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Interstate Natural Gas Pipeline Industry

2015 Cost of Capital Study

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Common Terms

AEO	Annual Energy Outlook
Bcf/d	Billion cubic feet per day
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
SBBI	*Stocks, Bonds, Bills & Inflation*
SFV	Straight Fixed Variable
S&P	Standard & Poor's
STEO	Short-Term Energy Outlook
VL	*The Value Line Investment Survey*
WACC	Weighted Average Cost of Capital
WSJ	*Wall Street Journal*
YTM	Yield to Maturity

2015 Cost of Capital Study of the Interstate Natural Gas Pipeline Industry for the Interstate Natural Gas Pipeline Property Tax Forum January 1, 2015

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, 2015. 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, 2015, 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, additional adjustments must be made to reflect the enhanced risk associated with an investment in the operating assets of companies which are considered below investment grade.

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, 2015.

Executive Summary - Cost of Capital

Based on our analysis and investigation, we have calculated the weighted average cost of capital (WACC) for the INGPI to be **10.65%** as of January 1, 2015. The cost of capital

developed in this study is also known as the discount rate[1] and is appropriate to use in discounting the after-tax operating cash flows projected as of January 1, 2015, for determination of the market value of the operating assets, tangible and intangible, of the typical interstate natural gas pipeline. 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 20.

Interstate Natural Gas Pipeline Property Tax Forum

The INGPPTF represents approximately 66 companies engaged in the transportation of natural gas. Only a few of the parents of these companies have common equity traded on the major financial markets. Thus, the financial information from the actually traded INGPPTF members (primarily parent companies) may not, by itself, be indicative of the actual cost of capital for the interstate natural gas pipeline industry. The 2015 membership roster of the INGPPTF is listed below:

Boardwalk Pipeline
  Texas Gas Transmission, LLC
Centerpoint Energy
  Centerpoint Energy Gas Transmission
  Centerpoint Energy Mississippi River Transmission
Columbia Gas/Gulf Transmission Corporation
Dominion Transmission Corporation
Kern River Gas Transmission
Kinder Morgan, Inc.
  Tennessee Gas Pipeline
  Southern Natural Gas
  El Paso Natural Gas
  Mojave Pipeline
  Colorado Interstate Gas
  Cheyenne Plains Pipeline
Wyoming Interstate Company
Natural Gas Pipeline Company of America
Midcontinent Express Pipeline
TransColorado Gas Pipeline
Louisiana Pipeline
Bear Creek Storage
Elba Express
Gulf LNG
Ruby Pipeline, LLC
Southern LNG
Young Gas Storage
MDU Resources Group, Inc.
National Fuel Gas Supply Corporation
Northern Natural Gas Company
Oneok Partners, LP

[1] A rate of return used to convert a monetary sum, payable or receivable in the future, into present value. Theoretically it should reflect the opportunity cost of capital, i.e., the rate of return the capital can earn if put to other uses having similar risk. [See *The Dictionary of Real Estate Appraisal*, 5th ed., (Chicago: Appraisal Institute, 2010) 246.]

Guardian Pipeline Company
Midwestern Gas Transmission Company
OKTEX Pipeline
Viking Gas Transmission Company
Questar Pipeline Company
Southern Star Central Gas Pipeline, Inc.
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 Corporation
TransCanada Pipelines Limited
TransCanada Corp – US Pipelines
ANR Pipeline
North Baja Pipeline
Portland Natural Gas Transmission
GTN Pipeline System
Tuscarora Gas Transmission
Great Lakes Gas Transmission
Iroquois Gas Transmission
Bisan Pipeline LLC
Northern Border Pipeline Company
Williams Companies, Inc.
Transcontinental Gas Pipeline Company LLC
Northwest Pipeline Company LLC

General Economic Trends - 2015

Economic Background

The Great Recession in the U.S. started in December 2007 and lasted for 18 months. In late 2008, in an effort to help kick-start the economy, the Federal Reserve initiated its generous bond buying program (quantitative easing) and sent short-term interest rates tumbling to near zero. The low interest rate environment was supposed to encourage banks to lend more money to businesses and people.

This didn't happen exactly like it was supposed to. Instead of making it easier to get money, America's big banks tightened their lending rules, taking the opportunity to strategically invest the money themselves. Granted, the banks were more than willing to lend to well-heeled Americans. Keeping interest rates artificially low has made it cheaper to borrow and is generally recognized as the fuel that's been propelling the stock market increasingly higher.

Since the Federal Reserve enacted its quantitative easing strategy, the S&P 500 has soared more than 200% in value. During the same time-frame, the number of Americans receiving food stamps has essentially doubled to 46.23 million, or one-sixth of the American population.

As a broader measure, since the Great Recession began, the top one percent of earners have seen their incomes rise more than 30%, while the bottom 99% saw their earnings rise 0.4%. During the so-called recovery, the top one percent captured 95% of the total growth in the U.S.

Unfortunately, the widening gap has slowed the five-year recovery and contributed to *Standard & Poor's (S&P)* cutting its growth estimates for the economy. Because (in part) of the income disparity, *S&P* estimates the economy will grow 2.5% annually for the next decade—down from a forecast five years ago of 2.8%, according to John Whitefoot of Profit Confidential on January 21, 2015.[2]

Last Year - 2014

U.S. economic growth slowed in the final months of 2014, highlighting challenges facing the U.S. expansion amid rising global uncertainty. Gross domestic product—the broadest measure of goods and services produced across the economy—expanded at a 2.6% annual rate in the fourth quarter, the Commerce Department reported on January 30, 2015.[3]

Energy-rich regions of the U.S. were seeing signs of slower growth due to the plunge in oil prices, though the national economy continued to expand in late 2014, the Federal Reserve said in its latest survey of regional economic conditions reported in the Federal Reserve's Beige Book report released January 14, 2015, ahead of the Federal Reserve's January 27-28, 2015 policy meeting in Washington, DC. The Federal Reserve found "modest" or "moderate" growth across most of its 12 districts in mid-November through late December of 2014, according to the "Beige Book."

The central bank's top officials are debating the timing and pace of interest-rate increases that are widely expected to begin sometime this year. Ms. Janet Yellen, chairwoman of the Federal Reserve, said in December of 2014 that it was unlikely the Federal Reserve would begin to raise rates at its January or March 2015 meetings.

In areas where energy production has boomed in recent years, the sharp decline in oil prices since mid-2014 was generating worries about a slowdown. But Federal Reserve officials have said, on balance, the drop in oil prices should provide a boost for U.S. consumers and the economy as a whole. "It is putting more money in their pockets, having to spend less on gas and energy, and so in that sense it's like a tax cut that boosts their spending power," Yellen said in December of 2014.

The central bank has kept short-term interest rates pinned near zero since December 2008 to bolster the economy through the financial crisis, the recession and the slow recovery that followed. Now, Federal Reserve policy makers must weigh rapid improvement in the labor

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[2] Whitefoot, John. "What is the U.S. Economic Outlook for 2015?," Profit Confidential, January 21, 2015, http://www.profitconfidential.com/economic-analysis/economic-outlook-for-2015.

[3] Davidson, Kate. "Economists React to Fourth-Quarter GDP: 'The Trend is Improving'," *The Wall Street Journal*, January 30, 2015, *WSJ* online.

market—including a drop in the unemployment rate to a fresh postrecession low of 5.6% in December—against sluggish price and wage growth in deciding when to begin tightening credit.

U.S. inflation has undershot the central bank's 2% target for more than 2½ years. Lower oil prices have further depressed inflation readings. Federal Reserve officials, however, have said they expect inflation will gradually move back toward its 2% goal over time.[4]

Economic Forecasts for 2015

Economic forecasters might be eagerly looking forward to 2015 particularly because of their poor projections for 2014. Looking back at the projections made in January 2014 in *The Wall Street Journal's* monthly survey of economists, the picture wasn't pretty. Most economists expected higher oil prices, firmer inflation, a worse jobless rate and higher interest rates than the year 2014 actually delivered.[5] As 2014 wound down, many investors were wondering what the economic outlook for 2015 would be.

Falling oil prices will be a boon to the domestic economy at least through the first half of the year, but the price drop also means the U.S. will flirt briefly with deflation, according to *The Wall Street Journal's* 2015 survey of economic forecasters reported by Kathleen Madigan.

The roster of 66 economists—not all of whom answered every question—is on average slightly more upbeat about the 2015 economy. Inflation-adjusted gross domestic product is forecast to grow 3% across the four quarters of 2015, better than the 2.6% rate that was estimated for 2014. Wages are expected to pick up as the labor market tightens.[6]

Cheaper oil also means that inflation—as measured by the consumer-price index—would turn into deflation temporarily, many economists said. The average of the forecasts sees the CPI up only 0.5% in the 12 months ended in June 2015, and one-quarter of respondents expected the percentage change to be negative, with the headline CPI declining as much as 1%. Deflation would be short-lived, however, as oil prices headed north and other prices in the core index—which excluded food and energy—continued to increase, said Tom Porcelli of RBC Capital Markets.[7]

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[4] Leubsdorf, Ben and Sara Portlock. "Fed's Beige Book: Continued Growth, but No Broad-Based Pickup," *The Wall Street Journal*, January 14, 2015, *WSJ* online.

[5] Reddy, Sudeep. "How Economists' 2014 Projections Fared," *The Wall Street Journal*, January 1, 2015, *WSJ* online.

[6] Kavadas, Ted. "*Wall Street Journal* Economic Forecast Survey January 2015 - Notable Aspects, StratX, LLC, January 16, 2015, http://www.stratxllc.com/wall-street-journal-economic-forecaset-survey-january-2015-notable-aspects/.

[7] *Ibid.*

The biggest economic lift was projected to come from the prolonged drop in oil prices that began in June of 2014. Almost all respondents said cheaper oil would lift GDP growth "slightly" or "considerably." Fewer than 7% of economists thought oil would have no impact or be a detriment. "The plunge in energy prices provides big dividends to consumers and businesses," said Bernard Baumohl of the Economic Outlook Group.[8]

Starting with this survey, the *WSJ* has expanded the number of economists surveyed to more than 70 from about 50 in previous years. The survey will now capture more opinions from economists in academia and nonfinancial firms. The larger roster is also more geographically diverse.

If gasoline prices stay near $2 a gallon for 2015, the economy would see a net savings of $750 per household, or just over $90 billion in savings across 124 million U.S. households, said Jim Miel of ACT Research. "The fall in oil prices represents a backdoor boost to take home pay, the likes of which affect the masses, not just a few," said Diane Swonk of Mesirow Financial.

Although the forecasters on average expected growth to hover around 3% in each of 2015's four quarters, the lift from cheap oil was expected to ebb later because most of oil's decline had already occurred. The economists on average saw U.S. oil prices edging up over the course of the year, ending 2015 at $63.03 per barrel. The U.S. benchmark has traded below $50 a barrel the end of 2014 and beginning of 2015 after falling from a peak of $107.26 in June of 2014.

Although the economists generally were more upbeat about the economic outlook and labor-market improvement, as a group they had not altered their expectations much about the timing of the Federal Reserve's policy shift. When asked when the Fed would raise its policy rate, the most frequent answer remained June 2015.

Overseas troubles remain the biggest downside risk seen by most economists. A large share of the forecasters specifically cited problems in Europe as a negative that could hurt U.S. growth. Those problems range from Greece's exit from the eurozone to the eurozone falling back into recession.[9]

Value Line's Selection & Opinion, in January 2015, projected a much more stable year (2015) for the economy. Its expectation was that the business expansion—which went back and forth in 2014, with the U.S. gross domestic product contracting early in the year, before the economy put on its best performance in 11 years in the third quarter of 2014—would not be all over the lot in the new year (2015). On point, most of the key indicators suggested the U.S.

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[8] Madigan, Kathleen. "*WSJ* Survey: Economists See 2015 GDP Growth at 3%," The Wall Street Journal, January 15, 2015, *WSJ* online.

[9] *Ibid.*

could be in for somewhat smoother sailing in 2015, although growth was likely to be just modest. *Value Line*'s prediction appeared to be in consensus with the economists of the *Wall Street Journal*.[10]

Other economic groups, such as Wells Fargo's economics group, predicted that 2015 would be a game-changer for the U.S. economy and for global markets. Wells Fargo's economic group forecast the U.S. real GDP would grow roughly 2.5-3 percent in each of the next two years, marking the strongest two-year period since the middle of the 2001-2007 economic expansion. Wells Fargo projected the U.S. economy's strong fundamentals should allow the domestic economy to become more self-sustaining in 2015 in complete agreement with *WSJ*'s and *Value Line's* economists' projections.[11]

Stock Market Projections

January marks a fresh start for Wall Street, a time for investors to reassess risks and put fresh cash to work. The first month of the year is also known for setting the trading tone and mood of the market for the full year. So, will January tell a bullish or bearish story for 2015?

There is an old saying on Wall Street: "As January goes, so goes the market." The direction of the broad U.S. stock market has tracked January 77% of the time since 1950 — and "registered only seven major errors" — according to *The Stock Trader's Almanac* (*Almanac*). Last year, however, was an exception, with the *Standard & Poor's* 500-stock index tumbling 3.6% in January before rebounding strongly and finishing the year up 11.4%. Gains in the first five days of January have led to full-year gains 85% of the time.

January's predictive nature has been even more spot-on in pre-presidential election years, with the U.S. stock market's full-year direction determined 87.5% of the time by how the market fares in January, according to *Almanac* editor Jeffrey Hirsch. "Getting off to a good start is always important," says Hirsch, especially this year when the Federal Reserve is expected to start hiking interest rates for the first time since 2006.[12]

While all predictions require a few shakes of salt, the range of 2015 targets for the *S&P* 500 among market strategists – the top-down thinkers on Wall Street – surveyed by Barron's varies from a low of 2100 to a high of 2350, with a mean of 2208. The *S&P* 500 closed at 2062 on January 8, 2015.

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[10] "Economic and Stock Market Commentary," *The Value Line Investment Survey*, Selection & Opinion, January 16, 2015, p. 4425.

[11] "2015 Economic Outlook," Wells Fargo, December 10, 2014, *Bloomberg* online.

[12] Shell, Adam. "Will stock market celebration continue in 2015?," *USA Today*, January 5, 2015, *USA Today* online.,

Barrons' analysts do not see utilities or telecommunications companies continuing their winning ways in 2015, however, forecasting profit growth of 2.6% and 5.1%, respectively. But nothing is as ugly as energy, with sharp estimate cuts by industry analysts as they race to keep up with the unbelievably fast skid in oil prices. Projects that made sense when oil was at $100 a barrel look like folly at $50 a barrel. So as producers pull back on spending and drilling, companies that provide equipment and services are getting squeezed. Additional problems are the heavy debt loads many American oil and gas companies took on during the energy boom.

As the price of oil continued to fall – it dipped below $50 a barrel the week of January 5-9, 2015 for the first time since the financial crisis – analysts covering energy companies continued to slash earnings forecasts. Falling estimates for energy earnings, in turn, were dragging down *Wall Street's* forecast for the *S&P* 500. With no clear end in sight to the sell-off in crude prices, and an increasingly dour global economic outlook, analysts and investors could be in for a bumpy ride.[13]

"There are a lot of moving parts behind earnings estimates in 2015," says Jack Ablin, chief investment officer at BMO Private Bank. "It is hard to know right now how all the pieces will fit together." "With a market multiple now at 16 times earnings, 17 is not out of the realm of possibility, but the real question is going to be earnings," says Ed Yardeni of Yardeni Research.[14]

Despite all the optimism surrounding the U.S. economy, there is reason for concern. The stock markets may be near their all-time highs, but they are beginning to shows signs of weakness according to John Whitefoot of Profit Confidential.

Just because the U.S. is doing well does not mean stocks will run in step. Remember, the stock market is only as strong as the companies that go into making up the exchanges. The U.S. is finally showing signs of strength, but the global economy…that's another issue entirely. Why? asked Whitefoot, because roughly half of all U.S. companies get some of their revenue from outside the country. A slowing global economy could translate into slowing global sales and fears of a stock market correction in the U.S.[15]

Investors should take predictions about the stock market with a grain of salt, according to Eric McWinnie of *WallStCheatSheet.* In any given year, stocks can go up, down, or sideways.

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[13] Bennett, Johanna. "2015 Earnings Outlook," Barrons, January 9, 2015, http://online.barrons.com/articles/2015-earnings-outlook-1420801665.

[14] *Ibid.*

[15] Whitefoot, John. "U.S. Economic Outlook for 2015: Economy Strong but Markets Unstable," Profit Confidential, January 1, 2015, http://www.profitconfidential.com/economic-analysis/u-s-economic-outlook-2015/

Instead of focusing on short-term fluctuations and annual targets for the S&P 500 from your favorite hedge fund manager, long-term investors should heed probabilities. Since World War II, the average annual gain on stocks is 7% to 9%. As long as the U.S. economy avoids a recession in 2015, probabilities favor stocks.

Since 1950, in years during which the U.S. economy does not enter recession, the odds of a positive year for the S&P 500 were 82%, according to research from LPL Financial. The presidential cycle also suggests a positive year for stocks. "2015 is the third year of the four-year presidential cycle, which historically has been the best year to own stocks," explains LPL Financial. "Since 1950, during each of the other three years of the cycle — including the presidential election year — stocks gained an average of about 6%, excluding dividends. But during the third year of the cycle, which is one year before the election, stocks have produced an average gain of 17%. This transition through the presidential cycle is a tailwind supporting a potentially strong backdrop of stocks in 2015."[16]

Natural Gas Pipeline Industry - 2015

Interstate pipelines have both utility and merchant energy characteristics. They are 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 company can expand its service territory through new permitting and construction, whereas this is not usually the case for LDCs. Pipelines and LDCs 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 appraiser/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.

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

The demand side of the equation is subject to potential secular shifts. For example,

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[16] McWhinnie, Eric. "5 Predictions About the Economy for 2015," WallStCheatSheet, January 5, 2015, http://wallstcheatsheet.com/business/5-sensible-predictions-about-the-economy-and-financial-markets-for-2015.html/?a=viewall.

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.[17]

Pipeline MLPs

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 raise fresh debt and equity capital to fund new investment. Unlike other pipeline companies, pension funds generally cannot hold MLPs due to current tax obligations generated from their partnership structure. Accordingly, shares of publicly traded MLP's generally are held by smaller retail investors.[18]

The Pipeline Master Limited Partnership (MLP) Industry is ranked in the bottom half of all industries covered in *The Value Line Investment Survey (VL)*. Pipeline MLPs are high-yield equities that afford exposure to growing energy demand with minimal risk of commodity price fluctuations.

The MLP Industry consists of tax-advantaged oil and gas processing and distribution companies. They do not pay state or federal corporate income taxes. Instead, the general partnerships typically pay out all of their distributable income to unit-holders (usually, earnings plus depletion, depreciation, and amortization and other noncash expenses, minus maintenance capital spending and payouts to the general) less a small portion retained to fund growth. MLPs own storage, processing, and transportation assets, and charge customers fees for using those facilities. They do not usually take title to hydrocarbons and, thus, are not generally directly exposed to commodity price risk. MLPs are operated by a general partner, an entity that sometimes trades separately.[19]

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[17] Glickman, Stewart, CFA. "Natural Gas Distribution," *Standard & Poor's*, January 2015, p. 43-44.

[18] *Ibid*, p. 44.

[19] Fong, Bryan J. "Pipeline MLPs", *The Value Line Investment Survey*, December 5, 2014, 621.

Pipeline MLP Industry in a Consolidation Phase

Kinder Morgan Inc. consolidated three different entities that operate under its umbrella. The parent company owns the general or limited partner interests in Kinder Morgan Energy Partners, El Paso Pipeline Partners and Kinder Morgan Management. It has recently decided to fully acquire those operations, offering up equity and cash deals to current unitholders. All of those transactions were completed on November 26, 2014. Meanwhile, the Williams Companies, which owns all of the Williams Partners LP (WPZ) general partner units and the majority of its limited partner units, is merging WPZ into a subsidiary of its fully owned Access Midstream Partners LP. The surviving entity of that deal will be called Williams Partners LP. This complex transaction may face unitholder and/or regulatory delays, but assuming everything goes as planned, completion is anticipated in early 2015.[20]

Pipeline Capacity Expansion is Slowing

Interstate pipeline capacity for natural gas expanded from 1996 through 2011 by an average of 1,707 miles per year and intrastate pipeline capacity expanded by an average of 378 miles per year, in part to bring gas to the northeastern US, based on Energy Information Administration (EIA) data. The average annual cost of these pipelines was $4.2 billion. Some of the new pipelines allow expected LNG imports to move from LNG terminals to major gas pipelines, while others help to move new gas discoveries in the western and mid-continent US supply regions to distributors and end users in the Northeast and on the West Coast. These new pipelines could have helped to reduce city-gate price volatility in the Northeast, but now, shale gas from the Marcellus Shale has reduced the need to transport gas to the Northeast from other areas.

According to data from the EIA, only 368 miles of interstate and 135 miles of intrastate pipelines were completed in 2012; in 2013 (through the end of the third quarter), just 154 interstate and 105 intrastate pipeline miles were completed (latest available data). The pipelines entering service in 2012 cost $1.9 billion and those entering service so far in 2013 cost just $449 million.

The sharp drop off in pipeline projects appears set to continue through 2016. In 2014, only 194 interstate miles and 66 intrastate miles were expected to be completed, partly due to the 500-mile interstate Pony Express pipeline being taken out of gas service to be converted to an oil pipeline. The EIA data show that 408 interstate miles and six intrastate miles are expected to be completed in 2015. As of May 12, 2014, the Northeast Gas Association (NGA), a trade association, summarized 18 planned enhancements in the northeast natural gas pipeline systems, with estimated in-service from the second half of 2014 until 2018. In 2016, 1,084 interstate

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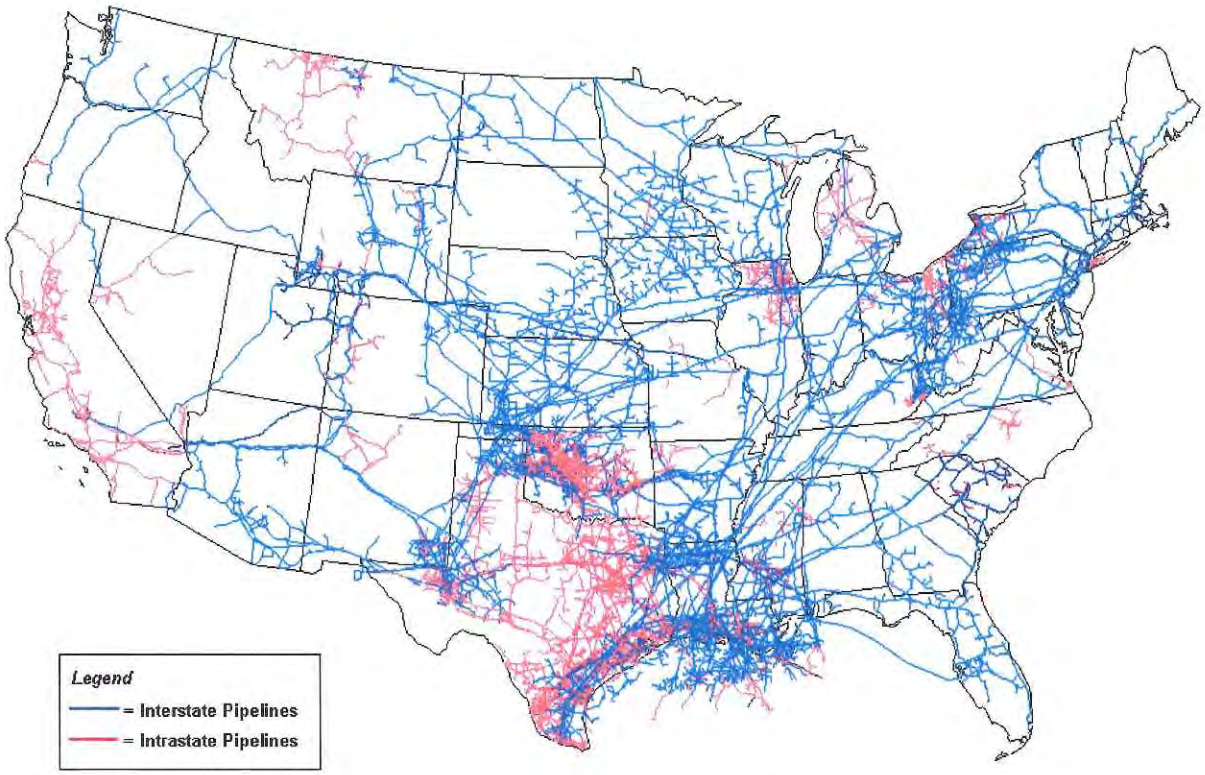
[20] *Ibid.*

miles and 125 intrastate miles are expected to be completed. Announced projects scheduled for 2016 completion include a 400-mile North Dakota and Montana pipeline announced by MDU Resources Group, and a 250-mile pipeline through Ohio, Michigan, and Canada, and a 230-mile Alabama and Georgia pipeline—both announced by Spectra Energy.[21]

U.S. Natural Gas Pipeline Network, (latest EIA map, 2010)



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

Short-Term Natural Gas Outlook

The February 2015 EIA Short-Term Energy Outlook (STEO) reported that recent data indicate marketed natural gas production reached a record 77.3 Bcf/d in November of 2014. Despite cold weather and reports of production freeze-offs this winter, supply has remained abundant and prices have fallen.

The February 2015 natural gas futures contract expired at $2.87/MMBtu, and prices for the March contract have fallen further, settling at $2.60/MMBtu on February 5. Henry Hub spot

[21] *Op. Cit.*, Glickman, p. 24-25.

prices are now projected to average $3.05/MMBtu in 2015, $1.34/MMBtu lower than in 2014 and $0.39/MMBtu lower than in last month's forecast. Lower expected prices in 2015 contribute to increasing consumption of natural gas for power generation, which is projected to be 5.5% above the 2014 level.

EIA projects that U.S. total natural gas consumption would average 74.3 Bcf/d in 2015 and 75.2 Bcf/d in 2016, compared with an estimated 73.3 Bcf/d in 2014. Growth is largely driven by demand in the industrial and electric power sectors, while residential and commercial consumption is projected to decline in 2015 and 2016. Natural gas consumption in the power sector is expected to average 23.5 Bcf/d in 2015, a 0.5 Bcf/d increase from last month's STEO. EIA expects power sector consumption to grow by 2.6%, to 24.1 Bcf/d, in 2016. Industrial sector consumption increases by 5.6% and 1.9% in 2015 and 2016, respectively, as new industrial projects come online, particularly in the fertilizer and chemicals sectors, and industrial consumers are able to take advantage of low natural gas prices.

