Interstate Natural Gas Pipeline Industry

2011 Cost of Capital Study

●Prepared by Tegarden & Associates • 105 Point East Drive • Nashville, TN 37216 • 615-226-2300 • Fax: 615-226-4488 • e-mail: tegarden@comcast.net

Table of Contents

Common Terms

CAPM	Capital Asset Pricing Model
CPI	Consumer Price Index
DCF	Discounted Cash Flow
EIA	Energy Information Administration
FED	Federal Reserve
FERC	Federal Energy Regulatory Commission
GDP	Gross Domestic Product
GP	General Partner
GRI	Gas Research Institute
GSR	Gas Supply Realignment
GTI	Gas Technology Institute
INGAA	Interstate Natural Gas Association of America
IBES	Institutional Brokers Estimate System
INGPC	Interstate Natural Gas Pipeline Company
INGPI	Interstate Natural Gas Pipeline Industry
INGPPTF	Interstate Natural Gas Pipeline Property Tax Forum
K_D	Cost of Debt
K_E	Cost of Equity
LDC	Local Distribution Company
LNG	Liquified Natural Gas
M&A	Mergers and Acquisitions
MLP	Master Limited Partnership
NUOI	Net Utility Operating Income
OCS	Outer Continental Shelf
PFRB	Philadelphia Federal Reserve Bank
PUHCA	Public Utility Holding Company Act
RP	Risk Premium
SFV	Straight Fixed Variable
S&P	Standard & Poor's
STEO	Short-Term Energy Outlook
VL	Value Line Investment Survey
WACC	Weighted Average Cost of Capital
WSJ	Wall Street Journal
YTM	Yield to Maturity

2011 Cost of Capital Study of the Interstate Natural Gas Pipeline Industry for the Interstate Natural Gas Pipeline Property Tax Forum January 1, 2011

Purpose of the Cost of Capital Study

The purpose of the cost of capital study is to provide the Interstate Natural Gas Pipeline Property Tax Forum (INGPPTF) with a cost of capital study for the Interstate Natural Gas Pipeline Industry (INGPI) as of January 1, 2011. This cost of capital can be used to capitalize the net cash flow for the typical interstate natural gas pipeline company for the purpose of estimating market value. The cost of capital derived in this study is the cost of capital for the typical interstate natural gas pipeline company at January 1, 2011, and is not representative of any particular interstate pipeline company. Thus, we advise against its random use by anyone without first examining and determining the differences between the specific pipeline company and the typical pipeline represented by the cost of capital herein and adjusting for the differences accordingly. For example, if one were interested in the typical cost of capital for a mid-cap or a low-cap pipeline, size adjustments of 1.20% and 1.98% respectively would need to be made to the capital asset pricing model.[1] Further, for companies which are considered below investment grade, additional adjustments must be made to reflect the enhanced risk associated with an investment in the operating assets of such companies.

Introduction and Scope

This copyrighted study was prepared for the Interstate Natural Gas Pipeline Property Tax Forum, and any use of this material by any entity other than those approved by the INGPPTF is expressly prohibited by the authors, who reserve all rights to any reproduction. We have reviewed financial and economic information, analytical reports, and statistics in order to estimate the cost of capital of the Interstate Natural Gas Pipeline Industry as of January 1, 2011.

Executive Summary - Cost of Capital

Based on our analysis and investigation, we have calculated the weighted average cost of

[1] *2011 Ibbotson Risk Premia Over time Report*, p. 4.

capital (WACC) for the INGPI to be **10.75%** as of January 1, 2011. The cost of capital developed in this study is appropriate to use in discounting the after-tax operating cash flows projected as of January 1, 2011, for determination of the market value of the operating assets, tangible and intangible, of the INGPI. After-tax operating cash flows are known as earnings before the deduction of interest, depreciation and amortization and after the deduction of taxes and capital expenditures. For market valuation purposes, this level of cash flow is estimated typically by assuming that depreciation and amortization equals capital expenditures. Thus, the cash flow to be discounted is assumed to be equal to what is commonly known in the INGPI as net utility operating income (NUOI). The detailed discussion of the derivation of the weighted average cost of capital along with supporting documentation begins on page 12.

Interstate Natural Gas Pipeline Property Tax Forum

The current members of the INGPPTF are listed below:

Boardwalk Pipeline Partners, LP
- Texas Gas Transmission, LLC
- Gulf South Pipeline Company, LP
- Gulf Crossing Pipeline Company, LLC

Centerpoint Energy
- Centerpoint Energy Gas Transmission
- Centerpoint Energy Mississippi River Transmission

Columbia Gas/Gulf Transmission Corporation
Dominion Transmission Corporation
El Paso Corporation
- El Paso Natural Gas
- Mojave Pipeline
- Colorado Interstate Gas
- Cheyenne Plains Pipeline
- Southern Natural Gas
- Tennessee Gas Pipeline
- Wyoming Interstate Company

Kern River Gas Transmission
Kinder Morgan, Inc.
- Natural Gas Pipeline Company of America
- KN Energy
- Rockies Express

MDU Resources Group, Inc.
National Fuel Gas Supply Corporation
Northern Natural Gas Company
Oneok Partners, LP
- Guardian Pipeline Company
- Midwestern Gas Transmission Company
- Viking Gas Transmission Company

Questar Pipeline Company
Southern Star Central Gas Pipeline, Inc.
Southern Union Company
- Florida Gas Transmission Co., LLC
- Panhandle Eastern Pipeline, LLC
- Trunkline Gas Company, LLC
- Sea Robin Pipeline, LLC

Spectra Energy - Canada
- West Coast Pipelines & Field Services
- West Coast Gas Services, Inc.
- Maritimes and Northeast Pipeline (Canada)
- Spectra Energy Empress L.P.
- Union Gas Limited
- St. Clair Pipelines (1996)
- Market Hub Partners
- Spectra Energy Income Fund

Spectra Energy Corp
- Texas Eastern Transmission
- Algonquin Gas Transmission
- Gulf Stream Natural Gas Transmission
- Maritimes and Northeast Pipeline
- East Tennessee Natural Gas

TransCanada - Northern Border Pipeline

TransCanada USA Pipelines Limited
ANR Pipeline
North Baja Pipeline
Portland Natural Gas Transmission
GTN Pipeline System
Tuscarora Gas Transmission
Great Lakes Gas Transmission
Iroquois Gas Transmission
Keystone Pipeline
Williams - Northwest Pipeline GP
Williams - Transcontinental Gas Pipeline Corp.

General Economic Trends - 2011

Economists, John Maynard Keynes wrote in 1931, should be more like dentists - "to get themselves thought of as humble, competent people." It's a goal more necessary than ever in today's economy, since economists, especially those who purport to understand the workings of the macro-economy, have been kicked in the teeth during the last few years. Their intricate mathematical models failed to predict the 2008 financial crisis for the most part. Some of these economists have been assailed for having financial ties to the big banks that did so much to precipitate the crisis. And now the economists are divided about how to get out of the slump and worried that United States unemployment won't return to normal for years, according to Peter Coy of *Bloomberg Businessweek.*[2]

Having said the above, in writing and performing research each January on the economic forecasts for the United States economy during the past few years, it has been proven by the end of each year forecasted that the prediction and economic forecasts being made by people in all sectors of the economy have failed miserably, for the most part. The economists forecasting abilities have appeared to worsen each year, as today's markets are driven less by fundamentals and increasingly more by the whims of elite bureaucrats deciding how to spend billions of tax dollars.

The United States' economy grew slightly faster than the government previously estimated in the third quarter of 2010 and at December 23, 2010, forecasters were raising growth projections for the fourth quarter and for 2011. Optimism concerning the United States recovery grew sharply during December 2010 fueled by a series of economic reports showing everything from consumers spending more freely to businesses curbing layoffs.

According to Phil Izzo of *The Wall Street Journal (WSJ)*, the consensus of economic forecasters for the *WSJ* have grown more optimistic about the outlook for United States growth in 2011, predicting the expansion would accelerate as the year 2011 progressed. The 55

---

[2] Coy, Peter. "The Economics' Newest Thinking Comes from the Old Masters, *Bloomberg Businessweek*, Jnauary 13, 2001, http://www.blusinessweek.com/print/magazine/content/11_04/b4212006799674.htm.

economic forecasters raised their growth projections for the gross domestic products (GDP) from 2.4% in the last quarter of 2010 to 3% for all of 2011. Meanwhile they projected the odds of a double-dip recession to 15%, the lowest average forecast of the year, from 22% in the September 2010 survey.[3] To illustrate the disparity in what economists are projecting, according to Jason Hamlin, in *Seeking Alpha*, deflation would give way to inflation in 2011, with sharp prices increases across most commodities. He forecasted the official inflation rate would climb back above 5%, with true inflation easily above 10%.[4]

All in all, the *WSJ* forecasters predicted there would be a better chance the United States economy in 2011 would outperform their forecasts than it would underperform. Thirty-five economists said the risks to their forecasts were more to the upside; 14 said the risk was to the downside.[5] The optimism of the *WSJ* forecasters was mirrored by the United States Chamber of Commerce. On January 11, 2011, Tom Donohue, president and chief executive of the U.S. Chamber of Commerce (the largest United States business lobby), forecast United States economic growth of 3.2% in 2011 and said the United States economy would create between 2.4 million to 2.6 million net new jobs during the year.

Additionally, when *USA Today* asked 46 economists about their projections for 2011, nine of ten economists said they were more optimistic than three months ago (this report was as of January 24, 2011). The *USA Today* economists projected the economy to grow at an annual rate of 3.2% to 3.4% each quarter of 2011. Mark Zandi, chief economist of Moody's Analytics, said that growth was now becoming self-reinforcing. He expected the economy to grow 4.4% this year which was better than last year's estimate of 3% growth, but well short of the 5% to 7% expansion that followed previous severe recessions.[6] These projections by Zandi and the 46 economists were made well into the month of January 2011 when the economy appeared to be gaining strength. Thus, the projections are slightly higher than those of the *Chamber of Commerce*, *WSJ*, and *BloombergBusinessweek*.

---

[3] Izzo, Phil. "Economists Predict Growth in 2011," *The Wall Street Journal*, December 13, 2010, http://online.wsj.com/article/SB10001424052748703727804576011521781546808.html.

[4] Hamlin, Jason. "10 Economic Predictions for 2011," *Seeking Alpha*, January 12, 2011, http://seekingalpha.com/article/246079-10-economic-predictions-for-2011.

[5] Izzo, op. cit.

[6] Davidson, Paul and Barbara Hansen. "Experts: Economy looking brighter," *USA Today*, January 24, 2011, 1A/

On January 12, 2011, the Federal Government's latest "Beige Book[7]" reported the United States economy gained muscle at the end of 2010 but remained so weak that inflation pressures were muted and the jobs market was still soft (the report was from a survey of all 12 Federal Reserve district's survey of regional economies). The report did indicate there was some form of strengthening in economic activity in November and December 2010. However, the expansion was "moderate" as strength in manufacturing and retail sectors was offset by weakness in real estate and financial services.[8]

As far as the stock and bond markets projections for 2011, research provided no general consensus among forecasters. Former Federal Reserve Chairman, Alan Greenspan, on January 8, 2011, said the United States could face a bond-market crisis if politicians didn't act soon to start cutting the nation's debt. He reported the risk of a bond-market crisis was so great that he favored raising taxes immediately and the probability that the United States would go through the next two or three years with no bond-market problems, no inflation problems, was probably better than50-50, but not much better. Greenspan did say he thought the United States economy was gaining momentum, with the strongest signs of growth coming since the middle of December 2010. He credited the "wealth effect," which refers to an increase in spending that accompanies escalating stock prices.[9]

In summary the United States economy still faces significant headwinds during 2011. As reported earlier in this section, different forecasters', having failed miserably in the past several years of recessionary times, opinions widely vary. Generally, most forecasters projected that the United States economy would move forward during 2011. Where the forecasters differ is on quantifying and qualifying how much of an improvement.[10]

Natural Gas Pipeline Industry - 2011

Interstate pipelines have both utility and merchant energy characteristics. They are

---

[7] The "Beige Book report" is a summary of economic activity prepared for use at the U.S. central bank's next policy meeting January 25-26, 2011.

[8] Di Leo, Luca. "Beige Book Notes Moderate Strength," *The Wall Street Journal*, January 12, 2011, http://online.wsj.com/article/SB10001424052748704803604576078054022910880.html.

[9] Sparshott, Jeffrey. "Greenspan Warns of Risks From U.S. Debt," *The Wall Street Journal*, January 8, 2011, http://online.wsj.com/article/SB10001424052748704739504576078324615291921088O.html.

[10] Andy, "2010 US Economic Outlook - Strong Growth Expected as Recession Fades," January 26, 2010, http://www.savingtoinvest.com/2009/12/2010-us-economic-outlook.

similar to monopoly utilities in that they require significant capital expenditures, involve a permitting process, and are subject to price controls. However, an interstate pipeline's service territory can be expanded through new permitting and construction, whereas that is not usually the case for LDCs. Pipelines are also subject to competition from other pipelines that are built close enough to contend for institutional customers.

Pipelines differ from LDCs in that their business generally relies on a limited number of large institutional customers (including wholesale marketers, exploration and production companies, LDCs, and large industrial companies). Such high customer concentration increases the risks associated with bad debt expense. When evaluating a pipeline company, the analyst must investigate demand and supply growth along the pipeline's footprint, opportunities for pipeline expansion, applications for competitive pipeline developments, and the growth prospects and credit quality of shippers along the pipeline's system.[11]

The location of natural gas supply sources and shifts in consumption patterns affects pipeline capacity utilization. A change in source requires new pipelines to transmit gas from growing production centers (such as the Rockies). The increased use of LNG imported via tanker also would affect the need for and utilization of pipeline assets.

The demand side of the equation is subject to potential secular shifts. For example, growth in the number of gas fired electric generating plants has had a major impact on geographical demand patterns. The appraiser/analyst must be aware of longer-term supply and demand trends that could increase or decrease the value of pipeline assets. Many pipeline companies historically have engaged in various unregulated merchant energy activities through subsidiary operations. Thus, the appraiser/analyst must be careful not to assume that a company has a low-risk profile just because it owns substantial regulated pipeline assets.

A number of pure-play pipeline businesses are owned by master limited partnerships (MLPs). MLPs trade on exchanges just like common stocks, but the businesses avoid income taxation by paying out nearly all free cash flows to shareholders. These income-oriented investments generally trade based on their yield, distribution growth potential, and volatility of cash flows. Because MLPs cannot use operating cash flows for growth-oriented capital expenditures, they depend on the ability to continuously raise fresh debt and equity capital to fund new investment. Unlike other pipeline companies, MLPs generally cannot be held by pension funds due to current tax obligations generated from their partnership structure.

Accordingly, shares of publicly traded MLPs generally are held by smaller retail investors. The general partners (GPs) for MLPs often have performance participation awards that

---

[11] Muir, Christopher B. "Natural Gas Distribution," *Standard & Poor's*, January 13, 2011, 40-41.

provide the GPs with larger and larger interests in MLP distributions as the dividend is raised.[12] *Value Line's (VL)* "Pipeline Master Limited Partnerships Industry" is ranked in the bottom half of all industries. According to *VL*, pipeline MLPs are high-yield equities that give investors a way to bet on growing energy demand with minimal exposure to commodity-price fluctuations. The United States economy's lackluster growth has limited the MLP industry's bottom-line recovery and is likely to continue to do so in 2011.[13]

Imports to start declining?

United States natural gas utilities have been relying increasingly on imported natural gas to meet growth in demand, a trend that's projected to lose momentum in the years ahead. Since the early 1970s, when long-term growth in United States natural gas production ended, imports — mostly from Canada, but also in the form of liquefied natural gas (LNG) from Africa and the Caribbean — have increased steadily, both in overall terms and as a percentage of United States supply. Since 1973, net imports of natural gas have more than tripled in volume, growing by a cumulative average annual rate of about 3.6%.

In its *Annual Energy Outlook 2008*, the EIA estimated that net imported natural gas would represent about 16.9% of US gas consumption in 2009, but shrink to 14.0% by 2030. However, in the *Annual Energy Outlook 2010* forecast, the EIA sees net imports falling to 10.9% of total consumption by 2014 and then rising temporarily to 11.7% of consumption by 2017, before continuing its fall to 5.9% of total consumption by 2035. In its *Annual Energy Outlook 2011 Early Release*, the EIA sees net imports falling from 3.0 Tcf in 2008 to 0.3 Tcf in 2035, or just 1.2% of total consumption, according to Christopher Muir, Gas Utilities Analyst of *Standard & Poor's* Natural Gas Distribution publication published January 13, 20110.[14]

While oil imports can easily be increased to accommodate rising demand, the same is not true for natural gas. Transportation is a major cost component of natural gas, whereas it is generally incidental to the cost of oil. As a result, the favored source of gas is domestic production. However, transportation of liquefied natural gas has made natural gas transportation far more economical than in the past.[15]

---

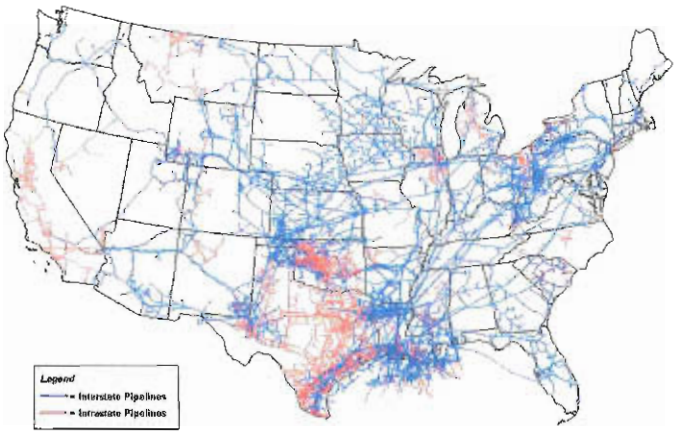
[12] *Ibid.*

[13] Sullivan, James Jan. "Pipeline MLPs," *Value Line*, December 10, 2010, 627.

[14] Muir, Christopher B. "Natural Gas Distribution," *Standard & Poor's*, January 13, 2011, 15.

[15] *Ibid*, 13.

U.S. Natural Gas Pipeline Network, (latest EIA map, 2009)



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System

Short-Term Natural Gas Outlook

The January 11, 2011, Energy Information Administration (EIA) Short-Term Energy Outlook (STEO) reported that the natural gas working inventories ended 2010 at 3.1 trillion cubic feet (Tcf), about one percent below the 2009 record-setting end-of-December level. Inventories are expected to remain at or near record-high levels through most of 2011. The projected Henry Hub natural gas spot price averages $4.02 per million Btu (MMBtu) for 2011, $0.37 per MMBtu lower than the 2010 average. EIA expects the natural gas markets to begin to tighten in 2012, with the Henry Hub spot price increasing to an average $4.50 per MMBtu.[16]

EIA estimated that total marketed natural gas production increased significantly in 2010, by an estimated 2.4 Bcf/d, or 4.1%. Declines in production of 0.07 Bcf/d and 0.46 Bcf/d in Alaska and the Gulf of Mexico, respectively, were offset by a 2.9 Bcf/d increase in lower-48 onshore production. EIA expects average total production to fall by 0.3% percent in 2011. The projected decline in production in 2011 and increase in natural gas consumption in 2012 contribute to a strengthening of natural gas prices late in 2011 and in 2012.[17]

Value Line reported in December 2010 that the prospects for the natural gas (diversified) industry[18] appear favorable. Industrial demand should pick up with greater economic activity in

---

[16] "Short-Term Energy Outlook," *Energy Information Administration*, Jan. 11, 2011, 1-2.

[17] *Ibid*, 6.

[18] The Diversified Natural Gas Industry consists of companies that produce, sell, and transport natural gas. It is labeled "diversified" because operations can vary widely among

the coming years. Natural gas prices should benefit as excess supply is absorbed according to Michael Napoli of *Value Line*. Companies with rising production levels would probably benefit the most. [19]

Additionally, *VL* reported that the Natural Gas (Diversified) Industry has improved significantly in Timeliness over the past three months, and is now ranked near the middle of the pack for year-ahead performance. Looking further out, Napoli anticipated solid growth in revenues and share earnings for the industry over the years 2013-2015.[20]

Gas Pipeline Transportation Risk Rating

IBISWorld Inc. annually produces an IBISWorld Industry Risk Rating Report. On December 21, 2010, the "Gas Pipeline Transportation of Natural Gas in the US: 48621" report was released. This industry group comprises establishments primarily engaged in the pipeline transportation of natural gas from processing plants to local distribution systems. The forecast period encompasses 2011 up to December 31, 2011. Three types of risk are recognized in their analysis. These are: risk arising from within the industry itself (structural risk), risks arising from the expected future performance of the industry (growth risk) and risk arising from forces external to the industry (external sensitivity risk). The results follow.[21]

Structural Risk Analysis — is forecast to be MEDIUM-LOW over the outlook period. The structural factors for this industry are largely favorable, from high barriers to entry that protect incumbents to low import competition and modest volatility. Competition is limited by the high amount of capital required to fund the construction of gas pipelines. Large initial contracts must also be secured in order to make the pipeline viable. These factors deter new entrants and prevents competition from soaring. Meanwhile, the industry is exposed to a modest level of revenue volatility, stemming from fluctuations in the price and quantity of gas being transported. Additionally, the industry is in the mature phase of its life cycle with slow growth in new pipelines and tepid growth in industry revenue. Negative structural factors for this industry stem from the lack of government assistance.[22]

---

natural gas companies.

[19] Napoli, Michael F. "Natural Gas (Diversified) Industry," *Value Line Investment Survey*, December 10, 2010, 530.

[20] *Ibid.*

[21] "IBISWorld Industry Risk Rating Report, Gas Pipeline Transportation in the US: 48621," *IBISWorld*, December 21, 2011, 3-4.

[22] *Ibid.*, 3-4.

Growth Risk Analysis — is forecast to exhibit a MEDIUM-HIGH level of growth risk during the outlook period. The demand for natural gas in the United States is expected to expand over the outlook period, and new gas pipelines will be installed and pipeline expansions undertaken. New supply sources and varying growth in gas demand in the different regions of the United States would also change the shape of the gas grid. At the same time, the growth in the availability of natural gas from Canada and the expansion in markets in the west and northeast of the United States have spurred the construction of new pipelines linking those areas. *IBISWorld* forecasts that industry revenue would grow by 2.2% in 2011 down from 3.9% in 2010.[23]

Recent Growth Analysis — The Gas Pipeline Transportation industry was expected to face fairly flat demand for its services over the five-year period ending in 2010. Natural gas consumption was expected to grow at a modest rate, due to rising gas prices and the adverse effect of economic recession. Weak demand growth put downward pressure on gas haulage rates, as firms sought to maintain or expand the volume of gas transported. Indications are that real industry revenue would marginally increase by about 0.3% over the five years ending in 2010.

The expanding natural gas pipeline network highlights increased competition in the market for natural gas pipeline transportation. Industry participants had to find more efficient ways of transacting business in order to maintain market share and reduce business costs. Certainly, the substantial number of mergers and asset sales within the industry prior to and during the past five years has tended to reduce overhead costs, although in at least some cases the restructuring resulted from financial difficulties. The well-publicized collapse of Enron Corporation saw its pipeline interests sold off by the mid 2000s.

Forecast Growth Analysis — The revenue generated by the Gas Pipeline Transportation industry is expected to expand moderately over the next five years to 2015, increasing at an average annual rate of about 3.3%. Rising depreciation charges associated with the construction of pipeline expansions will see the industry's net profit before interest and tax rise a bit more slowly than revenue. The growth in industry revenue will reflect a revival in natural gas consumption as the United States economy moves out of recession. Demand for natural gas in the United States is expected to expand over the next five years and beyond. New gas pipelines will be installed and pipeline expansions undertaken. New supply sources and varying growth in gas demand in different regions of the United States will also change the shape of the gas grid. As gas demand and the gas grid expand, players in the industry will need to improve ancillary facilities, such as storage, and develop new methods of conducting business to facilitate the flow

[23] *Ibid.*, 4.

of natural gas from supply locations to markets and from one market to another.[24]

Sensitivity Risk Analysis for the year 2011 is projected to be at a MEDIUM level, up slightly from the previous two years. The industry is primarily sensitive to the health of the Natural Gas Distribution industry, which is essential to demand for the Gas Pipeline Transportation. The performance of downstream industry is forecast to improve in 2011, ensuring robust demand for the transportation industry. However, these gains are being wiped out by the expected rise in interest rates as they cannot stay at their current near-zero levels indefinitely. This will raise financing costs and encumber profit margins. Meanwhile, legislative compliance requirements will remain strict.

Life Cycle Analysis — The performance of the Gas Pipeline Transportation industry was fairly flat during the past five years ending in 2010, suggesting that its life cycle stage is mature. The industry has seen considerable acquisition and merger activity since the early 2000s, with financially troubled firms (the most notable example being Enron) selling their assets. Other firms have used these sales as an opportunity to secure assets that offer synergies with their existing operations.[25]

When the three risk analyses are combined, the overall "Risk Rating Analysis" in the Natural Gas Pipeline Transportation industry is expected to be MEDIUM - LOW over the 2011 outlook period. This would be the sixth consecutive year in which risk has declined, as the industry continues to benefit from rising quantities of natural gas being produced and utilized within the United States. Primary risk factors contributing to the level of risk for this industry are the level demand from the Natural Gas Distribution industry and *IBISWorld's* forecast growth score.

Natural Gas Outlook Summary

Trends in energy supply and demand are affected by difficult-to-predict factors: energy prices, United States and worldwide economic growth or decline, advances in technologies, and future public policy decisions in the United States and in other countries. The projection for United States economic growth, a key determinant of United States demand, is expected to expand moderately over the next five years. The growth in industry revenue would reflect a revival in natural gas consumption as the United States moves out of recession. All of the political and economic factors discussed in this section will affect the typical investor's cost of capital as the elements of business risk increases. The additional risk attributable to the natural gas pipeline industry should be reflected in the development of the cost of capital.

---

[24] *Ibid*, 8.

[25] *Ibid*, 7.

Weighted Average Cost of Capital (WACC)

The return investors require on investments of comparable risk is what the cost of capital measures. Rational investors will not invest in a particular investment opportunity if the expected return on that opportunity is less than their cost of capital requirement. The weighted average cost of capital (WACC) is also known in the appraisal and financial community as the opportunity cost of capital. The WACC is used primarily for making long-term capital investment decisions by investors and purchasers. Accordingly, the WACC is used by appraisers to estimate ***market value***.[26] To calculate market value, the appraiser discounts expected future income (cash flow) by the rate of return offered by comparable investment alternatives. [All of the annual "income" figures used in appraising income-producing properties are *cash flows* rather than accrual accounting incomes.[27]] This rate of return is often referred to as the discount rate or the opportunity cost of capital.[28] The Appraisal Institute has defined opportunity cost as quoted below:

> *Opportunity cost is the net cost of opportunities not chosen or options foregone, denied or lost.* An investor who selects one investment forgoes the opportunity to invest in other available investments...Opportunity cost is related to the principle of substitution, and is particularly significant in estimating the rates of return necessary to attract capital. By analyzing and comparing the prospective rates of return offered by alternative investment opportunities, an appraiser can estimate the required rate of return for the property being appraised.[29]

The estimated cost of capital in this report for the Interstate Natural Gas Pipeline Industry as of January 1, 2011, is based on the generally accepted appraisal methodology known as the band of investment technique. The band of investment technique consists of the following steps:

---

[26] Market value is defined by the Appraisal Institute as, "The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress." See *The Appraisal of Real Estate*, 13th ed., (Chicago: Appraisal Institute, 2008), 23.

[27] William N. Kinnard, Jr., *Income Property Valuation*, (Lexington: Heath Lexington Books, 1982), 70.

[28] Richard A. Brealey and Stewart C. Meyers, *Principles of Corporate Finance*, 4th ed., (New York: McGraw-Hill, 1991), 13.

[29] *The Appraisal of Real Estate*, 11th ed., (Chicago: Appraisal Institute, 1996), 44.

1. Analyze and determine the appropriate capital structure.
2. Identify the appropriate cost for each financing band of the capital structure.
3. Weight the appropriate cost for each financing band by the relative proportion of the capital structure represented by each financing band.

The sum of the weighted costs for the financing bands represents the weighted average cost of capital. This weighted cost of capital is typically known as the discount rate in appraisal literature and the algebraic formula is shown in Figure 1.

$$K = (D \times K_d) + (E \times K_e)$$

where

K = *Weighted Average Cost of Capital*
D = *Proportion of Debt in Capital Structure*
K_d = *Cost of Debt*
E = *Proportion of Equity in Capital Structure*
K_e = *Cost of Equity*

Figure 1

In explaining the estimation of the cost of capital, Ibbotson Associates states:

> The cost of capital is always an expectational or forward-looking concept. While the past performance of an investment and other historical information can be good guides and are often used to estimate the required rate of return on capital, the expectations of future events are the only factors that actually determine the cost of capital. An investor contributes capital to a firm with the expectation that the business' future performance will provide a fair return on the investment. If past performance were the criterion most important to investors, no one would invest in start-up ventures. It should also be noted that the cost of capital is a function of the investment, not the investor.[30]

Cost of Capital Study Results

The cost of capital for the Interstate Natural Gas Pipeline Industry as of January 1, 2011 is estimated to be 10.73% (rounded to **10.75%**) as the chart on the following page indicates. Following the chart are explanations of the derivation of each of the component parts of the cost of capital study.

[30] *SBBI (Stocks, Bonds, Bills and Inflation)*, 2010 Yearbook: Valuation Edition, (Chicago: Morningstar, Inc., 2010), 21.

