STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

JOINT PETITION OF OHIO VALLEY GAS CORPORATION AND OHIO VALLEY GAS, INC. FOR (1) AUTHORITY TO INCREASE THEIR RATES AND CHARGES FOR GAS UTILITY SERVICE; (2) APPROVAL OF NEW SCHEDULES OF RATES AND CHARGES; AND (3) APPROVAL OF CHANGES TO THEIR GENERAL RULES AND REGULATIONS APPLICABLE TO GAS UTILITY SERVICE	**CAUSE NO. 44891**

INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR

PUBLIC'S EXHIBIT NO. 4

TESTIMONY OF BRADLEY E. LORTON

APRIL 20, 2017

Respectfully submitted,

Scott Franson
Attorney No. 27839-49
Deputy Consumer Counselor

TESTIMONY OF OUCC WITNESS
BRADLEY E. LORTON, CRRA
CAUSE NO. 44891
OHIO VALLEY GAS CORPORATION AND OHIO VALLEY GAS, INC.

I. INTRODUCTION

Q: Please state your name and business address.

A: My name is Bradley E. Lorton, and my business address is 115 W. Washington Street, Suite 1500 South, Indianapolis, Indiana, 46204.

Q: By whom are you currently employed and in what capacity?

A: I am a Utility Analyst in the Natural Gas Division of the Indiana Office of Utility Consumer Counselor ("OUCC"). For a summary of my education and professional experience, and general preparation for this case, please see Appendix BEL-1 attached to my testimony.

Q: What is the purpose of your testimony?

A: I testify on the cost of common equity capital, sometimes referred to as the authorized return on equity ("ROE"). Ohio Valley Gas Corporation and Ohio Valley Gas, Inc., (jointly "OVG" or "Petitioner") have recommended an 11.1% cost of equity. Based on the results of the Discounted Cash Flow ("DCF") method, Capital Asset Pricing Model ("CAPM"), and macroeconomic analysis, I conclude that a cost of equity of 9.0% would be a reasonable and appropriate ROE for OVG.

II. PETITIONER'S PROPOSED COST OF EQUITY IS TOO HIGH

Q: What is Petitioner's current authorized ROE?

A: Petitioner's current ROE of 10.1% was approved by the Commission's Order in Cause No. 44147 on December 5, 2012.

Q: What is Petitioner's proposed ROE?

A: Petitioner's witness Mr. Adrien M. McKenzie recommends a return on equity of 11.1%.

Q: Do you agree with Mr. McKenzie's recommendation?

A: No.

Q: What level of ROE do you recommend?

A: I recommend an ROE of 9.0%.

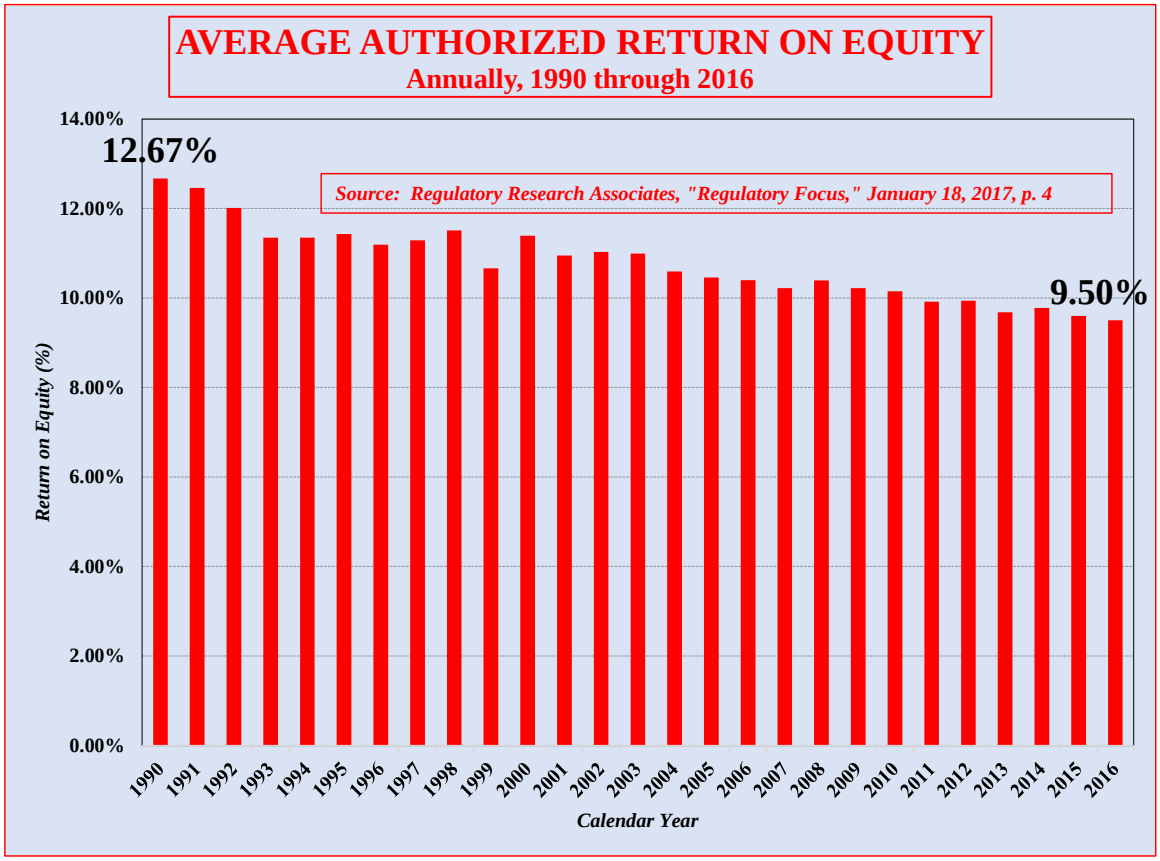
Q: Why do you recommend a lower authorized ROE at this time?

A: Neither my DCF nor my CAPM analyses yield a return as high as OVG's current 10.1%, let alone Mr. McKenzie's proposed 11.1% cost of equity. The current economic condition, both nationally and in the State of Indiana, is best described as a maturing recovery. Data on bond yields, dividend yields, inflation and economic growth do not support projections of double-digit rates of return. Moreover, regulated public utilities tend to be less risky than the market as a whole.

Lower ROEs have become more common, and less threatening to public utilities, over the past decades. Graph 1 clearly illustrates the long term downward trend of ROE. Each bar represents the average of authorized ROE from each calendar year between 1990 and 2016, as published by Regulatory

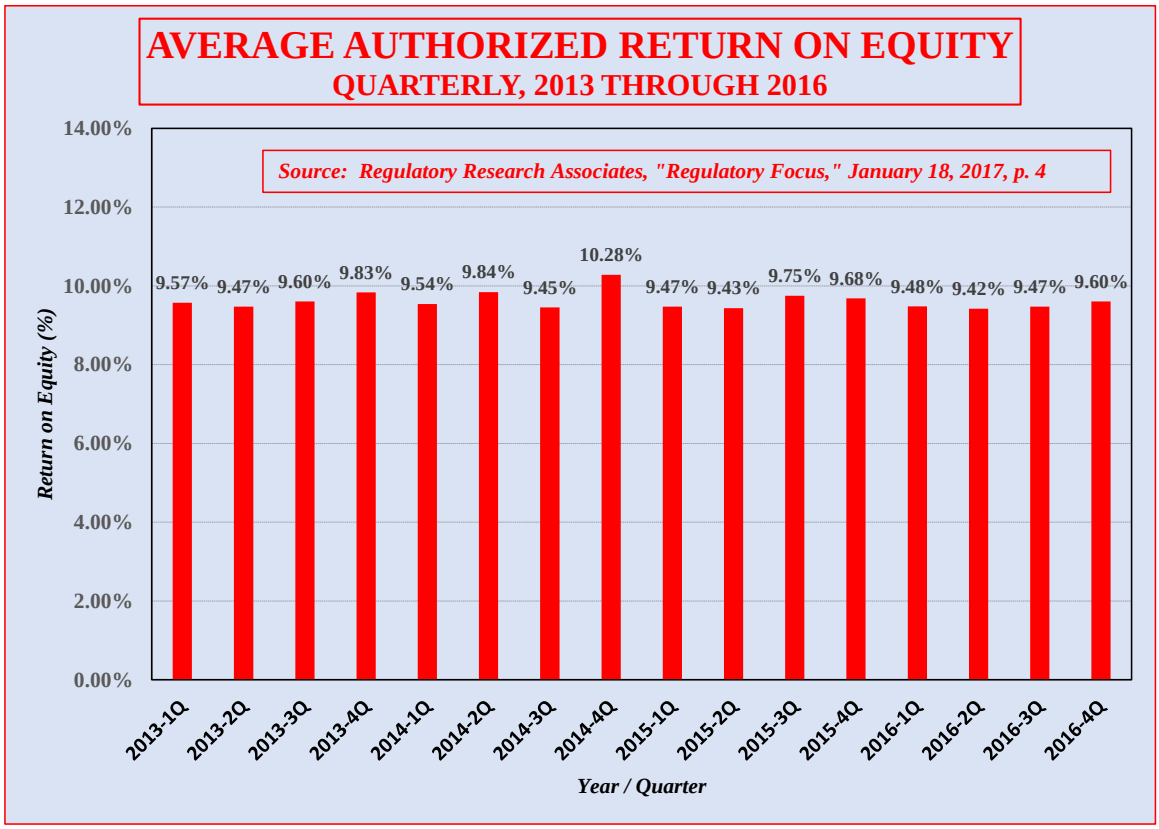
Research Associates (S&P Global Market Intelligence) (Attachment BEL-1). The average for 2016 was 9.5%.

GRAPH 1



Not only has the annual average of authorized ROE been below 10% every year since 2011, but in the past four calendar years the average authorized ROE has been above 10% in only one quarter, (Fourth Quarter, 2014). Graph 2 illustrates the quarterly averages from calendar year 2013 through 2016.

GRAPH 2



Moreover, investors are not unaware of the trend toward lower ROE. In March 2015, *Moody's Investors Service* issued an in-depth report titled, "Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles," (Attachment BEL-2) in which *Moody's* posited that lowering authorized ROE's will not inhibit the flow of cash to the utility:

> The credit profiles of US regulated utilities will remain intact over the next few years despite our expectation that regulators will continue to trim the sector's profitability by lowering its authorized returns on equity (ROE). Persistently low interest rates and a comprehensive suite of cost recovery mechanisms ensure a low business risk profile for utilities, prompting regulators to scrutinize their profitability, which is defined as the ratio of net income to book equity. We view cash flow measures as a more important rating driver than authorized ROEs, and we note that regulators can lower authorized ROEs without hurting cash flow, for instance by targeting depreciation, or through special rate structures. Regulators can also adjust a utility's equity capitalization in its rate base. All else being equal, we think most utilities would prefer a thicker equity base and a lower authorized ROE over a small equity layer and a high authorized ROE.
>
> (*Moody's Investors Service,* "Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles," Sector In-Depth, March 10, 2015, p. 1.) (Emphasis added.)

Moody's goes on to point out that local distribution companies' financial performance has remained stable, even with declining authorized ROEs:

> Utilities' actual financial performance remains stable. Earned ROEs, which typically lag authorized ROEs, have not fallen as much as authorized returns in recent years. Since 2007, vertically integrated utilities, transmission and distribution only utilities, and natural gas local distribution companies have maintained steady earned ROEs in the 9% - 10% range.
>
> (*Id.)* (Emphasis added.)

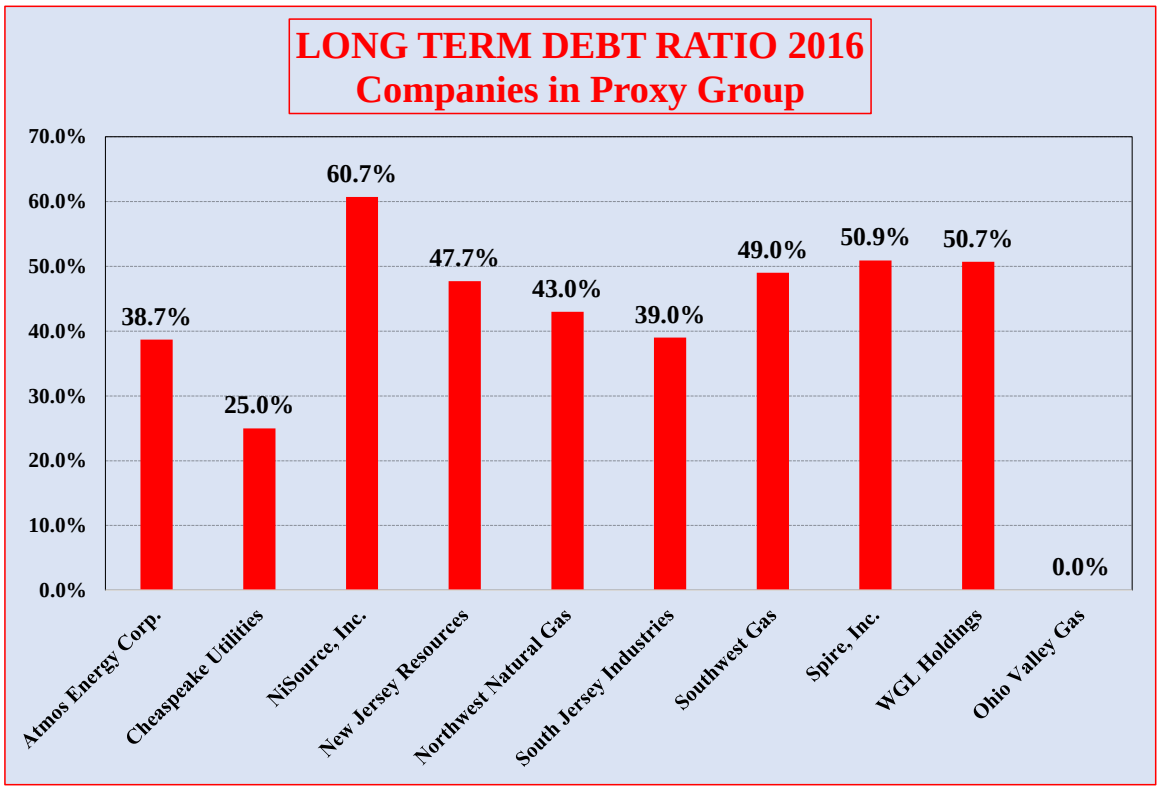
With my DCF and CAPM results for OVG both below 9%, and with OVG carrying no long term debt, I recommend 9.0% as a reasonable cost of common equity in OVG's capital structure.