EIA expects that marketed natural gas production will increase by 2.9 Bcf/d (3.8%) and 1.7 Bcf/d (2.2%) in 2015 and 2016, respectively. This increase reflects continuing strong production in the Lower 48 states, which more than offsets the long-term declining production in the Gulf of Mexico. Although natural gas prices have fallen dramatically in recent months, EIA expects that increases in drilling efficiency and growth in oil production (albeit at a slower rate) will continue to support growing natural gas production in the forecast.

Additionally, preliminary data indicate freeze-offs modestly reduced production in January, but production has quickly recovered and growth continues. With most growth expected to come from the Marcellus Shale, a backlog of drilled but uncompleted wells will continue to support production growth, as new pipelines come online in the Northeast. Increases in domestic natural gas production are expected to contribute to lower demand for natural gas imports from Canada and increasing exports to Mexico.

EIA expects exports to Mexico, particularly from the Eagle Ford Shale in South Texas, to increase because of growing demand from Mexico's electric power sector, coupled with flat Mexican natural gas production. Liquefied natural gas (LNG) imports have fallen over the past five years because higher prices in Europe and Asia are more attractive to LNG exporters than the relatively low prices in the United States. Forecast LNG gross imports average 0.2 Bcf/d in both 2015 and 2016. EIA projects that LNG gross exports will increase from an average of 0.04 Bcf/d in 2014 to almost 0.8 Bcf/d in 2016. On January 30, 2015 natural gas working inventories totaled 2,428 Bcf, 468 Bcf (24%) above the level at the same time in 2014 and 29 Bcf (1%) below the previous five-year (2010-14) average. Following last year's extremely cold winter, inventories fell 1,000 Bcf below the five-year average in mid-April but since then have consistently narrowed the gap . EIA projects that end-of-March 2015 inventories will total 1,699

Bcf, 43 Bcf more than the five-year (2010-14) average.[22]

Gas Pipeline Transportation Business Locations

The geographic spread of the Gas Pipeline Transportation industry is difficult to isolate because many pipelines extend across state and regional boundaries. Therefore, the starting point of interstate pipelines (where natural gas is sourced) and the volume of gas delivered is used as the basis for geographic spread.

Using this framework, the Southwest region is the most prominent (accounting for more than 31.8% of interstate natural gas shipments), followed by the Southeast (31.0%) and the Plains (10.6%). The most significant states are Texas, which account for 21.9% of establishments, and Louisiana, which account for 9.2% of establishments. About 6.0% of natural gas shipments originate in the Gulf of Mexico and are split between the Southeast and Southwest regions for the purposes of this analysis.

Regional gas markets in the U.S. have different demographics, differing weather patterns and distinct natural gas customer profiles. In the colder, seasonal markets, regional transportation and distribution systems are designed to meet space-heating demands by residential and commercial customers, and they are interlaced with backup storage and peaking facilities. In markets where seasonality is not a main issue, natural gas demand is mainly determined by electric power generation or industrial use. In these regions, storage is needed to support short-term demand fluctuations and system balancing.[23] The following map illustrates the Natural Gas Pipeline Transportation Industry's business locations in 2015.[24]

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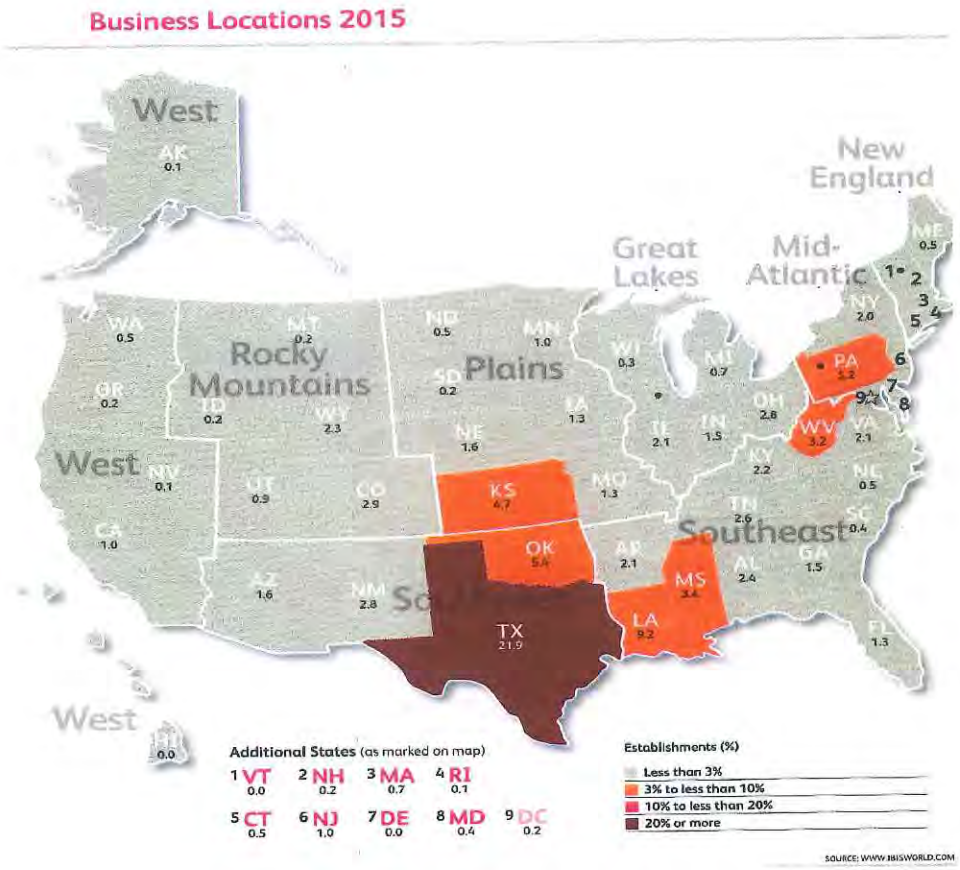
[22] "Short-Term Energy Outlook," U.S. Energy Information Administration, February 2015, p. 7-8.

[23] Ulama, Darryle. "Gas Pipeline Transportation in the US," *IBISWorld* Industry Report 48621, January 2015, 16.

[24] *Ibid.*, 15.



Stunted Profit

The natural gas pipeline transportation industry's exposure to commodity price volatility is limited because operators typically do not own the natural gas that they transport, leading to relatively steady revenue and profit. Nevertheless, rising capital costs associated with the construction of pipeline expansion will prevent profit from keeping up with revenue growth. Moreover, interest rates are expected to rise in the next five years, increasing the costs associated with heavy investments that require borrowing capital. In 2020, the prime rate is forecast to increase to 6.8%, up from 3.4% in 2015. As operators accelerate their investments in expansion, with the hope of receiving rate increases from the FERC, profit is projected to contract slightly from 22.6% of revenue in 2015 to 21.7% in 2020, according to Ulama.[25].

Executive Summary by IBISWorld of Natural Gas Transportation in the US

The Gas Pipeline Transportation industry has experienced explosive growth in the five years to 2015. Industry operators generally do not own the natural gas they transport, and instead

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[25] *Ibid.*, 9.

generate revenue from the fees paid by distributors and set by the Federal Energy Regulatory Committee (FERC). Consumption of natural gas has increased over the past five years, spurring production and demand from industry operators. In the five years to 2015, industry revenue is expected to increase at an annualized rate of 6.2% to $27.0 billion. Despite slow growth in prices, the industry is anticipated to grow 2.4% in 2015.

Higher volumes of natural gas production have encouraged industry operators to extend their pipeline capacity. Advances in hydraulic fracturing technology have allowed previously untapped reserves to be utilized. For example, large discoveries of natural gas reserves in the Marcellus Shale Basin, located in the northern Appalachians, have led to substantial growth in the amount of natural gas that requires transporting. Increased supply has maintained low gas prices, encouraging higher demand. Industry operators are investing heavily in expanding their infrastructure to maintain capacity, which has depressed profit margins from 28.4% of revenue in 2010 to 22.6% in 2015. On the positive side, infrastructure upgrades and additional capital costs have allowed for rate *increases*, which have translated into revenue growth. The FERC accelerated its rate increases during the past five years as industry operators invested more into their assets to accommodate the growing volume of transported natural gas.

Industry growth is forecast to endure in the five years to 2020. Electricity generation operators will continue to demand natural gas at higher volumes, as they decrease their dependence on imported oil, and natural gas prices remain near historic lows. Natural gas extraction operators will also expand production in shale basins during this time period, which will lead to continued growth in the amount of gas that needs to be transported. In order to accommodate the increase in production from shale deposits, industry operators will continue to extend their pipelines, which will cause rates to continue rising. Due to these positive trends, revenue is projected to grow at an annualized rate of 3.2% to $31.6 billion in the five years to 2020.[26]

Gas Pipeline Transportation Risk Rating

IBISWorld Inc. annually produces an IBISWorld Industry Risk Rating Report. In December 2014, the "Gas Pipeline Transportation 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 using pipelines and does not include the recovery of natural gas from wells or the processing of natural gas. The forecast period encompasses all of 2015. 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 economic forces (sensitivity risk).

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[26] *Ibid.*, 4.

The results follow.[27]

Structural Risk Analysis — is forecast to be MEDIUM-LOW over the outlook period from a LOW over 2014. Operators are exposed to moderate revenue volatility, which requires prudent management of cash flows and planning in the face of uncertain demand. Businesses that fail to account for these challenges are at a risk for sudden losses or diminished margins. Additionally, firms face a moderate amount of competition, which exacerbates risk by placing downward pressure on prices and profit margins. However a positive for operators within the industry are the high barriers to entry, which protect against higher competition in the long run by reducing the ability of new operators to enter the marketplace.[28]

Growth Risk Analysis — is expected to be MEDIUM-LOW over the outlook period. *IBISWorld* forecasts that annual industry revenue will grow 3.2% to $26.8 billion. In comparison, revenue expanded 3.1% per year between 2012 and 2014. The Gas Pipeline Transportation industry has experienced explosive growth in the five years to 2014.

Industry operators generally do not own the natural gas they transport, and instead generate revenue from the fees paid by distributors and set by the Federal Energy Regulatory Committee (FERC). The industry suffered in 2009, when an overall decline in energy consumption lowered demand for gas and gas transport. Industry operators were then able to rebound, as increased shale gas production lowered prices, which increased demand for natural gas. Higher volume of natural gas production has encouraged industry operators to extend their pipeline capacity. Advances in hydraulic fracturing technology have allowed previously untapped reserves to be utilized. For example, large discoveries of natural gas reserves in the Marcellus Shale Basin, located in the northern Appalachians, have led to substantial growth in the amount of natural gas that requires transporting. Increased supply has maintained low gas prices, encouraging higher demand. Industry operators are investing heavily in expanding their infrastructure to maintain capacity, which has depressed profit margins from 23.2% of revenue in 2009 to 22.2% in 2014. On the positive side, infrastructure upgrades and additional capital costs have allowed for rate increases, which have translated into revenue growth. The FERC accelerated its rate increases during the past five years as industry operators invested more into their assets to accommodate the growing volume of transported natural gas.[29]

Sensitivity Risk Analysis — is forecast to be LOW over the outlook period, down marginally from 2014. The two factors with the most significant impact on the industry are

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[27] "IBISWorld Industry Risk Rating Report 48621, Gas Pipeline Transportation in the US," *IBISWorld*, December 2014, 2.

[28] *Ibid.*, 2-3.

[29] *Ibid.*, 8.

electric power consumption and the industrial production index. A rise in either of these factors will lower industry risk.

Electric power consumption: The demand for gas from electricity generators plays a key role in determining the volume of gas transported by the industry. An increase in electric power consumption generally leads to an increase in the demand for natural gas, and higher volumes of transported gas lead to an increase in industry revenue. Conversely, a decline in electric power consumption lowers the demand for natural gas, depressing industry revenue. This factor's contribution to risk is expected to decrease in the coming year.

Industrial production index: Industrial activity is an important indicator of energy consumption, including natural gas, because these operations often demand a significant amount of energy in their day-to-day functions. As industrial production activity increases, manufacturers will require more energy, including natural gas; thus, more natural gas will need to be transported. This factor's contribution to risk is expected to decrease in 2015.

World price of natural gas: The price of natural gas has a direct impact on the volume of gas demanded for transmission by pipeline. An increase in the price of natural gas will lower demand, which will lead to lower transport activity within the industry; conversely, a decline in prices will encourage natural gas consumption, increasing the volume of transported gas. This factor's contribution to risk is expected to increase in 2015.

Prime rate: The prime rate refers to the interest rates charged by banks to their most creditworthy and largest corporate customers. The large capital exposure and investments required of most pipelines make interest rates a key factor in the cost structure of industry operators. Growth in interest rates will generally have a negative effect on industry profit, as they increase the cost of financing operations. This factor's contribution to risk is expected to increase in 2015.

World price of crude oil: Natural gas competes with other energy sources, such as coal and oil, and the price movements of these commodities will influence the demand for natural gas. Although commodity prices are typically volatile, an increase in oil prices will generally increase demand for substitute energy sources like natural gas. Conversely, a decline in oil prices will typically decrease demand for natural gas. This factor's contribution to risk is expected to increase in 2015.[30]

Barriers to Entry

Barriers to entry into the Gas Pipeline Transportation industry are high and tend to be only surmountable by large industry enterprises. Typically, opportunities to enter the industry arise when the construction of new pipelines is necessary or consolidation occurs. For example,

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[30] *Ibid*, 3.

the recent sale of some of the assets formerly owned by Enron gave firms a chance to enter the industry or allowed active industry players to expand their existing position. The amount of capital required to fund construction of gas pipelines is the most significant entry barrier.

Pipeline infrastructure is a costly endeavor, and potential entrants must incur high initial investments before securing supply of natural gas and demand for transport services. Additionally, gas pipeline operations require skilled construction, engineering and managerial staff. In addition, large initial contracts must be secured in order to make the pipeline viable. Large contracts are typically awarded to existing firms with extensive infrastructure and a history of regulation compliance. Potential entrants could find it difficult to compete with established enterprises in securing these contracts.

Lastly, state and federal regulation on safety and energy act as strong barriers to entry. Compliance with various state laws that regulate energy transport and Federal Energy Regulatory Commission standards must be achieved before commencing operations. Because most pipeline infrastructure cross state boundaries, compliance with a number of governing authorities at the federal level is often required.[31]

Basis of Competition

The Gas Pipeline Transportation industry has a moderate level of competition according to *IBISWorld*. The fixed nature of natural gas pipelines, federal regulation and shared source of natural gas limits competition between industry firms in the short term. However, in the longer term, the potential for new pipeline infrastructure and expanded capacity to meet demand and volume growth will spur competition.

Since 1993, firms in the Gas Pipeline Transportation industry have been prevented from buying and selling gas and are only permitted to charge for gas transportation. This standardized the fees charged to pipeline users. The Federal Energy Regulatory Committee is in charge of regulating these fees at the interstate level, whereas state authorities are in charge of intrastate pipelines.[32]

Natural Gas Pipeline Transportation Outlook

The Gas Pipeline Transportation industry is projected to expand in the next five years, with revenue forecast to grow. The industry is highly regulated and charges customers based on rates established by the Federal Energy Regulatory Commission. During the next five years, the FERC will accept more rate increase applications, as industry operators continue expanding capacity and building new pipelines. The need for greater capacity will come from rising

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[31] *Ibid.*, 5.

[32] *Ibid.*, 6.

demand from electricity generators and increasing production in regions close to natural gas reserves. Additionally, supply pushes, a financing mechanism in which gas producers provide capital for pipeline extensions, will become more common.[33]

Value Line's Michael Napoli also agreed with *IBISWorld* in its positive outlook. According to Napoli, the Natural Gas (Diversified) Industry[34] perked up as of the first of December of 2014. Prices had been depressed for much of the summer and fall seasons, following a decline in the first half of 2014. Gas quotations remain fairly low, compared to much of the previous decade. Looking forward, the short-term direction of prices remains unclear. However, the long-term outlook appears solid reported Napoli. Supply restrictions and growing industrial demand should drive prices higher in the coming years. [35]

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 and financial risk increases. The additional risk attributable to the natural gas pipeline industry should be reflected in the development of the cost of capital.

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 accept a particular investment opportunity if the expected return on that opportunity is less than the cost of capital required to compensate for the risk involved. 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***.[36] To calculate market value, the appraiser discounts expected future income (cash flow) by the rate of return offered by comparable investment

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[33] *Op. Cit.,* Ulama, 8.

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

[35] Napoli, Michael F. "Natural Gas (Diversified) Industry," *Value Line Investment Survey*, December 5, 2014, 520.

[36] 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*, 14th ed., (Chicago: Appraisal Institute, 2013), 58.

alternatives. [All of the annual "income" figures used in appraising income-producing properties are *cash flows* rather than accrual accounting incomes.[37]] This rate of return is often referred to as the discount rate or the opportunity cost of capital.[38] 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.[39]

The estimated cost of capital in this report for the Interstate Natural Gas Pipeline Industry as of January 1, 2015, 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:

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:

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

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

[39] *The Appraisal of Real Estate*, 11th ed. (Chicago: Appraisal Institute, 1996) 44. See also *The Dictionary of Real Estate Appraisal*, 5th ed., (Chicago: Appraisal Institute, 2010) 139.

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.[40]

Cost of Capital Study Results

The cost of capital for the Interstate Natural Gas Pipeline Industry as of January 1, 2015 is estimated to be **10.65%** as the chart below indicates. Following the chart are explanations of the derivation of each of the component parts of the cost of capital study.

Capital	Portion	Cost	Product
Debt	30.00%	5.66%	1.70%
Equity	70.00%	12.79%	8.95%
Totals	100.00%		10.65%

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.

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[40] *SBBI (Stocks, Bonds, Bills and Inflation)*, 2013 Yearbook: Valuation Edition, (Chicago: Morningstar, Inc., 2013), 21.

> 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.[41]
>
> 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.[42]

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 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.[43]

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

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

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

> **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.[44]

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 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...[45]

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 2015. The capital structure study involved the following companies we believe to be representative of the interstate natural gas transmission pipeline industry: 20 large (sales over $1 billion) companies classified by *Value Line* as the Natural Gas (Diversified) Industry (from the *Value Line* full data base of 6,243 companies), using both *Value Line* and S&P data; 30 large companies from both the *Value Line* natural gas (diversified) group and the large *Value Line* oil/gas distribution group; 18 large (sales over $1 billion) natural gas

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[44] *Ibid.*, 132.

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

Pipeline MLPs; and 13 companies heavily involved with natural gas pipelines from the Interstate Natural Gas Pipeline Property Tax Forum group, which have traded common stock listed by *Standard and Poor's*. We also considered the 29 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.

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 companies, there are only a few members of the Interstate Natural Gas Pipeline Property Tax 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."[46] 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.

A summary of the capital structure analysis follows along with the supporting calculations for each of the company groups.

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[46] *SBBI (Stocks, Bonds, Bills and Inflation), 2013 Yearbook: Valuation Edition*, (Chicago: Morningstar, Inc., 2013) p. 14-15.

Summary of Capital Structure Data - 2015

Value Line Data - Medians	Debt	Pref. Stk.	Com. Stk.
Natural Gas Diversified Industry (Large)	23.03%	0.00%	76.97%
Natural Gas Div. & Oil/Gas Dist. (Large)	30.61%	0.00%	69.17%
Natural Gas Pipeline MLPs (Large)	35.04%	0.00%	64.97%
Interstate Natural Gas Pipeline Forum (Pipelines)	34.84%	0.00%	64.83%
S&P 500 Companies with "BBB-" Rated Debt	16.44%	0.00%	77.47%
Averages	**27.99%**	**0.00%**	**70.68%**

S&P Data - Medians	Debt	Pref. Stk.	Com. Stk.
Natural Gas Diversified Industry (Large)	29.97%	0.00%	69.92%
Natural Gas Div. & Oil/Gas Dist. (Large)	33.63%	0.00%	65.22%
Natural Gas Pipeline MLPs (Large)	35.96%	0.00%	64.04%
Interstate Natural Gas Pipeline Forum (Pipelines)	35.96%	0.00%	64.04%
S&P 500 Companies with "BBB-" Rated Debt	17.28%	0.00%	77.69%
Averages	**30.56%**	**0.00%**	**68.18%**

Natural Gas Diversified Industry (Large)
Capital Structure (VL Data) - January 1, 2015

Company Name	Ticker	LTD %	PS %	CS %
Cabot Oil & Gas 'A'	COG	11.47%	0.00%	88.53%
Chesapeake Energy	CHK	42.13%	11.10%	46.77%
Cimarex Energy	XEC	13.86%	0.00%	86.14%
Concho Resources	CXO	23.03%	0.00%	76.97%
Devon Energy	DVN	28.95%	0.00%	71.05%
EOG Resources	EOG	10.46%	0.00%	89.54%
EP Energy Corp	EPE	62.99%	0.00%	37.01%
EQT Corp.	EQT	20.26%	0.00%	79.74%
Encana Corp.	ECA			
Energen Corp.	EGN	12.03%	0.00%	87.97%
Linn Energy LLC	LINE	74.51%	0.00%	25.49%
MDU Resources	MDU	30.61%	0.22%	69.17%
National Fuel Gas	NFG	21.87%	0.00%	78.13%
Newfield Exploration	NFX	45.84%	0.00%	54.16%
Pengrowth Energy	PGH			
QEP Resources	QEP	46.38%	0.00%	53.62%
Questar Corp.	STR	22.43%	0.00%	77.57%
Southwestern Energy	SWN	15.90%	0.00%	84.10%
Talisman Energy	TLM			
WPX Energy	WPX	45.80%	0.00%	54.20%
	Average	31.09%	0.67%	68.24%
	Median	23.03%	0.00%	76.97%

Source: *Value Line*, January 2015.

Natural Gas Diversified Industry (Large)
Capital Structure (S&P Data) - January 1, 2015

Company Name	Ticker	LTD %	PS %	CS %
CABOT OIL & GAS CORP	COG	11.64%	0.00%	88.36%
CHESAPEAKE ENERGY CORP	CHK	42.01%	11.07%	46.93%
CIMAREX ENERGY CO	XEC	13.96%	0.00%	86.04%
CONCHO RESOURCES INC	CXO	23.05%	0.00%	76.95%
DEVON ENERGY CORP	DVN	28.87%	0.00%	71.13%
ENCANA CORP	ECA	39.05%	0.00%	60.95%
ENERGEN CORP	EGN	11.95%	0.00%	88.05%
EOG RESOURCES INC	EOG	10.48%	0.00%	89.52%
EP ENERGY CORP	EPE	63.03%	0.00%	36.97%
EQT CORP	EQT	20.64%	0.00%	79.36%
LINN ENERGY LLC	LINE	76.61%	0.00%	23.39%
MDU RESOURCES GROUP INC	MDU	31.07%	0.23%	68.71%
NATIONAL FUEL GAS CO	NFG	21.99%	0.00%	78.01%
NEWFIELD EXPLORATION CO	NFX	45.01%	0.00%	54.99%
PENGROWTH ENERGY CORP	PGH	45.47%	0.00%	54.53%
QEP RESOURCES INC	QEP	46.11%	0.00%	53.89%
QUESTAR CORP	STR	22.46%	0.00%	77.54%
SOUTHWESTERN ENERGY CO	SWN	15.78%	0.00%	84.22%
TALISMAN ENERGY INC	TLM	32.64%	1.56%	65.80%
WPX ENERGY INC	WPX	46.39%	0.00%	53.61%
	Average	32.41%	0.64%	66.95%
	Median	29.97%	0.00%	69.92%

Source: *S&P Compustat*, January 2015.

Natural Gas Diversified & Oil/Gas Dist. - Large
Capital Structure (VL Data) - January 1, 2015

Company Name	Ticker	LTD %	PS %	CS %
Cabot Oil & Gas 'A'	COG	11.47%	0.00%	88.53%
Chesapeake Energy	CHK	42.13%	11.10%	46.77%
Cimarex Energy	XEC	13.86%	0.00%	86.14%
Concho Resources	CXO	23.03%	0.00%	76.97%
Devon Energy	DVN	28.95%	0.00%	71.05%
EOG Resources	EOG	10.46%	0.00%	89.54%
EP Energy Corp	EPE	62.99%	0.00%	37.01%
EQT Corp.	EQT	20.26%	0.00%	79.74%
Enbridge Inc.	ENB.TO			
Encana Corp.	ECA			
Energen Corp.	EGN	12.03%	0.00%	87.97%
Enerplus Corp.	ERF.TO			
Kinder Morgan Inc.	KMI	44.74%	0.00%	55.26%
Linn Energy LLC	LINE	74.51%	0.00%	25.49%
MDU Resources	MDU	30.61%	0.22%	69.17%
NGL Energy Partners LP	NGL	49.04%	0.00%	50.96%
National Fuel Gas	NFG	21.87%	0.00%	78.13%
Newfield Exploration	NFX	45.84%	0.00%	54.16%
ONEOK Inc.	OKE	40.91%	0.00%	59.09%
Pembina Pipeline Corp.	PPL.TO			
Pengrowth Energy	PGH			
QEP Resources	QEP	46.38%	0.00%	53.62%
Questar Corp.	STR	22.43%	0.00%	77.57%
Southwestern Energy	SWN	15.90%	0.00%	84.10%
Spectra Energy	SE	34.44%	0.68%	64.88%
Talisman Energy	TLM			
TransCanada Corp.	TRP			
WPX Energy	WPX	45.80%	0.00%	54.20%
Williams Cos.	WMB	37.10%	0.00%	62.90%
World Fuel Services	INT	18.02%	0.00%	81.98%
	Average	32.73%	0.52%	66.75%
	Median	30.61%	0.00%	69.17%

Source: *Value Line*, January 2015.

