the market's assessment of risk.

In addition, given the arbitrariness of some accounting allocations, it is conceivable that these alternatives provide better measures of the flow of real resources and the substitution possibilities of the fixed and variable costs (and the concomitant risk) that operating leverage is intended to capture. For example, it can be argued that a better reflection of operating risk for an enterprise is the extent of the fixed cash outlays (in comparison to the variable cash expenditures) required to sustain operations. Investments in assets already in place are sunk and therefore not pertinent to the operating risk profile. If this view is accepted, then the use of an unlevered measure of cash or funds flow may be more pertinent than the earnings data that standard textbooks advocate in the determination of operating leverage. At the very least, adjusting earnings for the depreciation effect may provide a better measure of operating leverage. Similarly, financial leverage may be better reflected in the extent to which a firm's net cash/funds flows are responsive to changes in its gross flows (before financing costs).

For these reasons, the approach taken in this study is to assume that all the accounting flow variables provide measures of the underlying constructs with some error. Since multiple observable measures of the unobserved constructs are available, factor analysis was used to derive composite constructs for *IBR*, *DOL* and *DFL* respectively using all four accounting flows.

Factor analysis was chosen for generating the composite model for two reasons. First, it permits an examination of whether only three dimensions exist among the ensemble of variables computed with the alternative accounting flows used as empirical proxies for *X*. Furthermore, it is possible to examine whether these dimensions have an interpretation consistent with the concepts of Intrinsic Business Risk, Operating Leverage and Financial Leverage. Second, it permits the relationship between market beta and the three parameters in equation (7) to be assessed using all available accounting flow data without the need to be concerned about possible collinearity among the independent variables. An orthogonal rotation of the axes to eliminate collinearity among the factors identified can be applied to obtain distinct constructs.[7]

3.3. Sample Selection

The analyses were limited to nonfinancial firms who had the relevant data for either the 11-year period 1967/77 or the entire 20-year period (1967/86), covered by the 1987 version

of the Compustat Industrial Annual tape. Monthly returns data were gathered from the CRSP tapes. Altogether, there were 265 firms available for the 10-year analysis and 237 firms for the 19-year analysis. One year was lost due to the need to lag observations to compute the cash flow variable. Restricting the analyses only to firms who had complete data for the entire 19-year period did not change the qualitative results for the 10-year interval analysis.

Part of the motivation for examining the two different intervals was to determine if the length of the estimation period had an effect on the results. Another reason was to maintain consistency with the previous studies by Mandelker and Rhee (1984) and Ismail and Kim (1989) who used 20 and 19-year intervals, respectively. However, given evidence that market betas computed from monthly data using OLS may be nonstationary over periods longer than five to seven years (Gonedes, (1973)), it was felt that a 10-year interval balanced the possible market beta nonstationarity against the lack of precision of the time series estimates of *DOL*, *DFL* and *IBR* which are based on annual observations. Thus analyses conducted for the the two different time intervals permit both issues to be addressed.

The accounting flows (as proxies for X_{Lit}) were computed on a per share basis before deflation by the stock price at the beginning of the period to derive Z_{Lit}. The unlevered versions (X_{Uit}) were derived by adding back preferred dividends and after-tax interest expense to X_{Lit} before deflation by the stock price.

The market portfolio used for estimating both the beta of the individual stock and the market rate of return (R_m) was initially the CRSP equally-weighted index. To ensure correspondence between the market portfolio used in computing the accounting beta term (*IBR*) and that used in computing the market beta term, the results were reestimated using a market portfolio based only on firms with data available for each period. The correlations between the CRSP index-based *MBETA*s and those from the internally derived index were around 0.92 for both sets of analyses. Those reported here are based on the CRSP index (for better comparability with prior studies in this area). To reduce measurement error in the market beta estimates, the securities were grouped into 7-stock portfolios.[8]

4. Results of Analyses

4.1. Preliminary Results

Table 1 shows the means and standard deviations of the variables used in the study for both the 19-year and 10-year intervals respectively. As observed in Table 1, the means of *MBETA* (sample-based) and the *ABETA* terms are nearly unity by construction since the market portfolio is defined in terms of the firms with available data for the period. In contrast, the mean of *MBETA* (CRSP Index) is less than one, implying that the average firm in this study had lower risk than the average firm in the CRSP market index. The means of the *DFL* and *DOL* terms are all around unity, implying that, for the average firm in the sample, the degrees of financial and operating leverage are close to being perfectly elastic.

As indicated earlier, the four sets of accounting flows are highly correlated. Consequently, any attempt to use variables computed from all variables in a single regression equation

Table 1. Means and standard deviations (S.D.) of variables.

	10-year interval (1968/77)		19-year period (1968/86)	
	Mean	S.D.	Mean	S.D.
MBETA—CRSP Index	0.832	0.267	0.849	0.198
MBETA—Sample-based	1.000	0.287	0.999	0.211
CFOP — *IBR*	0.928	0.544	0.608	0.273
— *DFL*	1.104	0.148	1.074	0.066
— *DOL*	1.004	0.288	1.095	0.157
WCOP — *IBR*	1.066	0.738	1.056	0.889
— *DFL*	1.082	0.172	1.023	0.040
— *DOL*	0.994	0.142	1.034	0.163
FFOP — *IBR*	1.139	0.745	0.995	0.894
— *DFL*	1.107	0.090	1.017	0.035
— *DOL*	0.979	0.140	1.021	0.152
NIOP — *IBR*	1.018	0.932	0.642	0.822
— *DFL*	1.124	0.189	1.102	0.176
— *DOL*	1.087	0.235	1.037	0.211
Sample Size	265 firms		237 firms	
No. of Portfolios	38		34	

is likely to run into severe problems of multicollinearity. On the other hand, one would expect that all four variables contain information not fully reflected in the others. The procedure adopted here was to apply factor analysis to generate a set of common factors from the ensemble of measures. The initial factors were derived using principal component analysis with a default eigenvalue cutoff of 1.0. The factors identified were then rotated orthogonally to eliminate any overlap between the dimensions and permit as unambiguous an interpretation as possible. The qualitative results and conclusions derived for the composite models presented here are fairly robust since sensivitity tests using other combinations of initial factor extraction and rotation techniques did not materially affect the results. The merits of the alternative methods in factor analysis are discussed in detail in Cattell ((1978), pp. 118–154). The results are presented in table 2 below.

Table 2 presents results with the original three parameters *IBR*, *DFL*, and *DOL* computed using the alternative accounting flows for the 19-year interval data (panel A) and the 10-year data (panel B). The results in both panels clearly support the notion that there are three underlying dimensions in the ensemble of observed variables presented. The dimension labelled *FACTOR1—Intrinsic Business Risk* is characterized by high positive loadings of the *IBR* terms for all four accounting flows. The dimension labelled *FACTOR2—Operating Leverage* has an unambiguous interpretation as only the *DOL* factors load highly on it. Similarly, *FACTOR3—Financial Leverage* can be accorded that label without much ambiguity since only the *DFL* terms load highly on this factor.

Table 2. Results of factor analysis of real determinants of beta. (Orthogonally rotated factor loadings of natural log of original variables.)

	FACTOR1 Intrinsic Business Risk	*FACTOR2* Financial Leverage	*FACTOR3* Operating Leverage
Panel A: 19-year Interval			
IBR-1	0.960		
IBR-2	0.955		
IBR-3	0.953		
IBR-4	0.878		0.224
DOL-3		0.942	
DOL-4		0.910	
DOL-2		0.887	
DOL-1		0.595	
DFL-3			0.893
DFL-2			0.825
DFL-4		−0.304	0.696
DFL-1	0.357		
Eigenvalue	5.83	3.42	2.08
PTV	42%	24%	18%
Panel B: 10-year Interval			
IBR-2	0.910		
IBR-3	0.894		
IBR-4	0.738		
IBR-1	0.608		
DOL-3		0.940	
DOL-2		0.914	
DOL-4		0.828	
DOL-1		0.686	0.262
DFL-2			0.925
DFL-1			0.921
DFL-4			0.825
DFL-3		0.320	0.510
Eigenvalue	5.24	2.60	1.90
PTV	44%	25%	14%

LEGEND: 1 = CFOP 2 = WCOP 3 = FFOP 4 = NIOP
PTV = Porportion of Total Variance

Note: To improve readability, only loadings above 0.25 are reported.

Panel B of table 2 presents results for the 10-year interval. Essentially, the same conclusions apply—there are three identifiable factors: *Factor 1*—Intrinsic Business Risk, the most important factor accounting for the highest proportion of the observed variance, *Factor 2*—Degree of Operating Leverage, *Factor 3*—Degree of Financial Leverage accounting for the least amount of variance.

4.2. *Results of Regression on Individual Flows*

The results of estimating equation (7) using variables computed from the four accounting flows separately are reported in table 3. Panel A of table 3 presents results for the 19-year interval data, while panel B presents those for the 10-year interval.

The results in panel A of table 3 show that, of the four accounting flows, parameters computed using FFOP had the highest explanatory power relative to *MBETA*. The observed r-squared values are 0.643, 0.689, 0.730 and 0.680 for CFOP, WCOP, FFOP and NIOP respectively.[9] Similarly, in panel B of table 3, the regression model computed using variables based on FFOP have the highest r-squared value (0.620) compared to the other variables, although the differences are not as large as those observed for the 19-year interval.

Table 3. Results of regression analyses on parameters from individual flows.

Model Estimated: $\ln MBETA = \lambda_0 + \lambda_1 (\ln IBR) + \lambda_2 (\ln DOL) + \lambda_3 (\ln DFL)$

	CFOP	WCOP	FFOP	NIOP
Panel A: 19-year period				
λ_0	−0.254	−0.161	−0.158	−0.169
(t-value)	(−3.50)***	(−4.27)***	(−4.07)***	(−3.32)***
λ_1	0.370	0.581	0.670	0.610
(t-value)	(5.19)***	(4.30)***	(6.43)***	(5.63)***
λ_2	0.080	0.062	0.075	0.077
(t-value)	(1.99)*	(2.15)*	(2.48)*	(2.34)*
λ_3	0.030	0.156	0.160	0.145
(t-value)	(1.23)	(1.42)	(1.86)+	(1.29)
Adjusted R^2	0.643	0.689	0.730	0.680
Panel B: 10-year period				
λ_0	−0.294	−0.220	−0.161	−0.124
(t-value)	(−3.21)**	(−4.40)***	(−5.05)***	(−3.94)**
λ_1	0.410	0.580	0.670	0.750
(t-value)	(3.58)**	(4.03)**	(6.89)***	(7.45)***
λ_2	0.120	0.593	0.348	0.284
(t-value)	(1.85)+	(1.89)+	(2.34)*	(2.19)*
λ_3	0.950	1.080	0.672	0.523
(t-value)	(1.11)	(1.55)	(1.98)+	(1.69)+
Adjusted R^2	0.557	0.547	0.620	0.613

Explanatory Notes

+Significant at alpha level of 0.10
***Significant at alpha level below 0.001
**Significant at alpha level below 0.01
*Significant at alpha level of 0.05.

As far as the significance of the individual parameters are concerned, the most significant finding is that the *IBR* is consistently significant for all four models in both sets of analyses. *DOL* is also significant in all four models, although its level of significance is only at 0.05 rather than the 0.001 observed for *IBR*. Finally, *DFL* computed using CFOP and WCOP is statistically insignificant in analyses of both the 19-year and 10-year interval data. However, it is statistically significant for FFOP in both sets of analyses, although the level of significance is weaker than that of either *IBR* or *DOL*.[10]

4.3. Regression on Factor Scores

To determine if the common dimensions derived from the factor analyses have any potential for improving the results obtained using the individual accounting flows, *MBETA* was regressed on factor scores obtained from the factor analysis. The results of these regressions on the composite factors are presented in table 4 below.

Panel A of table 4 presents results using the 19-year interval data, and shows that all thre factors (*FACTOR 1—Intrinsic Business Risk*; *FACTOR 2—Operating Leverage*; and *FACTOR 3—Financial Leverage*) are statistically significant. In terms of the relative contribution of the overall R-squared values, most of the explanatory power is provided by *Factor 1—Intrinsic Business Risk* (0.654), followed by *Factor 2—Operating Leverage* (0.060), and *Factor 3—Financial Leverage* (0.055). Thus, unlike the earlier results disclosed in table 3, *Factor 3* is almost as important as *Factor 2* in the 19-year interval data.

Table 4. Results of regression of market beta on factor scores formed from *IBR* and other determinants of market beta.

Model Estimated: $\ln MBETA = \omega_0 + \omega_1 (FACTOR1) + \omega_2 (FACTOR2) + \omega_3 (FACTOR3)$

Parameter	Coefficient	t-value	Significance Level	Contribution to R-squared
Panel A: 19-year Interval				
Intercept $-\omega_0$	0.846	3.260	0.001	
Bus. Risk $-\omega_1$	0.162	7.471	0.000	0.654
Oper. Lev. $-\omega_2$	0.048	2.195	0.040	0.060
Fin. Lev. $-\omega_3$	0.047	2.162	0.045	0.055
Overall R^2				0.769
Panel B: 10-year Interval				
Intercept $-\omega_0$	0.812	3.461	0.001	
Bus. Risk $-\omega_1$	0.117	6.652	0.001	0.450
Oper. Lev. $-\omega_2$	0.039	2.474	0.015	0.110
Fin. Lev. $-\omega_3$	0.032	1.960	0.052	0.050
Overall R^2				0.610

Explanatory Notes:

FACTOR 1 = Intrinsic Business Risk composite factor
FACTOR 2 = Operating Leverage composite factor
FACTOR 3 = Financial Leverage composite factor

The results in panel B of table 4 for the 10-year interval data are consistent with the results obtained from the regressions on the parameters from the individual accounting flow models. All three factors are significant, but *Factor 3* has a relatively weak effect compared to the other two factors. In order of relative explanatory power, *FACTOR 1* (*Intrinsic Business Risk*) is first with a contribution to the R-squared of 0.45, followed by *FACTOR 2* (*Operating Leverage*) with 0.11, followed by *FACTOR 3* (*Financial Leverage*) with 0.05.

One final point to note is that these results confirm the prior suspicion that the empirical findings reported by Mandelker and Rhee (1984) may have been based on a misspecified model. With the identification of *IBR*, the strong explanatory role of both *DOL* and *DFL* in relationship to market beta no longer exists. By far the most important factor is *IBR*; consequently, the degree to which a firm may trade off financial leverage against operating leverage does not appear to be as important as the strategic posture of the firm.

4.4. Regression of Δ MBETA on Changes in Determinants

Perhaps, a stricter test of the hypothesis that the variables identified in this study are related to the underlying real economic determinants of market risk is to evaluate the association between changes in market risk (Δ ln *MBETA*) and changes in the associated levels of the composite factors. To perform this final analysis, the total period was divided into two 10-year subperiods: 1968/77 and 1977/86. The factor scoring coefficients derived from the 19-year analysis were used to compute factor scores for the firms with data for the entire period. The change in ln *MBETA* (Δ ln *MBETA*) was then regressed on the change in the factor scores computed for the two subperiods. The results of this analysis are presented in table 5 below.

Table 5. Results of regression of change in market beta on changes in factor scores over two 10-year intervals.

Model Estimated: $\Delta \ln MBETA_i = \alpha_0 + \alpha_1 \Delta(FACTOR1_i) + \alpha_2 \Delta(FACTOR2_i) + \alpha_3 \Delta(FACTOR3_i) + e_i$

Parameter	Coefficient	t-value	Significance Level	Contribution to R-squared
Intercept $-\alpha_0$	−0.014	−0.598	0.552	
Bus. Risk $-\alpha_1$	0.318	2.670	0.010	0.560
Oper. Lev. $-\alpha_2$	0.206	1.880	0.070	0.063
Fin. Lev. $-\alpha_3$	−0.162	−0.690	0.490	0.001
Overall R^2				0.615

Explanatory Notes:

FACTOR 1 = Intrinsic Business Risk composite factor
FACTOR 2 = Operating Leverage composite factor
FACTOR 3 = Financial Leverage composite factor

Δ (ln *MBETA*) = (ln $MBETA_2$) − (ln $MBETA_1$)

Δ *FACTOR*(.) = *FACTOR*(.)$_2$ − *FACTOR*(.)$_1$

where subscript '1' = 1968/77 time period.
subscript '2' = 1977/86 time period.

The results in table 5 show that, of the three dimensions identified, only *Factor 1* and *Factor 2* are significant in explaining the shift in market beta over the two subperiods. The coefficient for *Factor 1* is statistically significant at an alpha of 0.01, while that of *Factor 2* is significant at 0.07. The coefficient for *Factor 3* (*Financial Leverage*) has the wrong sign (i.e., negative instead of positive) but is statistically insignificant.

One possible reason for this counter-intuitive result (the nonsignificance of *Factor 3*) may be that not enough shifts occurred in the observed *DFL* variables to cause an effect on market beta. To examine this possibility, the means of the four *DFL* terms computed for the two subperiods were compared. A simple t-test for the diffeence in means showed the shift in the *DFL* terms was not statistically significant for any of the four accounting flows. Thus, the lack of significance of the *Financial Leverage* factor could be due to effects specific to the sample and/or subperiods examined in this study.

5. Conclusions

The major finding of this study is that the real determinants of market beta can be satisfactorily represented by accounting flow measures, specifically, accounting measures of Intrinsic Business Risk, Operating Leverage and Financial Leverage as represented by the Mandelker and Rhee (1984) model. From a managerial standpoint, the significance of this finding is that, absent any deliberate manipulation of the accounting reports, changes in the business profile as reflected in the accounting reports will be associated with changes in systematic risk. Specifically, the accounting measures of degrees of financial leverage, operating leverage, the relative cyclicality of the earnings and cash flows of the firm, and changes in the productivity of the firm appear to reflect the underlying economic concepts that affect market risk.

This study also found some evidence that the cyclicality of accounting flows relative to those of other firms in the general economy may have a more profound influence on market beta than either operating leverage or financial leverage. This finding suggests that management strategic decisions on the mix of assets and the resulting effect on the relative cyclicality of the accounting flows have the most impact on systematic market risk. It also suggests that firms with stable earnings and cash flows can afford higher financial and operating leverage than firms with highly volatile accounting flows. Furthermore, firms with stable accounting flows can probably afford higher financial and operating leverage with lower market-perceived risk than firms with little or no financial and operating leverage but highly volatile accounting earnings and cash flows.

These conclusions, however, must be tempered by some observations on two possible limitations of the study. These are (1) the assumption of linear relationships between the unlevered accounting flows and sales and between the unlevered and levered versions of the same flows; and (2) the possible influence of omitted variables and measurement errors on the results.

The assumption of linear relationships between sales and the levered and unlevered accounting flows was used by Mandelker and Rhee (1984) and was retained in this article to derive an operationally testable model. Since this assumption is unlikely to hold for many industries and over many time intervals, the results found may be dependent on the

sample of firms used and the time period covered. This suggests that the results may be unstable over different samples and time periods. This limitation, however, applies to most other studies in this area.

A second limitation is the possibility that the results obtained are driven by underlying economic variables whose relationship to the accounting variables used in this study is unstable. The instability may result from the effect of possible omitted variables or measurement errors in the data used. While this possiblity may be discounted because of prior evidence of the strong asociation between the accounting flows used in this study and market prices, replications of this study over different time intervals should provide evidence on the validity of the model developed in this study.

Acknowledgments

This article has benefited from comments prcvided by Bikki Jaggi, the editor and two anonymous reviewers of this journal. Any remaining shortcomings are the author's own. The study was made possible by summer funding provided by the accounting firm of Deloitte and Touche, for which the author is grateful.

Appendix I. Definition and Operational Measurement of Variables (on per share basis)

NIOP = Net Income Available to Common Equity

$[NI/(Q^* \times A)]_t$

$[20/(54 \times 27)]_t$

FFOP = Funds from Operations

$= [(NIOP + DEP)/(Q^* \times A)]_t$

$[(20 + 14)/(54 \times 27)]_t$

**WCOP = Working Capital From Operations

$= [(NI + DEP + DEFTAX)/(Q^* \times A)]_t$

$[(20 + 14 + 50)/(54 \times 27)]_t$

CFOP = Cash Flow From Operations

$= \{[NI + DEP + DEFTAX)_t - (CA - CASH - CL)_t$

$+ (CA - CASH - CL)_{t-1}]/(Q^* \times A)_t\}$

$= \{[(20 + 14 + 50)_t - (4 - 1 - 5)_t + (4 - 1 - 5)_{t-1}]/(54 \times 27)_t\}$

where

NI = Total earnings available to common equity

DEP = Depreciation and Amortization expense during the period.

DEFTAX = Deferred taxes (from income statement)

Q^* = Weighted-average number of shares outstanding during the period used by firm to determine the primary earnings per share;

A = Cumulative adjustment factor used by Compustat to equalize per share computations from different years;

CA = Current Assets

CL = Current Liabilities

Notes:

(1) Figures in parentheses are the Compustat DATA fields
**(2) Ismail and Kim (1989) labelled this Funds Flow (2).

Notes

1. Studies in the latter category typically did not offer complete models of the presumed theoretical relationship expressed purely in accounting terms. Lev (1974), for instance, showed a link between the firm's operating leverage and market beta, but the model was admittedly only a partial one. Brenner and Schmidt (1978) presented several models relating unit sales, fixed costs and other factors to market beta, but no overall model. A model by Gahlon and Gentry (1982) included accounting based measures of degrees of financial and operating leverage and the coefficient of variation of total revenue, a term whose implication for managerial action are not clear. Similarly, Mandelker and Rhee's (1984) model identified accounting-based measures of operating and financing leverage, but inlcuded an *intrinsic business risk* term which was undefined.
2. This approximate linear relationship is not an unreasonable assumption. Ohlson (1979) and Garman and Ohlson (1980), starting from more theoretically rigorous assumptions than those used by Beaver et al. (1970), concluded that such a relationship can be defended as a second order approximation.
3. The details of the model development have been omitted in the interest of brevity, but are available upon request from the author.
5. Equation (4b) follows from (4a) because the term $(\tilde{g}_t/\tilde{g}_x)$ can be shown to be nonstochastic and, therefore, can be factored out of the covariance operator.
6. The term *cyclicality* as used in this study refers to the behavior of the accounting flows over the course of a business cycle.
7. See Hanushek and Jackson ((1977), pp. 302-312) for alternative approaches to the unobserved variables problem.
8. Fama and McBeth (1973) have previously noted that ranking the observed market betas of a given period to construct the portfolios is likely to result in a serious bunching of positive and negative sampling errors since high (low) observed betas tend to be above (below) the corresponding *true* betas. Thus, a subsequent cross sectional regression using the portfolios is likely to result in an *error-in-variables* problem. To alleviate this problem, we used as the portfolio grouping criteria the market beta computed from the sample based

index while retaining the CRSP-based market beta as the dependent variable. The results were not affected by switching the process around and using the CRSP-based beta as the grouping criterion and the sample based index as the dependent variable in the cross sectional regressions.

9. Since differences in explanatory power of different regression models that are nonnested cannot be evaluated statistically if the variables are nonnested, the statistical significance of these differences are open to question. However, the differences do not seem to be of particular significance.
10. Although comparing the R-squares values from different studies may be a dubious proposition, it is interesting to compare the explanatory power achieved when the NIOP-based *DFL* and *DOL* are used as independent variables with the results in the fourth column of table 3. Restricting the independent variables only to *DOL* and *DFL* results in an adjusted R-squared value of 0.24 as compared to 0.680 reported in table 3. By way of comparison, it may be noted that the highest R-squared reported by Mandelker and Rhee (1984) was 0.48. Thus, the improvement in the explanatory power of this extension of the Mandelker and Rhee model is impressive by any standard.

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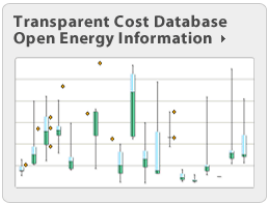
Simple Levelized Cost of Energy (LCOE) Calculator Documentation

This is a simple LCOE calculator (/analysis/tech-lcoe.html) to give a metric that allows the comparison of the combination of capital costs, O&M, performance and fuel costs. Note that this doesn't include nancing issues, discount issues, future replacement or degradation costs, etc. which would need to be included for a more complex analysis.



(https://openei.org/wiki/Transp

Financial Assumptions

Adjust the sliders to suitable values for book life in years and discount rate. The discount rate may be nominal or real. Using periods and discount rate we calculate a capital recovery factor (CRF) (http://en.wikipedia.org/wiki/Capital_recovery_factor). A capital recovery factor is the ratio of a constant annuity to the present value of receiving that annuity for a given length of time.

Using an interest rate i, the capital recovery factor is:

> CRF = {i(1 + i)^n} / {[(1 + i)^n]-1}

where n is the number of annuities received. This is related to the annuity formula, which gives the present value in terms of the annuity, the interest rate, and the number of annuities. If n = 1, the CRF reduces to 1 + i. As n goes to infinity, the CRF goes to i (Source: 1).

Cost and Performance

Adjust the sliders to suitable values for each of the cost and performance values.

Simple Levelized Cost of Energy Calculation

The simple levelized cost of energy (http://en.wikipedia.org/wiki/Levelized_cost_of_energy) is calculated using the following formula:

> sLCOE = {(overnight capital cost * capital recovery factor + fixed O&M cost)/(8760 * capacity factor)} + (fuel cost * heat rate) + variable O&M cost.

Where overnight capital cost is measured in dollars per installed kilowatt ($/kW), capital recovery factor is a fraction calculated as described above. Fixed Operation and Maintenance (O&M) costs in dollars per kilowatt-year ($/kW-yr) and variable O&M costs in dollars per kilowatt-hour ($/kWh).

In the denominator 8760 is the number of hours in a year and capacity factor is a fraction between 0 and 1 representing the portion of a year that the power plant is generating power.

Fuel cost is expressed in dollars per million british thermal units ($/MMBtu) and heat rate is measured in british thermal units per kilowatt-hour (Btu/kWh). Fuel cost is optional since some generating technologies like solar and wind do not have fuel costs.

Levelized Cost of Energy (LCOE, also called Levelized Energy Cost or LEC) is a cost of generating energy (usually electricity) for a particular system. It is an economic assessment of the cost of the energy-generating system including all the costs over its lifetime: initial investment, operations and maintenance, cost of fuel, cost of capital. A net present value calculation is performed and solved in such a way that for the value of the LCOE chosen, the project's net present value becomes zero (Source: 2, 3).

This means that the LCOE is the minimum price at which energy must be sold for an energy project to break even.

Typically LCOEs are calculated over 20 to 40 year lifetimes, and are given in the units of currency per kilowatt-hour, for example USD/kWh or EUR/kWh or per megawatt-hour.

When comparing LCOEs for alternative systems, it is important to define the boundaries of the 'system' and the costs that are included in it. For example, should transmissions lines and distribution systems be included in the cost? Should R&D, tax, and environmental impact studies be included? Should the costs of impacts on public health and environmental damage be included? Should the costs of government subsidies be included in the calculated LCOE?

Another key issue is the decision about the value of the discount rate i. The value that is chosen for i can often 'weight' the decision towards one option or another, so the basis for choosing the discount must clearly be carefully evaluated. The discount rate depends on the cost of capital, including the balance between debt-financing and equity-financing, and an assessment of the financial risk.

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Wind Energy Finance in the United States: Current Practice and Opportunities

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National Renewable Energy Laboratory

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Technical Report
NREL/TP-6A20-68227
August 2017

Contract No. DE-AC36-08GO28308

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Acknowledgments

This work was supported by the U.S. Department of Energy under Contract No. DE-AC36-08GO28308 with Alliance for Sustainable Energy, LLC, the Manager and Operator of the National Renewable Energy Laboratory. Funding for the work was provided by the DOE Office of Energy Efficiency and Renewable Energy, Wind and Water Power Technologies Office. We wish to thank the following individuals who reviewed and provided insightful feedback to earlier versions of this report: Audun Botterud, Argonne National Laboratory; Dave James and Christopher Schneider, CoBank; Matt McCabe, Clear Wind; and Lori Bird, Jaquelin Cochran, Jenny Heeter, and Eric Lantz, National Renewable Energy Laboratory. We would like to also thank Karin Haas and Kathryn Ruckman and for their editorial assistance.

List of Acronyms

A2e	Atmosphere to Electrons
DOE	Department of Energy
DSCR	debt service coverage ratio
FTR	financial transmission rate
GW	gigawatt
IRR	Internal Rate of Return
IRS	Internal Revenue Service
ITC	investment tax credit
kWh	kilowatt-hour
LCOE	levelized cost of energy
LLC	limited liability company
LLP	limited liability partnership
MACRS	modified accelerated cost recovery system
MW	megawatt
MWh	megawatt-hour
NREL	National Renewable Energy Laboratory
O&M	operations and maintenance
PPA	power purchase agreement
PRUF	performance, risk, uncertainty, and finance
PTC	production tax credit
PV	photovoltaic
RPS	renewable portfolio standard
SPV	special purpose vehicle
SAM	system advisor model
WACC	Weighted Average Cost of Capital

Executive Summary

In the United States, investment in wind energy has averaged nearly $13.6 billion annually since 2006 with more than $140 billion invested cumulatively over that period (BNEF 2017). This sizable investment activity demonstrates the persistent appeal of wind energy and its increasing role in the U.S electricity generation portfolio. Despite its steady investment levels over the last decade, some investors still consider wind energy as a specialized asset class. Limited familiarity with the asset class both limit the pool of potential investors and drive up costs for investors.

This publication provides an overview of the wind project development process, capital sources and financing structures commonly used, and traditional and emerging procurement methods. It also provides a high-level demonstration of how financing rates impact a project's all-in cost of energy. The goal of the publication is to provide a representative and wide-ranging resource for the wind development and financing processes.

Wind energy finance generally comprises three main sources of capital: sponsor equity, tax equity, and debt. The blend and proportion of each of these capital sources in a given project is referred to as the capital structure or capital stack. Each source is discussed briefly below:

- **Sponsor equity** in a project most closely resembles a traditional equity investor and often can be provided by the original developer of the project. The sponsor equity is typically the first investor to suffer losses and the last to receive distributions of profit. Because the sponsor commonly faces the highest risk in the partnership, it will often have the highest return requirements, but is typically a small portion of the overall capital stack.
- **Tax equity** will commit upfront capital to a project in exchange for access to tax credits and tax losses from accelerated depreciation. Because this type of investment requires significant capital and tax capacity for up to ten years, tax equity investors are often large financial entities such as banks and insurance funds. Tax equity investors have several other tax-oriented investment options outside of wind to consider including solar energy as well as affordable housing.
- **Debt capital** is a contractually-arranged loan that must be repaid by the borrower and occurs when the lender has no ownership shares in the company or venture. Debt is generally a lower-risk and lower-cost funding source relative to equity—particularly as compared to sponsor equity. Debt capital providers benefit from additional financing protections such as contractually-fixed payment schedules, preferred repayment positions, access to collateral, and rights to assume control of a defaulting company if necessary. Debt capital may be invested through a variety of different financial mechanisms including a construction loan, a direct loan to the sponsor or developer of the project, or, to a lesser extent, a loan to the project itself.

One of the key factors in wind finance is the mechanism by which electricity is sold. Traditionally, power purchase agreements (PPAs) have been used as a contract between energy generators (sellers) and energy "offtakers" (buyers). Offtakers generally include utilities and other load-serving entities; increasingly, however, corporate buyers and financial companies are also serving as offtakers. Wiser and Bolinger (2016) report that around 24% of cumulative installed wind projects have been constructed on a "merchant/quasi-merchant" basis in which they are financed and built with either a partial PPA or without a PPA entirely, instead selling

energy into the wholesale spot markets, typically with a pricing hedge contract. In these cases, investors may demand a higher return for the risks attendant to merchant projects, such as unforeseen shortfalls in revenue and resource risk (Wiser and Bolinger 2016). Recently, the various procurement strategies by which corporations have sought to supplement their electricity purchases with wind contracts have included offsite PPAs, virtual PPAs, and other mechanisms.

This report also provides a high-level illustrative example of how financing rates can modestly impact a project's overall cost of energy and, accordingly, its cost competitiveness with other investment alternatives. The financing rates of a wind project reflect the perceived risks by potential investors in a project. These risks can be categorized into three basic risk types. *General risks* can be attributed to macroeconomic forces and market-wide risks tolerances, which are illustrated in metrics such as benchmark interest rates. There are also *wind-industry-specific risks* derived from issues like regional market factors, national incentive structures, and industry-wide financing practices. Lastly, there are many *wind-project-specific risks* such as the turbine's performance history in the marketplace, the project developer's history of delivering projects on time and budget, the use of contractual elements to mitigate risks, and other subjective factors. All of these considerations contribute to both the ability of the developer to secure financing as well as the overall investment costs for a wind energy project.

Looking ahead, the near-term outlook for wind energy reported previously suggests a continued need for capital at levels consistent with deployment seen in 2015 and 2016 (Wiser and Bolinger 2016). The market has shown the capacity to finance projects using the current mechanisms at economically viable rates; however, increased deployment could require investment from new capital providers. Broad changes to the financial industry—such as the possibility of major corporate tax reform and, specifically, the role of the tax equity—could fundamentally reshape the predominant mechanism for wind energy investment. Financing will continue to have at least a modest impact on a project's overall economic competitiveness, and efforts to open up more capital sources and reduce financing costs will be one of a set of levers to improve the economic competitiveness of wind power and enable a larger expansion onto the power grid.

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1 Introduction

By the end of 2016, cumulative U.S. wind generation capacity stood at 82.2 gigawatts (GW), expanding by 8.7 GW from 2015 installations levels (AWEA 2017; Ray 2017). Wind energy added the most utility-scale electricity generation capacity to the U.S. grid in 2015 and the second most in 2016 (Lee and Darling 2016; Ray 2017). Project investment in wind in the United States has averaged $13.6 billion annually since 2006 with a cumulative investment total of $149 billion over this time period (BNEF 2017).[1]

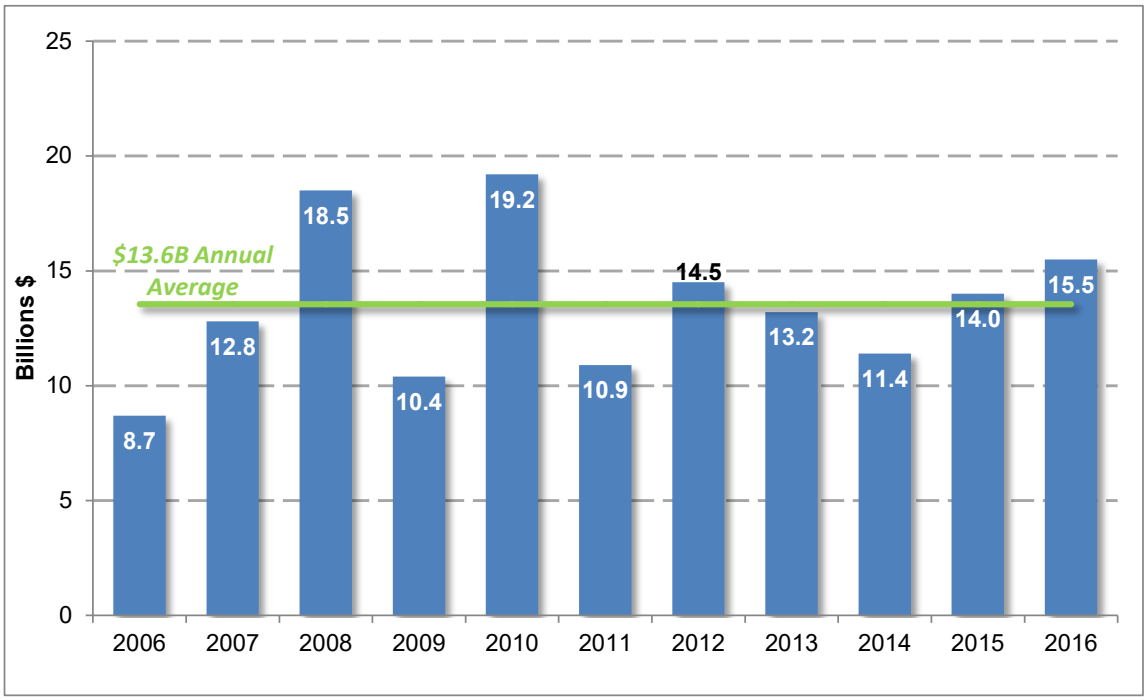

Figure 1. New U.S. investment in wind energy 2006-2016

Source: BNEF 2017

Despite its consistent investment levels over the last decade, some investors still consider wind energy as a specialized asset class. The level and depth of understanding and comfort with the technology, market, policies, and financing practices that underpin the deployment of wind energy naturally varies among financiers. Limited familiarity of the particular asset class can both limit the pool of potential investors and drive up costs for investors. And for a capital-intensive project such as a wind farm, where a 100-megawatt (MW) project can cost, on average, nearly $165 million (Wiser and Bolinger 2016), reducing the cost of capital even by just a half percentage point could result in measurable cost savings and improved competitiveness and ultimately enable greater penetration on the grid.

[1] As reported by BNEF (2017), all figures are in nominal dollars. BNEF 2017 investment estimates include public capital sources such as stock and bond markets, commercial capital from banks and insurance funds, research and development funds from corporations and governments, and other sources such as private equity or venture capital.

To this end, the National Renewable Energy Laboratory (NREL) is leading an effort called "Performance, Risk, Uncertainty, and Finance" or "PRUF" under the Atmosphere to Electrons (A2e) initiative sponsored by the U.S. Department of Energy (DOE). A2e is focused on risk mitigation, and PRUF in particular is focused on the mitigation of risk related to investment and financing of wind energy projects. Through activities such as PRUF and general industry maturation, a broad and widely understood assessment of wind energy project risk among developers, investors, and policymakers can help to expand the potential pool of industry investors and drive down the cost of capital for the wind industry. Reducing the cost of capital can lead to attendant—though modest—reductions in the levelized cost of energy (LCOE), which in turn contribute toward wind energy competitiveness in the marketplace (EERE 2017).