Q: Do you agree with Mr. McKenzie's observation that if ROE is too low, "investors will become unwilling to supply capital to the utility on reasonable terms"?

A: Yes. However, I do not believe that my recommendation would have that result. As I have noted, the long term trend, nationally, has been toward lower ROEs,

and specifically ROEs below 10%. OVG's lack of debt financing in its capital structure pre-empts any financial risk to the company. As I elaborate in Section III of my testimony, I use the same proxy group as Mr. McKenzie. Graph 3 compares the proportion of long term debt in the capital structures of each company in Mr. McKenzie's proxy group to that of OVG. Every company in the proxy group has considerably more financial risk than OVG.

GRAPH 3



Q: Why is an ROE of 9.0% or below reasonable?

A: Neither my CAPM analysis nor my DCF model analysis supports an ROE higher than 9.0%. In fact, my analyses and calculations could justify a lower rate of return, as an 8.7% ROE is the higher end of the range of results in my DCF and

CAPM analyses. While my DCF model indicated an ROE of 8.7%, my CAPM results indicated an ROE of 7.87%.

As bond yields have remained in a historically low range, my review of 5-year, 10-year, 20-year and 30-year constant maturity Treasury bonds to arrive at a CAPM risk free rate produced nothing above 3.0%. Therefore, I am using the same 4.0% normalized risk free rate that Mr. McKenzie used, based on calculations by Duff & Phelps. In my DCF analysis, I use a growth rate considerably above Value Line's forecasted growth rates in Earnings Per Share, Dividends Per Share and Book Value Per Share. To do this, I considered long term growth rates in the U.S. economy, in order to produce as reasonable a growth rate as possible for the company. Even with these considerations, economic and financial trends do not justify a higher ROE.

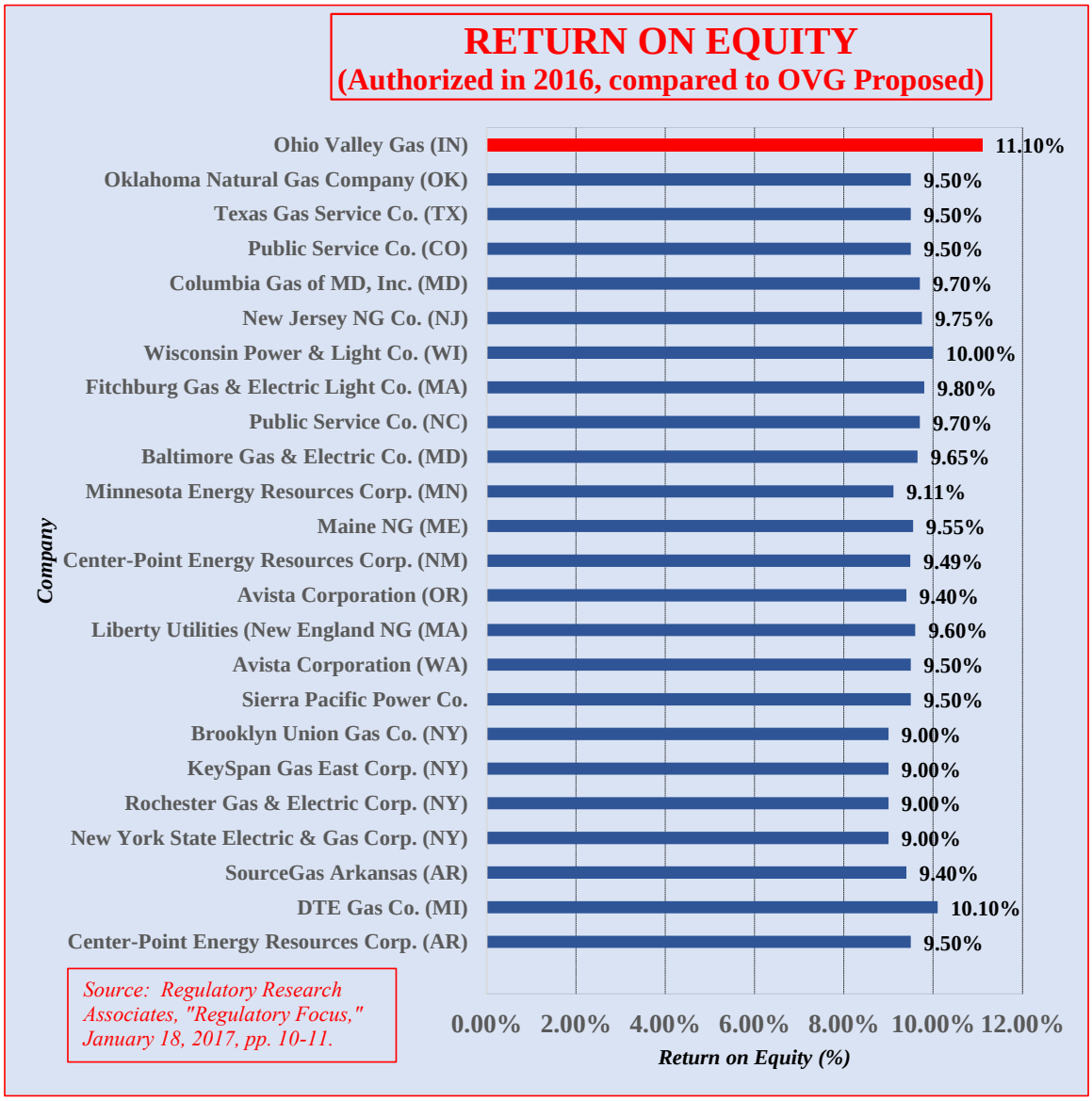
Considerations in the macro-economy, in Federal Reserve policy, and in utility regulation suggest a gradual increase of important variables in the DCF and CAPM calculations. However, with the Federal Reserve committed to gradual increases in interest rates and a target of 2% inflation, with the broader economy still sluggish, and with regulatory commissions consistently averaging ROE decisions in the 9.0% range for the past four years, only a small increment above my 8.7% DCF result appears to be justified.

While the stock market has made significant gains in the recent short term, other macroeconomic variables do not support the return of an inflationary economy. The Consumer Price Index rose only 4.9 index points during calendar year 2016, a 2.1% increase. (https://data.bls.gov/cgi-bin/surveymost) Even with

some tightening by the Federal Reserve, interest rates remain well below those of previous inflationary periods. Expectations of significantly higher rates of return have not accelerated. The Duke University *CFO Magazine Business Outlook Survey* for the first quarter of 2017 reveals expectations of an average 6.1% return on S&P 500 stocks over the next year and 6.6% over the next ten years. The survey revealed only a 1-in-10 chance that the return to S&P 500 stocks would be greater than 9.8% over the same period. (Attachment BEL-3.)

Finally, I would point out that 9.0% is much more in line with recent ROEs authorized for investor owned companies around the nation than Mr. McKenzie's 11.1%. According to Regulatory Research Associates (RRA), four companies whose rate cases they track were authorized 9.0% cost of equity in calendar 2016. Only two were authorized 10% or above. Graph 4 illustrates the results of all the cases reported by RRA for 2016 to the ROE proposed by OVG.

GRAPH 4



Based on this comparison, I conclude that Mr. McKenzie's recommended 11.1% ROE for OVG is not consistent with recent trends. It is too high, particularly considering the fact that OVG has no financial risk.

III. THE PROXY GROUP USED FOR DCF AND CAPM ANALYSES

Q: Please describe your approach to establish a cost of equity estimate for Petitioner.

A: I relied primarily on the DCF model and CAPM to estimate Petitioner's cost of equity.

Q: Can you apply the DCF model and CAPM directly to Petitioner?

A: No. Petitioner is not publicly traded. Consequently, much of the data that would be available for publicly traded companies is not available for Petitioner. This fact makes it impractical to apply the DCF and CAPM directly to Petitioner. Therefore, I calculated cost of equity for Petitioner based on a proxy group of publicly traded companies.

Q: Please describe how you derived the proxy group for your DCF and CAPM studies.

A: I used the same proxy group as Mr. McKenzie. These companies are included among natural gas utility companies listed in the latest Standard Edition of the Value Line Investment Survey (March 3, 2017).

Q: What companies are in this proxy group?

A: There are nine companies in Mr. McKenzie's proxy group. They are: Atmos Energy Corporation, Chesapeake Utilities, NiSource, Incorporated, New Jersey Resources Corporation; Northwest Natural Gas Company; South Jersey Industries, Incorporated; Southwest Gas Corporation; Spire, Incorporated; and WGL Holdings, Incorporated. (Attachment BEL-4.)

IV. DISCOUNTED CASH FLOW ANALYSIS

Q: Please describe DCF Analysis.

A: DCF analysis helps investors determine the appropriate price to pay for particular assets, such as utility stocks. The model has been adapted for regulatory proceedings in order to determine the cost of utility equity capital. The DCF model holds that the price of an asset today should equal the sum of all the cash flows that the asset will generate, discounted by the appropriate rate back to the present. This discount rate equals the cost of capital. With utility stocks, dividends are the relevant cash flows.

Q: Please describe the "Constant Growth" DCF Model.

A: The underlying principle of the "Constant Growth" DCF Model is that the price of a firm's stock reflects the *expected* cash flows (i.e., dividends) associated with that stock, discounted at a rate equal to the cost of equity capital. This can be expressed mathematically with the following equation:

$$P_0 = D_1/(K - g)$$

In this equation, the current price, P_0, can be calculated by dividing the expected annual dividend for the next year, D_1, by the term $K - g$, where K represents the cost of equity capital and g equals the expected, long-run annual growth rate in dividends per share ("DPS"). This model relies on the assumption that investors *expect* earnings per share ("EPS"), book value per share ("BPS"), and stock price per share to also grow at a constant long-run rate (g).

By rearranging the algebraic terms, it becomes possible to solve for the cost of equity capital. The resulting formula is the DCF model most familiar in utility regulation:

$$K = (D_1/P_0) + g$$

Here, the cost of equity capital, K, equals the "forward dividend yield," D_1/P_0, plus the expected growth rate in dividends per share, g. The DCF model, therefore, requires estimates of the forward dividend yield and the expected growth rate.

Q: Is the "Constant Growth" DCF Model considered a reliable method for estimating cost of equity for public utilities?

A: Yes. When combined with reasonable judgment, this model provides a realistic and reliable method of estimating a utility's cost of equity. It also formulates the cost of equity as "yield plus growth," which accurately defines the incentive for investors to purchase stocks.

The DCF model is also relatively simple in that it states cost of equity in terms of just two components; and only one of these involves any significant controversy. The calculation of dividend yield generally involves few disputes. Most of the controversy in DCF calculations focuses on the growth rate, g. This should not be surprising since the growth rate projects into the future, and disagreements will always arise regarding such projections. However, a reasonable estimate for g can be developed by evaluating variables such as dividends, earnings, and book value per share. (Note: for the balance of my testimony, the "Constant Growth DCF Model" will simply be referred to as the "DCF model.")

Q: What is the difference between current and forward dividend yields?

A: The current yield, D_0/P_0, equals the current annual dividend rate, D_0, divided by the current stock price, P_0. The current annual dividend rate, D_0, equals the most recent quarterly dividend multiplied by four -- it does not include any projection into the next year. Dividend yields published by *The Wall Street Journal* are current dividend yields, D_0/P_0.

The forward yield, D_1/P_0, adjusts the current yield D_0/P_0 to reflect likely dividend growth in the subsequent year. The forward yield replaces the current dividend rate, D_0, with a prospective dividend rate, D_1. D_1 is the rate expected during the following year, and the forward yield will then be calculated by dividing D_1 by the current price, P_0. This adjustment is frequently accomplished by increasing the current dividend yield for one-half of a year's growth in dividends. This method is often referred to as the "half-year method," and is recognized as valid and reasonable by the Commission. I use this method in my DCF analysis to convert current dividend yields (D_0/P_0) into forward dividend yields (D_1/P_0).

Q: What is the result of your forward dividend yield calculation?

A: My calculation resulted in a 2.8% forward dividend yield for the Gas Utility Proxy Group. This calculation applies the "half year method" to the data from Value Line. Attachment BEL-5 p. 2 shows my calculation. In Petitioner's Exhibit AMM-4 Mr. McKenzie also arrived at an average 2.8% dividend yield for the proxy group.

Q: Did you compare your forward dividend yield calculation with any other published data?

A: Yes. I compared the results to an average of the *Value Line* dividend yields for the Gas Utility Proxy Group. *Value Line* publishes forward dividend yield estimates that reflect anticipated dividend growth in the coming year. My calculations and the *Value Line* forward yields are shown in Attachment BEL-5, p. 2. In the past I have also used *AUS Utility Reports* data to arrive at my dividend yield estimate. However, *AUS Utility Reports* ceased publication in the Fall of 2016. Therefore, I added dividend yield data from Market Watch, NASDAQ, Yahoo Finance and Zack's to supplement Value Line data. In each case, the average dividend yield was the same.

Q: What did you conclude with respect to the Dividend Yield of the DCF model?

A: I concluded that a 2.8% dividend yield is reasonable for my DCF calculations. This is equal to the *Value Line* average dividend yields for the proxy group.

Q: Please describe the results of your growth calculations.

A: I concluded that 5.9% is a reasonable growth rate for the Gas Utility Proxy Group. (See page 3 of Attachment BEL-5 for *Value Line* Growth Rate data and averages). This rate results from analyzing both historical and projected EPS, DPS, and BPS growth rates for the proxy group. My projected growth rate of 5.9% is well above the projected growth rates for the proxy group companies of 5.1% for EPS and 4.3% for DPS. It is also above the 5.4% projected BPS for the proxy group.

Q: Do you agree with Mr. McKenzie's elimination of low growth rates from his DCF analysis?

A: No. I have eliminated negative growth rates from my analysis. However, I do not agree with Mr. McKenzie's elimination of low end estimates based on a 100 basis

point premium over Baa utility bond yields. Investors do not ignore low growth rates. Low historical or forecasted growth rates are relevant to investors when considering a company's future growth.