Capital	Portion	Cost	Product
Debt	30.00%	6.54%	1.96%
Equity	70.00%	12.53%	8.77%
Totals	100.00%		10.73%

Capital Structure

Economists and appraisers measure a firm's capital structure in terms of the market values of its debt and equity because that is the best measure of the amounts of debt and equity that investors have invested in the company on a going-forward basis. Furthermore, economists and appraisers generally agree that the goal of management is to maximize the value of the firm, where the value of the firm is the sum of the market value of the firm's debt and equity. Only by measuring a firm's capital structure in terms of market values can its managers choose a financing strategy that maximizes the value of the firm.

For estimating the cost of capital for the INGPI, it is appropriate to use the typical market capital structure for similar interstate natural gas pipeline companies. There is very little debate about this concept, however for clarity we note the following statements from Brigham and Gapenski and from Damodaran.

> We are absolutely convinced that the procedures we recommend are correct — namely, firms should focus on market value capital structures and base their cost of capital calculations on market value weights. Because market values do change, it would be impossible to keep the actual capital structure on target at all times, but this fact in no way detracts from the validity of market value targets.[31]

> The weights assigned to equity and debt in calculating the weighted average cost of capital have to be based upon market value, not book value. The rationale rests on the fact that the cost of capital measures the cost of issuing securities, stocks as well as bonds, to finance projects, and that these securities are issued at market value, not at book value.[32]

In the appraisal process or in developing the cost of capital to be used in the appraisal process the appraiser must utilize the market capital structure for all types of appraisal. Even

---

[31] Eugene F. Brigham and Louis C. Gapenski, *Financial Management*, 7th ed. (New York: The Dryden Press, 1994), 599.

[32] Aswath Damodaran, *Investment Valuation*, (New York, NY: John Wiley & Sons, Inc., 1996), p. 64.

when public utilities are strictly regulated, it is necessary for the appraiser to use the market capital structure unless the book capital structure is found to be the same as the market capital structure. In the past often the book capital structure was quite similar to the market capital structure, however that is not the case today. Today the market capital structure varies significantly from the book capital structure for most interstate natural gas pipelines. Thus, investors are concerned with the capital structure they will use to finance the purchase of an interstate natural gas pipeline, and that will always be the typical market capital structure.

It is also important to note what elements of capital comprise the makeup of the ***capital structure*** from an appraisal standpoint. The capital structure consists only of long-term debt, common stock, and where appropriate, preferred stock. The capital structure should not be confused with *financial structure* or any other term used in financial literature. To understand what elements comprise the capital structure it is important to define capital structure and financial structure, which are defined as follows:

> **CAPITAL STRUCTURE** corporation's financial framework, including LONG-TERM DEBT, PREFERRED STOCK, and NET WORTH. It is distinguished from FINANCIAL STRUCTURE, which includes additional sources of capital such as short-term debt, accounts payable, and other liabilities.[33]
>
> **FINANCIAL STRUCTURE** makeup of the right-hand side of a company's BALANCE SHEET, which includes all the ways its assets are financed, such as trade accounts payable and short-term borrowings as well as long-term debt and ownership equity. Financial structure is distinguished from CAPITAL STRUCTURE, which includes only long-term debt and equity.[34]

It is also important to note that neither accumulated depreciation or accumulated deferred income taxes are included in capital structure. Some appraisers have mistakenly included accumulated deferred income taxes in constructing a firm's capital structure. This is simply wrong for estimating the cost of capital and for appraisal purposes. The following quotation from *Financial Management* addresses this issue quite well:

> Since depreciation-generated funds have the same cost as the firm's WACC when retained earnings are used for the equity component, it is not necessary to consider them when estimating the WACC...Therefore, deferred taxes, like depreciation, have a cost equal to the firm's WACC using retained earnings as the equity

---

[33] John Downes and Jordan Elliot Goodman, *Dictionary of Finance and Investment Terms*, (New York: Barron's, 1985), 54.

[34] *Ibid.*, 132.

> component. Indeed, deferred taxes arise solely because a firm records a different depreciation expense on its tax books than on the books used to report income to shareholders... Deferred taxes are treated the same way as depreciation cash flows: they are not included when estimating the firm's WACC...[35]

The appropriate capital structure for use in estimating the INGPI's cost of capital is the expected capital structure that a typical purchaser would likely use to finance the purchase of the operating assets of a company within this industry. This typical purchaser would take into account the regulatory agency's allowed rate of return in analyzing the risk profile and selecting the market capital *structure*. Thus, an analysis of the typical market capital structure used in the interstate natural gas pipeline industry is appropriate.

The market capital structure developed for the INGPI was calculated from information obtained from *Value Line Investment Survey* data base (*Value Line*) and *Standard & Poor's Compustat* data base as of January 2011. The capital structure study involved the following companies we believe to be representative of the interstate natural gas transmission pipeline industry: 22 companies classified by *Value Line* as the Natural Gas (Diversified) Industry (from the *Value Line* full data base), using both *Value Line* and S&P data; 18 companies that make up the *Value Line* Oil/Gas Distribution and the Pipeline Master Limited Partnerships (MLPs); 32 companies from the *Value Line* natural gas (diversified) group combined with the *Value Line* oil/gas distribution group and the Pipeline MLPs (large companies – with over $750 million in annual sales); and 15 companies heavily involved with natural gas pipelines from the interstate natural gas pipeline forum group, which have traded common stock listed by *Standard and Poor's*. We also considered the 60 companies from the *S&P* 500 which have **BBB-** rated long-term debt (the same rating as the typical interstate natural gas pipeline company). Ultimately, to retain a particular rating status by the major rating agencies, companies must maintain a certain level of equity and the ability to pay their long-term debt obligations. Thus, it is important to consider the capital structures of companies with similar ratings in estimating the appropriate capital structure. Finally, we considered 11 companies identified as the *Value Line* Pipeline MLPs, a new category of companies separately compiled by *Value Line* for the first time this year.

The results indicate that the market capital structure for the industry is approximately 30% debt, essentially no preferred stock, and 70% equity. For each of the above mentioned groups of companies, we calculated the simple average and median capital structure for each grouping using data reported both by *Value Line* and *Standard & Poor's*. As many traditional interstate natural gas pipelines have become subsidiaries of other pipelines and other energy

---

[35] Eugene F. Brigham and Louis C. Gapenski, *Financial Management*, 7th ed. (New York: The Dryden Press, 1994), 368-369.

companies, there are now less members of the interstate natural gas pipeline forum group, which have traded common stock. Thus, we are inclined to give a little less consideration to the data from the forum group.

For purposes of analysis we used the market capital structure for each company. The market value of the common equity portion of the capital structure was determined by multiplying the number of shares outstanding times the recent price reported by *Value Line* and/or *Standard & Poor's*. As surrogates for the market value of debt and preferred stock we substituted the book value of each. The market values of both debt and equity are always preferred, if available. Since the book value of debt is usually close to market value, book value is usually used for the debt weight. Ibbotson states, "Therefore, in most cases the market value of debt in the capital structure is assumed to be the book value of debt."[36] Only a few companies in this industry have issued preferred stock and, like debt, we used book value as a surrogate for the market value of preferred stock. Our recent analysis indicates that book values for long-term debt and preferred stock are fairly reasonable approximations for market value at the present time, thus book value can be substituted as a reasonable proxy for the market value of debt and preferred stock capital.

The capital structure calculations can be found on the following thirteen pages. As can be observed from the capital structure calculations using the natural gas transmission pipeline industry groupings described above, the indicators point to an approximate market capital structure of 30% debt (***D***) and 70% equity (***E***). (*Preferred stock was judged not to be of significant importance in the financing of companies in the overall interstate natural gas pipeline industry.*) We gave the most consideration to the median indicators (median figures being less influenced by extremes than averages) from the data groups made up of the *Value Line* Natural Gas Diversified Industry (All), *Value Line* Oil/Gas Distribution Industry (All), the 32 large[37] companies from the combining of the first two groups, the 60 companies from the **S&P** 500 with long-term debt ratings of BBB- and 11 *Value Line* Pipeline MLPs.

On the following pages are the capital structure data from *Value Line* and *Standard & Poor's Compustat.*

---

[36] *SBBI (Stocks, Bonds, Bills and Inflation), 2010 Yearbook: Valuation Edition*, (Chicago: Morningstar, Inc., 2010) p. 14.

[37] Large pipeline group made up of companies with annual sales of over $750 million.

Value Line Natural Gas Diversified Industry (All)
Capital Structure (VL Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
ATP Oil & Gas Corp	ATPG	64.66%	5.11%	30.23%
Cabot Oil & Gas 'A'	COG	20.74%	0.00%	79.26%
Callon Pete Co	CPE	48.51%	0.00%	51.49%
Chesapeake Energy	CHK	36.27%	9.71%	54.01%
Cimarex Energy	XEC	4.36%	0.00%	95.64%
Crosstex Energy	XTXI	64.41%	0.00%	35.59%
Crosstex Energy LP	XTEX	49.41%	0.00%	50.59%
Delta Natural Gas	DGAS	36.15%	0.00%	63.85%
Devon Energy	DVN	10.13%	0.00%	89.87%
EOG Resources	EOG	13.61%	0.00%	86.39%
EQT Corp.	EQT	22.27%	0.00%	77.73%
Eagle Rock Energy Partners Ltd	EROC	40.83%	0.00%	59.17%
Energen Corp.	EGN	9.79%	0.00%	90.21%
MDU Resources	MDU	27.18%	0.28%	72.54%
Markwest Energy Partners LP	MWE	28.47%	0.00%	71.53%
National Fuel Gas	NFG	15.74%	0.00%	84.26%
ONEOK Partners LP	OKS	24.31%	0.00%	75.69%
Penn Virginia Corp.	PVA	38.85%	0.00%	61.15%
Petroleum Development Corp.	PETD	28.38%	0.00%	71.62%
Questar Corp.	STR	17.20%	0.00%	82.80%
Quicksilver Res.	KWK	48.68%	0.00%	51.32%
Southwestern Energy	SWN	8.90%	0.00%	91.10%
	Average	29.95%	0.69%	69.37%
	Median	27.78%	0.00%	72.08%

Source: *Value Line*, January 2011.

Value Line Oil/Gas Distribution Industry (All + MLPs)
Capital Structure (VL Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
Boardwalk Pipeline	BWP	34.97%	0.00%	65.03%
Buckeye Partners L.P.	BPL	30.09%	0.00%	69.91%
El Paso Corp.	EP	54.31%	5.92%	39.77%
El Paso Pipeline	EPB	31.62%	0.00%	68.38%
Enbridge Energy Partners LLP	EEP	40.63%	0.00%	59.37%
Enbridge Inc.	ENB.TO			
Energy Transfer	ETP	37.13%	1.08%	61.79%
Enterprise Products	EPD	32.07%	0.00%	67.93%
Inergy L.P.	NRGY	32.45%	0.00%	67.55%
Kinder Morgan Energy	KMP	33.46%	0.71%	65.82%
Magellan Midstream	MMP	23.17%	0.00%	76.83%
ONEOK Inc.	OKE	38.31%	0.00%	61.69%
Plains All Amer. Pipe.	PAA	34.80%	0.00%	65.20%
Southern Union	SUG	52.99%	0.00%	47.01%
Spectra Energy	SE	36.08%	1.00%	62.91%
Suburban Propane	SPH	15.07%	0.00%	84.93%
Williams Cos.	WMB	35.48%	0.00%	64.52%
Williams Partners L.P.	WPZ	30.75%	0.00%	69.25%
	Average	34.90%	0.51%	64.58%
	Median	34.80%	0.00%	65.20%

Source: *Value Line*, January 2011.

VL Natural Gas Diversified & Oil/Gas Distribution/MLP - Large
Capital Structure (VL Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
Boardwalk Pipeline	BWP	34.97%	0.00%	65.03%
Buckeye Partners L.P.	BPL	30.09%	0.00%	69.91%
Cabot Oil & Gas 'A'	COG	20.74%	0.00%	79.26%
Chesapeake Energy	CHK	36.27%	9.71%	54.01%
Cimarex Energy	XEC	4.36%	0.00%	95.64%
Crosstex Energy	XTXI	64.41%	0.00%	35.59%
Crosstex Energy LP	XTEX	49.41%	0.00%	50.59%
Devon Energy	DVN	10.13%	0.00%	89.87%
EOG Resources	EOG	13.61%	0.00%	86.39%
EQT Corp.	EQT	22.27%	0.00%	77.73%
El Paso Corp.	EP	54.31%	5.92%	39.77%
Enbridge Energy Partners LLP	EEP	40.63%	0.00%	59.37%
Enbridge Inc.	ENB.TO			
Energen Corp.	EGN	9.79%	0.00%	90.21%
Energy Transfer	ETP	37.13%	1.08%	61.79%
Enterprise Products	EPD	32.07%	0.00%	67.93%
Inergy L.P.	NRGY	32.45%	0.00%	67.55%
Kinder Morgan Energy	KMP	33.46%	0.71%	65.82%
MDU Resources	MDU	27.18%	0.28%	72.54%
Magellan Midstream	MMP	23.17%	0.00%	76.83%
National Fuel Gas	NFG	15.74%	0.00%	84.26%
ONEOK Inc.	OKE	38.31%	0.00%	61.69%
ONEOK Partners LP	OKS	24.31%	0.00%	75.69%
Penn Virginia Corp.	PVA	38.85%	0.00%	61.15%
Plains All Amer. Pipe.	PAA	34.80%	0.00%	65.20%
Questar Corp.	STR	17.20%	0.00%	82.80%
Quicksilver Res.	KWK	48.68%	0.00%	51.32%
Southern Union	SUG	52.99%	0.00%	47.01%
Southwestern Energy	SWN	8.90%	0.00%	91.10%
Spectra Energy	SE	36.08%	1.00%	62.91%
Suburban Propane	SPH	15.07%	0.00%	84.93%
Williams Cos.	WMB	35.48%	0.00%	64.52%
	Average	30.42%	0.60%	68.98%
	Median	32.45%	0.00%	67.55%

Source: *Value Line*, January 2011.

Interstate Natural Gas Pipeline Forum (Pipelines)
Capital Structure (VL Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
Boardwalk Pipeline	BWP	34.97%	0.00%	65.03%
CenterPoint Energy	CNP	55.48%	0.00%	44.52%
El Paso Corp.	EP	54.31%	5.92%	39.77%
El Paso Pipeline	EPB	31.62%	0.00%	68.38%
Kinder Morgan Energy	KMP	33.46%	0.71%	65.82%
MDU Resources	MDU	27.18%	0.28%	72.54%
National Fuel Gas	NFG	15.74%	0.00%	84.26%
ONEOK Inc.	OKE	38.31%	0.00%	61.69%
ONEOK Partners LP	OKS	24.31%	0.00%	75.69%
Questar Corp.	STR	17.20%	0.00%	82.80%
Southern Union	SUG	52.99%	0.00%	47.01%
Spectra Energy	SE	36.08%	1.00%	62.91%
TransCanada Corp.	TRP			
Williams Cos.	WMB	35.48%	0.00%	64.52%
Williams Partners L.P.	WPZ	30.75%	0.00%	69.25%
	Average	34.85%	0.57%	64.58%
	Median	34.22%	0.00%	65.42%

Source: *Value Line*, January 2011.

Value Line Natural Gas Diversified Industry (All)
Capital Structure (S&P Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
ATP OIL & GAS CORP	ATPG	63.98%	5.05%	30.97%
CABOT OIL & GAS CORP	COG	20.59%	0.00%	79.41%
CALLON PETROLEUM CO/DE	CPE	49.26%	0.00%	50.74%
CHESAPEAKE ENERGY CORP	CHK	36.38%	9.74%	53.88%
CIMAREX ENERGY CO	XEC	4.46%	0.00%	95.54%
CROSSTEX ENERGY INC	XTXI	64.00%	0.00%	36.00%
CROSSTEX ENERGY LP	XTEX	45.93%	9.12%	44.94%
DELTA NATURAL GAS CO INC	DGAS	35.15%	0.00%	64.85%
DEVON ENERGY CORP	DVN	10.12%	0.00%	89.88%
EAGLE ROCK ENERGY PARTNRS LP	EROC	41.42%	0.00%	58.58%
ENERGEN CORP	EGN	10.48%	0.00%	89.52%
EOG RESOURCES INC	EOG	13.97%	0.00%	86.03%
EQT CORP	EQT	22.57%	0.00%	77.43%
MARKWEST ENERGY PARTNERS LP	MWE	28.22%	0.00%	71.78%
MDU RESOURCES GROUP INC	MDU	27.29%	0.28%	72.43%
NATIONAL FUEL GAS CO	NFG	16.30%	0.00%	83.70%
ONEOK PARTNERS -LP	OKS	24.19%	0.00%	75.81%
PENN VIRGINIA CORP	PVA	39.78%	0.00%	60.22%
PETROLEUM DEVELOPMENT CORP	PETD	27.09%	0.00%	72.91%
QUESTAR CORP	STR	17.48%	0.00%	82.52%
QUICKSILVER RESOURCES INC	KWK	48.81%	0.00%	51.19%
SOUTHWESTERN ENERGY CO	SWN	9.04%	0.00%	90.96%
	Average	29.84%	1.10%	69.06%
	Median	27.19%	0.00%	72.67%

Source: *S&P Compustat*, January 2011.

Value Line Oil/Gas Distribution Industry (All + MLPs)
Capital Structure (S&P Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
BOARDWALK PIPELINE PRTNRS-LP	BWP	35.16%	0.00%	64.84%
BUCKEYE PARTNERS LP	BPL	29.49%	0.00%	70.51%
EL PASO CORP	EP	54.15%	5.90%	39.95%
EL PASO PIPELINE PARTNERS LP	EPB	27.88%	0.00%	72.12%
ENBRIDGE ENERGY PRTNRS -LP	EEP	40.96%	0.00%	59.04%
ENBRIDGE INC	ENB	38.77%	0.34%	60.88%
ENERGY TRANSFER PARTNERS -LP	ETP	37.69%	0.00%	62.31%
ENTERPRISE PRODS PRTNER -LP	EPD	32.17%	0.00%	67.83%
INERGY LP	NRGY	35.26%	0.00%	64.74%
KINDER MORGAN ENERGY -LP	KMP	31.87%	0.00%	68.13%
MAGELLAN MIDSTREAM PRTNRS LP	MMP	22.94%	0.00%	77.06%
ONEOK INC	OKE	38.47%	0.00%	61.53%
PLAINS ALL AMER PIPELNE -LP	PAA	34.90%	0.00%	65.10%
SOUTHERN UNION CO	SUG	54.02%	0.00%	45.98%
SPECTRA ENERGY CORP	SE	36.06%	1.00%	62.94%
SUBURBAN PROPANE PRTNRS -LP	SPH	14.94%	0.00%	85.06%
WILLIAMS COS INC	WMB	35.66%	0.00%	64.34%
WILLIAMS PARTNERS LP	WPZ	30.73%	0.00%	69.27%
	Average	35.06%	0.40%	64.54%
	Median	35.21%	0.00%	64.79%

Source: *S&P Compustat*, January 2011.

VL Natural Gas Diversified & Oil/Gas Distribution/MLP - Large
Capital Structure (S&P Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
BOARDWALK PIPELINE PRTNRS-LP	BWP	35.16%	0.00%	64.84%
BUCKEYE PARTNERS LP	BPL	29.49%	0.00%	70.51%
CABOT OIL & GAS CORP	COG	20.59%	0.00%	79.41%
CHESAPEAKE ENERGY CORP	CHK	36.38%	9.74%	53.88%
CIMAREX ENERGY CO	XEC	4.46%	0.00%	95.54%
CROSSTEX ENERGY INC	XTXI	64.00%	0.00%	36.00%
CROSSTEX ENERGY LP	XTEX	45.93%	9.12%	44.94%
DEVON ENERGY CORP	DVN	10.12%	0.00%	89.88%
EL PASO CORP	EP	54.15%	5.90%	39.95%
ENBRIDGE ENERGY PRTNRS -LP	EEP	40.96%	0.00%	59.04%
ENBRIDGE INC	ENB	38.77%	0.34%	60.88%
ENERGEN CORP	EGN	10.48%	0.00%	89.52%
ENERGY TRANSFER PARTNERS -LP	ETP	37.69%	0.00%	62.31%
ENTERPRISE PRODS PRTNER -LP	EPD	32.17%	0.00%	67.83%
EOG RESOURCES INC	EOG	13.97%	0.00%	86.03%
EQT CORP	EQT	22.57%	0.00%	77.43%
INERGY LP	NRGY	35.26%	0.00%	64.74%
KINDER MORGAN ENERGY -LP	KMP	31.87%	0.00%	68.13%
MAGELLAN MIDSTREAM PRTNRS LP	MMP	22.94%	0.00%	77.06%
MDU RESOURCES GROUP INC	MDU	27.29%	0.28%	72.43%
NATIONAL FUEL GAS CO	NFG	16.30%	0.00%	83.70%
ONEOK INC	OKE	38.47%	0.00%	61.53%
ONEOK PARTNERS -LP	OKS	24.19%	0.00%	75.81%
PENN VIRGINIA CORP	PVA	39.78%	0.00%	60.22%
PLAINS ALL AMER PIPELNE -LP	PAA	34.90%	0.00%	65.10%
QUESTAR CORP	STR	17.48%	0.00%	82.52%
QUICKSILVER RESOURCES INC	KWK	48.81%	0.00%	51.19%
SOUTHERN UNION CO	SUG	54.02%	0.00%	45.98%
SOUTHWESTERN ENERGY CO	SWN	9.04%	0.00%	90.96%
SPECTRA ENERGY CORP	SE	36.06%	1.00%	62.94%
SUBURBAN PROPANE PRTNRS -LP	SPH	14.94%	0.00%	85.06%
WILLIAMS COS INC	WMB	35.66%	0.00%	64.34%
	Average	30.75%	0.82%	68.43%
	Median	33.54%	0.00%	66.47%

Source: *S&P Compustat*, January 2011.

Interstate Natural Gas Pipeline Forum (Pipelines)
Capital Structure (S&P Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
BOARDWALK PIPELINE PRTNRS-LP	BWP	35.16%	0.00%	64.84%
CENTERPOINT ENERGY INC	CNP	55.41%	0.00%	44.59%
EL PASO CORP	EP	54.15%	5.90%	39.95%
EL PASO PIPELINE PARTNERS LP	EPB	27.88%	0.00%	72.12%
KINDER MORGAN ENERGY -LP	KMP	31.87%	0.00%	68.13%
MDU RESOURCES GROUP INC	MDU	27.29%	0.28%	72.43%
NATIONAL FUEL GAS CO	NFG	16.30%	0.00%	83.70%
ONEOK INC	OKE	38.47%	0.00%	61.53%
ONEOK PARTNERS -LP	OKS	24.19%	0.00%	75.81%
QUESTAR CORP	STR	17.48%	0.00%	82.52%
SOUTHERN UNION CO	SUG	54.02%	0.00%	45.98%
SPECTRA ENERGY CORP	SE	36.06%	1.00%	62.94%
TRANSCANADA CORP	TRP	40.80%	3.32%	55.88%
WILLIAMS COS INC	WMB	35.66%	0.00%	64.34%
WILLIAMS PARTNERS LP	WPZ	30.73%	0.00%	69.27%
	Average	35.03%	0.70%	64.27%
	Median	35.16%	0.00%	64.84%

Source: *S&P Compustat*, January 2011.

All Companies in S&P 500 with "BBB-" Rated Debt

Capital Structure (VL Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
Agilent Technologies	A	13.12%	0.00%	86.88%
Alcoa Inc.	AA	34.83%	0.21%	64.96%
Allegheny Energy	AYE	51.57%	0.00%	48.43%
Allegheny Techn.	ATI	16.04%	0.00%	83.96%
Ameren Corp.	AEE	51.70%	0.00%	48.30%
Anadarko Petroleum	APC	25.63%	0.00%	74.37%
Best Buy Co.	BBY	7.09%	0.00%	92.91%
Boston Scientific	BSX	31.69%	0.00%	68.31%
CareFusion Corp.	CFN	19.73%	0.00%	80.27%
CBS Corp. 'B'	CBS	31.32%	0.00%	68.68%
CenturyLink Inc.	CTL	34.24%	0.00%	65.76%
Cliffs Natural Res.	CLF	14.28%	0.00%	85.72%
CMS Energy Corp.	CMS	57.59%	2.10%	40.31%
Constellation Energy	CEG	39.70%	1.72%	58.58%
Coventry Health Care	CVH	26.98%	0.00%	73.02%
CSX Corp.	CSX	22.34%	0.00%	77.66%
DIRECTV	DTV	22.87%	0.00%	77.13%
Discover Fin'l Svcs.	DFS	63.25%	0.00%	36.75%
Discovery Communic.	DISCA	17.28%	0.01%	82.71%
Dow Chemical	DOW	28.81%	6.39%	64.79%
Edison Int'l	EIX	49.05%	3.42%	47.53%
Expedia Inc.	EXPE	18.82%	0.00%	81.18%
First Horizon National	FHN	43.07%	13.30%	43.63%
FirstEnergy Corp.	FE	50.94%	0.00%	49.06%
Fiserv Inc.	FISV	28.00%	0.00%	72.00%
Fortune Brands	FO	28.07%	0.04%	71.89%
Freep't-McMoRan C&G	FCX	7.80%	0.00%	92.20%
Health Care REIT	HCN			
Humana Inc.	HUM	14.87%	0.00%	85.13%
L-3 Communic.	LLL	28.05%	0.00%	71.95%
Lexmark Int'l `A'	LXK	19.15%	0.00%	80.85%
Lorillard Inc.	LO	13.47%	0.00%	86.53%
Marsh & McLennan	MMC	17.08%	0.00%	82.92%
Molson Coors Brewing	TAP	14.07%	0.00%	85.93%
National Semic.	NSM	23.59%	0.00%	76.41%
Newell Rubbermaid	NWL	28.55%	0.00%	71.45%
Newfield Exploration	NFX	18.88%	0.00%	81.12%
NiSource Inc.	NI	54.06%	0.00%	45.94%
Pinnacle West Capital	PNW	43.38%	0.00%	56.62%
Plum Creek Timber	PCL	27.02%	0.00%	72.98%
priceline.com	PCLN	2.13%	0.00%	97.87%

All Companies in S&P 500 with "BBB-" Rated Debt (cont.)

Capital Structure (VL Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
Prologis	PLD			
Reynolds American	RAI	16.08%	0.00%	83.92%
Roper Inds.	ROP	16.30%	0.00%	83.70%
Rowan Cos.	RDC	21.49%	0.00%	78.51%
SLM Corporation	SLM	96.09%	0.68%	3.23%
Southwestern Energy	SWN	8.90%	0.00%	91.10%
Sunoco Inc.	SUN	31.83%	0.00%	68.17%
Textron Inc.	TXT	46.10%	0.00%	53.90%
Unum Group	UNM	25.16%	0.00%	74.84%
Ventas Inc	VTR			
Vulcan Materials	VMC	31.87%	0.00%	68.13%
Weyerhaeuser Co.	WY	31.63%	0.00%	68.37%
Whirlpool Corp.	WHR	24.84%	0.00%	75.16%
Williams Cos.	WMB	35.48%	0.00%	64.52%
Wyndham Worldwide	WYN	39.42%	0.00%	60.58%
Xerox Corp.	XRX	34.75%	1.23%	64.02%
Xilinx Inc.	XLNX	10.23%	0.00%	89.77%
Yum! Brands	YUM	11.14%	0.00%	88.86%
Zions Bancorp.	ZION	23.74%	22.96%	53.30%
	Average	28.86%	0.91%	70.22%
	Median	26.98%	0.00%	72.98%

Source: *Value Line*, January 2011.

All Companies in S&P 500 with "BBB-" Rated Debt

Capital Structure (S&P Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
AGILENT TECHNOLOGIES INC	A	13.25%	0.00%	86.75%
ALCOA INC	AA	36.30%	0.22%	63.47%
ALLEGHENY ENERGY INC	AYE	52.49%	0.00%	47.51%
ALLEGHENY TECHNOLOGIES INC	ATI	16.04%	0.00%	83.96%
AMEREN CORP	AEE	51.79%	0.00%	48.21%
ANADARKO PETROLEUM CORP	APC	25.25%	0.00%	74.75%
BEST BUY CO INC	BBY	7.53%	0.00%	92.47%
BOSTON SCIENTIFIC CORP	BSX	30.85%	0.00%	69.15%
CAREFUSION CORP	CFN	19.49%	0.00%	80.51%
CBS CORP	CBS	31.55%	0.00%	68.45%
CENTURYLINK INC	CTL	33.57%	0.00%	66.43%
CLIFFS NATURAL RESOURCES INC	CLF	14.79%	0.00%	85.21%
CMS ENERGY CORP	CMS	59.23%	0.00%	40.77%
CONSTELLATION ENERGY GRP INC	CEG	39.68%	1.80%	58.53%
COVENTRY HEALTH CARE INC	CVH	28.98%	0.00%	71.02%
CSX CORP	CSX	23.18%	0.00%	76.82%
DIRECTV	DTV	23.71%	0.00%	76.29%
DISCOVER FINANCIAL SVCS INC	DFS	63.70%	0.00%	36.30%
DISCOVERY COMMUNICATIONS INC	DISCA	16.80%	0.00%	83.20%
DOW CHEMICAL	DOW	29.24%	6.49%	64.27%
EDISON INTERNATIONAL	EIX	47.33%	3.54%	49.13%
EXPEDIA INC	EXPE	19.14%	0.00%	80.86%
FIRST HORIZON NATIONAL CORP	FHN	43.78%	12.65%	43.57%
FIRSTENERGY CORP	FE	51.75%	0.00%	48.25%
FISERV INC	FISV	28.30%	0.00%	71.70%
FORTUNE BRANDS INC	FO	28.47%	0.04%	71.50%
FREEPORT-MCMORAN COP&GOLD	FCX	7.64%	0.00%	92.36%
HEALTH CARE REIT INC	HCN	34.11%	2.70%	63.19%
HUMANA INC	HUM	15.35%	0.00%	84.65%
L-3 COMMUNICATIONS HLDGS INC	LLL	30.19%	0.00%	69.81%
LEXMARK INTL INC -CL A	LXK	19.19%	0.00%	80.81%
LORILLARD INC	LO	12.78%	0.00%	87.22%
MARSH & MCLENNAN COS	MMC	16.94%	0.00%	83.06%
MOLSON COORS BREWING CO	TAP	13.41%	0.00%	86.59%
NATIONAL SEMICONDUCTOR CORP	NSM	23.94%	0.00%	76.06%
NEWELL RUBBERMAID INC	NWL	28.43%	0.00%	71.57%
NEWFIELD EXPLORATION CO	NFX	18.35%	0.00%	81.65%
NISOURCE INC	NI	54.88%	0.00%	45.12%
PINNACLE WEST CAPITAL CORP	PNW	43.46%	0.00%	56.54%
PLUM CREEK TIMBER CO INC	PCL	28.06%	0.00%	71.94%

All Companies in S&P 500 with "BBB-" Rated Debt (cont.)