This publication provides an overview into the wind project development process, capital sources and financing structures commonly used, and traditional and emerging procurement methods. It also provides a high-level demonstration of how financing rates impact a project's all-in cost of energy. The goal of the publication is to provide a representative and wide-ranging resource for the wind development and financing processes. It is organized into five sections after this introduction:

- **Section 2** offers a general summary of the various risks during the development, construction, and operation phases of a wind project. Risk is a critical factor in the availability and cost at which project sponsors (owners) can access debt and equity capital as well as the rates offered.
- **Section 3** takes a chronological tour through the wind project development cycle, from screening and pre-development all the way through commissioning and project operation. It also indicates what kind of capital is typically invested at each stage.
- **Section 4** discusses three capital sources in greater depth: sponsor equity, tax equity, and debt. The subsection on tax equity also includes a brief overview of the federal tax benefits available to wind projects as of this writing. The section concludes with a discussion of the financial structuring designed to monetize these tax benefits.
- **Section 5** covers the various contractual instruments by which wind projects can earn revenue from the energy they generate with a focus on corporate purchasing.
- **Section 6** presents a high-level analysis to demonstrate the effect of variation in the cost of capital (through improved investor risk perception, robust due diligence, and other practices) on LCOE, which contributes to an energy project's competitiveness and feasibility in a particular market.

2 Risk and Uncertainty in Wind Projects

Commercial-scale wind projects are large, complex, and capital-intensive infrastructure assets. Like any other large-scale energy or infrastructure project, decisions to invest in wind projects are built on expectations about the future that are subject to some amount of uncertainty, including electricity price projections, changing market demand, technology and cost evolutions over time, and yearly weather patterns among other factors. The owners of these wind projects (referred to hereafter as "project sponsors") extensively study these uncertainties to develop a model that forecasts the project's financial performance and the returns it can pay to its investors.

In simple terms, risk is a measure of the uncertainty of future outcomes and their impact on a project. Risk is ubiquitous across financial investments, and investors can be made comfortable with accepting certain types of risk knowing that reduction mechanisms and remedies can be put into place. Higher risk generally offers the potential for a correspondingly higher return on investment. Any event that could have a negative impact on the investment is typically referred to as a "risk event" and largely consists of the scenario, the probability of occurrence, and the magnitude of impact.

One tool used to examine the effects of risks and uncertainty in a wind project's performance is through analysis with a pro forma financial model.[2] Each of the parameters underlying the pro forma financial model carries a degree of uncertainty that introduces an element of risk to the project. Project sponsors strive to identify sources of risk, quantify the potential impact of each risk, and develop strategies to minimize the potential of these risks to negatively impact project outcomes. As with all investments, some risk inevitably remains in wind energy despite best efforts to analyze and control for uncertainties.

Investors, industry analysts, and financial ratings agencies describe a few major areas of risk with land-based wind energy projects (Fitch 2016).[3] These perceived risks are summarized at high level below.

- **Project Development Risk**. This risk reflects the uncertainty of a project reaching commercial operations and the point at which it generates electricity and therefore revenue. A project developer will likely pursue the development of multiple potential projects at a time and could choose to pause or permanently halt the development activities of any one project for any number of reasons. Site control difficulties, lack of transmission access, wind resource uncertainty, and unfavorable market dynamics are among the more commonly reported issues. In general, the time and cost spent developing a wind project is considered entirely at risk because an unsuccessfully developed project has only a minimal asset value, and limited or no revenue potential.[4]

[2] The term *pro forma* is Latin for "for the sake of form" (Investopedia 2016). A pro forma financial estimate is defined as "assumed, forecasted, or informal information presented in advance of the actual or formal information" (Business Dictionary 2017).
[3] For a more comprehensive listing, the investment rating agency Fitch provides a thorough analysis in "Rating Criteria of Onshore Wind Farms Debt Instruments" (Fitch 2016). The Fitch report summarizes risk for only one type of investors—a lender—though it is broadly applicable to other types of investors (e.g., tax equity) as well.
[4] The possible exception here is where a project development company may transfer a partially-developed project to another developer.

- **Construction Risk**. Fitch (2016) classifies the construction risk of wind projects as "low in complexity" based on the industry's extensive history constructing land-based projects. The construction of a project is generally viewed as an acceptable risk after turbine pricing has been secured, and the construction is likely completed with a fixed-price contract with built-in protections for the investors. Fitch does note, however, that delays in the supply chain can have a material impact on the ability of the project to generate revenue. Delays and over-runs can be contractually mitigated through guarantees, funds set aside for contingencies, and punitive payments.
- **Regulatory Risk**. This is the risk arising from the inability to predict with complete certainty if regulatory schemes supporting wind energy development will be available for the term described at the onset of the project. For example, the use of tax incentives that are recovered over a period of 10 years and green energy attributes that also may have multi-year contracts both provide a revenue source to the project, but are only valuable if they are considered secure by the investor in the project.
- **Market or Selling Price Risk**. This risk encompasses the extent to which the project's source of revenue is subject to an unknown selling price (e.g., if the plant is "merchant" and relies on revenues from selling into an electricity market with variable pricing rather than a fixed-price PPA contract). All else being equal, a project that has a guaranteed price for its energy over its entire lifetime has less uncertainty and therefore less perceived risk compared to a project with some market price exposure. Of course, while guaranteed power prices protect project investors from the downside of market exposure, they also prevent the investor from benefitting from the potential upside of increasing market prices above the locked-in rate. Another component of the selling price risk involves the ability of the electricity purchaser to pay for the energy as contractually obligated.
- **Pre-Construction Energy Estimate Risk.** This is the risk associated with the forecast accuracy of the amount of energy a wind project is expected to generate annually and over its lifetime. Expected production is a critical input to a financial model, as it will significantly factor into determining investment viability, sizing, and profitability. It is also the key focus area of PRUF's 2016 energy estimate primer (Clifton et al. 2016). Fitch's rating criteria for wind projects notes that the ratings agency will typically reduce any pre-construction energy estimate by up to 10% based on a number of project-specific factors (Fitch 2016).
- **Technology and Energy Production Risk.** This risk category includes several different components that all manifest as reduced energy production in a given year, and consequently diminished electricity sales volume and revenue. There are many factors that contribute to production risk that can be either temporary or permanent in nature. Some of these factors include weather anomalies, technology reliability, project availability, curtailment, and unexpected operations and maintenance (O&M) events. Availability generally refers to the ability of the operator to keep the wind project working and producing electricity. Curtailment can refer to the situation where a project is technically capable of delivering power to the grid but fails to do so for either bulk

electric system reliability issues or economic reasons.[5] Similarly, O&M risk typically refers to the track record of the entity responsible for running the wind plant to service turbines in a timely manner and according to budgeted forecasts.

[5] System reliability curtailment typically refers to a situation in which a generating asset must curtail its power to protect the safety of the grid system. Economic curtailment typically refers to a situation in which the price of electricity bid into the wholesale market is not accepted. The renewable energy asset owner typically bears the risk of system reliability and emergency curtailment; however, it is up to the contract to determine whether the project owner or electricity purchaser bears the risk of economic curtailment.

3 Wind Energy Project Lifecycle

Wind project development contains multiple phases, each with its own unique set of tasks, risks, capital sources, and potential obstacles to overcome. Collectively these phases represent the lifecycle of a wind energy project, and while there is no standard definition or sequencing of the project development phases, most approaches envision a comprehensive set of actions that can be carried out in parallel or in some instances in a stage-gate manner.

During the development process, a central coordinating party (the developer or sponsor) ushers the project through a series of activities that addresses all the requirements for reducing risks and uncertainties, completing milestones, and advancing a project from conceptual to concrete. Development activities are directed to demonstrating and assembling the key criteria of a successful wind project, which include but are not limited to the following:

- Verified resource (feasible wind characteristics)
- Controlled location (a permitted site)
- Market for product (demand for energy and other grid services)
- Path to market (transmission access).

The remainder of this section briefly describes the major phases of project development**.**

3.1 Screening

The initial phase of a project is providing a first-order assessment of its overall feasibility within the larger energy market. Typically, a developer will first evaluate the suitability of the site through a virtual screening, followed by a more robust, dedicated wind study. For a virtual assessment, regional wind profiles allow for a quick desktop-based screening to determine estimated winds based on the local characteristics rather than the specific site.

During the initial screening, a project developer will also conduct a “fatal flaw analysis” that gauges the critical aspects across a number of different potential sites and tries to identify all mission critical barriers to development. This step is undertaken very early in the development process so as to avoid investing too much time and capital in a project that ultimately may prove unfeasible. Some common issues that developers may consider a fatal flaw include:

- Poor wind resource
- Lack of transmission access
- Limited site access
- No electricity purchaser
- Insufficient local support and buy-in
- Environmental sensitivities
- Historical or cultural sensitivities
- Permitting complications.

Investment required at this initial screening phase is relatively small and typically sourced from the developer's own funds. Outside investment is not typical at this early stage due to the high-risk nature of the activity and the uncertainty of any one project becoming fully developed and commercially operational (Springer 2013).[6] Sources of funding at this stage for a small developer may be personal funds from the principals in the development company, landowner(s), friends and family, or other willing early-stage investors. Larger developers will usually fund scouting and initial prospecting using capital available on their own balance sheet. They may also purchase promising projects from smaller developers who have conducted initial screens.

3.2 Pre-Development

If the initial screening of a site indicates a promising resource and has no apparent fatal flaws, then the developer may elect to continue with early stage development activities. At this stage, a more credible assessment of the wind resource will be conducted, requiring an onsite, structured wind-measurement program be implemented. In many cases, multiple meteorological towers will be deployed temporarily across the site to further assess the wind speed, direction, duration, and turbulence. A 12-month (or more) data collection period with a high level of data quality assurance will provide input to a power production model that will be used later for construction financing (Vestas, n.d.). Robustness of the wind data varies across developers and projects, although, generally, the more detailed and specific the data, the higher the likelihood that the developer will secure funding for construction. The quality of the meteorological monitoring program will contribute to both the availability and the cost of capital.

Another crucial aspect of the development activity is to ensure sufficient access to and certain control over the project site (Taylor and Parsons 2008). Even the best wind data is of little value without also having sufficient control over the potential site. Though the developer will typically treat the wind data as highly confidential, the developer will also need to forge relationships early with potential wind turbine hosts on the site.[7] Site control can be contracted through various mechanisms including a land lease or outright purchase. The developer will typically seek site control for an extended period to accommodate the timeline of the development and operations processes.

During the initial development phase, the developer may also have preliminary discussions with county commissioners, local government agencies, community leaders, and other key stakeholders to begin to secure the permits necessary for construction of the project. Presenting the local authority having jurisdiction with the meteorological monitoring program findings may give the commissioners an opportunity to identify whether they will likely object to all or a portion of an eventual wind farm located at the site.

At the early development stage, the developer will also prepare an economic assessment for converting the wind resource into marketable electricity at the chosen site. A simplified pro forma financial model using typical assumptions for technology, reliability, availability, degradation, transmission losses, revenue, expenses, incentives, and other inputs will indicate

[6] Risk at various levels from prospecting through development is not easily quantified without understanding success rates for the pool of wind energy developers, and developers are often hesitant to publicize such detail (Taylor and Parsons 2008). Therefore, characterization of development risk herein is illustrative.
[7] The "site" could entail multiple landowners and multiple counties.

whether a wind project at the site will deliver a satisfactory return on investment. Such a model can also help forecast whether the project will produce power at an economically attractive price. A business case is likely developed with updates as more details come to light and conditions and assumptions change, demonstrating whether or not the project appears to be economically feasible (Springer 2013).

3.3 Development

As a conceptual project begins to show more promise and risks are mitigated, development activity in the project will typically accelerate. Preliminary design and site engineering work can begin with a basic layout of the project on the site. At this stage, a utility PPA or comparable instrument will be pursued. The turbine vendor will be selected and a turbine supply agreement will be considered. The impact on the local electrical grid will also be studied through system impact and interconnection studies to help determine if any upgrades may be necessary for the wind farm to connect to the grid and the market served (Burns & McDonnell 2009). A construction contractor or multiple contractors may also be preliminarily screened and qualified.

At this stage the likelihood of the project reaching completion will have increased as will the level of investment in the project. Larger developers will usually continue to fund such development with their own internal capital, while smaller developers may look for additional support through partnerships with external funding sources, a sale of development rights, and other approaches.

As the end of the development stage approaches and construction of the wind farm appears to be reasonably likely, the projected future revenue of the project will be heavily scrutinized to secure outside commercial financing. The various agreements in the development stage, however, are typically pliable so they can be modified if necessary. The investor will typically provide term sheets that outline the specifics of the investment to ensure that the parties agree to the basic parameters before advancing to the more costly final negotiations. Outside advisors such as independent engineers and tax consultants will also be engaged to help investors understand project risks from an objective perspective (Fitch 2016).

At the end of the development stage, construction is ready to begin, pending the finalized decision(s) for investment and the financial close (the point at which the financial documents are signed and capital begins flowing to the project from the investors).

3.4 Construction

A wind farm will begin construction when the developers give the Notice to Proceed to the contractor(s). At this stage, the project has secured the necessary financing and development risk has shifted to construction-oriented risks, including unforeseen construction barriers, cost and timeline overruns, and others. Because of the large number of wind projects successfully completed, construction of land-based wind farms is generally well-understood by construction contractors, insurance providers, and equipment vendors among others (Fitch 2016).

Activities during the construction phase include the procurement of materials; the physical building of the wind farm; management of construction site, personnel, and process; reporting to investors; and community relations. The elements of the physical construction process generally

include construction of support roads; concrete pumping for the turbine pad; turbine delivery; setting the tower section; lifting the nacelle; assembling the rotor; lifting and attaching the rotor; installation of a collection system of wiring to electrically connect to a substation; and construction of an O&M support building (We Energies, n.d.).

In a typical construction financing scenario, the project sponsor will be expected to contribute significant capital to the project, colloquially referred to as "skin in the game." This contribution ensures that priorities between the different parties during construction are aligned. The remainder of the investment is typically a loan from a commercial bank (aptly called a "construction loan"). In many cases the construction lender will also provide longer-term financing for the project. This commonly happens through a conversion, where the construction loan is refinanced by the same lender as a term loan, with a different interest rate, maturity, and term sheet.

During the construction phase but before the wind farm is fully completed, the project sponsor may be able to bring certain turbines online to deliver test electricity to the grid for sale. The revenue received on such electricity sales before the commercial operation date of the wind farm may be sold at separate prices from the power delivered after the project is fully operational and may be contributed as sponsor equity.

3.5 Operations

Operation of the wind farm generally commences once a substantial amount of construction has been completed. "Substantial completion" generally means that each wind turbine has been commissioned and certified, electricity will be delivered to the grid, and there is coordination with the grid operator and utility or power purchaser.[8]

During the first year of the wind farm operation, the operator (the developer/sponsor or a contracted third-party operations manager) will typically ensure that any challenges—from hardware (e.g., blades, gearboxes, etc.) to software (e.g., turbine electronics, wind farm controls)—are tracked and remedied. This is sometimes referred to as "teething." These actions can reduce the availability of the wind project and diminish the amount of energy produced by the system operating in its initial phase compared to pre-construction estimates (Fitch 2016). By the second year of operation, the wind farm is generally expected to be producing and selling electricity at a level consistent with the forecast presented in the wind plant's pro forma financial model. The level at which operational wind projects have been producing energy compared to their earlier performance forecasts, however, varies (Fitch 2014; NAW 2014; Bailey 2016).

The plant operator may be contracted to carry out both routine O&M activities as well as major maintenance measures, although the original turbine supplier may also be involved for some technically complex activities. Major maintenance is generally pre-funded through reserve accounts, which are set up during the project's financial close. As the major maintenance reserve is drawn upon to repair failures, it is usually replenished from the project's cash flow. After a few years of successful operation consistent with the original business plan, risk is generally considered to be at its lowest in the project's operating lifecycle.

[8] See IRS 2013 for guidance on placed in service conditions (IRS 2013).

3.6 End of Life

As the wind farm approaches the end of its original estimated useful life, the equipment may be decommissioned, overhauled, or repowered. These activities will depend on land lease provisions, PPAs, and the economics of different decision pathways. Typically, wind energy contracts will provide a financial mechanism such as posting a performance bond or requiring a reserve account be set aside to fund the cost of the end of life activities to restore the site to a pre-agreed-upon condition.

4 Capital Sources

Generally, wind project financing is composed of three main sources of capital: equity—including sponsor equity and tax equity, and debt. The blend and proportion of each of these capital sources in a given project is referred to as the capital structure or capital stack. At a basic level, most wind project capital structures will include a sponsor equity partner (commonly a developer), a debt provider, and many projects will use a third party tax equity partner that provides upfront capital in exchange for the tax benefits of the project.

Subsections 4.1–4.3 provide focused discussions on each of the primary capital sources, while Section 4.4 summarizes how these sources combine to form capital structures.

4.1 Equity Capital

Equity generally refers to an ownership share of an asset, which can take the form of a security (e.g., stock or share) or a direct investment in a company. Equity investors typically stand to lose some or all of their investment depending on whether the company or project is successful. Conversely, equity capital also stands to gain beyond original expectations if the company or project outperforms forecasts or if the project is sold to another party.

There are multiple ways in which an equity partner can invest in the construction and/or long-term ownership of a wind project. This report looks at the two most common forms: tax equity and sponsor equity. Before jumping into these equity options, a basic overview of the federal tax incentives available to wind technologies is warranted.

4.1.1 U.S. Federal Tax Incentives

The United States Federal Government incentivizes renewable energy projects principally through the tax code. As of this writing, wind technologies are eligible to receive either the production tax credit (PTC) or the investment tax credit (ITC) (one or the other, but not both) as well as accelerated depreciation tax offsets through the Modified Accelerated Cost Recovery System (MACRS). The tax credit incentives (the PTC and ITC) provide an after-tax credit on tax liabilities (i.e., the taxes paid) and thus are often described as dollar-for-dollar tax incentives. Accelerated depreciation, by contrast, provides a reduction in taxable income against which the tax rate is subsequently applied, and so is described as a before-tax incentive. As of this writing the PTC is currently worth $0.024 for every kWh generated over a 10-year period[9] while the ITC is structured as a one-time credit valued at 30% of eligible system costs (Novogradac 2016). For projects to claim the aforementioned full PTC or ITC values, however, the project is required to have begun construction prior to December 31, 2016.[10] Projects that begin construction in 2017 through 2019 are available for a reduced-value PTC or ITC, shown in Table 1.

Depending on the performance of the project, the net present value of the full $0.024 value of the PTC combined with the accelerated depreciation benefits have historically provided in excess of 50% of the project's initial capital costs in tax savings (Bolinger 2014).[11] The rules governing

[9] Periodically adjusted for inflation.
[10] Qualifying criteria for begun construction clarified in IRS 2016 and IRS 2017a.
[11] A diminished value of the PTC or ITC would reduce this estimate somewhat. Note that only the PTC or ITC is reduced in value while, as of this writing, the MACRS schedule is a permanent part of the tax code.

the eligibility, receipt, and other aspects of the tax credits are codified in the Internal Revenue Code, specifically Section 45 for the PTC and Section 48 for the ITC. The rules related to the accelerated depreciation of property for tax purposes are found in several places, including Section 168, Section 48, and Internal Revenue Service (IRS) Publication 946 (IRS 2017b).[12] In addition to the five-year MACRS schedule, qualifying renewable energy projects have the option to depreciate 50% of an investment operation under a so-called "bonus" depreciation scheme.[13] See Figure 2 for an illustrative example of how PTC and 5-year MACRS are received over the life of a typical wind project (Bolinger 2014).

Table 1. Tax Credits and Accelerated Depreciation

		PTC	ITC	
	Year	Value	Value	Accelerated Depreciation
Value/Basis	2016	100% PTC (2.4¢/kWh)	30%	Depreciation of *qualifying* project costs according to specified annual schedule. For wind, 100% of qualifying costs (and ~92%–98% of total project costs) can be depreciated in the first six years of commercial operation. The principal section of the U.S. Internal Revenue Code that deals with depreciation is Section 168.
	2017	80% PTC (1.8¢/kWh)	24%	
	2018	60% PTC (1.4¢/kWh)	18%	
	2019	40% PTC (0.9¢/kWh)	12%	
Expiration/Step-Down	Wind projects must be deemed to have begun construction by each year to qualify for credit value. Credit value steps down from 2017–2019 and expires completely on December 31, 2019. Qualifying criteria for "begun" construction clarified in IRS 2016 and IRS 2017a.			**5-year MACRS:** No expiration **Bonus Depreciation:** 50% depreciation allowed in year 1 of project operation until December 31, 2017; 40% until December 31, 2018; and 30% until December 31, 2019.

Source: Updated from Lowder et al. 2015 and Novogradac 2016

[12] Section 168 defines accelerated depreciation broadly, and Section 48 contains the provision for an investment tax credit for several renewable energy technologies. Publication 946 contains MACRS schedules, including the 5-year MACRS for eligible renewable energy technologies (IRS 2017b). Note that election of the ITC also requires a reduction in the eligible cost basis for MACRS equal to one-half the value of the tax credit (e.g. 15% for the 30% ITC and so forth).

[13] Bonus depreciation can generate sizable tax losses in the first year of the project and thus requires an entity with a significant tax liability to make efficient use of it. Moreover, high tax losses will decrease the tax equity partner's capital account, which can introduce complications and risks into the financial structure of the project. For this reason, tax equity investors may forgo the use of bonus depreciation in wind deals (Burton 2016).

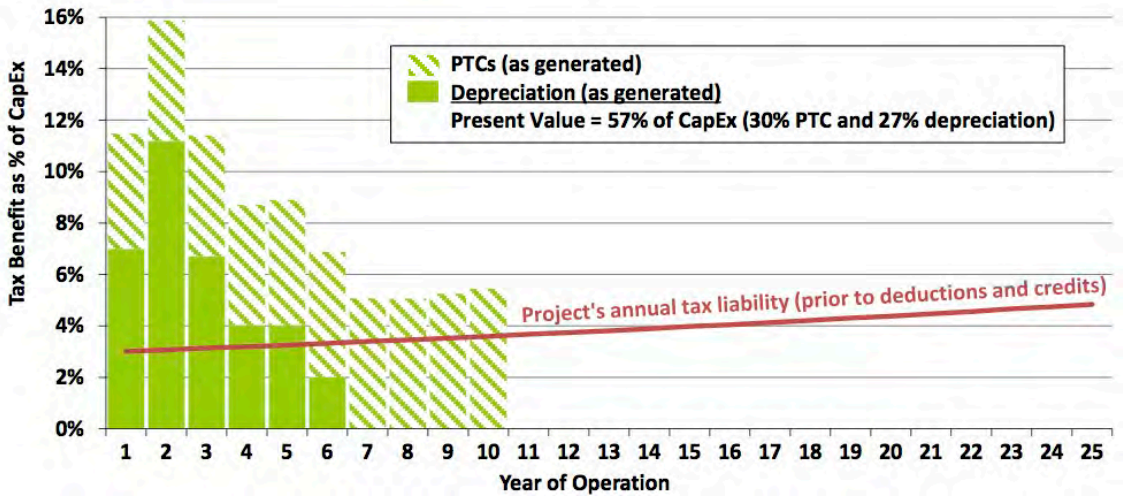

Figure 2. Timing of the federal tax benefits generated by a wind project[14]

Source: Bolinger 2014

4.2 Tax Equity

To make the most efficient use of the tax benefits—the PTC or ITC coupled with MACRS—a taxable entity must apply them to taxable income (depreciation) and tax liability (credits) in the year in which the benefits were generated. However, many sponsors or developers in the wind industry do not have enough tax capacity to do so and would otherwise have to carry the benefits forward (thus depleting their present value due to the time value of money) if it were not for the ability of outside investors to "monetize" them. These investors, known as tax equity investors, will commit capital to a project in exchange for access to the PTC or ITC and accelerated depreciation, thus providing the project with a sizable portion of its capital needs (typically 30%–50% of the total). Because this type of investment requires significant capital and tax liabilities, tax equity investors are often large financial entities such as banks and insurance funds. Several multinational corporations are also active in the tax equity market.

To access the tax benefits, investors must demonstrate ownership of the project assets for tax purposes (a determination made by the IRS). In wind projects, this ownership usually comes in the form of a partnership with the developer (unless the project is owned by a single entity that can wholly use the tax incentives themselves). The partnership is structured as a special purpose vehicle (SPV)—either a limited liability partnership (LLP) or limited liability company (LLC)—into which each of the partners (developer and tax equity) makes a capital contribution. Each partner is allocated a certain share of the project value streams—namely income (cash) and tax benefits (deductions and credits)—which change over the life of the partnership.[15]

[14] CapEx refers to the capital expenditures of a wind project.

[15] Renewable energy projects that utilize the investment tax credit (Section 48) can execute one of three tax equity financial structures: partnership flip, sale leaseback, and inverted lease/lease pass-through. However, projects that utilize the PTC are not permitted to execute lease structures as per the "owner/operator" requirement in Section 45. For this reason, the partnership flip is the dominant financial structure to monetize tax equity for wind projects.

Two criticisms of utilizing outside tax equity investments are frequently reported. First, there are relatively few active tax equity partners in the market in any given year.[16] Because the demand for this type of capital often outpaces the available supply, the tax equity investors may require a higher return than a comparable debt product, ranging generally from 7%–10% based on the particulars of the investment and the overall supply of market tax equity (Shurey 2016; Shanahan, Wisniewski, and Andiorio 2017).

The second criticism to tax equity financing is also a function of the complicated structuring. Setting up a deal entails high transaction costs—e.g., fees associated with legal services, tax opinions, consultants, financial structuring, and other services (Feldman, Lowder, and Schwabe 2016). Such transactional costs reduce the nominal value of the tax incentives and can also drive deal flow to larger project sizes (which keep the more-or-less fixed transaction costs low relative to deal size). This can have the effect of limiting the competitiveness in the wind development market place, as smaller developers may not be able to access financing as readily as larger players.

4.3 Sponsor Equity

The sponsor equity ("sponsor") in a project most closely resembles a traditional equity investor and often can be the original developer of the project. The sponsor equity is typically the ultimate financial backstop in the project, and also the last entity to receive payment in the distribution of income in the project. Because the sponsor commonly faces the highest risk in the partnership, it will often also have the highest return requirements. However, because the sponsor equity is typically either back-levered (discussed later) or is only a marginal portion of the capital stack, this highest cost equity may exert only a limited impact on the project's weighted average cost of capital (WACC)—the combined cost of capital from all the sources in the project's capital stack).

If the sponsor is also the developer, it is responsible for bringing the project from initial concept through the extensive development phase all the way to construction and commercial operations.[17] In many cases, the sponsor may ultimately manage the long-run functioning of the project, providing O&M services, fulfilling the obligations of the PPA (if there is one), or managing the dispatch of electricity into wholesale markets. In some cases, the sponsor can also be a relatively passive or non-active owner in the project and contract out the day-to-day O&M of the project. The sponsor may also receive some of the project's income distributions as well as a "development fee" that it collects upon commercial operation of the project (Bolinger 2014). This fee varies, but some report ranges from 8%–15% of the project capital costs, which can be paid from a portion of the tax equity's initial investment in the partnership, from any leftover construction debt, or from a portion of the term debt disbursal (Martin 2011; Feldman, Lowder, and Schwabe 2016). Sponsor equity largely receives its returns on a primarily cash basis rather than through distribution of the tax benefits.

[16] One of the reasons that the pool of tax equity investors is limited (which in turn can drive tax equity yields higher for the limited supply relative to demand) is the passive activity loss and at-risk rules in the U.S. Internal Revenue Code. Both rules effectively prevent certain entities from accessing the full value of the tax benefits available to investors in renewable energy projects (Eliason 2012).

[17] In some cases, more than one developer can be involved in the process of conceptualization, project development, construction, and ultimate ownership of the project. This will happen when one developer sells a project to another at the outset of any one of these phases.

The sponsor can raise funds for project development and investment via several sources, including their own balance sheet; funding from customers and suppliers; outside private investors; and others. More recently, companies have looked to the public capital markets, employing vehicles such as yieldcos once projects were fully developed (see textbox below) to raise equity funds at a lower cost than other sources. Additionally, a more mature company may "go public" and issue stock in the public markets and the proceeds can be used to fund development work.

Financing in the Capital Markets: Yieldcos

Capital markets are the transactional marketplace into which businesses, governments, individuals, and other entities sell debt and equity instruments to investors, and investors sell such instruments to one another. The most common instruments sold in the capital markets are bonds (debt) and stocks (equity) (Goldman Sachs 2014). In the last several years, renewable energy developers have turned their attention to the capital markets as a source of low-cost finance that could help to reduce project LCOE. Two means by which developers have accomplished this are through yieldcos and asset-backed securities (see textbox below for a discussion of securitization and asset-backed securities).

A yieldco is a corporate entity (a limited liability corporation, limited liability partnership, or joint venture) that aggregates a portfolio of energy assets for which ownership shares—i.e., stocks—are sold. Yieldcos are commonly subsidiaries of larger parent developers that hold and generate additional value from operating assets. As such, yieldcos often get a right-of-first-offer for projects developed by their parent companies, and this in turn can give the parent a captive means to sell completed projects and redeploy capital. Yieldcos also purchase operating projects and pipelines from other developers to grow their asset-base (Lowder et al. 2015).

Yieldcos allow project developers to potentially access lower-cost equity capital, and to source capital for growth that might otherwise be difficult to come by (either through corporate bonds, stock issuance, or other means). The principal benefit of a yieldco for investors include: limited taxation (accelerated depreciation benefits can allow yieldcos to eliminate corporate-level tax for a number of years); long-term predictable cash flows; and, until recently, the promise of dividend growth. This last benefit became difficult to achieve as yieldco sponsors found the practice of continually expanding their asset bases to be difficult to sustain. This and other factors have led to a dormancy in yieldco markets that has largely persisted since late 2015. Some of the more stable yieldcos have been able to raise some equity since that time, though others have not (owing, in some cases to financial difficulties at the corporate parent) (Lowder et al. 2015).

4.4 Debt

Debt is a contractually-arranged loan that must be repaid by the borrower and in which the lender has no ownership shares in the company or venture. Debt is generally considered a lower-risk investment and therefore a lower-cost funding source relative to equity, though in the case of tax

equity financing risk may be considered comparable between the two (Shurey 2016; Shanahan, Wisniewski, and Andiorio 2017). Outside of this unique case, the reduced risk profile of a debt investment derives from several structural features, including but not limited to the following:

- Lenders are typically less exposed to the downside of project performance (i.e., if a project does not generate as much electricity in a year as was forecasted), but correspondingly do not enjoy the upside if the project outperforms forecasts. Moreover, once the loan is paid off, there are no remaining financial obligations from the borrower to the debt providers.
- Debt can be—though not always with tax equity involved— a "senior" investment, meaning that debt investors are typically repaid before other investors in the capital stack (i.e., most notably sponsor equity). This means that shortfalls in project revenues from underperformance, equipment failures, force majeure events, or others could cut payments to the equity holders to allow for the full and timely repayment of the loan. In some cases, however, tax equity providers may actually have repayment seniority over debt due to the relative scarcity of tax equity compared to debt (Chadbourne & Parke 2017; Feldman, Lowder, and Schwabe 2016).
- Lenders often have financial protections such as collateral to their investment (e.g., the project assets or partnership interests) or rights to "step-in" and take over control of the company if necessary. These are often expressed in the debt "covenants"—agreements between the lender and the borrower executed before the disbursement of the loan.

The three main forms of debt in the wind market are short-duration construction debt, longer-duration term debt, and back-leverage. Each of these financing products is described in more detail below.

4.4.1 Construction Debt

As the name implies, construction debt is used primarily to fund the engineering, design, equipment procurement, and construction of the wind project. Construction debt is typically characterized by lower-cost, shorter-tenor debt compared to the long-term debt that funds the operation of the project. Construction debt reflects the inherent risk of the project's construction processes and the associated likelihood of experiencing events that can negatively impact the ability of the project to recover its costs (Groobey et al. 2010). Examples of these risks include the project exceeding its budgeted cost or missing construction milestones, which delays the ability of the project to generate revenue. Moreover, the lender is providing construction capital against a project that is not yet generating revenue, thus the pricing is also influenced by the longer-term characteristic and credit quality of the project and its sponsor. The tenor of the construction debt (i.e., length) of the construction loan may match the construction period until the project is considered to be commercially operational.

A distinguishing feature of construction debt is the ability to access the debt financing as it is needed rather than entirely upfront (referred to as a construction drawdown schedule). For the lender this pre-negotiated scheduled helps to mitigate their lending risk by limiting the amount of capital going to the project until specific milestones have been met and excess funds are not used improperly for other purposes. For borrowers, the construction drawdown schedule allows them

to reduce the amount of time for which that debt is outstanding and typically reduces the amount of overall interest costs paid.

The availability and pricing of construction debt will also vary depending on the type of construction strategy employed. For example, projects that employ a single designated party to engineer, procure, and construct the wind facility tend to be viewed as less risky than a multi-party strategy that may separate and allocate these tasks to more than one entity.

4.4.2 Term Debt

Term debt is the loan (or portfolio of loans) that refinances the construction loan at a longer maturity (construction loans typically last only a couple years while term debt loans extend to 7+ years). The interest rate on a term debt reflects the longer tenor of the term loan compared to the construction loan, as well as the risk profile of an operating asset. In some cases, capital from the term loan can be used to "take out" or, more simply, replace a portion of the sponsor equity's stake in a project, which will reduce project WACC and therefore LCOE. Accordingly, term loans are sometimes referred to as "takeout financing." Term debt can come from several sources, including commercial banks, syndicates (a group of banks operating in agreement with one another), private equity funds, insurance and pension funds, equipment manufacturers (vendor financing), and governments (in the form of concessional loans, export credit financing, and other mechanisms). Term debt can sit at either the project level or at the sponsor level, though recent trends in tax-based wind finance structures most commonly utilize debt at the sponsor level, which is described in the section on "Back-Leverage" (Chadbourne & Parke 2017).

In the current market, much of the term debt extended to wind projects is structured as "mini-perms." Mini-perms are long-term debt products (where the principal and interest are amortized over a period near the length of the contracted revenue period such as a 20-year PPA), but have shorter-dated maturities (typically 5–7 years). Due to this structuring, mini-perms will have a large balloon payment that is due when the maturity is up. This balloon payment is typically refinanced by another mini-perm loan with another principal and interest amortization schedule that extends beyond the loan's maturity (Feldman, Lowder, and Schwabe 2016).

For example, a lender might offer an 18-year loan to a wind project with a slightly longer 20-year PPA (to avoid the final contracted years of the asset), but will require that, in year 7 of project operation, all available revenue coming into the project be "swept" up to repay the entire amount of the debt service. In order to prevent this, the project sponsor will refinance the original mini-perm for another 7 years, although the principal and interest payments will continue to amortize as if the loan term were longer than 7 years.

Debt Service Coverage Ratio (DSCR)

When deciding the appropriate amount to lend to a renewable energy project, term lenders will often look at the expected production of the project in the form of exceedance probabilities. The lender will evaluate a set of probability scenarios where energy production would exceed forecasts in any given year (Fitch 2016). Typically, they will look at a 50%, 90%, and 99% exceedance probability scenario (denoted as P50, P90, and P99, respectively).

Exceedance probabilities will also determine the debt service coverage ratio (DSCR), which is the measure of a project's cash flow to its debt obligations. A DSCR of 1.25 means that the project is anticipated to generate 25% more cash flow available for debt service (revenue less operating expenses) in a period than is required for debt service. Lenders will often require certain DSCRs at certain exceedance probabilities to afford themselves sufficient cushion in case energy production and therefore the cash flow falls below a specified amount in a certain timeframe or expenses are higher than anticipated.

4.4.3 Back-Leverage

When it sits at the project level, term debt can obstruct cash flows to the equity partners, impose complications in daily operations through the various covenants, and present a risk to the tax equity investor's ability to receive its anticipated economic returns. For these reasons and others, tax equity may be unwilling to lend to a project with project-level debt or may demand a higher return on its investment than it would for a project without debt at the project level. Accordingly, sponsors in the project have adopted the practice of "back leveraging" their loans. In a back-leveraged debt arrangement, the tax equity and the sponsor equity form a partnership company that owns the project through different class ownership shares. The sponsor equity will typically own more junior Class B shares, while tax equity will own more senior Class A shares. The sponsor equity will pledge its ownership interests in the project company as collateral, and a lender will issue debt to the sponsor directly instead of to the project company. This removes the debt from the project company level and the loan is repaid by the cash flows allocated to Class B shares as defined in the partnership company agreement. In this scenario, the cost of back-leveraged debt is based on the overall credit of the sponsor rather than the wind project itself. If there is a default, the financiers (lender or tax equity) may exercise the right to step in and take on the managing interests that were previously afforded to the sponsor.

At current interest rates and terms, back-leveraged debt is typically priced slightly higher than project-level debt, as it can represent a riskier loan than term debt from the perspective of the lender, particularly because tax equity may have preferred repayment rights. Developers, however, will often back-leverage their debt on a project in order to attract the limited tax equity funding. Back-leverage lenders tend to be a more limited group than term-debt lenders, consisting largely of commercial banks (though some private equity players have reportedly issued loans in the back-leverage market).

Financing in the Capital Markets: Securitization

Securitization is the process by which financial assets (e.g., contracts such as leases and loans that stipulate cash transfers between parties) are pooled and processed into financial vehicles (securities), which are then sold to investors. These securities represent claims to the cash flows in a particular pool of assets, and in this way, the purchase of a security by an investor is treated as a collateralized loan. One of the principal goals for executing securitization transactions is to achieve a lower cost of capital on a pool of assets—essentially, to refinance at a lower rate (Lowder and Mendelsohn 2013).

In a wind project financial structure, it is possible for a developer or sponsor to "pledge" its partnership interests in the project LLC (and thus any income it receives from project revenues) to a securitization trust. From this trust a series of instruments (likely asset-backed securities) would be issued to investors. In this way, a developer/sponsor could swap out their high-cost equity for a lower-cost debt from the capital markets.