Q: Do you agree with Mr. McKenzie's reliance on forecasted growth rates in EPS in his DCF analysis?

A: No. Mr. McKenzie's reliance on forecasted EPS growth rates does not conform to the long standing and well established practice in Indiana of considering both historical and projected growth rates in the DCF Model. Consideration of growth in EPS, DPS, and BPS has also long been standard in Indiana.

> Although we agree that historical and projected dividend data are important considerations when estimating future rates of growth for use in the DCF model, we do not believe that book value and earnings data should be ignored. It is clear that dividend growth cannot exceed earnings or book value growth in the long run. To derive growth rate estimates in the past, this Commission has sanctioned the use of per share data for dividends, earnings, and book values. We continue to view the use of these data as a legitimate method for estimating future growth when judiciously employed. See generally In re Indiana Gas Co Inc. (Ind. URC September 18, 1987) Cause No. 38080, 86 P.U.R. 4th 241 at 285-286. In re Indiana Michigan Power Co., (Ind. URC August 24, 1990) Cause No. 38728, 116 P.U.R. 4th 1 at 19-20. We conclude that Public's use of all available per share data was appropriate for estimating Petitioner's growth rate.

Northern Indiana Fuel and Light, Cause No. 39145, Final Order at 25.

Mr. McKenzie further contends that the accuracy and bias of analysts' forecast are irrelevant so long as investors share the expectations of those analysts. (Pet. Exh. AMM, p. 38, lines 3 to 17). While I agree that projections should not be held up to hindsight review, I believe that analysis of historical data is an important check on analysts' projections. Moreover, the upward bias in securities analysts' forecasts is very high.

> The other problem with using analyst forecasts at the long-term growth rate in the DCF model is such forecasts are biased to the upside. The evidence on this issue is overwhelming. The forecast bias persists year after year in large part due to the incentive structures in place at many Wall Street firms that tend to reward more optimistic projections and to discourage the incorporation of potential negative views in analysts' forecasts. (Emphasis by author).

Steven G. Kihm, *How Improper Risk Assessment Leads To Overstated Required Returns for Utility Stocks*, NRRI Journal of Applied Regulation, Volume 1, June 2003, p. 98.

Further observations of the upside bias of analysts' forecasts come from several sources. For example, an article in the Wall Street Journal in 2003 observed:

> Those overly optimistic growth estimates also show that, even with all regulatory forces on too-bullish analysts allegedly influenced by their firms' investment-banking relationships, a lot of things haven't changed: Research remains rosy and many believe it always will.

The Wall Street Journal, Analysts: Still Coming Up Rosy, January 27, 2003

Also:

> No executive would dispute that analysts' forecasts serve as an important benchmark of the current and future health of companies. To better understand their accuracy, we undertook research nearly a decade ago that produced sobering results. Analysts we found, were typical overoptimistic, slow to revise their forecasts to reflect new economic conditions, and prone to making increasingly inaccurate forecasts when economic growth declined.
>
> Alas, a recently completed update of our work only reinforces this view – despite a series of rules and regulations, dating to the last decade, that were intended to improve the quality of the analysts' long-term earnings forecasts, restore investor confidence in them and prevent conflicts of interest. For executives, many of whom go to great lengths to satisfy Wall Street's expectation in their financial reporting and long-term strategic moves, this is a cautionary tale worth remembering.

Marc H. Goedhart, Rishi Raj and Abhishek Saxena, Equity Analysts: Still Too Bullish, McKinsey Quarterly – April 2010

While I do not contend that analysts' forecasts are not important considerations, I believe that historical benchmarks and analyses are not to be excluded. A reasonable rate of return that allows the utility to meet its obligations and attract capital is not exclusively defined by the forecasts of Wall Street analysts with incentives for upward bias. Nor should rate payers be required to pay rates of return based on exaggerated projections.

Q: What have you concluded based on your DCF analysis?

A: My DCF calculations result in a cost of equity of 8.7%. This combines the 2.8% forward yield and the 5.9% growth rate. (Attachment BEL-5, p. 1).

V. CAPITAL ASSET PRICING MODEL

Q: Please describe the CAPM.

A: The underlying assumption of CAPM is that the stock market compensates investors for risk that cannot be eliminated by means of a diversified stock portfolio. In CAPM, the required return on a stock equals the sum of a risk free rate of return (R_f) plus a risk premium [$\beta*(R_m - R_f)$], which is proportional to the level of market risk. Market risk cannot be eliminated through diversification.

The CAPM formula is:

$$K = R_f + \beta*(R_m - R_f)$$

where,

β = Beta, a measure of risk for the company,

K = Required return (i.e., cost of equity) on the stock of the company,

R_f = Risk-free rate of return,

R_m = Market equity return, and

(R_m - R_f) = Market equity risk premium.

The "beta" is considered the measure of risk most relevant in CAPM. A stock with a beta below 1.0 is considered less volatile and less risky than the stock market. If beta exceeds 1.0, the stock is considered more volatile and more risky than the stock market as a whole. By definition, the stock market has a beta of 1.0. The market is usually represented by a large and highly diversified portfolio of stocks such as the Standard & Poor's 500.

Q: Were you able to perform a CAPM analysis directly for Petitioner?

A: No. Petitioner is not a publicly traded company. Consequently, the necessary data does not exist to perform a CAPM analysis directly for Petitioner. Therefore, I have used Mr. McKenzie's proxy group to perform a CAPM analysis.

Q: How did you determine beta for purpose of your analysis?

A: I used betas from the *Value Line Investment Survey*. (Attachment BEL-6, p. 3.) For this analysis I used the average of the *Value Line* adjusted betas for the proxy group, 0.74, as the beta estimate in my CAPM analysis.

Q: What risk free rate (R_f) did you use for your CAPM calculations?

A: I used 4.0% for my risk free rate.

Q: Please describe how you determined the risk free rate of 4.0%.

A: I used the Duff & Phelps normalized risk free rate, as described in a Client Alert on March 16, 2016. (See Attachment BEL-7.) I reviewed bond yield performance for calendar year 2016, and could justify a risk free rate no higher than 2.82% based on the average 30 year bond yields of the last quarter of 2016. I examined recent term trends in yields on 5-year, 10-year, 20-year, and 30-year Treasury Bonds from data available from the Federal Reserve (www.federalreserve.gov). I

calculated averages for the 3 month, 6 month and 12 month periods ending in February 2017.

Twenty-year treasury yields averaged 2.76% in February 2017, slightly below 2.84% in December 2016, the month of the Fed's previous rate action. Since the Fed's latest action of March 15, 2017, the yield on the 20 year bond has declined from 2.87% to 2.79% on March 21, 2017. The 30 year Treasury stood at 3.04% on March 21, 2017 as compared to its March 15, 2017 level of 3.11%. As in the December 2016 rate action, the increase in the Federal Funds rate was followed by some retrenchment in the long term constant maturity Treasury bond yields. While trends show improvement over the past year, these yields remain well below historical normal. I believe that it is fair and reasonable to adopt the 4.0% normalized risk free rate recommend by Duff & Phelps.

I also examined the economic projections from the Congressional Budget Office ("CBO") in *The Budget and Economic Outlook: Fiscal Years 2017-2027,* published in January, 2017. The latest CBO projection for 10-year Treasuries in 2017 is 2.3%, and 2.5% in 2018. (Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2017-2027, January, 2017*. www.cbo.gov.) (Attachment BEL-8.)

The above research and analysis leads me to conclude that 4.0% is a reasonable risk-free rate to use in my CAPM analysis, considering both recent experience and future projections.

Q: How did you estimate the Market Risk Premium (R_m - R_f)?

A: I calculated long-term market risk premiums based on historical data from the Preview Version of *Stocks, Bonds, Bills and Inflation (SBBI), 2017 Yearbook*, by Duff & Phelps / John Wiley and Sons. Previously published by Morningstar, Inc. (Attachment BEL-9.) These data points are directly comparable with previous Morningstar and Ibbotson Associates publications. With the hard bound version not yet available, Duff & Phelps issued the preview for current subscribers. The SBBI database covers the period between 1926 and 2016.

There are two methods of calculating historical holding period returns: the geometric mean (or compound annual return) and the arithmetic mean, which is a simple average of one year holding period returns. The geometric mean return measures the average compound annual rate of return from an investment over a period of more than one year. The arithmetic mean measures the average of one year holding period returns. Unless the investment provides a constant return year after year, the arithmetic mean rate of return *always* exceeds the geometric mean rate of return. The arithmetic mean approach also produces higher estimates of the market risk premium, and higher overall CAPM results.

The Commission has consistently expressed its preference for considering both the geometric mean and arithmetic mean approaches. For instance, in its final order in the Indiana-American Water rate case (Cause No. 42520), the Commission once again expressed this preference:

> In past rate cases this Commission has given weight to both the arithmetic and the geometric mean risk premiums. This position was reaffirmed in our 1996 Rate Order, when we stated "[t]he debate over the proper use of the arithmetic and geometric means is one we consider resolved. As we stated in Indianapolis Water Company, Cause No. 39713-39843 [*sic*], each method has its strengths and weaknesses, and neither is so clearly appropriate as to exclude consideration of the other." (*1996 Rate Order*, Cause No. 40103, p. 41.) Also, in the 2002 Rate Order, we stated ". . . that, while the debate over the proposed use of the arithmetic and geometric means continues, however, each method has its strengths and weaknesses, neither is so clearly appropriate as to exclude consideration of the other. (*2002 Rate Order*, Cause No. 42029, p. 32.) . . .
>
> . . . We will continue to give both the geometric and arithmetic mean risk premiums substantial weight. Neither the arithmetic nor geometric mean risk premiums should be excluded in favor of the other.

(November 18, 2004 Order, Cause No. 42520, p. 59.)

Following this well-established directive, I calculated market risk premiums giving equal weight to both the geometric and arithmetic mean approaches. I used the resulting market risk premium of 5.25% in my CAPM calculations. (See Attachment BEL-6, p. 4.)

Q: Please describe the results of your CAPM analysis.

A: Here again, I emphasize that my CAPM analysis results in an estimate that is higher than it might otherwise be. I used the Duff & Phelps normalized risk free rate of 4.0%, which is almost 100 basis points above the average of recent 30-year bond yields. I used only the adjusted betas from *Value Line,* and balanced the weight given to the geometric mean and arithmetic mean approaches. This results in a CAPM estimate of 7.87%. (Attachment BEL-6, p. 1.)

Q: Mr. McKenzie states that size adjustment in the range of 170 to 360 basis points to ROE is needed to reflect OVG's risk. Do you believe that a small stock adjustment is justified?

A: No. The applicability of a small stock adjustment to regulated public utilities is questionable. Regulation reduces the financial risks faced by Petitioner. Annie Wong of Western Connecticut State University writes that business and financial risks are very similar among utilities regardless of size in *Utility Stock and the Size Effect: An Empirical Analysis*:

> The fact that the two samples show different, though weak results indicates that utility and industrial stocks do not share the same characteristics. First, given firm size, utility stocks are consistently less risky than industrial stocks. Second, industrial betas tend to decrease with firm size, but utility betas do not. These findings may be attributed to the fact that all public utilities operate in an environment with regional monopolistic power and regulated financial structure. As a result, the business and financial risks are very similar among the utilities regardless of their size. Therefore, utility betas would not necessarily be related to firm size.
>
> The object of this study is to examine if the size effect exists in the utility industry. After controlling for equity values, there is some weak evidence that firm size is a missing factor from the CAPM for industrial but not utility stocks. This implies that although the size phenomenon has been strongly documented for industrials, findings **suggest that there is no need to adjust for the firm size in utility regulation**. (Emphasis added.)
>
> (Annie Wong, *"Utility Stock and the Size Effect: An Empirical Analysis,"* Journal of the Midwest Finance Association, 1993, p. 98.)

Further, Michael Paschall and George B. Hawkins, authors of *Do Smaller Companies Warrant a Higher Discount Rate for Risk?: The "Size Effect" Debate*, state that privately held companies should be analyzed individually to determine if a size premium is appropriate:

> A size premium does not automatically apply in every case. Each privately held company should be analyzed to determine if a size premium is appropriate in its particular case. There can be unusual circumstances where a small company has risk characteristics that make it far less risky than the average company, warranting the use of a very low risk premium. One possible example of this is a private water utility (monopoly situation, very low risk, near-guarantee of payments). (Paschall and Hawkins, *Do Smaller Companies Warrant a Higher Discount Rate for Risk?: The "Size Effect" Debate,* CCH Business Valuation Alert, December, 1999.)

Moreover, the Commission has found that a blind application of Ibbotson's small company adjustment ignores the fact that the risk of regulated utilities is not as great as small companies:

> We are familiar with the Ibbotson-derived 400 basis point small company risk premium used by Dr. Beatty. The rationale behind this approach is that, all other things being equal, the smaller the company, the greater the risk. However, to blindly apply this risk premium to Petitioner is to ignore the fact that Petitioner is a regulated utility. The risks from small size for a regulated water utility are not as great as those small companies facing competition in the open market. *(South Haven Sewer, Cause No. 40398,* Final Order May 28, 1997, pp. 30-31.)

Also, more recently in an Indiana-American rate case Order, Cause No. 43680, on April 30, 2010, the Commission stated that the regulated utilities have different risk than other small companies:

> The Commission rejects Petitioner's equity size premium adjustment because it cannot be directly applied to regulated water utilities. Regulated water utilities do not experience the same risks as other small companies. (*Indiana-American Water,* Cause No. 43680, Order, p. 47.*)*

The same principle can be applied to regulated natural gas companies, particularly those with no long term debt in the capital structure and no financial risk.

VI. PROBLEMS ARE INHERENT IN MR. MCKENZIE'S OTHER MODELS

Q: Does Mr. McKenzie use any models that you do not?

A: Yes. In addition to his DCF and CAPM analyses, Mr. McKenzie developed a Gas Utility Risk Premium Model ("RP"), an Expected Earnings Model ("EE"), and an Empirical Capital Asset Pricing Model ("ECAPM").

Q: Please describe Mr. McKenzie's RP approach.