Natural Gas Diversified & Oil/Gas Dist. - Large
Capital Structure (S&P Data) - January 1, 2015

Company Name	Ticker	LTD %	PS %	CS %
CABOT OIL & GAS CORP	COG	11.64%	0.00%	88.36%
CHESAPEAKE ENERGY CORP	CHK	42.01%	11.07%	46.93%
CIMAREX ENERGY CO	XEC	13.96%	0.00%	86.04%
CONCHO RESOURCES INC	CXO	23.05%	0.00%	76.95%
DEVON ENERGY CORP	DVN	28.87%	0.00%	71.13%
ENBRIDGE INC	ENB	34.62%	7.68%	57.69%
ENCANA CORP	ECA	39.05%	0.00%	60.95%
ENERGEN CORP	EGN	11.95%	0.00%	88.05%
ENERPLUS CORP	ERF	31.07%	0.00%	68.93%
EOG RESOURCES INC	EOG	10.48%	0.00%	89.52%
EP ENERGY CORP	EPE	63.03%	0.00%	36.97%
EQT CORP	EQT	20.64%	0.00%	79.36%
KINDER MORGAN INC	KMI	45.03%	0.00%	54.97%
LINN ENERGY LLC	LINE	76.61%	0.00%	23.39%
MDU RESOURCES GROUP INC	MDU	31.07%	0.23%	68.71%
NATIONAL FUEL GAS CO	NFG	21.99%	0.00%	78.01%
NEWFIELD EXPLORATION CO	NFX	45.01%	0.00%	54.99%
NGL ENERGY PARTNERS LP	NGL	49.58%	0.00%	50.42%
ONEOK INC	OKE	40.97%	0.00%	59.03%
PEMBINA PIPELINE CORP	PBA	14.18%	5.28%	80.54%
PENGROWTH ENERGY CORP	PGH	45.47%	0.00%	54.53%
QEP RESOURCES INC	QEP	46.11%	0.00%	53.89%
QUESTAR CORP	STR	22.46%	0.00%	77.54%
SOUTHWESTERN ENERGY CO	SWN	15.78%	0.00%	84.22%
SPECTRA ENERGY CORP	SE	34.69%	0.68%	64.63%
TALISMAN ENERGY INC	TLM	32.64%	1.56%	65.80%
TRANSCANADA CORP	TRP	36.29%	3.48%	60.23%
WILLIAMS COS INC	WMB	37.24%	0.00%	62.76%
WORLD FUEL SERVICES CORP	INT	18.17%	0.00%	81.83%
WPX ENERGY INC	WPX	46.39%	0.00%	53.61%
	Average	33.00%	1.00%	66.00%
	Median	33.63%	0.00%	65.22%

Source: *S&P Compustat*, January 2015.

Natural Gas Pipeline MLPs - Large
Capital Structure (VL Data) - January 1, 2015

Company Name	Ticker	LTD %	PS %	CS %
Access Midstream Partners L.P.	ACMP	27.88%	0.00%	72.12%
Boardwalk Pipeline	BWP	43.60%	0.00%	56.40%
DCP Midstream Partners LP	DPM	30.20%	0.00%	69.80%
Eagle Rock Energy Partners Ltd	EROC	40.97%	0.00%	59.03%
EnLink Midstream Partners L.P	ENLK	20.45%	0.00%	79.55%
Energy Transfer	ETP	43.22%	0.00%	56.78%
Energy Transfer Equity L.P.	ETE	47.44%	0.05%	52.51%
Enterprise Products	EPD	20.40%	0.00%	79.60%
Ferrellgas Partners L.P.	FGP	41.60%	0.00%	58.40%
Markwest Energy Partners L.P.	MWE	22.45%	0.00%	77.55%
Martin Midstream Ptnrs L.P.	MMLP	46.77%	0.00%	53.23%
ONEOK Partners L.P.	OKS	37.43%	0.00%	62.57%
Regency Energy Partners LP	RGP	39.71%	0.00%	60.29%
Spectra Energy Partners LP	SEP	24.13%	0.00%	75.87%
Suburban Propane	SPH	31.90%	0.00%	68.10%
Targa Resources Partners LP	NGLS	34.84%	0.00%	65.16%
Western Gas Partners LP	WES	19.06%	0.00%	80.94%
Williams Partners L.P.	WPZ	35.23%	0.00%	64.77%
	Average	33.74%	0.00%	66.26%
	Median	35.04%	0.00%	64.97%

Source: *Value Line*, January 2015.

Natural Gas Pipeline MLPs - Large

Capital Structure (S&P Data) - January 1, 2015

Company Name	Ticker	LTD %	PS %	CS %
ACCESS MIDSTREAM PARTNERS LP	ACMP			
BOARDWALK PIPELINE PRTNRS-LP	BWP	44.10%	0.00%	55.90%
DCP MIDSTREAM PARTNERS LP	DPM	31.14%	0.00%	68.86%
EAGLE ROCK ENERGY PARTNRS LP	EROC	44.39%	0.00%	55.61%
ENERGY TRANSFER EQUITY LP	ETE	47.97%	0.00%	52.03%
ENERGY TRANSFER PARTNERS -LP	ETP	43.46%	0.00%	56.54%
ENLINK MIDSTREAM PARTNERS LP	ENLK	20.60%	0.00%	79.40%
ENTERPRISE PRODS PRTNRS -LP	EPD	20.68%	0.00%	79.32%
FERRELLGAS PARTNERS -LP	FGP	42.29%	0.00%	57.71%
MARKWEST ENERGY PARTNERS LP	MWE	22.88%	0.00%	77.12%
MARTIN MIDSTREAM PARTNERS LP	MMLP	48.92%	0.00%	51.08%
ONEOK PARTNERS -LP	OKS	37.84%	0.00%	62.16%
REGENCY ENERGY PARTNERS LP	RGP	40.03%	0.20%	59.77%
SPECTRA ENERGY PARTNERS LP	SEP	23.83%	0.00%	76.17%
SUBURBAN PROPANE PRTNRS -LP	SPH	32.28%	0.00%	67.72%
TARGA RESOURCES PARTNERS LP	NGLS	35.46%	0.00%	64.54%
WESTERN GAS PARTNERS LP	WES	19.32%	0.00%	80.68%
WILLIAMS PARTNERS LP	WPZ	35.96%	0.00%	64.04%
	Average	34.77%	0.01%	65.21%
	Median	35.96%	0.00%	64.04%

Source: *S&P Compustat*, January 2015.

Interstate Natural Gas Pipeline Forum (Pipelines)
Capital Structure (VL Data) - January 1, 2015

Company Name	Ticker	LTD %	PS %	CS %
Boardwalk Pipeline	BWP	43.60%	0.00%	56.40%
CenterPoint Energy	CNP	43.43%	0.00%	56.57%
Dominion Resources	D	31.49%	0.00%	68.51%
Kinder Morgan Inc.	KMI	44.74%	0.00%	55.26%
MDU Resources	MDU	30.61%	0.22%	69.17%
National Fuel Gas	NFG	21.87%	0.00%	78.13%
ONEOK Partners L.P.	OKS	37.43%	0.00%	62.57%
Questar Corp.	STR	22.43%	0.00%	77.57%
Spectra Energy	SE	34.44%	0.68%	64.88%
Spectra Energy Partners LP	SEP	24.13%	0.00%	75.87%
TransCanada Corp.	TRP			
Williams Cos.	WMB	37.10%	0.00%	62.90%
Williams Partners L.P.	WPZ	35.23%	0.00%	64.77%
	Average	33.88%	0.08%	66.05%
	Median	34.84%	0.00%	64.83%

Source: *Value Line*, January 2015.

Interstate Natural Gas Pipeline Forum (Pipelines)
Capital Structure (S&P Data) - January 1, 2015

Company Name	Ticker	LTD %	PS %	CS %
BOARDWALK PIPELINE PRTNRS-LP	BWP	44.10%	0.00%	55.90%
CENTERPOINT ENERGY INC	CNP	43.64%	0.00%	56.36%
DOMINION RESOURCES INC	D	31.45%	0.20%	68.35%
KINDER MORGAN INC	KMI	45.03%	0.00%	54.97%
MDU RESOURCES GROUP INC	MDU	31.07%	0.23%	68.71%
NATIONAL FUEL GAS CO	NFG	21.99%	0.00%	78.01%
ONEOK PARTNERS -LP	OKS	37.84%	0.00%	62.16%
QUESTAR CORP	STR	22.46%	0.00%	77.54%
SPECTRA ENERGY CORP	SE	34.69%	0.68%	64.63%
SPECTRA ENERGY PARTNERS LP	SEP	23.83%	0.00%	76.17%
TRANSCANADA CORP	TRP	36.29%	3.48%	60.23%
WILLIAMS COS INC	WMB	37.24%	0.00%	62.76%
WILLIAMS PARTNERS LP	WPZ	35.96%	0.00%	64.04%
	Average	34.28%	0.35%	65.37%
	Median	35.96%	0.00%	64.04%

Source: *S&P Compustat*, January 2015.

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

Capital Structure (VL Data) - January 1, 2015

Company Name	Ticker	LTD %	PS %	CS %
Alcoa Inc.	AA	31.92%	0.21%	67.87%
Allegheny Techn.	ATI	28.76%	0.00%	71.24%
Amer. Tower 'A'	AMT	24.44%	1.13%	74.43%
Coach Inc.	COH	0.00%	0.00%	100.00%
ConAgra Foods	CAG	33.45%	0.00%	66.55%
Darden Restaurants	DRI	16.44%	0.00%	83.56%
Discover Fin'l Svcs.	DFS	40.97%	1.12%	57.91%
Dun & Bradstreet	DNB	27.21%	0.00%	72.79%
Expedia Inc.	EXPE	13.87%	0.00%	86.13%
Family Dollar Stores	FDO	5.12%	0.00%	94.88%
Flowserve Corp.	FLS	12.12%	0.00%	87.88%
Ford Motor	F	57.01%	0.00%	42.99%
Gap (The) Inc.	GPS	7.07%	0.00%	92.93%
General Motors	GM	31.98%	3.69%	64.32%
Harman Int'l	HAR	5.40%	0.00%	94.60%
Kansas City South'n	KSU	12.19%	0.04%	87.77%
Kinder Morgan Inc.	KMI	44.74%	0.00%	55.26%
L-3 Communic.	LLL	26.65%	0.00%	73.35%
Lorillard Inc.	LO	13.62%	0.00%	86.38%
Nasdaq OMX Group	NDAQ	22.53%	0.00%	77.47%
Newell Rubbermaid	NWL	12.14%	0.00%	87.86%
Pioneer Natural Res.	PXD	11.05%	0.00%	88.95%
Reynolds American	RAI	13.05%	0.00%	86.95%
Textron Inc.	TXT	23.54%	0.00%	76.46%
Weyerhaeuser Co.	WY	21.55%	2.75%	75.70%
Whole Foods Market	WFM	0.33%	0.00%	99.67%
Wyndham Worldwide	WYN	30.56%	0.00%	69.44%
Zions Bancorp.	ZION	14.17%	12.78%	73.05%
Zoetis Inc.	ZTS	14.37%	0.00%	85.63%
	Average	20.56%	0.75%	78.69%
	Median	16.44%	0.00%	77.47%

Source: *Value Line*, January 2015.

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

Capital Structure (S&P Data) - January 1, 2015

Company Name	Ticker	LTD %	PS %	CS %
ALCOA INC	AA	32.05%	0.21%	67.74%
ALLEGHENY TECHNOLOGIES INC	ATI	28.53%	0.00%	71.47%
AMERICAN TOWER CORP	AMT	24.87%	0.00%	75.13%
COACH INC	COH	0.00%	0.00%	100.00%
CONAGRA FOODS INC	CAG	33.17%	0.00%	66.83%
DARDEN RESTAURANTS INC	DRI	17.28%	0.00%	82.72%
DISCOVER FINANCIAL SVCS INC	DFS	40.77%	1.09%	58.13%
DUN & BRADSTREET CORP	DNB	27.33%	0.00%	72.67%
EXPEDIA INC	EXPE	13.92%	0.00%	86.08%
FAMILY DOLLAR STORES	FDO	5.09%	0.00%	94.91%
FLOWSERVE CORP	FLS	12.09%	0.00%	87.91%
FORD MOTOR CO	F	56.79%	0.00%	43.21%
GAP INC	GPS	7.07%	0.00%	92.93%
GENERAL MOTORS CO	GM	31.98%	3.59%	64.44%
HARMAN INTERNATIONAL INDS	HAR	5.31%	0.00%	94.69%
KANSAS CITY SOUTHERN	KSU	12.05%	0.04%	87.91%
KINDER MORGAN INC	KMI	45.03%	0.00%	54.97%
L-3 COMMUNICATIONS HLDGS INC	LLL	26.85%	0.00%	73.15%
LORILLARD INC	LO	13.57%	0.00%	86.43%
NASDAQ OMX GROUP INC	NDAQ	22.49%	0.00%	77.51%
NEWELL RUBBERMAID INC	NWL	12.08%	0.00%	87.92%
PIONEER NATURAL RESOURCES CO	PXD	11.12%	0.00%	88.88%
REYNOLDS AMERICAN INC	RAI	12.97%	0.00%	87.03%
TEXTRON INC	TXT	23.56%	0.00%	76.44%
WEYERHAEUSER CO	WY	22.25%	0.06%	77.69%
WHOLE FOODS MARKET INC	WFM	0.33%	0.00%	99.67%
WYNDHAM WORLDWIDE CORP	WYN	30.43%	0.00%	69.57%
ZIONS BANCORPORATION	ZION	14.09%	12.71%	73.20%
ZOETIS INC	ZTS	14.45%	0.00%	85.55%
	Average	20.60%	0.61%	78.79%
	Median	17.28%	0.00%	77.69%

Source: *S&P Compustat*, January 2015.

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.[47] 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.[48]

From information in *Standard and Poor's Compustat* and *Mergent Bond Record* databases we found the *Standard & Poor's* and *Moody's* long-term senior debt ratings to range from **BB+** to **BBB** and **Ba1** to **Baa2,** respectively, for the typical interstate natural gas pipeline. The predominant ratings were **BBB-** and **Baa3**, respectively. This information is presented in the following table:

Summary of Pipeline Long-Term Debt Ratings - January 1, 2015

Averages	S&P Ratings		Moody's Ratings	
Natural Gas Diversified Industry (Large)	BBB-	12	Ba1	13
Natural Gas Diversified & Oil/Gas Dist. (Large)	BBB-	12	Baa3	12
Interstate Natural Gas Pipeline Forum (Pipelines)	BBB	11	Baa2	11
Natural Gas Pipeline MLPs (Large)	BB+	13	Ba1	13
Average	**BBB-**	**12**	**Baa3**	**12**

Medians				
Natural Gas Diversified Industry (Large)	BBB-	12	Ba1	13
Natural Gas Diversified & Oil/Gas Dist. (Large)	BBB-	12	Baa3	12
Interstate Natural Gas Pipeline Forum (Pipelines)	BBB	11	Baa2	11
Natural Gas Pipeline MLPs (Large)	BB+	13	Baa3	12
Average	**BBB-**	**12**	**Baa3**	**12**

The Reuters Corporate Bond Spread Tables for Utilities, Industrials, and Transportations are shown as follows.

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

[48] *Stocks, Bonds, Bills and Inflation: 2013 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2013), p. 24

Reuters Corporate Spreads for Utilities

Jan. 2015 Rating	1 yr	2 yr	3 yr	5 yr	7 yr	10 yr	30 yr	Lg-Trm Yld
Aaa/AAA	10	14	19	26	37	51	70	3.45
Aa1/AA+	16	23	29	37	46	58	78	3.53
Aa2/AA	22	31	38	47	55	66	86	3.61
Aa3/AA-	29	40	48	57	64	74	95	3.70
A1/A+	35	49	57	67	74	82	103	3.78
A2/A	41	58	67	77	83	90	111	3.86
A3/A-	46	60	67	79	87	96	122	3.97
Baa1/BBB+	68	86	97	110	119	128	157	4.32
Baa2/BBB	82	97	106	118	126	134	158	4.33
Baa3/BBB-	129	158	176	198	212	227	274	5.49
Ba1/BB+	228	242	256	272	284	297	312	5.87
Ba2/BB	258	273	289	306	319	333	349	6.24
Ba3/BB-	288	304	321	339	353	369	386	6.61
B1/B+	323	340	358	377	393	410	428	7.03
B2/B	353	371	390	411	428	446	465	7.40
B3/B-	382	402	422	444	462	481	502	7.77
Caa/CCC+	417	438	459	482	501	522	544	8.19
US Treasury	0.25	0.67	1.1	1.65	1.97	2.17	2.75	

Reuters Corporate Spreads for Industrials

Jan. 2015 Rating	1 yr	2 yr	3 yr	5 yr	7 yr	10 yr	30 yr	Lg-Trm Yld
Aaa/AAA	5	8	12	18	28	42	65	3.40
Aa1/AA+	7	19	27	38	47	60	87	3.62
Aa2/AA	9	30	42	57	67	77	109	3.84
Aa3/AA-	15	37	49	65	75	86	120	3.95
A1/A+	20	43	56	72	83	95	130	4.05
A2/A	27	48	60	76	86	97	130	4.05
A3/A-	39	61	73	89	100	111	145	4.20
Baa1/BBB+	54	79	94	112	124	137	177	4.52
Baa2/BBB	66	97	115	138	153	169	219	4.94
Baa3/BBB-	116	150	170	195	212	229	283	5.58
Ba1/BB+	209	222	237	252	264	277	292	5.67
Ba2/BB	239	253	269	286	299	313	329	6.04
Ba3/BB-	268	284	301	319	333	349	366	6.41
B1/B+	303	320	338	357	373	390	408	6.83
B2/B	333	351	370	391	408	426	445	7.20
B3/B-	363	382	403	424	442	461	482	7.57
Caa/CCC+	397	418	439	462	481	502	524	7.99
US Treasury	0.25	0.67	1.1	1.65	1.97	2.17	2.75	

Source: *BondsOnline Group*, Thompson Reuters

Reuters Corporate Spreads for Transportations

Jan. 2015 Rating	1 yr	2 yr	3 yr	5 yr	7 yr	10 yr	30 yr	Lg-Trm Yld
Aaa/AAA	10	13	17	23	33	47	70	3.45
Aa1/AA+	12	24	32	43	52	65	92	3.67
Aa2/AA	14	35	47	62	72	82	114	3.89
Aa3/AA-	20	42	54	70	80	91	125	4.00
A1/A+	25	48	61	77	88	100	135	4.10
A2/A	32	53	65	81	91	102	135	4.10
A3/A-	44	66	78	94	105	116	150	4.25
Baa1/BBB+	59	84	99	117	129	142	182	4.57
Baa2/BBB	71	102	120	143	158	174	224	4.99
Baa3/BBB-	121	155	175	200	217	234	288	5.63
Ba1/BB+	214	227	242	257	269	282	297	5.72
Ba2/BB	244	258	274	291	304	318	334	6.09
Ba3/BB-	273	289	306	324	338	354	371	6.46
B1/B+	308	325	343	362	378	395	413	6.88
B2/B	338	356	375	396	413	431	450	7.25
B3/B-	368	387	408	429	447	466	487	7.62
Caa/CCC+	402	423	444	467	486	507	529	8.04
US Treasury	0.25	0.67	1.1	1.65	1.97	2.17	2.75	

Average Reuters Corporate Long-Term Yields

Jan. 2015 Rating	Avg. 30 yr Spread	Average Lg-Trm Yld
Aaa/AAA	68	3.43
Aa1/AA+	86	3.61
Aa2/AA	103	3.78
Aa3/AA-	113	3.88
A1/A+	123	3.98
A2/A	125	4.00
A3/A-	139	4.14
Baa1/BBB+	172	4.47
Baa2/BBB	200	4.75
Baa3/BBB-	282	5.57
Ba1/BB+	300	5.75
Ba2/BB	337	6.12
Ba3/BB-	374	6.49
B1/B+	416	6.91
B2/B	453	7.28
B3/B-	490	7.65
Caa/CCC+	532	8.07
US Treasury	2.75	

Source: *BondsOnline Group*, Thompson Reuters

The indicated long-term yields of **BBB-** rated bonds for Utilities, Industrials, and Transportations, respectively, provided by *BondsOnline* Group, Thompson Reuters, were 5.49%, 5.58% and 5.63% at the beginning of January 2015. From the information discussed we estimated the appropriate cost of debt capital rated **BBB-** to be **5.60%** at January 1, 2015.

The following tables indicate the long-term debt ratings for the various natural gas industry groups, along with the Reuters yields for the correspondent Standard & Poor's bond ratings. This information is coupled with the Reuters yields to maturity (YTM) for public utility bonds and corporate bonds.

Natural Gas Diversified Industry (Large)

Long-Term Debt Ratings & Corporate Bond Yields - January 1, 2015

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating	Reuters Avg. Yields
CABOT OIL & GAS CORP	COG					
CHESAPEAKE ENERGY CORP	CHK	BB+	13	Ba1	13	5.75
CIMAREX ENERGY CO	XEC	BB+	13	Ba1	13	5.75
CONCHO RESOURCES INC	CXO	BB+	13	Ba3	15	5.75
DEVON ENERGY CORP	DVN	BBB+	10	Baa1	10	4.47
ENCANA CORP	ECA	BBB	11	Baa2	11	4.75
ENERGEN CORP	EGN	BB	14	Ba2	14	6.12
EOG RESOURCES INC	EOG	A-	9	A3	9	4.14
EP ENERGY CORP	EPE			B2	17	
EQT CORP	EQT	BBB	11	Baa3	12	4.75
LINN ENERGY LLC	LINE	BB-	15	B1	16	6.49
MDU RESOURCES GROUP INC	MDU	BBB+	10			4.47
NATIONAL FUEL GAS CO	NFG	BBB	11	Baa2	11	4.75
NEWFIELD EXPLORATION CO	NFX	BBB-	12	Ba1	13	5.57
PENGROWTH ENERGY CORP	PGH					
QEP RESOURCES INC	QEP	BB+	13	Ba1	13	5.75
QUESTAR CORP	STR	A	8	A3	9	4.00
SOUTHWESTERN ENERGY CO	SWN	BBB	11	Baa3	12	4.75
TALISMAN ENERGY INC	TLM	BBB-	12	Baa3	12	5.57
WPX ENERGY INC	WPX	BB+	13	Ba1	13	5.75
	Average	BBB-	12	Ba1	13	5.57
	Median	BBB-	12	Ba1	13	5.57

Source: *S&P Compustat, Mergent, & BondsOnline Group, Thompson Reuters*, January 2015.

Natural Gas Diversified & Oil/Gas Dist. - Large

Long-Term Debt Ratings & Corporate Bond Yields - January 1, 2015

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating	Reuters Avg. Yields
CABOT OIL & GAS CORP	COG					
CHESAPEAKE ENERGY CORP	CHK	BB+	13	Ba1	13	5.75
CIMAREX ENERGY CO	XEC	BB+	13	Ba1	13	5.75
CONCHO RESOURCES INC	CXO	BB+	13	Ba3	15	5.75
DEVON ENERGY CORP	DVN	BBB+	10	Baa1	10	4.47
ENBRIDGE INC	ENB	A-	9	Baa1	10	4.14
ENCANA CORP	ECA	BBB	11	Baa2	11	4.75
ENERGEN CORP	EGN	BB	14	Ba2	14	6.12
ENERPLUS CORP	ERF					
EOG RESOURCES INC	EOG	A-	9	A3	9	4.14
EP ENERGY CORP	EPE					
EQT CORP	EQT	BBB	11	Baa3	12	4.75
KINDER MORGAN INC	KMI	BBB-	12	Baa3	12	5.57
LINN ENERGY LLC	LINE	BB-	15	B1	16	6.49
MDU RESOURCES GROUP INC	MDU	BBB+	10			4.47
NATIONAL FUEL GAS CO	NFG	BBB	11	Baa2	11	4.75
NEWFIELD EXPLORATION CO	NFX	BBB-	12	Ba1	13	5.57
NGL ENERGY PARTNERS LP	NGL	BB-	15	B2	17	6.49
ONEOK INC	OKE	BB+	13	Baa3	12	5.75
PEMBINA PIPELINE CORP	PBA					
PENGROWTH ENERGY CORP	PGH					
QEP RESOURCES INC	QEP	BB+	13	Ba1	13	5.75
QUESTAR CORP	STR	A	8	A3	9	4.00
SOUTHWESTERN ENERGY CO	SWN	BBB	11	Baa3	12	4.75
SPECTRA ENERGY CORP	SE	BBB	11	Baa2	11	4.75
TALISMAN ENERGY INC	TLM	BBB-	12	Baa3	12	5.57
TRANSCANADA CORP	TRP	BBB	9			
WILLIAMS COS INC	WMB	BB+	13	Baa3	12	5.75
WORLD FUEL SERVICES CORP	INT					
WPX ENERGY INC	WPX	BB+	13	Ba1	13	5.75
Average		BBB-	12	Baa3	12	5.57
Median		BBB-	12	Baa3	12	5.57

Source: *S&P Compustat, Mergent, & BondsOnline Group, Thompson Reuters*, January 2015.

Interstate Natural Gas Pipeline Forum (Pipelines)

Long-Term Debt Ratings & Corporate Bond Yields - January 1, 2015

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating	Reuters Avg. Yields
BOARDWALK PIPELINE PRTNRS-LP	BWP	BB+	12	Baa3	12	5.57
CENTERPOINT ENERGY INC	CNP	A-	9	Baa2	11	4.14
DOMINION RESOURCES INC	D	A-	9			4.14
KINDER MORGAN INC	KMI	BBB-	12	Baa3	12	5.57
MDU RESOURCES GROUP INC	MDU	BBB+	10			4.47
NATIONAL FUEL GAS CO	NFG	BBB	11	Baa2	11	4.75
ONEOK PARTNERS -LP	OKS	BBB	11	Baa2	11	4.75
QUESTAR CORP	STR	A	8	A3	9	4.00
SPECTRA ENERGY CORP	SE	BBB	11	Baa2	11	4.75
SPECTRA ENERGY PARTNERS LP	SEP	BBB	11	Baa2	11	4.75
TRANSCANADA CORP	TRP	BBB	9			
WILLIAMS COS INC	WMB	BB+	13	Baa3	12	5.75
WILLIAMS PARTNERS LP	WPZ	BBB	11	Baa2	11	4.75
	Average	BBB	11	Baa2	11	4.75
	Median	BBB	11	Baa2	11	4.75

Source: *S&P Compustat, Mergent, & BondsOnline Group, Thompson Reuters*, January 2015.