To date, securitzation has been most effectively executed by distributed solar sponsors (namely the large third-party finance providers such as Tesla [formerly SolarCity] and Sunrun). It is theoretically possible that a wind project could securitize its cash flows, though because wind projects tend to be large, utility-scale assets, securitization is not as readily applicable to the wind asset class at this time. The technique works well in the distributed solar space in part because the high number of offtaker contracts (residential and some commercial PPAs and leases) that back a securitization pool provides diversity that can protect investors. Additionally, there is standardization among these contracts, which facilitates pooling these assets together into a trust and alleviates the diligence requirements (and therefore costs) for investors.

4.4.4 Other Forms of Debt

4.4.4.1 Term Loan B

Term loan B are debt products that are underwritten by an institutional investor or other non-bank entity (such as a hedge fund or collateralized loan obligation fund), and typically issued for projects perceived as higher risk than a standard wind deal (e.g., a "merchant" project that doesn't have a PPA). Typically, term loan B debt holders will have less interaction with the project sponsor than would a bank in a term loan situation and make fewer requirements of the borrower (Dworkin and Holland 2014). Because of the risk profile, the relative relief in debt covenants, and other factors, term loans B will usually carry a higher interest rate than a loan from a commercial bank (Chadbourne & Parke 2015, 2017).

4.4.4.2 Bonds

Bonds are a form of debt security that can be backed by a corporate balance sheet, an entity's creditworthiness (as in the case of a municipal bond), a project's projected cash flows (as in the case of non-recourse finance), or other forms of collateral. In the case of a wind project financing, the sponsor can issue corporate bonds provided it has access to the bond capital markets, or bonds can be issued by the project's SPV (in which case it is project-level debt). The

costs, regulations, and creditor requirements are different for bonds than they are for debt sourced through a commercial bank, though the capital is still treated as a debt on the borrower's balance sheet. The terms of the debt, specified in a document called the debenture or covenant, are spelled out to protect the interest of both parties and will differ by the type of bond and the issuer. A municipality with a high credit rating will be able to issue bonds at a lower interest rate and often with a tax exemption on the interest payments to investors. Corporate entities commonly have lower credit ratings (if they are rated at all) than municipalities and other governments, and may not be able to access debt capital for as long a term and as low an interest rate.

4.5 Financial Capital Stack

The various financing sources described above are the principal source of funds for most wind energy projects. Collectively these sources of funds are referred to as the "capital stack" of the wind project, which represents the total financing package needed to construct and build the wind project. In some projects, a particular type of funds such as the term loan may actually be provided by more than one capital provider. This is typically because the total cost of a wind project can exceed the preferred or even maximum investment size for any one partner, requiring multiple investors to collectively make up the capital stack. For loan products this is typically referred to as a syndicated loan product, which can take a number of different forms depending on the type of the arrangement between the group of lenders. Tax equity syndication is also available (US Bank 2016).

Figure 3 below depicts an illustrative representation of the relative risks and returns of each of the main sources of capital in wind energy projects as well as the typical point of investment for the type of investment product. As described above, the construction debt, term debt, and tax equity of the project are typically the lowest-risk and lowest-cost financing available for a number of reasons, including preferred payment position, collateral in the project, contractually agreed upon yields or returns, and step-in rights, among others. Term debt is typically priced higher than construction debt due to the longer tenor of the term loan compared to the construction loan, the drawdown feature of construction loans, and other contractual protections such as full engineering, procurement, and construction wraps with fixed-price structures. Depending on a project's specifics, term debt and tax equity may be considered comparable in risk for a number of reasons, such as they both can benefit from preferred payment position, collateral in the project, and step-in rights, among others. Tax equity, however, typically commands a higher return compared to term debt due to the relatively limited supply of tax equity (wind energy competes for tax equity investment with other energy technologies or alternative tax-oriented investments such as affordable housing) and return periods that extend to around ten years, typically a few years longer than current mini-perm term debt tenors. Among the equity options, tax equity typically assumes less risk than either the sponsor or developer equity (which may be one and the same) because of senior repayment structures and pre-defined yields.

Figure 3 also shows whether the investment capital typically comes into the project prior to or following commercial operations, which have different risk profiles. The main finance sources that come into the project before reaching commercial operations are the construction loan and

the developer equity that fund the steps preceding even the construction phase. Note that the sponsor equity and developer equity may be one in the same.

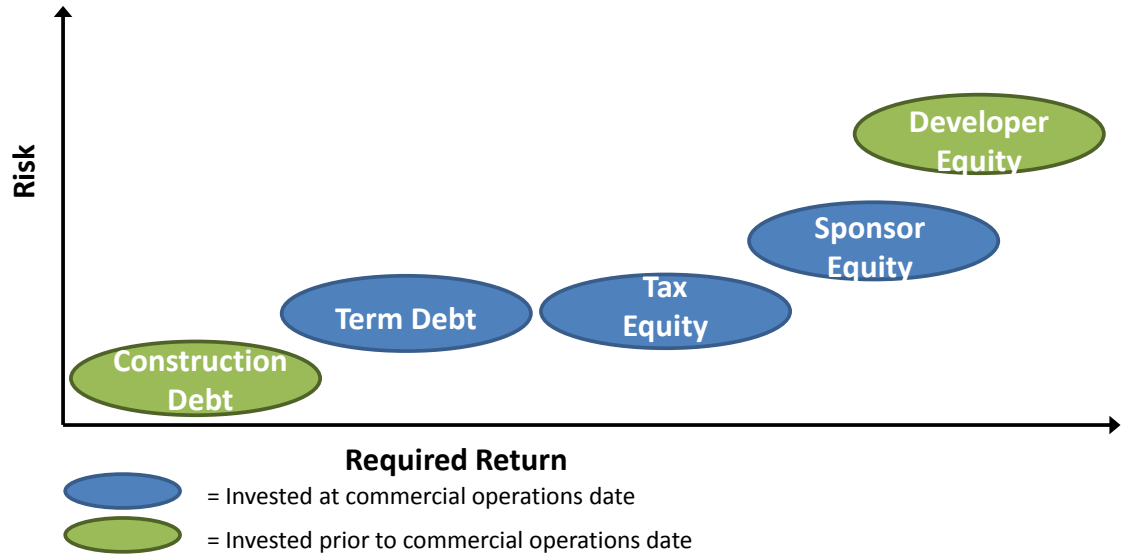

Figure 3. Comparison of the relative risks and returns for typical wind energy financing sources

Adapted from Schwabe 2010

4.6 Financial Structures

Historically there are a number of different financial structures that have been used to fund a wind project. This section briefly touches on two of the most common structures: the single-owner model and the partnership flip. The report here largely focuses on the partnership flip, as this structure demonstrates a multiple-party finance structure with separate entities for sponsor equity, tax equity, and debt.

4.6.1 Single-Owner

If the sponsor of a wind project can duly fund the project with its own capital (or source sufficient debt for a portion), *and* also make efficient use of the federal tax benefits, then single ownership is likely the most economic option. The single ownership structure employs a single entity, to develop, finance, and operate a project themselves. With only one owner in the effort, there is no requirement for third-party tax equity and comparatively smaller transaction costs for setting up a project financial structure with an outside entity. Single ownership is also the simplest financial structure available to wind project sponsors, as it keeps control of the project, its assets, and its benefit streams wholly within their control.

4.6.2 Partnership Flip

The partnership flip structure is the predominant tax equity financial structure currently available to wind projects due to an owner-operator requirement in Section 45 of the Internal Revenue Code (that the owner of the wind project must also be the operator), among other reasons. Thus, the use of the Section 45 PTC prevents a lease arrangement for any project that elects the PTCs

since the lease splits the owner and operator roles. If a wind developer were to elect the ITC instead of the PTC, additional financial structures could be used including a partnership flip, sale leaseback, or inverted lease (also known as a lease pass-through).

In a partnership flip, both equity partners (i.e., the sponsor and the tax equity) contribute the upfront capital requirement to finance the wind project and, in turn, share in the project's economic distributions. The principal economic benefits include distributable cash and tax losses and credits. Distributable cash is the revenue earned primarily from selling energy and environmental attributes less operating expenses. Tax deductions stem from accelerated depreciation, while tax credits are claimed from the ITC and PTC.

Although every project is unique, in one often-employed version for wind projects, the sponsor equity and tax equity collectively fund the entirety of the project's upfront capital requirements. The sponsor equity receives some or all of the initial distributable cash during a predefined period. Concurrently, the tax equity investor would typically receive the majority of the project's tax benefits including both the PTC as well as taxable losses generated from accelerated depreciation and some portion of the distributable cash. After a predefined period or a financial return threshold is met, the project allocations will "flip" and the distributions of distributable cash and tax benefits shift to a second sharing allocation. The secondary allocations will typically remain until the tax equity investor achieves their pre-determined internal rate of return (IRR), which is typically modeled to occur around the expiration of the principal tax benefits (i.e., around year 10 for the PTC). After the tax equity investors achieve their IRR, the project might "flip" for a second time, after which a majority of the project's remaining benefits flow to the sponsor. Figure 4 displays a schematic of a hypothetical partnership flip structure described above.

In executing a partnership flip, the sponsor and the tax equity will jointly invest in a SPV (the "partnership"), which will be the project operations entity (i.e., it will hold and manage the assets), which is also shown in Figure 4. Typically, the tax equity partner will contribute up to 50%–60% of the project's cost as an investment in the partnership, with the sponsor contributing the balance (Chadbourne & Parke 2016b). The sponsor may also use back leveraged debt to finance the sponsor's capital contribution which is shown in Figure 4.

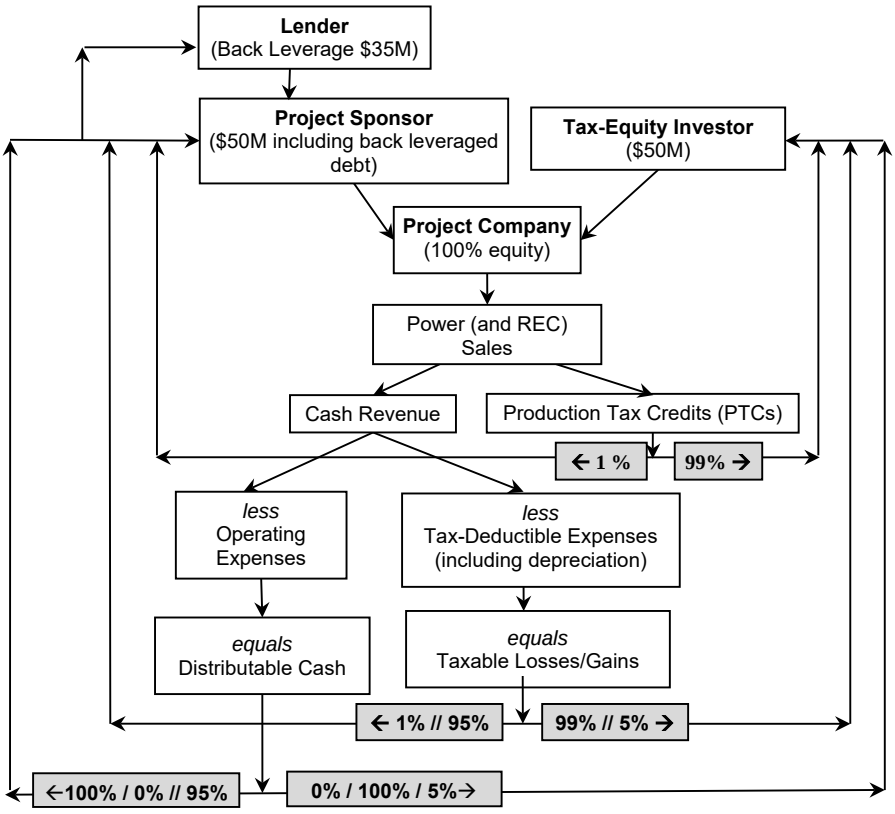

Figure 4. Hypothetical partnership flip structure for a $100 million wind project

/= first flip point in transaction where distributions ratios are initially altered
//= second flip point in transaction where distribution ratios are again altered
Source: Adapted from Feldman, Lowder, and Schwabe 2016

5 Corporate Purchasing and Procurement[18]

PPAs are energy transaction contracts—usually long-term (20 years is common)—between electricity generation owners (sellers) and energy offtakers (buyers). A PPA stipulates the commercial terms at which energy sales will be transacted from the buyer of electricity to the seller, principally the price at which the offtaker will purchase the energy (usually expressed in kilowatt-hour [kWh] or megawatt-hour [MWh]) and the length of time during which it will make such purchases (the term).[19]

One of the principal benefits of a PPA is that it provides electricity generation owners with long-term, contractually-obligated energy sales mechanisms in which they earn revenue and investment returns. Financiers of wind projects will typically require that the sponsor has successfully negotiated a PPA from a creditworthy buyer before providing capital for the project. There are, however, cases in which wind farms have been constructed on a "merchant" basis (i.e., they are financed and built with a partial PPA or entirely without a PPA and must sell energy into the wholesale markets), and in these cases investors will typically demand a higher return for the risks associated with merchant projects (Wiser and Bolinger 2016).

Utilities have traditionally been the primary offtakers/buyers for electricity from wind PPAs, largely because of renewable portfolio standards (RPS) at the state level. The contribution of RPS purchasing to renewable energy growth, however, has declined in recent years, falling from 71% of builds in 2013 to 46% in 2015 (Barbose 2016).[20] While compliance-oriented purchasing of renewables from utilities has been decreasing in recent years, purchases of renewable energy by corporations has been on the rise. For example, the Rocky Mountain Institute reports that all corporate renewable deals rose from 50 MW in 2012 to a recent high of 3.25 GW in 2015, which fell to 1.48 GW in 2016. Nearly 1.17 GW of corporate purchases were completed in the first six months of 2017 (see Figure 5).[21]

[18] Unless specifically noted otherwise, this section was constructed from a variety of industry sources including the 2016 Corporate Renewables Conference, with discussion from Chester et al. (2016), Martin et al. (2016), Porter, Craft, and Jackson (2016), and Quan (2016).
[19] Other common PPA terms may include an energy price escalation rate, insurance requirements, in-term purchase options, stipulations for system repair and maintenance, and removal, among other terms.
[20] Compliance purchasing is still likely to play an important role in wind procurement, particularly as states increase their renewable portfolio standards requirements.
[21] Note that this figure includes some corporate procurement strategies not included here such as green power purchases and green tariffs. For more information on these sources see the forthcoming Heeter et al. report.

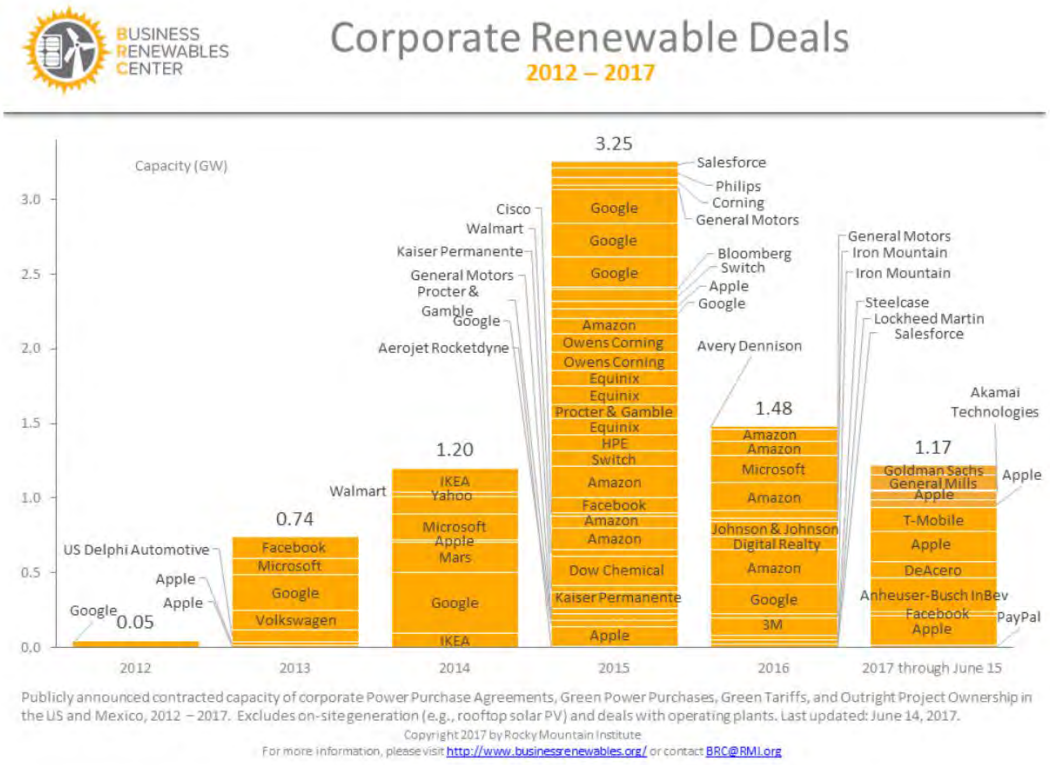

Figure 5. Corporate renewable deals: 2012-2017

Source: Rocky Mountain Institute 2017

The rise of corporate purchasing has allowed businesses to hedge their exposure to electricity price increases and meet sustainability goals while providing the wind industry with the critical revenue contracts that drive project financing. Corporate procurement has also offered additional opportunities for wind developers to attract new customers beyond just utilities. The following subsections, discuss the various contractual mechanisms by which corporations have sought to supplement their electricity purchases, primarily focused on those pertaining to wind-energy based procurement.

5.1 Corporate Onsite Procurement

Onsite procurement of energy may be an option for many commercial entities to meet their sustainability goals, limit exposure to energy price variability, benefit from federal tax incentives, and potentially return a profit. The majority of onsite renewable energy corporate procurement to date has used photovoltaic (PV) technology, with 13.8 GW of non-residential

distributed PV installed at the end of 2015 (SEIA and GTM Research 2016). [22] Large companies have contributed significantly to this deployment.

However, corporations have installed other renewable technologies as well, including wind. Commercial and industrial projects represented 57% of the 28 MW of distributed wind capacity installed in 2015 (Orrell and Foster 2016).

There are several advantages to procuring onsite renewable energy over offsite procurement. Companies have the potential to leverage underutilized assets, such as unused land or roofs for economic gain. Energy produced onsite is also potentially more valuable than energy procured offsite, as it is closer to energy load and does not necessarily need the use of transmission and distribution infrastructure. Onsite generation also provides a better hedge against rising electricity prices by simply reducing electricity consumption, rather than an imperfect hedge offered by a virtual PPA (discussed in the next section). Companies can also more directly incorporate these generating assets into their existing energy use to optimize performance.

However, the ability for companies to use onsite renewable energy is highly dependent on resource availability, available land, local interconnection policies, and other utility and government regulations. For large energy users such as datacenters, it is unlikely that companies will be able to source all of their energy from onsite generation, making it more difficult to meet aggressive sustainability targets. Additionally, some commercial customers may not have the ability to diversify their onsite renewable energy procurement options, potentially making them limited in their technology choices (Wrathall, Kramer, and Gerard 2016).

5.2 Corporate Offsite Procurement

Another way that corporations have secured renewable energy is by purchasing energy from a project that is located offsite or away from the corporate entity, utilizing variants of the PPA mechanism, and other procurement options.

Offsite procurement of renewable energy can mitigate many site-specific limitations that a company's physical land and building facilities may face in installing renewable energy systems. For example, a corporation may be located in an area with a comparatively poor wind resource quality or may have insufficient land, rooftops, or regulatory permission to build a renewable energy asset large enough to meet its energy needs (particularly if the corporation has aggressive energy goals). Additionally, a corporation with multiple facilities can pool its total energy needs and enjoy efficiencies from contracting with one or more offsite facilities. Offsite procurement can also allow corporations the ability to diversify their renewable energy procurement, potentially sourcing energy that is complementary to its needs. As an example, a corporation may contract with a wind facility to offset more of its nighttime and winter energy needs (when wind resources are typically the highest) and a solar facility to offset more of its daytime and summer energy needs.

Offsite corporate procurement can benefit renewable energy project developers because it can expand their potential customer base from utilities and onsite procurement. This is particularly

[22] The non-residential market includes mostly commercial and industrial customers, but also includes the government and nonprofit sectors.

helpful in areas where utilities have already fulfilled their renewable energy procurement requirements or are not procuring more due to uncertainty surrounding future energy scenarios. Companies, in turn, benefit because they may be able make arrangements with developers on more favorable terms (Maloney 2016).

Because electricity generated by offsite facilities is not necessarily delivered to corporations' facilities, there are several different contracts employed that allow corporations the ability to benefit from the energy or other values produced by the systems. These include direct PPAs through virtual net metering; virtual PPAs (also known as contracts for differences); and contracting renewable energy through a company's electric service provider.[23] Each procurement type will be discussed in detail below.

5.2.1 Direct PPAs through Virtual Net Metering

Under virtual net metering utility ratepayers can receive bill credits for some or all of the electricity generated by a qualifying offsite renewable energy project that is not directly interconnected to their electricity meter. A virtual-net-metered system may have many potential consumers and/or buyers of its energy including a corporate purchaser; likewise, consumers may have many virtual-net-metered systems from which to choose. However, virtual net metering is only available in select areas that have adopted legislation and/or regulation allowing its use; where available it is typically offered by the local regulated electric utility. As of October 2015, virtual net metering for wind projects was available to some corporations in six states and the District of Columbia (Farrell 2015).[24]

5.2.2 Virtual PPAs

Virtual PPAs (also known as "financial PPAs," "synthetic PPAs," "contracts for differences," or "fixed for floating swaps") do not involve the direct purchase of energy as do onsite PPA contracts or Direct PPAs with virtual net metering. Virtual PPAs, by contrast, require the ability to sell electricity into a wholesale electricity market.[25] As of this writing, virtual PPAs are among the most preferred form of offsite corporate renewable energy procurement in the United States (Heeter et al., forthcoming).

In a virtual PPA the developer or sponsor does not actually deliver the power to the customer (i.e., the corporate purchaser). Instead, the corporation and developer agree to exchange the difference between the price at which the renewable energy is sold into the wholesale electricity market from the developer and the set contract price (or the virtual PPA rate) between the developer and corporate purchaser. If the renewable energy is sold into the wholesale market at a rate higher than the set contract price, the developer pays the corporate purchaser the difference in value; if on the other hand, the renewable energy is sold in the wholesale market at a lower price, the corporate purchaser pays the developer the difference in value. At the same time, the

[23] As noted previously, examples of other procurement options include green power programs offered by electricity suppliers and purchases of renewable energy certificates. For more information on these types of corporate procurement approaches see Heeter et al. (forthcoming).
[24] These states include Maine, Massachusetts, New Hampshire, Pennsylvania, Vermont, and Illinois (in which utilities can choose to offer virtual net metering). An additional four states offer virtual net metering to state and local governments, multi-tenant properties, or agricultural customers.
[25] Wholesale markets are responsible for serving two-thirds of the United States' electricity load (FERC 2017).

corporation likely continues to purchase energy from its local utility (or utilities), ideally in the same power market. Figure 6 below summarizes these various transactions.

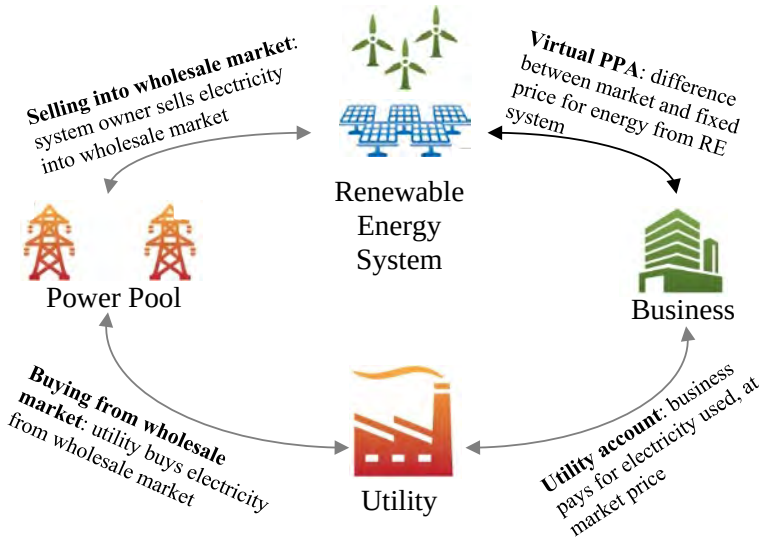

Figure 6. Summary of virtual PPA transactions

In executing a virtual PPA, both the developer and the corporate purchaser can be hedged to some extent against electricity market pricing. The developer of the renewable energy project will net the agreed-upon fixed price for energy through the contract of differences regardless of the price at which electricity was sold in the wholesale market. The corporate purchaser can also have some degree of a pricing hedge because the electricity it purchases from its service provider should be inversely correlated to the funds it either owes or receives from the developer through the contract for differences (assuming that the service provider rates are closely tied to wholesale market rates, as discussed below).

5.2.2.1 Managing Location Risk in a Virtual PPA (Busbar vs. Hub)

The ability for a business to use a virtual PPA as a hedge against its own electricity price depends on how correlated its electricity rates are to the rate at which the energy project sells its electricity.[26] The price at which electricity is bought and sold in a wholesale market can depend on one's location within the market or electricity grid. In a contract for differences, the settling price of the contract can either be designated at the hub (regional location) or at the busbar (point of interconnection). If the busbar node (i.e., point of interconnection to the electricity grid) of the renewable energy project is different from that of the business then there is a potential difference in price that imposes a risk on the transaction, making the hedge less than fully protective.[27] However, electricity can also be bought and sold at a power market's trading hub at a price which is calculated as the average price across all nodes within that area. Because these hubs

[26] When these prices are relatively correlated it is referred to as a "clean hedge;" the less correlated they are the "dirtier" the hedge.
[27] The difference between the location at which a project sells power and the location at which the contract price is set under the virtual PPA is called the "basis risk."

cover several nodes they can be less volatile and more liquid (as more trading occurs at a hub than a specific node). Buying and selling at a hub incurs more costs because the electricity has to be delivered, or "wheeled," to the hub through contracts called financial transmission rates (FTRs). FTRs are another type of hedge, representing the difference between the price at the hub and the price at the node. FTRs are offered by many financial entities and utilities.

Corporations often prefer the settling price to be at the hub because there is less "basis risk"—risk that some corporations think is better mitigated and managed by a developer. Developers, however, usually prefer the contract to be settled at the busbar because there are fewer costs and less complexity.[28] Further, some developers think that settling the price at the busbar provides companies the opportunity to make more money because they do not have to incur wheeling costs. In the end it comes down to the preference of the corporation between financial upside and risk as well as its experience with these types of contracting mechanisms. In some instances, corporations have signed virtual PPAs for projects in regions in which they have no facilities; in these transactions there is greater basis risk (though likely some level of energy price hedge), but the project may offer a better return and a larger offset of a corporation's electricity use (Chadbourne & Parke 2016a).

Bundling electricity load or renewable energy projects across a wider area can also diversify individual nodal electricity risk and create opportunities for corporations that do not own real estate and therefore are not as strongly tied to a particular location.

5.2.3 Sleeved PPAs

In some regulated states corporations may not have access to a wholesale market that prevents the use of a Virtual PPA. Additionally, some corporations may be reluctant to take on any sort of basis risk as described previously in the Virtual PPA model. Projects and developers have addressed these issues by contracting in a three-way deal with a customer's electricity provider, in what's known as a "utility green tariff," "sleeved PPA," or "back-to-back PPA."

In a sleeved PPA transaction the electricity service provider agrees to purchase the electricity from a renewable energy project through a PPA between the developer and electricity service provider, and the corporation in turn agrees to purchase that electricity from the utility through a matching PPA between the utility and corporate purchaser. Sleeved PPAs can offer benefits for all parties, as shown in the following examples: electricity service providers lock in energy and load from customers (avoiding stranded assets and declining customer usage); developers often have an easier time financing the project with the typically strong credit profile of a utility instead of corporation; and corporations lock in an electricity price hedge without the basis risk from their existing electric utility with which they have a long-standing relationship.

Sleeved PPAs are not without their drawbacks. Having multiple parties involved in back-to-back contracts—particularly if one of them is a regulated entity—means significant time, energy, and money is spent setting up transactions. Additionally, sleeved PPAs typically require state public utility commission approval and the regulated utility will usually charge fees on top of the PPA.

[28] In addition to the cost of arranging and executing the FTR, developers may have to set aside a cash reserve to satisfy contract terms. These additional requirements make it more difficult for the developer to finance the project.

6 Cost-of-Capital Impacts

The cost of capital can influence a wind project's overall cost of energy and accordingly its cost competitiveness. It is therefore critical for developers to have a comprehensive understanding about not only the availability of capital, but also about how variations in possible financing rates will impact their projects' economic cost profile. Developers often won't have fully-secured financing rates until near the financial close of the project, which is among the latter milestones of the development process. Thus developers will use best estimates and forecasts to estimate possible financing costs and the corresponding impact on their projects' overall economics. The developer will typically identify the point at which the financing rates are low enough to enable the project to be economically viable and the high-cost threshold where the project may no longer be competitive.

This section demonstrates how low- and high-cost financing scenarios can impact the cost of a wind energy project using a simplified LCOE analysis.[29] LCOE is an economic measure that is calculated by summing the entirety of the project's lifetime costs (including upfront capital costs, ongoing O&M expenditures, and financing rates among others expenses), discounting to present value terms, and then dividing by the expected lifetime energy production of the wind plant. The output of this calculation is a cost per unit of energy, typically expressed either in cents per kWh or dollars per MWh. LCOE can be used in comparison to the price that a developer expects to receive for the energy generated by the system, which could be the market price, the negotiated PPA price, the applicable green tariff rate, or another revenue source. A calculated LCOE at or below the comparative energy price would indicate the project is competitive economically, while an LCOE at or above the comparative price would likely require additional actions to lower the LCOE of the project through decreasing costs or increasing energy production.

To illustrate the effects of financing rates on the LCOE, the authors ran an analysis in NREL's System Advisor Model (SAM), a performance and financial model that allows users to provide a number of project-specific input parameters to estimate the LCOE along with several other outputs (NREL 2017). The authors employed a simplistic methodology that minimizes the number of non-financial parameters required, including capital costs (equipment), capacity factor (i.e., energy production), annual O&M expenses, and annual inflation assumptions.[30] The specific values of these variables were based on NREL's comprehensive wind cost analysis report "2015 Cost of Energy Review" (Moné et al. 2017).

In this analysis, two financing scenarios are assumed representing a high- and low-cost financing case while the non-financial parameters are held constant. The input values for the financial parameters are shown in Table 2. In the Higher-Cost Financing Scenario, sponsor equity and tax

[29] Other recent wind energy LCOE analyses include Cory and Schwabe (2009), which present multiple-variable sensitivity analyses, and the International Energy Agency (IEA) Wind Working Group Task 26, which looks at international variations in the cost of wind energy (Cory and Schwabe 2016, IEA 2016). The investment bank Lazard also produces an annual report that compares LCOE across multiple energy generation technologies as well as various cost sensitivities (Lazard 2016).

[30] The following values were used for the non-financial parameters representing the "Base-Case" project in the cost of energy review: $1,690/kW capital costs, a net capacity factor of 39.9% based on a P50 estimates, annual O&M costs at $51/kW-yr, 2% inflation and escalation rates, and a 20-year project, assuming the use of the $23/MWh PTC for the first ten years of a project's operation (equating to the PTC value in 2016 for a project that began construction in 2016 to qualify for the full value PTC).

equity IRR are valued at 12% and 8%, respectively; the interest rate on debt is offered at 5% with a 15-year repayment term, and debt comprises 35% of the project's capital.[31] In the Lower-Cost Financing Scenario, sponsor equity and tax equity IRR are 10% and 7%, respectively; interest rate on debt is 4.5% with an 18-year repayment term, and debt comprises 40% of the project's total capital. The use of the PTC is also assumed in both cases.

These financing cost scenarios illustrate only two of any number of possible financing permutations. In general, however, the Higher- and Lower-Cost Financing Scenarios represent plausible variations in both the cost and structure of the project. The Lower-Cost financing scenarios generally reflect historic lows in pricing, particularly for the tax equity rates (Chadbourne & Parke 2007; Harper, Karcher, and Bolinger 2007), while the Higher-Cost Financing Scenario is closer to project pricing in 2016 (Shurey 2016; Chadbourne & Parke 2015).

As shown in Table 2, the SAM model yields an LCOE of $51 per MWh for the Higher-Cost Financing Scenario. Under the Lower-Cost Financing Scenario, the SAM model yields a lower LCOE of $42 per MWh. This analysis reveals an LCOE premium of approximately $9/MWh for the Higher-Cost Financing Scenario relative to the Lower-Cost Financing Scenario.[32]

Table 2. LCOE Comparison of a Higher Cost and Lower Cost Financing Scenario

SAM Financial Model Inputs	Higher-Cost Financing Scenario	Lower-Cost Financing Scenario
Sponsor Equity IRR	12%	10%
Tax Equity IRR	8%	7%
Debt Interest Rate	5%	4.5%
Loan Term (years)	15	18
Debt Percentage	35%	40%
Resulting Nominal LCOE ($/MWh)	**$ 51**	**$ 42**

From the perspective of the project developer, these calculated LCOEs of $51/MWh and $42/MWh would then be compared to the expected energy price of the project, whether that be an executed PPA price, a wholesale energy price, a green tariff rate, or other revenue metric. If the project's developer had secured an energy price that exceeds the LCOE from either the Higher- or Lower-Cost Financing Scenarios, then the project will likely generate sufficient revenue to meet its ongoing maintenance, debt payments, reserve accounts, and investor returns. This case is illustrated by the black gradient bar shown in Figure 7. The more the energy price exceeds the LCOE, the larger the potential revenue surplus and thus the more profit the project may earn.

[31] SAM's financial calculations model debt that is secured at the project level. The debt term assumes that a constant amortization period is utilized rather than the mini-perm structure described previously, which requires a balloon payment before the end of the term.

[32] Importantly, this LCOE range includes the effect of both economy-wide conditions, such as the overall supply of debt and equity and investor's appetite for risk, as well as project-specific risk factors. A project developer may be able to address the project-specific risk factors but usually not those attributable to market-wide forces, such as overall investor sentiment and benchmark financing rates. As an example, Bolinger (2017) finds a comparatively smaller LCOE reduction opportunity of around $2/MWh to $2.5/MWh when analyzing risks specifically associated with energy production uncertainty (Bolinger 2017).

Conversely, if a developer has secured an energy price that is below the Lower-Cost Financing Scenario's LCOE, then the project will not likely generate sufficient revenue to both meet its ongoing cost obligations (i.e., debt payments, O&M, reserve accounts, etc.) as well as provide the modeled return to the investor. This case is depicted with the red gradient bar in Figure 7. In this case, the sponsor or investor may willingly accept a lower return, seek cost reductions elsewhere (e.g., through lower-cost equipment), or delay project financing until market conditions improve (e.g., if benchmark interest rates fall). An energy price that falls between the two financing costs scenarios ($51/MWh versus $42/MWh—showed in the dashed area in Figure 7) can likely proceed if the developer is able to secure financing at the rates used in the Lower-Cost Scenario. However, if rates lie at the Higher-Cost Financing Scenario, the developer may seek similar measures to close the revenue gap.

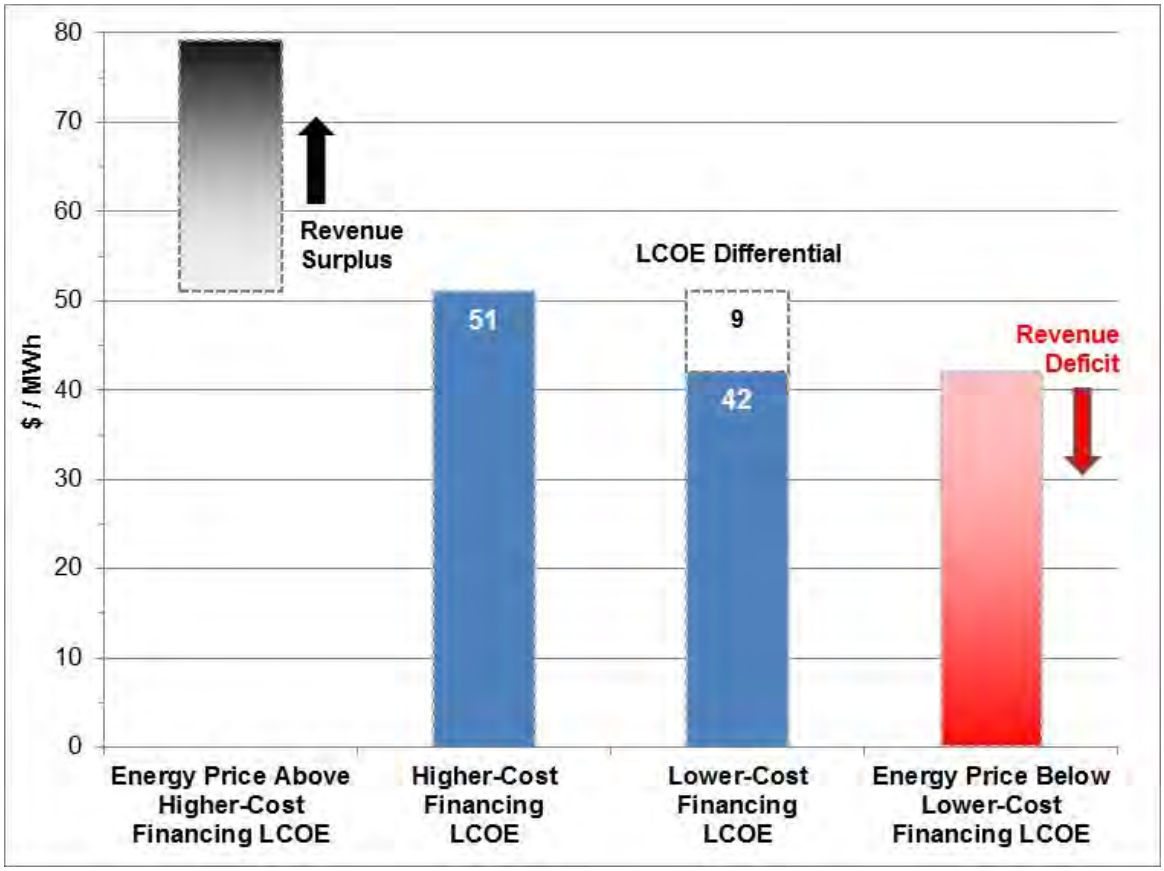

Figure 7. Comparison of financing scenarios to energy prices

There are several reasons why the financing costs for a wind project can vary from one project to the next, as well as over time. First, some financing cost variations are attributable to macroeconomic forces and reflect the changing benchmark interest rates or the market's risk tolerance. Second, financing rates are also driven by the unique characteristics of the project itself. For example investors will look at unique project-specific factors such as the type of the specific turbine technology utilized, its performance history in the marketplace, the commercial experience of the project developer to deliver projects on time and budget, and the specific elements within the deal to mitigate and control for risks and uncertainty. Some investors will

simply be more comfortable with accepting certain types of project risks while others investors will not. Finally, other hard to quantify or subjective factors also contribute towards the overall financing costs of a project. As an example of this, the history and relationship between the firms is also an important consideration: commercial lending can be a “relationship-based” business and firms may be willing to offer preferred pricing to partners who have a long, profitable, or strategic banking partnership. In reality, many if not all of these factors contributes in varying degrees to the overall investment costs for a project.