A: Mr. McKenzie calculates two RP estimates of cost of equity. One estimate uses a current bond yield for his first risk premium model and a second estimate uses forecasted bond yields. His RP model is based on calculating the historical spread (risk premium) between authorized costs of equity and average utility bond yields from the first quarter of 1980 through the second quarter of 2016. Mr. McKenzie's RP relies on the assumption that the risk premium tends to be lower when interest rates are high and higher when interest rates are low. His RP produces estimated costs of equity of 9.28% when using current bond yields, and 10.30%, when he incorporates forecasted bond yields.

Q: Please explain how Mr. McKenzie derived an estimated cost of equity for Risk Premium Models.

A: When estimating based on current bond yields, Mr. McKenzie used an average yield for single-A rated public utility bonds for the six month period ending October 2016. Adding this average of 3.72% to his implied risk premium of 5.56% resulted in a 9.28% cost of equity. When using forecasted bond yields, he averaged Blue Chip forecasts for the years 2017-2021 to arrive at 5.63% which, when added to his implied equity risk premium of 4.67%, resulted in a 10.30% cost of equity. In both calculations, Mr. McKenzie estimated an implied risk

premium based on the difference between historical average of authorized ROEs and single-A utility bond yields.

Q: Do you agree with Mr. McKenzie's Risk Premium approach.

A: No. Mr. McKenzie's direct use of previously authorized costs of equity creates circularity in his model. His implied risk premiums are not appropriate to estimate a required rate of return. Authorized returns are the results of a cost of equity analysis, not inputs. Moreover, he is not consistent in his forecasted bond yields estimate, as he used an implied risk premium based on current bond yields, rather than on forecasted yields.

Q: Please describe Mr. McKenzie's Expected Earnings ("EE") Approach.

A: Mr. McKenzie's EE approach estimated costs of equity at 11.0% (average) and 11.1% (midpoint). His EE approach averaged 3-5 year estimated returns on common equity of nine gas utility companies from his proxy group. In a footnote at the bottom of AMM Attachment 9, Mr. McKenzie noted he adjusted Value Line's Expected Return on Common Equity to convert year-end returns to average rates of return.

Q: Do you agree with Mr. McKenzie's EE approach.

A: No. His EE approach amounts to a compilation of Value Line's 3-5 year estimated returns on common equity. Value Line's 3-5 year forecasted return on common equity is an intermediate forecast, not a required return nor a cost of equity. Forecasts of companies over-earning or under-earning can distort and skew expectations and future rates if used in determining an authorized return. Moreover, as many companies also have unregulated operations, Mr. McKenzie's

EE approach would include forecasted returns on those operations. Value Line's intermediate forecasted returns should not be used to estimate cost of equity.

Q: Do you agree with Mr. McKenzie's Empirical CAPM ("ECAPM") estimate?

A: No. Mr. McKenzie's ECAPM produced an estimated cost of equity of 11.1%, with a midpoint of 11.2%. The ECAPM is designed to address a theoretical downward bias in risk by increasing the risk factor, called "beta." This is accomplished by giving a 25% weight to the Market Risk Premium, and a 75% weight to a traditional CAPM risk premium for the proxy group. It essentially limits the impact of the beta calculated for the proxy group. However, Mr. McKenzie also uses betas which have already been upwardly adjusted. His ECAPM estimate includes an additional upward adjustment, and produces an artificially inflated result.

Q: Has the Commission expressed an opinion on the use and results of an ECAPM approach?

A: Yes. The Commission has rejected the use of ECAPM in at least two previous Causes (Cause Nos. 40003 and 42359). In its Final Order in Cause No. 42359 the Commission stated:

> With respect to the ECAPM analysis performed by Dr. Morin we note that the Commission rejected this model in Cause No. 40003, and found that: "the Empirical CAPM is not sufficiently reliable for ratemaking purposes." Cause No. 40003 at 32. We went on to conclude that the ECAPM ". . . would adjust, in essence, future expectations with regard to investor perceptions of relative risks for further change which may occur years hence." The Commission concluded that ". . . we do not believe exercises in approximating future cost of capital are conducive to such precise estimation as the Empirical CAPM would suggest." Id. We find that nothing presented in this Cause has changed our prior determination that ECAPM is not sufficiently reliable for

ratemaking purposes and hereby reject the model in this proceeding.

PSI Energy, Cause No. 42359, p. 56 (Ind. Util. Regulatory Comm'n May 18, 2004.)

VII. MACROECONOMIC TRENDS

Q: Do macroeconomic factors and trends influence the cost of equity?

A: Yes. The most noteworthy of these factors are interest rates, economic growth, and inflation.

Q: Do you have economic forecast data to support 9.0% as a reasonable ROE for Petitioner?

A: Yes. The *CFO Magazine Business Outlook Survey*, published by Duke University in the First Quarter 2017 (http://www.cfosurvey.org/) (the "CFO Survey") states that "[o]n February 20, 2017 the annual yield on 10-yr treasury bonds was 2.41%," and asked respondents for their expectations on the rate of return for S&P 500 companies in the future. Their responses revealed an average expected return of 6.1% over the next year and 6.6% over the next 10 years. My recommended ROE of 9.0% for Petitioner is 290 basis points above the expectations of respondents to the CFO Survey for next year, and 240 basis points above expectations for the next ten years. Survey respondents expect only a 1-in-10 chance of the annual S&P 500 return being greater than 9.8%. (Attachment BEL-3.) I emphasize that these return estimates apply to companies in the S&P 500, which includes many industrial companies considered more risky than regulated utilities.

Q: Please discuss bond yields as an influencing factor on the cost of equity.

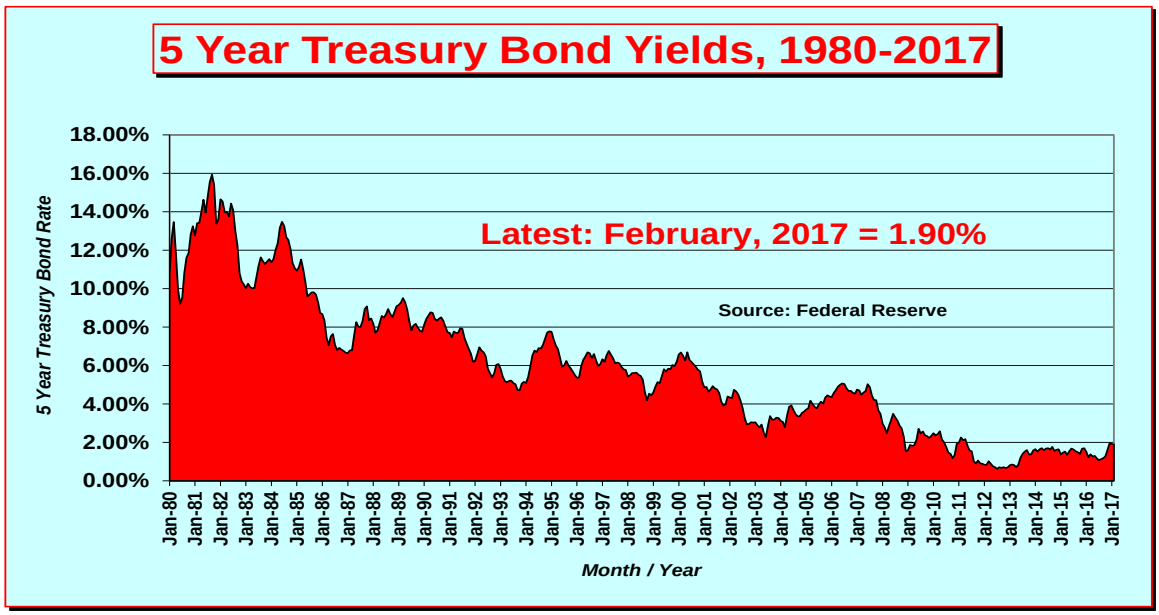
A: Bond yields are extremely important factors influencing cost of equity. Yields on U.S. Treasury Bonds are commonly used to establish the risk-free rate of return in CAPM and other risk premium analyses. Moreover, changes in bond yields and interest rates affect investor expectations.

Q: Please compare current and historical trends in bond yields.

A: The long period of low cost capital has been unchanged in recent years. Lower interest rates and bond yields have been the main indicator of this trend. The trend toward low cost capital has taken place over two decades; it is a long run phenomenon, and not simply a result of the recent recession. Graph 5 below shows the monthly interest rate trend on 5-year Constant Maturity Treasury Bonds, reported by the Federal Reserve. Graphs 5 through 8 indicate the American economy is in a period with rates well below those of the 1980s and 1990s.

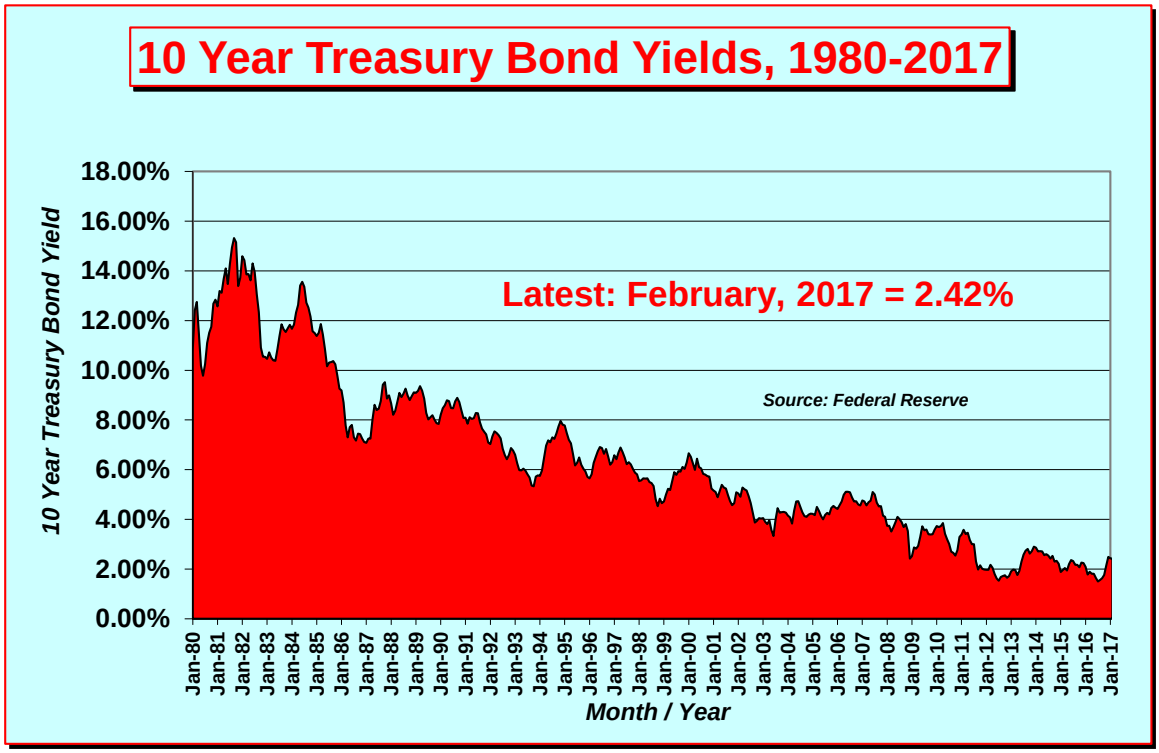
In March, 2017, long term bond yields remained low in comparison to earlier periods. On March 21, 2017, the spot yield on the bellwether 10 Year Treasury bond stood at 2.43%, and the 5 Year Treasury stood at 1.96%. The 20 Year Treasury closed at 2.79%, and the 30 Year Treasury stood at 3.04%. (https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15)