Capital Structure (S&P Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
PRICELINE.COM INC	PCLN	2.35%	0.00%	97.65%
PROLOGIS	PLD	53.02%	2.27%	44.70%
REYNOLDS AMERICAN INC	RAI	16.32%	0.00%	83.68%
ROPER INDUSTRIES INC/DE	ROP	16.02%	0.00%	83.98%
ROWAN COS INC	RDC	20.66%	0.00%	79.34%
SLM CORP	SLM	95.33%	0.86%	3.81%
SOUTHWESTERN ENERGY CO	SWN	9.04%	0.00%	90.96%
SUNOCO INC	SUN	31.68%	0.00%	68.32%
TEXTRON INC	TXT	46.64%	0.00%	53.36%
UNUM GROUP	UNM	25.69%	0.00%	74.31%
VENTAS INC	VTR	25.99%	0.00%	74.01%
VULCAN MATERIALS CO	VMC	29.93%	0.00%	70.07%
WEYERHAEUSER CO	WY	33.45%	0.00%	66.55%
WHIRLPOOL CORP	WHR	24.55%	0.00%	75.45%
WILLIAMS COS INC	WMB	35.66%	0.00%	64.34%
WYNDHAM WORLDWIDE CORP	WYN	39.36%	0.00%	60.64%
XEROX CORP	XRX	34.26%	1.41%	64.34%
XILINX INC	XLNX	10.54%	0.00%	89.46%
YUM BRANDS INC	YUM	11.23%	0.00%	88.77%
ZIONS BANCORPORATION	ZION	24.31%	23.01%	52.68%
	Average	29.48%	0.92%	69.60%
	Median	28.18%	0.00%	71.64%

Source: *S&P Compustat*, January 2011.

Value Line Pipeline MLPs
Capital Structure (VL Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
Boardwalk Pipeline	BWP	35.16%	0.00%	64.84%
Buckeye Partners L.P.	BPL	30.08%	0.00%	69.92%
El Paso Pipeline	EPB	31.72%	0.00%	68.28%
Energy Transfer	ETP	37.33%	1.08%	61.59%
Enterprise Products	EPD	32.32%	0.00%	67.68%
Inergy L.P.	NRGY	32.87%	0.00%	67.13%
Kinder Morgan Energy	KMP	33.58%	0.71%	65.70%
Magellan Midstream	MMP	22.94%	0.00%	77.06%
Plains All Amer. Pipe.	PAA	34.90%	0.00%	65.10%
Suburban Propane	SPH	14.94%	0.00%	85.06%
Williams Partners L.P.	WPZ	30.73%	0.00%	69.27%
	Average	30.60%	0.16%	69.24%
	Median	32.32%	0.00%	67.68%

Source: *Value Line*, January 2011.

Value Line Pipeline MLPs
Capital Structure (S&P Data) - January 1, 2011

Company Name	Ticker	LTD %	PS %	CS %
BOARDWALK PIPELINE PRTNRS-LP	BWP	35.16%	0.00%	64.84%
BUCKEYE PARTNERS LP	BPL	29.49%	0.00%	70.51%
EL PASO PIPELINE PARTNERS LP	EPB	27.88%	0.00%	72.12%
ENERGY TRANSFER PARTNERS -LP	ETP	37.69%	0.00%	62.31%
ENTERPRISE PRODS PRTNER -LP	EPD	32.17%	0.00%	67.83%
INERGY LP	NRGY	35.26%	0.00%	64.74%
KINDER MORGAN ENERGY -LP	KMP	31.87%	0.00%	68.13%
MAGELLAN MIDSTREAM PRTNRS LP	MMP	22.94%	0.00%	77.06%
PLAINS ALL AMER PIPELNE -LP	PAA	34.90%	0.00%	65.10%
SUBURBAN PROPANE PRTNRS -LP	SPH	14.94%	0.00%	85.06%
WILLIAMS PARTNERS LP	WPZ	30.73%	0.00%	69.27%
	Average	30.28%	0.00%	69.72%
	Median	31.87%	0.00%	68.13%

Source: *S&P Compustat*, January 2011.

Cost of Debt

The expected return on debt, or the cost of debt capital (K_d), is the rate that investors would incur when financing the purchase of the operating assets of an interstate natural gas pipeline company. It is the cost of debt that is appropriate for the cost of capital study and it is relatively simple to estimate. Unlike the cost of equity, the required return on debt is directly observable in the market. It is best approximated by the current yield to maturity (YTM) on the applicable debt. The YTM is the rate of return the existing bondholders expect to receive, and it is also a good estimate of K_d (cost of debt), the rate of return that new bondholders would require.[38] Often an average of recent yields is also used. The yield exemplifies the market's expectation of future returns. If the market's expectations of future debt returns were different from those implicit in the price, the market price of the debt would be bid up or down so that the market's expectations were reflected in the price.[39]

From information in *Mergent Bond Database* (January 2011), we found the *Moody's* bond rating to be predominately **Baa3** (average & median) and the *Standard & Poor's* long-term senior debt rating to be **BBB-** (average & median) for the typical interstate natural gas pipeline. This information is presented in the following table:

Summary of Pipeline Long-Term Debt Ratings - January 1, 2011

Averages	S&P		Mergent	
Value Line Natural Gas Diversified Industry (All)	BB+	13	Ba2	14
Value Line Oil/Gas Distribution Ind. (All + MLPs)	BBB-	12	Baa3	12
VL Natural Gas Diversified & Oil/Gas Dist./MLP - Large	BBB-	12	Baa3	12
Interstate Natural Gas Pipeline Forum (Pipelines)	BBB-	12	Baa2	11
Value Line Master Limited Partnerships	BBB-	12	Baa3	12
Average	**BBB-**	**12**	**Baa3**	**12**

Medians	S&P		Mergent	
Value Line Natural Gas Diversified Industry (All)	BBB-	12	Ba1	13
Value Line Oil/Gas Distribution Ind. (All + MLPs)	BBB-	12	Baa3	12
VL Natural Gas Diversified & Oil/Gas Dist./MLP - Large	BBB	11	Baa3	12
Interstate Natural Gas Pipeline Forum (Pipelines)	BBB-	12	Baa2	11
Value Line Master Limited Partnerships	BBB-	12	Baa3	12
Average	**BBB-**	**12**	**Baa3**	**12**

[38] Brigham, Eugene F. & Michael C. Ehrhardt, *Financial Management: Theory and Practice*, 10th ed. (Thomson Learning, Inc.: Stamford, CT, 2002), p. 423.

[39] *Stocks, Bonds, Bills and Inflation: 2010 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2010), p. 24

The yield for utility, corporate, and industrial bonds rated **Baa** was **6.04%**, **6.10%**, and **6.15%,** respectively as of December 31, 2010. We also considered various Corporate Bond Yields from Bloomberg at December 31, 2010 as shown in the table below.

Bloomberg Data at December 31, 2010

Years to Maturity	Bond Rating										
	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+
15	4.63	4.82	4.82	4.82	4.97	5.03	5.70	5.17	5.56	5.94	6.74
20	4.92	5.12	5.12	5.12	5.25	5.32	5.51	5.51	5.74	6.19	6.99
25	4.99	5.16	5.16	5.16	5.20	5.30	5.60	5.61	5.83	6.31	7.08
30	5.07	5.30	5.30	5.30	5.34	5.42	5.57	5.63	5.86	6.35	7.21

Source: Bloomberg, January 2010.

Further, we took note of the yield to maturity for the *Value Line* Natural Gas Diversified Industry group, the *Value Line* Oil/Gas Distribution Industry plus the Value Line Pipeline group, the large companies form the former three groups, the Interstate Natural Gas Pipeline Forum Group, and the Pipeline Screened Comparables Group. The results of those measurements is shown in the following box.

Pipeline Group	YTM 20+*	
	Bond Avg.	Bond Med.
VL Natural Gas Diversified Industry	5.92	5.75
VL Oil/Gas Distribution + MLPs	7.06	6.57
VL Nat. Gas Divers. & Oil/Gas + MLPs (Large)	6.72	6.55
Interstate Nat. Gas Pipeline Forum	6.92	6.48
Screened Comparables	6.30	6.15

* YTM 20+ = yield to maturity for bonds with at least 20 years to maturity.

Finally, to focus on the lower end of the Baa spectrum (where the interstate natural gas pipelines tend to congregate), we took note of the *Moody's* and *Standard & Poor's* yields to maturity for all oil and gas bonds rated Baa3 and BBB- bonds with at least 20 years to maturity. The following tables show the results of that extensive research.

Moody's & *Standard & Poor's* Ratings & YTM
Oil and Gas Industry Bonds (Rated Baa3 and BBB-)

Moody's Ratings	Median YTM 20+ Baa3 Oil and Gas Bonds	6.45
S&P Ratings	Median YTM 20+ BBB- Oil and Gas Bonds	6.55

Source: *Mergent Bond Database*, Jan. 2011.

From this information we determined the appropriate cost of debt capital to be **6.50%**. The following tables were used to illustrate the long-term debt ratings for the *Value Line* Natural Gas

Industry and yield to maturity (YTM) for public utility bonds and corporate bonds as reported in *Mergent Bond Record.*

Value Line Natural Gas Diversified Industry (All)
S&P and Mergent Long-Term Debt Ratings - January 1, 2011

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
ATP Oil & Gas Corp	ATPG	CCC+	19	Caa2	20
Cabot Oil & Gas 'A'	COG				
Callon Pete Co	CPE				
Chesapeake Energy	CHK	BB	14	Ba3	15
Cimarex Energy	XEC	BB	14	Ba3	15
Crosstex Energy	XTXI	B+	16	B3	18
Crosstex Energy LP	XTEX				
Delta Natural Gas	DGAS				
Devon Energy	DVN	BBB+	10	Baa1	10
EOG Resources	EOG	A-	9	A3	9
EQT Corp.	EQT	BBB	11	Baa1	10
Eagle Rock Energy Partners Ltd	EROC				
Energen Corp.	EGN	BBB	11	Baa3	12
MDU Resources	MDU	BBB-	12	Baa3	12
Markwest Energy Partners LP	MWE	BB-	15	B1	16
National Fuel Gas	NFG	BBB	11	Baa1	10
ONEOK Partners LP	OKS	BBB	11	Baa2	11
Penn Virginia Corp.	PVA	BB-	15	B2	17
Petroleum Development Corp.	PETD	B-	18	B3	18
Questar Corp.	STR	A	8	A3	9
Quicksilver Res.	KWK	B+	16	B2	17
Southwestern Energy	SWN	BBB	11	Ba1	13
	Average	BB+	13	Ba2	14
	Median	BBB-	12	Ba1	13

* Source: *Mergent* Database, Jan. 2011.

Value Line Oil/Gas Distribution Industry (All + MLPs)
S&P and Mergent Long-Term Debt Ratings - January 1, 2011

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
Boardwalk Pipeline	BWP	BBB-	12	Baa2	11
Buckeye Partners L.P.	BPL	BBB	11	Baa2	11
El Paso Corp.	EP	BB-	15	Ba3	15
El Paso Pipeline	EPB	BB	14	Ba1	13
Enbridge Energy Partners LLP	EEP	BBB	11	Baa2	11
Enbridge Inc.	ENB.TO	A-	9	Baa1	10
Energy Transfer	ETP	BBB-	12	Baa3	12
Enterprise Products	EPD	BBB-	12	Baa3	12
Inergy L.P.	NRGY	B+	16	Ba3	15
Kinder Morgan Energy	KMP	BBB	11	Baa2	11
Magellan Midstream	MMP	BBB	11	Baa2	11
ONEOK Inc.	OKE	BBB	11	Baa2	11
Plains All Amer. Pipe.	PAA	BBB-	12	Baa3	12
Southern Union	SUG	BBB-	12	Baa3	12
Spectra Energy	SE	BBB	11	Baa2	11
Suburban Propane	SPH				
Williams Cos.	WMB	BB+	13	Baa3	12
Williams Partners L.P.	WPZ	BBB-	12	Baa3	12
	Average	BBB-	12	Baa3	12
	Median	BBB-	12	Baa3	12

*Source: *Mergent* Database, Jan. 2011.

VL Natural Gas Diversified & Oil/Gas Distribution/MLP - Large

S&P and Mergent Long-Term Debt Ratings - January 1, 2011

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
Boardwalk Pipeline	BWP	BBB-	12	Baa2	11
Buckeye Partners L.P.	BPL	BBB	11	Baa2	11
Cabot Oil & Gas 'A'	COG				
Chesapeake Energy	CHK	BB	14	Ba3	15
Cimarex Energy	XEC	BB	14	Ba3	15
Crosstex Energy	XTXI	B+	16	B3	18
Crosstex Energy LP	XTEX				
Devon Energy	DVN	BBB+	10	Baa1	10
EOG Resources	EOG	A-	9	A3	9
EQT Corp.	EQT	BBB	11	Baa1	10
El Paso Corp.	EP	BB-	15	Ba3	15
Enbridge Energy Partners LLP	EEP	BBB	11	Baa2	11
Enbridge Inc.	ENB.TO	A-	9	Baa1	10
Energen Corp.	EGN	BBB	11	Baa3	12
Energy Transfer	ETP	BBB-	12	Baa3	12
Enterprise Products	EPD	BBB-	12	Baa3	12
Inergy L.P.	NRGY	B+	16	Ba3	15
Kinder Morgan Energy	KMP	BBB	11	Baa2	11
MDU Resources	MDU	BBB-	12	Baa3	12
Magellan Midstream	MMP	BBB	11	Baa2	11
National Fuel Gas	NFG	BBB	11	Baa1	10
ONEOK Inc.	OKE	BBB	11	Baa2	11
ONEOK Partners LP	OKS	BBB	11	Baa2	11
Penn Virginia Corp.	PVA	BB-	15	B2	17
Plains All Amer. Pipe.	PAA	BBB-	12	Baa3	12
Questar Corp.	STR	A	8	A3	9
Quicksilver Res.	KWK	B+	16	B2	17
Southern Union	SUG	BBB-	12	Baa3	12
Southwestern Energy	SWN	BBB	11	Ba1	13
Spectra Energy	SE	BBB	11	Baa2	11
Suburban Propane	SPH				
Williams Cos.	WMB	BB+	13	Baa3	12
	Average	BBB-	12	Baa3	12
	Median	BBB	11	Baa3	12

* Source: *Mergent* Database, Jan. 2011.

Interstate Natural Gas Pipeline Forum (Pipelines)

S&P and Mergent Long-Term Debt Ratings - January 1, 2011

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
Boardwalk Pipeline	BWP	BBB-	12	Baa2	11
CenterPoint Energy	CNP	BBB-	12	Ba1	13
El Paso Corp.	EP	BB-	15	Ba3	15
El Paso Pipeline	EPB	BB	14	Ba1	13
Kinder Morgan Energy	KMP	BBB	11	Baa2	11
MDU Resources	MDU	BBB-	12	Baa3	12
National Fuel Gas	NFG	BBB	11	Baa1	10
ONEOK Inc.	OKE	BBB	11	Baa2	11
ONEOK Partners LP	OKS	BBB	11	Baa2	11
Questar Corp.	STR	A	8	A3	9
Southern Union	SUG	BBB-	12	Baa3	12
Spectra Energy	SE	BBB	11	Baa2	11
TransCanada Corp.	TRP	A-	9	A3	9
Williams Cos.	WMB	BB+	13	Baa3	12
Williams Partners L.P.	WPZ	BBB-	12	Baa3	12
	Average	BBB-	12	Baa2	11
	Median	BBB-	12	Baa2	11

* Source: *Mergent* Database, Jan. 2011.

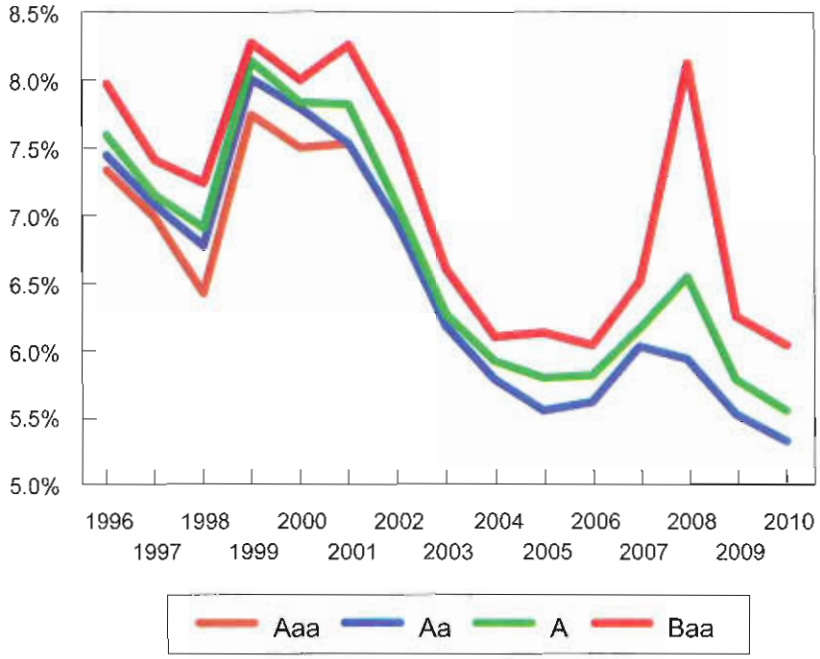
Value Line Master Limited Partnerships

S&P and Mergent Long-Term Debt Ratings - January 1, 2011

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
Boardwalk Pipeline	BWP	BBB-	12	Baa2	11
Buckeye Partners L.P.	BPL	BBB	11	Baa2	11
El Paso Pipeline	EPB	BB	14	Ba1	13
Energy Transfer	ETP	BBB-	12	Baa3	12
Enterprise Products	EPD	BBB-	12	Baa3	12
Inergy L.P.	NRGY	B+	16	Ba3	15
Kinder Morgan Energy	KMP	BBB	11	Baa2	11
Magellan Midstream	MMP	BBB	11	Baa2	11
Plains All Amer. Pipe.	PAA	BBB-	12	Baa3	12
Suburban Propane	SPH				
Williams Partners L.P.	WPZ	BBB-	12	Baa3	12
	Average	BBB-	12	Baa3	12
	Median	BBB-	12	Baa3	12

Source: *Mergent* Database, Jan. 2011.

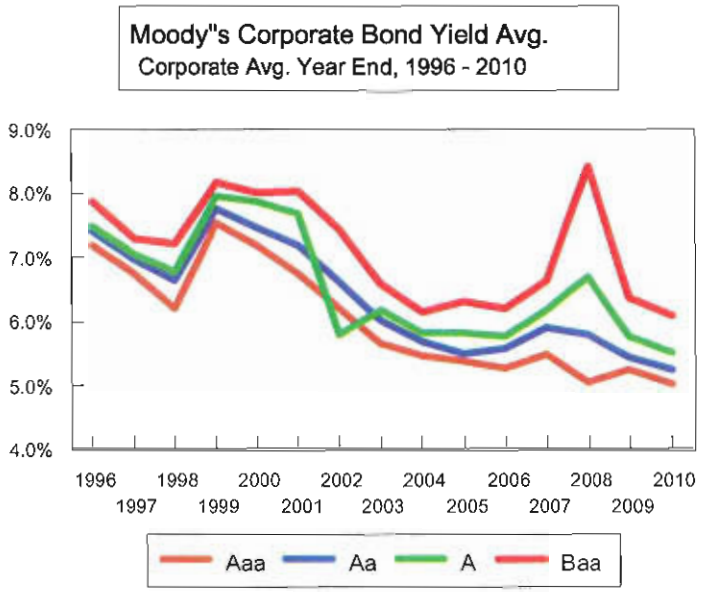
Mergent Utility Bond Yields
Public Utility Yields (1996 - 2010)
Year End Data



Public Utility Bond Yields - Year End Data (1996 - 2010)				
Year End Date	Aaa	Aa	A	Baa
1996	7.33%	7.44%	7.59%	7.98%
1997	6.99%	7.07%	7.16%	7.41%
1998	6.43%	6.78%	6.91%	7.24%
1999	7.74%	8.00%	8.14%	8.28%
2000	7.51%	7.79%	7.84%	8.01%
2001	7.53%	7.53%	7.83%	8.27%
2002	---	6.94%	7.07%	7.61%
2003	---	6.18%	6.27%	6.61%
2004	---	5.78%	5.92%	6.10%
2005	---	5.55%	5.80%	6.14%
2006	---	5.62%	5.81%	6.05%
2007	---	6.03%	6.16%	6.51%
2008	---	5.93%	6.54%	8.13%
2009	---	5.52%	5.79%	6.26%
2010	---	5.32%	5.56%	6.04%

Source: *Mergent's Bond Record*, January 1997 - 2011

Mergent Corporate Bond Yields



1996 - 2010 Moody's Corporate Bond Yield Averages Corporate Averages - Year End Data				
Year End Date	Aaa	Aa	A	Baa
1996	7.20%	7.41%	7.51%	7.89%
1997	6.76%	6.99%	7.05%	7.32%
1998	6.22%	6.65%	6.80%	7.23%
1999	7.55%	7.78%	7.96%	8.19%
2000	7.21%	7.48%	7.88%	8.02%
2001	6.76%	7.19%	7.70%	8.05%
2002	6.21%	6.63%	5.80%	7.45%
2003	5.65%	6.02%	6.19%	6.60%
2004	5.47%	5.69%	5.82%	6.15%
2005	5.38%	5.51%	5.84%	6.33%
2006	5.29%	5.58%	5.78%	6.22%
2007	5.49%	5.91%	6.19%	6.65%
2008	5.06%	5.81%	6.70%	8.45%
2009	5.26%	5.44%	5.77%	6.37%
2010	5.02%	5.26%	5.52%	6.10%

Source: *Mergent's Bond Record*, January 1997 - 2011.

Cost of Equity

We have estimated the cost of equity capital by employing several methods. The market cost of equity is generally considered to be the most difficult part of computing the cost of capital because it relies on interpretation of projections by market analysts as well as the projections of the equity models used by the appraiser. The market cost of equity capital is equal to the rate of return *expected* by investors at their perceived level of risk for a company's equity. There are several methods used to estimate the cost of equity capital. The most common methods are the Gordon growth model sometimes referred to as the discounted cash flow method (or DCF method), the risk premium method (RP), and the capital asset pricing model (CAPM).

All estimates of the cost of equity rates fall into one of two classes. They are either (1) add-ons to an interest rate, or (2) ratios of return to investment. Add-on estimates of the cost of equity capital include RP and the CAPM. The DCF method is a ratio of return to investment.

After computing the cost of equity by the DCF, RP, and CAPM methods, the data was analyzed and reconciled to obtain the cost of equity capital before flotation costs of **12.00%**. On the following page is a summary of the cost of equity calculations by each of the methods employed. The summary page is followed by an explanation of each method and the indicators found therein.

Summary of Cost of Equity Calculations

DCF Indicators - January 1, 2011

Company Groups	*Value Line* Data		S&P (IBES) Data	
	Average	Median	Average	Median
Value Line Natural Gas (Diversified) - All	9.96	9.18	11.33	9.90
Value Line Oil/Gas Distribution - All + MLPs	12.46	10.39	11.11	10.83
VL Nat. Gas Divers. & Oil/Gas Dist. + MLPs - Large	10.71	9.53	11.45	10.83
Value Line Pipeline MLPs	15.17	14.38	10.67	10.74
Interstate Natural Gas Pipeline Forum (Pipes)	11.15	9.18	10.85	10.57
S&P Screened Comparables Group	10.16	10.08	10.98	10.88
All Companies in S&P 500 with "BBB-" Rated Debt	11.55	10.29	14.62	11.86
Averages	11.59	10.43	11.57	10.80

The discounted cash flow method for above industry groups were calculated as follows:

Using *Value Line* data and *Value Line* earnings growth estimates and S&P's *Compustat* data with *Institutional Brokers Estimate System* (IBES) earnings growth.

Risk Premium Indicators - January 1, 2011

General Risk Premium Indicators

Indicators	Rates		Indicator
	Rf	Rp	
20-Year Treasury Bonds (ex post)	4.18	6.70	10.88
20-Year Treasury Bonds (ex ante)	4.18	9.09	13.27

Risk Premium Indicators by Groups

Indicators	Risk Premium	
	Average	Median
VL Natural Gas Diversified Industry (All)	11.62	11.45
VL Oil/Gas Distribution (All + MLPs)	12.76	12.27
VL Natural Gas Diversified & Oil/Gas Dist./MLP (Large)	12.42	12.25
Value Line Pipeline MLPs	12.41	12.27
Interstate Nat. Gas Pipeline Forum Group (Pipes)	12.62	12.18
Screened Comparables Group	12.00	11.85
Average	12.31	12.05

Risk Premium Formula: Ke = Rf + Rp

Base Rate: Yield to maturity on each company's long-term bonds, *Mergent Bond Record*, January, 2011.

Risk Premium: *SBBI*, Morningstar, 2011 Corporate Bond RP of 5.7%.

Capital Asset Pricing Model (CAPM) - January 1, 2011

Item	Rates			CAPM Indicator
	Rf	Rp	Beta	
CAPM Indicator *				
Long-Term Gov't Bonds (ex post)	4.18	6.70	1.05	11.22
Long-Term Gov't Bonds (ex ante)	4.18	9.09	1.05	13.72

CAPM Formula: Ke = Rf + B(Rp)

* CAPM Indicator is based upon a *Value Line* beta of 1.05. Morningstar, *2011 SBBI & Risk Premia over Time Report*;, & Federal Reserve data Jan. 3, 2011.

DCF Method

The discounted cash flow method of estimating the cost of equity is based on the formula shown in Figure 2. Our computations using the DCF method are based upon information from the *Standard and Poor's Compustat* database, *Institutional Brokers Estimate System* (IBES), and the *Value Line Investment Survey* database. We began our analysis by screening the *Standard and Poor's* database of approximately 9,725 companies for companies with risk equal to the risk of the typical interstate natural gas pipeline. As a measure of financial risk the average *Standard and Poor's* rating on the long-term debt of companies comprising the large natural gas pipeline industry was **BBB**- Our first screening process was to find all companies having a *S&P* senior debt rating of BBB to BBB- (the mid-rated triple B debt to the lowest level triple B debt). This screening will give us a list of companies that have long-term debt which is believed to be either equal in risk or slightly less risky than the typical interstate natural gas pipeline. (Several of these companies have double B rated debt.) This measure is indicative of financial risk for the companies.

$$K_e = \frac{D_1}{P_0} + g$$

where

K_e = *Cost of equity*
D_1 = *Expected Dividend in year* 1
P_0 = *Current price of stock*
g = *Growth in dividends*

Figure 2

Next we screened the surviving group of companies by the return on net plant investment (before taxes). This is a measure of business risk and measures the ability of a company to compete in the market and maintain its rate of return before income taxes. From this calculation we screened out all companies varying more than fifty percent from the average return of the interstate natural gas pipelines industry.

Next we screened the surviving group of companies by their S&P adjusted betas. Beta is a measurement of the sensitivity of a company's stock price to the overall fluctuation in the *Standard & Poor's 500* (*S&P 500*) Index Price. For example, a beta of 1.5 indicates that a company's stock price tends to rise (or fall) 1.5%, with a 1% rise (or fall) in the index price. The S&P adjusted beta of the interstate natural gas pipeline industry averages approximately 0.95 presently. Thus we excluded all companies with *S&P* adjusted betas less than 0.80 and greater than 1.10. In our judgment, this range is a reasonable range of betas to use for comparison purposes in determining comparables of approximate risk to the natural gas pipelines. A table of risk screening data is follows.