7 Conclusion

As discussed in this report, investment in wind energy in the United States has averaged nearly $13.6 billion on annual basis since 2006 with more than $140 billion invested cumulatively over that period (BNEF 2017). The investment activity demonstrates the persistent appeal of wind energy and its significant role in the overall market for electricity generation in the United States. The development and financing of wind projects, however, remains a complex and expensive process that, because of the capital requirements of wind energy, can influence the economic competitiveness of wind energy compared to other generation sources that are less capital intensive.

Looking ahead, the near-term outlook for wind energy reported previously suggests a continued need for capital availability at levels consistent with deployment seen in 2015 and 2016 (Wiser and Bolinger 2016). The market has shown the capacity to finance projects at this level using current mechanisms at economically viable rates; however, increased deployment could necessitate new sources of capital. Broad changes to the financial industry—such as the possibility of major corporate tax reform, the currently scheduled phase out of the PTC and ITC for wind, and, specifically, a change in the role of tax equity—could fundamentally reshape the predominant mechanism for wind energy investment. It is possible that financing practices may need to evolve, while the growing body of wind energy deployment and operational experiences could help to attract new market participants. Whatever the future holds, it is likely that financing will continue to impact a project's overall economic competitiveness, and that efforts to open up more capital sources and reduce financing costs will continue.

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NOVEMBER 2018

LAZARD'S LEVELIZED COST OF ENERGY ANALYSIS—VERSION 12.0

LAZARD

Introduction

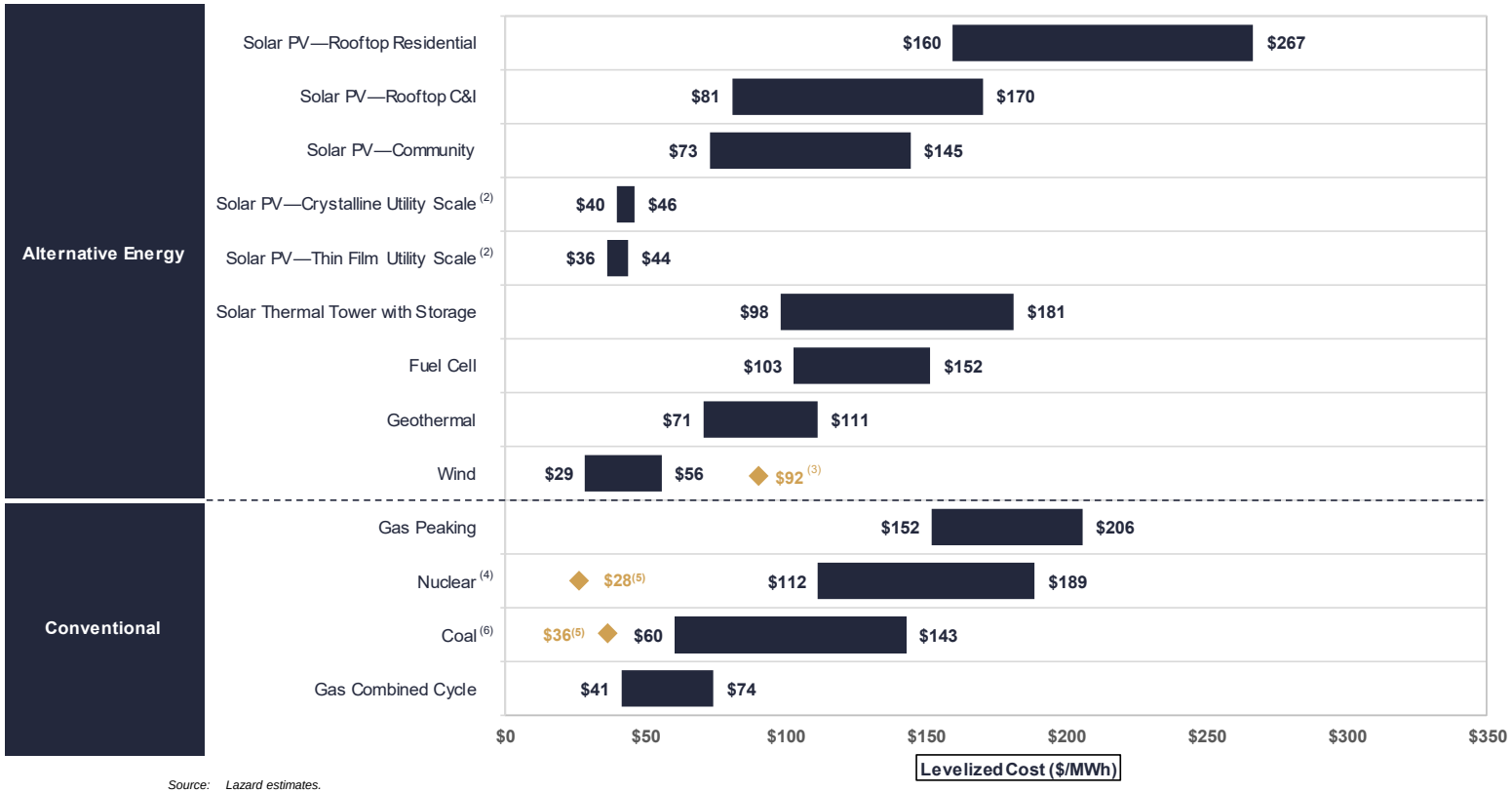
Lazard's Levelized Cost of Energy ("LCOE") analysis addresses the following topics:

- **Comparative LCOE analysis for various generation technologies on a $/MWh basis, including sensitivities, as relevant, for U.S. federal tax subsidies, fuel prices and costs of capital**
- **Illustration of how the LCOE of wind and utility-scale solar compare to the marginal cost of selected conventional generation technologies**
- **Historical LCOE comparison of various utility-scale generation technologies**
- **Illustration of the historical LCOE declines for wind and utility-scale solar technologies**
- **Illustration of how the LCOE of utility-scale solar compares to the LCOE of gas peaking and how the LCOE of wind compares to the LCOE of gas combined cycle generation**
- **Comparison of assumed capital costs on a $/kW basis for various generation technologies**
- **Decomposition of the LCOE for various generation technologies by capital cost, fixed operations and maintenance expense, variable operations and maintenance expense and fuel cost, as relevant**
- **A methodological overview of Lazard's approach to our LCOE analysis**
- **Considerations regarding the usage characteristics and applicability of various generation technologies**
- **An illustrative comparison of the cost of carbon abatement of various Alternative Energy technologies relative to conventional generation**
- **Summary assumptions for Lazard's LCOE analysis**
- **Summary of Lazard's approach to comparing the LCOE for various conventional and Alternative Energy generation technologies**

Other factors would also have a potentially significant effect on the results contained herein, but have not been examined in the scope of this analysis. These additional factors, among others, could include: import tariffs; capacity value vs. energy value; stranded costs related to distributed generation or otherwise; network upgrade, transmission, congestion or other integration-related costs; significant permitting or other development costs, unless otherwise noted; and costs of complying with various environmental regulations (e.g., carbon emissions offsets or emissions control systems). This analysis also does not address potential social and environmental externalities, including, for example, the social costs and rate consequences for those who cannot afford distributed generation solutions, as well as the long-term residual and societal consequences of various conventional generation technologies that are difficult to measure (e.g., nuclear waste disposal, airborne pollutants, greenhouse gases, etc.)

Levelized Cost of Energy Comparison—Unsubsidized Analysis

Certain Alternative Energy generation technologies are cost-competitive with conventional generation technologies under certain circumstances(1)



Source: *Lazard estimates.*

Note: Here and throughout this presentation, unless otherwise indicated, the analysis assumes 60% debt at 8% interest rate and 40% equity at 12% cost. Please see page titled "Levelized Cost of Energy Comparison—Sensitivity to Cost of Capital" for cost of capital sensitivities.

(1) Such observation does not take into account other factors that would also have a potentially significant effect on the results contained herein, but have not been examined in the scope of this analysis. These additional factors, among others, could include: import tariffs; capacity value vs. energy value; stranded costs related to distributed generation or otherwise; network upgrade, transmission, congestion or other integration-related costs; significant permitting or other development costs, unless otherwise noted; and costs of complying with various environmental regulations (e.g., carbon emissions offsets or emissions control systems). This analysis also does not address potential social and environmental externalities, including, for example, the social costs and rate consequences for those who cannot afford distribution generation solutions, as well as the long-term residual and societal consequences of various conventional generation technologies that are difficult to measure (e.g., nuclear waste disposal, airborne pollutants, greenhouse gases, etc.).

(2) Unless otherwise indicated herein, the low end represents a single-axis tracking system and the high end represents a fixed-tilt design.

(3) Represents the estimated implied midpoint of the LCOE of offshore wind, assuming a capital cost range of approximately $2.25 – $3.80 per watt.

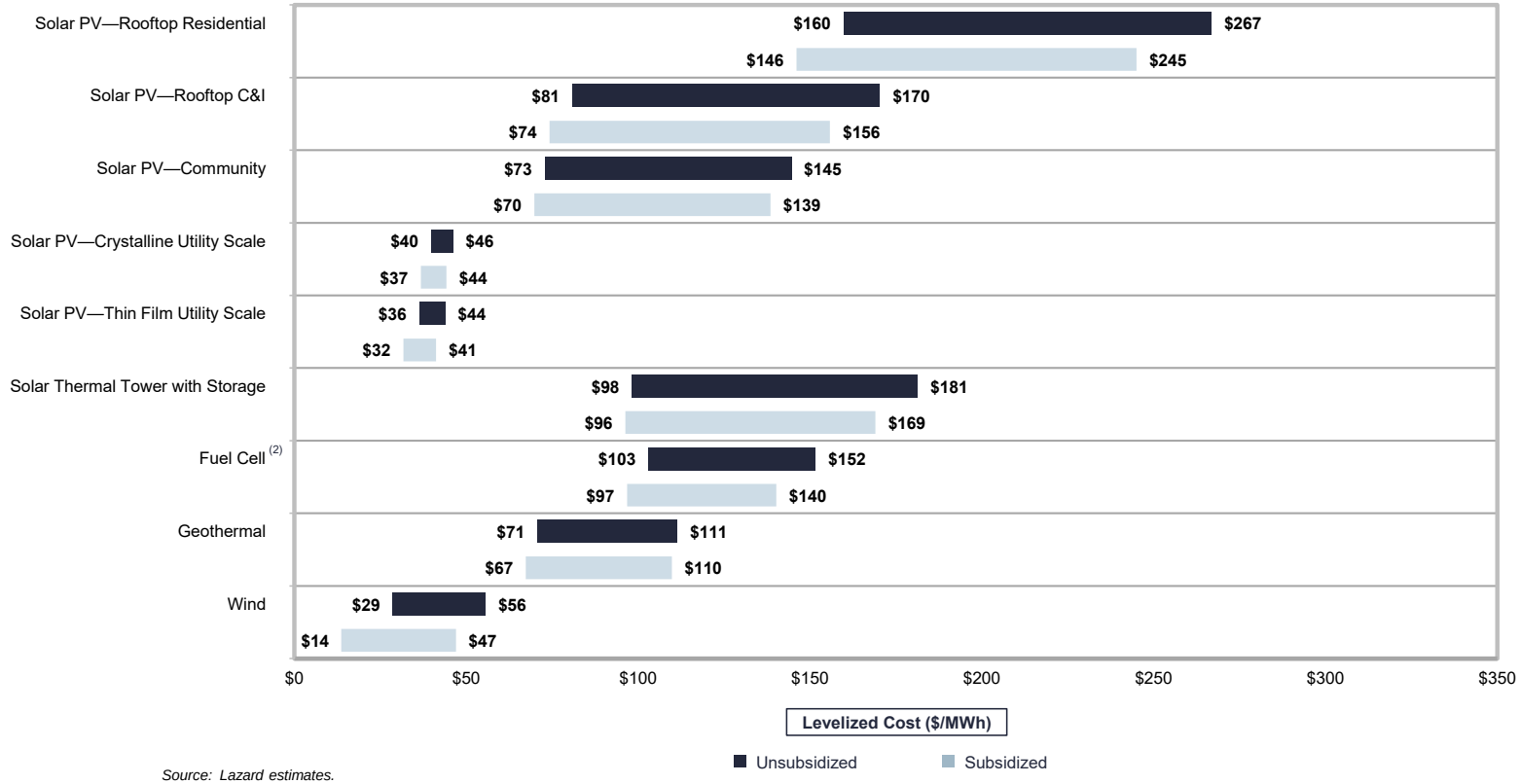
(4) Unless otherwise indicated, the analysis herein does not reflect decommissioning costs or the potential economic impacts of federal loan guarantees or other subsidies.

(5) Represents the midpoint of the marginal cost of operating fully depreciated coal and nuclear facilities, inclusive of decommissioning costs for nuclear facilities. Analysis assumes that the salvage value for a decommissioned coal plant is equivalent to the decommissioning and site restoration costs. Inputs are derived from a benchmark of operating, fully depreciated coal and nuclear assets across the U.S. Capacity factors, fuel, variable and fixed operating expenses are based on upper and lower quartile estimates derived from Lazard's research. Please see page titled "Levelized Cost of Energy Comparison—Alternative Energy versus Marginal Cost of Selected Existing Conventional Generation" for additional details.

(6) Unless otherwise indicated, the analysis herein reflects average of Northern Appalachian Upper Ohio River Barge and Pittsburgh Seam Rail coal. High end incorporates 90% carbon capture and compression. Does not include cost of transportation and storage.

Levelized Cost of Energy Comparison—Sensitivity to U.S. Federal Tax Subsidies(1)

Given the extension of the **Investment Tax Credit ("ITC") and Production Tax Credit ("PTC") in** December 2015 and resulting subsidy visibility, U.S. federal tax subsidies remain an important component of the economics of Alternative Energy generation technologies



Source: Lazard estimates.

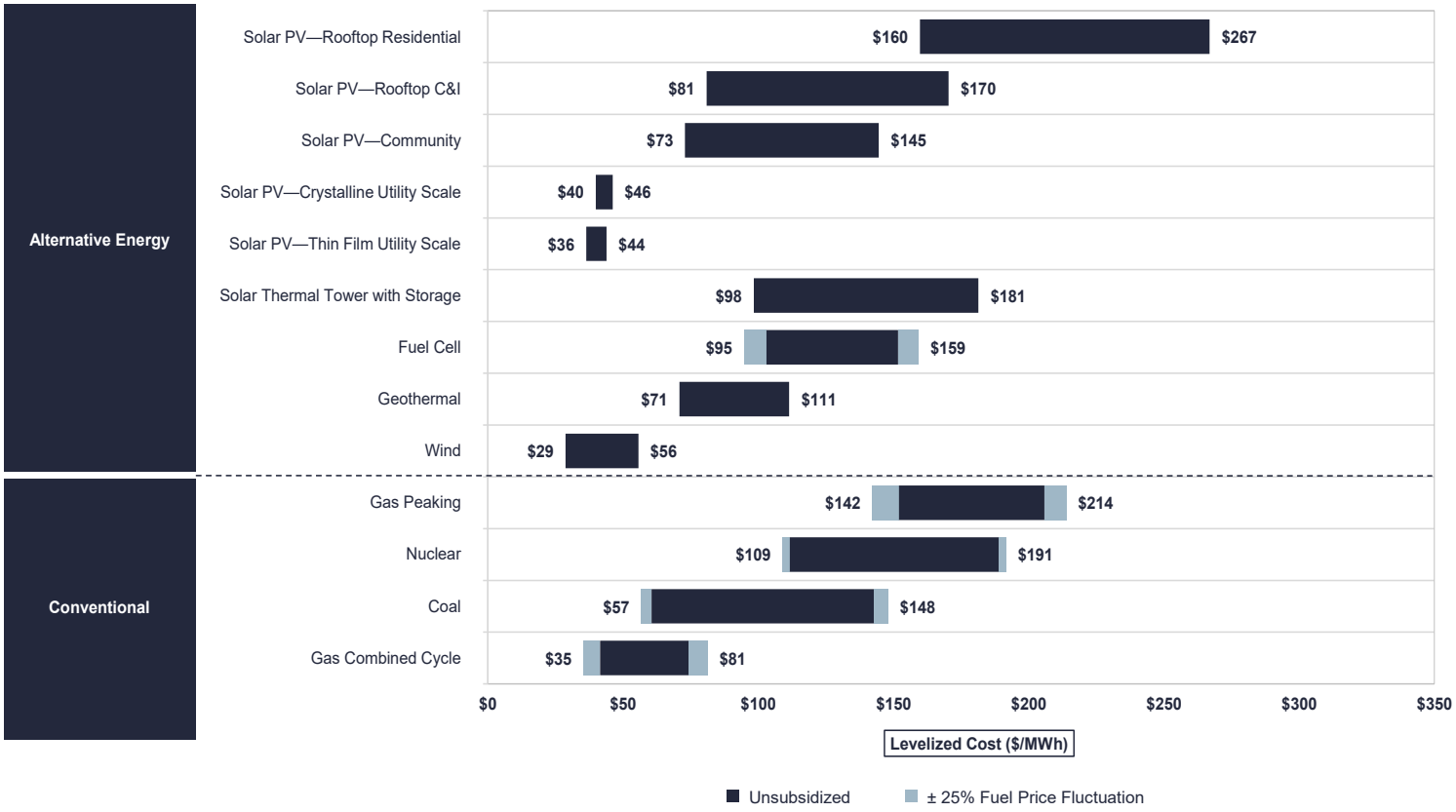
Note: The sensitivity analysis presented on this page also includes sensitivities related to the U.S. Tax Cuts and Jobs Act ("TCJA") of 2017. The TCJA contains several provisions that impact the LCOE of various generation technologies (e.g., a reduced federal corporate income tax rate, an ability to elect immediate bonus depreciation, limitations on the deductibility of interest expense and restrictions on the utilization of past net operating losses). On balance, the TCJA reduced the LCOE of conventional generation technologies and marginally increased the LCOE for Alternative Energy technologies.

(1) The sensitivity analysis presented on this page assumes that projects qualify for the full ITC/PTC and have a capital structure that includes sponsor equity, tax equity and debt.

(2) The ITC for fuel cell technologies is capped at $1,500/0.5 kW of capacity.

Levelized Cost of Energy Comparison—Sensitivity to Fuel Prices

Variations in fuel prices can materially affect the LCOE of conventional generation technologies, but direct comparisons against **"competing"** Alternative Energy generation technologies must take into account issues such as dispatch characteristics (e.g., baseload and/or dispatchable intermediate load vs. peaking or intermittent technologies)



LAZARD *Source: Lazard estimates.*

Levelized Cost of Energy Comparison—Sensitivity to Cost of Capital

A key consideration for utility-scale generation technologies is the impact of the availability and cost of capital[1] on LCOE values; availability and cost of capital have a particularly significant impact on Alternative Energy generation technologies, whose costs reflect essentially the return on, and of, the capital investment required to build them

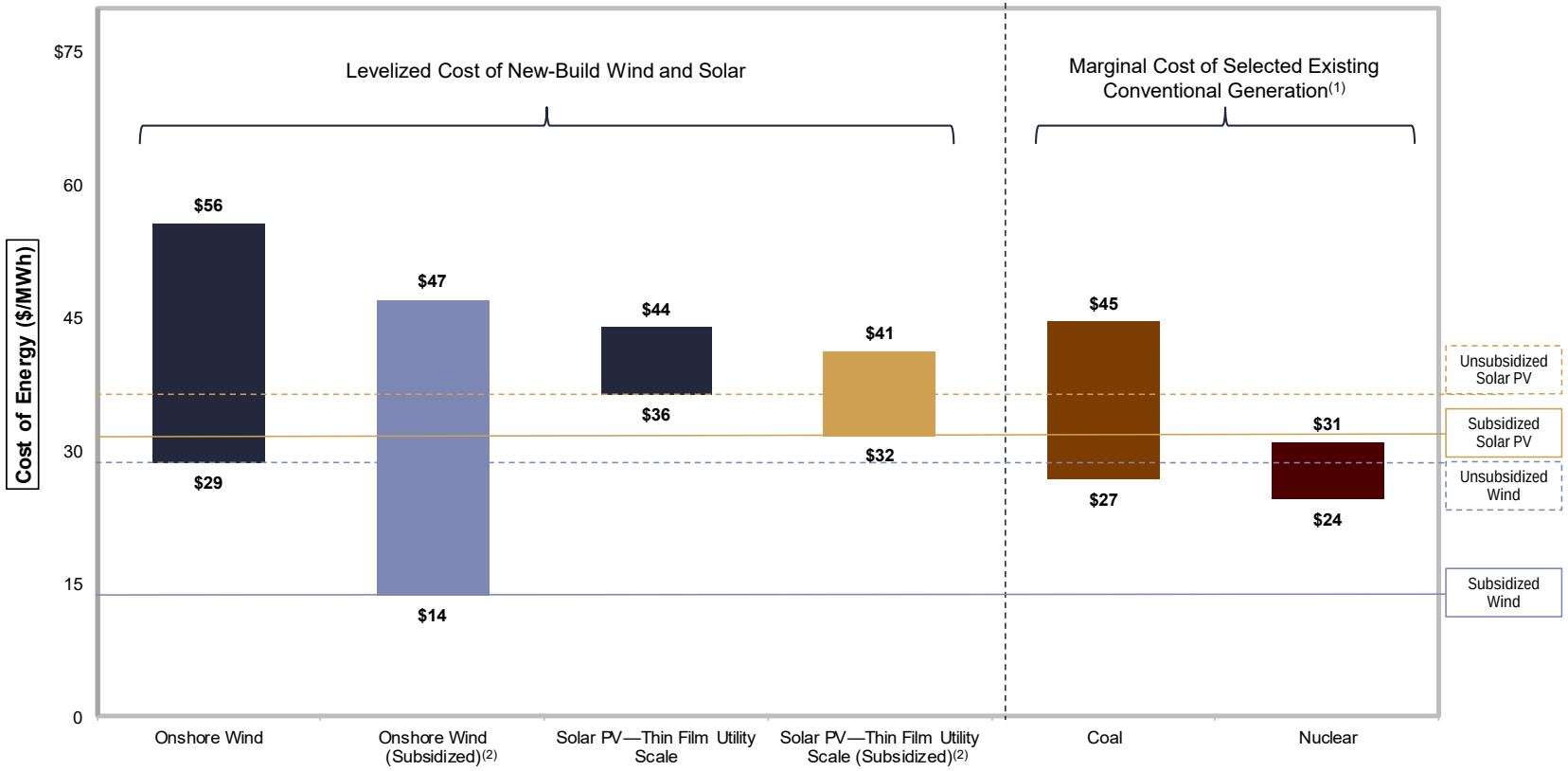
Midpoint of Unsubsidized LCOE[2]

After-Tax IRR/WACC	5.4%	6.2%	6.9%	7.7%	8.4%	9.2%
Cost of Equity	9.0%	10.0%	11.0%	12.0%	13.0%	14.0%
Cost of Debt	5.0%	6.0%	7.0%	8.0%	9.0%	10.0%

Source: Lazard estimates.
Note: Analysis assumes 60% debt and 40% equity.
(1) Cost of capital as used herein indicates the cost of capital for the asset/plant and not the cost of capital of a particular investor/owner.
(2) Reflects the average of the high and low LCOE for each respective cost of capital assumption.

Levelized Cost of Energy Comparison—Alternative Energy versus Marginal Cost of Selected Existing Conventional Generation

Certain Alternative Energy generation technologies, which became cost-competitive with conventional generation technologies several years ago, are, in some scenarios, approaching an LCOE that is at or below the marginal cost of existing conventional generation technologies



Source: Lazard estimates.

(1) Represents the marginal cost of operating, fully depreciated coal and nuclear facilities, inclusive of decommissioning costs for nuclear facilities. Analysis assumes that the salvage value for a decommissioned coal plant is equivalent to the decommissioning and site restoration costs. Inputs are derived from a benchmark of operating, fully depreciated coal and nuclear assets across the U.S. Capacity factors, fuel, variable and fixed operating expenses are based on upper and lower quartile estimates derived from Lazard's research.

(2) The subsidized analysis includes sensitivities related to the TCJA and U.S. federal tax subsidies. Please see page titled "Levelized Cost of Energy Comparison—Sensitivity to U.S. Federal Tax Subsidies" for additional details.

Levelized Cost of Energy Comparison—Historical Utility-Scale Generation Comparison

Lazard's unsubsidized LCOE analysis indicates significant historical cost declines for utility-scale Alternative Energy generation technologies driven by, among other factors, decreasing supply chain costs, improving technologies and increased competition

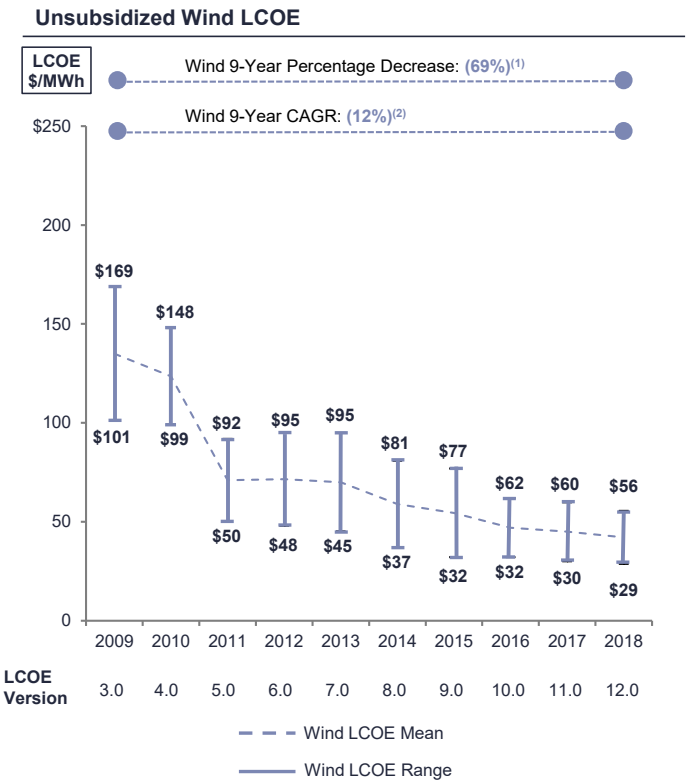
Selected Historical Mean Unsubsidized LCOE Values(1)

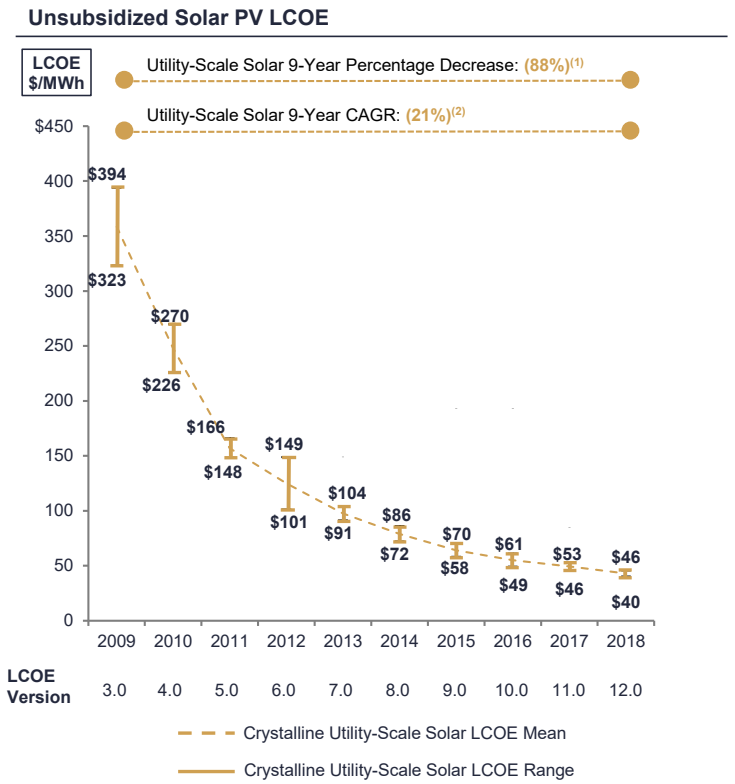
Source: Lazard estimates.

(1) Reflects the average of the high and low LCOE for each respective technology in each respective year. Percentages represent the total decrease in the average LCOE since Lazard's LCOE—Version 3.0.

Levelized Cost of Energy Comparison—Historical Alternative Energy LCOE Declines

In light of material declines in the pricing of system components (e.g., panels, inverters, turbines, etc.) and improvements in efficiency, among other factors, wind and utility-scale solar PV have seen dramatic historical LCOE declines; however, over the past several years the rate of such LCOE declines have started to flatten

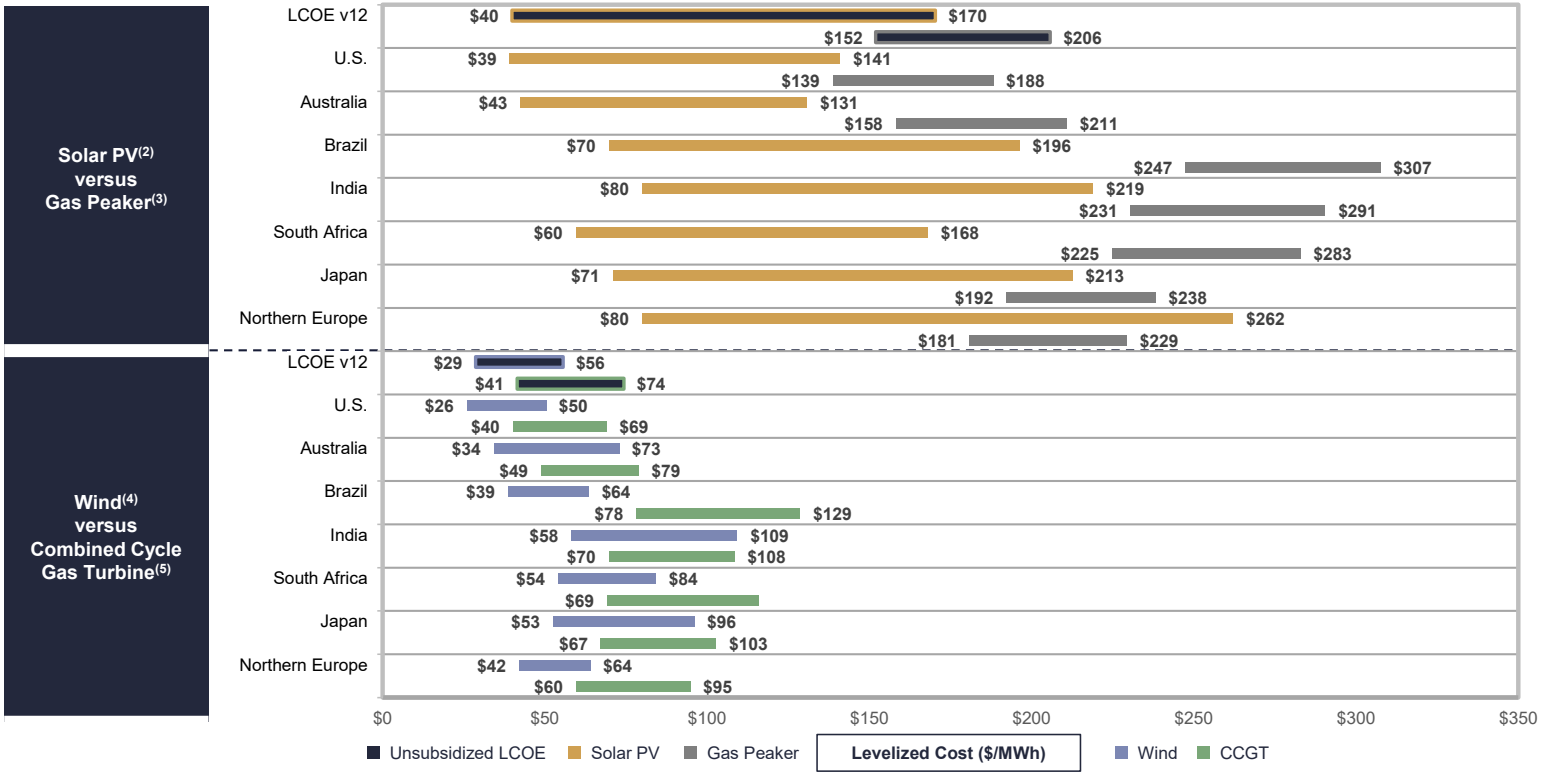




Source: Lazard estimates.
(1) Represents the average percentage decrease of the high end and low end of the LCOE range.
(2) Represents the average compounded annual rate of decline of the high end and low end of the LCOE range.

Solar PV versus Peaking and Wind versus CCGT—Global Markets(1)

Solar PV and wind have become an increasingly attractive resource relative to conventional generation technologies with similar generation profiles; without storage, however, these resources lack the dispatch characteristics of such conventional generation technologies



Source: Lazard estimates.

(1) Equity IRRs are assumed to be 10% for the U.S., 12% for Australia, Japan and Northern Europe and 18% for Brazil, India and South Africa. Cost of debt is assumed to be 6% for the U.S., 8% for Australia, Japan and Northern Europe, 14.5% for Brazil, 13% for India and 11.5% for South Africa.

(2) Low end assumes crystalline utility-scale solar with a single-axis tracker. High end assumes rooftop C&I solar. Solar projects assume illustrative capacity factors of 21% – 28% for the U.S., 26% – 30% for Australia, 26% – 28% for Brazil, 22% – 23% for India, 27% – 29% for South Africa, 16% – 18% for Japan and 13% – 16% for Northern Europe.

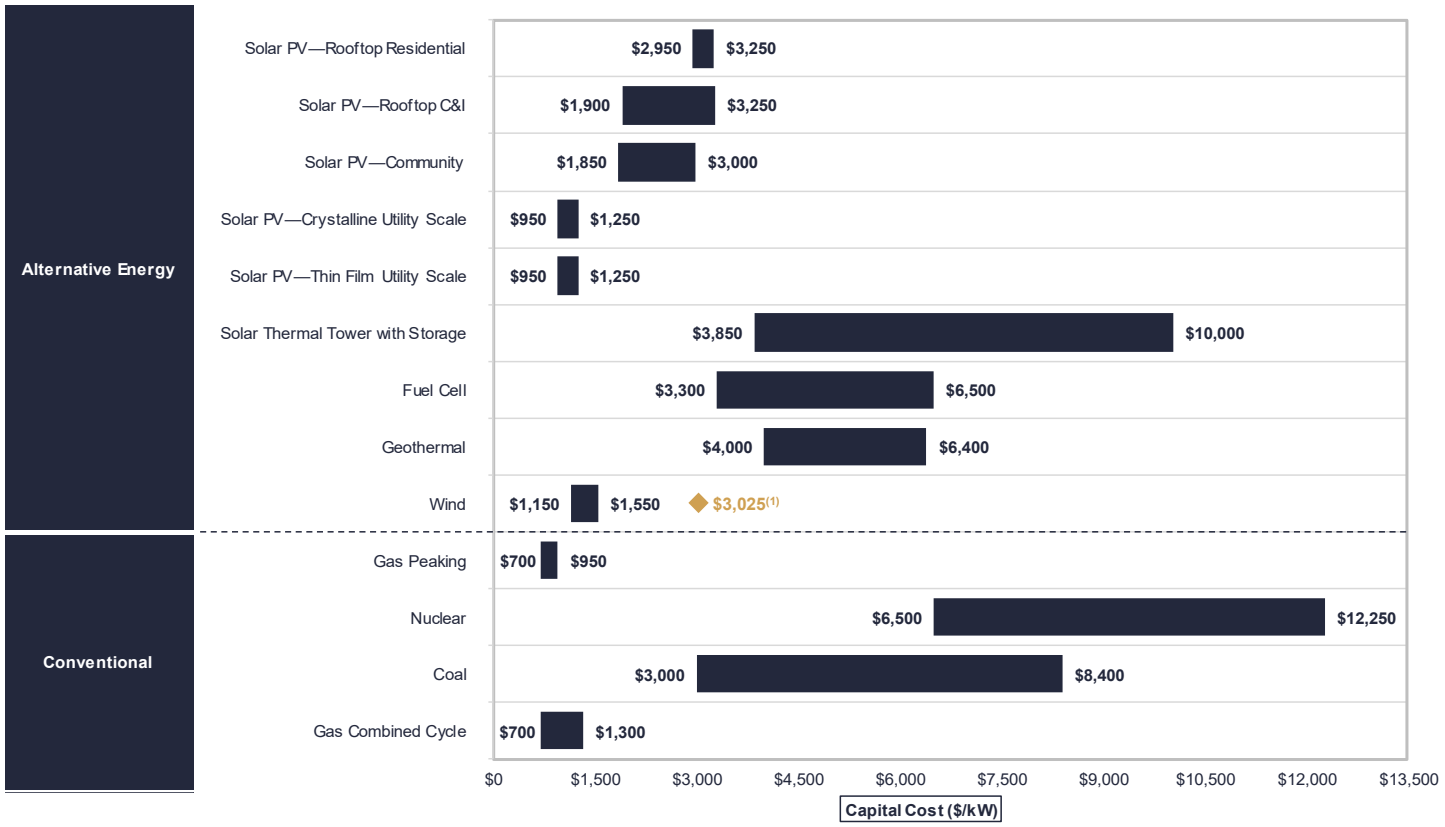
(3) Assumes natural gas prices of $3.45 for the U.S., $4.00 for Australia, $8.00 for Brazil, $7.00 for India, South Africa and Japan and $6.00 for Northern Europe (all in U.S. $ per MMBtu). Assumes a capacity factor of 10% for all geographies.