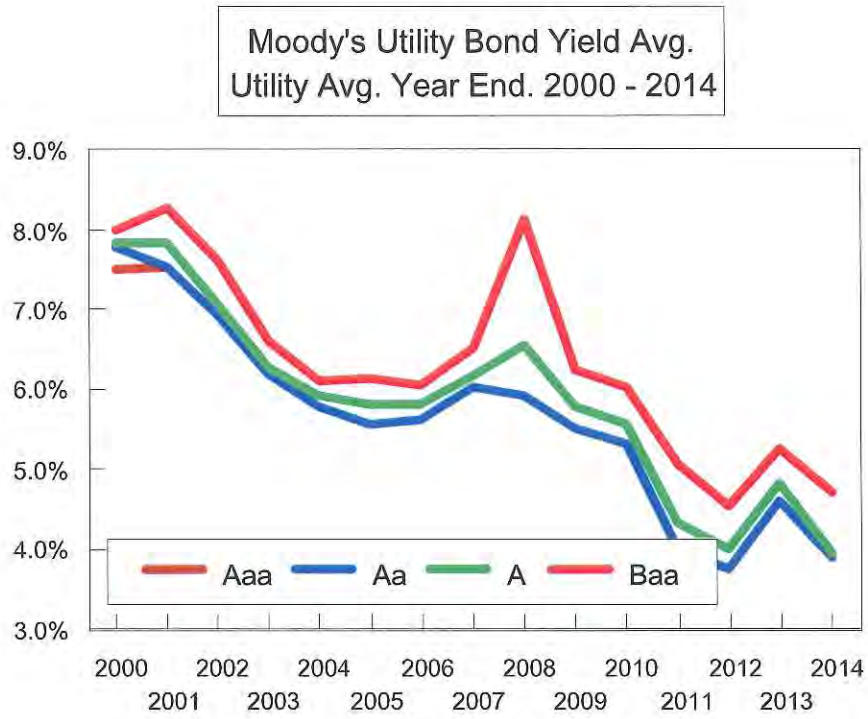
Natural Gas Pipeline MLPs - Large

Long-Term Debt Ratings & Corporate Bond Yields - January 1, 2015

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating	Reuters Avg. Yields
ACCESS MIDSTREAM PRT LP	ACMP	BB+	13	Ba2	14	5.75
BOARDWALK PIPELINE PRT LP	BWP	BB+	12	Baa3	12	5.57
DCP MIDSTREAM PRT LP	DPM	BBB-	12	Baa3	12	5.57
EAGLE ROCK ENERGY PRT LP	EROC	B-	18			7.65
ENERGY TRANSFER EQUITY LP	ETE	BB	14	Baa3	12	6.12
ENERGY TRANSFER PRT LP	ETP	BBB-	12	Baa3	12	5.57
ENLINK MIDSTREAM PRT LP	ENLK	BBB	11	Baa3	12	4.75
ENTERPRISE PRODS PRT LP	EPD	BBB+	10	Baa1	10	4.47
FERRELLGAS PARTNERS LP	FGP	B+	16	B2	17	6.91
MARKWEST ENERGY PRT LP	MWE	BB	14	Ba3	15	6.12
MARTIN MIDSTREAM PRT LP	MMLP	B+	16	B3	18	6.91
ONEOK PARTNERS -LP	OKS	BBB	11	Baa2	11	4.75
REGENCY ENERGY PRT LP	RGP	BB	14	Ba3	15	6.12
SPECTRA ENERGY PRT LP	SEP	BBB	11	Baa2	11	4.75
SUBURBAN PROPANE PRT LP	SPH	BB-	15			6.49
TARGA RESOURCES PRT LP	NGLS	BB+	13	Ba2	14	5.75
WESTERN GAS PRT LP	WES	BBB-	12	Baa3	12	5.57
WILLIAMS PARTNERS LP	WPZ	BBB	11	Baa2	11	4.75
	Average	BB+	13	Ba1	13	5.75
	Median	BB+	13	Baa3	12	5.75

Source: *S&P Compustat, Mergent, & BondsOnline Group, Thompson Reuters*, January 2015.

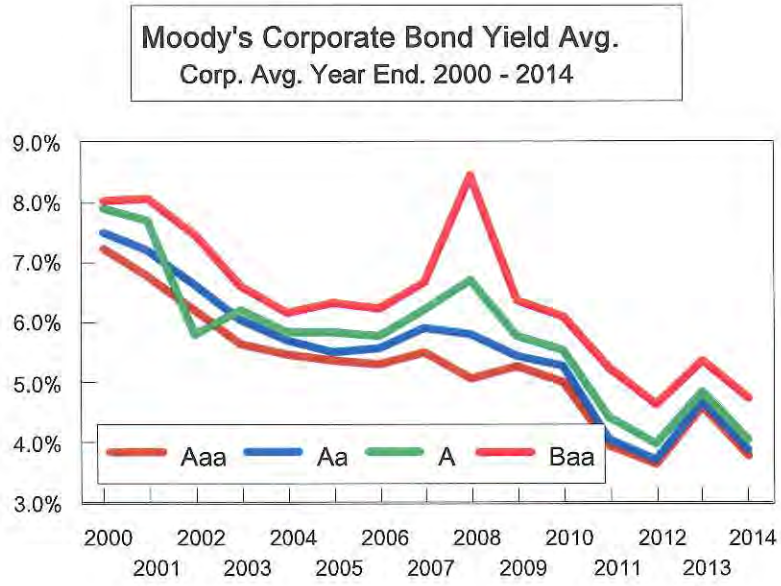
Mergent Utility Bond Yields



Public Utility Bond Yields - Year End Data (2000 - 2014)				
Year End Date	Aaa	Aa	A	Baa
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%
2011	---	4.00%	4.33%	5.07%
2012	---	3.75%	4.00%	4.56%
2013	---	4.59%	4.81%	5.25%
2014	---	3.90%	3.95%	4.70%

Source: *Mergent's Bond Record*, January 2001 - 2015

Mergent Corporate Bond Yields



Corp. Bond Yields - Year End Data (2000 - 2014)				
Year End Date	Aaa	Aa	A	Baa
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%
2011	3.93%	4.03%	4.40%	5.25%
2012	3.65%	3.70%	3.98%	4.63%
2013	4.62%	4.68%	4.85%	5.38%
2014	3.79%	3.89%	4.05%	4.74%

Source: Mergent's Bond Record, January 2001 - 2015

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 **12.25%**. 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, 2015

Company Groups	*Value Line* Data		S&P (IBES) Data	
	Average	Median	Average	Median
Natural Gas Diversified Industry (Large)	17.41	15.69	27.55	17.86
Natural Gas Diversified & Oil/Gas Dist. (Large)	16.26	15.35	25.09	14.49
Natural Gas Pipeline MLPs (Large)	14.92	14.73	23.57	13.51
Interstate Natural Gas Pipeline Forum (Pipelines)	12.49	11.25	9.58	8.77
S&P Screened Comparables Group	18.22	18.38	19.24	13.29
S&P 500 Companies with "BBB-" Rated Debt	14.41	14.42	14.27	12.97
Averages	15.62	14.97	19.88	13.48

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, 2015

General Risk Premium Indicators

Indicators	Rates		Indicator
	Rf	Rp	
30-Year Treasury Bonds (ex post)	2.75	7.00	9.75
30-Year Treasury Bonds (ex ante)	2.75	9.81	12.56

Risk Premium Indicators by Groups

Indicators	Median S&P Rating		Reuters Yields	Risk Prem. Indicator
	Rating	Number		
Natural Gas Diversified Industry (Large)	BBB-	12	5.57	11.37
Natural Gas Divers. & Oil/Gas Dist. (Large)	BBB-	12	5.57	11.37
Natural Gas Pipeline MLPs (Large)	BB+	13	5.75	11.55
Interstate Natural Gas Pipeline Forum (Pipes)	BBB	11	4.75	10.55
S&P Screened Comparables Group	BBB	11	4.75	10.55
Average	BBB-	12	5.28	11.08

* Base Rate: Average YTM for Reuters Utilities, Industrials, Transportations, *BondsOnline*, Thompson Reuters. Risk Premium: Simulated *SBBI* Methodology (see p. 118).

Capital Asset Pricing Model (CAPM) - January 1, 2015

Item	Rates			CAPM Indicator
	Rf	Rp	Beta	
CAPM Indicator *				
Long-Term Gov't Bonds (ex post)	2.75	7.00	1.00	9.75
Long-Term Gov't Bonds (ex ante)	2.75	9.81	1.00	12.56

CAPM Formula: Ke = Rf + B(Rp)

* CAPM Indicator is based upon a *Value Line* beta of 1.00 & Federal Reserve data 12/31/14.

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 9,744 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-**. (Several of these companies have double-B rated debt.) 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. 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 0.85 and greater than 1.05. 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 follows.

Pipeline Risk Screening Data - January 1, 2015
Natural Gas Diversified & Oil/Gas Distribution/MLP - Large

Company Name	Ticker	S&P Debt Rating Letter	S&P Debt Rating Number	S&P Adj. Beta	Return on Net Invest.
ACCESS MIDSTREAM PARTNERS LP	ACMP	BB+	13	0.69	6.31
BOARDWALK PIPELINE PRTNRS-LP	BWP	BBB-	12	0.59	6.42
CABOT OIL & GAS CORP	COG			0.82	11.64
CHESAPEAKE ENERGY CORP	CHK	BB+	13	1.17	6.90
CIMAREX ENERGY CO	XEC	BB+	13	1.36	12.62
CONCHO RESOURCES INC	CXO	BB+	13	1.35	8.28
DCP MIDSTREAM PARTNERS LP	DPM	BBB-	12	0.91	7.19
DEVON ENERGY CORP	DVN	BBB+	10	1.21	2.20
EAGLE ROCK ENERGY PARTNRS LP	EROC	B-	18	1.17	(11.67)
ENBRIDGE INC	ENB	A-	9	0.68	3.23
ENCANA CORP	ECA	BBB	11	1.08	9.55
ENERGEN CORP	EGN	BB	14	1.24	39.66
ENERGY TRANSFER EQUITY LP	ETE	BB	14	0.96	7.30
ENERGY TRANSFER PARTNERS -LP	ETP	BBB-	12	0.94	8.59
ENERPLUS CORP	ERF			1.26	6.28
ENLINK MIDSTREAM PARTNERS LP	ENLK	BBB	11	1.06	2.04
ENTERPRISE PRODS PRTNRS -LP	EPD	BBB+	10	0.81	12.00
EOG RESOURCES INC	EOG	A-	9	1.18	13.08
EP ENERGY CORP	EPE				5.08
EQT CORP	EQT	BBB	11	1.03	7.62
FERRELLGAS PARTNERS -LP	FGP	B+	16	0.45	25.92
KINDER MORGAN INC	KMI	BBB-	12	0.81	11.13
LINN ENERGY LLC	LINE	BB-	15	0.91	(1.40)
MARKWEST ENERGY PARTNERS LP	MWE	BB	14	0.78	2.76
MARTIN MIDSTREAM PARTNERS LP	MMLP	B+	16	0.87	13.05
MDU RESOURCES GROUP INC	MDU	BBB+	10	0.90	10.00
NATIONAL FUEL GAS CO	NFG	BBB	11	1.33	9.92
NEWFIELD EXPLORATION CO	NFX	BBB-	12	1.28	5.06
NGL ENERGY PARTNERS LP	NGL	BB-	15	0.32	14.04
ONEOK INC	OKE	BB+	13	0.99	7.44
ONEOK PARTNERS -LP	OKS	BBB	11	0.55	9.76
PEMBINA PIPELINE CORP	PBA	BBB	11	0.81	11.23
PENGROWTH ENERGY CORP	PGH			1.28	(0.64)
QEP RESOURCES INC	QEP	BB+	13	1.58	3.92
QUESTAR CORP	STR	A	8	0.42	10.73
REGENCY ENERGY PARTNERS LP	RGP	BB	14	0.74	1.29
SOUTHWESTERN ENERGY CO	SWN	BBB	11	1.03	16.50
SPECTRA ENERGY CORP	SE	BBB	11	0.94	7.78
SPECTRA ENERGY PARTNERS LP	SEP	BBB	11	0.64	8.56
SUBURBAN PROPANE PRTNRS -LP	SPH	BB-	15	0.72	24.48
TALISMAN ENERGY INC	TLM	BBB-	12	1.27	(4.05)
TARGA RESOURCES PARTNERS LP	NGLS	BB+	13	0.91	8.70
TRANSCANADA CORP	TRP	A-	9	0.78	7.65
WESTERN GAS PARTNERS LP	WES	BBB-	12	0.78	9.51
WILLIAMS COS INC	WMB	BB+	13	1.19	7.83
WILLIAMS PARTNERS LP	WPZ	BBB	11	0.57	8.32

Pipeline Risk Screening Data - January 1, 2015
Natural Gas Diversified & Oil/Gas Distribution/MLP - Large

Company Name	Ticker	S&P Debt Rating Letter	S&P Debt Rating Number	S&P Adj. Beta	Return on Net Invest.
WORLD FUEL SERVICES CORP	INT			1.07	205.25
WPX ENERGY INC	WPX	BB+	13	1.27	(24.28)
	Average	BBB-	12	0.95	11.97

Source: *S&P Compustat*, January 2015.

Surviving the screening process are nine (9) 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 in the following table.

DCP Midstream Partners LP
EQT Corp.
Kroger Company
Plum Creek Timber
Rayonier Inc.
Southwest Airlines
Southwestern Energy Co.
Spectra Energy Corp.
WeyerHaeuser Co.

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 five (5) other groups of companies – 20 large (sales of over $1 billion) companies from the *Value Line* Natural Gas Diversified group; 30 large companies from both the *Value Line* Natural Gas Diversified group and the large *Value Line* Oil and Gas Distribution group; 18 large natural gas Pipeline MLPs; and 13 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 29 companies from the *S&P* 500 which have **BBB-** rated long-term debt (the same rating as the typical interstate natural gas pipeline company).

We used financial data from two independent sources, *Standard and Poor's Compustat* database of approximately 9,744 companies, and the *Value Line Investment Survey* full database of approximately 6,243 companies. The two independent sources of data gave us two sets of growth estimates for the six 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.[49] 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 **14.00%** as of January 1, 2015. The result of all of the DCF analysis and research can be found below and on the following pages.

Summary of DCF Method Indicators - January 1, 2015

Company Groups	*Value Line* Data		S&P (IBES) Data	
	Average	Median	Average	Median
Natural Gas Diversified Industry (Large)	17.41	15.69	27.55	17.86
Nat. Gas Diversified & Oil/Gas Dist. (Large)	16.26	15.35	25.09	14.49
Natural Gas Pipeline MLPs (Large)	14.92	14.73	23.57	13.51
Interstate Natural Gas Pipeline Forum (Pipelines)	12.49	11.25	9.58	8.77
S&P Screened Comparables Group	18.22	18.38	19.24	13.29
All Companies in S&P 500 with "BBB-" Rated Debt	14.41	14.42	14.27	12.97
Averages	15.62	14.97	19.88	13.48

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.

[49] 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.

Natural Gas Diversified Industry (Large)
DCF Indicator (VL Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Cabot Oil & Gas 'A'	COG	0.33	31.00	31.33
Chesapeake Energy	CHK	1.78	13.50	15.28
Cimarex Energy	XEC	0.60	9.00	9.60
Concho Resources	CXO		14.50	
Devon Energy	DVN	1.56	8.00	9.56
EOG Resources	EOG	0.72	19.00	19.72
EP Energy Corp	EPE		15.00	
EQT Corp.	EQT	0.15	19.50	19.65
Encana Corp.	ECA	2.01	16.00	18.01
Energen Corp.	EGN	0.12	11.50	11.62
Linn Energy LLC	LINE	30.10	12.00	42.10
MDU Resources	MDU	3.10	9.50	12.60
National Fuel Gas	NFG	2.21	10.00	12.21
Newfield Exploration	NFX		4.00	
Pengrowth Energy	PGH	15.43		
QEP Resources	QEP	0.59	15.50	16.09
Questar Corp.	STR	3.04	6.50	9.54
Southwestern Energy	SWN		12.50	
Talisman Energy	TLM	3.44	13.00	16.44
WPX Energy	WPX			
	Average	4.35	13.33	17.41
	Median	1.78	12.75	15.69

Source: *Value Line*, January 2015.

Natural Gas Diversified Industry (Large)
DCF Indicator (S&P Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
CABOT OIL & GAS CORP	COG	0.35	30.00	30.35
CHESAPEAKE ENERGY CORP	CHK	1.66	(7.35)	
CIMAREX ENERGY CO	XEC	0.59	(1.60)	
CONCHO RESOURCES INC	CXO		17.80	
DEVON ENERGY CORP	DVN	1.86	18.40	20.26
ENCANA CORP	ECA	2.48	23.00	25.48
ENERGEN CORP	EGN	0.05	(57.24)	
EOG RESOURCES INC	EOG	0.79	8.00	8.79
EP ENERGY CORP	EPE		15.00	
EQT CORP	EQT	0.21	30.00	30.21
LINN ENERGY LLC	LINE			
MDU RESOURCES GROUP INC	MDU	3.26	5.00	8.26
NATIONAL FUEL GAS CO	NFG	2.34	5.60	7.94
NEWFIELD EXPLORATION CO	NFX		10.00	
PENGROWTH ENERGY CORP	PGH	26.00	95.20	121.20
QEP RESOURCES INC	QEP	0.45	15.00	15.45
QUESTAR CORP	STR	3.14	4.40	7.54
SOUTHWESTERN ENERGY CO	SWN		7.10	
TALISMAN ENERGY INC	TLM			
WPX ENERGY INC	WPX			
	Average	3.32	12.84	27.55
	Median	1.66	10.00	17.86

Source: *S&P Compustat*, January 2015.

Natural Gas Diversified & Oil/Gas Dist. - Large
DCF Indicator (VL Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Cabot Oil & Gas 'A'	COG	0.33	31.00	31.33
Chesapeake Energy	CHK	1.78	13.50	15.28
Cimarex Energy	XEC	0.60	9.00	9.60
Concho Resources	CXO		14.50	
Devon Energy	DVN	1.56	8.00	9.56
EOG Resources	EOG	0.72	19.00	19.72
EP Energy Corp	EPE		15.00	
EQT Corp.	EQT	0.15	19.50	19.65
Enbridge Inc.	ENB.TO	3.11	10.50	13.61
Encana Corp.	ECA	2.01	16.00	18.01
Energen Corp.	EGN	0.12	11.50	11.62
Enerplus Corp.	ERF.TO	9.65		
Kinder Morgan Inc.	KMI	4.16	16.00	20.16
Linn Energy LLC	LINE	30.10	12.00	42.10
MDU Resources	MDU	3.10	9.50	12.60
NGL Energy Partners LP	NGL		10.00	
National Fuel Gas	NFG	2.21	10.00	12.21
Newfield Exploration	NFX		4.00	
ONEOK Inc.	OKE	4.74	11.00	15.74
Pembina Pipeline Corp.	PPL.TO	4.18	11.00	15.18
Pengrowth Energy	PGH	15.43		
QEP Resources	QEP	0.59	15.50	16.09
Questar Corp.	STR	3.04	6.50	9.54
Southwestern Energy	SWN		12.50	
Spectra Energy	SE	4.07	5.00	9.07
Talisman Energy	TLM	3.44	13.00	16.44
TransCanada Corp.	TRP	3.91	11.50	15.41
WPX Energy	WPX			
Williams Cos.	WMB	5.45	12.00	17.45
World Fuel Services	INT	0.32	7.00	7.32
	Average	4.37	12.37	16.26
	Median	3.07	11.50	15.35

Source: *Value Line*, January 2015.

Natural Gas Diversified & Oil/Gas Dist. - Large
DCF Indicator (S&P Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
CABOT OIL & GAS CORP	COG	0.35	30.00	30.35
CHESAPEAKE ENERGY CORP	CHK	1.66	(7.35)	
CIMAREX ENERGY CO	XEC	0.59	(1.60)	
CONCHO RESOURCES INC	CXO		17.80	
DEVON ENERGY CORP	DVN	1.86	18.40	20.26
ENBRIDGE INC	ENB			
ENCANA CORP	ECA	2.48	23.00	25.48
ENERGEN CORP	EGN	0.05	(57.24)	
ENERPLUS CORP	ERF	14.68	51.90	66.58
EOG RESOURCES INC	EOG	0.79	8.00	8.79
EP ENERGY CORP	EPE		15.00	
EQT CORP	EQT	0.21	30.00	30.21
KINDER MORGAN INC	KMI	4.53	9.00	13.53
LINN ENERGY LLC	LINE			
MDU RESOURCES GROUP INC	MDU	3.26	5.00	8.26
NATIONAL FUEL GAS CO	NFG	2.34	5.60	7.94
NEWFIELD EXPLORATION CO	NFX		10.00	
NGL ENERGY PARTNERS LP	NGL	9.57	10.00	19.57
ONEOK INC	OKE	5.02	6.00	11.02
PEMBINA PIPELINE CORP	PBA			
PENGROWTH ENERGY CORP	PGH	26.00	95.20	121.20
QEP RESOURCES INC	QEP	0.45	15.00	15.45
QUESTAR CORP	STR	3.14	4.40	7.54
SOUTHWESTERN ENERGY CO	SWN		7.10	
SPECTRA ENERGY CORP	SE	4.28	5.00	9.28
TALISMAN ENERGY INC	TLM			
TRANSCANADA CORP	TRP			
WILLIAMS COS INC	WMB			
WORLD FUEL SERVICES CORP	INT	0.34	5.65	5.99
WPX ENERGY INC	WPX			
	Average	4.29	13.30	25.09
	Median	2.34	9.00	14.49

Source: *S&P Compustat*, January 2015.

Natural Gas Pipeline MLPs - Large
DCF Indicator (VL Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Access Midstream Partners L.P.	ACMP		15.00	
Boardwalk Pipeline	BWP	2.25	9.00	11.25
DCP Midstream Partners LP	DPM		14.08	
Eagle Rock Energy Partners Ltd	EROC		9.00	
EnLink Midstream Partners L.P	ENLK		8.00	
Energy Transfer	ETP	6.00	11.50	17.50
Energy Transfer Equity L.P.	ETE		24.65	
Enterprise Products	EPD	4.23	10.50	14.73
Ferrellgas Partners L.P.	FGP		19.10	
Markwest Energy Partners L.P.	MWE		7.65	
Martin Midstream Ptnrs L.P.	MMLP			
ONEOK Partners L.P.	OKS		4.25	
Regency Energy Partners LP	RGP			
Spectra Energy Partners LP	SEP		7.00	
Suburban Propane	SPH	8.09	12.00	20.09
Targa Resources Partners LP	NGLS		25.10	
Western Gas Partners LP	WES		9.77	
Williams Partners L.P.	WPZ	8.55	2.50	11.05
	Average	5.82	11.82	14.92
	Median	6.00	10.14	14.73

Source: *Value Line*, January 2015.

Natural Gas Pipeline MLPs - Large
DCF Indicator (S&P Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
ACCESS MIDSTREAM PARTNERS LP	ACMP			
BOARDWALK PIPELINE PRTNRS-LP	BWP	2.31	2.50	4.81
DCP MIDSTREAM PARTNERS LP	DPM	7.32	8.00	15.32
EAGLE ROCK ENERGY PARTNRS LP	EROC			
ENERGY TRANSFER EQUITY LP	ETE	3.74	29.30	33.04
ENERGY TRANSFER PARTNERS -LP	ETP			
ENLINK MIDSTREAM PARTNERS LP	ENLK	5.51	8.00	13.51
ENTERPRISE PRODS PRTNRS -LP	EPD	4.32	6.85	11.17
FERRELLGAS PARTNERS -LP	FGP	12.21	34.20	46.41
MARKWEST ENERGY PARTNERS LP	MWE	5.43	2.50	7.93
MARTIN MIDSTREAM PARTNERS LP	MMLP			
ONEOK PARTNERS -LP	OKS	8.32	6.30	14.62
REGENCY ENERGY PARTNERS LP	RGP	14.47	72.80	87.27
SPECTRA ENERGY PARTNERS LP	SEP	3.67	(9.35)	
SUBURBAN PROPANE PRTNRS -LP	SPH			
TARGA RESOURCES PARTNERS LP	NGLS			
WESTERN GAS PARTNERS LP	WES	4.01	8.50	12.51
WILLIAMS PARTNERS LP	WPZ	8.63	4.00	12.63
	Average	6.66	14.47	23.57
	Median	5.47	7.43	13.51

Source: *S&P Compustat*, January 2015.

Interstate Natural Gas Pipeline Forum (Pipelines)
DCF Indicator (VL Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Boardwalk Pipeline	BWP	2.25	9.00	11.25
CenterPoint Energy	CNP	4.39	5.50	9.89
Dominion Resources	D	3.25	5.50	8.75
Kinder Morgan Inc.	KMI	4.16	16.00	20.16
MDU Resources	MDU	3.10	9.50	12.60
National Fuel Gas	NFG	2.21	10.00	12.21
ONEOK Partners L.P.	OKS		4.25	
Questar Corp.	STR	3.04	6.50	9.54
Spectra Energy	SE	4.07	5.00	9.07
Spectra Energy Partners LP	SEP		7.00	
TransCanada Corp.	TRP	3.91	11.50	15.41
Williams Cos.	WMB	5.45	12.00	17.45
Williams Partners L.P.	WPZ	8.55	2.50	11.05
	Average	4.03	8.02	12.49
	Median	3.91	7.00	11.25

Source: *Value Line*, January 2015.

Interstate Natural Gas Pipeline Forum (Pipelines)
DCF Indicator (S&P Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
BOARDWALK PIPELINE PRTNRS-LP	BWP	2.31	2.50	4.81
CENTERPOINT ENERGY INC	CNP	4.18	3.00	7.18
DOMINION RESOURCES INC	D	3.33	6.70	10.03
KINDER MORGAN INC	KMI	4.53	9.00	13.53
MDU RESOURCES GROUP INC	MDU	3.26	5.00	8.26
NATIONAL FUEL GAS CO	NFG	2.34	5.60	7.94
ONEOK PARTNERS -LP	OKS	8.32	6.30	14.62
QUESTAR CORP	STR	3.14	4.40	7.54
SPECTRA ENERGY CORP	SE	4.28	5.00	9.28
SPECTRA ENERGY PARTNERS LP	SEP	3.67	(9.35)	
TRANSCANADA CORP	TRP			
WILLIAMS COS INC	WMB			
WILLIAMS PARTNERS LP	WPZ	8.63	4.00	12.63
	Average	4.36	3.83	9.58
	Median	3.67	5.00	8.77

Source: *S&P Compustat*, January 2015.

Pipeline Screened Comparables Group
DCF Indicator (VL Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
DCP Midstream Partners LP	DPM		14.08	
EQT Corp.	EQT	0.15	19.50	19.65
Kroger Co.	KR	1.18	10.00	11.18
Plum Creek Timber	PCL	4.11	13.00	17.11
Rayonier Inc.	RYN	3.57	(8.50)	
Southwest Airlines	LUV	0.56	30.00	30.56
Southwestern Energy	SWN		12.50	
Spectra Energy	SE	4.07	5.00	9.07
Weyerhaeuser Co.	WY	3.23	18.50	21.73
	Average	2.41	12.68	18.22
	Median	3.23	13.00	18.38

Source: *Value Line*, January 2015.

Pipeline Screened Comparables Group
DCF Indicator (S&P Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
DCP MIDSTREAM PARTNERS LP	DPM	7.32	8.00	15.32
EQT CORP	EQT	0.21	30.00	30.21
KROGER CO	KR	1.29	12.00	13.29
PLUM CREEK TIMBER CO INC	PCL	4.44	8.00	12.44
RAYONIER INC	RYN	3.42	(4.50)	
SOUTHWEST AIRLINES	LUV	0.82	44.90	45.72
SOUTHWESTERN ENERGY CO	SWN		7.10	
SPECTRA ENERGY CORP	SE	4.28	5.00	9.28
WEYERHAEUSER CO	WY	3.39	5.00	8.39
	Average	3.15	12.83	19.24
	Median	3.41	8.00	13.29

Source: *S&P Compustat*, January 2015.