Pipeline Risk Screening Data - January 1, 2011
VL Natural Gas Diversified & Oil/Gas Dist./MLP - Large (S&P Data)

Company Name	Ticker	S&P Debt Rating Letter	S&P Debt Rating Number	S&P Adj. Beta	Return on Net Invest.
BOARDWALK PIPELINE PRTNRS-LP	BWP	BBB	11	0.43	4.69
BUCKEYE PARTNERS LP	BPL	BBB	11	0.53	13.46
CABOT OIL & GAS CORP	COG			1.10	8.50
CHESAPEAKE ENERGY CORP	CHK	BB	14	1.16	(33.14)
CIMAREX ENERGY CO	XEC	BB	14	1.27	(19.15)
CROSSTEX ENERGY INC	XTXI			1.63	1.84
CROSSTEX ENERGY LP	XTEX	B+	16	1.22	2.06
DEVON ENERGY CORP	DVN	BBB+	10	1.06	(22.62)
EL PASO CORP	EP	BB	14	1.07	11.70
ENBRIDGE ENERGY PRTNRS -LP	EEP	BBB	11	0.78	7.99
ENBRIDGE INC	ENB	A-	9	0.81	6.69
ENERGEN CORP	EGN	BBB	11	1.05	59.65
ENERGY TRANSFER PARTNERS -LP	ETP	BBB-	12	0.73	13.01
ENTERPRISE PRODS PRTNER -LP	EPD	BBB-	12	0.72	10.02
EOG RESOURCES INC	EOG	A-	9	0.95	2.62
EQT CORP	EQT	BBB	11	0.90	7.37
INERGY LP	NRGY			0.72	11.94
KINDER MORGAN ENERGY -LP	KMP	BBB	11	0.55	10.36
MAGELLAN MIDSTREAM PRTNRS LP	MMP	BBB	11	0.57	10.61
MDU RESOURCES GROUP INC	MDU	BBB+	10	1.12	11.99
NATIONAL FUEL GAS CO	NFG	BBB	11	0.91	12.77
ONEOK INC	OKE	BBB	11	1.06	11.42
ONEOK PARTNERS -LP	OKS	BBB	11	0.68	10.11
PENN VIRGINIA CORP	PVA	BB-	15	1.39	(4.44)
PLAINS ALL AMER PIPELNE -LP	PAA	BBB-	12	0.63	12.38
QUESTAR CORP	STR	A	8	0.67	11.68
QUICKSILVER RESOURCES INC	KWK	B+	16	1.58	(19.73)
SOUTHERN UNION CO	SUG	BBB-	12	0.99	6.15
SOUTHWESTERN ENERGY CO	SWN	BBB-	12	0.69	(0.85)
SPECTRA ENERGY CORP	SE	BBB+	10	0.96	9.61
SUBURBAN PROPANE PRTNRS -LP	SPH	BB	14	0.67	45.08
WILLIAMS COS INC	WMB	BBB-	12	1.15	8.03
	Average	BBB-	12	0.93	6.93

Source: *S&P Compustat*, January 2011.

Surviving the screening process are eleven (11) companies, which in general should be approximately of equal or slightly less risk when compared to the interstate natural gas pipeline industry. These companies are shown on the following page.

Allegheny Energy, Inc.
Avista Corp.
Black Hills Corp
EQT Corp.
Great Plains Energy, Inc.
NiSource, Inc.
Northwestern Corp
Portland General Electric Co.
Southern Union
Southwest Gas Corp
TECO Energy

In addition to performing a DCF analysis for the companies listed above of approximately equal or slightly less risk to the interstate natural gas pipelines, we performed additional DCF analyses on six (6) other groups of companies – the *Value Line* natural gas (diversified) group (all companies); the *Value Line* oil/gas distribution group (all companies) plus the *Value Line* Pipeline MLPs; the *Value Line* natural gas (diversified) group combined with the *Value Line* oil/gas distribution group and the *Value Line* Pipeline MLPs (large companies – with over $750 million in annual sales); the *Value Line* MLPs; the interstate natural gas pipeline forum group (traded) that are heavily involved with pipelines; and all of the companies in the Standard and Poor's 500 with a BBB- rating for their long-term debt. We used financial data from two independent sources, *Standard and Poor's Compustat* database, and the *Value Line Investment Survey*. The two independent sources of data gave us two sets of growth estimates for the five groups of companies. The growth estimates considered were provided by *Value Line* and the *Institutional Brokers Estimate System* (IBES) through the *Standard and Poor's Compustat* database. From these analysts' projections we calculated DCF indicators on all groupings and calculated a simple average and median indicator. We gave the most weight to the median indicator in each grouping. The median indicator is not affected by extreme values and outliers and thus is a very good indicator of central tendency of a representative sample of companies. We placed the most confidence in the estimates provided by the IBES projections, because these estimates were provided by a large group of financial analysts who monitor these companies.[40] It is our opinion, based on this documented data, that the appropriate cost of equity for the interstate natural gas pipeline industry by the DCF method is **11.25%** as of January 1, 2011. The result of all of the DCF analysis and research can be found on the following pages.

[40] The Institutional Brokers Estimate System (IBES) is a database provided through *Standard & Poor's Compustat* of earnings expectations obtained from more than 3,500 security analysts from over 300 contributing firms.

Summary of DCF Method Indicators

Company Groups	*Value Line* Data		S&P (IBES) Data	
	Average	Median	Average	Median
Value Line Natural Gas (Diversified) - All	9.96	9.18	11.33	9.90
Value Line Oil/Gas Distribution - All + MLPs	12.46	10.39	11.11	10.83
VL Nat. Gas Divers. & Oil/Gas Dist. + MLPs - Large	10.71	9.53	11.45	10.83
Value Line Pipeline MLPs	15.17	14.38	10.67	10.74
Interstate Natural Gas Pipeline Forum (Pipes)	11.15	9.18	10.85	10.57
S&P Screened Comparables Group	10.16	10.08	10.98	10.88
All Companies in S&P 500 with "BBB-" Rated Debt	11.55	10.29	14.62	11.86
Averages	11.59	10.43	11.57	10.80

The discounted cash flow method for above industry groups were calculated as follows:
Using *Value Line* data and *Value Line* earnings growth estimates and *S&P's Compustat* data with *Institutional Brokers Estimate System* (IBES) earnings growth.

Value Line Natural Gas Diversified Industry (All)
DCF Indicator (VL Data) - January 1, 2011

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
ATP Oil & Gas Corp	ATPG			
Cabot Oil & Gas 'A'	COG	0.32	4.50	4.82
Callon Pete Co	CPE			
Chesapeake Energy	CHK	1.12	5.00	6.12
Cimarex Energy	XEC	0.35	10.50	10.85
Crosstex Energy	XTXI	3.20	19.50	22.70
Crosstex Energy LP	XTEX		6.00	
Delta Natural Gas	DGAS			
Devon Energy	DVN	0.84	9.50	10.34
EOG Resources	EOG	0.69	3.50	4.19
EQT Corp.	EQT	1.94	12.00	13.94
Eagle Rock Energy Partners Ltd	EROC			
Energen Corp.	EGN	1.06	(0.50)	
MDU Resources	MDU	3.18	6.00	9.18
Markwest Energy Partners LP	MWE		3.00	
National Fuel Gas	NFG	2.03	5.50	7.53
ONEOK Partners LP	OKS		4.00	
Penn Virginia Corp.	PVA		5.00	
Petroleum Development Corp.	PETD		12.00	
Questar Corp.	STR	3.25	(11.00)	
Quicksilver Res.	KWK		11.50	
Southwestern Energy	SWN		18.50	
	Average	1.63	6.92	9.96
	Median	1.12	5.75	9.18

Source: *Value Line*, January 2011.

Value Line Natural Gas Diversified Industry (All)
DCF Indicator (S&P Data) - January 1, 2011

Company Name	Ticker	Current Yield	EPS Growth	DCF
ATP OIL & GAS CORP	ATPG			
CABOT OIL & GAS CORP	COG	0.31	(3.00)	
CALLON PETROLEUM CO/DE	CPE			
CHESAPEAKE ENERGY CORP	CHK	1.23	6.00	7.23
CIMAREX ENERGY CO	XEC	0.45	25.10	25.55
CROSSTEX ENERGY INC	XTXI			
CROSSTEX ENERGY LP	XTEX	7.36	6.00	13.36
DELTA NATURAL GAS CO INC	DGAS	4.51	4.00	8.51
DEVON ENERGY CORP	DVN	0.93	14.25	15.18
EAGLE ROCK ENERGY PARTNRS LP	EROC			
ENERGEN CORP	EGN	1.14	6.10	7.24
EOG RESOURCES INC	EOG	0.76	12.00	12.76
EQT CORP	EQT	2.25	14.50	16.75
MARKWEST ENERGY PARTNERS LP	MWE	6.12	3.50	9.62
MDU RESOURCES GROUP INC	MDU	3.42	6.75	10.17
NATIONAL FUEL GAS CO	NFG	2.21	5.30	7.51
ONEOK PARTNERS -LP	OKS	5.97	5.00	10.97
PENN VIRGINIA CORP	PVA	1.40	5.00	6.40
PETROLEUM DEVELOPMENT CORP	PETD			
QUESTAR CORP	STR	3.35	4.00	7.35
QUICKSILVER RESOURCES INC	KWK		(32.90)	
SOUTHWESTERN ENERGY CO	SWN		12.25	
	Average	2.76	5.52	11.33
	Median	2.21	6.00	9.90

Source: *S&P Compustat*, January 2011.

Value Line Oil/Gas Distribution Industry (All + MLPs)
DCF Indicator (VL Data) - January 1, 2011

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Boardwalk Pipeline	BWP	6.74	7.50	14.24
Buckeye Partners L.P.	BPL	5.94	4.50	10.44
El Paso Corp.	EP	0.29	3.00	3.29
El Paso Pipeline	EPB	4.90	21.00	25.90
Enbridge Energy Partners LLP	EEP		2.50	
Enbridge Inc.	ENB.TO	3.58	8.00	11.58
Energy Transfer	ETP	6.92	(2.50)	
Enterprise Products	EPD	5.81	10.50	16.31
Inergy L.P.	NRGY	7.10	19.50	26.60
Kinder Morgan Energy	KMP	6.47	8.00	14.47
Magellan Midstream	MMP	5.33	5.00	10.33
ONEOK Inc.	OKE	3.44	5.00	8.44
Plains All Amer. Pipe.	PAA	6.05	3.00	9.05
Southern Union	SUG	2.42	4.50	6.92
Spectra Energy	SE	4.26	3.50	7.76
Suburban Propane	SPH	6.15	1.50	7.65
Williams Cos.	WMB	2.03	7.50	9.53
Williams Partners L.P.	WPZ	6.32	10.50	16.82
	Average	4.93	6.81	12.46
	Median	5.81	5.00	10.39

Source: *Value Line*, January 2011.

Value Line Oil/Gas Distribution Industry (All + MLPs)
DCF Indicator (S&P Data) - January 1, 2011

Company Name	Ticker	Current Yield	EPS Growth	DCF
BOARDWALK PIPELINE PRTNRS-LP	BWP	6.95	5.00	11.95
BUCKEYE PARTNERS LP	BPL	6.03	3.30	9.33
EL PASO CORP	EP	0.32	8.90	9.22
EL PASO PIPELINE PARTNERS LP	EPB	5.10	4.00	9.10
ENBRIDGE ENERGY PRTNRS -LP	EEP	6.75	2.50	9.25
ENBRIDGE INC	ENB	3.26	8.15	11.41
ENERGY TRANSFER PARTNERS -LP	ETP	7.14	3.50	10.64
ENTERPRISE PRODS PRTNER -LP	EPD	5.93	5.85	11.78
INERGY LP	NRGY			
KINDER MORGAN ENERGY -LP	KMP	6.57	4.00	10.57
MAGELLAN MIDSTREAM PRTNRS LP	MMP	5.51	4.45	9.96
ONEOK INC	OKE	3.76	8.50	12.26
PLAINS ALL AMER PIPELNE -LP	PAA	6.35	5.00	11.35
SOUTHERN UNION CO	SUG	2.68	7.45	10.13
SPECTRA ENERGY CORP	SE	4.36	9.00	13.36
SUBURBAN PROPANE PRTNRS -LP	SPH	6.33	4.50	10.83
WILLIAMS COS INC	WMB	2.31	14.25	16.56
WILLIAMS PARTNERS LP	WPZ	6.19	5.00	11.19
	Average	5.03	6.08	11.11
	Median	5.93	5.00	10.83

Source: *S&P Compustat*, January 2011.

VL Natural Gas Diversified & Oil/Gas Distribution/MLP - Large
DCF Indicator (VL Data) - January 1, 2011

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Boardwalk Pipeline	BWP	6.74	7.50	14.24
Buckeye Partners L.P.	BPL	5.94	4.50	10.44
Cabot Oil & Gas 'A'	COG	0.32	4.50	4.82
Chesapeake Energy	CHK	1.12	5.00	6.12
Cimarex Energy	XEC	0.35	10.50	10.85
Crosstex Energy	XTXI	3.20	19.50	22.70
Crosstex Energy LP	XTEX		6.00	
Devon Energy	DVN	0.84	9.50	10.34
EOG Resources	EOG	0.69	3.50	4.19
EQT Corp.	EQT	1.94	12.00	13.94
El Paso Corp.	EP	0.29	3.00	3.29
Enbridge Energy Partners LLP	EEP		2.50	
Enbridge Inc.	ENB.TO	3.58	8.00	11.58
Energen Corp.	EGN	1.06	(0.50)	
Energy Transfer	ETP	6.92	(2.50)	
Enterprise Products	EPD	5.81	10.50	16.31
Inergy L.P.	NRGY	7.10	19.50	26.60
Kinder Morgan Energy	KMP	6.47	8.00	14.47
MDU Resources	MDU	3.18	6.00	9.18
Magellan Midstream	MMP	5.33	5.00	10.33
National Fuel Gas	NFG	2.03	5.50	7.53
ONEOK Inc.	OKE	3.44	5.00	8.44
ONEOK Partners LP	OKS		4.00	
Penn Virginia Corp.	PVA		5.00	
Plains All Amer. Pipe.	PAA	6.05	3.00	9.05
Questar Corp.	STR	3.25	(11.00)	
Quicksilver Res.	KWK		11.50	
Southern Union	SUG	2.42	4.50	6.92
Southwestern Energy	SWN		18.50	
Spectra Energy	SE	4.26	3.50	7.76
Suburban Propane	SPH	6.15	1.50	7.65
Williams Cos.	WMB	2.03	7.50	9.53
	Average	3.48	6.27	10.71
	Median	3.23	5.00	9.53

Source: *Value Line*, January 2011.

VL Natural Gas Diversified & Oil/Gas Distribution/MLP - Large
DCF Indicator (S&P Data) - January 1, 2011

Company Name	Ticker	Current Yield	EPS Growth	DCF
BOARDWALK PIPELINE PRTNRS-LP	BWP	6.95	5.00	11.95
BUCKEYE PARTNERS LP	BPL	6.03	3.30	9.33
CABOT OIL & GAS CORP	COG	0.31	(3.00)	
CHESAPEAKE ENERGY CORP	CHK	1.23	6.00	7.23
CIMAREX ENERGY CO	XEC	0.45	25.10	25.55
CROSSTEX ENERGY INC	XTXI			
CROSSTEX ENERGY LP	XTEX	7.36	6.00	13.36
DEVON ENERGY CORP	DVN	0.93	14.25	15.18
EL PASO CORP	EP	0.32	8.90	9.22
ENBRIDGE ENERGY PRTNRS -LP	EEP	6.75	2.50	9.25
ENBRIDGE INC	ENB	3.26	8.15	11.41
ENERGEN CORP	EGN	1.14	6.10	7.24
ENERGY TRANSFER PARTNERS -LP	ETP	7.14	3.50	10.64
ENTERPRISE PRODS PRTNER -LP	EPD	5.93	5.85	11.78
EOG RESOURCES INC	EOG	0.76	12.00	12.76
EQT CORP	EQT	2.25	14.50	16.75
INERGY LP	NRGY			
KINDER MORGAN ENERGY -LP	KMP	6.57	4.00	10.57
MAGELLAN MIDSTREAM PRTNRS LP	MMP	5.51	4.45	9.96
MDU RESOURCES GROUP INC	MDU	3.42	6.75	10.17
NATIONAL FUEL GAS CO	NFG	2.21	5.30	7.51
ONEOK INC	OKE	3.76	8.50	12.26
ONEOK PARTNERS -LP	OKS	5.97	5.00	10.97
PENN VIRGINIA CORP	PVA	1.40	5.00	6.40
PLAINS ALL AMER PIPELNE -LP	PAA	6.35	5.00	11.35
QUESTAR CORP	STR	3.35	4.00	7.35
QUICKSILVER RESOURCES INC	KWK		(32.90)	
SOUTHERN UNION CO	SUG	2.68	7.45	10.13
SOUTHWESTERN ENERGY CO	SWN		12.25	
SPECTRA ENERGY CORP	SE	4.36	9.00	13.36
SUBURBAN PROPANE PRTNRS -LP	SPH	6.33	4.50	10.83
WILLIAMS COS INC	WMB	2.31	14.25	16.56
	Average	3.75	6.02	11.45
	Median	3.39	5.93	10.83

Source: S&P Compustat, January 2011.

Value Line Pipeline MLPs
DCF Indicator (VL Data) - January 1, 2011

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Boardwalk Pipeline	BWP	6.78	7.50	14.28
Buckeye Partners L.P.	BPL	5.86	4.50	10.36
El Paso Pipeline	EPB	4.90	21.00	25.90
Energy Transfer	ETP	6.97	(2.50)	
Enterprise Products	EPD	5.85	10.50	16.35
Inergy L.P.	NRGY	7.14	19.50	26.64
Kinder Morgan Energy	KMP	6.47	8.00	14.47
Magellan Midstream	MMP	5.27	5.00	10.27
Plains All Amer. Pipe.	PAA	6.07	3.00	9.07
Suburban Propane	SPH	6.04	1.50	7.54
Williams Partners L.P.	WPZ	6.34	10.50	16.84
	Average	6.15	8.05	15.17
	Median	6.07	7.50	14.38

Source: *Value Line*, January 2011.

Value Line Natural Gas & Oil Pipelines
DCF Indicator (S&P Data) - January 1, 2011

Company Name	Ticker	Current Yield	EPS Growth	DCF
BOARDWALK PIPELINE PRTNRS-LP	BWP	6.95	5.00	11.95
BUCKEYE PARTNERS LP	BPL	6.03	3.30	9.33
EL PASO PIPELINE PARTNERS LP	EPB	5.10	4.00	9.10
ENERGY TRANSFER PARTNERS -LP	ETP	7.14	3.50	10.64
ENTERPRISE PRODS PRTNER -LP	EPD	5.93	5.85	11.78
INERGY LP	NRGY			
KINDER MORGAN ENERGY -LP	KMP	6.57	4.00	10.57
MAGELLAN MIDSTREAM PRTNRS LP	MMP	5.51	4.45	9.96
PLAINS ALL AMER PIPELNE -LP	PAA	6.35	5.00	11.35
SUBURBAN PROPANE PRTNRS -LP	SPH	6.33	4.50	10.83
WILLIAMS PARTNERS LP	WPZ	6.19	5.00	11.19
	Average	6.21	4.46	10.67
	Median	6.26	4.48	10.74

Source: *S&P Compustat*, January 2011.

Interstate Natural Gas Pipeline Forum (Pipelines)
DCF Indicator (VL Data) - January 1, 2011

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Boardwalk Pipeline	BWP	6.74	7.50	14.24
CenterPoint Energy	CNP	5.12	3.00	8.12
El Paso Corp.	EP	0.29	3.00	3.29
El Paso Pipeline	EPB	4.90	21.00	25.90
Kinder Morgan Energy	KMP	6.47	8.00	14.47
MDU Resources	MDU	3.18	6.00	9.18
National Fuel Gas	NFG	2.03	5.50	7.53
ONEOK Inc.	OKE	3.44	5.00	8.44
ONEOK Partners LP	OKS		4.00	
Questar Corp.	STR	3.25	(11.00)	
Southern Union	SUG	2.42	4.50	6.92
Spectra Energy	SE	4.26	3.50	7.76
TransCanada Corp.	TRP	4.20	8.50	12.70
Williams Cos.	WMB	2.03	7.50	9.53
Williams Partners L.P.	WPZ	6.32	10.50	16.82
	Average	3.90	5.77	11.15
	Median	3.82	5.50	9.18

Source: *Value Line*, January 2011.

Interstate Natural Gas Pipeline Forum (Pipelines)
DCF Indicator (S&P Data) - January 1, 2011

Company Name	Ticker	Current Yield	EPS Growth	DCF
BOARDWALK PIPELINE PRTNRS-LP	BWP	6.95	5.00	11.95
CENTERPOINT ENERGY INC	CNP	5.29	6.70	11.99
EL PASO CORP	EP	0.32	8.90	9.22
EL PASO PIPELINE PARTNERS LP	EPB	5.10	4.00	9.10
KINDER MORGAN ENERGY -LP	KMP	6.57	4.00	10.57
MDU RESOURCES GROUP INC	MDU	3.42	6.75	10.17
NATIONAL FUEL GAS CO	NFG	2.21	5.30	7.51
ONEOK INC	OKE	3.76	8.50	12.26
ONEOK PARTNERS -LP	OKS	5.97	5.00	10.97
QUESTAR CORP	STR	3.35	4.00	7.35
SOUTHERN UNION CO	SUG	2.68	7.45	10.13
SPECTRA ENERGY CORP	SE	4.36	9.00	13.36
TRANSCANADA CORP	TRP	4.46	6.00	10.46
WILLIAMS COS INC	WMB	2.31	14.25	16.56
WILLIAMS PARTNERS LP	WPZ	6.19	5.00	11.19
	Average	4.20	6.66	10.85
	Median	4.36	6.00	10.57

Source: *S&P Compustat*, January 2011.

Pipeline Screened Comparables Group
DCF Indicator (VL Data) - January 1, 2011

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Allegheny Energy	AYE	2.39	4.00	6.39
Avista Corp.	AVA	4.64	8.50	13.14
Black Hills	BKH	4.77	4.50	9.27
EQT Corp.	EQT	1.94	12.00	13.94
G't Plains Energy	GXP	4.47	4.50	8.97
NiSource Inc.	NI	5.13	6.50	11.63
NorthWestern Corp	NWE		6.33	
Portland General	POR	4.84	3.00	7.84
Southern Union	SUG	2.42	4.50	6.92
Southwest Gas	SWX	2.88	8.00	10.88
TECO Energy	TE	4.66	8.00	12.66
	Average	3.81	6.35	10.16
	Median	4.56	6.33	10.08

Source: *Value Line*, January 2011.

Pipeline Screened Comparables Group
DCF Indicator (S&P Data) - January 1, 2011

Company Name	Ticker	Current Yield	EPS Growth	DCF
ALLEGHENY ENERGY INC	AYE	2.50	1.00	3.50
AVISTA CORP	AVA	4.64	4.50	9.14
BLACK HILLS CORP	BKH	5.09	6.00	11.09
EQT CORP	EQT	2.25	14.50	16.75
GREAT PLAINS ENERGY INC	GXP	4.84	13.00	17.84
NISOURCE INC	NI	5.43	4.00	9.43
NORTHWESTERN CORP	NWE	5.05	7.00	12.05
PORTLAND GENERAL ELECTRIC CO	POR	5.08	6.00	11.08
SOUTHERN UNION CO	SUG	2.68	7.45	10.13
SOUTHWEST GAS CORP	SWX	2.89	6.00	8.89
TECO ENERGY INC	TE	4.88	6.00	10.88
	Average	4.12	6.86	10.98
	Median	4.84	6.00	10.88

Source: *S&P Compustat*, January 2011.

All Companies in S&P 500 with "BBB-" Rated Debt

DCF Indicator (VL Data) - January 1, 2011

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Agilent Technologies	A		16.50	
Alcoa Inc.	AA	0.73	14.00	14.73
Allegheny Energy	AYE	2.39	4.00	6.39
Allegheny Techn.	ATI	1.29	4.00	5.29
Ameren Corp.	AEE	5.44	(2.50)	
Anadarko Petroleum	APC	0.48	10.00	10.48
Best Buy Co.	BBY	1.70	6.50	8.20
Boston Scientific	BSX		10.00	
CareFusion Corp.	CFN			
CBS Corp. 'B'	CBS	1.02	4.00	5.02
CenturyLink Inc.	CTL	6.38	(2.00)	
Cliffs Natural Res.	CLF	0.67	19.00	19.67
CMS Energy Corp.	CMS	4.49	10.00	14.49
Constellation Energy	CEG	3.09	7.00	10.09
Coventry Health Care	CVH		7.00	
CSX Corp.	CSX	1.57	12.50	14.07
DIRECTV	DTV		25.50	
Discover Fin'l Svcs.	DFS	0.42	16.00	16.42
Discovery Communic.	DISCA			
Dow Chemical	DOW	1.98	9.50	11.48
Edison Int'l	EIX	3.42	(1.00)	
Expedia Inc.	EXPE	1.11	18.00	19.11
First Horizon National	FHN			
FirstEnergy Corp.	FE	5.76	(2.00)	
Fiserv Inc.	FISV		11.00	
Fortune Brands	FO	1.23	5.00	6.23
Freep't-McMoRan C&G	FCX	1.72	6.50	8.22
Health Care REIT	HCN		5.77	
Humana Inc.	HUM		7.00	
L-3 Communic.	LLL	2.16	7.50	9.66
Lexmark Int'l `A'	LXK		10.00	
Lorillard Inc.	LO	6.17	8.00	14.17
Marsh & McLennan	MMC	3.07	27.00	30.07
Molson Coors Brewing	TAP	2.33	5.50	7.83
National Semic.	NSM	2.84	13.00	15.84
Newell Rubbermaid	NWL	1.09	8.00	9.09
Newfield Exploration	NFX		7.50	
NiSource Inc.	NI	5.13	6.50	11.63
Pinnacle West Capital	PNW	5.06	6.00	11.06
Plum Creek Timber	PCL	4.28	4.00	8.28
priceline.com	PCLN		21.50	
Prologis	PLD	3.10		
Reynolds American	RAI	5.79	3.00	8.79
Roper Inds.	ROP	0.58	10.50	11.08
Rowan Cos.	RDC		1.00	
SLM Corporation	SLM		9.50	
Southwestern Energy	SWN		18.50	
Sunoco Inc.	SUN	1.47	(4.50)	

All Companies in S&P 500 with "BBB-" Rated Debt (cont.)
DCF Indicator (VL Data) - January 1, 2011

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Textron Inc.	TXT	0.32	(3.00)	
Unum Group	UNM	1.47	5.00	6.47
Ventas Inc	VTR		5.42	
Vulcan Materials	VMC	2.47	5.00	7.47
Weyerhaeuser Co.	WY	0.99		
Whirlpool Corp.	WHR	1.95	14.00	15.95
Williams Cos.	WMB	2.03	7.50	9.53
Wyndham Worldwide	WYN	1.60	3.00	4.60
Xerox Corp.	XRX	1.48	8.00	9.48
Xilinx Inc.	XLNX	2.12	17.00	19.12
Yum! Brands	YUM	2.16	10.50	12.66
Zions Bancorp.	ZION	0.16		
	Average	2.44	8.45	11.55
	Median	1.98	7.50	10.29

Source: *Value Line*, January 2011.

All Companies in S&P 500 with "BBB-" Rated Debt

DCF Indicator (S&P Data) - January 1, 2011

Company Name	Ticker	Current Yield	EPS Growth	DCF
AGILENT TECHNOLOGIES INC	A		54.10	
ALCOA INC	AA			
ALLEGHENY ENERGY INC	AYE	2.50	1.00	3.50
ALLEGHENY TECHNOLOGIES INC	ATI			
AMEREN CORP	AEE	5.46		
ANADARKO PETROLEUM CORP	APC	0.57	20.20	20.77
BEST BUY CO INC	BBY	1.96	12.00	13.96
BOSTON SCIENTIFIC CORP	BSX		7.00	
CAREFUSION CORP	CFN		9.50	
CBS CORP	CBS	1.18	12.50	13.68
CENTURYLINK INC	CTL	6.28		
CLIFFS NATURAL RESOURCES INC	CLF			
CMS ENERGY CORP	CMS	4.79	6.00	10.79
CONSTELLATION ENERGY GRP INC	CEG	3.44	9.90	13.34
COVENTRY HEALTH CARE INC	CVH		10.00	
CSX CORP	CSX	1.84	14.00	15.84
DIRECTV	DTV		28.00	
DISCOVER FINANCIAL SVCS INC	DFS	0.45	5.00	5.45
DISCOVERY COMMUNICATIONS INC	DISCA		21.30	
DOW CHEMICAL	DOW	1.88	7.00	8.88
EDISON INTERNATIONAL	EIX	3.48	5.00	8.48
EXPEDIA INC	EXPE	1.28	15.00	16.28
FIRST HORIZON NATIONAL CORP	FHN		7.50	
FIRSTENERGY CORP	FE	6.00	1.00	7.00
FISERV INC	FISV		11.00	
FORTUNE BRANDS INC	FO	1.45	15.00	16.45
FREEPORT-MCMORAN COP&GOLD	FCX	1.06	6.10	7.16
HEALTH CARE REIT INC	HCN	6.03	4.00	10.03
HUMANA INC	HUM		7.50	
L-3 COMMUNICATIONS HLDGS INC	LLL	2.50	10.00	12.50
LEXMARK INTL INC -CL A	LXK		(4.10)	
LORILLARD INC	LO	5.81	6.00	11.81
MARSH & MCLENNAN COS	MMC	3.41	11.00	14.41
MOLSON COORS BREWING CO	TAP	2.43	8.70	11.13
NATIONAL SEMICONDUCTOR CORP	NSM	3.14	8.00	11.14
NEWELL RUBBERMAID INC	NWL	1.20	9.00	10.20
NEWFIELD EXPLORATION CO	NFX		9.00	
NISOURCE INC	NI	5.43	4.00	9.43
PINNACLE WEST CAPITAL CORP	PNW	5.40	6.50	11.90
PLUM CREEK TIMBER CO INC	PCL	4.58	2.00	6.58
PRICELINE.COM INC	PCLN		20.00	
PROLOGIS	PLD	5.11	64.00	69.11
REYNOLDS AMERICAN INC	RAI	6.47	7.75	14.22
ROPER INDUSTRIES INC/DE	ROP	0.57	15.50	16.07
ROWAN COS INC	RDC		11.35	
SLM CORP	SLM		10.00	
SOUTHWESTERN ENERGY CO	SWN		12.25	

All Companies in S&P 500 with "BBB-" Rated Debt (cont.)