(4) Wind projects assume illustrative capacity factors of 38% – 55% for the U.S., 29% – 46% for Australia, 45% – 55% for Brazil, 25% – 35% for India, 31% – 36% for South Africa, 22% – 30% for Japan and 33% – 38% for Northern Europe.

(5) Assumes natural gas prices of $3.45 for the U.S., $4.00 for Australia, $8.00 for Brazil, $7.00 for India, South Africa and Japan and $6.00 for Northern Europe (all in U.S. $ per MMBtu). Assumes capacity factors of 43% – 80% on the high and low ends, respectively, for all geographies.

Capital Cost Comparison

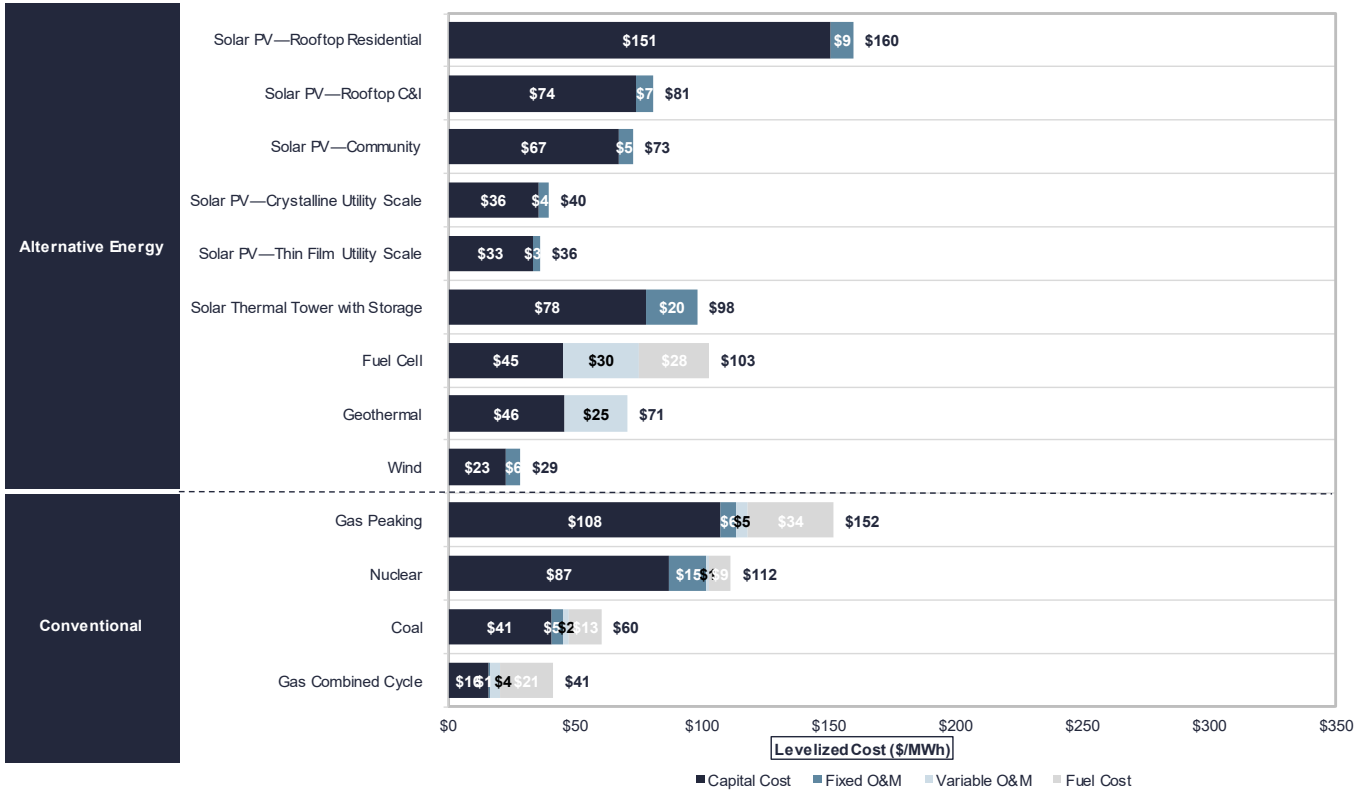
While capital costs for a number of Alternative Energy generation technologies are currently in excess of some conventional generation technologies, declining costs for many Alternative Energy generation technologies, coupled with uncertain long-term fuel costs for conventional generation technologies, are working to close formerly wide gaps in LCOE values



Source: Lazard estimates.
(1) Represents the estimated midpoint of the total capital cost for offshore wind.

Levelized Cost of Energy Components—Low End

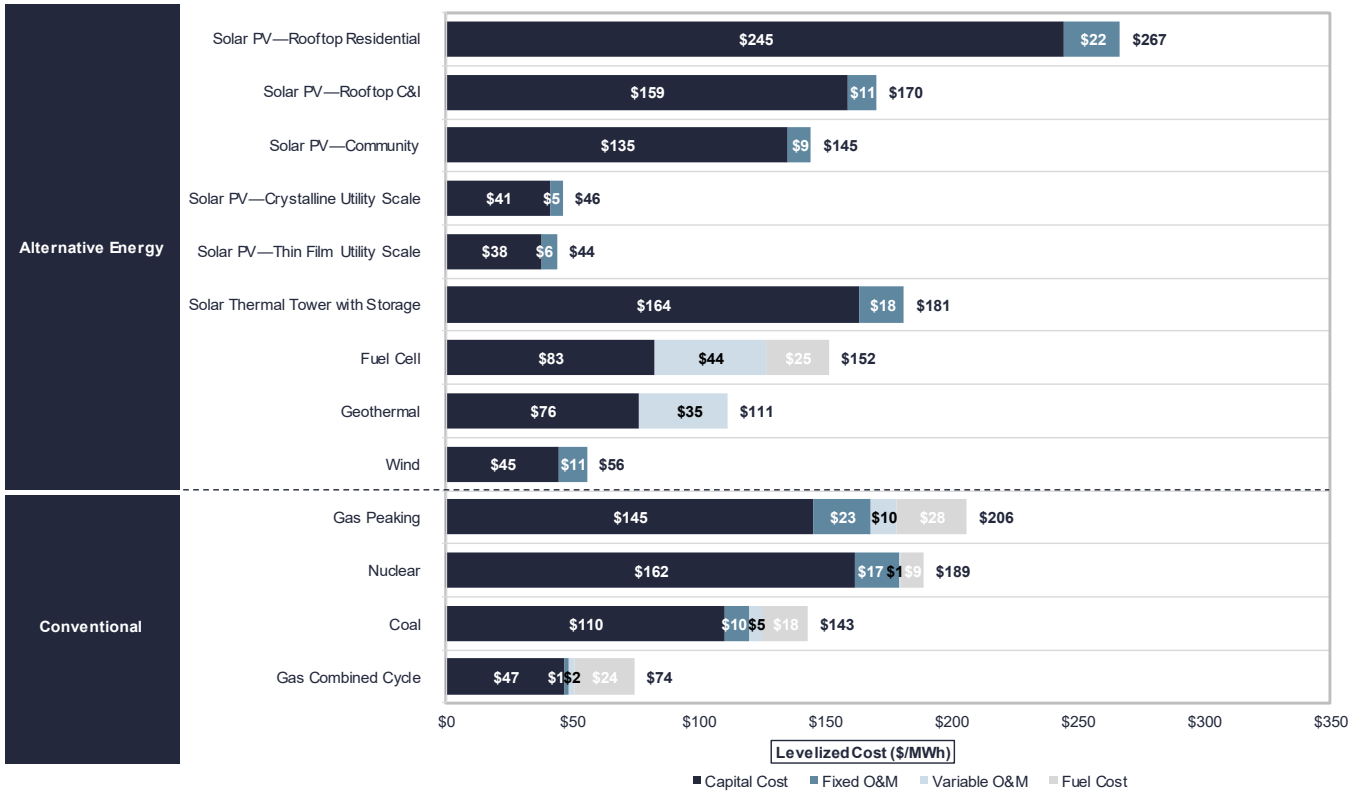
Certain Alternative Energy generation technologies are already cost-competitive with conventional generation technologies; a key factor regarding the long-term competitiveness of Alternative Energy generation technologies is the ability of technological development and increased production volumes to materially lower operating expenses and capital costs for Alternative Energy generation technologies



LAZARD *Source: Lazard estimates.*

Levelized Cost of Energy Components—High End

Certain Alternative Energy generation technologies are already cost-competitive with conventional generation technologies; a key factor regarding the long-term competitiveness of Alternative Energy generation technologies is the ability of technological development and increased production volumes to materially lower operating expenses and capital costs for Alternative Energy generation technologies



LAZARD *Source: Lazard estimates.*

Levelized Cost of Energy Comparison—Methodology

($ in millions, unless otherwise noted)

Lazard's LCOE analysis consists of creating a power plant model representing an illustrative project for each relevant technology and solving for the $/MWh figure that results in a levered IRR equal to the assumed cost of equity (see appendix for detailed assumptions by technology)

Unsubsidized Wind — High Case Sample Illustrative Calculations

Year [1]		*0*	*1*	*2*	*3*	*4*	*5*	*20*
Capacity (MW)	(A)		150	150	150	150	150	150
Capacity Factor	(B)		38%	38%	38%	38%	38%	38%
Total Generation ('000 MWh)	(A) x (B) = (C)*		499	499	499	499	499	499
Levelized Energy Cost ($/MWh)	***(D)***		***$55.6***	***$55.6***	***$55.6***	***$55.6***	***$55.6***	***$55.6***
Total Revenues	**(C) x (D) = (E)***		**$27.8**	**$27.8**	**$27.8**	**$27.8**	**$27.8**	**$27.8**
Total Fuel Cost	(F)		--	--	--	--	--	--
Total O&M	(G)*		5.5	5.6	5.7	5.9	6.0	8.4
Total Operating Costs	**(F) + (G) = (H)**		**$5.5**	**$5.6**	**$5.7**	**$5.9**	**$6.0**	$8.4
EBITDA	**(E) - (H) = (I)**		**$22.3**	**$22.2**	**$22.0**	**$21.9**	**$21.8**	**$19.4**
Debt Outstanding - Beginning of Period	(J)		$139.5	$136.7	$133.7	$130.5	$127.0	$24.8
Debt - Interest Expense	(K)		(11.2)	(10.9)	(10.7)	(10.4)	(10.2)	(2.0)
Debt - Principal Payment	(L)		(2.8)	(3.0)	(3.2)	(3.5)	(3.8)	(11.9)
Levelized Debt Service	(K) + (L) = (M)		($13.9)	($13.9)	($13.9)	($13.9)	($13.9)	($13.9)
EBITDA	**(I)**		$22.3	$22.2	$22.0	$21.9	$21.8	$19.4
Depreciation (MACRS)	(N)		(46.5)	(74.4)	(44.6)	(26.8)	(26.8)	--
Interest Expense	(K)		(11.2)	(10.9)	(10.7)	(10.4)	(10.2)	(2.0)
Taxable Income	**(I) + (N) + (K) = (O)**		**($35.4)**	**($63.2)**	**($33.3)**	**($15.3)**	**($15.2)**	**$17.4**
Tax Benefit (Liability) [2]	**(O) x (tax rate) = (P)**		**$14.2**	**$25.3**	**$13.3**	**$6.1**	**$6.1**	**($7.0)**
After-Tax Net Equity Cash Flow	**(I) + (M) + (P) = (Q)**	**($93.0)**[3]	**$22.5**	**$33.5**	**$21.4**	**$14.1**	**$13.9**	**($1.5)**
IRR For Equity Investors		**12.0%**						

Key Assumptions [4]	
Capacity (MW)	150
Capacity Factor	38%
Fuel Cost ($/MMBtu)	$0.00
Heat Rate (Btu/kWh)	0
Fixed O&M ($/kW-year)	$36.5
Variable O&M ($/MWh)	$0.0
O&M Escalation Rate	2.25%
Capital Structure	
Debt	60.0%
Cost of Debt	8.0%
Equity	40.0%
Cost of Equity	12.0%
Taxes and Tax Incentives:	
Combined Tax Rate	40%
Economic Life (years) [5]	20
MACRS Depreciation (Year Schedule)	5
Capex	
EPC Costs ($/kW)	$1,550
Additional Owner's Costs ($/kW)	$0
Transmission Costs ($/kW)	$0
Total Capital Costs ($/kW)	$1,550
Total Capex ($mm)	$233

Source: *Lazard estimates.*
Note: Wind—High LCOE case presented for illustrative purposes only.
* Denotes unit conversion.
(1) Assumes half-year convention for discounting purposes.
(2) Assumes full monetization of tax benefits or losses immediately.
(3) Reflects initial cash outflow from equity investors.
(4) Reflects a "key" subset of all assumptions for methodology illustration purposes only. Does not reflect all assumptions.
(5) Economic life sets debt amortization schedule. For comparison purposes, all technologies calculate LCOE on a 20-year IRR basis.

Technology-dependent
Levelized

Energy Resources—Matrix of Applications

While the LCOE for Alternative Energy generation technologies is, in some cases, competitive with conventional generation technologies, direct comparisons must take into account issues such as location (e.g., centralized vs. distributed) and dispatch characteristics (e.g., baseload and/or dispatchable intermediate load vs. peaking or intermittent technologies)

- **This analysis does not take into account potential social and environmental externalities or reliability-related considerations**

		Carbon Neutral/ REC Potential	Location			Dispatch			
			Distributed	Centralized	Geography	Intermittent	Peaking	Load-Following	Base-Load
Alternative Energy	Solar PV(1)	✓	✓	✓	Universal(2)	✓	✓		
	Solar Thermal	✓		✓	Varies	✓	✓	✓	
	Fuel Cell	✗	✓		Universal				✓
	Geothermal	✓		✓	Varies				✓
	Onshore Wind	✓		✓	Varies	✓			
Conventional	Gas Peaking	✗	✓	✓	Universal		✓	✓	
	Nuclear	✓		✓	Rural				✓
	Coal	✗(3)		✓	Co-located or rural				✓
	Gas Combined Cycle	✗		✓	Universal			✓	✓

Source: Lazard estimates.

(1) Represents the full range of solar PV technologies; low end represents thin film utility-scale solar single-axis tracking, high end represents the high end of rooftop residential solar.
(2) Qualification for RPS requirements varies by location.
(3) For the purposes of this analysis, carbon neutrality also considers the emissions produced during plant construction and fuel extraction.

Cost of Carbon Abatement Comparison

As policymakers consider ways to limit carbon emissions, Lazard's LCOE analysis provides insight into the implicit "costs of carbon **avoidance", as measured by the abatement value offered by Alternative Energy generation technologies. This analysis suggests** that policies designed to promote wind and utility-scale solar development could be a particularly cost-effective means of limiting carbon emissions; providing an implied value of carbon abatement of $26 – $34/Ton vs. Coal and $10 – $25/Ton vs. Gas Combined Cycle

- **These observations do not take into account potential social and environmental externalities or reliability or grid-related considerations**

		Conventional Generation			Alternative Energy Generation			
	Units	Coal	Gas Combined Cycle	Nuclear	Wind	Solar PV Rooftop	Solar PV Utility Scale	Solar Thermal with Storage
Capital Investment/KW of Capacity [1]	$/kW	$3,000	$700	$6,500	$1,150	$2,950	$950	$3,850
Total Capital Investment	**$mm**	**1,800**	**490**	**4,030**	**1,162**	**8,673**	**1,558**	**5,044**
Facility Output	MW	600	700	620	1,010	2,940	1,640	1,310
Capacity Factor	%	93%	80%	90%	55%	19%	34%	43%
Effective Facility Output	**MW**	**558**	**558**	**558**	**558**	**558**	**558**	**558**
MWh/Year Produced [2]	GWh/yr	4,888	4,888	4,888	4,888	4,888	4,888	4,888
Levelized Cost of Energy	$/MWh	$60	$41	$112	$29	$160	$36	$98
Total Cost of Energy Produced	**$mm/yr**	**$296** (2)	**$203**	**$546**	**$140**	**$781**	**$178** (1)	**$480**
CO_2 Equivalent Emissions	Tons/MWh	0.92	0.51	—	—	—	—	—
Carbon Emitted	mm Tons/yr	4.51	2.50	—	—	—	—	—
Difference in Carbon Emissions	mm Tons/yr							
vs. Coal		—	2.01	4.51	4.51	4.51	4.51 (3)	4.51
vs. Gas		—	—	2.50	2.50	2.50	2.50	2.50
Difference in Total Energy Cost	$mm/yr							
vs. Coal		—	($93)	$250	($155)	$485	($118) (4)	$185
vs. Gas		—	—	$343	($63)	$578	($25)	$278
Implied Abatement Value/(Cost)	$/Ton							
vs. Coal		—	$46	($55)	$34	($108)	$26 (5)	($41)
vs. Gas		—	—	($137)	$25	($231)	$10	($111)

: Favorable vs. Coal/Gas : Unfavorable vs. Coal/Gas

Implied Carbon Abatement Value Calculation (Solar vs. Coal)—Methodology

(4) Difference in Total Energy Cost (Solar vs. Coal) = (1) – (2)
= $178 mm/yr (Solar) – $296 mm/yr (Coal) = ($118) mm/yr

(5) Implied Carbon Abatement Value (Solar vs. Coal) = (4) ÷ (3)
= $118 mm/yr ÷ 4.51 mm Tons/yr = $26/Ton

Source: Lazard estimates.
(1) Inputs for each of the various technologies are those associated with the low end LCOE.
(2) All facilities illustratively sized to produce 4,888 GWh/yr.

Levelized Cost of Energy—Key Assumptions

		Solar PV				
	Units	Rooftop—Residential	Rooftop—C&I	Community	Utility Scale—Crystalline [2]	Utility Scale—Thin Film [2]
Net Facility Output	MW	0.005	1	5	50	50
Total Capital Cost [1]	$/kW	$2,950 – $3,250	$1,900 – $3,250	$1,850 – $3,000	$1,250 – $950	$1,250 – $950
Fixed O&M	$/kW-yr	$14.50 – $25.00	$15.00 – $20.00	$12.00 – $16.00	$12.00 – $9.00	$12.00 – $9.00
Variable O&M	$/MWh	—	—	—	—	—
Heat Rate	Btu/kWh	—	—	—	—	—
Capacity Factor	%	19% – 13%	25% – 20%	25% – 20%	32% – 21%	34% – 23%
Fuel Price	$/MMBtu	—	—	—	—	—
Construction Time	Months	3	3	4 – 6	9	9
Facility Life	Years	25	25	30	30	30
Levelized Cost of Energy	$/MWh	$160 – $267	$81 – $170	$73 – $145	$40 – $46	$36 – $44

Source: Lazard estimates.

(1) Includes capitalized financing costs during construction for generation types with over 24 months construction time.

(2) Left column represents the assumptions used to calculate the low end LCOE for single-axis tracking. Right column represents the assumptions used to calculate the high end LCOE for fixed-tilt design. Assumes 50 MW system in high insolation jurisdiction (e.g., Southwest U.S.).

Levelized Cost of Energy—Key Assumptions (cont'd)

	Units	Solar Thermal Tower with Storage	Fuel Cell	Geothermal	Wind—Onshore	Wind—Offshore
Net Facility Output	MW	135 – 110	2.4	20 – 50	150	210 – 385
Total Capital Cost [(1)]	$/kW	$3,850 – $10,000	$3,300 – $6,500	$4,000 – $6,400	$1,150 – $1,550	$2,250 – $3,800
Fixed O&M	$/kW-yr	$75.00 – $80.00	—	—	$28.00 – $36.50	$80.00 – $110.00
Variable O&M	$/MWh	—	$30.00 – $44.00	$25.00 – $35.00	—	—
Heat Rate	Btu/kWh	—	8,027 – 7,260	—	—	—
Capacity Factor	%	43% – 52%	95%	90% – 85%	55% – 38%	55% – 45%
Fuel Price	$/MMBtu	—	3.45	—	—	—
Construction Time	Months	36	3	36	12	12
Facility Life	Years	35	20	25	20	20
Levelized Cost of Energy	$/MWh	$98 – $181	$103 – $152	$71 – $111	$29 – $56	$62 – $121

Source: Lazard estimates.
(1) Includes capitalized financing costs during construction for generation types with over 24 months construction time.

Levelized Cost of Energy—Key Assumptions (cont'd)

	Units	Gas Peaking	Nuclear	Coal	Gas Combined Cycle
Net Facility Output	MW	241 – 50	2,200	600	550
Total Capital Cost [1]	$/kW	$700 – $950	$6,500 – $12,250	$3,000 – $8,400	$700 – $1,300
Fixed O&M	$/kW-yr	$5.00 – $20.00	$115.00 – $135.00	$40.00 – $80.00	$6.00 – $5.50
Variable O&M	$/MWh	$4.70 – $10.00	$0.75 – $0.75	$2.00 – $5.00	$3.50 – $2.00
Heat Rate	Btu/kWh	9,804 – 8,000	10,450 – 10,450	8,750 – 12,000	6,133 – 6,900
Capacity Factor	%	10%	90%	93%	80%
Fuel Price	$/MMBtu	$3.45 – $3.45	$0.85 – $0.85	$1.45 – $1.45	$3.45 – $3.45
Construction Time	Months	12 – 18	69 – 69	60 – 66	24 – 24
Facility Life	Years	20	40	40	20
Levelized Cost of Energy	$/MWh	$152 – $206	$112 – $189	$60 – $143	$41 – $74

Source: Lazard estimates.
(1) Includes capitalized financing costs during construction for generation types with over 24 months construction time.

Summary Considerations

Lazard has conducted this analysis comparing the LCOE for various conventional and Alternative Energy generation technologies in order to understand which Alternative Energy generation technologies may be cost-competitive with conventional generation technologies, either now or in the future, and under various operating assumptions, as well as to understand which technologies are best suited for various applications based on locational requirements, dispatch characteristics and other factors. We find that Alternative Energy technologies are complementary to conventional generation technologies, and believe that their use will be increasingly prevalent for a variety of reasons, including environmental and social consequences of various conventional generation technologies, RPS requirements, carbon regulations, continually improving economics as underlying technologies improve and production volumes increase and government subsidies in certain regions.

In this analysis**, Lazard's approach was to determine the** LCOE, on a $/MWh basis, that would provide an after-tax IRR to equity holders equal to an assumed cost of equity capital. Certain assumptions (e.g., required debt and equity returns, capital structure, etc.) were identical for all technologies in order to isolate the effects of key differentiated inputs such as investment costs, capacity factors, operating costs, fuel costs (where relevant) and other important metrics on the LCOE. These inputs were originally developed with a leading consulting and engineering **firm to the Power & Energy Industry, augmented with Lazard's commercial knowledge where relevant. This analysis (as well as p**revious versions) has benefited from additional input from a wide variety of Industry participants.

Lazard has not manipulated capital costs or capital structure for various technologies, as the goal of the study was to compare the current state of various generation technologies, rather than the benefits of financial engineering. The results contained in this study would be altered by different assumptions regarding capital structure (e.g., increased use of leverage) or capital costs (e.g., a willingness to accept lower returns than those assumed herein).

Key sensitivities examined included fuel costs and tax subsidies. Other factors would also have a potentially significant effect on the results contained herein, but have not been examined in the scope of this current analysis. These additional factors, among others, could include: import tariffs; capacity value vs. energy value; stranded costs related to distributed generation or otherwise; network upgrade, transmission, congestion or other integration-related costs; significant permitting or other development costs, unless otherwise noted; and costs of complying with various environmental regulations (e.g., carbon emissions offsets or emissions control systems). This analysis also does not address potential social and environmental externalities, including, for example, the social costs and rate consequences for those who cannot afford distribution generation solutions, as well as the long-term residual and societal consequences of various conventional generation technologies that are difficult to measure (e.g., nuclear waste disposal, airborne pollutants, greenhouse gases, etc.).

Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

Vol. 37, No. 12, December 1, 2018

Wolters Kluwer

BLUE CHIP FINANCIAL FORECASTS®

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Blue Chip Financial Forecasts® (ISSN: 0741-8345) is published monthly by CCH Incorporated, 76 Ninth Avenue, New York, NY 10011. Printed in the U.S.A.

Subscriptions: $1,791 per year for print delivery of 12 monthly issues. For alternate formats (PDF, Excel, online), multiple-copy rates and site-license agreements call Chris Carr in the U.S. at 212-771-0881. You may also contact him at: chris.carr@wolterskluwer.com

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Growth, Interest Rate Outlook Unchanged Despite Stock Market Volatility

Domestic Commentary The Blue Chip Financial Forecasts panel continues to look for the gradual pace of Federal Reserve tightening it has anticipated for a number of months. The panel forecasts a 25-basis-point hike in the federal funds rate at the December 18-19 meeting of the Federal Open Market Committee, followed by several increases during 2019, leading to a roundly 3% rate by Q4. In this month's semi-annual long-term outlook, the panel consensus projects that 3% could last well through the 2020s. This path of Fed policy would accompany an orderly flow of economic activity, with GDP growth tapering very gently from a consensus estimate of 2.6% this quarter to 2% at the end of 2019. After a couple of slow-growth years just below 2%, the consensus sees the trend moving back up just above 2% for several years following. Inflation, measured by the CPI, is also seen hovering just a bit above 2%.

At the same time, the most prominent feature of financial markets in recent weeks has been the wide and mostly downward swings in stock prices. The S&P 500, for instance, had fallen 9.6% from its September 20 peak by this past Wednesday, November 21, and that day stood 0.9% below its value on December 31, 2017, thus having erased all of its gain heretofore in 2018. Moreover, for this year so far, the CBOE volatility index, or VIX, has moved with a standard deviation of 4.51, in stark contrast to just 1.35 during all of 2017.

This volatility, especially during which a widely accepted measure of stock market volatility is itself unusually volatile, raises questions about expectations for markets and, by extension, the economy itself. Should we be worried? Does this financial market instability have something useful to tell us about the outlook?

Notably, despite these recent wide swings in equity-market measures, the economic and financial market forecasts compiled by the Blue Chip Financial Forecasts panel have not changed. In fact, across the board, the main economic and inflation aggregate and various interest rate forecasts are almost identical quarter-by-quarter this month to those from the late September survey near the stock market peak and again those from late October. In the current survey, taken November 19 and 20, no participant has reduced their forecast of the federal funds rate for this quarter or next. One or two have reduced their forecasts for later in 2019, but in only one case does that reduction actually involve an outright cut in the fed funds rate target rather than just slowing the pace of tightening. Moreover, three or four participants have raised their quarterly forecasts throughout the forecast span to Q1 2020. These differences are not large, but it's the direction that gets our attention.

It's clearly not in our purview to analyze stock market developments. But it is the case that equity valuations and the resulting measures of aggregate market capitalization were very high through the market price peak in September and may have become disconnected from the real economy. Thus, one view of the recent equity market prices action is that it is just a correction which is basically constructive for the economy as a whole.

It's also the case that various features of the economy and financial markets are behaving in a relatively orderly manner. Excesses seem limited. The statement issued by the FOMC at the conclusion of their November 8 meeting includes the sentence, "Risks to the economic outlook appear roughly balanced." Also, in a recent article, the economics staff of one large financial institution, Goldman Sachs, describes its forecast for an ongoing Fed policy of continued gradual tightening as couched in an environment "with risks that are broadly balanced." This article, which analyzes Fed policy reactions to stock market movements, is reproduced here in the "Viewpoints" feature on page 13.

Two specific measures of economic and financial risk that we follow in this commentary continue to move along moderate paths. The yield curve, 10-year Treasuries less 2-year Treasuries, has held to a narrow range around 26 basis points. There can always be concern that with a maturing economic expansion, this curve could invert, producing one of the early signs of impending recession. While this month's survey doesn't contain the frequently asked "Special Question" about the probability of such an inversion, the forecasts can be examined for such a signal. The consensus does look for some further narrowing, but it would be a very small amount and the spread would hold very near to 20 basis points. In fact, this month, the adjustments to forecasts actually show a marginal widening from the November forecasts. As time goes on, the long-run projections indicate some limited further widening.

Quality spreads in the corporate bond market can also signal concern. Yields on high-grade corporates, with Aaa ratings, have recently run right at one percentage point above 30-year Treasuries. This is modestly wider than early in 2018, when they were about 80 basis points higher. Our panelists look for the one percentage-point gap to hold through next year, hardly an indication of credit distress for strong companies. Baa bonds run wider to Treasuries; their spread to the 30-year Treasury yield was about 1.63 percentage points in late September and early October. It has widened steadily since then, reaching 1.87 percentage points last week. The panel anticipates that this recent high would continue, but not widen markedly farther. So the decline in the stock market is accompanying somewhat more perceived risk in other corporate securities, but this would be quite modest by historical standards. In comparison, in late 2015 this spread was about 2.65 percentage points, and it was greater than 5 percentage points during the Great Recession in 2008-09. The conclusion appears to be that we should be cautious, but hardly alarmed in light of the current bond market moves that are happening along with the stock market volatility.

Longer-Term Outlook. As mentioned above, this month's survey included the semi-annual long-term financial market outlook, detailed here on page 14. By their nature, longer-term forecasts are trend-reverting and so typically do not exhibit much volatility. In the near term, following an estimated 2.9% expansion this year, GDP is forecast to grow 2.7% next year. By Q1 2020, the consensus shows just a 1.8% annualized gain and also projects that for 2020 as a whole and again in 2021. After that, a slight pick-up is foreseen, carrying GDP up at a 2.0%-2.2% pace through 2029. Inflation, too, is seen at about a 2% pace, with a consistent, almost constant increase of 2.1% each year in the GDP chain price index and 2.2% in the CPI. It thus appears that the Fed's current tightening policy is seen to be effective in keeping inflation from accelerating, with some modest sacrifice of economic vigor early in the projection period.

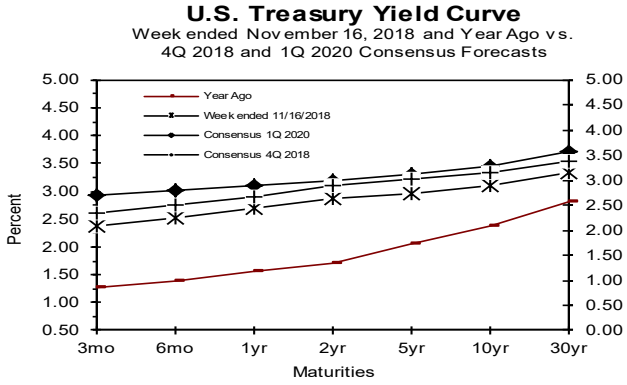
The accompanying interest rate outlook has a similar orderly pattern. The Fed's gradual tightening cycle concludes with the funds rate in a range of 2-3/4% to 3% extending through 2020, and possibly even a bit of easing toward the end of that span to an average of 2.8% for the early 2020s. By mid-decade the consensus sees an increase to 3% or a bit higher. In that setting, 2-year Treasury notes would trade for most of the decade at about 3.3%-3.4% with 10-year Treasuries at 3.50% to 3.75%. Long bonds would climb to and through 4%, reaching 4.25% during the middle and latter years of the 2020 decade. High-grade corporate bonds would maintain their 1-percentage point spread over the 30-year bond with upper medium-grade corporates (Baa rated) sustaining their recent 1.85-1.95 percentage point spreads.

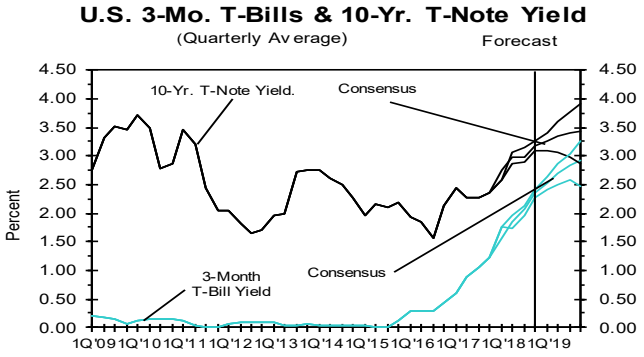
Carol Stone, CBE (Haver Analytics, NY, NY)

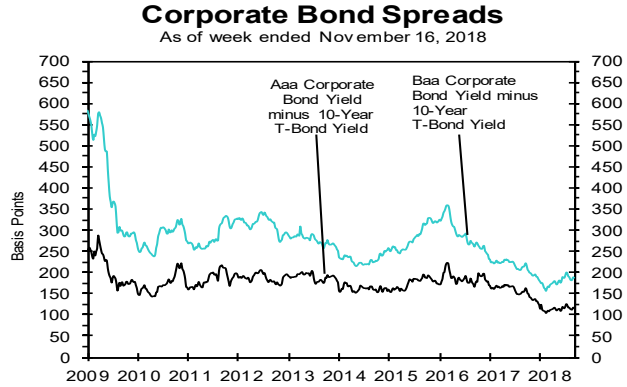
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

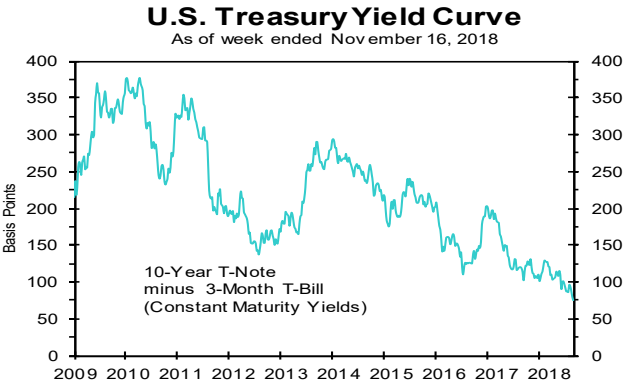
	History				History				Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Qtr	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Nov 16	Nov 9	Nov 2	Oct 26	Oct	Sep	Aug	Q3 2018	2018	2019	2019	2019	2019	2020
Federal Funds Rate	2.19	2.20	2.20	2.19	2.19	1.95	1.91	1.92	**2.3**	**2.5**	**2.7**	**2.9**	**3.0**	**3.0**
Prime Rate	5.25	5.25	5.25	5.25	5.25	5.03	5.00	5.01	**5.3**	**5.5**	**5.7**	**5.9**	**6.0**	**6.0**
LIBOR, 3-mo.	2.63	2.60	2.56	2.50	2.46	2.35	2.32	2.34	**2.6**	**2.8**	**3.0**	**3.2**	**3.3**	**3.3**
Commercial Paper, 1-mo.	2.29	2.27	2.25	2.26	2.23	2.06	1.96	1.99	**2.3**	**2.5**	**2.7**	**2.9**	**2.9**	**2.9**
Treasury bill, 3-mo.	2.37	2.36	2.33	2.34	2.29	2.17	2.07	2.08	**2.4**	**2.5**	**2.7**	**2.8**	**2.9**	**2.9**
Treasury bill, 6-mo.	2.52	2.52	2.49	2.48	2.46	2.34	2.24	2.25	**2.5**	**2.7**	**2.8**	**3.0**	**3.0**	**3.0**
Treasury bill, 1 yr.	2.70	2.73	2.67	2.66	2.65	2.56	2.45	2.47	**2.7**	**2.8**	**3.0**	**3.1**	**3.1**	**3.1**
Treasury note, 2 yr.	2.86	2.94	2.85	2.86	2.86	2.77	2.64	2.67	**2.9**	**3.0**	**3.1**	**3.2**	**3.2**	**3.2**
Treasury note, 5 yr.	2.95	3.06	2.97	2.98	3.00	2.89	2.77	2.81	**3.0**	**3.1**	**3.2**	**3.3**	**3.4**	**3.3**
Treasury note, 10 yr.	3.11	3.21	3.14	3.14	3.15	3.00	2.89	2.93	**3.2**	**3.3**	**3.4**	**3.4**	**3.4**	**3.4**
Treasury note, 30 yr.	3.35	3.42	3.38	3.35	3.34	3.15	3.04	3.07	**3.4**	**3.5**	**3.6**	**3.6**	**3.7**	**3.7**
Corporate Aaa bond	4.34	4.38	4.38	4.33	4.30	4.14	4.04	4.08	**4.2**	**4.5**	**4.6**	**4.7**	**4.8**	**4.8**
Corporate Baa bond	5.15	5.14	5.13	5.06	5.02	4.84	4.75	4.79	**5.1**	**5.3**	**5.5**	**5.5**	**5.6**	**5.6**
State & Local bonds	3.87	3.91	3.87	3.85	3.84	3.72	3.63	3.65	**4.1**	**4.2**	**4.3**	**4.4**	**4.4**	**4.4**
Home mortgage rate	4.94	4.94	4.83	4.86	4.83	4.63	4.55	4.57	**4.8**	**5.0**	**5.1**	**5.2**	**5.2**	**5.2**
	History				History				Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2016	2017	2017	2017	2017	2018	2018	2018	2018	2019	2019	2019	2019	2020
Major Currency Index	93.6	94.3	92.9	88.3	88.9	86.1	88.3	90.2	**90.6**	**90.5**	**90.1**	**89.2**	**89.1**	**88.9**
Real GDP	1.8	1.8	3.0	2.8	2.3	2.2	4.2	3.5	**2.6**	**2.4**	**2.4**	**2.2**	**2.0**	**1.8**
GDP Price Index	2.3	2.0	1.2	2.2	2.5	2.0	3.0	1.7	**2.3**	**2.2**	**2.3**	**2.2**	**2.2**	**2.2**
Consumer Price Index	2.7	3.0	0.1	2.1	3.3	3.5	1.7	2.0	**2.2**	**2.2**	**2.2**	**2.3**	**2.3**	**2.3**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS).