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

DCF Indicator (VL Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Alcoa Inc.	AA	0.76	18.50	19.26
Allegheny Techn.	ATI	2.07	18.50	20.57
Amer. Tower 'A'	AMT	1.67	21.50	23.17
Coach Inc.	COH	3.59	1.00	4.59
ConAgra Foods	CAG	2.75	8.00	10.75
Darden Restaurants	DRI	4.09	9.00	13.09
Discover Fin'l Svcs.	DFS	1.46	4.00	5.46
Dun & Bradstreet	DNB	1.45	7.50	8.95
Expedia Inc.	EXPE	0.89	19.50	20.39
Family Dollar Stores	FDO	1.56	4.50	6.06
Flowserve Corp.	FLS	1.07	12.00	13.07
Ford Motor	F	3.22	8.50	11.72
Gap (The) Inc.	GPS	2.25	11.50	13.75
General Motors	GM	3.43	11.00	14.43
Harman Int'l	HAR	1.30	24.00	25.30
Kansas City South'n	KSU	0.91	14.00	14.91
Kinder Morgan Inc.	KMI	4.16	16.00	20.16
L-3 Communic.	LLL	1.90	3.00	4.90
Lorillard Inc.	LO	3.90	10.50	14.40
Nasdaq OMX Group	NDAQ	1.25	10.50	11.75
Newell Rubbermaid	NWL	1.78	13.00	14.78
Pioneer Natural Res.	PXD	0.05	22.00	22.05
Reynolds American	RAI	4.17	10.50	14.67
Textron Inc.	TXT	0.19	17.00	17.19
Weyerhaeuser Co.	WY	3.23	18.50	21.73
Whole Foods Market	WFM	1.13	13.50	14.63
Wyndham Worldwide	WYN	1.63	10.50	12.13
Zions Bancorp.	ZION	0.56	9.00	9.56
Zoetis Inc.	ZTS	0.76		
	Average	1.97	12.39	14.41
	Median	1.63	11.25	14.42

Source: *Value Line*, January 2015.

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

DCF Indicator (S&P Data) - January 1, 2015

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
ALCOA INC	AA	1.04	36.48	37.52
ALLEGHENY TECHNOLOGIES INC	ATI	2.38	15.00	17.38
AMERICAN TOWER CORP	AMT	1.84	19.90	21.74
COACH INC	COH	3.72	3.50	7.22
CONAGRA FOODS INC	CAG	3.00	9.00	12.00
DARDEN RESTAURANTS INC	DRI	4.21	12.10	16.31
DISCOVER FINANCIAL SVCS INC	DFS	1.61	10.00	11.61
DUN & BRADSTREET CORP	DNB	1.53	5.30	6.83
EXPEDIA INC	EXPE	1.00	18.00	19.00
FAMILY DOLLAR STORES	FDO	1.68	7.35	9.03
FLOWSERVE CORP	FLS	1.16	8.00	9.16
FORD MOTOR CO	F	3.58	10.90	14.48
GAP INC	GPS	2.33	11.40	13.73
GENERAL MOTORS CO	GM	3.95	15.00	18.95
HARMAN INTERNATIONAL INDS	HAR	1.45	17.00	18.45
KANSAS CITY SOUTHERN	KSU	1.06	15.90	16.96
KINDER MORGAN INC	KMI	4.53	9.00	13.53
L-3 COMMUNICATIONS HLDGS INC	LLL	1.99	4.75	6.74
LORILLARD INC	LO	4.27	9.20	13.47
NASDAQ OMX GROUP INC	NDAQ	1.38	10.00	11.38
NEWELL RUBBERMAID INC	NWL	1.96	10.00	11.96
PIONEER NATURAL RESOURCES CO	PXD	0.06	18.00	18.06
REYNOLDS AMERICAN INC	RAI	4.52	8.45	12.97
TEXTRON INC	TXT	0.23	20.65	20.88
WEYERHAEUSER CO	WY	3.39	5.00	8.39
WHOLE FOODS MARKET INC	WFM	1.06	11.30	12.36
WYNDHAM WORLDWIDE CORP	WYN	1.80	10.32	12.12
ZIONS BANCORPORATION	ZION	0.61	8.00	8.61
ZOETIS INC	ZTS	0.75	12.15	12.90
	Average	2.14	12.13	14.27
	Median	1.80	10.32	12.97

Source: *S&P Compustat*, January 2015.

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. These groups are the *Value Line* Natural Gas Diversified Industry (large companies – with over $1 billion in annual sales); the *Value Line* Natural Gas Diversified Industry combined with the *Value Line* Oil & Gas Distribution Industry (large companies – with over $1 billion in annual sales); the large Natural Gas Pipeline MLPs; the Interstate Natural Gas Pipeline Forum Group (with subsidiaries) that are heavily involved with pipelines, and the S&P Screened Comparables Group as described on page 47. Our ex post risk premiums were derived from a simulated *SBBI* methodology as shown on page 118. This risk premium was cross-checked for reasonableness by information from *Value Line*.[50] Our *ex ante* risk premium indicator was derived from the expected cost of equity for the companies making up the *S&P 500* (which are expected to pay dividends). We developed the

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[50] In an effort to check the long-term risk premium of 7.00%, we performed our own calculations to confirm the reasonableness of this figure. The 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 3-5 year annual total return on their S&P 500 database is 12.51% and that the 5-year beta is 1.05 for this database (see statistics for database, *Value Line*, January 2015). Further, we know the long-term treasury bond rate was 2.75% at January 1, 2015. 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 9.30%, which well supports the long-term government bond risk premium of 7.00%.

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

Figure A

Solve for R_p

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

$$R_p = \frac{0.1251 - 0.0275}{1.05}$$

$$R_p = 0.0930$$

Figure B

weighted average cost of capital (weighted by market value) for the *S&P 500*, which was 12.56%. (*This figure was further checked for reasonableness using Value Line information for the S&P 500, which indicated the weighted average cost of equity capital to be 12.51%.*) We then subtracted the current long-term Treasury bond rate of 2.75% and divided the result by 1.05 to obtain the expected equity risk premium of 9.30%. *(This ex ante risk premium, while high by historical standards, is partially the result of very low yields – among the lowest in over 50 years – on long term Treasury bonds*). 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. Our relevant current 'safe rates' for the general indicators were derived from the Federal Reserve at December 31, 2014. The 'safe rates' (or base rates) used for each company within the company groupings were the average of the Reuters Utilities, Industrials, and Transportations long-term (30-year) yields for the bond rating for each company in *Standard & Poor's Compustat* database (January, 2015). The average yield to maturity for each company's bond rating was added to the corporate bond risk premium of 5.8% (as calculated on page 119) 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 calculated risk premium, indicates a cost of equity capital of 9.75% (ex post) and 12.56% (ex ante). The range for all calculations of risk premium indicators using the indicators by specific company groups are between 10.55% and 11.37%. A reasonable view of these results would indicate a correlated risk premium indicator for the specific company groups to be approximately 11.00%.

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 long-term bonds. We believe the appropriate cost of equity for the typical interstate natural gas pipeline by the risk premium method as of January 1, 2015, is **11.50%**. 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) follows and the supporting data follows afterward.

Summary of Risk Premium Indicators - January 1, 2015

General Risk Premium Indicators

Indicators	Rates		Indicator
	Rf	Rp	
30-year Treasury Bonds (ex post)	2.75	7.00	9.75
30-year Treasury Bonds (ex ante)	2.75	9.81	12.56

Risk Premium Indicators by Groups

Indicators	Median S&P Rating		Reuters Yields	Risk Prem Indicator
	Rating	Number		
Natural Gas Diversified Industry (Large)	BBB-	12	5.57	11.37
Natural Gas Diversified & Oil/Gas Dist. (Large)	BBB-	12	5.57	11.37
Natural Gas Pipeline MLPs (Large)	BB+	13	5.75	11.55
Interstate Natural Gas Pipeline Forum (Pipelines)	BBB	11	4.75	10.55
Pipeline Screened Comparables Group	BBB	11	4.75	10.55
Average	BBB-	12	5.28	11.08

* Base Rate: Average YTM for Reuters Utilities, Industrials, Transportations, *BondsOnline*, Thompson Reuters. Risk Premium Simulated *SBBI* Methodology (see p.118).

Natural Gas Diversified Industry (Large)
Risk Premium Indicator - January 1, 2015

Company Name	Ticker	S&P Rating	Numerical Rating	Reuters Avg. Yields	Risk Prem Indicator
CABOT OIL & GAS CORP	COG				
CHESAPEAKE ENERGY CORP	CHK	BB+	13	5.75	11.55
CIMAREX ENERGY CO	XEC	BB+	13	5.75	11.55
CONCHO RESOURCES INC	CXO	BB+	13	5.75	11.55
DEVON ENERGY CORP	DVN	BBB+	10	4.47	10.27
ENCANA CORP	ECA	BBB	11	4.75	10.55
ENERGEN CORP	EGN	BB	14	6.12	11.92
EOG RESOURCES INC	EOG	A-	9	4.14	9.94
EP ENERGY CORP	EPE				
EQT CORP	EQT	BBB	11	4.75	10.55
LINN ENERGY LLC	LINE	BB-	15	6.49	12.29
MDU RESOURCES GRP INC	MDU	BBB+	10	4.47	10.27
NATIONAL FUEL GAS CO	NFG	BBB	11	4.75	10.55
NEWFIELD EXPLORATION CO	NFX	BBB-	12	5.57	11.37
PENGROWTH ENERGY CORP	PGH				
QEP RESOURCES INC	QEP	BB+	13	5.75	11.55
QUESTAR CORP	STR	A	8	4.00	9.80
SOUTHWESTERN ENERGY CO	SWN	BBB	11	4.75	10.55
TALISMAN ENERGY INC	TLM	BBB-	12	5.57	11.37
WPX ENERGY INC	WPX	BB+	13	5.75	11.55
	Average	BBB-	12	5.57	11.37
	Median	BBB-	12	5.57	11.37

Source: *S&P Compustat, Mergent*, & *BondsOnline Group*, Thompson Reuters, January 2015.

Natural Gas Diversified & Oil/Gas Dist. - Large
Risk Premium Indicator - January 1, 2015

Company Name	Ticker	S&P Rating	Numerical Rating	Reuters Avg. Yields	Risk Prem Indicator
CABOT OIL & GAS CORP	COG				
CHESAPEAKE ENERGY CORP	CHK	BB+	13	5.75	11.55
CIMAREX ENERGY CO	XEC	BB+	13	5.75	11.55
CONCHO RESOURCES INC	CXO	BB+	13	5.75	11.55
DEVON ENERGY CORP	DVN	BBB+	10	4.47	10.27
ENBRIDGE INC	ENB	A-	9	4.14	9.94
ENCANA CORP	ECA	BBB	11	4.75	10.55
ENERGEN CORP	EGN	BB	14	6.12	11.92
ENERPLUS CORP	ERF				
EOG RESOURCES INC	EOG	A-	9	4.14	9.94
EP ENERGY CORP	EPE				
EQT CORP	EQT	BBB	11	4.75	10.55
KINDER MORGAN INC	KMI	BBB-	12	5.57	11.37
LINN ENERGY LLC	LINE	BB-	15	6.49	12.29
MDU RESOURCES GRP INC	MDU	BBB+	10	4.47	10.27
NATIONAL FUEL GAS CO	NFG	BBB	11	4.75	10.55
NEWFIELD EXPLORATION CO	NFX	BBB-	12	5.57	11.37
NGL ENERGY PARTNERS LP	NGL	BB-	15	6.49	12.29
ONEOK INC	OKE	BB+	13	5.75	11.55
PEMBINA PIPELINE CORP	PBA				
PENGROWTH ENERGY CORP	PGH				
QEP RESOURCES INC	QEP	BB+	13	5.75	11.55
QUESTAR CORP	STR	A	8	4.00	9.80
SOUTHWESTERN ENERGY CO	SWN	BBB	11	4.75	10.55
SPECTRA ENERGY CORP	SE	BBB	11	4.75	10.55
TALISMAN ENERGY INC	TLM	BBB-	12	5.57	11.37
TRANSCANADA CORP	TRP	BBB	9	4.14	9.94
WILLIAMS COS INC	WMB	BB+	13	5.75	11.55
WORLD FUEL SERVICES CORP	INT				
WPX ENERGY INC	WPX	BB+	13	5.75	11.55
	Average	BBB-	12	5.57	11.37
	Median	BBB-	12	5.57	11.37

Source: *S&P Compustat, Mergent*, & *BondsOnline Group*, Thompson Reuters, January 2015.

Natural Gas Pipeline MLPs - Large
Risk Premium Indicator - January 1, 2015

Company Name	Ticker	S&P Rating	Numerical Rating	Reuters Avg. Yields	Risk Prem Indicator
ACCESS MIDSTREAM PRT. LP	ACMP	BB+	13	5.75	11.55
BOARDWALK PIPELINE PRT-LP	BWP	BBB-	12	5.57	11.37
DCP MIDSTREAM PRT LP	DPM	BBB-	12	5.57	11.37
EAGLE ROCK ENERGY PRT LP	EROC	B-	18	7.65	13.45
ENERGY TRANSFER EQ. LP	ETE	BB	14	6.12	11.92
ENERGY TRANSFER PRT -LP	ETP	BBB-	12	5.57	11.37
ENLINK MIDSTREAM PRT LP	ENLK	BBB	11	4.75	10.55
ENTERPRISE PRODS PRT -LP	EPD	BBB+	10	4.47	10.27
FERRELLGAS PRT -LP	FGP	B+	16	6.91	12.71
MARKWEST ENERGY PRT LP	MWE	BB	14	6.12	11.92
MARTIN MIDSTREAM PRT LP	MMLP	B+	16	6.91	12.71
ONEOK PARTNERS -LP	OKS	BBB	11	4.75	10.55
REGENCY ENERGY PRT LP	RGP	BB	14	6.12	11.92
SPECTRA ENERGY PRT LP	SEP	BBB	11	4.75	10.55
SUBURBAN PROPANE PRT-LP	SPH	BB-	15	6.49	12.29
TARGA RESOURCES PRT LP	NGLS	BB+	13	5.75	11.55
WESTERN GAS PRT LP	WES	BBB-	12	5.57	11.37
WILLIAMS PARTNERS LP	WPZ	BBB	11	4.75	10.55
	Average	BB+	13	5.75	11.55
	Median	BB+	13	5.75	11.55

Source: *S&P Compustat*, *Mergent,* & *BondsOnline Group*, Thompson Reuters, January 2015.

Interstate Natural Gas Pipeline Forum (Pipelines)
Risk Premium Indicator - January 1, 2015

Company Name	Ticker	S&P Rating	Numerical Rating	Reuters Avg. Yields	Risk Prem Indicator
BOARDWALK PIPELINE PRT-LP	BWP	BBB-	12	5.57	11.37
CENTERPOINT ENERGY INC	CNP	A-	9	4.14	9.94
DOMINION RESOURCES INC	D	A-	9	4.14	9.94
KINDER MORGAN INC	KMI	BBB-	12	5.57	11.37
MDU RESOURCES GRP. INC	MDU	BBB+	10	4.47	10.27
NATIONAL FUEL GAS CO	NFG	BBB	11	4.75	10.55
ONEOK PARTNERS -LP	OKS	BBB	11	4.75	10.55
QUESTAR CORP	STR	A	8	4.00	9.80
SPECTRA ENERGY CORP	SE	BBB	11	4.75	10.55
SPECTRA ENERGY PRT LP	SEP	BBB	11	4.75	10.55
TRANSCANADA CORP	TRP	BBB	9	4.14	9.94
WILLIAMS COS INC	WMB	BB+	13	5.75	11.55
WILLIAMS PARTNERS LP	WPZ	BBB	11	4.75	10.55
	Average	BBB	11	4.75	10.55
	Median	BBB	11	4.75	10.55

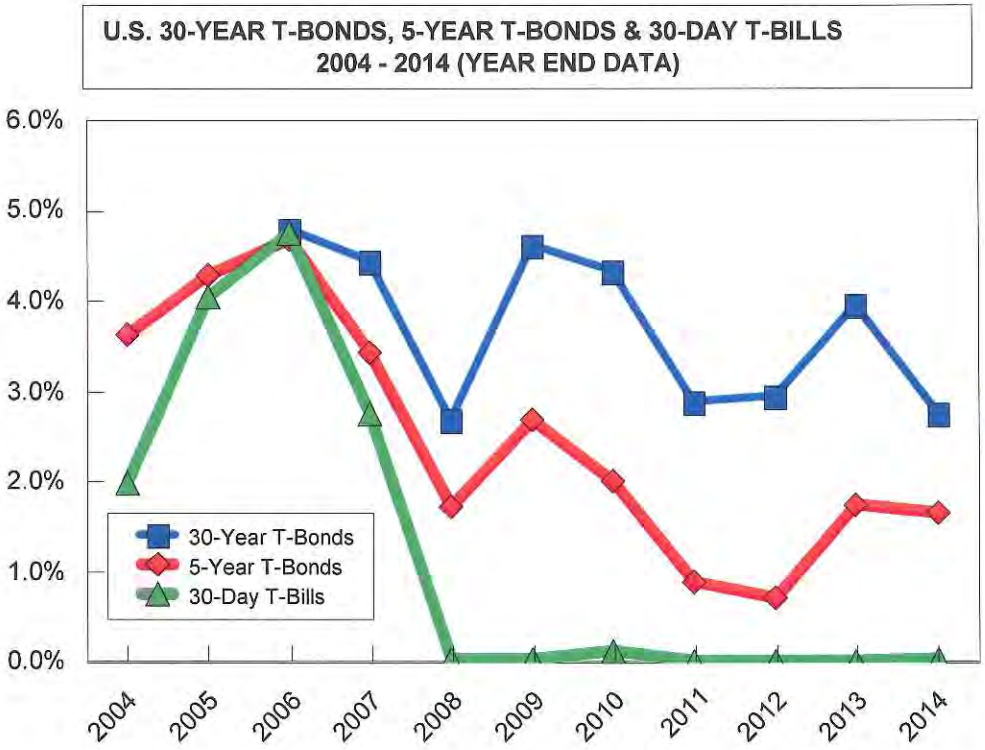
Source: *S&P Compustat, Mergent, & BondsOnline Group*, Thompson Reuters, January 2015.

Pipeline Screened Comparables Group
Risk Premium Indicator - January 1, 2015

Company Name	Ticker	S&P Rating	Numerical Rating	Reuters Avg. Yields	Risk Prem Indicator
DCP MIDSTREAM PRT LP	DPM	BBB-	12	5.57	11.37
EQT CORP	EQT	BBB	11	4.75	10.55
KROGER CO	KR	BBB	11	4.75	10.55
PLUM CREEK TIMBER CO INC	PCL	BBB	11	4.75	10.55
RAYONIER INC	RYN	BBB-	12	5.57	11.37
SOUTHWEST AIRLINES	LUV	BBB	11	4.75	10.55
SOUTHWESTERN ENERGY CO	SWN	BBB	11	4.75	10.55
SPECTRA ENERGY CORP	SE	BBB	11	4.75	10.55
WEYERHAEUSER CO	WY	BBB-	12	5.57	11.37
	Average	BBB	11	4.75	10.55
	Median	BBB	11	4.75	10.55

Source: *S&P Compustat, Mergent*, & *BondsOnline Group*, Thompson Reuters, January 2015.

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



U.S. 30-YEAR TREASURY BONDS
U.S. 5-YEAR TREASURY BONDS
U.S. 30-DAY TREASURY BILLS

Year End Date	30-Year T-Bonds	5 -Year T-Bonds	30-DAY T-Bills
2004		3.64%	1.99%
2005		4.30%	4.05%
2006	4.81%	4.70%	4.75%
2007	4.45%	3.45%	2.76%
2008	2.69%	1.72%	0.04%
2009	4.63%	2.69%	0.04%
2010	4.34%	2.02%	0.11%
2011	2.89%	0.89%	0.01%
2012	2.95%	0.72%	0.02%
2013	3.96%	1.75%	0.01%
2014	2.75%	1.65%	0.03%

Source: Federal Reserve, Dec. 31, 2014.

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 some analysts. 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, as shown on page 118, which includes data from 1926 through 2014. The indicated cost of equity by this method was 9.75% at January 1, 2015. Our *ex ante* CAPM calculations were based upon the expected risk premium of 9.81% 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 12.56% at January 1, 2015.

Our 'safe rates' for the CAPM calculations were derived as described in the risk premium method discussed earlier. Our beta estimate of 1.00 was based on observing the average and median *Value Line* 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 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

Group of Companies	Avg.	Med.
Value Line Betas VL Nat Gas Divers. (Large)	1.19	1.25
VL Nat Gas Divers & Oil Gas Dist. (large)	1.09	1.05
VL NG Pipeline MLPs (Large)	0.84	0.85
Nat Gas PL Forum (pipes)	0.85	0.80
S&P Screened Comps.	0.98	1.00
S&P 500 BBB- rated debt	1.09	1.10

Figure 5 - *Value Line* Betas

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.[51]

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

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

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 12.56%. This figure was further checked for reasonableness using *Value Line* information for the S&P 500, which indicated the weighted average cost of capital to be 12.51. (We typically give the most weight to the S&P data arriving at an estimate for the market cost of capital.) We then subtracted the current long-term Treasury bond rate of 2.75% to obtain the expected equity risk premium of 9.81%. 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.

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 **11.75%** of January 1, 2015. This conclusion gives weight and consideration to both indicators, with most emphasis on the ex ante indicator. A summary of the CAPM indicators and the supporting data begins below and on the following page.

Summary of CAPM Indicators - January 1, 2015

Item	Rates			CAPM Indicator
	Rf	Rp	Beta	
CAPM Indicator *				
Long-Term Gov't Bonds (ex post)	2.75	7.00	1.00	9.75
Long-Term Gov't Bonds (ex ante)	2.75	9.81	1.00	12.56

CAPM Formula: Ke = Rf + B(Rp)

* CAPM Indicator is based upon a *Value Line* beta of 1.00 & Federal Reserve data December 31, 2014.

On the following tables are the *Value Line* betas for the various groups of pipeline and comparable companies. Shown after the betas for the various groups are the calculations for the *ex ante* CAPM with supporting data from *Standard & Poor's Compustat* and from the *Value Line Investment Survey* databases at January 1, 2015.

Natural Gas Diversified Industry (Large)
Beta (Value Line) - January 1, 2015

Company Name	Ticker	Beta
Cabot Oil & Gas 'A'	COG	1.05
Chesapeake Energy	CHK	1.30
Cimarex Energy	XEC	1.35
Concho Resources	CXO	1.30
Devon Energy	DVN	1.20
EOG Resources	EOG	1.25
EP Energy Corp	EPE	
EQT Corp.	EQT	1.15
Encana Corp.	ECA	1.15
Energen Corp.	EGN	1.30
Linn Energy LLC	LINE	0.90
MDU Resources	MDU	0.95
National Fuel Gas	NFG	1.15
Newfield Exploration	NFX	1.45
Pengrowth Energy	PGH	1.30
QEP Resources	QEP	1.35
Questar Corp.	STR	0.80
Southwestern Energy	SWN	1.05
Talisman Energy	TLM	1.35
WPX Energy	WPX	1.35
	Average	1.19
	Median	1.25

Source: *Value Line*, January 2015.

Natural Gas Diversified & Oil/Gas Dist. - Large
Beta (Value Line) - January 1, 2015

Company Name	Ticker	Beta
Cabot Oil & Gas 'A'	COG	1.05
Chesapeake Energy	CHK	1.30
Cimarex Energy	XEC	1.35
Concho Resources	CXO	1.30
Devon Energy	DVN	1.20
EOG Resources	EOG	1.25
EP Energy Corp	EPE	
EQT Corp.	EQT	1.15
Enbridge Inc.	ENB.TO	0.60
Encana Corp.	ECA	1.15
Energen Corp.	EGN	1.30
Enerplus Corp.	ERF.TO	1.05
Kinder Morgan Inc.	KMI	0.90
Linn Energy LLC	LINE	0.90
MDU Resources	MDU	0.95
NGL Energy Partners LP	NGL	0.75
National Fuel Gas	NFG	1.15
Newfield Exploration	NFX	1.45
ONEOK Inc.	OKE	1.05
Pembina Pipeline Corp.	PPL.TO	0.65
Pengrowth Energy	PGH	1.30
QEP Resources	QEP	1.35
Questar Corp.	STR	0.80
Southwestern Energy	SWN	1.05
Spectra Energy	SE	0.95
Talisman Energy	TLM	1.35
TransCanada Corp.	TRP	0.85
WPX Energy	WPX	1.35
Williams Cos.	WMB	1.00
World Fuel Services	INT	1.05
	Average	1.09
	Median	1.05

Source: *Value Line*, January 2015.

Natural Gas Pipeline MLPs - Large
Beta (Value Line) - January 1, 2015

Company Name	Ticker	Beta
Access Midstream Partners L.P.	ACMP	0.85
Boardwalk Pipeline	BWP	0.60
DCP Midstream Partners LP	DPM	0.85
Eagle Rock Energy Partners Ltd	EROC	1.05
EnLink Midstream Partners L.P	ENLK	1.15
Energy Transfer	ETP	0.70
Energy Transfer Equity L.P.	ETE	1.00
Enterprise Products	EPD	0.85
Ferrellgas Partners L.P.	FGP	0.70
Markwest Energy Partners L.P.	MWE	0.85
Martin Midstream Ptnrs L.P.	MMLP	0.85
ONEOK Partners L.P.	OKS	0.75
Regency Energy Partners LP	RGP	0.85
Spectra Energy Partners LP	SEP	0.80
Suburban Propane	SPH	0.65
Targa Resources Partners LP	NGLS	1.00
Western Gas Partners LP	WES	0.85
Williams Partners L.P.	WPZ	0.80
	Average	0.84
	Median	0.85

Source: *Value Line*, January 2015.

Interstate Natural Gas Pipeline Forum (Pipelines)
Beta (Value Line) - January 1, 2015

Company Name	Ticker	Beta
Boardwalk Pipeline	BWP	0.60
CenterPoint Energy	CNP	0.75
Dominion Resources	D	0.70
Kinder Morgan Inc.	KMI	0.90
MDU Resources	MDU	0.95
National Fuel Gas	NFG	1.15
ONEOK Partners L.P.	OKS	0.75
Questar Corp.	STR	0.80
Spectra Energy	SE	0.95
Spectra Energy Partners LP	SEP	0.80
TransCanada Corp.	TRP	0.85
Williams Cos.	WMB	1.00
Williams Partners L.P.	WPZ	0.80
	Average	0.85
	Median	0.80

Source: *Value Line*, January 2015.

Pipeline Screened Comparables Group
Beta (Value Line) - January 1, 2015

Company Name	Ticker	Beta
DCP Midstream Partners LP	DPM	0.85
EQT Corp.	EQT	1.15
Kroger Co.	KR	0.75
Plum Creek Timber	PCL	0.90
Rayonier Inc.	RYN	
Southwest Airlines	LUV	1.05
Southwestern Energy	SWN	1.05
Spectra Energy	SE	0.95
Weyerhaeuser Co.	WY	1.10
	Average	0.98
	Median	1.00

Source: *Value Line*, January 2015.