DCF Indicator (S&P Data) - January 1, 2011

Company Name	Ticker	Current Yield	EPS Growth	DCF
SUNOCO INC	SUN	1.73	16.00	17.73
TEXTRON INC	TXT	0.49	45.50	45.99
UNUM GROUP	UNM	1.67	9.50	11.17
VENTAS INC	VTR			
VULCAN MATERIALS CO	VMC	2.45	8.50	10.95
WEYERHAEUSER CO	WY	1.08	2.50	3.58
WHIRLPOOL CORP	WHR	2.50	29.30	31.80
WILLIAMS COS INC	WMB	2.31	14.25	16.56
WYNDHAM WORLDWIDE CORP	WYN	1.70	6.00	7.70
XEROX CORP	XRX	1.46	(1.00)	
XILINX INC	XLNX	2.54	15.00	17.54
YUM BRANDS INC	YUM	2.28	12.00	14.28
ZIONS BANCORPORATION	ZION	0.18	8.00	8.18
	Average	2.83	12.34	14.62
	Median	2.43	9.50	11.86

Source: *S&P Compustat*, January 2011.

Risk Premium Method

The risk premium method is a standard method of estimating the cost of equity (K_e) based on the formula in Figure 3. This method sums two elements of risk — a risk free rate, which is the price of time (the reward for deferring consumption and for not exposing funds to risk), and a risk premium, which is the additional reward for assuming risk. The nominal risk free rate includes the real risk free rate and an inflation premium. The risk premium includes an interest rate risk, business risk, financial risk, and liquidity risk. All of these elements are included when calculating equity cost by the risk premium method.

$$K_e = R_f + R_p$$

where

K_e = *Cost of equity*
R_f = *Risk free rate*
R_p = *Risk premium*

Figure 3

Our risk premium calculations included computations for two categories of risk premium indicators — general indicators and indicators for specific groups. The *Value Line* natural gas (diversified) group; the *Value Line* oil/gas distribution group plus the *Value Line* Pipeline MLPs; the *Value Line* natural gas (diversified) group combined with the *Value Line* oil/gas distribution group and the *Value Line* Pipeline MLPs (large companies); the *Value Line* MLPs; the interstate natural gas pipeline forum group (traded) that are heavily involved with pipelines and the screened comparables group. Our ex post risk premiums were derived from the *2011 Valuation Edition* of *Stocks, Bonds, Bills and Inflation* (SBBI),. The SBBI risk premium was cross-checked for reasonableness by information from *Value Line*.[41] Our ex ante risk premium was derived from the market-weighted expected cost of capital for the *S&P 500* less the current 20-year Treasury bond rate Our relevant current 'safe rates' for the general indicators were derived from

---

[41] In an effort to check the long-term risk premium of 6.7% from SBBI published by Morningstar, Inc., we performed our own calculations to confirm or deny the reasonableness of this figure. The SBBI risk premium figure is supported by our own calculations of risk premium by using the CAPM formula in Figure A. From *Value Line* we know the market average return on all the stocks in their database is 11.93% and that the 5-year beta is 1.09 for the full database (see statistics for full database, *Value Line* CD ROM, January 2011). Further, we know the long-term treasury bond rate was 4.18% at January 1, 2011. Therefore, we can substitute all the known elements into the CAPM formula and solve for RP as shown in Figure B. The result of this calculation is a risk premium indicator of 7.11%, which well supports the SBBI long-term government bond risk premium of 6.7%.

$$K_e = R_f + \beta(R_p)$$

Figure A

Solve for R_p

$$R_p = \frac{K_e - R_f}{\beta}$$

$$R_p = \frac{0.1193 - 0.0418}{1.09}$$

$$R_p = 0.0711$$

Figure B

the sources footnoted below.[42] The 'safe rates' (or base rates) used for each company within the company groupings were the average yields to maturity for the long-term debt (20+ years to maturity) of each company in *Mergent Bond Record* database (January, 2011). The average yield to maturity for each company's bonds was added to the *SBBI* corporate bond risk premium of 5.7% to obtain an individual estimate for each company in the group. Thus, the risk premium indicators for the individual groups are specific for each company within the group and, thus, as individualized as possible for each company.

The general Risk Premium (or equity build-up method) indicators, using the risk premium from *SBBI* published by Morningstar, indicates a cost of equity capital of 10.88% (ex post) and 13.27% (ex ante).

The range for all calculations of risk premium indicators using the indicators by specific company groups are between 11.45% and 12.76%. This measurement included the use of average and median long-term yields to maturity for company bonds with at least 20 years to maturity plus the corporate bond risk premium of 5.7%. A reasonable view of these results would indicate a risk premium correlated indicator for the specific companies to be approximately 12.00%.

For the general indicators discussed on the previous page the ex post and ex ante indicators using the long-term government bonds are deemed appropriate because a purchase of an interstate natural gas pipeline company is considered a long-term commitment of capital, and thus the long-term bond risk premium should be indicative of the cost of long-term equity capital for the typical company. These indicators together would support a cost of equity of 12.00%.

The long-term bond risk premium indicators are well supported by the estimates derived from the specific indicators from the yields to maturity of all of the groups of interstate natural gas pipeline industry bonds with 20 years or more to maturity. We believe the appropriate cost of equity for the typical interstate natural gas pipeline by the risk premium method as of January 1, 2011, is **12.00%**. This conclusion gives weight and consideration to all indicators. A summary of the cost of equity indicators by the risk premium method (or equity build-up method) is below and the supporting data begins on the following page.

Risk Premium Indicators - January 1, 2011

General Risk Premium Indicators

Indicators	Rates		Indicator
	Rf	Rp	
20-Year Treasury Bonds (ex post indicator)	4.18	6.70	10.88
20-Year Treasury Bonds (ex ante indicator)	4.18	9.09	13.27

[42] Morningstar, *2011 SBBI & 2011 Ibbotson Risk Premia Over Time Report* and The Federal Reserve, Jan. 3, 2011.

Risk Premium Indicators by Groups

Indicators	Risk Premium	
	Average	Median
VL Natural Gas Diversified Industry (All)	11.62	11.45
VL Oil/Gas Distribution (All + MLPs)	12.76	12.27
VL Natural Gas Diversified & Oil/Gas Dist./MLP (Large)	12.42	12.25
Value Line Pipeline MLPs	12.41	12.27
Interstate Nat. Gas Pipeline Forum Group (Pipes)	12.62	12.18
Screened Comparables Group	12.00	11.85
Average	12.31	12.05

Risk Premium Formula: Ke = Rf + Rp

Base Rate: Yield to maturity on each company's long-term bonds, *Mergent Bond Record*, Jan. 2011. Risk Premium: *SBBI*, Morningstar, 2011 Corporate Bond RP of 5.7%.

Summary Statistics of Annual Returns: Basic Series (in percent)
2011 Ibbotson SBBI Valuation Yearbook: Table 2-1, (page 23)
From 1926 to 2010

Series	Geometric Mean	Arithmetic Mean	Standard Deviation
Large Company Stocks			
Total Returns[1]	9.9	11.9	20.4
Income	4.1	4.1	1.6
Capital Appreciation	5.5	7.5	19.7
Ibbotson Small Company Stocks			
Total Returns	12.1	16.7	32.6
Mid-Cap Stocks [2, 5]			
Total Returns	11.0	13.9	24.9
Income	3.9	3.9	1.7
Capital Appreciation	6.9	9.7	24.2
Low-Cap Stocks [3, 5]			
Total Returns	11.5	15.4	29.3
Income	3.6	3.6	2.0
Capital Appreciation	7.7	11.6	28.6
Micro-Cap Stocks [4, 5]			
Total Returns	12.3	18.4	39.0
Income	2.5	2.5	1.7
Capital Appreciation	9.7	15.7	38.4
Long-Term Corporate Bonds			
Total Returns	5.9	6.2	8.3
Long-Term Government Bonds			
Total Returns	5.5	5.9	9.5
Income	5.1	5.2	2.7
Capital Appreciation	0.1	0.5	8.4
Intermediate-Term Government Bonds			
Total Returns	5.4	5.5	5.7
Income	4.6	4.7	2.9
Capital Appreciation	0.6	0.7	4.5
Treasury Bills			
Total Returns	3.6	3.7	3.1
Inflation	3.0	3.1	4.2

[1] Total return is equal to the sum of three component returns: income return, capital appreciation return, and reinvestment return.
[2] Mid-Cap stocks are represented here by CRSP NYSE/AMEX/NASDAQ deciles 3-5.
[3] Low-Cap stocks are represented here by CRSP NYSE/AMEX/NASDAQ deciles 6-8.
[4] Micro-Cap stocks are represented here by CRSP NYSE/AMEX/NASDAQ deciles 9-10.
[5] Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2010 Center for Research in Security Price (CRSP®). The University of Chicago Booth School of Business. Used with permission.

Value Line Natural Gas Diversified Industry (All)
Yield to Maturity for Long-Term Debt - January 1, 2011

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
ATP Oil & Gas Corp	ATPG	Caa2	20		
Cabot Oil & Gas 'A'	COG				
Callon Pete Co	CPE				
Chesapeake Energy	CHK	Ba3	15	5.37	11.07
Cimarex Energy	XEC	Ba3	15		
Crosstex Energy	XTXI	B3	18		
Crosstex Energy LP	XTEX				
Delta Natural Gas	DGAS				
Devon Energy	DVN	Baa1	10	5.75	11.45
EOG Resources	EOG	A3	9		
EQT Corp.	EQT	Baa1	10		
Eagle Rock Energy Partners Ltd	EROC				
Energen Corp.	EGN	Baa3	12		
MDU Resources	MDU	Baa3	12	4.85	10.55
Markwest Energy Partners LP	MWE	B1	16		
National Fuel Gas	NFG	Baa1	10		
ONEOK Partners LP	OKS	Baa2	11	6.29	11.99
Penn Virginia Corp.	PVA	B2	17		
Petroleum Development Corp.	PETD	B3	18		
Questar Corp.	STR	A3	9	7.34	13.04
Quicksilver Res.	KWK	B2	17		
Southwestern Energy	SWN	Ba1	13		
	Average	Baa3	14	5.92	11.62
	Median	Baa2	13	5.75	11.45

* Yield to Maturity for bonds with 20+ years to maturity. Source: *Mergent Database*, Jan. 2011.

Value Line Oil/Gas Distribution Industry (All + MLPs)
Yield to Maturity for Long-Term Debt - January 1, 2011

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
Boardwalk Pipeline	BWP	Baa2	11		
Buckeye Partners L.P.	BPL	Baa2	11	6.31	12.01
El Paso Corp.	EP	Ba3	15	10.25	15.95
El Paso Pipeline	EPB	Ba1	13	7.74	13.44
Enbridge Energy Partners LLP	EEP	Baa2	11	6.8	12.50
Enbridge Inc.	ENB.TO	Baa1	10		
Energy Transfer	ETP	Baa3	12	6.57	12.27
Enterprise Products	EPD	Baa3	12	7.07	12.77
Inergy L.P.	NRGY	Ba3	15		
Kinder Morgan Energy	KMP	Baa2	11	6.57	12.27
Magellan Midstream	MMP	Baa2	11		
ONEOK Inc.	OKE	Baa2	11	6.38	12.08
Plains All Amer. Pipe.	PAA	Baa3	12	6.52	12.22
Southern Union	SUG	Baa3	12	8.63	14.33
Spectra Energy	SE	Baa2	11	6.59	12.29
Suburban Propane	SPH				
Williams Cos.	WMB	Baa3	12	6.21	11.91
Williams Partners L.P.	WPZ	Baa3	12	6.16	11.86
	Average	Baa3	12	7.06	12.76
	Median	Baa3	12	6.57	12.27

* Yield to Maturity for bonds with 20+ years to maturity. Source: *Mergent Database*, Jan. 2011.

VL Natural Gas Diversified & Oil/Gas Distribution/MLP - Large
Yield to Maturity for Long-Term Debt - January 1, 2011

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
Boardwalk Pipeline	BWP	Baa2	11		
Buckeye Partners L.P.	BPL	Baa2	11	6.31	12.01
Cabot Oil & Gas 'A'	COG				
Chesapeake Energy	CHK	Ba3	15	5.37	11.07
Cimarex Energy	XEC	Ba3	15		
Crosstex Energy	XTXI	B3	18		
Crosstex Energy LP	XTEX				
Devon Energy	DVN	Baa1	10	5.75	11.45
EOG Resources	EOG	A3	9		
EQT Corp.	EQT	Baa1	10		
El Paso Corp.	EP	Ba3	15	10.25	15.95
Enbridge Energy Partners LLP	EEP	Baa2	11	6.8	12.50
Enbridge Inc.	ENB.TO	Baa1	10		
Energen Corp.	EGN	Baa3	12		
Energy Transfer	ETP	Baa3	12	6.57	12.27
Enterprise Products	EPD	Baa3	12	7.07	12.77
Inergy L.P.	NRGY	Ba3	15		
Kinder Morgan Energy	KMP	Baa2	11	6.57	12.27
MDU Resources	MDU	Baa3	12	4.85	10.55
Magellan Midstream	MMP	Baa2	11		
National Fuel Gas	NFG	Baa1	10		
ONEOK Inc.	OKE	Baa2	11	6.38	12.08
ONEOK Partners LP	OKS	Baa2	11	6.29	11.99
Penn Virginia Corp.	PVA	B2	17		
Plains All Amer. Pipe.	PAA	Baa3	12	6.52	12.22
Questar Corp.	STR	A3	9	7.34	13.04
Quicksilver Res.	KWK	B2	17		
Southern Union	SUG	Baa3	12	8.63	14.33
Southwestern Energy	SWN	Ba1	13		
Spectra Energy	SE	Baa2	11	6.59	12.29
Suburban Propane	SPH				
Williams Cos.	WMB	Baa3	12	6.21	11.91
	Average	Baa3	12	6.72	12.42
	Median	Baa3	12	6.55	12.25

* Yield to Maturity for bonds with 20+ years to maturity. Source: Mergent Database, Jan. 2011.

Interstate Natural Gas Pipeline Forum (Pipelines)
Yield to Maturity for Long-Term Debt - January 1, 2011

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
Boardwalk Pipeline	BWP	Baa2	11		
CenterPoint Energy	CNP	Ba1	13		
El Paso Corp.	EP	Ba3	15	10.25	15.95
El Paso Pipeline	EPB	Ba1	13	7.74	13.44
Kinder Morgan Energy	KMP	Baa2	11	6.57	12.27
MDU Resources	MDU	Baa3	12	4.85	10.55
National Fuel Gas	NFG	Baa1	10		
ONEOK Inc.	OKE	Baa2	11	6.38	12.08
ONEOK Partners LP	OKS	Baa2	11	6.29	11.99
Questar Corp.	STR	A3	9	7.34	13.04
Southern Union	SUG	Baa3	12	8.63	14.33
Spectra Energy	SE	Baa2	11	6.59	12.29
TransCanada Corp.	TRP	A3	9	6.03	11.73
Williams Cos.	WMB	Baa3	12	6.21	11.91
Williams Partners L.P.	WPZ	Baa3	12	6.16	11.86
	Average	Baa2	11	6.92	12.62
	Median	Baa2	11	6.48	12.18

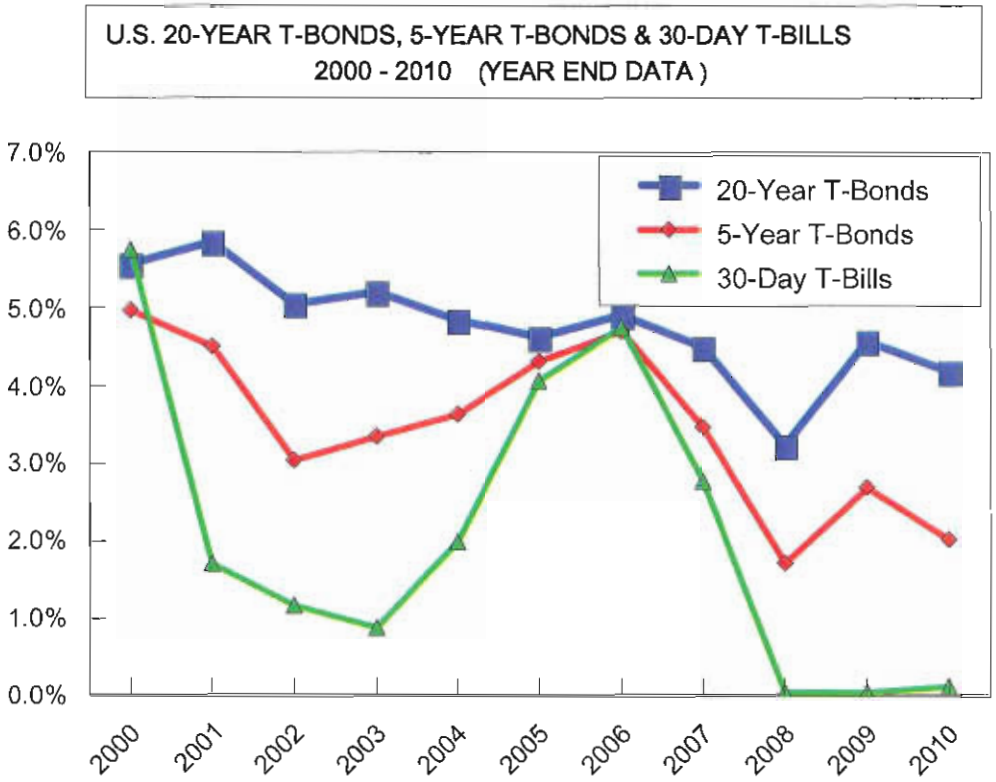
* Yield to Maturity for bonds with 20+ years to maturity. Source: *Mergent Database*, Jan. 2011.

Pipeline Screened Comparables Group
Yield to Maturity for Long-Term Debt - January 1, 2011

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
Allegheny Energy	AYE	Baa3	12	7.13	12.83
Avista Corp.	AVA	Baa1	10	6.12	11.82
Black Hills	BKH	A3	9	6.17	11.87
EQT Corp.	EQT	Baa1	10		
G't Plains Energy KCP&L)	GXP	Baa2	11	5.62	11.32
NiSource Inc.	NI	Baa3	12	6.43	12.13
NorthWestern Corp	NWE	A3	9		
Portland General	POR	A3	9	4.26	9.96
Southern Union	SUG	Baa3	12	8.63	14.33
Southwest Gas	SWX	Baa2	11		
TECO Energy (Tampa Electric)	TE	Baa1	10	6.02	11.72
	Average	Baa2	10	6.30	12.00
	Median	Baa2	10	6.15	11.85

* Yield to Maturity for bonds with 20+ years to maturity. Source: *Mergent Database*, Jan. 2011.

US 20-Year T-Bonds, 5-Year T-Bonds, and 30-Day T-Bills



Year End Date	20-Year T-Bonds	5 -Year T-Bonds	30-DAY T-Bills
2000	5.58%	4.98%	5.76%
2001	5.86%	4.52%	1.70%
2002	5.05%	3.05%	1.18%
2003	5.21%	3.36%	0.88%
2004	4.84%	3.64%	1.99%
2005	4.62%	4.30%	4.05%
2006	4.91%	4.70%	4.75%
2007	4.50%	3.45%	2.76%
2008	3.22%	1.72%	0.04%
2009	4.58%	2.69%	0.04%
2010	4.18%	2.02%	0.11%

Source: WSJ, first issue of each respective year & Fed. Reserve.

Capital Asset Pricing Model

The capital asset pricing model (CAPM) is a generally accepted method of estimating the cost of equity (K_e) based on the formula shown in Figure 4. It is the preferred method of estimating the cost of equity by many analysts *(it is recommended by Morningstar in their SBBI publication)*. The CAPM method is much like the risk premium method, however the risk premium is adjusted by beta before it is added to the appropriate risk level. The two elements of risk are a risk free rate, which is the price of time (the reward for postponing consumption and for not exposing funds to risk), and a risk premium, which is the additional compensation for assuming risk. The nominal risk free rate includes the real risk free rate and an inflation premium. The risk premium includes an interest rate risk, business risk, financial risk, and liquidity risk. All of these elements are accounted for when we calculate the cost of equity using the CAPM method.

$$K_e = R_f + \beta R_p$$

where

K_e = *Cost of equity*
R_f = *Risk free rate*
β = *Beta*
R_p = *Risk premium*

Figure 4

Our *ex post* CAPM calculations were based upon the long-term risk premium using the entire period data provided by Morningstar, which includes data from 1926 through 2010. The indicated cost of equity by this method was 11.22% at January 1, 2011. Our *ex ante* CAPM calculations were based upon the expected risk premium of 9.09% derived from the market-weighted average of the cost of equity capital less the current long-term Treasury bond rate. The indicated cost of equity by this method was 13.72% at January 1, 2011.

Our 'safe rates' for the CAPM calculations were derived as described in the risk premium method discussed earlier. Our beta estimate of 1.05 was based on observing the average and median betas from each of the groups. The average and median betas are shown in Figure 5. The calculated forward-looking (*ex ante*) CAPM indicator was found by deriving an expected

Group of Companies	Avg.	Med.
Value Line Betas VL Nat Gas Diver. (all)	1.33	1.20
VL Oil/Gas Dist. + MLPs	0.93	0.88
VL Nat Gas Diver & Oil Gas Dist. + MLPs (large)	1.12	1.05
VL Pipeline MLPs	0.85	0.85
Nat Gas PL Forum (pipes)	0.98	0.95
S&P Screened Comps.	0.85	0.80
S&P 500 BBB- rated debt	1.13	1.10

Figure 5 - Value Line Betas

risk premium from the S&P 500 companies. The *ex ante* CAPM indicator is a good check on the reliability of the standard CAPM because it is forward looking. All prospective investment in interstate natural gas pipeline companies is based on an expectation of future benefits. This is consistent with the fundamental principle underlying the income approach, which is the principle of anticipation. Further, this *ex ante* method is discussed in the *Cost of Capital* as follows:

> The ex ante risk premium is a forward looking premium. The Gordon Growth Model is applied to determine the resulting risk premium. The premium is determined by first estimating the cost of equity for the proxy market. The proxy market is a market large enough to remove the effects of non-diversification. Typically, the S&P 500 or the NYSE is used as this proxy...
>
> The first step in deriving the ex ante risk premium is to use a single-stage discounted cash flow analysis (otherwise known as the Gordon Growth Model) to calculate the cost of equity for the market proxy, (i.e., the S&P 500). The cost of equity is calculated by using the most recent I/B/E/S consensus long-term growth rates for each firm in the S&P 500 and adding it to the dividend growth yield. I/B/E/S is a service that polls analysts about their growth estimates for individual stocks. The dividend yield for the S&P 500 should be an estimate for Year 1's dividend (D_1). D_1 can be estimated by multiplying the S&P 500's current weighted average dividend yield (D_0) by 1 plus its weighted average long-term earnings growth rate. By adding the weighted average long-term growth rate to the dividend yield at the end of Year 1, the cost of equity is estimated. If for example, the long-term growth rate is equal to 10% and the current dividend yield is 4%, then the cost of equity is (4% x 1.1) + 10%, or 14.40 %. This can also be described in the following formula:

$$K_{e500} = DY \; x \; (1 + g) + g$$

Where:	DY	=	dividend yield
	G	=	long-term growth
	K_{e500}	=	cost of equity for the S&P 500

> The second step is to calculate the risk premium of the S&P 500 (RP_{500}). For the CAPM, the ex ante risk premium is calculated by subtracting the risk-free rate (R_f), from the cost of equity for the S&P 500. For the build up method, the

ex ante risk premium is calculated by subtracting the weighted average bond yield for the S&P 500 from the cost of equity for the S&P 500.[43]

$$RP_{500} = K_{e500} - R_f$$

In order to perform the *ex ante* CAPM indicator we derived the expected cost of equity for the companies making up the *S&P 500* (which are expected to pay dividends). We developed the weighted average cost of capital (weighted by market value) for the *S&P 500*, which was 13.27%. We then subtracted the current long-term Treasury bond rate of 4.18% to obtain the expected equity risk premium of 9.09%. The market-weighted average is appropriate because the monthly fundamental beta is estimated based upon the sensitivity of a company's stock price to the overall fluctuation in the *S&P 500* index price (with the *S&P 500* being the surrogate for the market in general). The market-weighted average gives most weight to the highest market value stocks and is a very good indicator of the central tendency of the overall market cost of capital.

The general CAPM indicator, using the risk premium from *SBBI* published by Morningstar and the pipeline industry beta of 1.05, indicates a cost of equity capital of 11.22%. To help determine the reasonableness of the general historical or *ex post* indicator we also computed an *ex ante* or forward-looking CAPM indicator. The *ex ante* CAPM indication of the cost of equity was 13.72%.

Based upon the analysis presented and considering all the relevant facts, we believe the appropriate cost of equity capital indicated by the CAPM method is **12.00%** of January 1, 2011. This conclusion gives weight and consideration to both indicators. A summary of the CAPM indicators and the supporting data begins below and on the following page.

Summary of CAPM Indicators - January 1, 2010

Item	Rates			CAPM Indicator
	Rf	Rp	Beta	
CAPM Indicator *				
Long-Term Gov't Bonds (ex post)	4.18	6.70	1.05	11.22
Long-Term Gov't Bonds (ex ante)	4.18	9.09	1.05	13.72

CAPM Formula: Ke = Rf + B(Rp)

* CAPM Indicator is based upon a *Value Line* beta of 1.05. Morningstar, *2011 SBBI & Risk Premia over Time Report*;, & Federal Reserve data January 3, 2011.

[43] Pratt, Shannon P. *Cost of Capital, Estimation and Applications*, (NY: John Wiley & Sons, Inc. 1998) p. 178.

Correlation of the ex post and ex ante CAPM indicators using long-term government bonds as the 'safe rate' indicates a cost of equity of 12.00% for the Interstate Natural Gas Pipelines as of January 1, 2011.

Beginning on the following page are the *Value Line* betas for the various companies in the Natural Gas Diversified Industry (all), Natural Gas Diversified Industry (large), and the Interstate Natural Gas Pipeline Forum (Pipeline) groups. Shown after the betas for the various groups are the calculations for the *ex ante* CAPM with supporting data from *Standard & Poor's Compustat*.

Value Line Natural Gas Diversified Ind. (All)
Beta (Value Line) - January 1, 2011

Company Name	Ticker	Beta
ATP Oil & Gas Corp	ATPG	1.95
Cabot Oil & Gas 'A'	COG	1.30
Callon Pete Co	CPE	1.85
Chesapeake Energy	CHK	1.35
Cimarex Energy	XEC	1.25
Crosstex Energy	XTXI	2.30
Crosstex Energy LP	XTEX	1.75
Delta Natural Gas	DGAS	0.60
Devon Energy	DVN	1.20
EOG Resources	EOG	1.15
EQT Corp.	EQT	1.15
Eagle Rock Energy Partners Ltd	EROC	1.05
Energen Corp.	EGN	1.10
MDU Resources	MDU	1.05
Markwest Energy Partners LP	MWE	1.20
National Fuel Gas	NFG	0.95
ONEOK Partners LP	OKS	0.85
Penn Virginia Corp.	PVA	1.50
Petroleum Development Corp.	PETD	1.55
Questar Corp.	STR	
Quicksilver Res.	KWK	1.70
Southwestern Energy	SWN	1.15
	Average	1.33
	Median	1.20

Source: *Value Line*, January 2011.

Value Line Oil/Gas Distribution Industry (All + MLPs)
Beta (Value Line) - January 1, 2011

Company Name	Ticker	Beta
Boardwalk Pipeline	BWP	0.85
Buckeye Partners L.P.	BPL	0.85
El Paso Corp.	EP	1.40
El Paso Pipeline	EPB	0.75
Enbridge Energy Partners LLP	EEP	0.90
Enbridge Inc.	ENB.TO	0.65
Energy Transfer	ETP	0.80
Enterprise Products	EPD	0.85
Inergy L.P.	NRGY	1.00
Kinder Morgan Energy	KMP	0.75
Magellan Midstream	MMP	0.90
ONEOK Inc.	OKE	0.95
Plains All Amer. Pipe.	PAA	0.85
Southern Union	SUG	1.05
Spectra Energy	SE	1.00
Suburban Propane	SPH	0.75
Williams Cos.	WMB	1.30
Williams Partners L.P.	WPZ	1.05
	Average	0.93
	Median	0.88

Source: *Value Line*, January 2011.

VL Nat. Gas Diversified & Oil/Gas Dist./MLP - Large Beta (Value Line) - January 1, 2011

Company Name	Ticker	Beta
Boardwalk Pipeline	BWP	0.85
Buckeye Partners L.P.	BPL	0.85
Cabot Oil & Gas 'A'	COG	1.30
Chesapeake Energy	CHK	1.35
Cimarex Energy	XEC	1.25
Crosstex Energy	XTXI	2.30
Crosstex Energy LP	XTEX	1.75
Devon Energy	DVN	1.20
EOG Resources	EOG	1.15
EQT Corp.	EQT	1.15
El Paso Corp.	EP	1.40
Enbridge Energy Partners LLP	EEP	0.90
Enbridge Inc.	ENB.TO	0.65
Energen Corp.	EGN	1.10
Energy Transfer	ETP	0.80
Enterprise Products	EPD	0.85
Inergy L.P.	NRGY	1.00
Kinder Morgan Energy	KMP	0.75
MDU Resources	MDU	1.05
Magellan Midstream	MMP	0.90
National Fuel Gas	NFG	0.95
ONEOK Inc.	OKE	0.95
ONEOK Partners LP	OKS	0.85
Penn Virginia Corp.	PVA	1.50
Plains All Amer. Pipe.	PAA	0.85
Questar Corp.	STR	
Quicksilver Res.	KWK	1.70
Southern Union	SUG	1.05
Southwestern Energy	SWN	1.15
Spectra Energy	SE	1.00
Suburban Propane	SPH	0.75
Williams Cos.	WMB	1.30
	Average	1.12
	Median	1.05

Source: *Value Line*, January 2011.