----------3-Month Interest Rates[1]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	2.65	2.49	1.45	**2.72**	**2.97**	**3.18**
Japan	-0.11	-0.09	-0.04	**-0.01**	**-0.01**	**0.00**
U.K.	0.89	0.80	0.52	**0.89**	**1.09**	**1.27**
Switzerland	-0.74	-0.74	-0.75	**-0.78**	**-0.81**	**-0.85**
Canada	2.18	2.12	1.35	**2.06**	**2.34**	**2.60**
Australia	2.21	2.32	2.05	**2.05**	**2.22**	**2.29**
Euro area	-0.32	-0.32	-0.33	**-0.32**	**-0.30**	**-0.19**

----------10-Yr. Government Bond Yields[2]------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	3.06	3.17	2.36	**3.21**	**3.29**	**3.32**
Germany	0.35	0.42	0.34	**0.58**	**0.67**	**0.82**
Japan	0.14	0.08	0.03	**0.11**	**0.12**	**0.12**
U.K.	1.41	1.47	1.32	**1.59**	**1.74**	**1.91**
France	0.78	0.79	0.66	**0.88**	**0.97**	**1.03**
Italy	3.61	3.60	1.77	**3.31**	**3.31**	**3.29**
Switzerland	0.04	0.09	-0.10	**0.08**	**0.13**	**0.25**
Canada	2.35	2.45	1.92	**2.66**	**2.76**	**2.87**
Australia	2.69	2.68	2.55	**2.70**	**2.78**	**2.82**
Spain	1.64	1.63	1.50	**1.76**	**1.84**	**1.90**

----------Foreign Exchange Rates[3]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	91.44	90.94	89.12	**92.7**	**91.5**	**87.4**
Japan	112.76	112.12	112.46	**113.2**	**112.0**	**111.1**
U.K.	1.28	1.30	1.32	**1.31**	**1.32**	**1.35**
Switzerland	1.00	0.99	0.99	**1.00**	**1.00**	**0.99**
Canada	1.32	1.31	1.28	**1.29**	**1.30**	**1.25**
Australia	0.73	0.71	0.76	**0.71**	**0.71**	**0.71**
Euro	1.14	1.15	1.17	**1.15**	**1.16**	**1.21**

	Consensus 3-Month Rates vs. U.S. Rate			Consensus 10-Year Gov't Yields vs. U.S. Yield	
	Now	In 12 Mo.		Now	In 12
Japan	-2.76	**-3.18**	Germany	-2.71	**-2.50**
U.K.	-1.76	**-1.91**	Japan	-2.95	**-3.20**
Switzerland	-3.39	**-4.04**	U.K.	-1.65	**-1.41**
Canada	-0.47	**-0.58**	France	-2.28	**-2.30**
Australia	-0.71	**-0.89**	Italy	0.55	**-0.03**
Euro area	-2.97	**-3.38**	Switzerland	-3.03	**-3.07**
			Canada	-0.72	**-0.45**
			Australia	-0.37	**-0.51**
			Spain	-1.42	**-1.42**

Forecasts of panel members are on pages 10 and 11. Definitions of variables are as follows: [1]Three month rate on interest-earning money market deposits denominated in selected currencies. [2]Government bonds are yields to maturity. [3]Foreign exchange rate forecasts for U.K., Australia and the Euro are U.S. dollars per currency unit. For the U.S dollar, forecasts are of the U.S. Federal Reserve Board's Major Currency Index.

International Commentary Equity market volatility continued to roil financial markets in November with equity prices worldwide exhibiting wide swings and measures of volatility rising. However, thus far, central banks have not expressed any concerns over the equity market turmoil, and so it seems that the equity price action to date has not yet impacted monetary policy.

The **Bank of Canada** raised its policy rate 25bps at its October meeting, as was widely expected. While the Bank again stated that further rate increases are needed to achieve its 2% inflation target, the market does not believe that the economy is sufficiently strong and inflation pressures sufficiently intense to warrant a rate hike at two consecutive policy committee meetings. Its next meeting is December 5. The Bank estimates that the neutral interest rate is in the range of 2.5% to 3.5%. So, with the policy rate currently at 1.75%, there need to be a least three 25bp increases before even the bottom of that range is reached. If the recent trends in the economic data continue, the markets generally look for three more 25bps increases in 2019 at every other meeting—with the next in January. After these three expected hikes and with the policy rate at 2.50%, the Bank will likely become even more data-dependent to examine how the economy is faring with an interest rate that could be near neutral.

At its last meeting in late October and in subsequent comments by President Draghi, the **European Central Bank** has reaffirmed its intent to end its asset purchase program in December and to leave its policy rate unchanged "at least through the summer of 2019." The market is generally looking for the ECB's first rate increase in September 2019. But the Euro Area economy continues to slow; real GDP grew only 0.7% q/q (saar) in Q3 versus 1.8% in Q2. Compared to a year ago, GDP growth slipped to 1.7% in Q3, its slowest annual pace since Q4 2014. Underlying inflation remains disturbingly well below the Bank's target. And market concern has arisen over Italy's fiscal budget conflict with the EU. But so far, these don't appear to have impacted the ECB's policy resolve.

As expected, the **Bank of England** left its key policy rate unchanged at 0.75% at its early November meeting. The economy picked up a bit in Q3 from Q2 with GDP rising 0.6% q/q (not annualized) in Q3 versus 0.4% in Q2 and the y/y rate rising to 1.5% from 1.2%. However, according to the relatively new monthly GDP data, most of the pickup occurred in late Q2 and early Q3 as the economy stagnated in August and September, auguring a Q4 slowdown. Brexit uncertainty—evident in the 1.2% q/q drop in real business capital spending in Q3—continues to be a drag. In its most recent rate announcement, the Bank noted the outlook for policy depended "significantly" on how Brexit occurs. Markets are generally of the view that Brexit uncertainty will keep the Bank on hold until after the exit, which is intended for next March. But with inflation still well above the 2% target, both the Bank and the markets think that further interest rate hikes will be required.

The **Bank of Japan** also left its policy unchanged and reiterated its promise to continue with its current policy "as long as it is necessary for maintaining [the 2% inflation] target." But boosting inflation is proving to be elusive. In the Outlook Report released after its October 30-31 meeting, the Bank lowered its near-term outlook for both GDP and CPI inflation. It now looks for real GDP to increase 1.4% in the current fiscal year (April 2018-March 2019), down from 1.5% previously. Indeed, real GDP fell a larger-than-expected 1.2% q/q (saar) in Q3 as severe typhoons and a major earthquake knocked the economy off course, though it is widely expected to rebound in Q4. And the Bank now expects inflation to be more recalcitrant than it did previously with the CPI excluding fresh food prices (its preferred core inflation measure) rising only 0.9% in this fiscal year versus 1.1% in its July forecast.

Sandy Batten (Haver Analytics, NY, NY)

Fourth Quarter 2018

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: Short-Term: 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	Intermediate-Term: 8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	Long-Term: 11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Major Currency $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index
Scotiabank Group	2.5 H	5.5 H	na	na	2.5 H	na	na	3.0	3.2 H	3.3 H	3.4	na	na	na	na	na	2.5	2.6	2.5
Bank of America Merrill Lynch	2.4	na	2.8 H	na	2.4	na	na	3.1 H	3.2 H	3.3 H	3.4	na	na	na	na	na	2.8	2.1	2.0
Barclays	2.4	5.5 H	na	na	na	na	na	3.0	3.0	3.0 L	3.2 L	na	na	na	na	na	3.0	1.7	1.2 L
BNP Paribas Americas	2.4	na	2.6	na	na	na	na	3.0	na	3.1	na	na	na	na	na	na	2.5	na	1.9
Goldman Sachs & Co.	2.4	na	2.7	na	2.3	na	na	3.0	3.1	3.2	3.4	na	na	na	4.8	na	2.5	2.2	2.4
J.P. Morgan Chase	2.4	na	2.5	na	na	na	na	3.0	3.1	3.2	3.3	na	na	na	na	na	2.5	2.3	2.2
Mizuho Research Institute	2.4	na	na	na	na	na	na	na	na	3.2	na	na	na	na	na	na	2.0 L	na	na
Swiss Re	2.4	5.4	2.5	2.4	2.3	2.4	2.6	2.8 L	2.9 L	3.1	3.4	4.4	5.3	na	5.0	na	2.0 L	2.2	2.5
TS Lombard	2.4	5.3	2.5	2.3	2.4	2.5	2.6	2.9	3.0	3.1	3.3	4.2	5.1	3.7	4.4 L	95.0 H	2.8	3.1 H	2.3
ACIMA Private Wealth	2.3	5.3	2.6	2.5	2.3	2.5	2.8 H	2.9	2.9 L	3.1	3.3	4.2	5.1	4.3	4.9	88.0	2.1	2.1	1.8
Action Economics	2.3	5.3	2.5	2.4	2.4	2.5	2.7	2.9	3.0	3.1	3.4	4.3	5.2	4.0	4.7	90.2	3.0	2.2	2.0
Chase Wealth Management	2.3	5.3	2.6	2.3	2.3	2.5	2.7	2.9	3.1	3.1	3.3	4.2	5.1	4.0	4.7	91.0	2.5	2.4	2.5
Daiwa Capital Markets America	2.3	5.3	2.7	2.3	2.4	2.5	2.7	2.9	3.0	3.2	3.3	4.3	5.2	na	4.9	92.0	2.5	2.1	2.2
Nomura Securities, Inc.	2.3	5.3	na	na	na	na	na	3.0	3.1	3.3 H	na	3.4 L	5.1	na	na	na	2.6	2.3	1.7
Via Nova Investment Mgt.	2.3	5.3	2.6	2.3	2.3	2.4	2.6	2.8 L	3.0	3.0 L	3.2 L	4.2	4.8 L	4.0	4.8	91.3	3.5 H	2.1	2.1
Amherst Pierpont Securities	2.2 L	5.3	2.6	2.3	2.4	2.5	2.7	2.9	3.0	3.2	3.4	4.2	5.2	4.4	4.9	91.5	3.3	2.3	1.8
BMO Capital Markets	2.2 L	5.3	2.6	na	2.3	2.5	2.7	2.9	3.0	3.1	3.3	na	na	na	4.8	91.3	2.6	2.7	1.8
Chmura Economics & Analytics	2.2 L	5.3	2.5	2.2 L	2.3	2.5	2.7	2.9	3.0	3.2	3.4	4.2	na	na	4.9	87.6 L	2.7	2.3	1.8
Comerica Bank	2.2 L	5.3	2.6	na	2.4	2.5	2.7	2.9	3.1	3.2	3.5 H	na	na	na	4.9	na	2.8	2.0	2.2
Cycledata Corp.	2.2 L	5.3	2.6	2.3	2.3	2.5	2.7	2.8 L	3.0	3.1	3.3	4.3	5.4 H	4.1	4.9	90.0	2.7	2.2	2.4
DePrince & Assoc.	2.2 L	5.3	2.6	2.3	2.4	2.5	2.7	2.9	3.0	3.2	3.4	4.3	5.2	4.4	4.9	90.9	3.1	2.0	2.1
Economist Intelligence Unit	2.2 L	5.2	2.5	2.3	2.4	2.5	2.7	2.9	3.0	3.2	3.4	na	na	na	4.9	na	2.5	na	2.8
Fannie Mae	2.2 L	5.3	na	na	2.4	2.5	2.7	2.9	3.0	3.1	3.4	na	na	na	4.9	na	2.6	3.0	3.0 H
Georgia State University	2.2 L	5.3	na	na	2.4	2.5	2.7	3.0	3.1	3.2	3.3	4.2	4.9	na	4.8	na	2.9	2.8	2.5
GLC Financial Economics	2.2 L	5.3	2.6	2.7 H	2.3	2.5	2.7	2.9	3.1	3.3 H	3.4	4.4	5.2	4.1	5.1 H	90.5	2.5	1.5 L	2.5
Grant Thornton/Diane Swonk	2.2 L	5.3	2.6	2.3	2.4	2.5	2.7	2.9	3.0	3.2	3.4	4.3	5.1	4.7 H	4.9	89.7	2.6	2.3	2.9
High Frequency Economics	2.2 L	5.3	na	na	2.2 L	2.4	2.5 L	2.9	3.0	3.1	3.3	na	na	na	na	na	3.0	2.1	2.1
Loomis, Sayles & Company	2.2 L	5.3	2.6	2.3	2.4	2.5	2.7	2.9	3.0	3.2	3.4	4.1	5.0	3.9	4.7	91.1	2.6	2.2	3.0 H
MacroFin Analytics & Rutgers Bus School	2.2 L	5.3	2.7	2.3	2.4	2.5	2.7	2.9	2.9 L	3.1	3.4	4.2	5.2	3.9	5.0	91.3	2.4	2.1	2.0
Moody's Analytics	2.2 L	5.3	2.6	2.3	2.2 L	2.3 L	2.6	2.8 L	3.0	3.2	3.5 H	4.3	5.2	3.6 L	4.9	na	2.6	2.8	2.3
Moody's Capital Markets Group	2.2 L	5.0 L	2.6	2.3	2.3	2.5	2.7	2.8 L	2.9 L	3.1	3.3	4.2	5.1	3.9	4.8	91.3	2.1	2.0	2.0
MUFG Union Bank	2.2 L	5.3	2.6	2.3	2.3	2.5	2.7	2.8 L	3.0	3.1	3.2 L	4.1	5.0	4.0	4.7	90.0	3.0	2.6	2.4
Naroff Economic Advisors	2.2 L	5.3	2.6	2.3	2.4	2.6 H	2.8 H	2.9	3.1	3.2	3.4	4.6 H	5.4 H	4.1	5.0	91.6	na	2.7	2.1
NatWest Markets	2.2 L	5.2	2.5	2.2 L	2.2 L	2.5	2.7	2.8 L	2.9 L	3.2	3.4	4.3	5.0	3.9	4.9	91.0	3.0	2.3	1.8
Oxford Economics	2.2 L	5.4	2.5	na	2.4	2.6 H	2.7	3.0	3.2 H	3.3 H	3.4	na	na	na	4.9	90.3	2.2	2.6	2.4
PNC Financial Services Corp.	2.2 L	5.3	2.6	na	2.3	2.5	2.7	2.9	3.1	3.2	3.5 H	na	5.2	4.4	4.9	87.7	2.0 L	2.2	1.8
RDQ Economics	2.2 L	5.3	2.6	2.3	2.4	2.6 H	2.8 H	2.9	3.1	3.2	3.4	4.2	5.1	4.0	4.8	90.6	3.0	2.3	2.3
Regions Financial Corporation	2.2 L	5.3	2.6	2.3	2.4	2.5	2.7	2.9	3.0	3.1	3.4	4.4	5.2	4.2	4.9	91.0	2.9	2.0	1.6
S&P Global	2.2 L	5.3	2.7	na	2.4	2.6 H	2.7	2.8 L	3.0	3.1	3.3	na	na	na	4.5	90.0	2.5	2.3	2.2
Societe Generale	2.2 L	5.3	na	na	2.4	na	na	2.9	na	3.2	3.4	na	na	na	na	na	2.1	2.0	2.0
Stone Harbor Investment Partners	2.2 L	5.3	2.5	2.3	2.3	2.4	2.5 L	2.9	3.0	3.1	3.4	4.2	5.1	na	4.8	90.0	3.1	1.7	2.0
The Northern Trust Company	2.2 L	5.3	2.6	2.3	2.4	2.5	2.7	2.9	3.0	3.2	3.4	4.2	5.1	4.0	4.9	91.6	2.9	1.9	2.0
Wells Fargo	2.2 L	5.2	2.3 L	2.3	2.3	2.4	2.5 L	2.9	3.0	3.2	3.4	4.2	5.2	4.2	5.0	90.5	2.5	2.4	2.6
December Consensus	**2.3**	**5.3**	**2.6**	**2.3**	**2.4**	**2.5**	**2.7**	**2.9**	**3.0**	**3.2**	**3.4**	**4.2**	**5.1**	**4.1**	**4.8**	**90.6**	**2.6**	**2.3**	**2.2**
Top 10 Avg.	2.4	5.4	2.7	2.4	2.4	2.5	2.7	3.0	3.1	3.3	3.4	4.4	5.3	4.3	5.0	91.8	3.1	2.7	2.7
Bottom 10 Avg.	2.2	5.2	2.5	2.3	2.3	2.4	2.6	2.8	3.0	3.1	3.3	4.1	5.0	3.9	4.7	89.4	2.2	1.9	1.7
November Consensus	2.3	5.3	2.6	2.3	2.3	2.5	2.7	2.9	3.1	3.2	3.3	4.2	5.1	4.0	4.8	90.6	2.8	2.4	2.5
Number of Forecasts Changed From A Month Ago:																			
Down	0	1	3	1	0	0	2	6	15	10	4	6	4	2	3	3	22	17	24
Same	40	35	19	20	28	26	25	28	18	29	25	12	13	11	22	11	12	18	16
Up	3	2	13	5	10	8	7	8	7	4	11	9	10	9	9	13	8	5	2
Diffusion Index	53%	51%	64%	58%	63%	62%	57%	52%	40%	43%	59%	56%	61%	66%	59%	69%	33%	35%	24%

First Quarter 2019

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter															Avg. For	(Q-Q % Change) (SAAR)		
	Short-Term							Intermediate-Term			Long-Term					Qtr.			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A.	B.	C.	D.
	Federal Funds Rate	Prime Bank Rate	LIBOR Rate 3-Mo.	Com. Paper 1-Mo.	Treas. Bills 3-Mo.	Treas. Bills 6-Mo.	Treas. Bills 1-Yr.	Treas. Notes 2-Yr.	Treas. Notes 5-Yr.	Treas. Notes 10-Yr.	Treas. Bond 30-Yr.	Aaa Corp. Bond	Baa Corp. Bond	State & Local Bonds	Home Mtg. Rate	Fed's Major Currency $ Index	Real GDP	GDP Price Index	Cons. Price Index
Scotiabank Group	2.8 H	5.8 H	na	na	2.7 H	na	na	3.0	3.1	3.2	3.3	na	na	na	na	na	2.1	2.5	2.6
Bank of America Merrill Lynch	2.6	na	3.0 H	na	2.7 H	na	na	3.2 H	3.3 H	3.3	3.4	na	na	na	na	na	2.4	1.8	1.0
Barclays	2.6	5.8 H	na	na	na	na	na	3.1	3.1	3.0	3.2	na	na	na	na	na	2.5	1.5	0.4 L
BNP Paribas Americas	2.6	na	2.8	na	na	na	na	3.0	na	3.2	na	na	na	na	na	na	1.0 L	na	1.2
Goldman Sachs & Co.	2.6	na	2.9	na	2.5	na	na	3.2 H	3.3 H	3.3	3.5	na	na	na	4.9	na	2.5	1.7	1.5
J.P. Morgan Chase	2.6	na	2.9	na	na	na	na	3.1	3.2	3.3	3.3	na	na	na	na	na	2.3	1.5	0.9
Mizuho Research Institute	2.6	na	na	na	na	na	na	na	na	3.3	na	na	na	na	na	na	2.8	na	na
TS Lombard	2.6	5.6	2.8	2.6	2.7 H	2.8 H	2.8	3.0	3.1	3.2	3.4	4.3	5.2	3.9	4.5 L	90.0	2.4	3.3 H	2.5
ACIMA Private Wealth	2.5	5.5	2.7	2.8 H	2.4 L	2.5	2.5 L	2.7 L	2.6 L	2.7 L	3.1 L	4.4	5.3	4.1	4.8	88.0	1.8	2.3	1.5
Action Economics	2.5	5.6	2.8	2.6	2.6	2.7	2.8	2.9	3.0	3.2	3.4	4.3	5.3	4.1	4.8	91.5	2.8	1.6	1.5
Amherst Pierpont Securities	2.5	5.6	2.9	2.6	2.6	2.7	2.9	3.1	3.2	3.4	3.7	4.6	5.6	4.7 H	5.3 H	92.0	2.9	2.5	2.0
BMO Capital Markets	2.5	5.6	2.8	na	2.5	2.6	2.8	3.0	3.1	3.1	3.3	na	na	na	4.8	92.1	2.4	2.1	2.3
Chase Wealth Management	2.5	5.5	2.8	2.5	2.5	2.7	2.9	3.1	3.3 H	3.3	3.5	4.4	5.3	4.2	4.9	90.8	2.0	2.2	2.3
Comerica Bank	2.5	5.6	2.7	na	2.5	2.7	2.8	3.0	3.2	3.3	3.6	na	na	na	5.0	na	3.0	2.1	2.4
Daiwa Capital Markets America	2.5	5.6	2.9	2.5	2.6	2.7	2.9	3.1	3.2	3.3	3.4	4.4	5.3	na	5.0	92.0	2.4	2.2	2.3
DePrince & Assoc.	2.5	5.5	2.8	2.6	2.5	2.7	2.9	3.0	3.1	3.3	3.5	4.5	5.6	4.4	5.0	91.8	2.7	2.1	2.2
Economist Intelligence Unit	2.5	5.5	2.7	2.5	2.6	2.7	2.9	3.1	3.2	3.3	3.5	na	na	na	5.0	na	2.0	na	2.9
MacroFin Analytics & Rutgers Bus School	2.5	5.6	2.9	2.5	2.6	2.8 H	3.0 H	3.1	3.2	3.4	3.7	4.5	5.5	4.2	5.2	91.7	2.3	2.3	2.2
Moody's Analytics	2.5	5.6	2.9	2.5	2.4 L	2.5	2.7	2.9	3.1	3.3	3.9 H	4.5	5.5	3.7 L	4.9	na	3.0	2.9	2.4
MUFG Union Bank	2.5	5.5	2.8	2.5	2.4 L	2.6	2.9	2.9	3.1	3.2	3.3	4.2 L	5.1	4.1	4.8	89.0	2.7	2.5	3.3
Naroff Economic Advisors	2.5	5.5	2.8	2.6	2.6	2.8 H	3.0 H	3.1	3.3 H	3.4	3.6	4.8 H	5.6	4.3	5.2	90.9	na	2.5	2.5
Nomura Securities, Inc.	2.5	5.5	na	na	na	na	na	3.1	3.3 H	3.4	na	4.5	5.2	na	na	na	2.2	2.3	1.1
Societe Generale	2.5	5.5	na	na	2.6	na	na	2.9	na	3.2	3.4	na	na	na	na	na	2.3	1.9	3.5 H
Swiss Re	2.5	5.5	2.6	2.4 L	2.4 L	2.5	2.6	2.8	2.9	3.1	3.7	4.8 H	5.7 H	na	5.0	na	2.1	1.2 L	2.2
Via Nova Investment Mgt.	2.5	5.5	2.8	2.5	2.4 L	2.6	2.8	3.0	3.1	3.2	3.4	4.3	5.0 L	4.2	5.0	93.0 H	3.0	2.2	2.2
Chmura Economics & Analytics	2.4	5.5	2.8	2.5	2.6	2.7	2.9	3.1	3.2	3.4	3.5	4.3	na	na	5.1	88.3	2.8	2.1	2.3
Fannie Mae	2.4	5.5	na	na	2.6	2.7	2.8	2.9	2.9	3.1	3.3	na	na	na	4.9	na	2.2	2.3	2.7
Georgia State University	2.4	5.5	na	na	2.5	2.7	2.9	3.2 H	3.3 H	3.4	3.5	4.4	5.1	na	5.0	na	2.6	2.7	2.2
GLC Financial Economics	2.4	5.4	2.7	2.8 H	2.5	2.7	2.8	3.0	3.3 H	3.5 H	3.6	4.8 H	5.5	4.4	5.3 H	90.0	2.7	2.3	2.8
Grant Thornton/Diane Swonk	2.4	5.5	3.0 H	2.4 L	2.6	2.7	2.9	3.1	3.2	3.3	3.5	4.7	5.2	4.6	5.0	90.7	2.3	2.7	2.9
High Frequency Economics	2.4	5.5	na	na	2.5	2.6	2.7	3.0	3.1	3.3	3.5	na	na	na	na	na	2.7	1.7	1.7
Loomis, Sayles & Company	2.4	5.5	2.8	2.6	2.6	2.7	2.9	3.2 H	3.2	3.3	3.5	4.3	5.1	4.0	4.8	91.3	2.5	2.7	2.9
Moody's Capital Markets Group	2.4	5.5	2.9	2.6	2.5	2.6	2.7	2.8	2.9	3.1	3.2	4.2 L	5.2	3.8	4.8	91.5	2.7	2.1	1.5
NatWest Markets	2.4	5.4	2.9	2.5	2.5	2.7	2.9	2.9	3.0	3.2	3.5	4.4	5.1	4.1	5.0	89.0	2.0	2.6	1.6
Oxford Economics	2.4	5.6	2.8	na	2.6	2.8 H	3.0 H	3.1	3.3 H	3.3	3.5	na	na	na	5.1	90.0	2.3	2.0	2.1
PNC Financial Services Corp.	2.4	5.5	2.8	na	2.4 L	2.5	2.7	3.1	3.2	3.4	3.6	na	5.3	4.5	5.0	86.6 L	3.2 H	2.5	2.4
RDQ Economics	2.4	5.5	2.8	2.5	2.6	2.8 H	2.9	3.0	3.2	3.4	3.6	4.5	5.4	4.3	5.0	89.8	2.1	2.3	2.3
Regions Financial Corporation	2.4	5.5	2.7	2.5	2.5	2.6	2.9	3.0	3.1	3.2	3.5	4.5	5.3	4.3	5.0	91.4	2.2	2.7	2.1
S&P Global	2.4	5.3 L	2.9	na	2.5	2.7	2.8	2.9	3.0	3.2	3.4	na	na	na	5.0	89.9	1.6	1.8	2.2
Stone Harbor Investment Partners	2.4	5.5	2.7	2.5	2.4 L	2.4 L	2.6	3.0	3.2	3.3	3.5	4.5	5.3	na	4.9	92.0	2.3	2.6	2.5
The Northern Trust Company	2.4	5.5	2.9	2.5	2.6	2.6	2.8	3.0	3.2	3.4	3.7	4.5	5.4	4.3	5.0	92.3	2.6	2.3	2.5
Wells Fargo	2.4	5.4	2.5 L	2.5	2.5	2.6	2.7	3.0	3.1	3.3	3.5	4.3	5.4	4.3	5.1	89.8	2.3	3.1	3.4
Cycledata Corp.	2.3 L	5.3 L	2.7	2.4 L	2.4 L	2.6	2.8	2.9	3.1	3.2	3.4	4.4	5.5	4.2	5.0	89.0	2.4	2.2	2.3
December Consensus	**2.5**	**5.5**	**2.8**	**2.5**	**2.5**	**2.7**	**2.8**	**3.0**	**3.1**	**3.3**	**3.5**	**4.5**	**5.3**	**4.2**	**5.0**	**90.5**	**2.4**	**2.2**	**2.2**
Top 10 Avg.	2.6	5.6	2.9	2.6	2.6	2.8	2.9	3.1	3.3	3.4	3.7	4.6	5.5	4.4	5.1	92.0	2.9	2.8	3.0
Bottom 10 Avg.	2.4	5.4	2.7	2.5	2.4	2.5	2.7	2.9	3.0	3.1	3.3	4.3	5.2	4.0	4.8	88.9	1.9	1.7	1.2
November Consensus	2.5	5.5	2.8	2.5	2.5	2.7	2.8	3.0	3.2	3.3	3.5	4.5	5.3	4.1	5.0	90.5	2.4	2.3	2.5
Number of Forecasts Changed From A Month Ago:																			
Down	0	1	2	0	4	4	6	11	12	10	6	6	4	1	6	3	10	12	19
Same	39	35	23	23	25	25	24	22	22	28	28	14	12	14	22	11	20	19	19
Up	4	2	10	3	9	5	4	9	6	5	6	7	11	7	6	13	12	9	4
Diffusion Index	55%	51%	61%	56%	57%	51%	47%	48%	43%	44%	50%	52%	63%	64%	50%	69%	52%	46%	32%

Second Quarter 2019

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: Short-Term 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR Rate 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	Intermediate-Term: 8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	Long-Term: 11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Major Currency $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index
Scotiabank Group	3.0 H	6.0 H	na	na	3.0 H	na	na	3.1	3.2	3.2	3.3	na	na	na	na	na	2.0	2.4	1.6
Bank of America Merrill Lynch	2.9	na	3.2	na	2.9	na	na	3.3	3.3	3.3	3.3	na	na	na	na	na	2.6	2.6	2.6
Barclays	2.9	6.0 H	na	na	na	na	na	3.2	3.1	3.0	3.1	na	na	na	na	na	2.5	2.4	2.3
Goldman Sachs & Co.	2.9	na	3.2	na	2.8	na	na	3.4 H	3.4	3.4	3.5	na	na	na	5.0	na	2.2	2.4	2.4
J.P. Morgan Chase	2.9	na	3.2	na	na	na	na	3.3	3.3	3.4	3.4	na	na	na	na	na	2.0	2.0	1.9
Mizuho Research Institute	2.9	na	na	na	na	na	na	na	na	3.3	na	na	na	na	na	na	2.5	na	na
TS Lombard	2.9	5.8	3.0	2.8	2.9	3.0 H	2.9	3.0	3.1	3.2	3.4	4.3	5.2	3.9	4.5 L	85.0 L	2.0	3.5 H	3.0
DePrince & Assoc.	2.8	5.8	3.1	2.8	2.9	3.0 H	3.2 H	3.3	3.3	3.4	3.6	4.7	5.8	4.5	5.2	92.0	2.5	2.2	2.4
Oxford Economics	2.8	5.7	3.0	na	2.9	3.0 H	3.1	3.2	3.3	3.4	3.6	na	na	na	5.2	89.3	2.3	2.0	2.0
Action Economics	2.7	5.8	3.0	2.8	2.7	2.8	2.9	3.0	3.1	3.3	3.5	4.4	5.3	4.1	4.8	92.4	3.0	2.7	2.6
Amherst Pierpont Securities	2.7	5.8	3.1	2.8	2.8	2.9	3.1	3.3	3.5 H	3.7	3.9	4.8	5.9 H	4.9 H	5.6 H	92.4	3.1	2.5	3.0
BMO Capital Markets	2.7	5.8	3.0	na	2.7	2.8	2.9	3.1	3.1	3.2	3.4	na	na	na	4.9	92.0	2.2	2.1	2.2
Chase Wealth Management	2.7	5.7	3.0	2.7	2.7	2.9	3.1	3.3	3.5 H	3.5	3.7	4.6	5.5	4.4	5.1	90.6	2.5	2.2	2.2
Chmura Economics & Analytics	2.7	5.8	3.1	2.8	2.7	2.9	3.1	3.3	3.4	3.6	3.7	4.5	na	na	5.2	88.7	3.2 H	1.9	2.1
Comerica Bank	2.7	5.8	2.8 L	na	2.7	2.8	3.0	3.2	3.3	3.4	3.6	na	na	na	5.1	na	2.7	2.1	2.2
Daiwa Capital Markets America	2.7	5.8	3.1	2.8	2.8	3.0 H	3.1	3.4 H	3.4	3.5	3.6	4.7	5.5	na	5.2	93.0	2.3	2.2	2.3
Economist Intelligence Unit	2.7	5.7	3.0	2.7	2.8	3.0 H	3.0	3.3	3.3	3.5	3.7	na	na	na	5.1	na	3.2 H	na	2.8
Fannie Mae	2.7	5.8	na	na	2.7	2.8	2.9	2.9	2.9	3.1	3.4	na	na	na	4.9	na	2.6	2.2	1.3
Grant Thornton/Diane Swonk	2.7	5.8	3.8 H	2.6	2.8	3.0 H	3.1	3.2	3.3	3.4	3.6	4.8	5.3	4.7	5.1	91.2	2.3	2.2	2.6
High Frequency Economics	2.7	5.8	na	na	2.7	2.9	2.9	3.1	3.2	3.4	3.6	na	na	na	na	na	2.5	2.1	2.1
Loomis, Sayles & Company	2.7	5.8	3.1	2.8	2.8	2.9	3.1	3.3	3.4	3.4	3.5	4.3	5.2	4.1	4.9	91.3	2.5	2.1	2.4
MacroFin Analytics & Rutgers Bus School	2.7	5.8	3.1	2.7	2.8	3.0 H	3.2 H	3.3	3.4	3.6	3.9	4.7	5.7	4.4	5.4	91.9	2.6	2.3	2.2
Moody's Analytics	2.7	5.8	3.2	2.7	2.6	2.6	2.9	3.0	3.3	3.5	4.1 H	4.6	5.5	3.7 L	5.0	na	3.2 H	2.7	2.4
MUFG Union Bank	2.7	5.8	3.0	2.8	2.7	2.8	3.2 H	3.0	3.2	3.3	3.4	4.3	5.2	4.2	4.9	87.0	2.9	2.9	3.1 H
Naroff Economic Advisors	2.7	5.8	3.0	2.7	2.8	3.0 H	3.2 H	3.3	3.5 H	3.6	3.9	5.0	5.8	4.4	5.4	89.5	na	2.5	2.7
RDQ Economics	2.7	5.8	3.1	2.8	2.8	3.0 H	3.1	3.2	3.4	3.6	3.8	4.9	5.7	4.6	5.3	90.0	2.7	2.3	2.3
Regions Financial Corporation	2.7	5.8	2.8 L	2.7	2.6	2.8	3.0	3.1	3.2	3.3	3.6	4.6	5.4	4.4	5.1	91.6	2.6	2.5	2.2
Societe Generale	2.7	5.8	na	na	2.8	na	na	2.9	na	3.2	3.4	na	na	na	na	na	2.2	1.8 L	1.1 L
The Northern Trust Company	2.7	5.8	3.1	2.8	2.8	2.8	2.9	3.1	3.4	3.6	3.9	4.8	5.7	4.6	5.2	91.3	2.4	2.3	2.5
Wells Fargo	2.7	5.7	2.8 L	2.8	2.8	2.9	3.0	3.1	3.3	3.4	3.6	4.4	5.5	4.4	5.3	88.5	2.6	2.6	2.5
BNP Paribas Americas	2.6	na	2.8 L	na	na	na	na	3.0	na	3.2	na	na	na	na	na	na	1.5 L	na	2.0
Cycledata Corp.	2.6	5.6	2.9	2.6	2.6	2.8	3.0	3.1	3.3	3.4	3.5	4.5	5.6	4.3	5.1	89.0	2.4	2.2	2.2
Moody's Capital Markets Group	2.6	5.8	3.1	2.8	2.7	2.8	2.8	2.8	2.9	3.0	3.2	4.2 L	5.1	3.7 L	4.7	91.0	2.9	2.0	1.6
NatWest Markets	2.6	5.6	3.0	2.7	2.7	2.9	3.1	3.0	3.0	3.3	3.6	4.6	5.2	4.2	5.2	88.0	2.4	2.0	1.2
Stone Harbor Investment Partners	2.6	5.8	2.8 L	2.6	2.6	2.7	2.8	3.1	3.3	3.4	3.6	4.6	5.4	na	5.0	92.0	2.1	2.2	2.3
Swiss Re	2.6	5.6	2.8 L	2.6	2.5	2.6	2.7	2.9	3.0	3.1	3.8	4.8	5.7	na	5.0	na	1.6	3.1	1.6
ACIMA Private Wealth	2.5	5.5 L	2.8 L	3.0 H	2.3 L	2.5 L	2.3 L	2.5 L	2.5 L	2.5 L	2.4 L	2.9 L	4.4	5.5	4.1	4.7	87.0	1.8	2.1	1.9
GLC Financial Economics	2.5	5.5 L	2.8 L	2.8	2.6	2.7	2.8	3.0	3.4	3.6	3.8	5.1 H	5.8	4.6	5.5	89.0	2.3	2.2	2.5
Nomura Securities, Inc.	2.5	5.5 L	na	na	na	na	na	3.1	3.1	3.3	na	4.4	5.1	na	na	na	1.8	2.3	1.8
S&P Global	2.5	5.5 L	3.0	na	2.5	2.7	2.8	2.9	3.1	3.3	3.5	na	na	na	5.1	88.9	2.2	2.0	2.0
Via Nova Investment Mgt.	2.5	5.5 L	2.8 L	2.5 L	2.4	2.6	2.8	3.0	3.1	3.2	3.4	4.3	5.0 L	4.2	5.0	94.0 H	2.5	2.2	2.2
Georgia State University	2.4 L	5.5 L	na	na	2.4	2.8	2.9	3.2	3.5 H	3.8 H	3.8	4.7	5.4	na	5.3	na	2.5	2.1	1.8
PNC Financial Services Corp.	2.4 L	5.5 L	2.9	na	2.6	2.6	2.8	3.1	3.2	3.4	3.6	na	5.3	4.2	5.0	85.6	2.9	2.2	2.6
December Consensus	**2.7**	**5.7**	**3.0**	**2.7**	**2.7**	**2.8**	**3.0**	**3.1**	**3.2**	**3.4**	**3.6**	**4.6**	**5.5**	**4.3**	**5.1**	**90.1**	**2.4**	**2.3**	**2.2**
Top 10 Avg.	2.9	5.8	3.2	2.8	2.9	3.0	3.1	3.3	3.4	3.6	3.9	4.8	5.7	4.6	5.3	92.3	3.0	2.8	2.8
Bottom 10 Avg.	2.5	5.5	2.8	2.6	2.5	2.7	2.8	2.9	3.0	3.1	3.3	4.4	5.2	4.0	4.8	87.7	1.9	2.0	1.6
November Consensus	2.7	5.7	3.0	2.7	2.7	2.8	3.0	3.1	3.3	3.4	3.6	4.6	5.4	4.2	5.1	90.0	2.4	2.3	2.2
Number of Forecasts Changed From A Month Ago:																			
Down	1	1	3	3	5	3	4	8	11	8	5	3	4	0	3	3	6	14	10
Same	39	34	26	19	28	25	24	28	25	30	28	18	14	14	24	11	22	18	20
Up	3	3	6	4	5	6	6	6	4	5	7	6	9	8	7	13	14	8	12
Diffusion Index	52%	53%	54%	52%	50%	54%	53%	48%	41%	47%	53%	56%	59%	68%	56%	69%	60%	43%	52%