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

Beta (Value Line) - January 1, 2015

Company Name	Ticker	Beta
Alcoa Inc.	AA	1.40
Allegheny Techn.	ATI	1.65
Amer. Tower 'A'	AMT	0.80
Coach Inc.	COH	1.10
ConAgra Foods	CAG	0.70
Darden Restaurants	DRI	0.90
Discover Fin'l Svcs.	DFS	1.10
Dun & Bradstreet	DNB	1.00
Expedia Inc.	EXPE	1.25
Family Dollar Stores	FDO	0.65
Flowserve Corp.	FLS	1.35
Ford Motor	F	1.25
Gap (The) Inc.	GPS	1.00
General Motors	GM	1.20
Harman Int'l	HAR	1.45
Kansas City South'n	KSU	1.15
Kinder Morgan Inc.	KMI	0.90
L-3 Communic.	LLL	1.00
Lorillard Inc.	LO	0.70
Nasdaq OMX Group	NDAQ	1.10
Newell Rubbermaid	NWL	1.15
Pioneer Natural Res.	PXD	1.40
Reynolds American	RAI	0.65
Textron Inc.	TXT	1.40
Weyerhaeuser Co.	WY	1.10
Whole Foods Market	WFM	0.90
Wyndham Worldwide	WYN	1.25
Zions Bancorp.	ZION	1.35
Zoetis Inc.	ZTS	0.90
	Average	1.09
	Median	1.10

Source: *Value Line*, January 2015.

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)	12.56		**LT Gov't.**		**Cost of Equity by**	
Current Yield on L-T Gov't. Bonds	2.75		**Bond Yield**		**CAPM**	
Expected Equity Risk Premium	9.81					
Beta	1.00					
Adjusted Risk Premium	9.81	+	2.75	=	12.56	*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 2015).

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
3M CO	MMM	2.30	10.43	12.72	104,514.09
ABBOTT LABORATORIES	ABT	2.17	11.00	13.17	67,790.71
ABBVIE INC	ABBV	2.87	11.95	14.82	104,263.26
ACCENTURE PLC	ACN	2.54	11.00	13.54	56,098.20
ACE LTD	ACE	2.38	5.20	7.58	38,110.06
ADT CORP	ADT	2.34	6.15	8.49	6,323.11
AES CORP	AES	1.48	2.20	3.68	9,818.64
AETNA INC	AET	1.10	9.00	10.10	31,241.51
AFLAC INC	AFL	2.60	1.74	4.34	27,526.36
AGILENT TECHNOLOGIES INC	A	1.44	11.50	12.94	13,728.08
AGL RESOURCES INC	GAS	3.65	1.50	5.15	6,517.92
AIR PRODUCTS & CHEMICALS INC	APD	2.37	10.85	13.22	30,868.39
AIRGAS INC	ARG	2.12	11.00	13.12	8,604.18
ALCOA INC	AA	1.04	36.48	37.52	18,613.62
ALLEGHENY TECHNOLOGIES INC	ATI	2.38	15.00	17.38	3,779.60
ALLERGAN INC	AGN	0.11	20.00	20.11	63,330.35
ALLSTATE CORP	ALL	1.72	8.00	9.72	29,465.17
ALTERA CORP	ALTR	2.18	12.00	14.18	11,259.94
ALTRIA GROUP INC	MO	4.55	7.80	12.35	97,380.68
AMEREN CORP	AEE	3.87	8.90	12.77	11,192.75
AMERICAN ELECTRIC POWER CO	AEP	3.67	5.14	8.82	29,706.65
AMERICAN EXPRESS CO	AXP	1.24	10.79	12.03	96,266.35
AMERICAN INTERNATIONAL GROUP	AIG	0.98	10.00	10.98	78,409.07
AMERICAN TOWER CORP	AMT	1.84	19.90	21.74	39,190.37
AMERIPRISE FINANCIAL INC	AMP	2.04	16.20	18.24	24,404.36
AMERISOURCEBERGEN CORP	ABC	1.46	13.51	14.97	19,717.27
AMETEK INC	AME	0.79	15.00	15.79	12,943.45
AMGEN INC	AMGN	1.70	10.95	12.65	121,167.13
AMPHENOL CORP	APH	1.04	11.69	12.73	16,652.31
ANADARKO PETROLEUM CORP	APC	1.45	10.80	12.25	41,782.12
ANALOG DEVICES	ADI	2.93	10.00	12.93	17,278.10
ANTHEM INC	ANTM	1.52	9.46	10.98	33,923.48
AON PLC	AON	1.18	11.70	12.88	27,039.54
APACHE CORP	APA	1.62	1.55	3.17	23,594.13
APPLE INC	AAPL	1.90	11.55	13.44	647,361.06
APPLIED MATERIALS INC	AMAT	1.83	14.10	15.93	30,439.08
ARCHER-DANIELS-MIDLAND CO	ADM	2.19	18.80	20.99	33,476.98
ASSURANT INC	AIZ	1.69	6.95	8.64	4,807.55
AT&T INC	T	5.75	5.00	10.75	174,231.33
AUTOMATIC DATA PROCESSING	ADP	2.61	11.00	13.61	40,189.09
AVAGO TECHNOLOGIES LTD	AVGO	1.86	33.75	35.61	25,683.85
AVALONBAY COMMUNITIES INC	AVB	3.63	27.70	31.33	21,568.79
AVERY DENNISON CORP	AVY	2.89	7.00	9.89	4,726.32
AVON PRODUCTS	AVP	2.65	3.80	6.45	4,081.42
BAKER HUGHES INC	BHI	1.53	26.45	27.98	24,260.54
BALL CORP	BLL	0.84	10.60	11.44	9,333.97
BANK OF AMERICA CORP	BAC	1.21	8.00	9.21	188,139.30
BANK OF NEW YORK MELLON CORP	BK	1.80	7.30	9.10	45,670.05

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
BARD (C.R.) INC	BCR	0.59	12.00	12.59	12,479.67
BAXTER INTERNATIONAL INC	BAX	2.98	5.00	7.98	39,721.57
BB&T CORP	BBT	2.62	6.10	8.72	28,012.39
BECTON DICKINSON & CO	BDX	1.85	7.53	9.38	26,911.04
BEST BUY CO INC	BBY	2.30	18.10	20.40	13,672.63
BLACKROCK INC	BLK	2.44	13.00	15.44	59,073.92
BLOCK H & R INC	HRB	2.64	11.00	13.64	9,267.66
BOEING CO	BA	2.51	11.60	14.11	92,666.64
BORGWARNER INC	BWA	1.09	15.00	16.09	12,494.20
BOSTON PROPERTIES INC	BXP	6.67	20.90	27.57	19,702.44
BRISTOL-MYERS SQUIBB CO	BMY	2.86	14.05	16.91	97,917.55
BROADCOM CORP -CL A	BRCM	1.24	12.30	13.54	23,484.86
BROWN-FORMAN -CL B	BF.B	1.56	9.00	10.56	18,744.88
C H ROBINSON WORLDWIDE INC	CHRW	2.28	12.15	14.43	10,943.98
CABOT OIL & GAS CORP	COG	0.35	30.00	30.35	12,229.52
CAMPBELL SOUP CO	CPB	2.93	3.30	6.23	13,787.09
CAPITAL ONE FINANCIAL CORP	COF	1.54	6.22	7.76	45,895.41
CARDINAL HEALTH INC	CAH	1.87	10.35	12.22	26,718.56
CARNIVAL CORP/PLC (USA)	CCL	2.60	17.90	20.50	26,864.78
CATERPILLAR INC	CAT	3.37	10.00	13.37	55,412.17
CBS CORP	CBS	1.24	14.45	15.69	28,714.59
CENTERPOINT ENERGY INC	CNP	4.18	3.00	7.18	10,070.12
CENTURYLINK INC	CTL	5.46	0.10	5.56	22,588.50
CF INDUSTRIES HOLDINGS INC	CF	2.37	7.50	9.87	13,554.78
CHEVRON CORP	CVX	4.03	5.50	9.53	212,067.77
CHUBB CORP	CB	2.11	9.00	11.11	24,399.67
CIGNA CORP	CI	0.04	10.87	10.91	26,919.10
CINTAS CORP	CTAS	1.21	12.00	13.21	9,175.83
CISCO SYSTEMS INC	CSCO	3.01	10.00	13.01	142,234.45
CITIGROUP INC	C	0.08	10.10	10.18	163,925.59
CLOROX CO/DE	CLX	2.99	5.40	8.39	13,484.98
CME GROUP INC	CME	4.99	14.11	19.10	29,860.69
CMS ENERGY CORP	CMS	3.31	6.41	9.72	9,596.18
COACH INC	COH	3.72	3.50	7.22	10,351.16
COCA-COLA CO	KO	2.98	3.10	6.08	184,928.38
COCA-COLA ENTERPRISES INC	CCE	2.43	7.30	9.73	10,689.48
COLGATE-PALMOLIVE CO	CL	2.25	8.15	10.40	63,059.63
COMCAST CORP	CMCSA	1.83	18.00	19.83	148,717.81
COMERICA INC	CMA	1.86	8.91	10.78	8,416.54
COMPUTER SCIENCES CORP	CSC	1.58	8.00	9.58	8,857.96
CONAGRA FOODS INC	CAG	3.00	9.00	12.00	15,452.27
CONOCOPHILLIPS	COP	4.53	7.25	11.78	85,006.85
CONSOL ENERGY INC	CNX	0.83	12.00	12.83	7,782.39
CONSOLIDATED EDISON INC	ED	3.91	2.50	6.41	19,333.54
CORNING INC	GLW	1.99	13.85	15.84	29,392.78
COSTCO WHOLESALE CORP	COST	1.10	9.90	11.00	62,441.44
COVIDIEN PLC	COV	1.53	9.00	10.53	46,310.75
CROWN CASTLE INTL CORP	CCI	6.72	61.25	67.97	26,274.63

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Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
CSX CORP	CSX	1.95	10.20	12.15	36,063.23
CUMMINS INC	CMI	2.48	14.45	16.93	26,338.71
CVS HEALTH CORP	CVS	1.31	15.00	16.31	110,408.15
D R HORTON INC	DHI	1.07	8.30	9.37	9,238.67
DANAHER CORP	DHR	0.52	11.18	11.69	60,227.73
DARDEN RESTAURANTS INC	DRI	4.21	12.10	16.31	7,777.09
DEERE & CO	DE	2.77	2.00	4.77	30,459.87
DELPHI AUTOMOTIVE PLC	DLPH	1.58	14.90	16.48	21,530.87
DELTA AIR LINES INC	DAL	0.88	20.60	21.48	41,169.13
DENTSPLY INTERNATL INC	XRAY	0.56	12.00	12.56	7,539.30
DEVON ENERGY CORP	DVN	1.86	18.40	20.26	25,041.01
DISCOVER FINANCIAL SVCS INC	DFS	1.61	10.00	11.61	29,698.40
DISNEY (WALT) CO	DIS	1.41	15.85	17.26	159,719.02
DOMINION RESOURCES INC	D	3.33	6.70	10.03	44,902.76
DOVER CORP	DOV	2.50	11.91	14.41	11,859.76
DOW CHEMICAL	DOW	4.15	12.79	16.94	53,754.17
DR PEPPER SNAPPLE GROUP INC	DPS	2.48	8.30	10.78	13,935.24
DTE ENERGY CO	DTE	3.39	5.95	9.34	15,286.71
DU PONT (E I) DE NEMOURS	DD	2.76	8.55	11.31	66,985.72
DUKE ENERGY CORP	DUK	3.99	4.75	8.74	59,087.09
DUN & BRADSTREET CORP	DNB	1.53	5.30	6.83	4,343.67
EASTMAN CHEMICAL CO	EMN	2.28	8.00	10.28	11,267.26
EATON CORP PLC	ETN	3.18	10.30	13.48	32,253.82
ECOLAB INC	ECL	1.45	15.10	16.55	31,368.13
EDISON INTERNATIONAL	EIX	2.58	1.25	3.83	21,334.10
EMC CORP/MA	EMC	1.66	7.60	9.26	60,518.20
EMERSON ELECTRIC CO	EMR	3.30	8.44	11.74	42,732.47
ENSCO PLC	ESV	10.20	1.80	12.00	7,016.03
ENTERGY CORP	ETR	3.83	0.99	4.82	15,788.48
EOG RESOURCES INC	EOG	0.79	8.00	8.79	50,455.19
EQT CORP	EQT	0.21	30.00	30.21	11,469.00
EQUIFAX INC	EFX	1.35	9.40	10.75	9,751.87
EXELON CORP	EXC	3.45	3.27	6.72	31,868.96
EXPEDIA INC	EXPE	1.00	18.00	19.00	9,709.53
EXPEDITORS INTL WASH INC	EXPD	1.59	10.90	12.49	8,611.11
EXXON MOBIL CORP	XOM	3.07	2.85	5.92	391,482.22
FAMILY DOLLAR STORES	FDO	1.68	7.35	9.03	9,057.74
FASTENAL CO	FAST	2.42	14.90	17.32	14,098.73
FEDEX CORP	FDX	0.53	15.00	15.53	49,200.14
FIDELITY NATIONAL INFO SVCS	FIS	1.73	12.00	13.73	17,649.31
FLIR SYSTEMS INC	FLIR	1.41	14.00	15.41	4,552.22
FLOWSERVE CORP	FLS	1.16	8.00	9.16	8,155.31
FLUOR CORP	FLR	1.56	12.30	13.86	9,471.68
FMC CORP	FMC	1.16	10.00	11.16	7,600.22
FORD MOTOR CO	F	3.58	10.90	14.48	58,556.44
FRANKLIN RESOURCES INC	BEN	1.19	9.60	10.79	34,460.74
GAMESTOP CORP	GME	4.48	14.80	19.28	3,667.81
GAP INC	GPS	2.33	11.40	13.73	17,836.79

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Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
GARMIN LTD	GRMN	3.87	6.50	10.37	10,102.52
GENERAL DYNAMICS CORP	GD	1.94	7.80	9.74	45,605.89
GENERAL ELECTRIC CO	GE	3.90	7.00	10.90	253,766.19
GENERAL GROWTH PPTYS INC	GGP	3.12	29.10	32.22	24,869.93
GENERAL MILLS INC	GIS	3.28	6.60	9.88	32,197.88
GENERAL MOTORS CO	GM	3.95	15.00	18.95	56,089.76
GENUINE PARTS CO	GPC	2.31	7.20	9.51	16,289.97
GOLDMAN SACHS GROUP INC	GS	1.34	7.86	9.20	84,421.88
GRAINGER (W W) INC	GWW	1.90	12.10	13.99	17,379.16
HALLIBURTON CO	HAL	2.20	20.00	22.20	33,330.60
HARLEY-DAVIDSON INC	HOG	1.89	13.31	15.20	14,122.40
HARMAN INTERNATIONAL INDS	HAR	1.45	17.00	18.45	7,311.34
HARRIS CORP	HRS	2.70	3.00	5.70	7,511.80
HARTFORD FINANCIAL SERVICES	HIG	1.85	7.00	8.85	17,988.44
HASBRO INC	HAS	3.52	12.40	15.92	6,911.25
HELMERICH & PAYNE	HP	4.12	1.00	5.12	7,298.62
HERSHEY CO	HSY	2.26	10.00	12.26	16,654.78
HESS CORP	HES	1.42	5.00	6.42	22,069.89
HEWLETT-PACKARD CO	HPQ	1.68	5.13	6.80	73,601.71
HOME DEPOT INC	HD	2.08	16.00	18.08	138,332.30
HONEYWELL INTERNATIONAL INC	HON	2.28	10.19	12.47	78,218.38
HORMEL FOODS CORP	HRL	1.64	7.10	8.74	13,735.54
HUMANA INC	HUM	0.86	10.00	10.86	22,023.51
HUNTINGTON BANCSHARES	HBAN	2.45	7.22	9.67	8,568.06
ILLINOIS TOOL WORKS	ITW	2.31	12.91	15.23	37,021.45
INGERSOLL-RAND PLC	IR	1.79	13.50	15.29	16,828.27
INTEGRYS ENERGY GROUP INC	TEG	3.67	5.00	8.67	6,225.12
INTEL CORP	INTC	2.70	8.95	11.65	175,462.16
INTERCONTINENTAL EXCHANGE	ICE	1.41	19.20	20.61	24,715.52
INTERPUBLIC GROUP OF COS	IPG	1.99	8.65	10.64	8,686.62
INTL BUSINESS MACHINES CORP	IBM	2.89	5.50	8.39	158,781.05
INTL FLAVORS & FRAGRANCES	IFF	2.05	10.60	12.65	8,207.32
INTL PAPER CO	IP	3.40	14.00	17.40	22,697.24
INTUIT INC	INTU	1.22	12.49	13.71	26,322.55
INVESCO LTD	IVZ	2.88	13.70	16.58	17,026.32
IRON MOUNTAIN INC	IRM	5.53	12.50	18.03	8,110.13
JOHNSON & JOHNSON	JNJ	2.84	5.95	8.79	292,702.94
JOHNSON CONTROLS INC	JCI	2.43	12.90	15.33	32,271.40
JPMORGAN CHASE & CO	JPM	2.71	6.00	8.71	233,935.88
JUNIPER NETWORKS INC	JNPR	2.01	12.00	14.01	9,654.94
KANSAS CITY SOUTHERN	KSU	1.06	15.90	16.96	13,467.23
KELLOGG CO	K	3.13	4.65	7.78	23,233.43
KEURIG GREEN MOUNTAIN INC	GMCR	0.87	15.00	15.87	21,456.20
KEYCORP	KEY	2.06	10.00	12.06	12,041.92
KIMBERLY-CLARK CORP	KMB	3.11	7.00	10.11	43,033.45
KIMCO REALTY CORP	KIM	4.21	10.34	14.55	10,343.22
KINDER MORGAN INC	KMI	4.53	9.00	13.53	97,183.95
KLA-TENCOR CORP	KLAC	3.18	11.80	14.98	11,566.02

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Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
KOHL'S CORP	KSS	2.76	8.00	10.76	12,330.63
KRAFT FOODS GROUP INC	KRFT	3.76	7.00	10.76	36,895.71
KROGER CO	KR	1.29	12.00	13.29	31,547.91
L BRANDS INC	LB	1.77	12.35	14.12	25,331.63
L-3 COMMUNICATIONS HLDGS INC	LLL	1.99	4.75	6.74	10,744.64
LAM RESEARCH CORP	LRCX	1.03	13.20	14.23	12,611.89
LAUDER (ESTEE) COS INC -CL A	EL	1.37	8.70	10.07	17,634.05
LEGG MASON INC	LM	1.41	17.50	18.91	6,090.05
LENNAR CORP	LEN	0.44	22.70	23.14	8,924.69
LINCOLN NATIONAL CORP	LNC	1.23	10.60	11.83	14,982.09
LINEAR TECHNOLOGY CORP	LLTC	2.61	10.40	13.01	10,877.06
LOCKHEED MARTIN CORP	LMT	3.43	10.00	13.43	60,837.68
LOEWS CORP	L	0.64	7.28	7.92	15,721.53
LORILLARD INC	LO	4.27	9.20	13.47	22,660.16
LOWE'S COMPANIES INC	LOW	1.57	17.40	18.97	66,936.14
LYONDELLBASELL INDUSTRIES NV	LYB	3.85	9.04	12.89	39,748.03
M & T BANK CORP	MTB	2.35	5.39	7.74	16,595.91
MACY'S INC	M	2.13	12.00	14.13	22,702.62
MARATHON OIL CORP	MRO	3.22	8.50	11.72	19,092.84
MARATHON PETROLEUM CORP	MPC	2.44	10.00	12.44	25,290.22
MARRIOTT INTL INC	MAR	1.24	20.88	22.12	22,110.66
MARSH & MCLENNAN COS	MMC	2.18	11.42	13.60	30,961.06
MARTIN MARIETTA MATERIALS	MLM	1.61	11.00	12.61	7,421.23
MASCO CORP	MAS	1.81	26.46	28.27	8,977.75
MASTERCARD INC	MA	0.60	18.00	18.60	95,889.19
MCCORMICK & CO INC	MKC	2.31	7.20	9.51	9,615.38
MCDONALD'S CORP	MCD	3.80	4.80	8.60	91,189.21
MCGRAW HILL FINANCIAL	MHFI	1.53	13.50	15.03	24,158.07
MCKESSON CORP	MCK	0.53	15.00	15.53	48,134.07
MEAD JOHNSON NUTRITION CO	MJN	1.63	9.00	10.63	20,312.10
MEADWESTVACO CORP	MWV	2.46	9.00	11.46	7,400.57
MEDTRONIC INC	MDT	1.81	7.00	8.81	71,067.69
MERCK & CO	MRK	3.42	8.00	11.42	161,901.08
METLIFE INC	MET	2.78	7.60	10.38	61,448.51
MICROCHIP TECHNOLOGY INC	MCHP	3.65	15.60	19.25	9,065.58
MICROSOFT CORP	MSFT	2.85	6.60	9.45	382,880.53
MOLSON COORS BREWING CO	TAP	2.08	4.80	6.88	12,307.91
MONDELEZ INTERNATIONAL INC	MDLZ	1.82	10.20	12.02	61,023.20
MONSANTO CO	MON	1.87	13.70	15.57	57,775.93
MOODY'S CORP	MCO	1.33	14.15	15.48	19,985.97
MORGAN STANLEY	MS	1.31	26.82	28.13	75,947.23
MOSAIC CO	MOS	2.37	8.05	10.42	15,382.45
MOTOROLA SOLUTIONS INC	MSI	2.07	2.00	4.07	15,909.10
NABORS INDUSTRIES LTD	NBR	2.37	27.94	30.31	3,756.92
NASDAQ OMX GROUP INC	NDAQ	1.38	10.00	11.38	8,041.21
NATIONAL OILWELL VARCO INC	NOV	3.06	9.00	12.06	28,215.51
NETAPP INC	NTAP	1.75	10.00	11.75	12,919.67
NEWELL RUBBERMAID INC	NWL	1.96	10.00	11.96	10,326.20

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Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
NEXTERA ENERGY INC	NEE	2.90	6.40	9.30	46,393.67
NIELSEN NV	NLSN	2.57	15.00	17.57	16,805.82
NIKE INC -CL B	NKE	1.33	14.05	15.38	65,761.89
NORDSTROM INC	JWN	1.80	8.50	10.30	15,103.55
NORFOLK SOUTHERN CORP	NSC	2.33	12.10	14.43	33,917.94
NORTHEAST UTILITIES	NU	3.11	6.00	9.11	16,955.08
NORTHERN TRUST CORP	NTRS	2.21	12.80	15.01	15,873.04
NORTHROP GRUMMAN CORP	NOC	2.01	5.91	7.93	29,772.63
NRG ENERGY INC	NRG	2.12	2.10	4.22	9,112.04
NUCOR CORP	NUE	4.24	39.69	43.93	15,646.95
NVIDIA CORP	NVDA	1.86	9.50	11.36	10,897.92
OCCIDENTAL PETROLEUM CORP	OXY	3.75	5.00	8.75	62,507.25
OMNICOM GROUP	OMC	2.77	7.25	10.02	19,226.50
ONEOK INC	OKE	5.02	6.00	11.02	10,366.18
ORACLE CORP	ORCL	1.14	6.50	7.64	197,479.78
PACCAR INC	PCAR	3.10	12.00	15.10	24,082.61
PALL CORP	PLL	1.37	13.75	15.12	10,782.31
PARKER-HANNIFIN CORP	PH	2.16	10.30	12.46	19,167.77
PATTERSON COMPANIES INC	PDCO	1.83	10.00	11.83	4,959.93
PAYCHEX INC	PAYX	3.62	10.00	13.62	16,766.50
PENTAIR PLC	PNR	2.08	15.00	17.08	12,406.86
PEOPLE'S UNITED FINL INC	PBCT	4.72	8.46	13.18	4,674.98
PEPCO HOLDINGS INC	POM	4.32	7.80	12.12	6,783.86
PEPSICO INC	PEP	2.98	7.65	10.63	141,519.06
PERKINELMER INC	PKI	0.71	11.60	12.31	4,939.87
PERRIGO CO PLC	PRGO	0.29	15.00	15.29	23,383.85
PETSMART INC	PETM	1.07	12.00	13.07	8,081.62
PFIZER INC	PFE	3.39	1.45	4.84	196,265.47
PG&E CORP	PCG	3.71	8.65	12.36	25,293.69
PHILIP MORRIS INTERNATIONAL	PM	5.21	6.10	11.31	126,550.09
PHILLIPS 66	PSX	3.18	14.05	17.23	39,686.88
PINNACLE WEST CAPITAL CORP	PNW	3.62	4.00	7.62	7,544.84
PIONEER NATURAL RESOURCES CO	PXD	0.06	18.00	18.06	22,163.47
PLUM CREEK TIMBER CO INC	PCL	4.44	8.00	12.44	7,526.42
PNC FINANCIAL SVCS GROUP INC	PNC	2.23	6.00	8.23	48,006.14
PPG INDUSTRIES INC	PPG	1.31	13.31	14.62	31,721.87
PRAXAIR INC	PX	2.21	10.15	12.36	37,750.29
PRECISION CASTPARTS CORP	PCP	0.06	13.90	13.96	34,333.35
PRICE (T. ROWE) GROUP	TROW	2.30	12.00	14.30	22,271.05
PRINCIPAL FINANCIAL GRP INC	PFG	2.94	12.10	15.04	15,253.06
PROCTER & GAMBLE CO	PG	3.06	8.30	11.36	246,136.02
PROGRESSIVE CORP-OHIO	PGR	1.97	8.00	9.97	15,864.72
PROLOGIS INC	PLD	3.91	27.60	31.51	21,514.53
PRUDENTIAL FINANCIAL INC	PRU	2.80	9.00	11.80	41,249.76
PUBLIC SERVICE ENTRP GRP INC	PEG	3.67	2.67	6.34	20,955.28
PULTEGROUP INC	PHM	1.60	7.00	8.60	7,956.68
PVH CORP	PVH	0.13	11.70	11.83	10,567.75
QEP RESOURCES INC	QEP	0.45	15.00	15.45	3,642.61