Value Line Pipeline MLPs
Beta (Value Line) - January 1, 2011

Company Name	Ticker	Beta
Boardwalk Pipeline	BWP	0.85
Buckeye Partners L.P.	BPL	0.85
El Paso Pipeline	EPB	0.75
Energy Transfer	ETP	0.80
Enterprise Products	EPD	0.85
Inergy L.P.	NRGY	1.00
Kinder Morgan Energy	KMP	0.75
Magellan Midstream	MMP	0.90
Plains All Amer. Pipe.	PAA	0.85
Suburban Propane	SPH	0.75
Williams Partners L.P.	WPZ	1.05
	Average	0.85
	Median	0.85

Source: *Value Line*, January 2011.

Interstate Nat. Gas PL Forum (Pipelines)
Beta (Value Line) - January 1, 2011

Company Name	Ticker	Beta
Boardwalk Pipeline	BWP	0.85
CenterPoint Energy	CNP	0.80
El Paso Corp.	EP	1.40
El Paso Pipeline	EPB	0.75
Kinder Morgan Energy	KMP	0.75
MDU Resources	MDU	1.05
National Fuel Gas	NFG	0.95
ONEOK Inc.	OKE	0.95
ONEOK Partners LP	OKS	0.85
Questar Corp.	STR	
Southern Union	SUG	1.05
Spectra Energy	SE	1.00
TransCanada Corp.	TRP	0.90
Williams Cos.	WMB	1.30
Williams Partners L.P.	WPZ	1.05
	Average	0.98
	Median	0.95

Source: *Value Line*, January 2011.

Pipeline Screened Comparables Group
Beta (Value Line) - January 1, 2011

Company Name	Ticker	Beta
Allegheny Energy	AYE	0.95
Avista Corp.	AVA	0.70
Black Hills	BKH	0.80
EQT Corp.	EQT	1.15
G't Plains Energy	GXP	0.75
NiSource Inc.	NI	0.85
NorthWestern Corp	NWE	0.70
Portland General	POR	0.75
Southern Union	SUG	1.05
Southwest Gas	SWX	0.75
TECO Energy	TE	0.85
	Average	0.85
	Median	0.80

Source: *Value Line*, January 2011.

All Companies in S&P 500 with "BBB-" Rated Debt

Beta (Value Line) - January 1, 2011

Company Name	Ticker	Beta
Agilent Technologies	A	1.10
Alcoa Inc.	AA	1.45
Allegheny Energy	AYE	0.95
Allegheny Techn.	ATI	1.55
Ameren Corp.	AEE	0.80
Anadarko Petroleum	APC	1.25
Best Buy Co.	BBY	1.10
Boston Scientific	BSX	1.00
CareFusion Corp.	CFN	
CBS Corp. 'B'	CBS	1.50
CenturyLink Inc.	CTL	0.70
Cliffs Natural Res.	CLF	2.00
CMS Energy Corp.	CMS	0.75
Constellation Energy	CEG	0.80
Coventry Health Care	CVH	1.25
CSX Corp.	CSX	1.25
DIRECTV	DTV	0.90
Discover Fin'l Svcs.	DFS	1.40
Discovery Communic.	DISCA	0.90
Dow Chemical	DOW	1.20
Edison Int'l	EIX	0.80
Expedia Inc.	EXPE	1.20
First Horizon National	FHN	1.15
FirstEnergy Corp.	FE	0.80
Fiserv Inc.	FISV	0.95
Fortune Brands	FO	1.10
Freep't-McMoRan C&G	FCX	1.75
Health Care REIT	HCN	0.85
Humana Inc.	HUM	1.05
L-3 Communic.	LLL	0.90
Lexmark Int'l `A'	LXK	0.90
Lorillard Inc.	LO	0.55
Marsh & McLennan	MMC	0.75
Molson Coors Brewing	TAP	0.60
National Semic.	NSM	1.05
Newell Rubbermaid	NWL	1.20
Newfield Exploration	NFX	1.35
NiSource Inc.	NI	0.85
Pinnacle West Capital	PNW	0.70
Plum Creek Timber	PCL	1.00
priceline.com	PCLN	1.00
Prologis	PLD	1.90

All Companies in S&P 500 with "BBB-" Rated Debt

Beta (Value Line) - January 1, 2011

Company Name	Ticker	Beta
Reynolds American	RAI	0.60
Roper Inds.	ROP	1.05
Rowan Cos.	RDC	1.50
SLM Corporation	SLM	1.55
Southwestern Energy	SWN	1.15
Sunoco Inc.	SUN	1.05
Textron Inc.	TXT	1.65
Unum Group	UNM	1.35
Ventas Inc	VTR	1.15
Vulcan Materials	VMC	1.15
Weyerhaeuser Co.	WY	
Whirlpool Corp.	WHR	1.25
Williams Cos.	WMB	1.30
Wyndham Worldwide	WYN	1.95
Xerox Corp.	XRX	1.25
Xilinx Inc.	XLNX	0.90
Yum! Brands	YUM	0.95
Zions Bancorp.	ZION	1.45
	Average	1.13
	Median	1.10

Source: *Value Line*, January 2011.

Cost of Equity Indication Using Expected Risk Premium

Weighted Average Cost of Equity for S&P 500 = Market Required Cost of Equity

CAPM Calculations:

S&P 500 Expected Equity Cost (Wt. Avg)	13.27		**LT Gov't.**		**Cost of Equity by**	
Current Yield on L-T Gov't. Bonds	4.18		**Bond Yield**		**CAPM**	
Expected Equity Risk Premium	9.09					
Beta	1.05					
Adjusted Risk Premium	9.54	+	4.18	=	13.72	*Ex Ante*

Note: Forward-looking CAPM (Ex Ante) uses the weighted average expected return on the S&P 500 as the expected market return. The current US Government bond yield is deducted from the weighted average expected return to obtain the expected risk premium. The current beta is applied to the expected risk premium and the result is added to the current US Government bond yield to obtain the indicated cost of equity by the CAPM method.

(Calculations for expected market return for S&P 500 can be found on the following pages.)

Source: *Standard & Poor's Compustat* (January 2011)

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2011						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
3M CO	2.35	86.30	2.72	11.85	14.57	61,692.33
ABBOTT LABORATORIES	1.91	47.91	3.99	8.70	12.69	74,060.05
ABERCROMBIE & FITCH -CL A	0.83	57.63	1.43	18.00	19.43	5,062.56
ACE LTD	1.45	62.25	2.33	10.00	12.33	21,127.03
AETNA INC	0.04	30.51	0.14	10.00	10.14	12,207.05
AFLAC INC	1.35	56.43	2.39	12.50	14.89	26,593.26
AIR PRODUCTS & CHEMICALS INC	2.17	90.95	2.39	10.70	13.09	19,504.50
AIRGAS INC	1.13	62.46	1.81	13.00	14.81	5,251.26
ALLEGHENY ENERGY INC	0.61	24.24	2.50	1.00	3.50	4,119.32
ALLERGAN INC	0.23	68.67	0.33	15.00	15.33	21,116.85
ALLSTATE CORP	0.88	31.88	2.76	10.00	12.76	17,157.31
ALTERA CORP	0.28	35.58	0.78	15.00	15.78	11,120.99
ALTRIA GROUP INC	1.62	24.62	6.57	6.35	12.92	51,402.30
AMERICAN ELECTRIC POWER CO	1.91	35.98	5.32	4.00	9.32	17,280.33
AMERICAN EXPRESS CO	0.79	42.92	1.85	10.00	11.85	51,665.55
AMERISOURCEBERGEN CORP	0.45	34.12	1.32	12.50	13.82	9,394.16
AMPHENOL CORP	0.07	52.78	0.13	15.30	15.43	9,216.02
ANADARKO PETROLEUM CORP	0.43	76.16	0.57	20.20	20.77	37,744.29
ANALOG DEVICES	0.99	37.67	2.63	12.50	15.13	11,250.26
AON CORP	0.64	46.01	1.39	6.50	7.89	15,179.39
APACHE CORP	0.66	119.23	0.55	9.30	9.85	43,470.18
APARTMENT INVST & MGMT CO	0.43	25.84	1.66	7.00	8.66	3,024.16
APPLIED MATERIALS INC	0.31	14.05	2.23	11.65	13.88	18,653.97
ARCHER-DANIELS-MIDLAND CO	0.65	30.08	2.15	7.80	9.95	19,217.90
ASSURANT INC	0.70	38.52	1.81	9.00	10.81	4,104.46
AT&T INC	1.78	29.38	6.06	5.95	12.01	173,635.80
AUTOMATIC DATA PROCESSING	1.58	46.28	3.42	10.00	13.42	22,825.85
AVALONBAY COMMUNITIES INC	3.78	112.55	3.36	6.00	9.36	9,598.83
AVERY DENNISON CORP	0.88	42.34	2.07	9.50	11.57	4,632.72
AVON PRODUCTS	0.98	29.06	3.38	11.50	14.88	12,471.97
BAKER HUGHES INC	0.70	57.17	1.22	16.00	17.22	24,655.94
BALL CORP	0.45	68.05	0.66	11.70	12.36	6,010.24
BANK OF AMERICA CORP	0.04	13.34	0.32	6.00	6.32	134,535.86
BANK OF NEW YORK MELLON CORP	0.40	30.20	1.31	10.00	11.31	37,461.71
BARD (C.R.) INC	0.80	91.77	0.87	10.80	11.67	8,525.71
BAXTER INTERNATIONAL INC	1.36	50.62	2.69	10.00	12.69	29,497.64
BB&T CORP	0.64	26.29	2.44	7.00	9.44	18,238.21
BECTON DICKINSON & CO	1.81	84.52	2.14	10.30	12.44	19,122.90
BEMIS CO INC	0.98	32.66	3.01	7.00	10.01	3,533.58
BEST BUY CO INC	0.67	34.29	1.96	12.00	13.96	13,641.97
BLOCK H & R INC	0.66	11.91	5.54	10.00	15.54	3,633.86
BOEING CO	1.83	65.26	2.81	9.00	11.81	47,873.43
BRISTOL-MYERS SQUIBB CO	1.31	26.48	4.94	2.25	7.19	45,325.42
BROADCOM CORP -CL A	0.37	43.55	0.85	16.00	16.85	19,880.57
BROWN-FORMAN -CL B	1.42	69.62	2.04	10.85	12.89	10,093.01
C H ROBINSON WORLDWIDE INC	1.33	80.19	1.66	15.00	16.66	13,325.97
CA INC	0.18	24.44	0.72	10.00	10.72	12,503.99
CABLEVISION SYS CORP -CL A	0.61	33.84	1.81	22.60	24.41	8,314.29
CAMPBELL SOUP CO	1.23	34.75	3.54	6.00	9.54	11,590.65
CAPITAL ONE FINANCIAL CORP	0.22	42.56	0.51	8.00	8.51	19,446.77

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2011						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
CARDINAL HEALTH INC	0.89	38.31	2.31	13.50	15.81	13,368.66
CARNIVAL CORP/PLC (USA)	0.46	46.11	1.00	15.00	16.00	27,968.99
CATERPILLAR INC	2.11	93.66	2.25	20.00	22.25	59,446.28
CBS CORP	0.23	19.05	1.18	12.50	13.68	12,970.02
CENTERPOINT ENERGY INC	0.83	15.72	5.29	6.70	11.99	6,652.45
CF INDUSTRIES HOLDINGS INC	0.42	135.15	0.31	5.00	5.31	9,613.08
CHESAPEAKE ENERGY CORP	0.32	25.91	1.23	6.00	7.23	16,942.94
CHEVRON CORP	3.33	91.25	3.65	15.60	19.25	183,634.06
CHUBB CORP	1.63	59.64	2.73	10.00	12.73	18,186.20
CIGNA CORP	0.04	36.66	0.12	10.00	10.12	9,931.93
CINCINNATI FINANCIAL CORP	1.76	31.69	5.55	10.00	15.55	5,157.10
CINTAS CORP	0.54	27.96	1.95	11.00	12.95	4,062.62
CLOROX CO/DE	2.42	63.28	3.82	10.00	13.82	8,823.95
CME GROUP INC	5.24	321.75	1.63	14.00	15.63	21,561.11
CMS ENERGY CORP	0.89	18.60	4.79	6.00	10.79	4,549.11
COACH INC	0.69	55.31	1.25	15.00	16.25	16,392.83
COCA-COLA CO	1.92	65.77	2.92	9.00	11.92	152,720.17
COCA-COLA ENTERPRISES INC	0.40	25.03	1.58	10.20	11.78	8,479.84
COLGATE-PALMOLIVE CO	2.33	80.37	2.90	10.00	12.90	38,793.31
COMCAST CORP	0.42	21.97	1.93	12.40	14.33	60,631.45
COMERICA INC	0.43	42.24	1.01	6.60	7.61	7,455.02
COMPUTER SCIENCES CORP	0.87	49.60	1.76	9.00	10.76	7,662.41
CONAGRA FOODS INC	0.99	22.58	4.40	8.00	12.40	9,928.88
CONOCOPHILLIPS	2.44	68.10	3.59	11.10	14.69	100,054.22
CONSOL ENERGY INC	0.50	48.74	1.03	25.05	26.08	11,007.69
CONSOLIDATED EDISON INC	2.48	49.57	4.99	4.00	8.99	14,401.87
CONSTELLATION ENERGY GRP INC	1.06	30.63	3.44	9.90	13.34	6,120.03
CORNING INC	0.22	19.32	1.14	10.00	11.14	30,194.82
COSTCO WHOLESALE CORP	0.93	72.21	1.28	13.00	14.28	31,521.47
CSX CORP	1.19	64.61	1.84	14.00	15.84	24,176.09
CUMMINS INC	1.25	110.01	1.14	19.00	20.14	21,761.08
CVS CAREMARK CORP	0.39	34.77	1.13	12.00	13.13	47,245.48
D R HORTON INC	0.16	11.93	1.32	5.00	6.32	3,809.06
DANAHER CORP	0.09	47.17	0.20	15.30	15.50	30,847.01
DARDEN RESTAURANTS INC	1.43	46.44	3.09	12.00	15.09	6,376.21
DEERE & CO	1.53	83.05	1.85	9.50	11.35	35,106.15
DENTSPLY INTERNATL INC	0.22	34.17	0.65	11.50	12.15	4,855.52
DEVON ENERGY CORP	0.73	78.51	0.93	14.25	15.18	33,908.47
DEVRY INC	0.27	47.98	0.57	13.50	14.07	3,361.19
DIAMOND OFFSHRE DRILLING INC	6.09	66.87	9.11	16.00	25.11	9,296.74
DISCOVER FINANCIAL SVCS INC	0.08	18.53	0.45	5.00	5.45	10,092.96
DISNEY (WALT) CO	0.45	37.51	1.19	11.60	12.79	71,028.34
DOMINION RESOURCES INC	1.88	42.72	4.41	3.00	7.41	24,799.30
DONNELLEY (R R) & SONS CO	1.15	17.47	6.61	11.00	17.61	3,604.06
DOVER CORP	1.23	58.45	2.11	12.00	14.11	10,917.88
DOW CHEMICAL	0.64	34.14	1.88	7.00	8.88	39,626.84
DR PEPPER SNAPPLE GROUP INC	1.09	35.16	3.10	8.85	11.95	7,984.55
DTE ENERGY CO	2.34	45.32	5.17	4.55	9.72	7,664.38
DU PONT (E I) DE NEMOURS	1.91	49.88	3.83	16.50	20.33	45,535.15
DUKE ENERGY CORP	1.02	17.81	5.72	4.00	9.72	23,590.22

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2011						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
DUN & BRADSTREET CORP	1.51	82.09	1.85	8.20	10.05	4,089.07
EASTMAN CHEMICAL CO	2.11	84.08	2.51	12.35	14.86	6,064.52
EATON CORP	2.59	101.51	2.55	11.50	14.05	17,084.13
ECOLAB INC	0.79	50.42	1.56	12.70	14.26	11,704.25
EDISON INTERNATIONAL	1.34	38.60	3.48	5.00	8.48	12,576.30
EL PASO CORP	0.04	13.76	0.32	8.90	9.22	9,689.01
EMERSON ELECTRIC CO	1.59	57.17	2.79	15.50	18.29	43,122.47
ENTERGY CORP	3.37	70.83	4.76	1.50	6.26	12,814.21
EOG RESOURCES INC	0.69	91.41	0.76	12.00	12.76	23,219.60
EQT CORP	1.01	44.84	2.25	14.50	16.75	6,687.62
EQUIFAX INC	0.70	35.60	1.98	10.00	11.98	4,393.11
EQUITY RESIDENTIAL	1.92	51.95	3.70	5.00	8.70	14,777.02
EXPEDIA INC	0.32	25.09	1.28	15.00	16.28	6,309.08
EXPEDITORS INTL WASH INC	0.46	54.60	0.84	15.00	15.84	11,594.64
EXXON MOBIL CORP	1.96	73.12	2.68	11.30	13.98	368,711.78
FAMILY DOLLAR STORES	0.71	49.71	1.42	13.80	15.22	6,282.60
FASTENAL CO	1.00	59.91	1.68	19.50	21.18	8,832.59
FEDERATED INVESTORS INC	1.04	26.17	3.96	8.00	11.96	2,693.34
FEDEX CORP	0.54	93.01	0.58	13.00	13.58	29,300.10
FIDELITY NATIONAL INFO SVCS	0.23	27.39	0.83	13.20	14.03	8,243.32
FIFTH THIRD BANCORP	0.04	14.68	0.28	4.00	4.28	11,689.43
FIRSTENERGY CORP	2.22	37.02	6.00	1.00	7.00	11,284.99
FLOWSERVE CORP	1.25	119.22	1.05	8.00	9.05	6,656.17
FLUOR CORP	0.55	66.26	0.84	10.75	11.59	11,846.76
FMC CORP	0.54	79.89	0.68	8.70	9.38	5,794.90
FORTUNE BRANDS INC	0.87	60.25	1.45	15.00	16.45	9,193.00
FRANKLIN RESOURCES INC	1.11	111.21	1.00	11.00	12.00	24,910.26
FREEPORT-MCMORAN COP&GOLD	1.27	120.09	1.06	6.10	7.16	56,562.39
GANNETT CO	0.17	15.09	1.15	8.00	9.15	3,605.42
GAP INC	0.44	22.14	2.00	10.50	12.50	13,601.93
GENERAL DYNAMICS CORP	1.80	70.96	2.53	7.00	9.53	26,804.71
GENERAL ELECTRIC CO	0.64	18.29	3.49	13.90	17.39	194,874.80
GENERAL MILLS INC	1.21	35.59	3.40	8.00	11.40	22,628.55
GENUINE PARTS CO	1.85	51.34	3.60	12.80	16.40	8,087.85
GOLDMAN SACHS GROUP INC	1.57	168.16	0.93	12.00	12.93	85,970.63
GOODRICH CORP	1.30	88.07	1.48	12.00	13.48	11,041.78
GRAINGER (W W) INC	2.46	138.11	1.78	14.00	15.78	9,538.15
HALLIBURTON CO	0.42	40.83	1.02	16.00	17.02	37,136.31
HARLEY-DAVIDSON INC	0.44	34.67	1.27	10.00	11.27	8,166.03
HARRIS CORP	1.06	45.30	2.34	6.00	8.34	5,811.04
HARTFORD FINANCIAL SERVICES	0.22	26.49	0.85	12.00	12.85	11,775.89
HASBRO INC	1.10	47.18	2.33	10.00	12.33	6,425.68
HCP INC	1.95	36.79	5.31	5.00	10.31	13,424.49
HEALTH CARE REIT INC	2.87	47.64	6.03	4.00	10.03	6,908.28
HEINZ (H J) CO	1.93	49.46	3.89	7.00	10.89	15,864.15
HELMERICH & PAYNE	0.27	48.48	0.55	12.00	12.55	5,138.20
HERSHEY CO	1.39	47.15	2.94	8.40	11.34	7,862.64
HESS CORP	0.48	76.54	0.63	20.90	21.53	25,804.24
HEWLETT-PACKARD CO	0.35	42.10	0.83	9.00	9.83	92,216.94
HOME DEPOT INC	1.09	35.06	3.10	14.90	18.00	57,457.06

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2011						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
HONEYWELL INTERNATIONAL INC	1.36	53.16	2.56	12.50	15.06	41,474.00
HORMEL FOODS CORP	0.92	51.26	1.80	10.00	11.80	6,823.94
HOST HOTELS & RESORTS INC	0.05	17.87	0.26	15.00	15.26	11,900.26
HUDSON CITY BANCORP INC	0.63	12.74	4.95	5.00	9.95	6,708.94
HUNTINGTON BANCSHARES	0.04	6.87	0.62	6.00	6.62	5,930.62
ILLINOIS TOOL WORKS	1.56	53.40	2.93	15.00	17.93	26,482.71
INGERSOLL-RAND PLC	0.32	47.09	0.68	14.00	14.68	15,257.68
INTEGRYS ENERGY GROUP INC	2.86	48.51	5.89	5.00	10.89	3,763.50
INTEL CORP	0.69	21.03	3.30	10.00	13.30	117,305.34
INTL BUSINESS MACHINES CORP	2.87	146.76	1.96	10.50	12.46	182,328.91
INTL FLAVORS & FRAGRANCES	1.16	55.59	2.09	7.50	9.59	4,444.48
INTL GAME TECHNOLOGY	0.28	17.69	1.56	15.00	16.56	5,275.16
INTL PAPER CO	0.51	27.24	1.88	2.50	4.38	11,916.30
INVESCO LTD	0.49	24.06	2.05	12.00	14.05	11,117.07
IRON MOUNTAIN INC	0.86	25.01	3.43	14.50	17.93	5,005.23
ITT CORP	1.10	52.11	2.11	10.00	12.11	9,567.40
JABIL CIRCUIT INC	0.31	20.09	1.56	12.00	13.56	4,379.28
JANUS CAPITAL GROUP INC	0.04	12.97	0.33	8.00	8.33	2,383.19
JOHNSON & JOHNSON	2.29	61.85	3.70	5.95	9.65	169,855.81
JOHNSON CONTROLS INC	0.74	38.20	1.94	16.00	17.94	27,558.44
JPMORGAN CHASE & CO	0.21	42.42	0.50	7.00	7.50	165,827.45
KELLOGG CO	1.77	51.08	3.46	9.00	12.46	18,808.37
KEYCORP	0.04	8.85	0.47	5.00	5.47	7,792.17
KIMBERLY-CLARK CORP	2.84	63.04	4.50	7.45	11.95	25,707.27
KLA-TENCOR CORP	1.06	38.64	2.76	6.50	9.26	6,455.35
KRAFT FOODS INC	1.25	31.51	3.98	8.00	11.98	55,040.85
KROGER CO	0.46	22.36	2.04	8.80	10.84	14,219.84
L-3 COMMUNICATIONS HLDGS INC	1.76	70.49	2.50	10.00	12.50	7,978.48
LAUDER (ESTEE) COS INC -CL A	0.83	80.70	1.03	11.10	12.13	9,607.09
LEGG MASON INC	0.26	36.27	0.73	10.00	10.73	5,549.31
LEGGETT & PLATT INC	1.24	22.76	5.46	15.00	20.46	3,332.86
LENNAR CORP	0.17	18.75	0.89	4.50	5.39	3,368.31
LIMITED BRANDS INC	0.69	30.73	2.25	15.00	17.25	9,912.02
LINCOLN NATIONAL CORP	0.05	27.81	0.16	13.05	13.21	8,809.12
LINEAR TECHNOLOGY CORP	1.00	34.59	2.90	9.00	11.90	7,796.76
LOCKHEED MARTIN CORP	3.26	69.91	4.67	8.75	13.42	25,176.55
LORILLARD INC	4.77	82.06	5.81	6.00	11.81	12,277.00
LOWE'S COMPANIES INC	0.50	25.08	1.99	13.65	15.64	34,610.50
M & T BANK CORP	3.00	87.05	3.44	7.00	10.44	10,391.85
MACY'S INC	0.22	25.30	0.86	8.50	9.36	10,713.97
MARATHON OIL CORP	1.17	37.03	3.15	16.70	19.85	26,288.04
MARRIOTT INTL INC	0.41	41.54	0.98	16.50	17.48	15,130.74
MARSH & MCLENNAN COS	0.93	27.34	3.41	11.00	14.41	14,857.95
MARSHALL & ILSLEY CORP	0.04	6.92	0.61	5.00	5.61	3,656.60
MASCO CORP	0.34	12.66	2.67	12.50	15.17	4,538.61
MASSEY ENERGY CO	0.26	53.65	0.49	10.10	10.59	5,478.95
MASTERCARD INC	0.72	224.11	0.32	20.00	20.32	27,460.20
MATTEL INC	0.90	25.43	3.54	8.50	12.04	9,125.02
MCCORMICK & CO INC	1.23	46.53	2.64	9.50	12.14	6,196.50
MCDONALD'S CORP	2.66	76.76	3.46	9.00	12.46	81,097.48

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2011						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
MCGRAW-HILL COMPANIES	1.04	36.41	2.87	11.00	13.87	11,177.87
MCKESSON CORP	0.82	70.38	1.17	14.00	15.17	17,810.57
MEAD JOHNSON NUTRITION CO	1.00	62.25	1.61	11.15	12.76	12,734.86
MEADWESTVACO CORP	1.11	26.16	4.24	10.95	15.19	4,401.55
MEDTRONIC INC	0.98	37.09	2.64	9.00	11.64	39,815.23
MERCK & CO	1.62	36.04	4.49	6.40	10.89	111,034.95
METLIFE INC	0.83	44.44	1.87	12.55	14.42	43,784.73
MICROCHIP TECHNOLOGY INC	1.55	34.21	4.52	12.00	16.52	6,391.25
MICROSOFT CORP	0.72	27.91	2.57	12.00	14.57	238,784.64
MOLEX INC	0.77	22.72	3.39	10.00	13.39	3,658.32
MOLSON COORS BREWING CO	1.22	50.19	2.43	8.70	11.13	8,218.81
MONSANTO CO	1.29	69.64	1.86	15.50	17.36	37,358.17
MOODY'S CORP	0.47	26.54	1.76	11.25	13.01	6,215.67
MORGAN STANLEY	0.22	27.21	0.82	11.00	11.82	41,183.25
MURPHY OIL CORP	1.22	74.55	1.64	10.90	12.54	14,340.96
NATIONAL OILWELL VARCO INC	0.51	67.25	0.76	16.00	16.76	28,220.45
NATIONAL SEMICONDUCTOR CORP	0.43	13.76	3.14	8.00	11.14	3,296.43
NEWELL RUBBERMAID INC	0.22	18.18	1.20	9.00	10.20	5,277.65
NEWMONT MINING CORP	0.66	61.43	1.07	10.05	11.12	29,867.14
NEWS CORP	0.16	14.56	1.12	8.95	10.07	39,703.97
NEXTERA ENERGY INC	2.12	51.99	4.08	6.00	10.08	21,619.63
NICOR INC	1.91	49.92	3.83	2.70	6.53	2,273.36
NIKE INC -CL B	1.37	85.42	1.61	10.85	12.46	33,132.96
NISOURCE INC	0.96	17.62	5.43	4.00	9.43	4,903.75
NOBLE ENERGY INC	0.77	86.08	0.89	7.00	7.89	15,072.18
NORDSTROM INC	0.89	42.38	2.10	11.00	13.10	9,281.22
NORFOLK SOUTHERN CORP	1.63	62.82	2.60	13.50	16.10	22,827.03
NORTHEAST UTILITIES	1.10	31.88	3.44	7.00	10.44	5,621.02
NORTHERN TRUST CORP	1.25	55.41	2.26	12.00	14.26	13,419.97
NORTHROP GRUMMAN CORP	2.11	64.78	3.25	12.10	15.35	18,915.05
NYSE EURONEXT	1.33	29.98	4.44	11.00	15.44	7,824.78
OCCIDENTAL PETROLEUM CORP	1.74	98.10	1.77	14.40	16.17	79,714.69
OMNICOM GROUP	0.85	45.80	1.87	6.80	8.67	13,796.75
ONEOK INC	2.08	55.47	3.76	8.50	12.26	5,907.11
ORACLE CORP	0.23	31.30	0.73	15.00	15.73	158,140.75
PACCAR INC	0.54	57.34	0.95	13.00	13.95	20,911.96
PALL CORP	0.72	49.58	1.44	11.80	13.24	5,725.10
PARKER-HANNIFIN CORP	1.29	86.30	1.50	11.45	12.95	13,922.95
PATTERSON COMPANIES INC	0.45	30.63	1.48	13.00	14.48	3,760.05
PAYCHEX INC	1.39	30.91	4.49	12.00	16.49	11,179.65
PEABODY ENERGY CORP	0.41	63.98	0.65	21.60	22.25	17,251.44
PENNEY (J C) CO	0.89	32.31	2.77	11.75	14.52	7,644.42
PEOPLE'S UNITED FINL INC	0.67	14.01	4.78	8.00	12.78	5,198.94
PEPCO HOLDINGS INC	1.14	18.25	6.27	6.00	12.27	4,097.13
PEPSICO INC	2.11	65.33	3.22	9.70	12.92	103,537.66
PERKINELMER INC	0.31	25.82	1.18	9.00	10.18	3,047.92
PFIZER INC	0.74	17.51	4.21	2.50	6.71	140,254.23
PG&E CORP	1.94	47.84	4.05	6.46	10.51	18,756.44
PHILIP MORRIS INTERNATIONAL	2.80	58.53	4.78	9.30	14.08	106,196.48
PINNACLE WEST CAPITAL CORP	2.24	41.45	5.40	6.50	11.90	4,506.11