Third Quarter 2019

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: Short-Term 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR Rate 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	Intermediate-Term: 8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	Long-Term: 11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Major Currency $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index
Scotiabank Group	3.3 H	6.3 H	na	na	3.2 H	na	na	3.3	3.4	3.4	3.5	na	na	na	na	na	1.9	2.3	2.2
Bank of America Merrill Lynch	3.1	na	3.6	na	3.1	na	na	3.4	3.3	3.3	3.3	na	na	na	na	na	2.1	2.2	2.1
Barclays	3.1	6.3 H	na	na	na	na	na	3.3	3.1	3.0	3.1	na	na	na	na	na	2.0	2.5	2.4
Goldman Sachs & Co.	3.1	na	3.4	na	3.0	na	na	3.5	3.5	3.5	3.6	na	na	na	5.1	na	1.8	2.1	2.1
J.P. Morgan Chase	3.1	na	3.3	na	na	na	na	3.5	3.5	3.5	3.4	na	na	na	na	na	1.8	2.3	2.3
Mizuho Research Institute	3.1	na	na	na	na	na	na	na	na	3.4	na	na	na	na	na	na	2.4	na	na
DePrince & Assoc.	3.0	6.0	3.3	3.0	3.1	3.1	3.3	3.4	3.4	3.5	3.7	4.9	5.9	4.6	5.3	92.0	2.4	2.2	2.4
Moody's Analytics	3.0	6.1	3.4	3.0	2.8	2.9	3.1	3.2	3.4	3.5	4.3 H	4.8	5.8	3.8	5.0	na	2.0	2.6	2.3
MUFG Union Bank	3.0	6.0	3.2	3.0	3.0	3.1	3.4 H	3.2	3.3	3.4	3.5	4.4	5.3	4.3	5.0	85.0	2.8	2.1	3.0
Amherst Pierpont Securities	2.9	6.1	3.3	3.0	3.0	3.1	3.3	3.4	3.6	3.8	4.1	5.1	6.1	5.1 H	5.7 H	92.8	2.9	2.6	3.1
BMO Capital Markets	2.9	6.0	3.2	na	2.8	2.9	3.0	3.2	3.2	3.3	3.5	na	na	na	5.0	90.0	2.0	2.0	2.0
Chmura Economics & Analytics	2.9	6.0	3.4	3.0	2.9	3.1	3.3	3.5	3.6	3.8	3.9	4.7	na	na	5.4	88.9	3.6 H	1.9	2.0
Comerica Bank	2.9	6.0	3.1	na	2.9	3.1	3.2	3.4	3.5	3.6	3.8	na	na	na	5.3	na	2.4	2.1	2.0
Daiwa Capital Markets America	2.9	6.0	3.3	3.0	3.0	3.2 H	3.3	3.6 H	3.6	3.6	3.7	4.8	5.7	na	5.4	93.0 H	2.3	2.3	2.4
Economist Intelligence Unit	2.9	5.9	3.1	2.9	3.0	3.2 H	3.3	3.4	3.4	3.6	3.8	na	na	na	5.2	na	2.2	na	2.9
Fannie Mae	2.9	6.0	na	na	2.8	2.8	2.9	2.9	3.0	3.1	3.4	na	na	na	4.9	na	2.4	1.9	2.0
Grant Thornton/Diane Swonk	2.9	6.0	4.6 H	2.6	2.9	3.1	3.2	3.3	3.4	3.5	3.7	5.4	5.6	4.9	5.2	91.8	2.1	2.4	2.3
High Frequency Economics	2.9	6.0	na	na	2.9	3.1	3.0	3.3	3.4	3.5	3.7	na	na	na	na	na	2.2	2.6	2.6
Loomis, Sayles & Company	2.9	6.0	3.3	3.1 H	3.0	3.1	3.2	3.4	3.4	3.4	3.5	4.4	5.2	4.1	4.9	91.3	2.4	2.3	2.4
MacroFin Analytics & Rutgers Bus School	2.9	6.0	3.3	2.9	3.0	3.2 H	3.4 H	3.5	3.6	3.8	4.1	4.9	5.9	4.6	5.6	92.2	2.3	2.1	2.1
Naroff Economic Advisors	2.9	6.0	3.2	2.9	3.0	3.2 H	3.4 H	3.5	3.7 H	3.8	4.1	5.2	6.0	4.6	5.6	88.2	na	2.3	2.4
Oxford Economics	2.9	5.8	3.2	na	3.0	3.1	3.2	3.3	3.4	3.4	3.6	na	na	na	5.4	88.6	2.1	1.9	1.9
RDQ Economics	2.9	6.0	3.3	3.0	3.0	3.1	3.3	3.4	3.6	3.8	4.0	5.2	5.9	4.8	5.5	90.5	2.5	2.4	2.4
Regions Financial Corporation	2.9	6.0	3.0	2.8	2.7	2.9	3.1	3.2	3.3	3.5	3.7	4.7	5.5	4.5	5.2	91.3	2.4	2.3	2.1
Societe Generale	2.9	6.0	na	na	2.9	na	na	2.9	na	3.2	3.4	na	na	na	na	na	1.6	1.8 L	2.8
Swiss Re	2.9	5.9	3.0	2.8	2.7	2.9	3.0	3.1	3.1	3.2	3.9	4.9	5.8	na	5.1	na	1.6	2.0	2.3
The Northern Trust Company	2.9	6.0	3.2	3.0	2.9	2.9	3.0	3.2	3.5	3.8	4.1	5.1	6.0	4.8	5.4	90.5	2.1	2.2	2.5
TS Lombard	2.9	5.5	2.7	2.5 L	2.6	2.7	2.5	2.5	2.6	2.6	2.8 L	3.7 L	4.6 L	3.3 L	3.9 L	75.0 L	1.8	3.7 H	3.5 H
Wells Fargo	2.9	5.9	3.0	3.0	3.0	3.1	3.2	3.2	3.4	3.6	3.8	4.5	5.5	4.5	5.4	87.3	2.5	2.6	2.9
Action Economics	2.8	5.8	3.1	2.8	2.9	2.9	3.0	3.1	3.2	3.3	3.5	4.4	5.4	4.1	4.8	92.7	2.7	2.3	2.6
Chase Wealth Management	2.8	5.8	3.1	2.8	2.8	3.0	3.2	3.4	3.6	3.6	3.8	4.7	5.6	4.5	5.2	90.0	2.3	2.1	2.2
Nomura Securities, Inc.	2.8	5.8	na	na	na	na	na	3.1	3.1	3.1	na	4.3	5.0	na	na	na	1.8	2.2	2.6
Via Nova Investment Mgt.	2.8	5.8	3.0	2.7	2.7	2.8	3.0	3.2	3.4	3.4	3.6	4.6	5.2	4.5	5.2	93.0 H	2.5	2.2	2.2
GLC Financial Economics	2.7	5.7	3.0	2.9	2.8	2.9	2.9	3.2	3.6	3.9 H	4.1	5.5 H	6.2 H	4.8	5.7 H	88.8	3.4	2.1	2.5
NatWest Markets	2.7	5.7	3.1	2.7	2.7	2.9	3.0	2.9	3.0	3.3	3.7	4.6	5.3	4.3	5.1	88.0	2.6	1.9	1.9
PNC Financial Services Corp.	2.7	5.8	3.0	na	2.7	2.7	2.9	3.1	3.2	3.3	3.6	na	5.3	4.1	5.0	85.6	2.7	2.5	2.6
S&P Global	2.7	5.6	3.1	na	2.8	2.8	2.9	3.0	3.2	3.4	3.6	na	na	na	5.3	87.6	2.1	1.8 L	1.9
BNP Paribas Americas	2.6	na	2.7	na	na	na	na	2.9	na	3.1	na	na	na	na	na	na	1.4	na	2.6
Cycledata Corp.	2.6	5.6	2.9	2.6	2.6	2.8	3.0	3.1	3.3	3.4	3.5	4.5	5.6	4.3	5.1	88.0	2.4	2.2	2.2
Georgia State University	2.6	5.8	na	na	2.6	3.0	3.1	3.4	3.7 H	3.9 H	3.9	4.8	5.6	na	5.5	na	2.1	2.1	1.6 L
Moody's Capital Markets Group	2.6	5.8	3.1	2.8	2.6	2.7	2.7	2.7	2.8	3.0	3.1	4.3	5.1	3.6	4.7	90.0	1.3 L	2.0	1.8
Stone Harbor Investment Partners	2.6	5.7	2.8	2.6	2.6	2.7	2.8	2.9	3.1	3.2	3.4	4.4	5.2	na	4.8	90.0	2.0	2.2	2.5
ACIMA Private Wealth	2.2 L	5.2 L	2.6 L	2.8	2.0 L	2.2 L	2.2 L	2.3 L	2.3 L	2.2 L	2.8 L	4.2	5.3	4.0	4.6	85.0	1.8	2.0	1.9
December Consensus	**2.9**	**5.9**	**3.2**	**2.9**	**2.8**	**3.0**	**3.1**	**3.2**	**3.3**	**3.4**	**3.6**	**4.7**	**5.5**	**4.4**	**5.2**	**89.2**	**2.2**	**2.2**	**2.3**
Top 10 Avg.	3.1	6.1	3.5	3.0	3.0	3.1	3.3	3.5	3.6	3.8	4.1	5.1	5.9	4.7	5.5	92.1	2.8	2.6	2.9
Bottom 10 Avg.	2.6	5.6	2.9	2.7	2.6	2.7	2.8	2.8	2.9	3.0	3.2	4.3	5.2	4.0	4.8	85.8	1.7	1.9	1.9
November Consensus	2.8	5.9	3.1	2.9	2.8	2.9	3.1	3.2	3.3	3.4	3.6	4.7	5.5	4.3	5.1	89.2	2.2	2.2	2.3
Number of Forecasts Changed From A Month Ago:																			
Down	2	3	5	5	4	4	6	8	9	8	6	3	4	1	5	3	7	9	7
Same	38	32	21	16	30	22	19	26	28	30	23	16	12	13	23	15	26	22	26
Up	3	3	9	5	4	8	9	8	3	5	11	8	11	8	6	9	9	9	9
Diffusion Index	51%	50%	56%	50%	50%	56%	54%	50%	43%	47%	56%	59%	63%	66%	51%	61%	52%	50%	52%

Fourth Quarter 2019

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Major Currency $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index
Bank of America Merrill Lynch	3.4 H	na	3.8	na	3.4 H	na	na	3.4	3.3	3.3	3.2	na	na	na	na	na	2.1	2.2	2.3
Barclays	3.4 H	6.5 H	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.5	2.5	2.3
Goldman Sachs & Co.	3.4 H	na	3.7	na	3.3	na	na	3.6	3.5	3.5	3.6	na	na	na	5.2	na	1.6	2.0	2.1
J.P. Morgan Chase	3.4 H	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.5	2.3	2.3
Moody's Analytics	3.3	6.4	3.6	3.2	3.0	3.1	3.2	3.3	3.4	3.5	4.3	4.9	6.0	3.9	5.0	na	1.2	2.4	2.1
Scotiabank Group	3.3	6.3	na	na	3.2	na	na	3.3	3.4	3.4	3.5	na	na	na	na	na	1.8	2.3	2.3
Chmura Economics & Analytics	3.2	6.3	3.6	3.3 H	3.2	3.4	3.5	3.7 H	3.8	3.9	4.0	4.8	na	na	5.5	88.6	3.6 H	2.1	2.3
Economist Intelligence Unit	3.2	6.2	3.3	3.1	3.2	3.4	3.5	3.5	3.5	3.7	3.9	na	na	na	5.3	na	1.8	na	2.4
Grant Thornton/Diane Swonk	3.2	6.3	4.8 H	2.8	3.1	3.3	3.3	3.3	3.4	3.6	3.8	5.6	5.8	5.1	5.3	93.8	1.8	2.4	1.9
Loomis, Sayles & Company	3.2	6.2	3.5	3.2	3.2	3.2	3.3	3.4	3.4	3.4	3.5	4.4	5.2	4.1	4.9	91.3	2.3	2.3	2.4
RDQ Economics	3.2	6.3	3.7	3.3 H	3.4 H	3.5 H	3.6 H	3.6	3.8	3.9	4.1	5.3	6.1	4.9	5.6	90.5	2.5	2.4	2.4
Regions Financial Corporation	3.2	6.3	3.1	2.9	2.9	3.0	3.2	3.3	3.4	3.6	3.8	4.8	5.6	4.5	5.3	90.9	1.9	2.4	1.9
Amherst Pierpont Securities	3.1	6.3	3.5	3.2	3.2	3.3	3.5	3.6	3.8	4.0	4.3	5.2	6.3	5.3 H	5.8	93.0	2.8	2.7	3.2
Comerica Bank	3.1	6.2	3.3	na	3.1	3.2	3.3	3.5	3.6	3.7	3.9	na	na	na	5.4	na	2.5	2.0	2.0
DePrince & Assoc.	3.1	6.1	3.5	3.2	3.2	3.2	3.4	3.4	3.5	3.6	3.8	5.1	6.0	4.7	5.4	91.9	2.4	2.2	2.4
High Frequency Economics	3.1	6.3	na	na	3.0	3.1	3.0	3.3	3.4	3.6	3.8	na	na	na	na	na	2.0	2.7	2.7
Mizuho Research Institute	3.1	na	na	na	na	na	na	na	na	3.4	na	na	na	na	na	na	2.1	na	na
Naroff Economic Advisors	3.1	6.3	3.4	3.1	3.2	3.4	3.5	3.6	3.9 H	4.1 H	4.4 H	5.4	6.2	4.7	5.7	87.5	na	2.1	2.0
Oxford Economics	3.1	6.0	3.2	na	3.1	3.2	3.3	3.4	3.4	3.5	3.7	na	na	na	5.4	88.0	1.6	1.9	2.0
Wells Fargo	3.1	6.1	3.2	3.2	3.1	3.2	3.2	3.3	3.5	3.7	3.9	4.6	5.6	4.5	5.4	86.3	2.3	2.5	2.6
BMO Capital Markets	3.0	6.1	3.3	na	2.9	3.0	3.2	3.3	3.3	3.3	3.5	na	na	na	5.1	87.8	1.9	2.0	2.1
Chase Wealth Management	3.0	6.0	3.3	3.0	3.0	3.2	3.4	3.6	3.8	3.8	4.0	4.9	5.8	4.7	5.4	89.9	2.2	2.2	2.3
Daiwa Capital Markets America	3.0	6.1	3.3	3.0	3.0	3.2	3.3	3.7 H	3.6	3.6	3.7	5.0	5.9	na	5.5	94.0 H	2.2	2.3	2.5
MUFG Union Bank	3.0	6.0	3.2	3.0	3.0	3.1	3.4	3.2	3.3	3.4	3.5	4.4	5.3	4.4	5.0	84.0 L	2.7	2.1	3.0
Swiss Re	3.0	6.0	3.1	2.9	2.8	3.0	3.1	3.2	3.1	3.2	3.9	4.9	5.8	na	5.1	na	1.7	1.7	2.7
Via Nova Investment Mgt.	3.0	6.0	3.3	3.0	2.9	3.1	3.3	3.5	3.6	3.7	3.9	4.8	5.5	4.8	5.5	92.0	2.5	2.3	2.2
Action Economics	2.9	6.0	3.3	3.0	3.0	3.1	3.1	3.2	3.3	3.4	3.6	4.5	5.4	4.1	4.9	92.5	2.4	2.4	2.5
Fannie Mae	2.9	6.0	na	na	2.8	2.9	2.9	2.9	3.0	3.1	3.4	na	na	na	4.9	na	2.1	2.6	3.3 H
GLC Financial Economics	2.9	5.9	3.1	3.1	2.9	3.0	3.1	3.3	3.8	4.1 H	4.3	5.8 H	6.6 H	5.0	6.0 H	88.2	3.0	2.1	3.0
MacroFin Analytics & Rutgers Bus School	2.9	6.0	3.4	3.0	3.1	3.2	3.4	3.6	3.6	3.8	4.1	4.9	5.9	4.6	5.7	92.4	2.2	2.1	2.1
NatWest Markets	2.9	5.9	3.2	2.9	2.9	3.1	3.2	2.8	3.0	3.2	3.8	4.6	5.3	4.4	5.1	87.0	2.5	1.9	1.7 L
PNC Financial Services Corp.	2.9	6.0	3.1	na	2.8	2.8	2.9	3.1	3.2	3.3	3.6	na	5.3	4.1	5.0	85.7	2.2	2.5	2.5
S&P Global	2.9	5.7	3.2	na	3.1	3.2	3.2	3.3	3.3	3.5	3.7	na	na	na	5.2	86.5	2.0	1.8	2.0
Societe Generale	2.9	6.0	na	na	2.9	na	na	2.8	na	3.1	3.3	na	na	na	na	na	1.1 L	1.6 L	3.2
The Northern Trust Company	2.9	6.0	3.2	3.0	2.9	2.9	3.0	3.2	3.5	3.8	4.1	5.3	6.0	4.8	5.4	89.7	1.9	2.2	2.4
Nomura Securities, Inc.	2.8	5.8	na	na	na	na	na	3.0	3.0	3.0	na	4.1	4.8	na	na	na	2.0	2.3	2.7
BNP Paribas Americas	2.6	na	2.6	na	na	na	na	2.6	na	2.9	na	na	na	na	na	na	1.3	na	1.8
Cycledata Corp.	2.6	5.6	2.9	2.6	2.6	2.8	3.0	3.1	3.3	3.4	3.5	4.5	5.6	4.3	5.1	88.0	2.4	2.2	2.2
Georgia State University	2.6	5.8	na	na	2.5	2.9	3.0	3.3	3.6	3.9	4.0	4.9	5.7	na	5.6	na	1.8	2.3	1.9
Moody's Capital Markets Group	2.6	5.8	3.1	2.8	2.6	2.7	2.6	2.5	2.7	2.9	3.0	4.2	5.1	3.6	4.6	89.5	1.9	1.9	1.8
Stone Harbor Investment Partners	2.6	5.7	2.8	2.6	2.5	2.5	2.6	2.8	2.9	3.0	3.3	4.2	5.0	na	4.6	88.0	1.7	2.4	2.3
TS Lombard	2.4	4.4 L	1.6 L	1.4 L	1.5 L	1.6 L	1.7 L	2.0 L	2.3	2.3	2.5 L	3.4 L	4.3 L	3.1 L	3.6 L	85.0	1.5	3.7 H	3.0
ACIMA Private Wealth	1.8 L	4.8	2.3	2.6	1.6	1.8	1.8	2.0 L	2.1 L	2.0 L	2.6	3.9	5.1	3.7	4.4	85.0	1.5	1.9	1.8
December Consensus	**3.0**	**6.0**	**3.3**	**2.9**	**2.9**	**3.0**	**3.1**	**3.2**	**3.4**	**3.4**	**3.7**	**4.8**	**5.6**	**4.4**	**5.2**	**89.1**	**2.0**	**2.2**	**2.3**
Top 10 Avg.	3.3	6.3	3.7	3.2	3.3	3.3	3.5	3.6	3.7	3.9	4.2	5.3	6.1	4.9	5.6	92.2	2.7	2.6	2.9
Bottom 10 Avg.	2.6	5.5	2.8	2.7	2.5	2.6	2.7	2.7	2.9	2.9	3.2	4.2	5.1	4.0	4.7	86.3	1.5	1.9	1.9
November Consensus	3.0	6.0	3.2	2.9	2.9	3.0	3.1	3.2	3.4	3.4	3.7	4.7	5.6	4.3	5.2	89.0	1.9	2.3	2.4
Number of Forecasts Changed From A Month Ago:																			
Down	2	1	1	3	5	7	8	9	11	9	3	5	6	1	7	4	6	11	9
Same	37	34	26	19	29	21	19	24	23	26	23	16	11	13	18	12	22	23	26
Up	4	3	6	4	3	6	7	6	3	5	11	6	10	8	9	11	14	6	7
Diffusion Index	52%	53%	58%	52%	47%	49%	49%	46%	39%	45%	61%	52%	57%	66%	53%	63%	60%	44%	48%

First Quarter 2020

Interest Rate Forecasts — Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR Rate 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Major Currency $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index
J.P. Morgan Chase	3.6 H	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.5	2.5	2.5
Moody's Analytics	3.5	6.6 H	3.8	3.4 H	3.2	3.2	3.4	3.4	3.5	3.5	4.3	5.0	6.2	4.0	5.0	na	0.4	1.7	1.6 L
Goldman Sachs & Co.	3.4	na	3.7	na	3.3	na	na	3.5	3.5	3.5	3.5	na	na	na	5.2	na	1.5	2.3	2.3
Grant Thornton/Diane Swonk	3.4	6.5	4.8 H	2.6	3.2	3.3	3.3	3.2	3.2	3.4	3.6	5.5	5.7	5.0	5.1	95.4 H	1.8	2.4	1.8
Loomis, Sayles & Company	3.4	6.5	3.6	3.4 H	3.4 H	3.4	3.4	3.4	3.4	3.4	3.5	4.4	5.2	4.1	4.9	91.3	1.9	2.3	2.3
Naroff Economic Advisors	3.4	6.5	3.6	3.3	3.4 H	3.6 H	3.7 H	3.8 H	4.0 H	4.3 H	4.6 H	5.5	6.4	4.9	5.8	86.8	na	1.9	1.7
Chmura Economics & Analytics	3.3	6.4	3.8	3.4 H	3.3	3.5	3.7 H	3.8 H	3.9	4.0	4.2	5.0	na	na	5.6	88.0	2.1	1.9	1.9
Scotiabank Group	3.3	6.3	na	na	3.2	na	na	3.3	3.4	3.5	3.6	na	na	na	na	na	1.7	2.3	2.2
Amherst Pierpont Securities	3.2	6.3	3.6	3.2	3.2	3.4	3.5	3.7	3.9	4.1	4.4	5.4	6.5 H	5.4 H	5.9	93.1	2.5	2.8	3.3 H
BMO Capital Markets	3.2	6.3	3.5	na	3.1	3.2	3.3	3.4	3.4	3.4	3.6	na	na	na	5.2	86.9	1.8	2.1	2.1
Chase Wealth Management	3.2	6.2	3.5	3.2	3.2	3.4	3.6	3.8 H	4.0 H	4.0	4.2	5.1	6.0	4.9	5.6	89.7	1.0	2.1	2.2
Daiwa Capital Markets America	3.2	6.3	3.5	3.2	3.2	3.4	3.5	3.8 H	3.7	3.7	3.7	5.1	5.9	na	5.7	95.0	1.8	2.3	2.4
DePrince & Assoc.	3.2	6.2	3.6	3.4 H	3.3	3.3	3.4	3.5	3.6	3.7	3.9	5.2	6.1	4.8	5.5	91.9	2.5	2.2	2.4
Economist Intelligence Unit	3.2	6.2	3.3	3.1	3.2	3.4	3.5	3.5	3.5	3.7	3.9	na	na	na	5.3	na	0.0 L	na	2.2
Regions Financial Corporation	3.2	6.3	3.2	2.9	2.8	2.9	3.1	3.2	3.3	3.5	3.8	4.7	5.6	4.4	5.2	90.6	1.6	2.2	1.8
Action Economics	3.1	6.2	3.4	3.2	3.2	3.2	3.2	3.3	3.3	3.4	3.6	4.5	5.4	4.1	4.9	92.4	2.4	2.0	2.5
Comerica Bank	3.1	6.2	3.3	na	3.1	3.2	3.3	3.5	3.6	3.7	4.0	na	na	na	5.4	na	2.4	2.0	2.0
High Frequency Economics	3.1	6.3	na	na	3.0	3.2	3.1	3.4	3.5	3.7	3.8	na	na	na	na	na	1.7	2.7	2.7
MacroFin Analytics & Rutgers Bus School	3.1	6.2	3.5	3.1	3.2	3.4	3.6	3.7	3.8	4.0	4.4	5.1	6.1	4.8	5.8	92.6	2.1	2.2	2.1
Mizuho Research Institute	3.1	na	na	na	na	na	na	na	na	3.3	na	na	na	na	na	na	na	na	na
Oxford Economics	3.1	6.0	3.3	na	3.2	3.3	3.3	3.4	3.5	3.5	3.8	na	na	na	5.5	87.4	1.6	1.9	1.9
S&P Global	3.1	5.8	3.2	na	3.2	3.2	3.3	3.3	3.3	3.6	3.8	na	na	na	5.3	86.0	2.0	1.8	2.0
Wells Fargo	3.1	6.1	3.2	3.2	3.0	3.1	3.1	3.2	3.4	3.7	3.9	4.6	5.6	4.5	5.4	84.8	2.1	2.3	2.8
MUFG Union Bank	3.0	6.0	3.2	3.0	3.0	3.1	3.4	3.2	3.3	3.4	3.5	4.4	5.4	4.4	5.0	84.0 L	2.7	2.3	2.9
Swiss Re	3.0	6.0	3.1	2.9	2.8	3.0	3.1	3.2	3.2	3.2	3.9	4.9	5.8	na	5.1	na	1.9	1.3 L	2.9
Via Nova Investment Mgt.	3.0	6.0	3.3	3.0	2.9	3.1	3.3	3.5	3.6	3.7	3.9	4.9	5.5	4.8	5.5	91.0	2.5	2.3	2.2
Fannie Mae	2.9	6.0	na	na	2.9	2.9	2.9	2.9	3.0	3.1	3.4	na	na	na	4.9	na	1.7	2.1	2.8
GLC Financial Economics	2.9	5.9	3.1	3.3	3.0	3.2	3.3	3.5	3.9	4.2	4.3	5.8 H	6.5 H	5.2	6.3 H	87.9	2.8	2.4	2.4
NatWest Markets	2.9	5.9	3.1	2.9	2.9	3.0	3.1	2.7	2.9	3.2	3.8	4.7	5.4	4.4	5.0	86.0	2.1	2.2	2.4
PNC Financial Services Corp.	2.9	6.0	3.2	na	2.9	2.9	3.0	3.1	3.2	3.3	3.6	na	5.3	4.0	5.0	85.1	1.9	2.4	2.5
Societe Generale	2.9	6.0	na	na	2.9	na	na	2.7	na	2.8	2.9	na	na	na	na	na	0.6	1.6	1.7
The Northern Trust Company	2.9	6.0	3.2	3.0	2.9	2.9	3.0	3.2	3.5	3.8	4.1	5.3	6.0	4.8	5.4	89.2	1.7	2.1	2.3
Nomura Securities, Inc.	2.8	5.8	na	na	na	na	na	3.0	3.0	3.0	na	4.1	4.8	na	na	na	1.7	2.3	2.8
Cycledata Corp.	2.6	5.6	2.9	2.6	2.6	2.8	3.0	3.1	3.3	3.4	3.5	4.5	5.6	4.3	5.1	88.0	2.4	2.2	2.2
Georgia State University	2.6	5.8	na	na	2.5	3.0	3.0	3.3	3.5	3.8	3.9	4.7	5.6	na	5.5	na	1.8	2.3	2.3
Moody's Capital Markets Group	2.6	5.8	3.1	2.8	2.5	2.6	2.6	2.6	2.7	2.9	3.0	4.2	5.1	3.6	4.6	88.5	3.5 H	1.9	1.6 L
Stone Harbor Investment Partners	2.3	5.4	2.5	2.3	2.2	2.2	2.2	2.3	2.5	2.8	3.1	4.0	4.8	na	4.4	86.0	1.8	2.4	2.2
TS Lombard	1.6	3.9 L	1.1 L	0.9 L	1.0 L	1.1 L	1.2 L	1.5 L	1.6 L	2.0	2.2 L	3.1 L	4.0 L	2.6 L	3.3 L	90.0	1.0	3.0 H	2.5
ACIMA Private Wealth	1.3 L	4.3	2.0	2.0	1.2	1.4	1.4	1.6	1.6 L	1.6 L	2.4	3.9	5.1	3.5	4.2	85.0	1.0	2.0	1.6 L
December Consensus	**3.0**	**6.0**	**3.3**	**2.9**	**2.9**	**3.0**	**3.1**	**3.2**	**3.3**	**3.4**	**3.7**	**4.8**	**5.6**	**4.4**	**5.2**	**88.9**	**1.8**	**2.2**	**2.3**
Top 10 Avg.	3.4	6.4	3.8	3.3	3.3	3.4	3.5	3.7	3.8	4.0	4.2	5.3	6.2	4.9	5.7	92.3	2.6	2.5	2.8
Bottom 10 Avg.	2.5	5.4	2.7	2.5	2.3	2.5	2.5	2.6	2.7	2.8	3.1	4.2	5.1	3.9	4.6	85.8	1.0	1.8	1.8
November Consensus	3.0	6.0	3.2	2.9	2.9	3.1	3.1	3.3	3.4	3.5	3.7	4.7	5.6	4.3	5.2	89.1	1.8	2.2	2.3
Number of Forecasts Changed From A Month Ago:																			
Down	4.0	5.0	4.0	5.0	8.0	8.0	8.0	12.0	14.0	12.0	5.0	4.0	6.0	1.0	8.0	4.0	6.0	9.0	5.0
Same	32.0	29.0	22.0	17.0	26.0	22.0	21.0	22.0	20.0	21.0	22.0	16.0	9.0	13.0	16.0	11.0	21.0	17.0	22.0
Up	2.0	2.0	5.0	3.0	2.0	3.0	4.0	3.0	2.0	5.0	9.0	6.0	11.0	7.0	9.0	11.0	8.0	9.0	9.0
Diffusion Index	47%	46%	52%	46%	42%	42%	44%	38%	33%	41%	56%	54%	60%	64%	52%	63%	53%	50%	56%

10 ■ BLUE CHIP FINANCIAL FORECASTS ■ DECEMBER 1, 2018

International Interest Rate And Foreign Exchange Rate Forecasts

United States

Blue Chip Forecasters	3 Mo. Interest Rate %			10 Yr. Gov't Bond Yield %			Fed's Major Currency $ Index		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	na	na	na	3.00	3.00	na	na	na	na
BMO Capital Markets	na	na	na	3.14	3.20	3.33	92.0	92.0	88.0
IHSMarkit	na	na	na	3.28	3.40	3.50	na	na	na
ING Financial Markets	2.65	2.95	3.45	3.20	3.30	3.20	95.2	94.8	91.2
Mizuho Research Institute	2.70	2.90	3.00	3.30	3.30	3.40	na	na	na
Moody's Analytics	2.87	3.15	3.56	3.34	3.45	3.53	na	na	na
Moody's Capital Markets	na	na	na	3.06	3.03	2.92	91.4	91.3	89.7
Nomura Securities	na	na	na	na	na	na	na	na	na
Oxford Economics	na	na	na	3.37	3.41	3.48	90.0	89.3	88.0
Scotiabank	na	na	na	3.25	3.15	3.40	na	na	na
TS Lombard	2.70	2.90	2.50	3.10	3.50	2.80	95.0	90.0	80.0
Wells Fargo	2.70	2.95	3.40	3.30	3.45	3.65	na	na	na
December Consensus	**2.72**	**2.97**	**3.18**	**3.21**	**3.29**	**3.32**	**92.7**	**91.5**	**87.4**
High	2.87	3.15	3.56	3.37	3.50	3.65	95.2	94.8	91.2
Low	2.65	2.90	2.50	3.00	3.00	2.80	90.0	89.3	80.0
Last Months Avg.	2.70	2.89	3.05	3.20	3.27	3.28	91.1	89.6	87.0

Japan

Blue Chip Forecasters	3 Mo. Interest Rate %			10 Yr. Gov't Bond Yield %			USD/YEN		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	na	na	na	0.15	0.15	na	112.0	110.0	na
BMO Capital Markets	na	na	na	0.15	0.15	0.15	113.0	112.0	110.0
IHSMarkit	na	na	na	na	na	na	114.8	115.7	118.2
ING Financial Markets	-0.05	-0.05	0.00	0.10	0.10	0.10	114.0	112.0	105.0
Mizuho Research Institute	0.05	0.05	0.05	0.10	0.15	0.15	na	na	na
Moody's Analytics	0.08	0.07	0.06	0.01	-0.01	-0.02	112.8	113.2	114.1
Moody's Capital Markets	na	na	na	0.10	0.12	0.15	113.5	113.3	113.0
Nomura Securities	na	na	na	na	na	na	115.0	118.0	120.0
Oxford Economics	na	na	na	0.12	0.10	0.10	111.5	110.6	109.6
Scotiabank	na	na	na	na	na	na	110.0	110.0	108.0
TS Lombard	-0.10	-0.10	-0.10	0.10	0.10	0.05	115.0	105.0	102.0
Wells Fargo	-0.01	0.00	0.00	0.16	0.20	0.27	na	na	na
December Consensus	**-0.01**	**-0.01**	**0.00**	**0.11**	**0.12**	**0.12**	**113.2**	**112.0**	**111.1**
High	0.08	0.07	0.06	0.16	0.20	0.27	115.0	118.0	120.0
Low	-0.10	-0.10	-0.10	0.01	-0.01	-0.02	110.0	105.0	102.0
Last Months Avg.	-0.01	0.01	0.00	0.12	0.12	0.12	111.9	111.1	110.5

United Kingdom

Blue Chip Forecasters	3 Mo. Interest Rate %			10 Yr. Gilt Yields %			GBP/USD		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	na	na	na	1.60	1.65	na	1.32	1.31	na
BMO Capital Markets	na	na	na	1.65	1.75	1.95	1.24	1.28	1.38
IHSMarkit	na	na	na	na	na	na	1.30	1.30	1.31
ING Financial Markets	0.80	0.85	1.05	1.55	1.55	1.80	1.32	1.32	1.40
Mizuho Research Institute	0.90	0.95	1.10	1.70	1.75	1.90	na	na	na
Moody's Analytics	0.88	0.98	1.19	1.65	1.86	2.17	1.26	1.28	1.31
Moody's Capital Markets	na	na	na	1.40	1.43	1.45	1.28	1.28	1.30
Nomura Securities	na	na	na	na	na	na	1.39	1.46	1.59
Oxford Economics	na	na	na	1.56	1.71	2.00	1.34	1.35	1.38
Scotiabank	na	na	na	na	na	na	1.32	1.32	1.37
TS Lombard	1.00	1.80	1.90	1.65	2.35	2.00	1.30	1.25	1.15
Wells Fargo	0.85	0.85	1.10	1.55	1.65	2.00	na	na	na
December Consensus	**0.89**	**1.09**	**1.27**	**1.59**	**1.74**	**1.91**	**1.31**	**1.32**	**1.35**
High	1.00	1.80	1.90	1.70	2.35	2.17	1.39	1.46	1.59
Low	0.80	0.85	1.05	1.40	1.43	1.45	1.24	1.25	1.15
Last Months Avg.	0.86	1.02	1.22	1.64	1.79	1.94	1.31	1.32	1.36

Switzerland

Blue Chip Forecasters	3 Mo. Interest Rate %			10 Yr. Gov't Bond Yield %			USD/CHF		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	na	na	na	na	na	na	0.97	0.97	na
BMO Capital Markets	na	na	na	na	na	na	1.01	1.00	0.97
IHSMarkit	na	na	na	na	na	na	1.01	1.02	1.03
ING Financial Markets	-0.75	-0.75	-0.75	0.05	0.05	0.15	0.99	1.02	1.00
Mizuho Research Institute	na	na	na	na	na	na	na	na	na
Moody's Analytics	-0.80	-0.78	-0.71	0.04	0.16	0.46	1.05	1.04	1.04
Moody's Capital Markets	na	na	na	-0.05	-0.03	0.00	1.00	1.00	0.99
Nomura Securities	na	na	na	na	na	na	0.98	0.99	0.96
Oxford Economics	na	na	na	0.30	0.42	0.60	1.02	1.00	0.98
Scotiabank	na	na	na	na	na	na	0.98	0.98	0.95
TS Lombard	-0.80	-0.90	-1.10	0.07	0.06	0.05	0.98	1.00	1.00
Wells Fargo	na	na	na	na	na	na	na	na	na
December Consensus	**-0.78**	**-0.81**	**-0.85**	**0.08**	**0.13**	**0.25**	**1.00**	**1.00**	**0.99**
High	-0.75	-0.75	-0.71	0.30	0.42	0.60	1.05	1.04	1.04
Low	-0.80	-0.90	-1.10	-0.05	-0.03	0.00	0.97	0.97	0.95
Last Months Avg.	-0.75	-0.78	-0.82	0.08	0.14	0.28	1.00	1.00	0.99

Canada

Blue Chip Forecasters	3 Mo. Interest Rate %			10 Yr. Gov't Bond Yield %			USD/CAD		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	na	na	na	na	na	na	1.30	1.30	na
BMO Capital Markets	na	na	na	2.52	2.61	2.80	1.31	1.30	1.28
IHSMarkit	na	na	na	na	na	na	1.28	1.28	1.27
ING Financial Markets	2.20	2.50	2.70	2.70	2.80	3.00	1.27	1.26	1.25
Mizuho Research Institute	na	na	na	na	na	na	na	na	na
Moody's Analytics	2.25	2.49	2.96	3.26	3.39	3.54	1.26	1.25	1.24
Moody's Capital Markets	na	na	na	2.35	2.33	2.30	1.33	1.33	1.30
Nomura Securities	na	na	na	na	na	na	1.31	1.33	1.35
Oxford Economics	na	na	na	2.79	2.98	3.29	1.29	1.28	1.28
Scotiabank	na	na	na	2.60	2.60	2.85	1.28	1.25	1.22
TS Lombard	1.60	1.90	1.80	2.40	2.60	2.20	1.30	1.40	1.10
Wells Fargo	2.20	2.45	2.95	2.65	2.80	3.00	na	na	na
December Consensus	**2.06**	**2.34**	**2.60**	**2.66**	**2.76**	**2.87**	**1.29**	**1.30**	**1.25**
High	2.25	2.50	2.96	3.26	3.39	3.54	1.33	1.40	1.35
Low	1.60	1.90	1.80	2.35	2.33	2.20	1.26	1.25	1.10
Last Months Avg.	2.00	2.20	2.52	2.68	2.77	2.89	1.29	1.29	1.25

International Interest Rate And Foreign Exchange Rate Forecasts

Australia

Blue Chip Forecasters	3 Mo. Interest Rate %			10 Yr. Gov't Bond Yield %			AUD/USD		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	na	na	na	na	na	na	0.70	0.70	na
BMO Capital Markets	na	na	na	na	na	na	0.73	0.74	0.75
IHSMarkit	na	na	na	na	na	na	0.69	0.69	0.69
ING Financial Markets	2.00	2.00	2.00	2.70	2.70	2.80	0.68	0.69	0.73
Mizuho Research Institute	na	na	na	na	na	na	na	na	na
Moody's Analytics	1.85	1.85	1.88	2.53	2.55	2.55	0.69	0.68	0.67
Moody's Capital Markets	na	na	na	2.65	2.63	2.58	0.72	0.73	0.73
Nomura Securities	na	na	na	na	na	na	0.72	0.72	0.71
Oxford Economics	na	na	na	2.81	2.90	3.15	0.72	0.73	0.74
Scotiabank	na	na	na	na	na	na	0.73	0.75	0.77
TS Lombard	2.30	2.80	3.00	2.80	3.10	3.00	0.75	0.65	0.60
Wells Fargo	na	na	na	na	na	na	na	na	na
December Consensus	**2.05**	**2.22**	**2.29**	**2.70**	**2.78**	**2.82**	**0.71**	**0.71**	**0.71**
High	2.30	2.80	3.00	2.81	3.10	3.15	0.75	0.75	0.77
Low	1.85	1.85	1.88	2.53	2.55	2.55	0.68	0.65	0.60
Last Months Avg.	2.05	2.22	2.29	2.68	2.77	2.82	0.71	0.71	0.72

Euro area

Blue Chip Forecasters	3 Mo. Interest Rate %			EUR/USD		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	na	na	na	1.15	1.15	na
BMO Capital Markets	na	na	na	1.13	1.10	1.20
IHSMarkit	na	na	na	1.13	1.11	1.10
ING Financial Markets	-0.32	-0.32	-0.18	1.15	1.15	1.20
Mizuho Research Institute	-0.30	-0.30	-0.25	na	na	na
Moody's Analytics	-0.33	-0.33	-0.14	1.12	1.13	1.14
Moody's Capital Markets	na	na	na	1.13	1.14	1.14
Nomura Securities	na	na	na	1.18	1.20	1.30
Oxford Economics	na	na	na	1.16	1.18	1.20
Scotiabank	na	na	na	1.20	1.22	1.26
TS Lombard	-0.32	-0.25	-0.25	1.16	1.23	1.35
Wells Fargo	-0.35	-0.30	-0.15	na	na	na
December Consensus	**-0.32**	**-0.30**	**-0.19**	**1.15**	**1.16**	**1.21**
High	-0.30	-0.25	-0.14	1.20	1.23	1.35
Low	-0.35	-0.33	-0.25	1.12	1.10	1.10
Last Months Avg.	-0.33	-0.31	-0.18	1.16	1.18	1.22

Blue Chip Forecasters	10 Yr. Gov't Bond Yields %											
	Germany			France			Italy			Spain		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.60	0.65	na	na	na	na	na	na	na	na	na	na
BMO Capital Markets	0.55	0.65	0.90	na	na	na	na	na	na	na	na	na
ING Financial Markets	0.50	0.50	0.60	0.80	0.80	0.90	3.25	2.75	3.10	1.55	1.50	1.65
Mizuho Research Institute	0.55	0.60	0.80	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.70	0.88	1.19	0.88	0.94	1.23	2.29	2.41	2.57	2.14	2.24	2.30
Moody's Capital Markets	0.38	0.43	0.50	0.79	0.87	0.90	3.63	3.58	3.51	1.69	1.72	1.80
Nomura Securities	na	na	na	na	na	na	na	na	na	na	na	na
Oxford Economics	0.72	0.83	1.07	1.10	1.26	1.50	3.72	3.83	4.07	1.82	1.93	2.17
TS Lombard	0.65	0.80	0.50	0.85	1.00	0.60	3.65	4.00	3.20	1.60	1.80	1.60
Wells Fargo	0.55	0.70	1.00	na	na	na	na	na	na	na	na	na
December Consensus	**0.58**	**0.67**	**0.82**	**0.88**	**0.97**	**1.03**	**3.31**	**3.31**	**3.29**	**1.76**	**1.84**	**1.90**
High	0.72	0.88	1.19	1.10	1.26	1.50	3.72	4.00	4.07	2.14	2.24	2.30
Low	0.38	0.43	0.50	0.79	0.80	0.60	2.29	2.41	2.57	1.55	1.50	1.60
Last Months Avg.	0.61	0.71	0.85	0.89	0.98	1.04	3.31	3.29	3.29	1.73	1.81	1.88

	Consensus Forecasts 10-year Bond Yields vs U.S. Yield			
	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-2.95	-3.10	-3.17	-3.20
United Kingdom	-1.65	-1.62	-1.55	-1.41
Switzerland	-3.03	-3.13	-3.16	-3.07
Canada	-0.72	-0.55	-0.53	-0.45
Australia	-0.37	-0.51	-0.51	-0.51
Germany	-2.71	-2.63	-2.62	-2.50
France	-2.28	-2.33	-2.32	-2.30
Italy	0.55	0.10	0.02	-0.03
Spain	-1.42	-1.45	-1.45	-1.42

	Consensus Forecasts 3 Mo. Deposit Rates vs U.S. Rate			
	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-2.76	-2.73	-2.96	-3.18
United Kingdom	-1.76	-1.84	-1.88	-1.91
Switzerland	-3.39	-3.51	-3.78	-4.04
Canada	-0.47	-0.66	-0.64	-0.58
Australia	-0.71	-0.67	-0.75	-0.89
Eurozone	-2.97	-3.05	-3.27	-3.38

Viewpoints:

A Sampling of Views on the Economy, Financial Markets and Government Policy Excerpted from Recent Reports Issued by our Blue Chip Panel Members and Others

Will Goldilocks Inflation Stay in 2019?