GRAPH 5

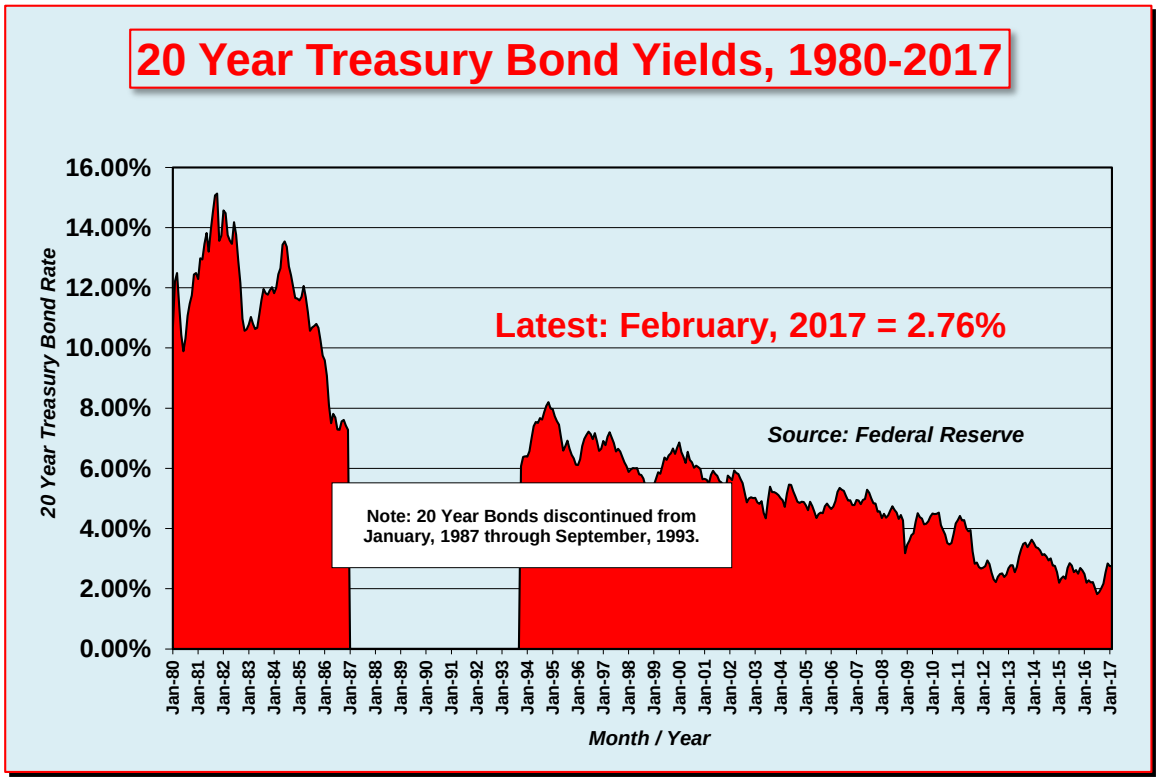


1 Graphs 6, 7 and 8 reveal similar trends for 10-year, 20-year and 30-year Treasuries.

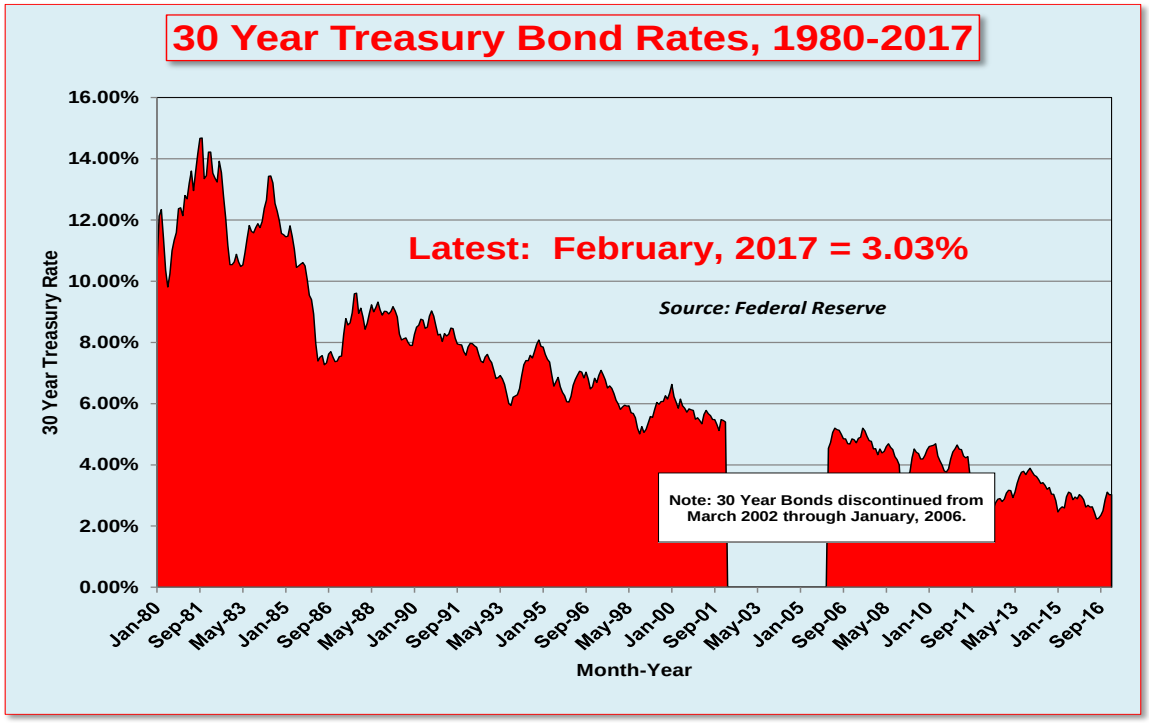
GRAPH 6



GRAPH 7



GRAPH 8



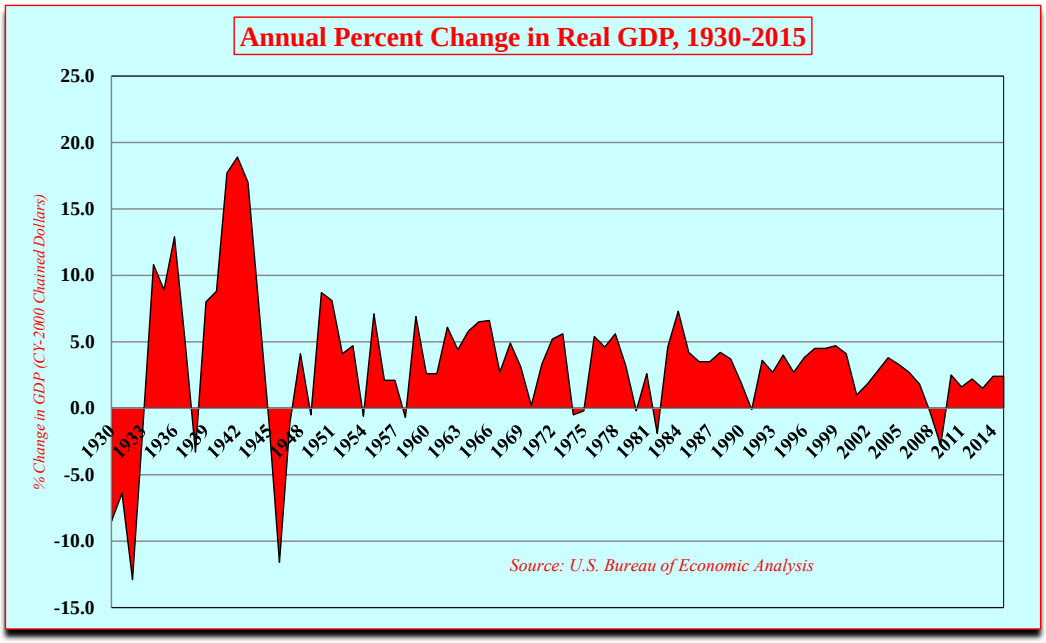
Q: How does economic growth influence cost of equity?

A: Economic growth primarily influences cost of equity through interest rates and investor expectations. A booming, high-growth economy tends to put upward pressure on interest rates. A lackluster or recessionary economy tends to lead to stagnant or falling interest rates.

Data from the U.S. Department of Commerce, Bureau of Economic Analysis ("BEA") (www.bea.gov) and from the CBO, provides historical perspectives. The CBO, using BEA data, projects 4.1% nominal growth (growth measure in current dollars – not adjusted for inflation) in 2017, and 3.8% nominal growth in 2018. CBO projections indicate a 3.5% rate of nominal growth in the period 2019-2020 and 4.0% in the period 2021-2027 (Attachment BEL-8).

Real economic growth is growth measured in constant (i.e., inflation adjusted) dollars. Moreover, CBO forecasts 2.3% real growth in 2017, 2.0% in 2018, 1.6% in the period 2019-2020, and 1.9% in 2021-2027. (*Id*.) Graph 9 shows annual percent changes in real GDP in the period 1930 through 2015, as published by BEA. (https://www.bea.gov/national/index.htm#gdp)

GRAPH 9



Prior to the 1990's, economic expansion periods included at least one or more years above 5% real growth. The U.S. economy has not experienced that level of real GDP growth on an annual basis since 1984.

Thus, recent data indicates the U.S. economy is in a mature, but slow recovery, and still struggling to achieve robust growth. The fourth quarter of 2016 saw a real annual growth rate of 1.9%. (U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov.) Such a growth rate is modest even for a mature recovery.

Q: In your analysis, have you taken into account current and projected inflation?

A: Yes. I examined historical and projected rates of inflation from both government and private sector sources, including the Bureau of Labor Statistics, the Congressional Budget Office, and Morningstar, Inc. Spikes or long-term

increases in inflation can affect the prospective real return, but I found no reason to believe that inflation will experience such increases in the near term.

Q: Please describe the trends in the rate of inflation.

A: The U.S. economy remains in a relatively low inflation period. In her February 15, 2017 testimony on the outlook of the economy before the U.S. Congressional Joint Economic Committee, Federal Reserve Chairperson Janet L. Yellen explained that inflation is moving consistent with the Federal Open Market Committee's ("FOMC") expectations. She also indicated that the FOMC expects only gradual increases in future interest rates:

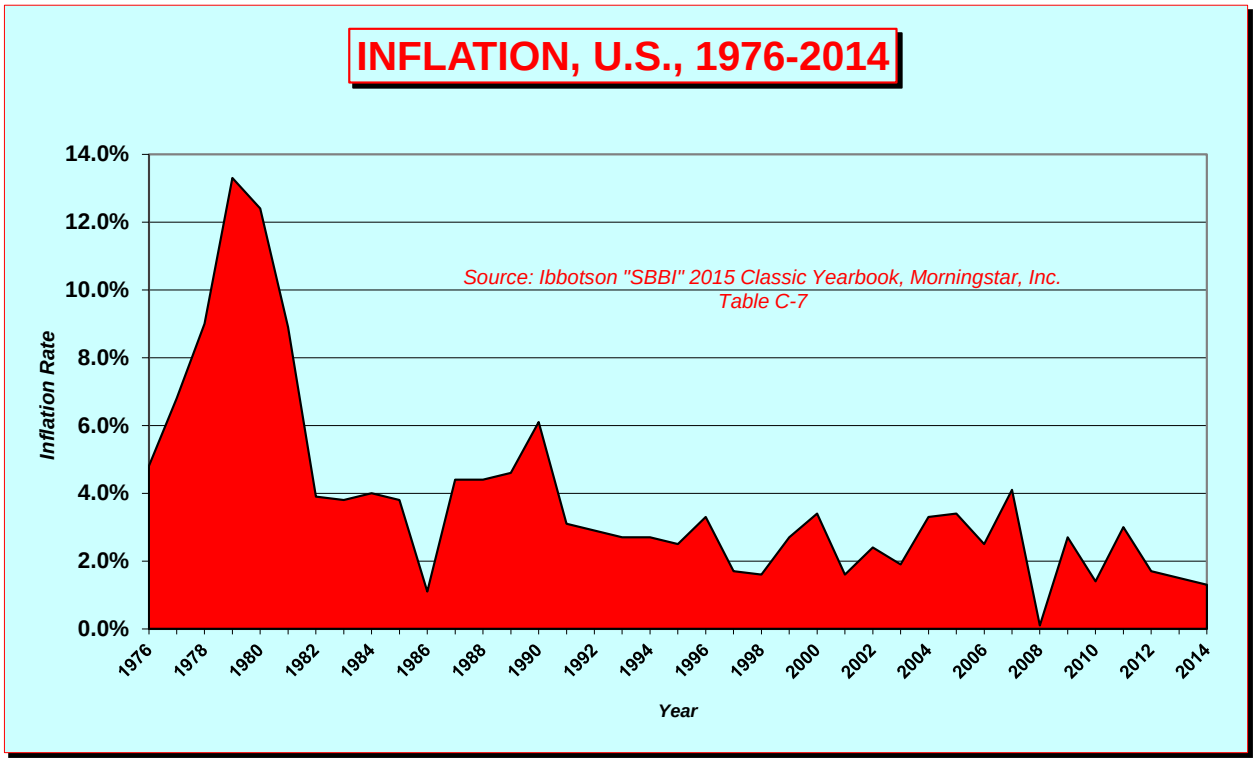
> Incoming data suggest that labor market conditions continue to strengthen and inflation is moving up to 2 percent, consistent with the Committee's expectations. At our upcoming meetings, the Committee will evaluate whether employment and inflation are continuing to evolve in line with these expectations, in which case a further adjustment of the federal funds rate would likely be appropriate.
>
> The Committee's view that gradual increases in the federal funds rate will likely be appropriate reflects the expectation that the neutral federal funds rate--that is, the interest rate that is neither expansionary nor contractionary and that keeps the economy operating on an even keel--will rise somewhat over time. Current estimates of the neutral rate are well below pre-crisis levels--a phenomenon that may reflect slow productivity growth, subdued economic growth abroad, strong demand for safe longer-term assets, and other factors. The Committee anticipates that the depressing effect of these factors will diminish somewhat over time, raising the neutral funds rate, albeit to levels that are still low by historical standards.
>
> That said, the economic outlook is uncertain, and monetary policy is not on a preset course. FOMC participants will adjust their assessments of the appropriate path for the federal funds rate in response to changes to the economic outlook and associated risks as informed by incoming data.

https://www.federalreserve.gov/newsevents/testimony/yellen20170214a.htm

The overall (also called "headline") Consumer Price Index ("CPI") has fluctuated over the past two years, but has remained relatively low in spite of the high volatility of energy prices. (CPI data from U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov.) As of the end of December 2016, the unadjusted CPI for "All Urban Consumers" was 2.1% higher than its December 2015 level (https://www.bls.gov/news.release/cpi.t01.htm). Core inflation, which removes the impact of energy and food price volatility, remains low. The CBO estimates core inflation in 2017 at 2.2% and 2.3% in 2018 (Attachment BEL-8).

Annual inflation rates from 1976 through 2014 indicate that the United States remains subject to low inflation, despite recent volatile energy costs. Current inflation is nowhere near levels experienced in earlier decades. Data from Morningstar, Inc., which I have recreated below in Graph 10, indicates that inflation evaporated in 2008, falling from 4.1% in 2007 to 0.1%. Inflation rebounded slightly in 2009 to 2.7%, retreated to 1.4% in 2010, and was 3.0% in 2011. However, inflation fell to 1.7% in 2012, 1.5% in 2013 and 1.3% in 2014. This compares to an annual average of 3.0% between 1990 and 2000, and 5.2% between 1980 and 1990. (Morningstar Inc., *2015 Classic Ibbotson SBBI Yearbook*, Table C-7.) (Attachment BEL-10.)

GRAPH 10



Moreover, the latest forecast from the CBO projects modest increases in both the overall CPI and the Core CPI (which excludes highly volatile commodities such as energy) over the next decade. The CBO projects a 2.4% increase in the overall CPI for 2017, followed by 2.3% in 2018, with increases in the period 2019-2020 averaging only 2.3%, and increases from 2021-2027 averaging 2.4% per year (Attachment BEL-8). The Federal Reserve Bank of Philadelphia projects core inflation at 2.2% in 2017 and 2.3% in 2018. Philadelphia Fed also projected continued low headline inflation: "Measured on a fourth-quarter over fourth-quarter basis, headline CPI inflation is expected to average 2.4 percent in 2017, 2.3 percent in 2018, up from 2.2 in both 2017 and

2018 in the last survey." (Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters, First Quarter 2017*, February 10, 2017, p. 4).

Even with the slight increase in core inflation, my research and analysis shows inflation remains low by historical standards. Low inflation rates tend to support lower interest rates and lower costs of financing capital investment, including investments in utility plant.

Q: Are you arguing there should be a decrease to ROE because of low levels of headline and core inflation?

A: No. I have made no reduction to my ROE recommendation due to inflation. I use inflation data projections merely to illustrate that inflation, which remains low and stable, is not likely to put pressure on interest rates and ROE in the near future.

Q: What conclusions have you reached about the macroeconomic trends that influence cost of equity?