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2011						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
PIONEER NATURAL RESOURCES CO	0.09	86.82	0.10	10.00	10.10	10,079.46
PITNEY BOWES INC	1.51	24.18	6.23	3.20	9.43	4,917.10
PLUM CREEK TIMBER CO INC	1.71	37.45	4.58	2.00	6.58	6,052.29
PNC FINANCIAL SVCS GROUP INC	0.42	60.72	0.70	6.00	6.70	31,926.33
POLO RALPH LAUREN CP -CL A	0.46	110.92	0.41	15.00	15.41	7,124.50
PPG INDUSTRIES INC	2.38	84.07	2.83	8.20	11.03	13,705.01
PPL CORP	1.45	26.32	5.51	3.60	9.11	12,720.25
PRAXAIR INC	2.01	95.47	2.10	11.50	13.60	29,250.10
PRECISION CASTPARTS CORP	0.13	139.21	0.09	10.00	10.09	19,853.71
PRICE (T. ROWE) GROUP	1.21	64.54	1.87	12.00	13.87	16,550.31
PRINCIPAL FINANCIAL GRP INC	0.62	32.56	1.90	12.70	14.60	10,430.69
PROCTER & GAMBLE CO	2.10	64.33	3.27	9.20	12.47	180,072.08
PROGRESS ENERGY INC	2.58	43.48	5.93	4.00	9.93	12,736.94
PROGRESSIVE CORP-OHIO	0.17	19.87	0.85	5.00	5.85	13,177.78
PROLOGIS	0.74	14.44	5.11	64.00	69.11	8,216.79
PRUDENTIAL FINANCIAL INC	1.26	58.71	2.15	9.84	11.99	28,377.42
PUBLIC SERVICE ENTRP GRP INC	1.40	31.81	4.39	2.00	6.39	16,093.76
PUBLIC STORAGE	4.32	101.42	4.26	35.00	39.26	17,274.36
QEP RESOURCES INC	0.09	36.31	0.25	15.00	15.25	6,376.80
QUALCOMM INC	0.87	49.49	1.77	15.00	16.77	80,060.62
QUEST DIAGNOSTICS INC	0.45	53.97	0.83	12.00	12.83	9,174.90
QWEST COMMUNICATION INTL INC	0.34	7.61	4.50	7.00	11.50	13,262.07
RADIOSHACK CORP	0.27	18.49	1.45	7.50	8.95	2,104.64
RANGE RESOURCES CORP	0.17	44.98	0.38	6.00	6.38	7,200.04
RAYTHEON CO	1.61	46.34	3.46	7.00	10.46	16,892.92
REGIONS FINANCIAL CORP	0.04	7.00	0.61	7.00	7.61	8,792.59
REPUBLIC SERVICES INC	0.91	29.86	3.05	13.70	16.75	11,473.62
REYNOLDS AMERICAN INC	2.11	32.62	6.47	7.75	14.22	19,019.16
ROBERT HALF INTL INC	0.60	30.60	1.95	15.00	16.95	4,502.94
ROCKWELL AUTOMATION	1.61	71.71	2.25	15.00	17.25	10,197.31
ROCKWELL COLLINS INC	1.04	58.26	1.79	8.50	10.29	9,035.19
ROPER INDUSTRIES INC/DE	0.44	76.43	0.57	15.50	16.07	7,235.70
ROSS STORES INC	0.73	63.25	1.16	14.80	15.96	7,532.13
RYDER SYSTEM INC	1.24	52.64	2.36	15.00	17.36	2,723.49
SAFEWAY INC	0.54	22.49	2.39	12.00	14.39	8,384.27
SARA LEE CORP	0.49	17.51	2.82	7.50	10.32	11,193.55
SCANA CORP	1.99	40.60	4.91	5.00	9.91	5,165.25
SCHLUMBERGER LTD	0.99	83.50	1.18	17.50	18.68	113,925.73
SCHWAB (CHARLES) CORP	0.28	17.11	1.64	16.80	18.44	20,443.51
SCRIPPS NETWORKS INTERACTIVE	0.34	51.75	0.66	14.50	15.16	6,758.24
SEALED AIR CORP	0.56	25.45	2.21	8.30	10.51	4,063.86
SEMPRA ENERGY	1.67	52.48	3.18	7.00	10.18	12,598.09
SHERWIN-WILLIAMS CO	1.61	83.75	1.92	11.65	13.57	9,039.56
SIGMA-ALDRICH CORP	0.70	66.56	1.05	9.00	10.05	8,073.66
SMUCKER (JM) CO	1.71	65.65	2.60	6.75	9.35	7,816.03
SNAP-ON INC	1.38	56.58	2.44	7.80	10.24	3,290.58
SOUTHERN CO	1.93	38.23	5.04	5.80	10.84	31,757.89
SOUTHWEST AIRLINES	0.02	12.98	0.17	25.00	25.17	9,697.31
SPECTRA ENERGY CORP	1.09	24.99	4.36	9.00	13.36	16,199.07
STAPLES INC	0.41	22.77	1.82	15.00	16.82	16,467.15

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2011						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
STARBUCKS CORP	0.60	32.13	1.88	16.00	17.88	23,811.54
STARWOOD HOTELS&RESORTS WRLD	0.36	60.78	0.60	21.00	21.60	11,587.71
STATE STREET CORP	0.04	46.34	0.09	10.00	10.09	23,263.84
STRYKER CORP	0.80	53.70	1.48	10.50	11.98	21,325.34
SUNOCO INC	0.70	40.31	1.73	16.00	17.73	4,860.54
SUNTRUST BANKS INC	0.04	29.51	0.15	7.00	7.15	14,753.79
SUPERVALU INC	0.37	9.63	3.85	5.95	9.80	2,043.17
SYSCO CORP	1.10	29.40	3.74	9.95	13.69	17,201.50
TARGET CORP	1.14	60.13	1.90	14.00	15.90	42,576.97
TECO ENERGY INC	0.87	17.80	4.88	6.00	10.88	3,822.41
TELLABS INC	0.09	6.78	1.30	10.00	11.30	2,501.35
TEXAS INSTRUMENTS INC	0.57	32.50	1.76	10.00	11.76	38,160.10
TEXTRON INC	0.12	23.64	0.49	45.50	45.99	6,498.66
TIFFANY & CO	1.15	62.27	1.85	15.00	16.85	7,870.93
TIME WARNER CABLE INC	1.85	66.03	2.80	15.65	18.45	23,489.05
TIME WARNER INC	0.97	32.17	3.02	14.25	17.27	35,686.09
TJX COMPANIES INC	0.67	44.39	1.51	12.00	13.51	17,569.65
TORCHMARK CORP	0.69	59.74	1.16	8.50	9.66	4,782.43
TOTAL SYSTEM SERVICES INC	0.31	15.38	1.98	9.00	10.98	2,988.72
TRAVELERS COS INC	1.56	55.71	2.79	8.00	10.79	25,654.46
TYCO INTERNATIONAL LTD	1.04	41.44	2.51	12.50	15.01	20,282.52
TYSON FOODS INC -CL A	0.17	17.22	0.99	7.00	7.99	5,288.69
U S BANCORP	0.21	26.97	0.79	7.00	7.79	51,736.74
UNION PACIFIC CORP	1.75	92.66	1.89	15.00	16.89	45,695.19
UNITED PARCEL SERVICE INC	2.11	72.58	2.90	12.00	14.90	52,904.07
UNITED TECHNOLOGIES CORP	1.89	78.72	2.40	11.00	13.40	72,690.60
UNITEDHEALTH GROUP INC	0.54	36.11	1.50	8.30	9.80	39,718.76
UNUM GROUP	0.41	24.22	1.67	9.50	11.17	7,681.23
VALERO ENERGY CORP	0.23	23.12	1.01	16.50	17.51	13,090.80
VERIZON COMMUNICATIONS INC	2.03	35.78	5.68	4.30	9.98	101,142.30
VF CORP	2.77	86.18	3.22	10.00	13.22	9,347.43
VIACOM INC	0.68	39.61	1.71	12.90	14.61	24,413.89
VISA INC	0.72	70.38	1.02	20.00	21.02	34,964.71
VORNADO REALTY TRUST	2.74	83.33	3.29	5.50	8.79	15,221.97
VULCAN MATERIALS CO	1.08	44.36	2.45	8.50	10.95	5,695.42
WAL-MART STORES INC	1.34	53.93	2.48	10.50	12.98	192,098.34
WALGREEN CO	0.79	38.96	2.03	13.10	15.13	36,067.77
WASHINGTON POST -CL B	11.65	439.50	2.65	29.40	32.05	3,167.04
WASTE MANAGEMENT INC	1.39	36.87	3.76	10.00	13.76	17,542.78
WELLS FARGO & CO	0.22	30.99	0.70	9.00	9.70	162,658.95
WESTERN UNION CO	0.31	18.57	1.69	12.00	13.69	12,179.45
WEYERHAEUSER CO	0.21	18.93	1.08	2.50	3.58	10,145.38
WHIRLPOOL CORP	2.22	88.83	2.50	29.30	31.80	6,752.86
WILLIAMS COS INC	0.57	24.72	2.31	14.25	16.56	14,455.64
WINDSTREAM CORP	1.02	13.94	7.32	2.00	9.32	6,742.76
WISCONSIN ENERGY CORP	1.76	58.86	2.99	10.00	12.99	6,880.56
WYNDHAM WORLDWIDE CORP	0.51	29.96	1.70	6.00	7.70	5,242.01
WYNN RESORTS LTD	1.30	103.84	1.25	30.00	31.25	12,870.55
XCEL ENERGY INC	1.08	23.55	4.58	6.75	11.33	10,835.66
XILINX INC	0.74	28.98	2.54	15.00	17.54	7,509.18

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2011						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
XL GROUP PLC	0.44	21.82	2.02	10.00	12.02	7,052.79
YUM BRANDS INC	1.12	49.05	2.28	12.00	14.28	22,984.04
ZIONS BANCORPORATION	0.04	24.23	0.18	8.00	8.18	4,311.92
			Market Weighted Average =		**13.27**	

Flotation Cost Adjustment

Flotation costs are the costs associated with financing the investment – issuing debt and equity. They are made up of several types of costs including underwriter's fees, legal expenses, cost of preparing the prospectus, etc. In the appraisal process it is appropriate to include the interest rate and any other charges necessary to obtain the financing for the investment. In other words, the cost of financing an investment includes not only the interest rate but also flotation costs (the cost of issuing securities – both debt and equity). The Appraisal Institute's *The Appraisal of Real Estate* and the International Association of Assessing Officers' *Property Assessment Valuation* state the following regarding the cost of financing:

> The cost of financing includes the interest rate and any points, discounts, equity participations, or other charges that the lender requires to increase the effective yield on the loan.[44]

> The investor considers risk, return, management, liquidity, and other factors in deciding an acceptable discount rate. The discount rate is the annual percentage rate reflecting the competitive rate of return on an investment. The discount rate, also known as the *overall yield rate* $[Y_O]$, is the weighted average cost of capital for a particular investment and includes the costs associated with issuing debt and equity.[45]

Flotation costs can be accounted for either by amortizing the cost (reducing the cash flow to discount), or by including them in the cost of capital. Many studies have been made regarding the amount of flotation costs for debt and equity capital.

> In general, the adjustment for flotation costs is a refinement of the basic unadjusted cost. In other words, usually the adjusted and unadjusted costs will not be very different. However, this doesn't imply that you shouldn't make the adjustment. The information needed to make the adjustment is readily available, and the adjustment itself doesn't require much effort or computer processing time. To paraphrase the film maker, Spike Lee, you should do the right thing *(especially if the right thing is relatively easy to do)*.[46]

---

[44] *The Appraisal of Real Estate*, 13th ed., (Chicago: Appraisal Institute, 2008) p. 154.

[45] *Property Assessment Valuation*, 3rd ed., (Kansas City: International Association of Assessing Officers, 2010), p. 305.

[46] Ehrhardt, Michael C., *The Search for Value: Measuring the Company's Cost of Capital*, (Harvard Business School Press: Boston, MA, 1994), p. 134.

> Flotation costs occur when new issues of stock or debt are sold to the public. The firm usually incurs several kinds of flotation or transaction costs, which reduces the actual proceeds received by the firm. Some of these are direct out-of-pocket outlays, such as fees paid to underwriters, legal expenses, and prospectus preparation costs. Because of this reduction in proceeds, the firm's required returns on these proceeds equate to a higher return to compensate for the additional costs. Flotation costs can be accounted for either by amortizing the cost, thus reducing the cash flow to discount, or by incorporating the cost into the cost of capital. Because flotation costs are not typically applied to operating cash flow, one must incorporate them into the cost of capital.[47]

An adjustment for flotation cost must be made even if the issuing company has no plans to ever issue any additional securities. The following illustration is quoted by Roger A. Morin, PhD, *Regulatory Finance: Utilities' Cost of Capital*, (Arlington, VA: Public Utilities Reports, Inc., 1994), p. 170.] and fully addresses this issue.

> Brigham, Aberwald, and Gapenski (1985) performed an excellent analysis regarding the need for a flotation cost adjustment. The following illustration adapted from Brigham, Aberwald, and Gapenski (1985) shows that: (1) even if no further stock issues are contemplated, the flotation adjustment is still permanently required to keep shareholders whole, and (2) flotation costs are only recovered if the rate of return is applied to total equity, including retained earnings, in all future years, even if no future financing is contemplated....<u>It is noteworthy that the adjustment is always required each and every year, whether or not new stock issues are sold in the future, and that the allowed return on equity must be earned on total equity, including retained earnings, for investors to earn the cost of equity.</u>[48]

> Companies generally hire an investment banker to assist them when they issue common stock, preferred stock, or bonds. In return for a fee, the investment banker helps the company with the terms, price, and sale of the issue. The banker's fees are often referred to as **flotation costs**. The total cost of capital should include not only the required return paid to investors but also the flotation fees paid to the investment banker for marketing the issue.[49] [This

---

[47] Pratt, Shannon P., *Cost of Capital, Estimation and Applications*, (NY: John Wiley & Sons, Inc. 1998) p. 176.

[48] Roger A. Morin, PhD, *Regulatory Finance: Utilities' Cost of Capital*, (Arlington, VA: Public Utilities Reports, Inc., 1994), p. 170-171. (emphasis added)

[49] Brigham, Eugene F. and Michael C. Ehrhardt, *Financial Management: Theory and Practice*, 10th ed. (Thomson Learning, Inc.: Stamford, CT, 2002), p. 452.

identical quote is also found in *Fundamentals of Financial Management*, 9th ed. (Dryden Press) by Eugene F. Brigham and Joel F. Houston, Chapter 10.]

Additionally, Dr. Roger Ibbotson refers to flotation cost in his book, Stocks, Bonds, Bills and Inflation, when he discusses the cost of capital. He states the following:

> Although the cost of capital estimation techniques set forth later in this book are applicable to rate setting, certain adjustments may be necessary. One such adjustment is for flotation costs (amounts that must be paid to underwriters by the issuer to attract and retain capital).[50]

All of these studies reach the conclusion that a flotation cost adjustment must be made when estimating the cost of capital. Alternatively, some finance textbooks suggest that it is better to adjust the net present value of the assets downward.

> ***Issue costs.*** If accepting the project forces the firm to issue securities, then the present value of issue costs should be subtracted from base-case NPV.[51]

In either case (whether the cost of capital is adjusted upward or the net present value of the assets is adjusted downward) the end result is exactly the same – the market value of the assets subject to appraisal is lower as a result of flotation costs.

Even if one accounted for flotation costs as a negative cash flow [as Brealey, Myers and Marcus suggest – see *Fundamentals of Corporate Finance* (2004) 4th ed. Pg. 335-336] rather than an adjustment to the WACC, we should get exactly the same correct valuation. The following will illustrate that it makes no difference mathematically whether we (1) account for flotation costs in the WACC or (2) account for flotation costs as a negative cash flow. Please note the example that follows where we compare the appraisal by either adjusting the WACC for flotation costs or simply deducting the flotation costs from the expected cash flow to get the net cash flow. In both cases $950 is available to purchase assets because $50 was the flotation cost from issuing $1,000 worth of securities. Note that market value in both cases is exactly the same — $950. Clearly it makes no difference whether one adjusts the WACC or does all the necessary math to find the net present value after treating flotation costs as a negative cash flow at the beginning of the first year. The following flotation cost measurement example is

---

[50] *Stocks, Bonds, Bills and Inflation: 2010 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2010), p. 2

[51] Brealey, Richard & Stewart C. Myers, *Principles of Corporate Finance*, 7th ed. (New York: McGraw-Hill, 2002), p. 552.

taken from the *Journal of Property Tax Assessment & Administration* published by the International Association of Assessing Officers.[52]

Flotation Cost Measurement

WACC Adjustment Method	
Securities Issued	$1,000
Cost of Capital	10%
Required Return	$100
Flotation Cost =	5.00%
Flotation Cost =	50
Assets Purchased	**950**
Cost of Capital	10.00%
1 - FC =	0.95
Adj'd. Cost of Cap.	10.5263%
Market Value:	
Required Return	100
	--------- = $950
Adj'd Cost of Cap.	10.5263%

Cash Flow Adjustment Method			
Securities Issued		$1,000	
Flotation Cost =		$50	
Assets Purchased		$950	
Disc. Rate = Unadjusted WACC =			10.00%
First Year's Cash Flow:			
		Pres. Value Factor	**NCF**
Beg. of Year	($50)	1.10	($55)
		First Year's Income =	100
		First Year's Net Cash Flow =	45

End of Year	NCF	Pres. Value Factor (divisor)	Pres. Value
1	45	1.10	40.91
2	100	1.21	82.64
3	100	1.33	75.13
4	100	1.46	68.30
5	100	1.61	62.09
6	100	1.77	56.45
7	100	1.95	51.32
8	100	2.14	46.65
9	100	2.36	42.41
10	100	2.59	38.55
skip to			
339	100	107,676,335,910,201.00	0.00
340	100	118,443,969,501,221.00	0.00
341	100	130,288,366,451,343.00	0.00
342	100	143,317,203,096,477.00	0.00
343	100	157,648,923,406,125.00	0.00
344	100	173,413,815,746,737.00	0.00
345	100	190,755,197,321,411.00	0.00
346	100	209,830,717,053,552.00	0.00
347	100	230,813,788,758,908.00	0.00

[52] Tegarden, Thomas K., "The Appraisal of Public Utilities: Adjustment to the WACC for Flotation Costs," *Journal of Property Tax Management & Administration*, (Chicago: IAAO), Vol. 5, Issue 1, 2008, pp. 71-74.

348	100	253,895,167,634,798.00	0.00
349	100	279,284,684,398,278.00	0.00
350	100	307,213,152,838,106.00	0.00
			$950.00

As one can see from the above mathematical example the same $950 value results in either case. Actually, it is wrong to presuppose that one knows how much flotation cost to deduct in a valuation problem because in order to know exactly how much flotation cost will be, one has to already know what the value in order to know how much debt and equity will have to be issued. Thus, the appraiser must be biased or clairvoyant or both. **In solving a valuation problem, the WACC adjustment method is best**. If one already knew how much debt and equity securities would have to be issued, one would have to already know the purchase price and thus the valuation. It's a 'Catch 22.' If one already knew the value, why do an appraisal at all?

The flotation costs associated with debt for large issues conservatively are approximately 1%. For relatively large issues of equity, the flotation costs range from a low of 2% to as much as 6%.

From information derived from *Public Utility Finance Tracker* we determined the average flotation cost associated with the issuance of long-term debt and common stock of natural gas and natural gas transmission companies. We found the average issuance cost of long-term debt to be 1.07% and the average issuance cost of common equity to be 4.30%. We selected 1.00% and 4.25% to be representative of the typical flotation cost associated with the issuance of long-term debt and common stock securities respectively.

On the following pages are the schedules detailing the long-term debt and common stock flotation costs.

Debt Issuance Cost
Natural Gas/Transmission Utilities (1997 - 2010)

Company	Type of Utility	Issue Date	Amount Offered ($000)	Price to Public ($/100)	Net Proceeds	Issue Cost
Michigan Con Gas Company	Gas	14-May-97	15,000	100.000	96.8683	3.23%
Michigan Con Gas Company	Gas	15-May-97	30,000	100.000	99.2467	0.76%
Michigan Con Gas Company	Gas	15-May-97	40,000	100.000	99.3605	0.64%
Seagull Energy Corp.	Gas	25-Sep-97	150,000	99.544	98.5437	1.02%
SONAT Inc.	Gas	25-Sep-97	100,000	99.748	99.0970	0.66%
Southern Natural Gas Co.	Gas	25-Sep-97	100,000	99.891	99.2393	0.66%
Laclede Gas	Gas	16-Oct-97	25,000	98.682	98.3519	0.34%
Kn Energy Inc.	Gas	22-Oct-97	150,000	100.000	99.3740	0.63%
Northern Illinois Gas Co.	Gas	23-Oct-97	50,000	99.500	98.9960	0.51%
Enron Oil & Gas Co.	Gas	25-Nov-97	100,000	99.709	99.0580	0.66%
Consolidated Natural Gas Co.	Gas	09-Dec-97	300,000	99.190	98.3143	0.89%
SONAT	Gas	27-Jan-98	100,000	99.531	98.8790	0.66%
SONAT	Gas	29-Jan-98	100,000	99.787	98.9115	0.89%
KN Energy, Inc.	Gas	04-Mar-98	500,000	99.784	98.9081	0.89%
KN Energy, Inc.	Gas	04-Mar-98	150,000	99.496	98.3701	1.14%
Coastal Corp.	Gas	02-Jun-98	200,000	99.882	99.2314	0.66%
Coastal Corp.	Gas	02-Jun-98	200,000	99.661	98.7854	0.89%
Wisconsin Gas Co.	Gas	19-Jan-99	50,000	99.252	98.6020	0.66%
No. Illinois Gas Co.	Gas	02-Feb-99	50,000	100.000	99.3500	0.65%
Providence Gas Co.	Gas	04-Feb-99	15,000	100.000	96.8500	3.25%
Cascade Natural Gas Corp.	Gas	15-Mar-99	15,000	100.000	99.2500	0.76%
Laclede Gas Co.	Gas	28-May-99	25,000	100.000	99.5020	0.50%
Mich. Consolidated Gas Co.	Gas	04-Jun-99	55,000	100.000	96.8500	3.25%
Williams Co.	Gas	21-Jul-99	700,000	99.075	98.2000	0.89%
Williams Communication Grp.	Gas	30-Sep-99	1,500,000	99.249	96.7490	2.58%
Indiana Gas Co.	Gas	04-Oct-99	30,000	100.000	99.3750	0.63%
Northwest Natural Gas	Gas	09-Dec-99	20,000	100.000	99.2500	0.76%
SEMCO Energy	Gas	12-Apr-00	30,000	100.000	97.2500	2.83%
New Jersey Gas Co.	Gas	29-Jun-00	10,000	100.000	99.2500	0.76%
New Jersey Gas Co.	Gas	05-Jul-00	10,000	100.000	96.8500	3.25%
New Jersey Gas Co.	Gas	01-Jul-00	15,000	100.000	97.6000	2.46%
Northwest Natural Gas	Gas	29-Aug-00	20,000	100.000	99.2500	0.76%
Northwest Natural Gas	Gas	06-Sep-00	20,000	100.000	99.2500	0.76%
Northwest Natural Gas	Gas	06-Sep-00	10,000	100.000	99.2500	0.76%
Northwest Natural Gas	Gas	27-Nov-00	25,000	100.000	99.3750	0.63%
Agl Capital Corp	Gas	23-Feb-01	300,000	99.578	98.9280	0.66%
Oneok, Inc	Gas	03-Apr-01	400,000	99.912	99.2620	0.65%
Atmos Energy Corp	Gas	15-May-01	350,000	99.940	99.2900	0.65%
Semco Energy	Gas	18-Jun-01	60,000	100.000	97.5000	2.56%
Questar Gas Co.	Gas	03-Oct-01	60,000	100.000	99.3750	0.63%
Northwest Natural Gas	Gas	26-Mar-02	40,000	100.000	99.375	0.63%
Northwest Natural Gas	Gas	24-Sep-02	30,000	100.000	99.250	0.76%
UGI Utilities Inc.	Gas	25-Sep-02	20,000	100.000	99.375	0.63%
California Gas Co.	Gas	02-Oct-02	250,000	99.897	99.247	0.65%
AGL Capital Corp.	Gas	07-Jan-03	225,000	99.927	99.277	0.65%
Atmos Energy Corp	Gas	13-Jan-03	250,000	99.915	99.250	0.67%
Sepra Energy	Gas	01-Feb-03	400,000	99.658	99.008	0.66%
Michigan Consolidated Gas Co	Gas	12-Feb-03	200,000	99.637	98.762	0.89%
Northwest Natural Gas	Gas	25-Feb-03	10,000	100.000	99.250	0.76%

Debt Issuance Cost
Natural Gas/Transmission Utilities (1997 - 2010)

Company	Type of Utility	Issue Date	Amount Offered ($000)	Price to Public ($/100)	Net Proceeds	Issue Cost
Nisource Finance Corp	Gas	01-Mar-03	345,000	100.000	99.354	0.65%
Keyspan Corporation	Gas	01-Apr-03	150,000	99.763	98.888	0.88%
AGL Capital Corp.	Gas	15-Apr-03	225,000	99.927	99.277	0.65%
The Cincinnati Gas & Electric Co.	Gas	12-Jun-03	200,000	99.764	98.889	0.88%
The Cincinnati Gas & Electric Co.	Gas	12-Jun-03	200,000	99.396	98.521	0.89%
Baltimore Gas And Electric Co.	Gas	17-Jun-03	200,000	99.295	98.420	0.89%
Nisource Finance Corp	Gas	16-Jul-03	500,000	99.862	99.212	0.66%
Vectren Coproation	Gas	24-Jul-03	100,000	99.746	99.096	0.66%
Vectren Coproation	Gas	24-Jul-03	100,000	99.177	98.477	0.71%
UGI Utilities	Gas	14-Aug-03	20,000	100.000	99.250	0.76%
UGI Utilities	Gas	14-Aug-03	25,000	100.000	99.370	0.63%
Energy East Corporation	Gas	08-Sep-03	200,000	99.830	98.950	0.89%
Madison Gas & Electric Co	Gas	09-Sep-03	20,000	100.000	99.250	0.76%
Energen Corporation	Gas	30-Oct-03	50,000	99.557	98.907	0.66%
Northwest Natural Gas	Gas	21-Nov-03	40,000	100.000	99.250	0.76%
Piedmont Natural Gas Co Inc	Gas	16-Dec-03	100,000	99.859	98.984	0.88%
Piedmont Natural Gas Co Inc	Gas	16-Dec-03	100,000	100.000	99.350	0.65%
AGL Resources	Gas	14-Dec-04	200,000	99.870	99.220	0.66%
Aquila	Gas	18-Aug-04	300,000	25.000	25.000	0.00%
Atmos Energy	Gas	18-Oct-04	500,000	99.993	99.343	0.65%
Atmos Energy	Gas	18-Oct-04	200,000	99.392	98.517	0.89%
Laclede Gas Co.	Gas	21-Apr-04	50,000	99.585	98.835	0.76%
Laclede Gas Co.	Gas	21-Apr-04	100,000	99.434	98.559	0.89%
Michigan Consolidated Gas	Gas	27-Sep-04	120,000	99.594	98.844	0.76%
Consolidated Natural Gas Co	Gas	15-Nov-04	400,000	99.686	99.036	0.66%
Alabama Gas Corp	Gas	11-Jan-05	40,000	100.000	96.860	3.24%
Alabama Gas Corp	Gas	11-Jan-05	40,000	100.000	99.350	0.65%
Alabama Gas Corp	Gas	14-Nov-05	80,000	100.000	99.400	0.60%
Cascade Natural Gas	Gas	20-Jan-05	30,000	100.000	96.850	3.25%
Cascade Natural Gas	Gas	29-Aug-05	15,000	100.000	99.300	0.70%
Northwest Natural Gas Co.	Gas	02-Jun-05	40,000	100.000	99.375	0.63%
Northwest Natural Gas Co.	Gas	21-Jun-05	10,000	100.000	99.250	0.76%
Vectren Utility Holdings, Inc	Gas	16-Nov-05	75,000	99.799	99.149	0.66%
Vectren Utility Holdings, Inc	Gas	16-Nov-05	75,000	99.779	98.904	0.88%
Laclede Gas Co.	Gas	06-Jun-06	55,000	99.852	98.977	0.88%
Piedmont Natural Gas Co., Inc	Gas	15-Jun-06	200,000	100.000	96.850	3.15%
AGI Capital Resources	Gas	27-Jun-06	175,000	99.856	99.206	0.65%
Southern Union Co.	Gas	18-Oct-06	600,000	99.644	98.344	1.30%
Northwest Natural Gas Co.	Gas	15-Dec-06	25,000	100.000	99.375	0.63%
Alabama Gas Corp	Gas	10-Jan-07	45,000	100.000	99.125	0.88%
Atmos Energy Corp	Gas	11-Jun-07	250,000	99.729	99.079	0.66%
Vectren Utility Holdings, Inc	Gas	05-Mar-08	125,000	100.000	96.850	3.25%
Vectren Utility Holdings, Inc	Gas	24-Mar-08	100,000	99.930	99.062	0.88%
Vectren Utility Holdings, Inc	Gas	24-Mar-08	50,000	99.400	99.290	0.11%
Laclede Gas Co	Gas	18-Sep-08	80,000	100.000	96.850	3.25%
Washington Gas Light	Gas	05-Dec-08	50,000	100.000	99.375	0.63%
AGI Capital Corp	Gas	05-Aug-09	300,000	99.78	99.13	0.66%
Atmos Energy	Gas	23-Mar-09	450,000	99.81	99.16	0.66%
National Fuel Gas Co	Gas	01-Apr-09	250,000	99.76	99.11	0.66%

Debt Issuance Cost
Natural Gas/Transmission Utilities (1997 - 2010)

Company	Type of Utility	Issue Date	Amount Offered ($000)	Price to Public ($/100)	Net Proceeds	Issue Cost
Northwest Natural Gas Co.	Gas	20-Mar-09	75,000	100.00	99.38	0.63%
Sempra Energy	Gas	05-Oct-09	750,000	99.16	98.28	0.89%
Central Hudson Gas &Elec Corp	Gas	02-Dec-10	44,150	100.000	99.375	0.63%
Central Hudson Gas &Elec Corp	Gas	02-Dec-10	30,000	100.000	92.467	8.15%
Southwest Gas Corporation	Gas	07-Dec-10	125,000	99.818	99.168	0.66%
Washington Gas Light Co.	Gas	30-Nov-10	75,000	100.000	99.979	0.02%
					Average	1.07%
					Selected	1.00%

Source: *Public Utility Finance Tracker*, February 1999 - 2011.