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Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
QUALCOMM INC	QCOM	2.50	10.75	13.25	123,581.13
QUEST DIAGNOSTICS INC	DGX	2.18	11.00	13.18	9,692.45
RALPH LAUREN CORP	RL	1.07	9.95	11.02	11,373.27
RANGE RESOURCES CORP	RRC	0.38	25.50	25.88	9,017.07
RAYTHEON CO	RTN	2.43	8.70	11.13	33,356.17
REGIONS FINANCIAL CORP	RF	1.99	4.90	6.89	14,535.58
REPUBLIC SERVICES INC	RSG	2.98	7.00	9.98	14,310.44
REYNOLDS AMERICAN INC	RAI	4.52	8.45	12.97	34,145.62
ROBERT HALF INTL INC	RHI	1.43	15.70	17.13	7,937.23
ROCKWELL AUTOMATION	ROK	2.57	9.85	12.42	15,083.28
ROCKWELL COLLINS INC	COL	1.59	11.60	13.19	11,231.28
ROPER INDUSTRIES INC/DE	ROP	0.59	15.00	15.59	15,659.70
ROSS STORES INC	ROST	0.95	11.50	12.45	19,651.89
ROYAL CARIBBEAN CRUISES LTD	RCL	1.92	32.22	34.15	18,354.94
RYDER SYSTEM INC	R	1.79	12.25	14.04	4,924.76
SAFEWAY INC	SWY	2.93	12.00	14.93	8,095.16
SANDISK CORP	SNDK	1.44	17.84	19.28	21,619.19
SCANA CORP	SCG	3.66	5.35	9.01	8,610.02
SCHLUMBERGER LTD	SLB	2.17	16.00	18.17	109,905.08
SCHWAB (CHARLES) CORP	SCHW	0.95	20.00	20.95	39,421.17
SCRIPPS NETWORKS INTERACTIVE	SNI	1.18	11.20	12.38	7,737.38
SEAGATE TECHNOLOGY PLC	STX	3.64	12.05	15.69	21,761.39
SEALED AIR CORP	SEE	1.43	16.40	17.83	8,959.43
SEMPRA ENERGY	SRE	2.56	8.02	10.58	27,418.84
SHERWIN-WILLIAMS CO	SHW	0.99	17.90	18.89	25,251.31
SIGMA-ALDRICH CORP	SIAL	0.72	7.00	7.72	16,348.31
SIMON PROPERTY GROUP INC	SPG	3.10	8.74	11.84	56,596.51
SMUCKER (JM) CO	SJM	2.65	4.40	7.05	10,281.48
SOUTHERN CO	SO	4.41	3.10	7.51	44,189.82
SOUTHWEST AIRLINES	LUV	0.82	44.90	45.72	28,724.45
SPECTRA ENERGY CORP	SE	4.28	5.00	9.28	24,357.30
ST JUDE MEDICAL INC	STJ	1.80	8.65	10.45	18,592.92
STANLEY BLACK & DECKER INC	SWK	2.40	10.70	13.10	15,051.12
STARBUCKS CORP	SBUX	1.84	18.20	20.04	61,398.02
STARWOOD HOTELS&RESORTS WRLD	HOT	1.86	7.95	9.81	14,477.08
STATE STREET CORP	STT	1.65	7.84	9.48	32,773.36
STRYKER CORP	SYK	1.59	8.60	10.19	35,687.02
SUNTRUST BANKS INC	STI	2.09	9.50	11.59	21,849.01
SYMANTEC CORP	SYMC	2.50	7.00	9.50	17,705.72
SYSCO CORP	SYY	3.24	7.05	10.29	23,333.12
TARGET CORP	TGT	3.06	11.55	14.61	48,351.94
TE CONNECTIVITY LTD	TEL	2.06	12.48	14.54	25,722.26
TECO ENERGY INC	TE	4.57	6.43	11.00	4,808.84
TESORO CORP	TSO	2.08	28.70	30.78	9,386.32
TEXAS INSTRUMENTS INC	TXN	2.80	10.00	12.80	56,475.08
TEXTRON INC	TXT	0.23	20.65	20.88	11,624.42
THERMO FISHER SCIENTIFIC INC	TMO	0.54	12.95	13.49	50,119.13

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Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
TIFFANY & CO	TIF	1.59	12.00	13.59	13,822.77
TIME WARNER CABLE INC	TWC	2.23	13.00	15.23	42,651.92
TIME WARNER INC	TWX	1.73	16.05	17.78	71,623.48
TJX COMPANIES INC	TJX	1.13	11.00	12.13	47,244.76
TORCHMARK CORP	TMK	1.01	8.10	9.11	6,968.59
TOTAL SYSTEM SERVICES INC	TSS	1.34	13.50	14.84	6,313.10
TRACTOR SUPPLY CO	TSCO	0.94	16.15	17.09	10,714.71
TRAVELERS COS INC	TRV	2.22	6.60	8.82	35,078.69
TWENTY-FIRST CENTURY FOX INC	FOXA	0.76	16.40	17.16	81,596.14
TYCO INTERNATIONAL PLC	TYC	1.85	13.00	14.85	18,353.92
U S BANCORP	USB	2.33	7.00	9.33	80,432.90
UNION PACIFIC CORP	UNP	1.93	15.00	16.93	105,918.37
UNITED PARCEL SERVICE INC	UPS	2.68	11.15	13.83	79,094.68
UNITED TECHNOLOGIES CORP	UTX	2.23	8.90	11.13	104,840.67
UNITEDHEALTH GROUP INC	UNH	1.62	9.20	10.83	97,025.27
UNIVERSAL HEALTH SVCS INC	UHS	0.39	9.60	9.99	10,203.68
UNUM GROUP	UNM	2.01	6.00	8.01	8,789.48
VALERO ENERGY CORP	VLO	2.44	10.00	12.44	25,801.63
VERIZON COMMUNICATIONS INC	VZ	5.03	7.00	12.03	194,124.09
VF CORP	VFC	1.93	12.90	14.83	32,347.21
VIACOM INC	VIAB	1.97	12.30	14.27	30,900.36
VISA INC	V	0.86	17.15	18.01	129,393.87
VULCAN MATERIALS CO	VMC	0.40	9.00	9.40	8,656.84
WAL-MART STORES INC	WMT	2.34	4.80	7.14	276,807.56
WALGREENS BOOTS ALLIANCE INC	WBA	2.02	14.00	16.02	72,057.92
WASTE MANAGEMENT INC	WM	3.11	6.40	9.51	23,500.51
WELLS FARGO & CO	WFC	2.81	10.00	12.81	284,385.56
WESTERN DIGITAL CORP	WDC	1.57	8.50	10.07	25,707.86
WESTERN UNION CO	WU	3.07	10.00	13.07	9,360.25
WEYERHAEUSER CO	WY	3.39	5.00	8.39	18,819.42
WHIRLPOOL CORP	WHR	1.90	22.70	24.60	15,086.73
WHOLE FOODS MARKET INC	WFM	1.06	11.30	12.36	18,138.44
WISCONSIN ENERGY CORP	WEC	3.12	5.43	8.55	11,893.77
WYNDHAM WORLDWIDE CORP	WYN	1.80	10.32	12.12	10,571.04
WYNN RESORTS LTD	WYNN	5.18	10.00	15.18	15,076.83
XCEL ENERGY INC	XEL	3.48	4.10	7.58	18,164.24
XEROX CORP	XRX	1.88	4.00	5.88	15,821.97
XILINX INC	XLNX	2.92	8.85	11.77	11,448.26
XL GROUP PLC	XL	1.90	1.80	3.70	8,869.32
XYLEM INC	XYL	1.55	15.00	16.55	6,923.98
YUM BRANDS INC	YUM	2.51	11.40	13.91	31,871.37
ZIMMER HOLDINGS INC	ZMH	0.85	10.00	10.85	19,208.13
ZIONS BANCORPORATION	ZION	0.61	8.00	8.61	5,785.59
ZOETIS INC	ZTS	0.75	12.15	12.90	21,572.02
		Market Weighted Average =		12.56	

Value Line Data for S&P 500 - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
3M Company	MMM	2.49	9.00	11.49	105,132.60
Accenture Plc	ACN	2.28	7.00	9.28	55,681.27
ACE Limited	ACE	2.26	9.50	11.76	38,006.78
ADT Corp. (The)	ADT	2.20	10.00	12.20	6,290.56
AES Corp.	AES	2.90	10.50	13.40	9,808.65
Aetna Inc.	AET	1.12	10.50	11.62	31,230.96
Aflac Inc.	AFL	2.58	6.50	9.08	27,516.48
AGL Resources	GAS	3.59	10.50	14.09	6,531.78
Air Products & Chem.	APD	2.13	9.00	11.13	30,978.77
Airgas Inc.	ARG	2.06	12.00	14.06	8,599.26
Alcoa Inc.	AA	0.76	18.50	19.26	18,701.43
Allegheny Techn.	ATI	2.07	18.50	20.57	3,738.57
Allergan Inc.	AGN	0.11	14.00	14.11	63,317.17
Allstate Corp.	ALL	1.59	13.00	14.59	29,380.28
Altera Corp.	ALTR	1.94	3.00	4.94	11,347.07
Altria Group	MO	4.22	10.50	14.72	96,764.72
Amer. Elec. Power	AEP	3.54	4.50	8.04	29,916.17
Amer. Express	AXP	1.11	10.00	11.11	96,275.70
Amer. Int'l Group	AIG	0.89	9.50	10.39	78,765.65
Amer. Tower 'A'	AMT	1.67	21.50	23.17	39,508.89
Ameren Corp.	AEE	3.57	4.50	8.07	11,157.17
Ameriprise Fin'l	AMP	1.75	15.50	17.25	24,488.56
AmerisourceBergen	ABC	1.28	14.00	15.28	20,288.91
Ametek Inc.	AME	0.68	9.00	9.68	12,940.94
Amgen	AMGN	1.98	9.00	10.98	121,612.33
Amphenol Corp.	APH	0.92	10.00	10.92	16,735.68
Anadarko Petroleum	APC	1.30	71.50	72.80	41,675.77
Analog Devices	ADI	2.66	14.50	17.16	17,284.27
Anthem Inc.	ANTM	1.39	10.50	11.89	33,938.43
Aon plc	AON	1.05	16.00	17.05	26,896.88
Apache Corp.	APA	1.59	4.00	5.59	24,052.29
Apple Inc.	AAPL	1.70	13.00	14.70	654,796.06
Applied Materials	AMAT	1.60	29.00	30.60	30,476.16
Archer Daniels Midl'd	ADM	1.84	8.50	10.34	33,604.92
Assurant Inc.	AIZ	1.57	4.00	5.57	4,798.73
AT&T Inc.	T	5.59	7.00	12.59	175,616.08
Automatic Data Proc.	ADP	2.35	7.50	9.85	40,129.12
Avago Technologies	AVGO	1.39	18.00	19.39	25,292.04
Avery Dennison	AVY	2.69	10.50	13.19	4,784.93
Avon Products	AVP	2.55	33.00	35.55	4,046.64
Baker Hughes	BHI	1.21	14.00	15.21	24,299.03
Ball Corp.	BLL	0.76	11.50	12.26	9,402.26
Bank of America	BAC	2.23	31.00	33.23	188,234.47
Bank of New York Mellon	BK	1.67	11.50	13.17	45,546.18
Bard (C.R.)	BCR	0.55	11.00	11.55	12,543.92
Baxter Int'l Inc.	BAX	2.83	7.50	10.33	39,750.66
BB&T Corp.	BBT	2.52	7.50	10.02	27,839.52
Becton Dickinson	BDX	1.72	7.00	8.72	26,830.04

Value Line Data for S&P 500 - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
Bemis Co.	BMS	2.38	7.00	9.38	4,513.48
Best Buy Co.	BBY	1.95	5.50	7.45	13,592.29
BlackRock Inc.	BLK	2.15	8.00	10.15	59,791.52
Block (H&R)	HRB	2.67	9.50	12.17	9,102.56
Boeing	BA	2.80	11.50	14.30	92,763.63
BorgWarner	BWA	0.94	12.50	13.44	12,446.40
Bristol-Myers Squibb	BMY	2.50	7.50	10.00	98,713.76
Broadcom Corp. 'A'	BRCM	1.10	6.50	7.60	25,503.36
Brown-Forman 'B'	BF/B	1.43	9.50	10.93	18,657.29
C.H. Robinson	CHRW	2.02	6.50	8.52	10,827.97
CA Inc.	CA	3.28	4.00	7.28	13,513.85
Cablevision Sys. 'A'	CVC	2.90	22.00	24.90	5,676.20
Cabot Oil & Gas 'A'	COG	0.33	31.00	31.33	12,439.52
Campbell Soup	CPB	2.84	4.00	6.84	13,772.00
Capital One Fin'l	COF	1.45	4.50	5.95	46,072.81
Cardinal Health	CAH	1.79	12.00	13.79	26,890.34
Carnival Corp.	CCL	2.20	8.00	10.20	35,438.97
Caterpillar Inc.	CAT	3.05	4.00	7.05	55,623.97
CBS Corp. 'B'	CBS	1.08	12.50	13.58	28,490.80
CenterPoint Energy	CNP	4.39	5.50	9.89	10,156.06
CenturyLink Inc.	CTL	5.45	19.50	24.95	22,593.14
CF Industries	CF	2.20	4.00	6.20	13,819.69
Chesapeake Energy	CHK	1.78	13.50	15.28	12,902.15
Chevron Corp.	CVX	3.81	2.50	6.31	212,823.94
Chubb Corp.	CB	1.93	7.50	9.43	24,267.52
Cigna Corp.	CI	0.03	13.00	13.03	27,009.22
Cincinnati Financial	CINF	3.39	10.50	13.89	8,412.43
Cintas Corp.	CTAS	1.08	9.50	10.58	9,177.94
Cisco Systems	CSCO	2.73	5.00	7.73	141,059.50
Citigroup Inc.	C	0.70	10.00	10.70	164,380.02
Clorox Co.	CLX	2.89	8.50	11.39	13,437.35
CME Group	CME	2.12	8.50	10.62	29,525.84
CMS Energy Corp.	CMS	3.28	6.50	9.78	9,667.01
Coach Inc.	COH	3.59	1.00	4.59	10,282.64
Coca-Cola	KO	3.07	6.50	9.57	184,362.50
Coca-Cola Enterprises	CCE	2.39	12.00	14.39	10,607.29
Colgate-Palmolive	CL	2.16	10.50	12.66	62,922.92
Comcast Corp.	CMCSA	1.55	10.00	11.55	147,750.64
Comerica Inc.	CMA	1.70	7.00	8.70	8,341.46
Computer Sciences	CSC	1.45	10.50	11.95	8,883.71
ConAgra Foods	CAG	2.75	8.00	10.75	15,256.31
ConocoPhillips	COP	4.22	0.50	4.72	84,834.45
CONSOL Energy	CNX	0.73	8.50	9.23	7,895.07
Consol. Edison	ED	3.90	2.00	5.90	19,429.06
Corning Inc.	GLW	2.09	7.00	9.09	29,498.82
Costco Wholesale	COST	1.00	10.50	11.50	62,379.06
Covidien Plc	COV	1.40	8.00	9.40	46,093.79
Crown Castle Int'l	CCI	4.16	27.50	31.66	26,430.16

Value Line Data for S&P 500 - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
CSX Corp.	CSX	1.76	9.50	11.26	35,684.98
Cummins Inc.	CMI	2.16	9.00	11.16	26,589.87
CVS Health	CVS	1.45	10.50	11.95	109,650.30
Danaher Corp.	DHR	0.46	11.50	11.96	60,234.67
Darden Restaurants	DRI	4.09	9.00	13.09	7,723.12
Deere & Co.	DE	2.71	2.00	4.71	31,662.82
Delphi Automotive PLC	DLPH	1.37	14.00	15.37	21,534.26
Delta Air Lines	DAL	0.73	16.00	16.73	41,016.12
Denbury Resources	DNR	4.92	7.50	12.42	2,759.76
Dentsply Int'l	XRAY	0.50	8.50	9.00	7,358.48
Devon Energy	DVN	1.56	8.00	9.56	24,932.64
Diamond Offshore	DO	6.81	6.00	12.81	5,105.98
Discover Fin'l Svcs.	DFS	1.46	4.00	5.46	29,764.75
Disney (Walt)	DIS	1.22	13.50	14.72	159,375.00
Dominion Resources	D	3.25	5.50	8.75	45,247.18
Dover Corp.	DOV	2.23	6.00	8.23	11,902.76
Dow Chemical	DOW	3.68	14.50	18.18	53,212.64
Dr Pepper Snapple	DPS	2.37	8.00	10.37	13,924.27
DTE Energy	DTE	3.27	5.50	8.77	15,399.99
Du Pont	DD	2.59	8.50	11.09	66,768.28
Duke Energy	DUK	3.84	5.00	8.84	59,423.35
Dun & Bradstreet	DNB	1.45	7.50	8.95	4,368.33
Eastman Chemical	EMN	2.10	10.00	12.10	11,355.44
Eaton Corp. plc	ETN	2.88	8.00	10.88	32,239.58
Ecolab Inc.	ECL	1.26	11.00	12.26	31,305.10
Edison Int'l	EIX	2.54	2.50	5.04	21,343.88
EMC Corp.	EMC	1.61	7.50	9.11	60,701.30
Emerson Electric	EMR	3.04	7.00	10.04	43,200.66
Ensco plc	ESV	10.01	4.50	14.51	7,070.34
Entergy Corp.	ETR	3.79	1.50	5.29	15,757.01
EOG Resources	EOG	0.72	19.00	19.72	50,538.20
EQT Corp.	EQT	0.15	19.50	19.65	11,744.74
Equifax Inc.	EFX	1.23	9.50	10.73	9,790.93
Exelon Corp.	EXC	3.34	3.50	6.84	32,290.06
Expedia Inc.	EXPE	0.89	19.50	20.39	10,851.13
Expeditors Int'l	EXPD	1.43	10.00	11.43	8,573.90
Exxon Mobil Corp.	XOM	3.08	6.50	9.58	393,091.22
Family Dollar Stores	FDO	1.56	4.50	6.06	8,980.84
Fastenal Co.	FAST	2.10	12.00	14.10	14,051.26
FedEx Corp.	FDX	0.46	15.50	15.96	48,857.16
Fidelity National	FIS	1.54	12.00	13.54	17,711.96
Fifth Third Bancorp	FITB	2.65	5.00	7.65	16,860.41
FirstEnergy Corp.	FE	3.69	4.50	8.19	16,492.58
FLIR Systems	FLIR	1.36	8.00	9.36	4,534.44
Flowserve Corp.	FLS	1.07	12.00	13.07	8,069.45
Fluor Corp.	FLR	1.38	7.00	8.38	9,499.62
FMC Corp.	FMC	1.19	11.50	12.69	7,592.22
Ford Motor	F	3.22	8.50	11.72	59,115.83

Value Line Data for S&P 500 - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
Franklin Resources	BEN	1.08	9.00	10.08	34,706.44
Freep't-McMoRan C&G	FCX	5.65	6.00	11.65	24,492.00
Frontier Communic.	FTR	5.99	21.00	26.99	6,653.82
GameStop Corp.	GME	3.90	13.50	17.40	3,694.34
Gannett Co.	GCI	2.50	8.00	10.50	6,923.95
Gap (The) Inc.	GPS	2.25	11.50	13.75	17,850.40
Garmin Ltd.	GRMN	3.74	4.50	8.24	10,054.72
Gen'l Dynamics	GD	1.80	7.00	8.80	45,939.23
Gen'l Electric	GE	3.64	10.50	14.14	251,657.33
Gen'l Mills	GIS	3.11	7.00	10.11	31,690.74
General Motors	GM	3.43	11.00	14.43	55,744.00
Genuine Parts	GPC	2.15	9.00	11.15	16,282.22
Goldman Sachs	GS	1.23	13.00	14.23	88,028.84
Goodyear Tire	GT	0.84	11.50	12.34	7,781.09
Grainger (W.W.)	GWW	1.69	12.00	13.69	17,401.66
Halliburton Co.	HAL	1.83	14.50	16.33	33,448.03
Harley-Davidson	HOG	1.66	13.50	15.16	14,182.48
Harman Int'l	HAR	1.30	24.00	25.30	7,186.65
Harris Corp.	HRS	2.67	3.00	5.67	7,488.30
Hartford Fin'l Svcs.	HIG	1.72	13.00	14.72	18,118.89
Hasbro Inc.	HAS	3.12	8.00	11.12	6,934.96
Helmerich & Payne	HP	4.07	9.50	13.57	7,286.12
Hershey Co.	HSY	2.19	11.50	13.69	22,910.99
Home Depot	HD	1.79	14.00	15.79	136,320.73
Honeywell Int'l	HON	2.07	9.50	11.57	78,461.05
Hormel Foods	HRL	1.91	11.00	12.91	13,627.78
Horton D.R.	DHI	0.98	19.50	20.48	9,100.07
Humana Inc.	HUM	0.78	8.50	9.28	21,925.23
Huntington Bancshs.	HBAN	2.28	7.00	9.28	8,551.76
Illinois Tool Works	ITW	2.04	9.50	11.54	37,013.54
Ingersoll-Rand	IR	1.57	13.00	14.57	16,814.51
Int'l Business Mach.	IBM	2.83	5.00	7.83	160,384.30
Int'l Flavors & Frag.	IFF	1.85	7.50	9.35	8,180.25
Int'l Game Tech.	IGT	2.55	10.50	13.05	4,275.82
Int'l Paper	IP	2.98	11.00	13.98	22,547.03
Integrys Energy	TEG	3.49	0.50	3.99	6,216.38
Intel Corp.	INTC	2.64	10.00	12.64	176,600.52
IntercontinentalExch.	ICE	1.18	16.00	17.18	24,593.32
Interpublic Group	IPG	1.83	13.00	14.83	8,469.14
Intuit Inc.	INTU	1.08	11.00	12.08	26,033.07
Invesco Ltd.	IVZ	2.52	14.00	16.52	16,862.57
Iron Mountain	IRM	4.91	6.50	11.41	7,545.69
Johnson & Johnson	JNJ	2.67	6.50	9.17	293,079.91
Johnson Controls	JCI	2.15	10.50	12.65	31,971.60
Joy Global	JOY	1.72	2.00	3.72	4,613.24
JPMorgan Chase	JPM	2.62	7.50	10.12	233,569.83
Juniper Networks	JNPR	1.88	15.50	17.38	9,835.35
Kansas City South'n	KSU	0.91	14.00	14.91	13,289.55

Value Line Data for S&P 500 - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
Kellogg	K	2.99	6.50	9.49	23,245.40
Keurig Green Mountain	GMCR	0.86	18.00	18.86	21,459.91
KeyCorp	KEY	1.94	7.50	9.44	12,037.09
Kimberly-Clark	KMB	2.90	9.50	12.40	43,042.38
Kinder Morgan Inc.	KMI	4.16	16.00	20.16	44,018.48
KLA-Tencor	KLAC	2.84	10.00	12.84	11,561.02
Kohl's Corp.	KSS	2.75	7.50	10.25	12,096.77
Kroger Co.	KR	1.18	10.00	11.18	30,875.58
L Brands	LB	1.57	9.50	11.07	25,212.65
L-3 Communic.	LLL	1.90	3.00	4.90	10,843.41
Lam Research	LRCX	0.90	24.00	24.90	12,663.06
Lauder (Estee)	EL	1.26	11.50	12.76	28,817.02
Legg Mason	LM	1.19	15.00	16.19	6,148.04
Leggett & Platt	LEG	2.91	12.50	15.41	5,802.27
Lennar Corp.	LEN	0.35	26.50	26.85	9,090.26
Lincoln Nat'l Corp.	LNC	1.45	8.00	9.45	14,916.91
Linear Technology	LLTC	2.36	10.50	12.86	10,989.04
Lockheed Martin	LMT	3.11	8.50	11.61	61,143.95
Loews Corp.	L	0.59	14.00	14.59	15,774.42
Lorillard Inc.	LO	3.90	10.50	14.40	22,550.40
Lowe's Cos.	LOW	1.33	16.00	17.33	65,939.80
LyondellBasell Inds.	LYB	3.52	15.00	18.52	40,355.76
M&T Bank Corp.	MTB	2.22	5.00	7.22	16,569.16
Macy's Inc.	M	1.90	12.00	13.90	22,681.84
Marathon Oil Corp.	MRO	2.96	4.00	6.96	19,305.00
Marathon Petroleum	MPC	2.21	12.50	14.71	25,750.84
Marriott Int'l	MAR	1.02	16.00	17.02	22,306.47
Marsh & McLennan	MMC	1.95	11.00	12.95	30,877.74
Martin Marietta	MLM	1.45	22.50	23.95	7,455.55
Masco Corp.	MAS	1.42	34.00	35.42	8,751.00
MasterCard Inc.	MA	0.74	14.50	15.24	98,917.64
Mattel Inc.	MAT	4.91	5.00	9.91	10,323.24
McCormick & Co.	MKC	2.15	8.00	10.15	9,550.20
McDonald's Corp.	MCD	3.62	7.00	10.62	90,760.91
McKesson Corp.	MCK	0.46	15.00	15.46	48,045.74
Mead Johnson Nutrition	MJN	1.49	11.00	12.49	20,197.88
MeadWestvaco	MWV	2.47	11.00	13.47	7,384.72
Medtronic Inc.	MDT	1.77	6.50	8.27	70,752.63
Merck & Co.	MRK	3.17	3.00	6.17	163,611.55
MetLife Inc.	MET	2.75	7.50	10.25	60,329.98
Microchip Technology	MCHP	3.17	10.00	13.17	9,017.17
Microsoft Corp.	MSFT	2.67	8.50	11.17	386,003.78
Molson Coors Brewing	TAP	1.98	8.50	10.48	13,693.64
Mondelez Int'l	MDLZ	1.65	7.50	9.15	61,798.22
Monsanto Co.	MON	1.64	12.50	14.14	62,790.34
Moody's Corp.	MCO	1.41	13.50	14.91	20,002.65
Morgan Stanley	MS	1.03	30.00	31.03	75,809.12
Mosaic Company	MOS	2.41	4.00	6.41	17,078.39