Not Too Hot, Not Too Cold but Just Right

Inflation has reached a Goldilocks state as far as the Fed is concerned. Both headline and core PCE inflation are up 2.0% over the past year, exactly in line with the FOMC's target. That follows six years in which the core—the FOMC's preferred barometer of trend inflation—undershot the committee's goal. Multiple bouts of disinflation, like in 2015 and again in 2017, had many questioning whether the Fed's 2% goal was achievable. The FOMC pressed ahead with normalizing anyway, but at a historically slow rate. Further tightening has continued on gradually as inflation has firmed without showing signs of becoming unhinged. Yet could the Goldilocks scenario change and cause the Fed to either quicken its pace of policy tightening or ease up on the brakes? In a report last year, we focused on five specific inflation surprises for the upcoming year. This year, we take a more thematic approach and look at the factors we view as most likely to lead inflation away from its current sweet spot of 2.0%. While we see a number of scenarios that would cause inflation to veer either above or below 2%, we believe that ultimately, solid U.S. growth and upward pressures from tariffs will push core PCE inflation to 2.2%. That would be moderate enough to where the Fed is likely to hike a few more times next year. But where might things go wrong?

Upside Risk I: Capacity Constraints Come to a Boil

The United States is on course for one of, if not the, best years of the current expansion. Strong growth alone is not sufficient for inflation, but 2018's solid performance registers at a time when there is very little excess capacity in the economy. Given inflation's tendency to lag growth, the economy's impressive performance this year may only now be starting to rev up inflation. Capacity constraints are particularly evident in the labor market, where the unemployment rate is already below "full employment." Job openings are near record highs, while finding qualified labor is small businesses' single most important problem. Wages are rising as a result. While still modest compared to the later stages of previous cycles, research suggests that the relationship between unemployment and wages is nonlinear. The pass-through between wage costs and inflation may not be as strong as it once was, but there is still a positive link between a tight labor market and inflation. Labor is the largest cost for most companies, particularly in the service sector, which accounts for 75% percent of core inflation. With order books full and companies seeing take-home pays rise as they cut bigger checks to their employees, businesses may be emboldened to raise prices. The share of businesses that is raising compensation and prices has jumped over the past year to the highest level of the expansion. The tighter labor market and increased willingness for firms to raise prices is part of our baseline call for modestly higher inflation next year, but a steepening of the Phillips Curve and/or faster tightening in the labor market may lead inflation to rise more strongly. That could lead the FOMC to tighten rates faster and/or more than the three quarterly 25 bps hikes in our current forecast.

Upside Risk II: Tariff Trouble

Labor costs are not the only thing pressuring business profits and prompting firms to raise prices. Tariffs on about $300 billion worth of goods are pushing up production costs for U.S. firms and allowing others to raise prices. Even though goods account for only 25% of the core CPI index, we estimate that the tariffs that have been put in place by the Trump administration thus far will add approximately a couple tenths to inflation. More tariffs, however, may very well be in store. Not only are tariffs on $200 billion of imports from China set to jump from 10% to 25% at the start of the year, but the administration has threatened 25% tariffs on remaining imports from China, worth about an additional $267 billion. While talks between the United States and China look poised to resume, there are major grievances regarding China's trade practices that make a quick fix look difficult.

In an environment where margins are already coming under pressure as labor costs rise, there may be little scope for firms to absorb prices. The reduction in corporate tax rates may have given firms some cushion in 2018, but tougher base comparisons for 2019 profit growth may lead firms to finally pass on related costs. Retaliatory tariffs that depress prices at home for U.S. goods will provide at least some offset. However, at the end of the day, the United States still runs a trade deficit with China, leading to more imports exposed to tariffs. Retaliatory tariffs from all countries have been placed on about $135 billion worth of U.S. goods this year versus the $300 billion in tariffs on imports. Were the trade spat to deepen, or extend to more countries, inflation is likely to rise more than we currently forecast. While that may erode real household income and investment returns, the Fed would likely look through the increase since it is likely to be a one-time level shift in prices. The risk, however, is that the proliferation of tariffs would cause inflation expectations to become unmoored, generating the need for the Fed to react to the higher path of inflation.

Downside Risk I: Slower Global Growth Overrides U.S. Strength

An escalating trade war brings us to our first downside risk. The trade battle with the United States may already be taking a toll on growth in China. Third quarter GDP slowed more than expected, coming in at 6.5% year-over-year, while other measures of activity have also cooled. That has begun to weigh on many of the country's other trading partners. Pared-back expectations for global growth have hit commodity prices. Oil has tumbled more than 20% since early October, while spot prices for industrial metals have fallen since the summer. At the same time, declining agricultural prices point to pressure on consumer food inflation in the year ahead.

Commodity prices have been pressured not only by a deteriorating outlook for global demand, but by the unwavering strength of the dollar. We expect the dollar to edge lower in early 2019. That call is contingent on growth and monetary policy beginning to converge between the U.S. and other major economies. If that dynamic takes more time, the dollar and commodity prices would put ontarget inflation in jeopardy. If headline inflation were to fall below target because of declining prices for energy and food commodities, the FOMC would likely be unfazed. In the short-run, energy and agricultural prices are less influenced by monetary policy than by politics and weather. The bigger risk for Fed policy is if moves in commodity prices and the dollar are sharp enough to filter into core inflation. Yet there is only a very small link between core inflation and the price of oil or the value of the dollar. The effects of oil and the dollar are primarily concentrated in the goods portion of core inflation, which, as we previously mentioned, is only 25% of the index. As a result, it would take some fairly big moves in commodity prices and the dollar to move core inflation enough for the Fed to rethink its policy path.

Downside Risk II: Just as Other Sectors Heat Up, Housing Cools

Most areas of the U.S. economy have boomed this year with one notable exception: housing. Affordability concerns have come to the forefront after years of prices outpacing income growth. The affordability challenge has grown more acute this past year as mortgage rates have jumped by about 100 bps. Home sales have fallen over the past six months as a result, and price growth is beginning to moderate. That could spell trouble for inflation. Shelter accounts for just over 40% of

Viewpoints

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core CPI and almost 20% of core PCE. Not only is housing a sizeable portion of inflation indices, but it has consistently risen faster than overall inflation. If the softness in home prices filters into the CPI, the inflationary pressure from a "hot" economy elsewhere might not be enough to offset weakening in such a juggernaut. The largest part of the shelter index, the imputed rent of owner-occupied homes, is derived from asking homeowners how much they think their home would rent for in the current market. The shelter component therefore lags sales-based measures of home prices by about 18 months. As such, we believe softening home prices won't be a problem for official inflation in 2019 as much as it will be in 2020. At the same time, the price of rented housing has been growing at a fairly steady rate and suggests that that fraction of shelter should hold up. A weakening in prices or faster pass-through to inflation, however, is not out of the question.

Will the Inflation Bears Return Home in 2019?

With recent economic developments pointing toward both U.S. and global growth slowing in the year ahead, concerns have reemerged about the FOMC maintaining its inflation target. The sharp decline in oil prices over the past month has lowered expectations for headline inflation next year. It has also raised concerns about core inflation wobbling as it did in 2015. Oil, however, is down a little less than 30% from its recent peak compared to a 60% year-over-year decline at the worst of the 2014-2016 oil rout. The price break that falling oil prices offers to transport-related costs for core goods and services is also likely to be offset by worker shortages in the sector that have pushed up labor costs. The recent strength of the dollar points to more tepid inflation, all else equal, again similar to 2015. The increase in the dollar over the past year, however, has been more moderate than at the height of the 2014-2015 run-up, even if on a level basis the dollar's value is close to a 16-year high. At the same time, cheaper import prices due to the stronger dollar will at least in part be negated by tariffs raising the costs of some imported items and their domestically-produced alternatives.

On net, we see core inflation drifting higher in the year ahead. Solid economic growth this past year when labor availability and capacity has become constrained is likely to be still filtering through to inflation. Tariffs are pressuring costs for some businesses and giving firms a clear reason to raise prices. Barring a significant escalation in trade disputes, the pickup in inflation should remain fairly modest, however. Inflation expectations have remained little changed over the past few years, which suggests that price increases are likely to be restrained. The pull-back in commodity prices, a strong dollar, retaliatory tariffs and the housing slowdown are also expected to keep domestic inflation pressures from generating a clear breakout in inflation. Therefore, while core inflation is likely to stray a bit above the FOMC's target in 2019, we expect the committee to slowly raise rates a few more times next year. There are plenty of risks around inflation, however, that could lead the Fed to change course.

Sarah House and Shannon Seery (Wells Fargo Economics Group)

How Does Fed Policy React to Stock Market Declines?

The equity market sell-off since the beginning of October has led to questions around whether the Fed will maintain its current path of rate hikes. Historically, the Fed appears to have responded with more accommodative policy after stock market sell-offs, on average. This has led some to conclude that there is a Fed "put," in which the Fed responds to large stock market declines with accommodative policy, but does not change course when faced with small declines or increases in stock prices.

The Fed might react to stock market sell-offs for two reasons. First, stock price declines can serve as a financial market signal of lower growth in the future. Second, stock price declines and Financial Conditions Index (FCI) tightening can cause a drag on future growth, for instance through wealth effects on consumer spending.

To assess how these factors affect the Fed's response to stock market declines, we construct a database of all scheduled FOMC meetings from 1994 to today, looking at S&P500 moves and changes in the fed funds rate. While changes to the fed funds rate do not always fully capture the stance of monetary policy, they provide the most direct and transparent measure of Fed policy.

We find that stock market sell-offs are more likely to worry the Fed if they occur in tandem with a broader tightening of financial conditions or in an environment of weak growth. Looking at the sample of FOMC meetings that follow stock market sell-offs, we find that the Fed is more likely to decrease the fed funds rate when credit spreads are widening simultaneously. We also find that the Fed is more accommodative when current growth is weak relative to potential. Such cases of stock market sell-offs correspond to times of elevated recession risk, suggesting the possibility that the Fed responds more aggressively to address downside risks. Today, in contrast, credit spreads have widened only moderately, and growth remains significantly above potential, with limited recession risk over the next year.

In fact, the Fed responds to stock market declines differently depending on whether the economy is currently in recession or not. Most cuts in the fed funds rate after stock market declines occurred in recessions or the immediate recovery after a recession.

We next look at specific historical examples of the Fed's policy response to equity market sell-offs outside of recessions to help understand how the Fed might react today in a non-recession environment.

The current environment most closely resembles two instances in which the Fed continued rate increases amidst a broader hiking cycle. In May 1994, the Fed hiked 75bp despite a 6% stock market decline in the prior months, and in August 2004, the Fed continued with a 25bp hike. In both cases, the pace of growth was over 1.5pp above potential and credit spreads did not widen significantly, and the Fed continued to hike in order to slow growth.

The Fed did respond in a dovish way to an equity market sell-off in two notable instances. In September 1998, the Fed cut the policy rate by 25bp, and in early 2016, the Fed held off on further rate hikes. In both cases, growth was below potential. The 1998 cut came alongside a broader financial panic, and late 2015 and early 2016 also saw a significant widening of credit spreads and a significant worry about recession. This left little room for the Fed to tolerate a large decline in the stock market and a corresponding tightening of financial conditions.

Taken together, the evidence from these historical examples and our empirical analysis suggest large differences in the Fed's response to stock market declines, depending on broader financial conditions as well as growth. With other financial conditions such as credit spreads still at moderate levels, and with growth running well above potential, the Fed is likely to continue with their current pace of tightening despite the decline in equity markets. This supports our view that the Fed will hike in December, with a subjective probability of 90%. Beyond this, we expect four hikes in 2019 to a terminal funds rate of 3¼-3½%, with risks that are broadly balanced.

Brian Chen, David Choi and Jan Hatzius (Goldman Sachs)

Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2020 through 2024 and averages for the five-year periods 2020-2024 and 2025-2029. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
Interest Rates		**2020**	**2021**	**2022**	**2023**	**2024**	**2020-2024**	**2025-2029**
1. Federal Funds Rate	**CONSENSUS**	**2.9**	**2.8**	**2.8**	**3.0**	**3.0**	**2.9**	**3.1**
	Top 10 Average	3.5	3.6	3.6	3.6	3.6	3.6	3.6
	Bottom 10 Average	2.1	1.9	2.0	2.3	2.5	2.2	2.6
2. Prime Rate	**CONSENSUS**	**5.9**	**5.8**	**5.9**	**6.0**	**6.1**	**5.9**	**6.1**
	Top 10 Average	6.5	6.6	6.6	6.6	6.6	6.6	6.6
	Bottom 10 Average	5.2	4.9	5.1	5.4	5.6	5.2	5.7
3. LIBOR, 3-Mo.	**CONSENSUS**	**3.3**	**3.2**	**3.2**	**3.5**	**3.5**	**3.3**	**3.5**
	Top 10 Average	3.9	4.0	4.0	4.2	4.2	4.0	4.0
	Bottom 10 Average	2.7	2.5	2.5	2.8	2.9	2.7	3.1
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**3.0**	**2.9**	**3.0**	**3.1**	**3.1**	**3.0**	**3.1**
	Top 10 Average	3.5	3.6	3.6	3.6	3.6	3.6	3.6
	Bottom 10 Average	2.5	2.3	2.3	2.6	2.6	2.4	2.6
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**2.9**	**2.8**	**2.8**	**3.0**	**3.0**	**2.9**	**3.1**
	Top 10 Average	3.5	3.6	3.6	3.6	3.6	3.6	**3.6**
	Bottom 10 Average	2.1	1.9	2.0	2.3	2.5	2.1	**2.6**
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**3.0**	**2.9**	**3.0**	**3.1**	**3.2**	**3.1**	**3.2**
	Top 10 Average	3.6	3.7	3.7	3.7	3.8	3.7	**3.7**
	Bottom 10 Average	2.4	2.1	2.2	2.5	2.7	2.4	**2.8**
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**3.1**	**3.1**	**3.1**	**3.2**	**3.3**	**3.2**	**3.4**
	Top 10 Average	3.7	3.8	3.8	3.8	3.8	3.8	**3.9**
	Bottom 10 Average	2.5	2.3	2.3	2.6	2.8	2.5	**2.9**
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**3.2**	**3.2**	**3.2**	**3.3**	**3.4**	**3.3**	**3.5**
	Top 10 Average	3.8	3.9	3.9	3.9	4.0	3.9	**4.0**
	Bottom 10 Average	2.5	2.4	2.4	2.7	2.8	2.6	**2.9**
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**3.4**	**3.3**	**3.4**	**3.5**	**3.5**	**3.4**	**3.6**
	Top 10 Average	4.0	4.0	4.1	4.1	4.1	4.1	**4.2**
	Bottom 10 Average	2.7	2.7	2.6	2.8	2.9	2.7	**3.0**
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.5**	**3.5**	**3.5**	**3.6**	**3.7**	**3.6**	**3.8**
	Top 10 Average	4.2	4.2	4.3	4.3	4.3	4.3	**4.4**
	Bottom 10 Average	2.9	2.9	2.8	3.0	3.0	2.9	**3.2**
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**3.8**	**3.8**	**3.9**	**4.0**	**4.0**	**3.9**	**4.2**
	Top 10 Average	4.5	4.5	4.6	4.7	4.7	4.6	**4.9**
	Bottom 10 Average	3.2	3.2	3.2	3.3	3.4	3.2	**3.5**
13. Corporate Aaa Bond Yield	**CONSENSUS**	**4.9**	**4.9**	**4.9**	**5.0**	**5.1**	**5.0**	**5.1**
	Top 10 Average	5.6	5.7	5.8	5.8	5.8	5.7	**5.9**
	Bottom 10 Average	4.2	4.1	4.1	4.2	4.3	4.2	**4.4**
13. Corporate Baa Bond Yield	**CONSENSUS**	**5.8**	**5.8**	**5.9**	**5.9**	**6.0**	**5.9**	**6.0**
	Top 10 Average	6.5	6.6	6.8	6.8	6.8	6.7	**6.9**
	Bottom 10 Average	5.2	5.1	5.1	5.2	5.3	5.2	**5.3**
14. State & Local Bonds Yield	**CONSENSUS**	**4.6**	**4.5**	**4.5**	**4.5**	**4.6**	**4.5**	**4.7**
	Top 10 Average	5.1	5.0	5.0	5.0	5.1	5.1	**5.2**
	Bottom 10 Average	4.2	4.0	3.9	4.0	4.0	4.0	**4.1**
15. Home Mortgage Rate	**CONSENSUS**	**5.2**	**5.2**	**5.2**	**5.3**	**5.4**	**5.3**	**5.5**
	Top 10 Average	5.8	5.8	5.9	6.0	6.0	5.9	**6.1**
	Bottom 10 Average	4.6	4.5	4.5	4.7	4.8	4.6	**4.9**
A. FRB - Major Currency Index	**CONSENSUS**	**90.1**	**89.7**	**89.4**	**90.0**	**89.8**	**89.8**	**89.9**
	Top 10 Average	94.6	94.6	94.4	94.2	94.0	94.3	93.9
	Bottom 10 Average	85.5	84.8	84.2	85.8	85.6	85.2	85.8
		Year-Over-Year, % Change					Five-Year Averages	
		2020	**2021**	**2022**	**2023**	**2024**	**2020-2024**	**2025-2029**
B. Real GDP	**CONSENSUS**	**1.8**	**1.8**	**2.1**	**2.2**	**2.1**	**2.0**	**2.1**
	Top 10 Average	2.4	2.3	2.4	2.6	2.5	2.5	2.5
	Bottom 10 Average	1.3	1.3	1.7	1.8	1.7	1.6	1.8
C. GDP Chained Price Index	**CONSENSUS**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.4	2.4	2.3	2.4	2.3	2.3	2.3
	Bottom 10 Average	1.9	1.8	1.9	1.9	1.9	1.9	1.9
D. Consumer Price Index	**CONSENSUS**	**2.1**	**2.1**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
	Top 10 Average	2.5	2.5	2.5	2.5	2.4	2.5	2.4
	Bottom 10 Average	1.7	1.8	1.9	2.0	1.9	1.9	2.0

Databank:

2018 Historical Data

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	-0.1	0.1	0.7	0.3	1.2	0.2	0.6	-0.1	-0.1	0.8		
Auto & Light Truck Sales (b)	17.12	16.92	17.23	17.20	17.20	17.23	16.72	16.69	17.43	17.51		
Personal Income (a, current $)	0.5	0.3	0.4	0.3	0.4	0.4	0.3	0.4	0.2			
Personal Consumption (a, current $)	0.2	-0.1	0.6	0.5	0.5	0.4	0.5	0.5	0.4			
Consumer Credit (e)	3.7	3.4	2.7	2.7	6.9	1.7	5.4	7.0	3.3			
Consumer Sentiment (U. of Mich.)	95.7	99.7	101.4	98.8	98.0	98.2	97.9	96.2	100.1	98.6	97.5	
Household Employment (c)	409	785	-37	3	293	102	389	-423	420	600		
Nonfarm Payroll Employment (c)	176	324	155	175	268	208	165	286	118	250		
Unemployment Rate (%)	4.1	4.1	4.1	3.9	3.8	4.0	3.9	3.9	3.7	3.7		
Average Hourly Earnings (All, cur. $)	26.71	26.74	26.80	26.86	26.94	26.99	27.07	27.17	27.25	27.30		
Average Workweek (All, hrs.)	34.4	34.5	34.5	34.5	34.5	34.6	34.5	34.5	34.4	34.5		
Industrial Production (d)	2.8	3.6	3.6	3.9	3.0	3.6	4.2	5.4	5.6	4.1		
Capacity Utilization (%)	77.0	77.2	77.5	78.2	77.5	77.8	78.0	78.5	78.5	78.4		
ISM Manufacturing Index (g)	59.1	60.8	59.3	57.3	58.7	60.2	58.1	61.3	59.8	57.7		
ISM Nonmanufacturing Index (g)	59.9	59.5	58.8	56.8	58.6	59.1	55.7	58.5	61.6	60.3		
Housing Starts (b)	1.334	1.290	1.327	1.276	1.329	1.177	1.184	1.280	1.210	1.228		
Housing Permits (b)	1.366	1.323	1.377	1.364	1.301	1.292	1.303	1.249	1.270	1.263		
New Home Sales (1-family) (h)	633	663	672	633	653	612	603	585	553			
Construction Expenditures (a)	0.3	2.3	-0.9	1.7	0.7	-0.7	0.2	0.8	0.0			
Consumer Price Index (nsa, d)	2.1	2.2	2.4	2.5	2.8	2.9	2.9	2.7	2.3	2.5		
CPI ex. Food and Energy (nsa, d)	1.8	1.8	2.1	2.1	2.2	2.3	2.4	2.2	2.2	2.1		
Producer Price Index (nsa, d)	2.6	2.8	2.9	2.7	3.1	3.3	3.3	2.8	2.6	2.9		
Durable Goods Orders (a)	-4.2	4.5	2.7	-1.0	-0.3	0.9	-1.2	4.7	-0.1	-4.4		
Leading Economic Indicators (a)	0.7	0.6	0.3	0.5	0.1	0.5	0.7	0.5	0.6	0.1		
Balance of Trade & Services (f)	-52.3	-55.0	-46.7	-45.5	-42.6	-45.7	-50.0	-53.3	-54.0			
Federal Funds Rate (%)	1.41	1.42	1.51	1.69	1.70	1.82	1.91	1.91	1.95	2.19		
3-Mo. Treasury Bill Rate (%)	1.43	1.59	1.73	1.79	1.90	1.94	1.99	2.07	2.17	2.29		
10-Year Treasury Note Yield (%)	2.58	2.86	2.84	2.87	2.98	2.91	2.89	2.89	3.00	3.15		

2017 Historical Data

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	1.2	-0.5	0.2	0.7	-0.3	0.5	0.1	0.2	2.0	0.4	0.7	0.0
Auto & Light Truck Sales (b)	17.32	17.28	16.76	16.84	16.82	16.80	16.70	16.45	18.09	17.88	17.52	17.34
Personal Income (a, current $)	0.7	0.5	0.3	0.1	0.4	0.1	0.4	0.4	0.5	0.4	0.3	0.4
Personal Consumption (a, current $)	0.4	-0.1	0.6	0.3	0.2	0.3	0.2	0.4	0.8	0.4	0.7	0.3
Consumer Credit (e)	5.3	5.9	4.1	4.1	5.6	3.6	4.7	4.3	2.6	6.4	9.6	4.1
Consumer Sentiment (U. of Mich.)	98.5	96.3	96.9	97.0	97.1	95.0	93.4	96.8	95.1	100.7	98.5	95.9
Household Employment (h)	-157	435	553	97	-269	358	261	-40	853	-478	71	104
Nonfarm Payroll Employment (c)	259	200	73	175	155	239	190	221	14	271	216	175
Unemployment Rate (%)	4.8	4.7	4.5	4.4	4.3	4.3	4.3	4.4	4.2	4.1	4.1	4.1
Average Hourly Earnings (All, cur. $)	25.99	26.07	26.11	26.17	26.21	26.26	26.34	26.39	26.51	26.47	26.54	26.64
Average Workweek (All, hrs.)	34.4	34.4	34.3	34.4	34.4	34.4	34.4	34.4	34.3	34.4	34.5	34.5
Industrial Production (d)	-0.5	-0.1	1.2	2.0	2.1	1.9	1.5	1.1	1.3	2.6	3.4	2.9
Capacity Utilization (%)	75.4	75.1	75.5	76.2	76.2	76.2	76.1	75.7	75.7	76.8	77.1	77.3
ISM Manufacturing Index (g)	55.6	57.6	56.6	55.3	55.5	56.7	56.5	59.3	60.2	58.5	58.2	59.3
ISM Nonmanufacturing Index (g)	56.8	57.4	55.6	57.3	57.1	57.2	54.3	55.2	59.4	59.8	57.3	56.0
Housing Starts (b)	1.225	1.289	1.179	1.165	1.122	1.225	1.185	1.172	1.158	1.265	1.303	1.210
Housing Permits (b)	1.329	1.248	1.279	1.255	1.205	1.312	1.258	1.300	1.254	1.343	1.323	1.320
New Home Sales (1-family) (h)	596	618	643	593	604	616	556	558	637	618	712	636
Construction Expenditures (a)	-0.3	0.9	1.2	-1.2	0.9	-1.0	0.1	-0.4	0.2	0.6	0.8	1.2
Consumer Price Index (nsa, d)	2.5	2.7	2.4	2.2	1.9	1.6	1.7	1.9	2.2	2.0	2.2	2.1
CPI ex. Food and Energy (nsa, d)	2.3	2.2	2.0	1.9	1.7	1.7	1.7	1.7	1.7	1.8	1.7	1.8
Producer Price Index (nsa, d)	1.7	2.0	2.2	2.5	2.3	1.9	2.0	2.4	2.6	2.8	3.0	2.5
Durable Goods Orders (a)	0.2	-0.9	2.9	1.4	-1.2	7.1	-7.4	2.7	4.7	-4.1	2.2	3.2
Leading Economic Indicators (a)	0.6	0.3	0.5	0.2	0.4	0.6	0.3	0.4	0.0	1.3	0.4	0.8
Balance of Trade & Services (f)	-46.9	-44.2	-43.9	-46.1	-45.8	-44.8	-44.2	-44.2	-44.4	-47.0	-49.0	-51.9
Federal Funds Rate (%)	0.65	0.66	0.79	0.90	0.91	1.04	1.15	1.16	1.15	1.15	1.16	1.30
3-Mo. Treasury Bill Rate (%)	0.52	0.53	0.75	0.81	0.90	1.00	1.09	1.03	1.05	1.09	1.25	1.34
10-Year Treasury Note Yield (%)	2.43	2.42	2.48	2.30	2.30	2.19	2.32	2.21	2.20	2.36	2.35	2.40

(a) month-over-month % change; (b) millions, saar; (c) month-over-month change, thousands; (d) year-over-year % change; (e) annualized % change; (f) $ billions; (g) level; (h) thousands. Most series are subject to frequent government revisions. Use with care.

Calendar of Upcoming Economic Data Releases

Monday	Tuesday	Wednesday	Thursday	Friday
November 26 Chicago Fed National Activity Index (Oct) Texas Manufacturing Outlook Survey (Nov)	**27** Case-Shiller HPI (Sep) FHFA HPI (Sep) Consumer Confidence (Nov) Texas Service Sector Outlook Survey (Nov) Steel Imports for Consumption (Oct, Preliminary)	**28** GDP (Q3, 2nd Estimate) Final Building Permits (Oct) Adv Trade & Inventories (Oct) New Residential Sales (Oct) Richmond Fed Mfg & Service Sector Surveys (Nov) EIA Crude Oil Stocks Mortgage Applications	**29** Dallas Fed Trimmed-Mean PCE (Oct) Personal Income (Oct) Agricultural Prices (Oct) Underlying NIPA Tables (Oct) State Initial Claims (Oct) Pending Home Sales (Oct) Weekly Jobless Claims Weekly Money Supply	**30** Strike Report (Nov) Chicago PMI (Nov)
December 3 Construction (Oct) IHS-Markit Mfg PMI (Nov) ISM Manufacturing (Nov)	**4** QFR (Q3) ISM New York (Nov)	**5** ADP Employment Report (Nov) Productivity & Costs (Q3) QSS (Q3) IHS-Markit Services PMI(Nov) ISM Nonmanufacturing (Nov) Help Wanted OnLine (Nov) EIA Crude Oil Stocks Mortgage Applications	**6** International Trade (Oct) CEW (Q2) Manufacturers' Shipments, Inventories & Orders (Oct) Public Debt (Nov) Flow of Funds (Q3) Challenger Employment Report (Nov) Weekly Jobless Claims Weekly Money Supply	**7** Employment Situation (Nov) Wholesale Trade (Oct) Consumer Sentiment (Dec, Preliminary) Consumer Credit (Oct)
10 JOLTS (Oct) Kansas City Financial Stress Index (Nov)	**11** Producer Prices (Nov) Manpower Survey (Q1) NFIB (Nov) Kansas City Fed Labor Market Conditions Indicators (Nov)	**12** CPI (Nov) Cleveland Fed Median CPI (Nov) Tech Pulse Index (Nov) Monthly Treasury (Nov) EIA Crude Oil Stocks Mortgage Applications	**13** Import and Export Prices (Nov) Weekly Jobless Claims Weekly Money Supply	**14** Advance Retail Sales (Nov) IP & Capacity Utilization (Nov) MTIS (Oct) ECEC (Q3)
17 Empire State Mfg Survey (Dec) Home Builders (Dec) TIC Data (Oct)	**18** New Residential Construction (Nov) Business Leaders Survey (Dec) Quarterly State Tax Collections (Q3)	**19** International Transactions (Q3) Existing Home Sales (Nov) FOMC Meeting EIA Crude Oil Stocks Mortgage Applications	**20** Philadelphia Fed Mfg Business Outlook Survey (Dec) Composite Indexes (Nov) Weekly Jobless Claims Weekly Money Supply	**21** Advance Durable Goods (Nov) Personal Income (Nov) GDP (Q3, 3rd Estimate) Consumer Sentiment (Dec, Final) Philadelphia Fed Nonmfg Business Outlook (Dec) Livingston Survey (Dec) Kansas City Fed Manufacturing Survey (Dec)
24 Treasury Auction Allotments (Dec) Chicago Fed National Activity Index (Nov)	**25** **CHRISTMAS DAY** **All Markets Closed**	**26** Case-Shiller HPI (Oct) Richmond Fed Mfg & Service Sector Surveys (Dec) EIA Crude Oil Stocks Mortgage Applications	**27** IIP (Q3); FHFA HPI (Oct) New Residential Sales (Nov) Agricultural Prices (Nov) Consumer Confidence (Dec) State Initial Claims (Nov) FRB Philadelphia Coincident Economic Activity Index (Nov) Weekly Jobless Claims Weekly Money Supply	**28** Strike Report (Dec) Advance Trade & Inventories (Nov) Chicago PMI (Dec) Pending Home Sales (Nov)
31 Texas Manufacturing Outlook Survey (Dec) Continued Claims by Industry by State (Nov)	**January 1** **NEW YEAR'S DAY** **All Markets Closed**	**2** Texas Service Sector Outlook Survey (Dec) Help Wanted OnLine (Dec) EIA Crude Oil Stocks Mortgage Applications	**3** ADP Employment Report (Dec) IHS-Markit Mfg PMI (Dec) ISM Manufacturing (Dec) Weekly Jobless Claims Weekly Money Supply	**4** Employment Situation (Dec)

BLUE CHIP FORECASTERS

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DIV 1-13

Request:

Please provide the data inputs and assumptions used by witness Revert in his 6.99 percent WACC shown on Table 1, page 35 of his testimony.

Response:

The 6.99 percent WACC was provided by NEC as the discount rate used in its quantitative evaluation of the project bids received.

Prepared by or under the supervision of: Timothy J. Brennan, Corinne M. DiDomenico, and Robert B. Hevert

DIV 1-14

Request:

Please identify the assumptions used by witness Hevert in Section V of his testimony in computing net benefits regarding the renewable energy tax benefits or credits as well as other tax features (e.g., the investment expensing provisions of current federal tax law). Please explain the basis of these assumptions.

Response:

As discussed in Section V of his Direct Testimony, Mr. Hevert evaluates the net benefits of the Project, including the 2.75 percent Remuneration Rate, on the basis of earnings before interest, taxes, depreciation and amortization (EBITDA). His analysis does not include potential benefits associated with renewable energy tax credits or other tax-specific assumptions.

Prepared by or under the supervision of: Robert B. Hevert

DIV 1-15

Request:

Is it NEC's belief or position that one or more credit rating agencies will impute debt to NEC's balance sheet as a result of the PPA? If so, please state the basis of that belief and the approximate amount of debt that would be imputed relating to the PPA. If NEC has an estimate of the debt imputation, please show how this was calculated.

Response:

NEC does not have a definite view at this time as to whether the credit rating agencies will impute debt to its balance sheet as a result of the PPA. That uncertainty is a risk that NEC is working to mitigate through the requested 2.75 percent Remuneration Rate. The requested remuneration rate is intended to demonstrate the receipt of compensation for extending the balance sheet and credit ratings to support the cost-effective financing of the Project. If one or more credit-rating agencies were to impute debt to NEC's balance sheet as a result of the PPA, then the opportunity to mitigate the harmful effects on the Company and its customers will have been lost, and both will be financially affected. As noted in the response to Data Request DIV 1-10, that effect would most likely cause the need for an increased equity ratio in the ratemaking capital structure to offset the increased debt, and achieve the balance needed to support the Company's current credit metrics. Under that scenario, costs to customers would increase. Mr. Hevert is not aware of any estimates of potential debt imputation amounts.

Prepared by or under the supervision of: Timothy J. Brennan, Corinne M. DiDomenico, and Robert B. Hevert