Common Stock Issuance Cost

Natural Gas/Transmission Utilities (1990 - 2010)

Company	Type of Company	Issue Date	Number of Shares (000)	Price to Public	Net Proceeds	Issue Cost
Consolidated Natural Gas	Gas	08-Jan-90	3,500	45.50	44.24	2.85%
Washington Energy	Gas	17-Jan-90	1,750	20.13	19.26	4.52%
Colonial Gas	Gas	15-May-90	600	21.50	20.27	6.07%
Atlanta Gas Light	Gas	05-Dec-90	1,000	31.38	30.00	4.60%
Washington Energy	Gas	04-Feb-91	2,650	19.00	18.21	4.34%
Piedmont Natural Gas	Gas	03-Apr-91	1,250	28.50	27.36	4.17%
Panhandle Eastern	Gas	18-Jul-91	13,800	10.75	10.27	4.67%
Bay State Gas Co.	Gas	13-Mar-92	1,550	23.25	22.28	4.35%
El Paso Natural Gas Co.	Gas	12-May-92	5,000	19.00	17.77	6.92%
New Jersey Resources Co.	Gas	15-Sep-92	1,500	22.25	21.27	4.61%
Washington Energy Co.	Gas	29-Sep-92	2,750	21.00	20.19	4.01%
Equitable Resources	Gas	22-Sep-93	2,400	38.50	37.25	3.36%
Brooklyn Union Gas	Gas	29-Sep-93	1,700	25.75	24.77	3.96%
S.E. Michigan Gas Enterprises	Gas	19-Jan-94	650	20.50	19.62	4.49%
Connecticut Energy Corp.	Gas	03-Mar-94	900	20.13	19.22	4.71%
Mobile Gas Service Corp.	Gas	14-Sep-94	400	22.00	20.30	8.37%
Northwest Natural Gas	Gas	15-Feb-95	1,000	29.75	28.59	4.06%
MCN Corp.	Gas	14-Mar-95	5,000	17.88	17.21	3.86%
Piedmont Natural Gas	Gas	20-Mar-95	1,500	20.00	19.14	4.49%
Laclede Gas	Gas	15-May-95	1,550	19.00	18.12	4.86%
United Cities	Gas	08-Jun-95	1,200	14.50	13.88	4.47%
Atlanta Gas Light	Gas	12-Jun-95	1,300	33.63	32.51	3.43%
WICOR, INC.	Gas	05-Dec-95	1,100	31.88	30.63	4.06%
Connecticut Natural Gas	Gas	05-Jun-96	640	23.25	22.19	4.78%
Delta Natural Gas	Gas	15-Jul-96	350	16.00	15.07	6.17%
Tejas Gas	Gas	22-Jul-96	3,075	35.00	33.42	4.73%
KN Energy	Gas	31-Jul-96	3,100	32.25	31.01	4.00%
Cascade Natural Gas	Gas	13-Aug-96	1,350	15.25	14.45	5.54%
Energen	Gas	17-Jan-97	1,500	29.50	28.39	3.91%
KCS Energy	Gas	29-Jan-97	3,000	39.00	36.91	5.66%
Energen	Gas	18-Sep-97	1,200	35.50	34.16	3.92%
COHO Energy, Inc.	Gas	29-Sep-97	8,585	10.50	9.87	6.38%
Fall River Gas Co.	Gas	30-Oct-97	340	13.25	12.06	9.87%
Connecticut Energy Corp.	Gas	12-Nov-97	900	24.25	23.17	4.66%
Roanoke Gas Co.	Gas	22-Feb-98	166	20.00	18.67	7.12%
KN Energy	Gas	04-Mar-98	11,000	52.00	49.90	4.21%
Enron Corp.	Gas	05-May-98	15,000	50.00	48.47	3.16%
Laclede Gas Co.	Gas	05-May-99	1,100	50.00	49.34	1.35%
SEMCO	Gas	12-Jun-00	9,000	10.00	9.60	4.17%
WGL Holdings Co.	Gas	26-Jun-01	1,790	26.73	25.80	3.47%
Utilicorp	Gas	25-Jan-02	11,000	23.00	22.28	3.25%
Calpine Corporation	Gas	24-Apr-02	66,000	11.50	11.13	3.30%
MDU Resources Group	Gas	19-Nov-02	2,100	24.00	23.30	3.00%
MDU Resources Group	Gas	29-Nov-02	2,100	24.00	23.16	3.63%
Agl Resources, Inc	Gas	11-Feb-03	5,600	22.00	21.21	3.70%
Atmos Energy Corp.	Gas	18-Jun-03	4,000	25.31	24.25	4.38%
Sempra Energy	Gas	23-Oct-03	15,000	28.00	27.15	3.12%
Southern Union Co.	Gas	10-Jun-03	3,000	16.15	16.15	0.00%

Common Stock Issuance Cost

Natural Gas/Transmission Utilities (1990 - 2010)

Company	Type of Company	Issue Date	Number of Shares (000)	Price to Public	Net Proceeds	Issue Cost
Southern Union Co.	Gas	05-Jun-03	9,500	16.00	15.38	4.06%
Southern Union Co.	Gas	15-Jun-03	2,500	50.00	48.17	3.80%
Vectren Corporation	Gas	07-Aug-03	6,500	22.81	22.00	3.70%
AGL Resources	Gas	19-Nov-04	9,600	31.010	30.038	3.23%
Ameren	Gas	30-Jun-04	10,000	42.000	40.700	3.19%
Aquila(M)	Gas	18-Aug-04	40,000	2.550	2.451	4.04%
Atmos Energy Co.	Gas	21-Oct-04	14,000	24.750	23.760	4.17%
Northwest Natural Gas Co.	Gas	30-Mar-04	1,200	31.000	29.844	3.87%
Piedmont Natural Gas Co. Inc	Gas	20-Jan-04	4,250	42.500	41.010	3.63%
Southern Union Co.	Gas	26-Jul-04	11,000	18.750	18.003	4.15%
The Laclede Group Inc	Gas	06-May-04	1,500	26.800	25.862	3.63%
UGI Corp.	Gas	18-Mar-04	7,500	32.100	30.696	4.58%
Semco Energy	Gas	09-Aug-05	27,176	6.320	6.067	4.17%
Southern Union Co.	Gas	07-Feb-05	342,999	23.000	22.300	3.14%
Chesapeake Utility Corp	Gas	15-Nov-06	600	30.100	28.975	3.88%
Vectron Corp	Gas	22-Feb-07	4,600	28.33	27.34	3.62%
Clean Energy	Gas	25-Jun-09	8,200	8.30	7.80	6.38%
EQT	Gas	10-Mar-11	12500	44.00	42.24	4.17%
					Average	4.30%
					Selected	4.25%

Source: *Public Utility Finance Tracker*, February 1999 - 2011.

Incorporating the flotation costs found on the previous pages into our cost of capital study is accomplished as shown in the table below.

Corp. Tax Rate =			38.00%	Flotation Cost Adjustment			
Capital	**Portion**	**Cost**	**Product**	**Flot. Cost**	**Divisor**	**Adj Cost**	**Product**
Debt	30.00%	6.50%	1.95%	1.00%	99.38%	6.54%	1.96%
Equity	70.00%	12.00%	8.40%	4.25%	95.75%	12.53%	8.77%
Totals	100.00%		10.35%				10.73%

The flotation cost adjustment for debt considers the tax deductibility of interest cost and the divisor for debt is obtained by subtracting the debt flotation cost times 1 minus the approximate corporate tax rate from 100% shown as follows: 1 - (0.01 x (1 - 0.38)) = 99.38%. Next we divide cost of debt of 6.50% by the divisor to obtain the flotation cost adjusted cost of debt, which is then multiplied times the debt portion of the capital structure to obtain the product of 1.96%. The divisor for the equity cost is 1 minus the equity flotation costs (100% - 4.25% = 95.75%). Next we divide cost of equity of 12.00% by the divisor to obtain the flotation cost adjusted cost of equity, which is then multiplied times the equity portion of the capital structure to obtain the product of 8.77%. The sum of the two products is 10.73% (rounded to **10.75%**) and is the cost of capital for the typical interstate natural gas pipeline after accounting for flotation costs.

Other Issues Regarding the Cost of Capital

Geometric Mean vs. Arithmetic Mean

Occasionally appraisers make the mistake of using the geometric mean rather than the arithmetic mean in measuring the equity risk premium. The geometric mean is backward-looking, measuring the change in wealth over more than one period. On the other hand, the arithmetic mean better represents a typical performance over single periods and serves as the correct rate for forecasting, discounting, and estimating the cost of capital. Dr. Roger Ibbotson has written regarding this issue as follows:

> The equity risk premium data presented in this book are arithmetic average risk premia as opposed to geometric average risk premia. The arithmetic average equity risk premium can be demonstrated to be most appropriate when discounting future cash flows. For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless

> rates is the relevant number. This is because both the CAPM and the building block approach are additive models, in which the cost of capital is the sum of its parts. The geometric average is more appropriate for reporting past performance, since it represents the compound average return.[53]

Additionally, Dr. Roger Morin addressed the issue of the arithmetic versus geometric means in estimating the cost of capital.

> In statistical parlance, the arithmetic average is the unbiased measure of the expected value of repeated observations of a random variable, not the geometric mean. This appendix formally illustrates that only arithmetic averages can be used as estimates of cost of capital, and that the geometric mean is not an appropriate measure of cost of capital.[54]

Brealey, Myers and Allen also addressed this issue:

> If the cost of capital is estimated from historical returns or risk premiums, use arithmetic averages, not compound annual rates of return (geometric averages).[55]

Income Return

The income return is the appropriate return for use in calculating the equity risk premium. This issue is discussed in SBBI as follows:

> Another point to keep in mind when calculating the equity risk premium is that the income return on the appropriate-horizon Treasury security, rather than the total return, is used in the calculation. The total return is comprised of three return components: the income return, the capital appreciation return, and the reinvestment return. The income return is defined as the portion of the total return that results from a periodic cash flow or, in this case, the bond coupon payment. The capital appreciation return results from the price change of a bond over a specific period. Bond prices generally change in reaction to unexpected fluctuations in yields. Reinvestment return is the return on a given month's investment income when reinvested into the same asset class in the subsequent months of the year. The income return is thus used in the estimation of the

---

[53] *Stocks, Bonds, Bills and Inflation: 2010 Valuation Edition Yearbook,* (Chicago: Morningstar, Inc., 2010), p. 56.

[54] Morin, Roger A., *New Regulatory Finance* (Vienna, VA: Public Utilities Reports, Inc., 2006), p. 133.

[55] Richard A. Brealey, Stewart C. Myers, and Paul Allen, Principles of Corporate Finance, 8th ed., (Irwin McGraw-Hill, 2006), pp. 156-157.

equity risk premium because it represents the truly riskless portion of the return.[56]

Equity Risk Premium Puzzle

In 1985, Mehra and Prescott published a paper that discussed the equity risk premium from a utility theory perspective. The point that Mehra and Prescott make is that under existing economic theory, economists cannot justify the magnitude of the equity risk premium. The utility theory model employed was incapable of obtaining values consistent with those observed in the market.

This is an interesting point and may be worthy of further study, but it does not do anything to prove that the equity risk premium is too high. It may, on the other hand, indicate that theoretical economic models require further refinement to adequately explain market behavior.[57]

There is no historical data to suggest a systematic decline in the market risk premium in estimating the cost of equity.

> Are there any historical data to suggest a systematic decline in the market risk premium? Exhibit 10.5 plots five-year rolling averages of the market equity risk premium from 1930 to 1995. The volatility of the market risk premium has decreased, but what about the average market risk premium? A regression of the rolling five-year market risk premium versus time indicates that there is no statistically significant change in the risk premium between 1926 and 1995. The slope of the regression is not significantly different from zero.[58]

Survivorship Bias

Some have suggested that a negative adjustment should be made to the cost of equity for survivorship bias. They argue that the United States has been the most successful stock market of the twentieth century and therefore equity costs do not consider the low returns that failing companies might indicate. If that is the case, is it possible that the equity risk premium

---

[56] *Stocks, Bonds, Bills and Inflation: 2010 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2010), p. 55.

[57] *Stocks, Bonds, Bills and Inflation: 2010 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2010), p. 62.

[58] Copeland, Tom, Tim Koller & Jack Murrin, *Valuation: Measuring and Managing the Value of Companies*, 3rd ed. (New York: John Wiley & Sons, 2000), 217.

statistics based only on U.S. data may overstate the returns of equities as a whole because they only focus on one successful market? According to Dr. Roger Ibbotson this is not the case.

> While the survivorship bias evidence may be compelling on a worldwide basis, one can question its relevance to a purely U.S. analysis. If the entity being valued is a U.S. company, then the relevant data set should be the performance of equities in the U.S. market.[59]

Other studies have reached similar conclusions – that survivorship bias is of no significance in measuring the cost of equity in U. S. equity markets.

> The U.S. equity premium plays an important role in many areas of finance research and practice. Therefore, the concerns raised by Brown, Goetzmann, and Ross (BGR) that the equity premium might contain serious survival bias should be studied with great care: If proven true, this hypothesis would have widespread impact.
>
> Based on a general survival model developed in this paper, we show that the fundamental difficulty facing the survival argument is that to have high survival bias, the probability of market survival over the long run has to be extremely small, which seems to be inconsistent with existing historical evidence. Therefore, we argue that contrary to what BGR suggest, the survival bias in the U.S. equity premium is unlikely to be significant and the resultant concerns about the survival problem in the current literature are probably overstated.[60]

Thus, we believe that there is no significant survivorship bias affecting our estimate of the cost of capital for the Interstate Natural Gas Pipeline industry at January 1, 2011, and no adjustment is necessary.

---

[59] *Stocks, Bonds, Bills and Inflation: 2010 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2010), p. 62.

[60] Li, Haitao, and Yuewu Xu, "Survival Bias and the Equity Premium Puzzle," *The Journal of Finance*, Vol. LVII, Issue 5, October 2002, p. 1991. (emphasis added)

Supplement to the Cost of Capital Study

The income approach is based on the principle of anticipation primarily and involves converting dollars of expected future income into present value. The execution of the income approach involves the selection of the appropriate capitalization method, estimation of the expected income, and estimation of a proper capitalization rate which matches the income to be capitalized. The basic income formula is shown in the box to the right.

$$Value = \frac{Income}{Rate}$$

Income-producing property is typically purchased for investment purposes, and the projected net income stream is the critical factor affecting its market value. An investor purchasing income-producing property is in effect trading a sum of present dollars for the right to a stream of future dollars. There is a relationship between the two, and the connecting link is the process of capitalization. Because future dollars are worth less than present dollars, the anticipated future dollars are discounted to a present worth on some basis that reflects the risk and the waiting time involved.

The historical development of the income approach reflects a movement away from an initial emphasis on physical components of value toward a greater emphasis on investment components. The initial division of capitalization was between the concept of value as income divided by a rate (straight capitalization) and as income multiplied by a factor (annuity capitalization). Contemporary income appraisal theory revolves around two categories of capitalization methods — *direct* capitalization and *yield* capitalization.

Rates of Return

The typical investor's objective in any investment is to ultimately receive more than the amount invested. The investor thus wants a complete return ***of*** all capital invested and, in addition, a fair return ***on*** the capital invested. Thus, the investor expects to completely recoup his investment and be fairly compensated for the use of his capital. The return of capital is usually referred to as the recapture of the initial capital investment. The return on capital is usually referred to as the compensation an investor receives for the use of his capital until the capital is recaptured.

All rates of return can be classified as either 1) ***income rates*** or 2) ***yield rates***. An example of an income rate is the ***overall capitalization rate (R_o)***. An example of a yield rate is the property's ***overall yield rate***, which is synonymous with the ***discount rate*** and the ***cost of capital***. Under certain conditions, the income and yield rates for a property are equal even though they are not conceptually equal.

Categories of Capitalization

There are two categories (sometimes called methods) of capitalization which can be used in the income approach — ***direct*** and ***yield*** capitalization. Each category is based on sound appraisal theory and each is theoretically different in application. Direct capitalization is accomplished by the use of an *overall capitalization rate* ($\mathbf{R_o}$). The overall capitalization rate is actually the percent that a single year's income (usually the first year's income) represents as compared to market value. Yield capitalization is accomplished through the use of an *overall yield rate* ($\mathbf{Y_o}$). The overall yield rate is conceptually the weighted average of the interest rate for long-term debt and the equity yield rate and is also known as the *weighted average cost of capital (WACC)* or *discount rate*. Unlike the overall capitalization rate, the overall yield rate is not necessarily the percent of market value that the first year's income represents. However, under certain circumstances the overall capitalization rate and the overall yield rate are identical.

Direct Capitalization

Direct capitalization is a method of converting one year's income into value in one direct step, usually by dividing the income estimate by the appropriate income rate. It is the present worth of the future earnings that gives a proper indication of value by the income approach. Typically the income capitalized is the estimated net utility operating income expected in the following year. Net utility operating income for public utilities is defined as the income representing the amount available to pay the debt costs and equity costs for the property. Public utility regulatory commissions (both state and federal) recognize that net utility operating income is the level of income necessary to pay the cost of capital annually.

Regulatory commissions develop the cost of debt capital and cost of equity capital for the INGPI company in each rate case. The cost of debt capital and the cost of equity capital is weighted by the respective percentages of the amount of debt and equity in the overall capital structure for the utility. The resulting **weighted average cost of capital** is multiplied by the authorized rate base to obtain the authorized net utility operating income for regulatory purposes, which is the targeted amount that the regulatory commissions intend for the utility to earn each year to pay its cost of capital. Net utility operating income is reported on the utility's income statement and it is the amount available to pay to debt and equity holders. Thus, net utility operating income is the level of income set by regulatory commissions to fully cover the cost of capital of a public utility.

A note of caution about the use of direct capitalization is given here. There are six accepted techniques which can be used correctly to derive the overall capitalization rate used in direct capitalization. They are as stated below.

When supported by appropriate market data, accepted techniques include 1) derivation from comparable sales, 2) derivation from effective gross income multipliers and net income ratios, 3) band of investment—mortgage and equity components, 4) band of investment—land and building components, 5) the debt coverage formula, and 6) yield capitalization techniques such as the general yield and change formula, (R_O = yield – change in income and value) and the Ellwood method.[61]

No generally accepted appraisal literature indicates that it is proper under any circumstances to use sales of stock as comparable sales for deriving an overall capitalization rate or even an equity capitalization rate. In fact, there is an abundance of caution in appraisal literature about the use of sales that are not comparable to the property being appraised (such as deriving earnings-price ratios from stock transactions). For example, the following quotation addresses this issue:

Fundamental Investment Difference between Investment Securities and Real Estate/Tangible Personal Property. Table 29-2 summarizes some of the intrinsic differences between capital market securities (whether debt or equity instruments) and real estate and tangible personal property (either individual assets or going concern assemblages of assets) as investment alternatives.

Table 29-2
Investment Differences between Securities and Real Estate/Personal Property

	Securities (Debt or Equity Instruments)		Real Estate/Personal Property (Individually or as a Mass Assemblage)
1.	Liquid, marketable investments	1.	Illiquid investments
2.	Noncontrolling interest in income production and distribution	2.	Controlling interest in income production and distribution
3.	Small, absolute dollar investment required	3.	Large, absolute dollar investment required
4.	Small percentage of overall wealth committed to this investment	4.	Large percentage of overall wealth committed to this investment
5.	Diversified portfolio of investments	5.	Nondiversified portfolio of investments
6.	Short-term investment time horizon	6.	Long-term investment time horizon
7.	Does not require re-investment to maintain investment base	7.	Requires "replenishment" investment to maintain investment base
8.	Investments expected to appreciate over time	8.	Investments expected to depreciate over time
9.	Income typically subject to only individual tax (from investor's perspective)	9.	Income typically subject to both corporate and individual tax (from investor's perspective)
10.	Portfolios can be created in limitless combinations of risky securities and risk-free securities	10.	Portfolio limited to the particular combination of real estate and personal property that operate the subject business

[61] *The Appraisal of Real Estate*, 13th ed., (Chicago: Appraisal Institute, 2008), p. 501.

As the table indicates, there are fundamental investment risk and return differences between (1) marketable, minority interests in debt and equity securities and (2) nonmarketable, controlling interests in operating real estate and tangible personal property. Due to these differences, and for other reasons, it is unlikely that an economic model that correlates nondiversified risk and expected return for one type of investment will effectively serve the same function for such a different type of investment.[62]

Thus, it is clear from appraisal literature that it is absolutely wrong to use earnings-price ratios derived from stock sales as the equity capitalization rate or the equity yield rate in the appraisal of tangible assets or mass assemblages of assets as a going concern. Further, it is improper to use earnings-price ratios to match with the net utility operating income authorized by the FERC. The FERC does not utilize earnings-price ratios in the determination of the cost of equity for any company or in setting the authorized net operating amount. Finally, for the FERC to set the cost of equity capital based on earnings-price ratios would violate the mandates of the US Supreme court in their *Hope Natural Gas* and *Bluefield Water Works* decisions, which require the regulatory commissions to allow the regulated utilities to earn their cost of capital (commensurate with the return earned by companies of comparable risk).

Appraisal texts tell us explicitly that an appraiser ***may not*** derive equity capitalization rates from the stock market, however the same appraisal texts emphatically state that appraisers can derive equity yield rates from stocks and bonds of commensurate risk in the market. The use of earnings-price ratios as a substitute for the equity capitalization rate in deriving equity value, is simply not permissible. For example, IAAO's primary textbook addresses this issue as stated below.

> The equity yield rate (Y_E) is different from the equity capitalization rate (R_E). The equity capitalization rate is simply the ratio between the first year's income and the equity value or equity investment. The equity yield rate is the rate of return on equity capital. It is similar in concept to the property's overall yield rate (Y_O). The equity yield rate can be estimated by extraction from recent comparable sales (similar to derivation of the overall yield rate in the previous example), survey and opinion of market participants, and comparison with the equity yield rates (Y_E) achieved in alternative investments of comparable risk such as stocks and bonds. While the equity yield rate (Y_E) can be developed from alternative investments of comparable risks such as stocks and bonds, the equity capitalization rate (R_E) used in direct capitalization cannot be developed correctly from the earnings-to-price ratios of common stocks. Earnings-to-price

[62] Pratt, Reilly, & Schweihs, *Valuing A Business*, 3rd edition, (Chicago: Irwin Professional Publishing, 1996), 708.

> ratios of common stocks can only be used in the appraisal of similar common stock, not for the appraisal of real personal property.[63]

Additionally, the majority of public utility companies are subsidiaries of publicly traded holding companies. The use of a parent company traded stock earnings-price ratio as comparison to an untraded subsidiary company would further exacerbate an incorrect equity value.

Yield Capitalization

Yield capitalization is a method of converting a series of income flows (called cash flows) or a singular representative level cash flow into present value by discounting the expected future benefits at an appropriate discount rate (synonymous with the property's **overall yield rate** or **cost of capital**).

> To perform yield capitalization, an appraiser 1) selects an appropriate projection period; 2) forecasts all future cash flows or cash flow patterns (including the reversion); 3) chooses an appropriate yield rate; and 4) converts future benefits into present value by discounting each annual future benefit or by developing an overall rate that reflects the income pattern, value change, and yield rate using one of the various yield capitalization formulas. The application of capitalization rates that reflect an appropriate yield rate, the use of present value factors, and discounted cash flow analysis are all yield capitalization procedures.[64]

Thus, the appraiser performs yield capitalization by either 1) discounting each individual cash flow to its present value for the duration of the income, or 2) capitalizing the appropriate income at an overall capitalization rate, which represents the income pattern, value change, and yield rate.

Upon projecting the amount, timing, and duration of the cash flows to the property being appraised, the appraiser must identify the pattern that the cash flow is expected to follow during the holding period. Those patterns are either variable, level, increasing, or decreasing annuities. For a level annuity where a property is expected to generate a level net utility operating income for a finite period of time and then be resold at the original purchase price, the property can be valued with capitalization in perpetuity by dividing the periodic income by

---

[63] *Property Assessment Valuation*, 3rd ed., (Kansas City: International Association of Assessing Officers, 2010), p. 362.

[64] *The Appraisal of Real Estate*, 13th ed., (Chicago: Appraisal Institute, 2008), 519-520.

the appropriate discount rate. In this model the discount rate and the overall capitalization rate are the same.[65]

When the net income consists of a fixed amount that represents the return of capital (depreciation expense) plus a declining amount representing the return on the capital remaining in the investment, classic straight-line capitalization can be used to value the property.[66] In this model, as with the level perpetuity, the discount rate and the overall capitalization rate are equal when properly applied to a utility's net cash flow.

If the cash flow pattern is expected to be in the form of a variable annuity each individual income flow will be discounted into an indication of present worth at the appropriate discount rate for the holding period. Further, the appraiser discounts any remaining value in the investment at the end of the holding period and adds the total present worth of the variable cash flows to the present worth of the future value at the end of the holding period. The total represents the present worth of the total property.

The application of the DCF model for a variable annuity can be accomplished using the following formula.

$$Value = \frac{I_1}{(1+r)^1} + \frac{I_2}{(1+r)^2} + \frac{I_3}{(1+r)^3} + \ldots + \frac{I_n}{(1+r)^n}$$

In this formula, ***I*** equals income or cash flow in periods 1 through n, and ***r*** equals the discount rate. Where income has the characteristics of a perpetuity or of a classic straight line capitalization model, the universal capitalization formula, *Value = Income ÷ Rate*, can be used. In this case the overall capitalization rate will equal the discount rate.

To derive *equity yield rates* from market information, yield capitalization permits some things that would not be proper when using direct capitalization. For example, generally accepted appraisal texts record how it is permissible to use stocks and bonds for determination of equity yield rates in alternative investments when appraising real estate.

> An investor may compare the expected equity yield on a real property investment with the yields on alternative investments with commensurate risk (e.g., stocks and bonds) and with a lender's yield on mortgages secured by similar real property.[67]

The Appraisal Institute goes on to state:

---

[65] *Ibid.*, 560.

[66] *Ibid.*, 560.

[67] *Ibid.*, 118-119.

> To estimate equity yield rates, appraisers must do market research. This research can take many forms and may include one or more of the following analyses...Comparison with the equity yield rates achieved in alternative investments of comparable risk such as stocks and bonds...[68]

An important difference between yield capitalization and direct capitalization is that in yield capitalization when deriving the equity yield rate, i.e., the cost of capital, it is entirely appropriate to use sales of stock (the capital asset pricing model, DCF or Gordon growth model, or risk premium models) to derive the equity yield rate. However, as discussed above, when using direct capitalization, it is absolutely inappropriate to use sales of stock (earnings-price ratios) to derive equity capitalization rates. The reason is simple; equity cap rates are intended to be ratios between income and value while equity yield rates are not. Thus, it is critical that the sales used in deriving those ratios be virtually identical to the property being appraised. Stocks, quite simply, are not comparable to tangible assets as discussed in the quotation on page 103. Because stock sales used to derive equity yield rates are used to indicate relative risk between investments, it is entirely appropriate to use stock sales to derive equity yield rates.

Estimation of Income to Capitalize

The income level capitalized in the income approach is usually called ***cash flow***. In fact, as mentioned previously on page 12, Dr. William Kinnard, MAI explains that all of the annual "income" figures used in appraising income-producing properties are *cash flows* rather than accrual accounting incomes. Cash flow can be defined in a number of ways, however for appraisal purposes it generally consists of income necessary to satisfy the cost of capital plus depreciation expense. Commercial and general appraisers recognize this level of income as simply ***net operating income***. Utility appraisers know that the definition of "net utility operating income" for public utilities and commercial properties is different in one important aspect. For public utilities the level of income reported as "net utility operating income" is only that income available to pay the utility's cost of capital, while for commercial properties "net operating income" includes not only the level of income available for debt and equity, but also the income to recapture a portion of the wasting asset (*otherwise known as depreciation expense*).

In general commercial appraisals cash flow is typically defined as simply net operating income (as defined for general commercial appraisal purposes), which is the income available for debt and equity and the depreciation expense. For an illustration of this type of analysis, refer to *The Appraisal of Real Estate*, 13th edition, page 542-543.

---

[68] *Ibid.*, 119.

For public utility appraisal, cash flow is often defined as net utility operating income (defined as the income available to pay the cost of capital) plus depreciation expense and the current portion of deferred income taxes. This definition of cash flow is sometimes referred to as ***gross cash flow*** because there is no deduction for capital expenditures to keep the utility operating, Thus this cash flow model will have a limited life duration. In other words, gross cash flows cannot continue indefinitely without significant new investment to keep the utility operations ongoing.

Another variation of this same general definition of cash flow for a public utility is called ***net cash flow***, which is the gross cash flow less capital expenditures. Some refer to this as gross revenue less all cash disbursements except interest expense. For the appraisal of public utilities where it is assumed that the amount of capital reinvestment is equal to the depreciation expense, *net cash flow* can be defined simply as utility net utility operating income. For the appraisal of a public utility as a going concern, net cash flow is usually the best level of income to work with. The purpose of this cost of capital study is to provide the cost of capital, which can be used to capitalize the net cash flow for the typical interstate natural gas pipeline company for the purpose of estimating market value.