A: Recent trends in interest rates, inflation, and economic growth do not reveal an inflationary economy. Instead, recent trends point to a continuing, but maturing, recovery from the financial crisis and recession that started in 2008. There is no indication that macroeconomic trends are fueling any significant increase in capital costs. Petitioner's proposed 11.1% cost of equity far exceeds market expectations, even for a more risky stock portfolio like the S&P 500 containing many industrial companies. Consequently, my recommended ROE of 9.0% is much more in line with current economic conditions.

VIII. SUMMARY AND RECOMMENDATIONS ON COST OF EQUITY

Q: Please summarize your testimony on DCF calculations for the proxy group.

A: Using the same proxy group as Mr. McKenzie, I calculated a 2.8% forward dividend yield. I also calculated a DCF growth rate, *g*, of 5.9%. This estimate was made using historical and projected growth rates from *Value Line,* and economic growth data from the Federal Reserve Bank of St. Louis. I considered both projected and historical data. Overall, my DCF calculations resulted in an 8.7% cost of equity.

Q: Please summarize your testimony on CAPM calculations for the proxy group.

A: Based on *Value Line* betas and using the same proxy group, I calculated an average beta for the proxy group of 0.74. As the beta is less than 1.0, it also describes a relatively low-risk industry. I used the Duff & Phelps normalized risk-free rate of 4.0%. I reviewed 5 Year, 10 Year, 20 Year, and 30 Year bond yield data ending calendar year 2016 in arriving at this estimate. Giving equal weight to both the geometric mean and arithmetic mean approaches, I calculated a market risk premium of 5.25%. This results in a CAPM cost of equity for the proxy group of 7.87%.

Q: Please summarize your testimony on macroeconomic and capital market trends influencing cost of equity.

A: In contrast to the market expectations described in *CFO Magazine* of a 6.1% anticipated return on the S&P 500 over the next year and 6.6% for the next ten years, Petitioner proposes a rate of return of 11.1% for a regulated public utility.

In today's capital market, a proposal that high is simply not in accord with current conditions.

I examined three macroeconomic variables that can influence the cost of equity capital. First, I examined interest rates. Interest rates on 5-year, 10-year, 20-year and 30-year bonds remain low by historical standards, and recent increases have been modest. Second, CBO forecasts real GDP growth over the next 10 years to range from 2.3% in 2017, declining to 2.0% in 2018, 1.6% in the period 2019-2020, and 1.9% in the period 2021-2027. Growth in this range is not likely to drive up interest rates.

Third, the United States is currently experiencing an extended period of low inflation. Even with energy price volatility in recent years, both "headline" inflation and core inflation remain low compared to earlier periods. While inflation fears are always a policy consideration for the Federal Reserve, recent experience and projections by the CBO tend to indicate that inflation is under control in spite of volatility in energy prices.

Q: Please summarize your recommendation for Petitioner's ROE.

A: I recommend the Commission authorize a 9.0% cost of equity for Petitioner. This recommendation reflects a risk premium close to 600 basis points over recent yields on 30-year Treasury bonds, which currently hovers near 3.0%. This recommendation is above both my DCF and CAPM calculations. With the Federal Reserve clearly on a long term gradual course to higher interest rates, prospects of continued economic growth, gradual increases in inflation and recent trends in utility rate cases towards the 9.0% level, I believe that a

recommendation above the results of my DCF model and CAPM are justified. However, I have found no evidence that would lead me to believe that dramatic changes in economic trends are likely in the foreseeable future. Therefore, I do not believe a larger adjustment to my ROE recommendation is justified. Given these economic conditions, and my DCF and CAPM calculations, I believe that my recommendation is both fair and reasonable.

Q: Does this conclude your testimony?

A: Yes.

AFFIRMATION

I affirm, under the penalties for perjury, that the foregoing representations are true.

Bradley E. Lorton
Utility Analyst II
Indiana Office of Utility Consumer Counselor
Cause No. 44891
Ohio Valley Gas Corporation and
Ohio Valley Gas, Inc.

April 20, 2017
Date

APPENDIX BEL-1 TO THE TESTIMONY OF OUCC WITNESS BRADLEY E. LORTON

Q: Please describe your educational background and experience.

A: My expertise is in economics and public utility regulation. I hold Bachelor of Science and Master of Science degrees in Economics from Indiana State University. I also completed additional courses in Economics, Mathematics and Labor Studies at Indiana University-Purdue University at Indianapolis. I have completed the Regulatory Studies Program sponsored by the National Association of Regulatory Utility Commissioners ("NARUC") at Michigan State University. I also completed NARUC's Advanced Regulatory Studies Program: Ratemaking, Accounting and Economics.

I have over thirty-five years of experience in government and private industry. My career in public utility regulation began in 2001 when I accepted my current position with the OUCC. Prior to that, I served in management and business analyst positions with the U.S. Department of the Navy at the Naval Air Warfare Center in Indianapolis, and its privatized successor organizations. I also served as an Economist at the Bureau of Labor Statistics, United States Department of Labor, and as a Statistician for the Indiana Division of Labor.

I have been awarded the professional designation Certified Rate of Return Analyst ("CRRA") by the Society of Utility and Regulatory Financial Analysts. This designation is awarded based upon experience and successful completion of a written examination.

Q: Have you previously testified before the Indiana Utility Regulatory Commission?

A: Yes. I have previously testified before this Commission addressing economic and financial issues over the past fifteen years, including rate cases in which I testified on cost of common equity.

Q: Please describe the review and analysis you conducted in order to prepare your testimony.

A: I reviewed OVG's Petition, Case-in-Chief and exhibits, prepared data requests, and reviewed Petitioner's responses. I researched Petitioner's previous rate case from 2012. I participated in several meetings of the OUCC Case Team in this Cause. I also researched economic data and analysis from government and authoritative private sector sources. I used the results of this research to run my cost of equity models and support my analyses.

Regulatory Research Associates
REGULATORY FOCUS
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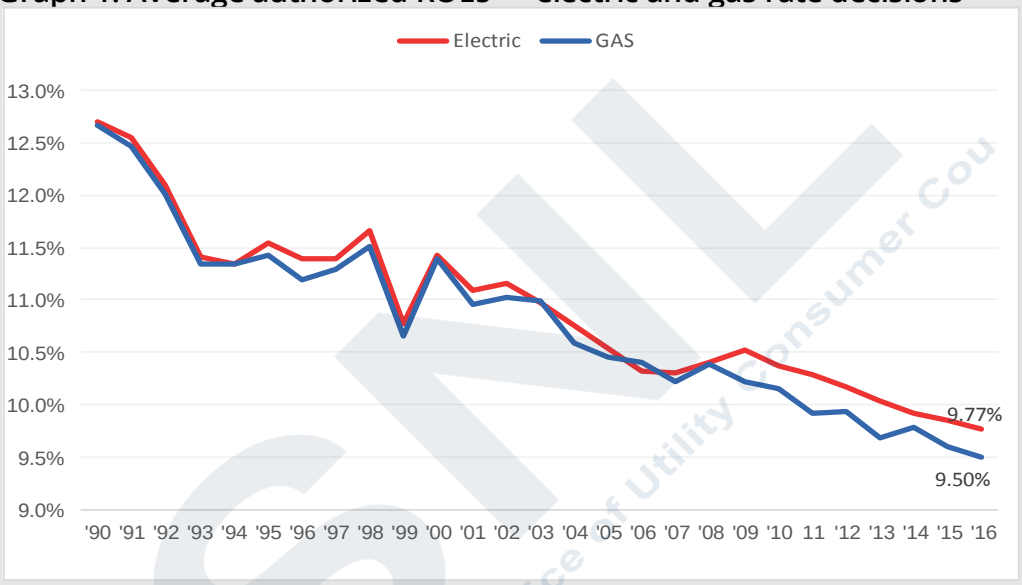
January 18, 2017

MAJOR RATE CASE DECISIONS — JANUARY-DECEMBER 2016

The average ROE authorized electric utilities was 9.77% in rate cases decided in 2016, compared to 9.85% in 2015. There were 42 electric ROE determinations in 2016, versus 30 in 2015. This data includes several limited issue rider cases; excluding these cases from the data, the average authorized ROE was 9.6% in rate cases decided in 2016, the same as in 2015. RRA notes that this differential in electric authorized ROEs is largely driven by Virginia statutes that authorize the State Corporation Commission to approve ROE premiums of up to 200 basis points for certain generation projects (see the Virginia Commission Profile). The average ROE authorized gas utilities was 9.5% in 2016 versus 9.6% in 2015. There were 24 gas cases that included an ROE determination in 2016, versus 16 in 2015.

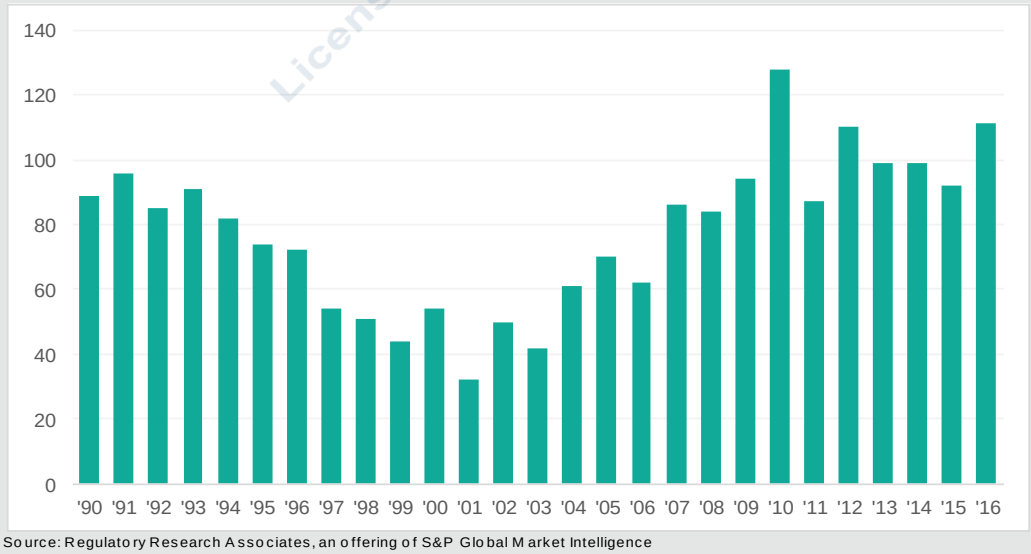
Graph 1: Average authorized ROEs — electric and gas rate decisions



Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence

As shown in Graph 2 below, after reaching a low in the early-2000s, the number of rate case decisions for energy companies has generally increased over the last several years, peaking in 2010 at more than 125 cases.

Graph 2: Volume of electric and gas rate case decisions

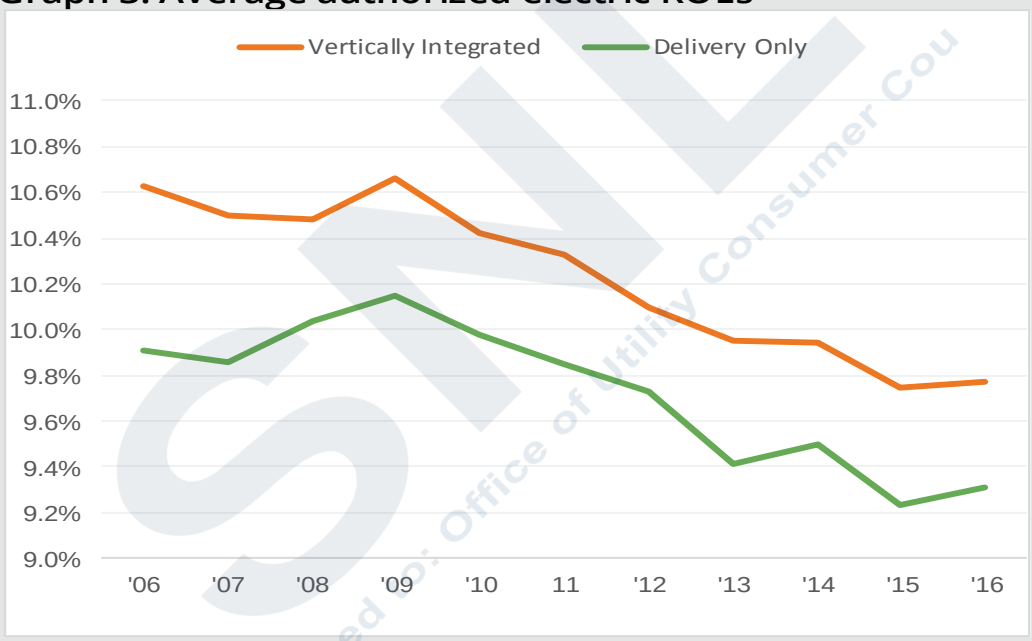


Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence

Since 2010, the number of rate cases has moderated somewhat but has been 90 or more in the last five calendar years. There were 111 electric and gas rate cases resolved in 2016, 92 in 2015, 99 in both 2014 and 2013, and 110 in 2012, and this level of rate case activity remains robust compared to the late 1990s/early 2000s. Increased costs associated with environmental compliance, including possible CO_2 reduction mandates, generation and delivery infrastructure upgrades and expansion, renewable generation mandates and employee benefits argue for the continuation of an active rate case agenda over the next few years. In addition, if the Federal Reserve continues its policy initiated in December 2015 to gradually raise the federal funds rate, utilities eventually would face higher capital costs and would need to initiate rate cases to reflect the higher capital costs in rates. However, the magnitude and pace of any additional Federal Reserve action to raise the federal funds rate is quite uncertain.

Included in tables on pages 6 and 7 of this report are comparisons, since 2006, of average authorized ROEs by settled versus fully litigated cases, general rate cases versus limited issues rider proceedings and vertically integrated cases versus delivery only cases. For both electric and gas cases, no pattern exists in average annual authorized ROEs in cases that were settled versus those that were fully litigated. In some years, the average authorized ROE was higher for fully litigated cases, in others it was higher for settled cases, and in a few years the authorized ROE was similar for fully litigated versus settled cases. Regarding electric cases that involve limited issue riders, over the last several years the annual average authorized ROEs in these cases was typically at least 100 basis points higher than in general rate cases, driven by the ROE premiums authorized in Virginia. Limited issue rider cases in which an ROE is determined have had extremely limited use in the gas industry. Comparing electric vertically integrated cases versus delivery only proceedings, RRA finds that the annual average authorized ROEs in vertically integrated cases are from roughly 40 to 70 basis points higher than in delivery only cases, arguably reflecting the increased risk associated with generation assets.