Value Line Data for S&P 500 - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
Motorola Solutions	MSI	2.02	4.00	6.02	16,010.42
Murphy Oil Corp.	MUR	2.77	7.50	10.27	8,961.67
Nabors Inds.	NBR	2.00	22.50	24.50	3,615.13
Nasdaq OMX Group	NDAQ	1.25	10.50	11.75	8,063.50
National Oilwell Varco	NOV	2.80	11.50	14.30	28,197.96
NetApp Inc.	NTAP	1.64	8.00	9.64	12,976.98
Newell Rubbermaid	NWL	1.78	13.00	14.78	10,263.85
NextEra Energy	NEE	2.89	6.00	8.89	46,568.27
Nielsen N.V.	NLSN	2.23	13.00	15.23	17,079.74
NIKE Inc. 'B'	NKE	1.16	15.00	16.16	82,105.92
NiSource Inc.	NI	2.45	10.50	12.95	13,397.09
Noble Corp. plc	NE	9.05	7.50	16.55	4,248.02
Noble Energy	NBL	1.51	15.00	16.51	16,970.56
Nordstrom Inc.	JWN	1.77	8.00	9.77	14,898.14
Norfolk Southern	NSC	2.08	8.50	10.58	33,775.49
Northeast Utilities	NU	3.13	8.00	11.13	17,015.27
Northern Trust Corp.	NTRS	1.95	10.50	12.45	15,908.36
Northrop Grumman	NOC	1.90	7.50	9.40	29,757.16
NRG Energy	NRG	2.07	27.00	29.07	9,297.97
Nucor Corp.	NUE	3.05	21.50	24.55	15,634.14
NVIDIA Corp.	NVDA	1.69	10.50	12.19	10,941.38
Occidental Petroleum	OXY	3.64	3.00	6.64	62,538.27
Omnicom Group	OMC	2.58	10.50	13.08	18,844.23
ONEOK Inc.	OKE	4.74	11.00	15.74	10,392.99
Oracle Corp.	ORCL	1.06	9.50	10.56	194,963.34
PACCAR Inc.	PCAR	2.64	11.00	13.64	24,138.73
Pall Corp.	PLL	1.20	11.00	12.20	10,799.35
Parker-Hannifin	PH	1.95	8.00	9.95	19,198.99
Patterson Cos.	PDCO	1.66	11.00	12.66	4,796.84
Paychex Inc.	PAYX	3.42	9.00	12.42	16,791.92
Pentair plc	PNR	1.92	15.00	16.92	12,455.42
People's United Fin'l	PBCT	4.41	13.50	17.91	4,543.79
Pepco Holdings	POM	4.01	7.00	11.01	6,836.00
PepsiCo Inc.	PEP	2.89	8.50	11.39	141,943.33
PerkinElmer Inc.	PKI	0.64	7.50	8.14	4,980.49
Perrigo Co. plc	PRGO	0.25	12.00	12.25	22,311.76
PetSmart Inc.	PETM	0.99	9.50	10.49	8,089.82
Pfizer Inc.	PFE	3.59	8.00	11.59	197,399.59
PG&E Corp.	PCG	3.41	5.00	8.41	25,311.64
Philip Morris Int'l	PM	4.91	6.50	11.41	126,063.71
Pinnacle West Capital	PNW	3.48	4.00	7.48	7,581.01
Pioneer Natural Res.	PXD	0.05	22.00	22.05	21,434.27
Pitney Bowes	PBI	3.07	2.50	5.57	4,898.08
Plum Creek Timber	PCL	4.11	13.00	17.11	7,572.49
PNC Financial Serv.	PNC	2.10	5.50	7.60	47,952.96
PPG Inds.	PPG	1.15	11.50	12.65	31,481.71
Praxair Inc.	PX	2.16	9.50	11.66	37,863.79
Precision Castparts	PCP	0.05	12.00	12.05	33,985.33

Value Line Data for S&P 500 - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
Price (T. Rowe) Group	TROW	2.15	12.00	14.15	22,353.77
Principal Fin'l Group	PFG	2.61	10.00	12.61	15,211.42
Procter & Gamble	PG	2.83	9.00	11.83	244,379.55
Progressive (Ohio)	PGR	1.81	13.50	15.31	15,932.13
Prudential Fin'l	PRU	2.56	10.00	12.56	41,369.50
Public Serv. Enterprise	PEG	3.64	2.00	5.64	21,196.42
PulteGroup Inc.	PHM	1.49	31.00	32.49	7,946.52
PVH Corp.	PVH	0.11	10.50	10.61	10,416.10
QEP Resources	QEP	0.59	15.50	16.09	3,601.18
Qualcomm Inc.	QCOM	2.25	9.50	11.75	124,641.84
Quest Diagnostics	DGX	1.96	7.00	8.96	10,000.65
Ralph Lauren	RL	0.97	8.50	9.47	16,057.87
Range Resources Corp.	RRC	0.29	31.00	31.29	9,164.88
Raytheon Co.	RTN	2.23	9.00	11.23	33,484.46
Regions Financial	RF	2.17	13.00	15.17	14,493.29
Republic Services	RSG	2.83	9.00	11.83	14,422.63
Reynolds American	RAI	4.17	10.50	14.67	33,906.48
Robert Half Int'l	RHI	1.30	14.00	15.30	7,759.05
Rockwell Automation	ROK	2.33	9.50	11.83	15,309.31
Rockwell Collins	COL	1.42	8.50	9.92	11,339.08
Roper Inds.	ROP	0.64	10.50	11.14	15,991.69
Ross Stores	ROST	0.84	8.50	9.34	19,541.39
Ryder System	R	1.59	13.00	14.59	4,894.44
Safeway Inc.	SWY	2.67	8.50	11.17	8,044.77
SanDisk Corp.	SNDK	1.22	15.50	16.72	21,597.03
SCANA Corp.	SCG	3.57	5.00	8.57	8,647.18
Schlumberger Ltd.	SLB	2.01	14.50	16.51	110,239.55
Schwab (Charles)	SCHW	0.79	10.50	11.29	39,453.72
Scripps Networks	SNI	1.06	8.00	9.06	10,411.60
Seagate Technology	STX	3.24	8.00	11.24	21,600.16
Sealed Air	SEE	1.41	20.00	21.41	9,047.40
Sempra Energy	SRE	2.47	7.00	9.47	27,589.49
Sherwin-Williams	SHW	0.98	17.00	17.98	24,879.31
Sigma-Aldrich	SIAL	0.67	10.00	10.67	16,351.56
Smucker (J.M.)	SJM	2.56	8.00	10.56	10,230.47
Snap-on Inc.	SNA	1.55	9.50	11.05	7,919.27
Southern Co.	SO	4.37	3.50	7.87	44,423.72
Southwest Airlines	LUV	0.56	30.00	30.56	28,975.58
Spectra Energy	SE	4.07	5.00	9.07	24,625.70
St. Jude Medical	STJ	1.66	8.50	10.16	18,543.81
Stanley Black & Decker	SWK	2.16	10.00	12.16	15,041.72
Starbucks Corp.	SBUX	1.56	18.00	19.56	61,161.44
Starwood Hotels	HOT	1.72	11.00	12.72	14,554.83
State Street Corp.	STT	1.58	9.00	10.58	32,901.59
Stryker Corp.	SYK	1.46	13.50	14.96	35,558.30
SunTrust Banks	STI	2.14	15.00	17.14	22,008.48
Symantec Corp.	SYMC	2.33	6.50	8.83	17,660.86
Sysco Corp.	SYY	3.02	12.00	15.02	23,402.99

Value Line Data for S&P 500 - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
Target Corp.	TGT	2.76	5.00	7.76	47,787.70
TE Connectivity	TEL	1.83	9.50	11.33	25,879.04
TECO Energy	TE	4.29	4.00	8.29	4,832.76
Tesoro Corp.	TSO	1.61	12.50	14.11	9,656.45
Texas Instruments	TXN	2.54	12.50	15.04	56,490.87
Textron Inc.	TXT	0.19	17.00	17.19	11,647.14
Thermo Fisher Sci.	TMO	0.47	13.00	13.47	51,251.20
Tiffany & Co.	TIF	1.46	12.50	13.96	13,646.74
Time Warner	TWX	1.48	14.50	15.98	71,511.06
Time Warner Cable	TWC	1.97	8.00	9.97	42,245.06
TJX Companies	TJX	1.02	11.00	12.02	46,817.64
Torchmark Corp.	TMK	0.94	7.50	8.44	7,001.16
Total System Svcs.	TSS	1.17	9.50	10.67	6,360.10
Tractor Supply	TSCO	0.96	16.00	16.96	10,665.53
Transocean Ltd.	RIG	16.36	4.50	20.86	6,563.68
Travelers Cos.	TRV	2.07	10.00	12.07	34,942.82
Twenty-First Century Fox	FOXA	0.65	13.50	14.15	82,281.35
Tyco Int'l plc	TYC	1.64	16.00	17.64	19,580.89
Tyson Foods 'A'	TSN	0.99	13.50	14.49	13,982.50
U.S. Bancorp	USB	2.22	6.00	8.22	80,469.85
Union Pacific	UNP	1.67	11.00	12.67	105,667.63
United Parcel Serv.	UPS	2.48	10.00	12.48	100,335.41
United Technologies	UTX	2.05	8.50	10.55	104,877.14
UnitedHealth Group	UNH	1.48	10.50	11.98	96,950.36
Universal Health Sv. `B'	UHS	0.36	11.50	11.86	10,982.59
Unum Group	UNM	1.89	7.50	9.39	8,752.08
V.F. Corp.	VFC	1.70	12.50	14.20	31,838.43
Valero Energy	VLO	2.22	13.00	15.22	26,335.02
Verizon Communic.	VZ	4.70	8.00	12.70	194,871.00
Viacom Inc. 'B'	VIAB	1.75	14.00	15.75	31,992.22
Visa Inc.	V	0.73	15.00	15.73	203,005.31
Vornado R'Ity Trust	VNO	2.54	6.50	9.04	22,409.93
Wal-Mart Stores	WMT	2.23	6.50	8.73	277,199.31
Walgreens Boots	WBA	1.77	10.50	12.27	72,698.56
Waste Management	WM	3.00	7.50	10.50	23,696.32
Wells Fargo	WFC	2.73	7.00	9.73	285,260.94
Western Digital	WDC	1.44	6.50	7.94	25,840.62
Western Union	WU	2.79	5.00	7.79	9,388.15
Weyerhaeuser Co.	WY	3.23	18.50	21.73	18,975.23
Whirlpool Corp.	WHR	1.54	12.00	13.54	15,054.78
Whole Foods Market	WFM	1.13	13.50	14.63	18,182.15
Williams Cos.	WMB	5.45	12.00	17.45	33,779.34
Windstream Hldgs.	WIN	12.13	6.50	18.63	5,001.58
Wisconsin Energy	WEC	3.20	5.50	8.70	11,995.25
Wyndham Worldwide	WYN	1.63	10.50	12.13	10,502.97
Wynn Resorts	WYNN	4.03	13.00	17.03	14,829.87
Xcel Energy Inc.	XEL	3.48	5.50	8.98	18,255.91
Xerox Corp.	XRX	1.94	4.00	5.94	15,696.38

Value Line Data for S&P 500 - Jan. 1, 2015					
Company Name	Ticker	Yield %	Growth Rate %	Equity Cost %	Market Value
Xilinx Inc.	XLNX	2.68	10.50	13.18	11,527.84
XL Group plc	XL	1.86	16.00	17.86	
Xylem Inc.	XYL	1.34	10.50	11.84	6,926.75
Yum! Brands	YUM	2.25	9.50	11.75	31,616.95
Zimmer Holdings	ZMH	0.82	9.50	10.32	19,061.49
Zions Bancorp.	ZION	0.56	9.00	9.56	5,739.98
			Market Weighted Average =	12.51	

Source: *Value Line*, January 2015.

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.[52]

> 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.[53]

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)*.[54]

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[52] *The Appraisal of Real Estate*, 14th ed., (Chicago: Appraisal Institute, 2013) p. 109.

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

[54] 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.[55]

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>.[56]

> 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.[57] [This identical quote

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

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

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

> 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).[58]

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.[59]

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 taken from the

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[58] *Stocks, Bonds, Bills and Inflation: 2012 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2012), p. 25.

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

Journal of Property Tax Assessment & Administration published by the International Association of Assessing Officers.[60]

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
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

[60] 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.

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 the amount of debt and equity securities 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 1.03% and the average issuance cost of common equity to be 4.33%. 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 - 2014)

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	96.868	3.23%
Michigan Con Gas Company	Gas	15-May-97	30,000	100.000	99.247	0.76%
Michigan Con Gas Company	Gas	15-May-97	40,000	100.000	99.361	0.64%
Seagull Energy Corp.	Gas	25-Sep-97	150,000	99.544	98.544	1.02%
SONAT Inc.	Gas	25-Sep-97	100,000	99.748	99.097	0.66%
Southern Natural Gas Co.	Gas	25-Sep-97	100,000	99.891	99.239	0.66%
Laclede Gas	Gas	16-Oct-97	25,000	98.682	98.352	0.34%
Kn Energy Inc.	Gas	22-Oct-97	150,000	100.000	99.374	0.63%
Northern Illinois Gas Co.	Gas	23-Oct-97	50,000	99.500	98.996	0.51%
Enron Oil & Gas Co.	Gas	25-Nov-97	100,000	99.709	99.058	0.66%
Consolidated Natural Gas Co.	Gas	09-Dec-97	300,000	99.190	98.314	0.89%
SONAT	Gas	27-Jan-98	100,000	99.531	98.879	0.66%
SONAT	Gas	29-Jan-98	100,000	99.787	98.912	0.89%
KN Energy, Inc.	Gas	04-Mar-98	500,000	99.784	98.908	0.89%
KN Energy, Inc.	Gas	04-Mar-98	150,000	99.496	98.370	1.14%
Coastal Corp.	Gas	02-Jun-98	200,000	99.882	99.231	0.66%
Coastal Corp.	Gas	02-Jun-98	200,000	99.661	98.785	0.89%
Wisconsin Gas Co.	Gas	19-Jan-99	50,000	99.252	98.602	0.66%
No. Illinois Gas Co.	Gas	02-Feb-99	50,000	100.000	99.350	0.65%
Providence Gas Co.	Gas	04-Feb-99	15,000	100.000	96.850	3.25%
Cascade Natural Gas Corp.	Gas	15-Mar-99	15,000	100.000	99.250	0.76%
Laclede Gas Co.	Gas	28-May-99	25,000	100.000	99.502	0.50%
Mich. Consolidated Gas Co.	Gas	04-Jun-99	55,000	100.000	96.850	3.25%
Williams Co.	Gas	21-Jul-99	700,000	99.075	98.200	0.89%
Williams Communication Grp.	Gas	30-Sep-99	1,500,000	99.249	96.749	2.58%
Indiana Gas Co.	Gas	04-Oct-99	30,000	100.000	99.375	0.63%
Northwest Natural Gas	Gas	09-Dec-99	20,000	100.000	99.250	0.76%
SEMCO Energy	Gas	12-Apr-00	30,000	100.000	97.250	2.83%
New Jersey Gas Co.	Gas	29-Jun-00	10,000	100.000	99.250	0.76%
New Jersey Gas Co.	Gas	05-Jul-00	10,000	100.000	96.850	3.25%
New Jersey Gas Co.	Gas	01-Jul-00	15,000	100.000	97.600	2.46%
Northwest Natural Gas	Gas	29-Aug-00	20,000	100.000	99.250	0.76%
Northwest Natural Gas	Gas	06-Sep-00	20,000	100.000	99.250	0.76%
Northwest Natural Gas	Gas	06-Sep-00	10,000	100.000	99.250	0.76%
Northwest Natural Gas	Gas	27-Nov-00	25,000	100.000	99.375	0.63%
Agl Capital Corp	Gas	23-Feb-01	300,000	99.578	98.928	0.66%
Oneok, Inc	Gas	03-Apr-01	400,000	99.912	99.262	0.65%
Atmos Energy Corp	Gas	15-May-01	350,000	99.940	99.290	0.65%
Semco Energy	Gas	18-Jun-01	60,000	100.000	97.500	2.56%
Questar Gas Co.	Gas	03-Oct-01	60,000	100.000	99.375	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%

Debt Issuance Cost
Natural Gas/Transmission Utilities (1997 - 2014)

Company	Type of Utility	Issue Date	Amount Offered ($000)	Price to Public ($/100)	Net Proceeds	Issue Cost
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%
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 Company	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%

Debt Issuance Cost
Natural Gas/Transmission Utilities (1997 - 2014)

Company	Type of Utility	Issue Date	Amount Offered ($000)	Price to Public ($/100)	Net Proceeds	Issue Cost
Washington Gas Light	Gas	05-Dec-08	50,000	100.000	99.375	0.63%
AGI Capital Corp	Gas	05-Aug-09	300,000	99.783	99.133	0.66%
Atmos Energy	Gas	23-Mar-09	450,000	99.813	99.163	0.66%
National Fuel Gas Co	Gas	01-Apr-09	250,000	99.762	99.112	0.66%
Northwest Natural Gas Co.	Gas	20-Mar-09	75,000	100.000	99.375	0.63%
Sempra Energy	Gas	05-Oct-09	750,000	99.159	98.284	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%
AGL Capital Corp.	Gas	16-Mar-11	500,000	99.833	98.958	0.88%
Atmos Energy Co	Gas	07-Jun-11	400,000	99.678	98.803	0.89%
Northwest Natural Gas Co	Gas	19-Aug-11	500,000	100.000	99.375	0.63%
AGL Capital Corp.	Gas	15-Sep-11	200,000	113.434	112.559	0.78%
AGL Capital Corp.	Gas	15-Sep-11	300,000	98.483	97.833	0.66%
National Fuel Gas Co	Gas	28-Nov-11	500,000	99.867	99.217	0.66%
San Diego Gas & Elec	Gas	19-Mar-12	250,000	99.481	98.606	0.89%
Pacific Gas & Elec	Gas	11-Apr-12	400,000	99.491	98.616	0.89%
Pacific Gas & Electric Co	Gas	13-Aug-12	350,000	99.911	99.035	0.88%
Pacific Gas & Electric Co	Gas	13-Aug-12	400,000	99.709	99.059	0.66%
Baltimore Gas & Electric Co.	Gas	14-Aug-12	250,000	99.620	99.314	0.31%
Sempra Energy	Gas	19-Sep-12	500,000	99.965	99.315	0.65%
AGI Capital	Gas	13-May-13	500,000	99.618	98.743	0.89%
Atmos Energy	Gas	08-Jan-13	500,000	99.812	98.937	0.88%
Integrys Energy Group	Gas	12-Aug-13	400,000	25.000	24.213	3.25%
NiSource	Gas	09-Apr-13	750,000	99.575	98.700	0.89%
NiSource Finance	Gas	03-Oct-13	500,000	99.341	98.466	0.89%
Northwest Natural Gas Co	Gas	14-Aug-13	50,000	100.000	99.375	0.63%
Piedmont Natural Gas Co	Gas	29-Jul-13	300,000	99.952	99.077	0.88%
Sempra Energy	Gas	09-Nov-13	500,000	99.665	99.015	0.66%
Laclede Group Inc	GAS	12-Aug-14	250,000	99.908	99.030	0.88%
Piedmont Natural Gas Co	GAS	15-Sep-14	250,000	99.826	99.076	0.75%
Atmos Energy	GAS	06-Oct-14	500,000	99.812	98.937	0.88%
WGL Holdings Inc	GAS	22-Oct-14	125,000	99.226	98.351	0.88%
WGL Holdings Inc	GAS	11-Dec-14	125,000	92.612	91.737	0.88%
					Average	1.03%
					Selected	1.00%

Source: *Public Utility Finance Tracker*, February 1999 - 2015.

Common Stock Issuance Cost
Natural Gas/Transmission Utilities (1990 - 2014)

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%

Common Stock Issuance Cost
Natural Gas/Transmission Utilities (1990 - 2014)

Company	Type of Company	Issue Date	Number of Shares (000)	Price to Public	Net Proceeds	Issue Cost
Southern Union Co.	Gas	10-Jun-03	3,000	16.15	16.15	0.00%
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	12,500	44.00	42.24	4.17%
Gas Natural Inc	Gas	30-Nov-13	1,134.000	10.00	9.42	6.16%
Gas Natural Inc	Gas	11-Jul-13	1,500	10.00	9.42	6.16%
Laclede Group	Gas	22-May-13	8,700	4.50	4.33	3.98%
Piedmont Natural Gas Co.	Gas	29-Jan-13	4,000	32.00	30.88	3.63%
Atmos Energy	Gas	11-Feb-14	800	44.00	42.46	3.63%
The Laclede Group Inc	Gas	05-Jun-14	9,000	46.25	44.54	3.84%
					Average	4.33%
					Selected	4.25%

Source: *Public Utility Finance Tracker*, February 1999 - 2015.

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

Cost of Capital Including Flotation Costs			
Capital	**Portion**	**Cost**	**Product**
Debt	30.00%	5.66%	1.70%
Equity	70.00%	12.79%	8.95%
Totals	100.00%		10.65%

Including flotation cost in the cost of capital requires an adjustment to compensate for the expense is issuing of debt and equity. This is in accordance with virtually all finance texts, as well as the practices of state and federal regulatory commissions, and the adjustment is necessary to properly match income and rate in the capitalization process for property tax appraisals. Including flotation cost adds 0.06% to the cost of debt, 0.54% to the cost of equity, and approximately 0.40% (40 basis points) to the overall cost of capital. The cost of capital to purchase the operating assets for the typical interstate natural gas pipeline after accounting for flotation costs was **10.65%** at January 1, 2015.

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.[61]

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.[62]

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).[63]

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 equity

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[61] *Stocks, Bonds, Bills and Inflation: 2012 Valuation Edition Yearbook,* (Chicago: Morningstar, Inc., 2012), p. 56.

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

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

risk premium because it represents the truly riskless portion of the return.[64]

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.[65]

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.[66]

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 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.

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[64] *Stocks, Bonds, Bills and Inflation: 2012 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2012), p. 55.

[65] *Stocks, Bonds, Bills and Inflation: 2012 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2012), p. 62.

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

> 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.[67]

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.[68]

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, 2015, and no adjustment is necessary.

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[67] *Stocks, Bonds, Bills and Inflation: 2012 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2012), p. 62.

[68] 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* ($\mathbf{R}_0$). 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* ($\mathbf{Y}_0$). 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.[69]

Generally accepted appraisal literature indicates that it is improper 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

[69] *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.[70]

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 ratios of common stocks can only be used in the appraisal of similar common stock, not for the appraisal of real

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

personal property.[71]

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.[72]

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 the appropriate discount rate. In this model the discount rate and the overall capitalization rate are the same.[73]

When the net income consists of a fixed amount that represents the return of capital

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

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

[73] *Ibid.*, 560.

(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.[74] 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.[75]

The Appraisal Institute goes on to state:

> To estimate equity yield rates, appraisers must research the market. This research can take many forms and may include one or more of the following

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[74] *Ibid.*, 560.

[75] *The Appraisal of Real Estate*, 13th ed., 635; 12th ed., 119; 11th ed., 554-555; and 10th ed., 506-507.

analyses...Comparison with the equity yield rates achieved in alternative investments of comparable risk such as stocks and bonds.[76]

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 112. 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 21, 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*, 14th edition, page 546-547.

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

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[76] *The Appraisal of Real Estate*, 13th ed., 635-636; 12th ed., 119; 11th ed., 554-555; and 10th ed., 506-507.

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.[77] 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 of the operating assets.

[77] Tegarden, Thomas K., "Income Approach Techniques in Central Assessment Appraisals," *Journal of Property Tax Assessment & Administration*, (Kansas City: IAAO), Vol. 10, Issue 3, 2013, pp. 13-14.

Computation of 2015 Equity Risk Premium
Adapted from *SBBI* Information

Computed By Dr. Hal Heaton, Brigham Young University

2014 ERP = 6.96% (Average of 1926 - 2013 data)[78]

$$0.0696 = \frac{\sum_{t=1926}^{2013}\left(R_{M^t} - R_{F^t}\right)}{(2014 - 1926)} = \frac{\sum}{88}$$

$$R_M^{2014} - R_F^{2014} = 0.1369 - 0.0396 = 0.0973$$

$$2015\ ERP = \frac{\sum_{t=1926}^{2014}\left(R_{M^t} - R_{F^t}\right)}{89} = \frac{\left(\sum + 0.0973\right)}{89}$$

$$Since\ 0.0696 = \frac{\sum}{88} \rightarrow \sum = 88 \times 0.0696 = 6.1248$$

$$2015\ ERP = \frac{(6.1248 + 0.0973)}{89} = 0.0699\ or\ 7.0\%$$

[78] Based on the *SBBI* study 1926 - 2013

Computation of 2015 Equity Risk Premium (for LT Corp Bonds) Adapted from *SBBI* Information

2014 ERP = 5.8% (Average of 1926 - 2013 data)[79]

$$0.058 = \frac{\sum_{t=1926}^{2013}\left(R_{M^t} - R_{F^t}\right)}{(2014 - 1926)} = \frac{\sum}{88}$$

$$R_M{}^{2014} - R_F{}^{2014} = 0.1369 - 0.0866 = 0.0503$$

$$2015\ ERP\ for\ LT\ Corp\ Bonds = \frac{\sum_{t=1926}^{2014}\left(R_{M^t} - R_{F^t}\right)}{89} = \frac{\left(\sum + 0.0503\right)}{89}$$

$$Since\ 0.058 = \frac{\sum}{88} \rightarrow \sum = 88 \times 0.058 = 5.1040$$

$$2015\ ERP\ for\ LT\ Corp\ Bonds = \sum_{1926}^{2014} + \left(\overset{2014}{R_f} + \overset{2014}{R_f}\right)$$

$$2015\ ERP\ for\ LT\ Corp\ Bonds = \frac{(5.1040 + 0.0503)}{89} = 0.0579\ or\ 5.8\%$$

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[79] Based on the *SBBI* study 1926 - 2013 (LT Corp Bonds). "iBoxx Investment Grade Corporate Bond Index" The index is composed of U.S. dollar-denominated, investment grade corporate bonds. The Index Provider Markit owns, compiles and publishes the iBoxx bond and iTraxx credit derivative indices, which are used around the world by financial market participants as benchmarks and as the basis for traded products. "Markit®" and "iBoxx®" are the registered trademarks of Markit Group Limited and Markit Indices Limited, respectively.

CRSP Deciles Size Premium[80]

Decile	Market Capitalization of Smallest Company (in millions)	Market Capitalization of Largest Company (in millions)	Size Premium (Return in Excess of CAPM)
Mid-Cap 3-5	$2,552,441 -	$10,105,622	1.07%
Low-Cap 6-8	549,056 -	2,542,913	1.80
Micro-Cap 9-10	3,037 -	548,839	3.74
Break down of CRSP Deciles 1 - 10			
1 - Largest	$24,428,848 -	$591,015,721	-0.36%
2	10,170,746 -	24,272,837	0.63
3	5,864,266 -	10,105,622	0.91
4	3,724,624 -	5,844,592	1.06
5	2,552,441 -	3,724,186	1.60
6	1,688,895 -	2,542,913	1.74
7	1,011,278 -	1,686,860	1.71
8	549,056 -	1,010,634	2.15
9	300,752 -	548,839	2.69
10 - Smallest	3,037 -	300,725	5.78
Breakdown of CRSP 10th Decile			
10a	$190,860 -	$300,725	4.22%
10w	231,975 -	300,725	3.18
10x	190,860 -	231,840	5.54
10b	$3,037 -	$190,529	8.94%
10y	116,330 -	190,529	7.51
10z	3,037 -	115,920	11.98

Sources of underlying data: 1.) CRSP U.S. Stock Database and CRSP U.S. Indices Database © 2015 Center for Research in Security Prices (CRSP ®), University of Chicago Booth School of Business, 2.) Morningstar EnCorr database. Used with permission. All rights reserved. Calculations performed by Duff & Phelps LLC.

[80]See Chapter 7 for complete methodology of Duff & Phelps 2015 Valuation Handbook – *Guide to Cost of Capital.*