Graph 3: Average authorized electric ROEs



Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence

We note that this report utilizes the simple mean for the return averages. In addition, the average equity returns indicated in this report reflect the cases decided in the specified time periods and are not necessarily representative of the returns actually earned by utilities industry wide.

As a result of electric industry restructuring, certain states unbundled electric rates and implemented retail competition for generation. Commissions in those states now have jurisdiction only over the revenue requirement and return parameters for delivery operations, which we footnote in our chronology beginning on page 8, thus complicating historical data comparability. We note that from 2008 through 2015, interest rates declined significantly, and average authorized ROEs have declined modestly. We also note the increased utilization of limited issue rider proceedings that allow utilities to recover certain costs outside of a general rate case and typically incorporate previously-determined return parameters.

The table on page 4 shows the average ROE authorized in major electric and gas rate decisions annually since 1990, and by quarter since 2013, followed by the number of observations in each period. The tables on page 5 indicate the composite electric and gas industry data for all major cases summarized annually since 2002 and by quarter for the past eight quarters. The individual electric and gas cases decided in 2016 are listed on pages 8-13, with the decision date shown first, followed by the company name, the abbreviation for the state

issuing the decision, the authorized rate of return, or ROR, ROE, and percentage of common equity in the adopted capital structure. Next we indicate the month and year in which the adopted test year ended, whether the commission utilized an average or a year-end rate base, and the amount of the permanent rate change authorized. The dollar amounts represent the permanent rate change ordered at the time decisions were rendered. Fuel adjustment clause rate changes are not reflected in this study.

The table below tracks the average equity return authorized for all electric and gas rate cases combined, by year, for the last 27 years. As the table indicates, since 1990 authorized ROEs have generally trended downward, reflecting the significant decline in interest rates and capital costs that has occurred over this time frame. The combined average equity returns authorized for electric and gas utilities in each of the years 1990 through 2016, and the number of observations for each year are as follows:

Composite Electric and Gas Average Annual Authorized ROEs: 1990 — 2016

Year	Average ROE (%)	Observations	Year	Average ROE (%)	Observations
1990	12.69	(75)	2004	10.67	(39)
1991	12.51	(80)	2005	10.50	(55)
1992	12.06	(77)	2006	10.39	(42)
1993	11.37	(77)	2007	10.30	(76)
1994	11.34	(59)	2008	10.42	(67)
1995	11.51	(49)	2009	10.36	(68)
1996	11.29	(42)	2010	10.28	(100)
1997	11.34	(24)	2011	10.21	(59)
1998	11.59	(20)	2012	10.08	(93)
1999	10.74	(29)	2013	9.92	(71)
2000	11.41	(24)	2014	9.86	(63)
2001	11.05	(25)	2015	9.76	(46)
2002	11.10	(43)	2016	9.67	(66)
2003	10.98	(47)			

Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence

Please Note: Historical data provided in this report may not match data provided on RRA's website due to certain differences in presentation, including the treatment of cases that were withdrawn or dismissed.

Dennis Sperduto

Average Equity Returns Authorized January 1990 - December 2016

		Electric Utilities		Gas Utilities	
Year	**Period**	**ROE %**	**(# Cases)**	**ROE %**	**(# Cases)**
1990	Full Year	12.70	(44)	12.67	(31)
1991	Full Year	12.55	(45)	12.46	(35)
1992	Full Year	12.09	(48)	12.01	(29)
1993	Full Year	11.41	(32)	11.35	(45)
1994	Full Year	11.34	(31)	11.35	(28)
1995	Full Year	11.55	(33)	11.43	(16)
1996	Full Year	11.39	(22)	11.19	(20)
1997	Full Year	11.40	(11)	11.29	(13)
1998	Full Year	11.66	(10)	11.51	(10)
1999	Full Year	10.77	(20)	10.66	(9)
2000	Full Year	11.43	(12)	11.39	(12)
2001	Full Year	11.09	(18)	10.95	(7)
2002	Full Year	11.16	(22)	11.03	(21)
2003	Full Year	10.97	(22)	10.99	(25)
2004	Full Year	10.75	(19)	10.59	(20)
2005	Full Year	10.54	(29)	10.46	(26)
2006	Full Year	10.32	(26)	10.40	(15)
2007	Full Year	10.30	(38)	10.22	(35)
2008	Full Year	10.41	(37)	10.39	(32)
2009	Full Year	10.52	(40)	10.22	(30)
2010	Full Year	10.37	(61)	10.15	(39)
2011	Full Year	10.29	(42)	9.92	(16)
2012	Full Year	10.17	(58)	9.94	(35)
	1st Quarter	10.28	(14)	9.57	(3)
	2nd Quarter	9.84	(7)	9.47	(6)
	3rd Quarter	10.06	(7)	9.60	(1)
	4th Quarter	9.91	(21)	9.83	(11)
2013	**Full Year**	**10.03**	**(49)**	**9.68**	**(21)**
	1st Quarter	10.23	(8)	9.54	(6)
	2nd Quarter	9.83	(5)	9.84	(8)
	3rd Quarter	9.87	(12)	9.45	(6)
	4th Quarter	9.78	(13)	10.28	(6)
2014	**Full Year**	**9.91**	**(38)**	**9.78**	**(26)**
	1st Quarter	10.37	(9)	9.47	(3)
	2nd Quarter	9.73	(7)	9.43	(3)
	3rd Quarter	9.40	(2)	9.75	(1)
	4th Quarter	9.62	(12)	9.68	(9)
2015	**Full Year**	**9.85**	**(30)**	**9.60**	**(16)**
	1st Quarter	10.29	(9)	9.48	(6)
	2nd Quarter	9.60	(7)	9.42	(6)
	3rd Quarter	9.76	(8)	9.47	(4)
	4th Quarter	9.57	(18)	9.60	(8)
2016	**Full Year**	**9.77**	**(42)**	**9.50**	**(24)**

Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence

Electric Utilities--Summary Table

	Period	ROR %	(# Cases)	ROE %	(# Cases)	Cap. Struc.	(# Cases)	$ Mil.	(# Cases)
2002	Full Year	8.72	(20)	11.16	(22)	46.27	(19)	-475.4	(24)
2003	Full Year	8.86	(20)	10.97	(22)	49.41	(19)	313.8	(12)
2004	Full Year	8.44	(18)	10.75	(19)	46.84	(17)	1,091.5	(30)
2005	Full Year	8.30	(26)	10.54	(29)	46.73	(27)	1,373.7	(36)
2006	Full Year	8.32	(26)	10.32	(26)	48.54	(25)	1,318.1	(39)
2007	Full Year	8.18	(37)	10.30	(38)	47.88	(36)	1,405.7	(43)
2008	Full Year	8.21	(39)	10.41	(37)	47.94	(36)	2,823.2	(44)
2009	Full Year	8.24	(40)	10.52	(40)	48.57	(39)	4,191.7	(58)
2010	Full Year	8.01	(62)	10.37	(61)	48.63	(57)	4,921.9	(78)
2011	Full Year	8.00	(43)	10.29	(42)	48.26	(42)	2,595.1	(56)
2012	Full Year	7.95	(51)	10.17	(58)	50.69	(52)	3,080.7	(69)
2013	Full Year	7.66	(45)	10.03	(49)	49.25	(43)	3,328.6	(61)
2014	Full Year	7.60	(32)	9.91	(38)	50.28	(35)	2,053.7	(51)
	1st Quarter	7.74	(10)	10.37	(9)	51.91	(9)	203.6	(11)
	2nd Quarter	7.04	(9)	9.73	(7)	47.83	(6)	819.5	(17)
	3rd Quarter	7.85	(3)	9.40	(2)	51.08	(3)	379.6	(5)
	4th Quarter	7.22	(13)	9.62	(12)	48.24	(12)	488.7	(19)
2015	**Full Year**	**7.38**	**(35)**	**9.85**	**(30)**	**49.54**	**(30)**	**1,891.5**	**(52)**
	1st Quarter	7.03	(9)	10.29	(9)	46.06	(9)	311.2	(12)
	2nd Quarter	7.42	(7)	9.60	(7)	49.91	(7)	117.7	(9)
	3rd Quarter	7.23	(8)	9.76	(8)	49.11	(8)	499.1	(13)
	4th Quarter	7.38	(17)	9.57	(18)	49.93	(17)	1,421.4	(23)
2016	**Full Year**	**7.28**	**(41)**	**9.77**	(42)	**48.91**	(41)	**2,349.4**	(57)

Gas Utilities--Summary Table

	Period	ROR %	(# Cases)	ROE %	(# Cases)	Cap. Struc.	(# Cases)	$ Mil.	(# Cases)
2002	Full Year	8.80	(20)	11.03	(21)	48.29	(18)	303.6	(26)
2003	Full Year	8.75	(22)	10.99	(25)	49.93	(22)	260.1	(30)
2004	Full Year	8.34	(21)	10.59	(20)	45.90	(20)	303.5	(31)
2005	Full Year	8.25	(29)	10.46	(26)	48.66	(24)	458.4	(34)
2006	Full Year	8.44	(17)	10.40	(15)	47.24	(16)	392.5	(23)
2007	Full Year	8.11	(31)	10.22	(35)	48.47	(28)	645.3	(43)
2008	Full Year	8.49	(33)	10.39	(32)	50.35	(32)	700.0	(40)
2009	Full Year	8.15	(29)	10.22	(30)	48.49	(29)	438.6	(36)
2010	Full Year	7.99	(40)	10.15	(39)	48.70	(40)	776.5	(50)
2011	Full Year	8.09	(18)	9.92	(16)	52.49	(14)	367.0	(31)
2012	Full Year	7.98	(30)	9.94	(35)	51.13	(32)	264.0	(41)
2013	Full Year	7.39	(20)	9.68	(21)	50.60	(20)	494.9	(38)
2014	Full Year	7.65	(27)	9.78	(26)	51.11	(28)	529.2	(48)
	1st Quarter	6.41	(2)	9.47	(3)	50.41	(2)	168.9	(9)
	2nd Quarter	7.29	(3)	9.43	(3)	50.71	(3)	34.9	(8)
	3rd Quarter	7.35	(1)	9.75	(1)	42.01	(1)	103.9	(8)
	4th Quarter	7.54	(10)	9.68	(9)	50.40	(10)	186.5	(15)
2015	**Full Year**	**7.34**	**(16)**	**9.60**	**(16)**	**49.93**	**(16)**	**494.1**	**(40)**
	1st Quarter	7.12	(6)	9.48	(6)	50.83	(6)	120.2	(11)
	2nd Quarter	7.38	(6)	9.42	(6)	50.01	(6)	276.3	(16)
	3rd Quarter	6.59	(5)	9.47	(4)	48.44	(4)	106.3	(8)
	4th Quarter	6.71	(7)	9.60	(8)	48.74	(7)	733.1	(19)
2016	**Full Year**	**6.95**	(24)	**9.50**	(24)	**49.56**	**(23)**	**1,235.9**	(54)

Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence

Electric Average Authorized ROEs: 2006 — 2016

Settled versus Fully Litigated Cases

	All Cases		Settled Cases		Fully Litigated Cases	
Year	ROE %	(# Cases)	ROE %	(# Cases)	ROE %	(# Cases)
2006	10.32	(26)	10.26	(11)	10.37	(15)
2007	10.30	(38)	10.42	(14)	10.23	(24)
2008	10.41	(37)	10.43	(17)	10.39	(20)
2009	10.52	(40)	10.64	(16)	10.45	(24)
2010	10.37	(61)	10.39	(34)	10.35	(27)
2011	10.29	(42)	10.12	(16)	10.39	(26)
2012	10.17	(58)	10.06	(29)	10.28	(29)
2013	10.03	(49)	10.12	(32)	9.85	(17)
2014	9.91	(38)	9.73	(17)	10.05	(21)
2015	9.85	(30)	10.07	(14)	9.66	(16)
2016	9.77	(42)	9.80	(17)	9.74	(25)

General Rate Cases versus Limited Issue Riders

	All Cases		General Rate Cases		Limited Issue Riders	
Year	ROE %	(# Cases)	ROE %	(# Cases)	ROE %	(# Cases)
2006	10.32	(26)	10.34	(25)	9.80	(1)
2007	10.30	(38)	10.31	(37)	9.90	(1)
2008	10.41	(37)	10.37	(35)	11.11	(2)
2009	10.52	(40)	10.52	(38)	10.55	(2)
2010	10.37	(61)	10.29	(58)	11.87	(3)
2011	10.29	(42)	10.19	(40)	12.30	(2)
2012	10.17	(58)	10.01	(52)	11.57	(6)
2013	10.03	(49)	9.81	(42)	11.34	(7)
2014	9.91	(38)	9.75	(33)	10.96	(5)
2015	9.85	(30)	9.60	(24)	10.87	(6)
2016	9.77	(42)	9.60	(32)	10.31	(10)

Vertically Integrated Cases versus Delivery Only Cases

	All Cases		Vertically Integrated Cases		Delivery Only Cases	
Year	ROE %	(# Cases)	ROE %	(# Cases)	ROE %	(# Cases)
2006	10.32	(26)	10.63	(15)	9.91	(10)
2007	10.30	(38)	10.50	(26)	9.86	(11)
2008	10.41	(37)	10.48	(26)	10.04	(9)
2009	10.52	(40)	10.66	(28)	10.15	(10)
2010	10.37	(61)	10.42	(41)	9.98	(17)
2011	10.29	(42)	10.33	(28)	9.85	(12)
2012	10.17	(58)	10.10	(39)	9.73	(13)
2013	10.03	(49)	9.95	(31)	9.41	(11)
2014	9.91	(38)	9.94	(19)	9.50	(14)
2015	9.85	(30)	9.75	(17)	9.23	(7)
2016	9.77	(42)	9.77	(20)	9.31	(12)

Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence

Gas Average Authorized ROEs: 2006 — 2016

Settled versus Fully Litigated Cases

	All Cases		Settled Cases		Fully Litigated Cases	
Year	ROE %	(# Cases)	ROE %	(# Cases)	ROE %	(# Cases)
2006	10.40	(15)	10.26	(7)	10.53	(8)
2007	10.22	(35)	10.24	(22)	10.20	(13)
2008	10.39	(32)	10.34	(20)	10.47	(12)
2009	10.22	(30)	10.43	(13)	10.05	(17)
2010	10.15	(39)	10.30	(12)	10.08	(27)
2011	9.92	(16)	10.08	(8)	9.76	(8)
2012	9.94	(35)	9.99	(14)	9.92	(21)
2013	9.68	(21)	9.80	(9)	9.59	(12)
2014	9.78	(26)	9.51	(11)	9.98	(15)
2015	9.60	(16)	9.60	(11)	9.58	(5)
2016	9.50	(24)	9.43	(14)	9.61	(10)

General Rate Cases versus Limited Issue Riders

	All Cases		General Rate Cases		Limited Issue Riders	
Year	ROE %	(# Cases)	ROE %	(# Cases)	ROE %	(# Cases)
2006	10.40	(15)	10.40	(15)	—	(0)
2007	10.22	(35)	10.22	(35)	—	(0)
2008	10.39	(32)	10.39	(32)	—	(0)
2009	10.22	(30)	10.22	(30)	—	(0)
2010	10.15	(39)	10.15	(39)	—	(0)
2011	9.92	(16)	9.91	(15)	10.00	(1)
2012	9.94	(35)	9.93	(34)	10.40	(1)
2013	9.68	(21)	9.68	(21)	—	(0)
2014	9.78	(26)	9.78	(26)	—	(0)
2015	9.60	(16)	9.60	(16)	—	(0)
2016	9.50	(24)	9.49	(23)	9.70	(1)

Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence

Electric Utility Decisions

Date	Company	State	ROR %	ROE %	Common Equity as % of Capital	Test Year	Rate Base	Amt. $ Mil.	Footnotes
1/5/16	MDU Resources Group	ND	7.95	10.50	50.27	12/16	—	15.1	(B,LIR,1)
1/6/16	Avista Corporation	WA	7.29	9.50	48.50	9/14	—	-8.1	(B)
1/28/16	Northern India-- Public Service Co.	IN	—	—	—	—	—	0.0	(LIR,2)
2/2/16	Kentucky Utilities Company	VA	—	—	—	12/14	—	5.5	(B)
2/23/16	Entergy Arkansas	AR	4.52	9.75	28.46	3/15	—	219.7	(B,*)
2/29/16	Virginia Electric and Power Company	VA	7.90	11.60	49.99	3/17	Average	21.0	(LIR,3)
2/29/16	Virginia Electric and Power Company	VA	7.40	10.60	49.99	3/17	Average	-9.3	(LIR,4)
2/29/16	Virginia Electric and Power Company	VA	7.40	10.60	49.99	3/17	Average	6.6	(LIR,5)
2/29/16	Virginia Electric and Power Company	VA	7.40	10.60	49.99	3/17	Average	-16.8	(LIR,6)
3/16/16	Indianapolis Power & Light Company	IN	6.51	9.85	37.33	6/14	Year-end	29.6	(*)
3/25/16	MDU Resources Group	MT	—	—	—	12/14	—	7.4	(B,Z)
3/29/16	Virginia Electric and Power Company	VA	6.90	9.60	49.99	3/17	Average	40.4	(LIR,7)
2016	**1ST QUARTER: AVERAGES/TOTAL**		**7.03**	**10.29**	**46.06**			**311.2**	
	OBSERVATIONS		**9**	**9**	**9**			**12**	
4/29/16	Fitchburg Gas and Electric Light Co.	MA	8.46	9.80	52.17	12/14	Year-end	2.1	(D)
6/3/16	Baltimore Gas and Electric Company	MD	7.28	9.75	51.90	11/15	Average	44.1	(D,R)
6/8/16	El Paso Electric Company	NM	7.67	9.48	49.29	12/14	Year-end	1.1	
6/15/16	New York State Electric & Gas Corp.	NY	6.68	9.00	48.00	4/17	Average	29.6	(B,D,Z,8)
6/15/16	Rochester Gas and Electric Corp.	NY	7.55	9.00	48.00	4/17	Average	3.0	(B,D,Z,8)
6/23/16	San Diego Gas & Electric Co.	CA	—	—	—	12/16	Average	3.0	(B,Z,9)
6/30/16	Appalachian Power Company	WV	—	—	—	—	—	55.1	(B,LIR,10)
6/30/16	Virginia Electric and Power Company	VA	7.40	10.60	49.99	8/17	Average	-25.7	(LIR,11)
6/30/16	Virginia Electric and Power Company	VA	6.90	9.60	49.99	8/17	Average	5.4	(LIR,12)
2016	**2ND QUARTER: AVERAGES/TOTAL**		**7.42**	**9.60**	**49.91**			**117.7**	
	OBSERVATIONS		**7**	**7**	**7**			**9**	
7/18/16	Northern Indiana Public Service Co.	IN	6.74	9.98	47.42	3/15	Year-end	72.5	(B,*)
8/9/16	Kingsport Power Company	TN	6.18	9.85	40.25	12/17	Average	8.6	(B)
8/10/16	Southwestern Public Service Co.	NM	—	—	—	—	—	23.5	(B)
8/10/16	Empire District Electric Company	MO	—	—	—	6/15	—	20.4	(B)
8/18/16	El Paso Electric Company	TX	—	—	—	3/15	—	40.7	(I,B)
8/18/16	UNS Electric, Inc.	AZ	7.22	9.50	52.83	12/14	Year-end	15.1	
8/22/16	Virginia Electric and Power Company	VA	—	—	—	8/17	—	21.3	(LIR, B,13)
8/24/16	Atlantic City Electric Company	NJ	7.64	9.75	49.48	12/15	Year-end	45.0	(D,B)

Electric Utility Decisions (continued)

Date	Company	State	ROR %	ROE %	Common Equity as % of Capital	Test Year	Rate Base	Amt. $ Mil.	Footnotes
9/1/16	PacifiCorp	WA	7.30	9.50	49.10	6/15	Year-end	13.7	(Z)
9/8/16	Upper Peninsula Power Company	MI	7.47	10.00	53.49	12/16	Average	4.6	(I,*)
9/28/16	Public Service Co. of New Mexico	NM	7.71	9.58	49.61	9/16	Average	61.2	
9/28/16	KCP&L Greater Missouri Operations	MO	—	—	—	—	—	3.0	(B)
9/30/16	Massachusetts Electric Company	MA	7.58	9.90	50.70	6/15	Year-end	169.7	(D)
2016	**3RD QUARTER: AVERAGES/TOTAL**		**7.23**	**9.76**	**49.11**			**499.3**	
	OBSERVATIONS		**8**	**8**	**8**			**13**	
10/6/16	Appalachian Power Company	VA	—	9.40	—	—	—	—	(LIR)
10/19/16	South Carolina Electric & Gas Co.	SC	8.24	—	51.35	6/16	Year-end	64.4	(LIR, 14)
10/26/16	Northern States Power Company - WI	WI	—	—	—	12/17	—	24.5	(15)
11/9/16	Madison Gas and Electric Company	WI	7.89	9.80	57.16	12/17	Average	-3.3	
11/10/16	Public Service Company of Oklahoma	OK	6.94	9.50	44.00	1/15	Year-end	14.5	
11/15/16	Potomac Electric Power Company	MD	7.49	9.55	49.55	12/15	Average	52.5	(D)
11/18/16	Wisconsin Power and Light Company	WI	7.91	10.00	52.20	12/18	Average	9.4	(B,Z)
11/29/16	Florida Power & Light Company	FL	—	10.55	—	12/18	—	811.0	(B,Z)
12/1/16	Liberty Utilities (CalPeco Electric) LLC	CA	7.51	10.00	52.50	12/16	Average	8.3	(B)
12/6/16	Commonwealth Edison Company	IL	6.71	8.64	45.62	12/15	Year-end	130.9	(D)
12/6/16	Ameren Illinois Company	IL	7.28	8.64	50.00	12/15	Year-end	-8.8	(D)
12/6/16	Entergy Arkansas, Inc.	AR	—	—	—	12/17	—	54.4	(B)
12/7/16	Duke Energy Progress, LLC	SC	7.21	10.10	53.00	12/15	Year-end	56.2	(B,Z)
12/9/16	Monongahela Power Company	WV	—	—	—	6/16	—	25.0	(B,LIR,16)
12/12/16	Jersey Central Power & Light Co.	NJ	7.47	9.60	45.00	6/16	Year-end	80.0	(B,D)
12/14/16	United Illuminating Company	CT	7.08	9.10	50.00	12/15	Average	57.4	(D,Z)
12/15/16	Avista Corporation	WA	—	—	—	—	—	0.0	(17)
12/19/16	Black Hills Colorado Electric Utility Co.	CO	7.43	9.37	52.39	12/15	Average	0.6	
12/19/16	Emera Maine	ME	7.45	9.00	49.00	12/14	Average	3.0	(D,Hy)
12/20/16	Georgia Power Company	GA	—	—	—	12/17	—	—	(LIR,W,18)
12/22/16	Sierra Pacific Power Company	NV	6.65	9.60	48.03	12/15	—	-2.9	(B)
12/22/16	Virginia Electric and Power Company	NC	7.37	9.90	51.75	12/15	Year-end	34.7	(B,I)
12/23/16	Hawaiian Electric Company, Inc.	HI	—	—	—	—	—	0.0	(19)
12/28/16	Avista Corporation	ID	7.58	9.50	50.00	12/15	Average	6.3	(B)
12/30/16	Appalachian Power Company	VA	7.30	10.00	47.22	12/17	Average	3.3	(B,LIR,20)
2016	**4TH QUARTER: AVERAGES/TOTAL**		**7.38**	**9.57**	**49.93**			**1,421.4**	
	OBSERVATIONS		**17**	**18**	**17**			**23**	
2016	**FULL YEAR: AVERAGES/TOTAL**		**7.28**	**9.77**	**48.91**			**2,349.6**	
	OBSERVATIONS		**41**	**42**	**41**			**57**	

Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence

Gas Utility Decisions

Date	Company	State	ROR %	ROE %	Common Equity as % of Capital	Test Year	Rate Base	Amt. $ Mil.	Footnotes
1/6/16	Oklahoma Natural Gas Company	OK	7.31	9.50	60.50	3/15	Year-end	30.0	(B)
1/6/16	Avista Corporation	WA	7.29	9.50	48.50	09/14	—	10.8	(B)
1/28/16	SourceGas Arkansas	AR	5.33	9.40	39.46	3/15	Year-end	8.0	(B,*)
2/10/16	Liberty Utilities (New England Nat. Gas)	MA	7.99	9.60	50.00	12/14	Year-end	7.8	(B)
2/16/16	Public Service Company of Colorado	CO	7.33	9.50	56.51	12/14	Average	39.2	(I,Z,R)
2/25/16	Black Hills Kansas Gas Utility Company	KS	—	—	—	10/15	Year-end	0.8	(LIR,21)
2/29/16	Avista Corporation	OR	7.46	9.40	50.00	12/16	Average	4.5	
3/17/16	Atmos Energy Corporation	KS	—	—	—	3/15	—	2.2	(B)
3/30/16	Indiana Gas Company, Inc.	IN	—	—	—	6/15	Year-end	7.0	(LIR,22)
3/30/16	Northern Indiana Public Service Co.	IN	—	—	—	6/15	Year-end	7.6	(LIR,23)
3/30/16	Southern Indiana Gas and Electric Co.	IN	—	—	—	6/15	Year-end	2.3	(LIR,22)
2016	**1ST QUARTER: AVERAGES/TOTAL**		**7.12**	**9.48**	**50.83**			**120.2**	
	OBSERVATIONS		**6**	**6**	**6**			**11**	
4/21/16	Consumers Energy Company	MI	—	—	—	12/16	—	40.0	(I,B)
4/29/16	Fitchburg Gas and Electric Light Company	MA	8.46	9.80	52.17	12/14	Year-end	1.6	
5/5/16	CenterPoint Energy Resources Corp.	MN	7.07	9.49	50.00	9/16	Average	27.5	(I)
5/11/16	Liberty Utilities (Midstates Nat. Gas)	MO	—	—	—	1/16	—	0.2	(LIR,24)
5/19/16	Delta Natural Gas Company	KY	—	—	—	12/15	Year-end	1.4	(LIR)
5/19/16	Laclede Gas Company	MO	—	—	—	2/16	Year-end	5.4	(LIR,25)
5/19/16	Missouri Gas Energy	MO	—	—	—	2/16	Year-end	3.6	(LIR,25)
6/1/16	Maine Natural Gas	ME	7.28	9.55	50.00	9/14	Average	2.5	(B,Z)
6/3/16	Baltimore Gas and Electric Company	MD	7.23	9.65	51.90	11/15	Average	47.9	(R)
6/15/16	New York State Electric & Gas Corporation	NY	6.68	9.00	48.00	4/17	Average	13.1	(B,Z,7)
6/15/16	Rochester Gas and Electric Corp.	NY	7.55	9.00	48.00	4/17	Average	8.8	(B,Z,7)
6/22/16	Northern Indiana Public Service Co.	IN	—	—	—	12/15	Year-end	6.7	(LIR,E,26)
6/23/16	San Diego Gas & Electric Co.	CA	—	—	—	12/16	Average	-1.6	(B,Z,27)
6/23/16	Southern California Gas Company	CA	—	—	—	12/16	Average	106.9	(B,Z,9)
6/29/16	Indiana Gas Company, Inc.	IN	—	—	—	12/15	Year-end	10.2	(LIR,28)
6/29/16	Southern Indiana Gas and Electric Co.	IN	—	—	—	12/15	Year-end	2.1	(LIR,28)
2016	**2ND QUARTER: AVERAGES/TOTAL**		**7.38**	**9.42**	**50.01**			**276.3**	
	OBSERVATIONS		**6**	**6**	**6**			**16**	

Gas Utility Decisions (continued)

Date	Company	State	ROR %	ROE %	Common Equity as % of Capital	Test Year	Rate Base	Amt. $ Mil.	Footnotes
7/7/16	Cascade Natural Gas Corporation	WA	7.35	—	—	—	—	4.0	(B)
7/19/16	CenterPoint Energy Resources Corp.	OK	—	—	—	12/15	—	0.0	(B,29)
8/4/16	Atmos Energy Corporation	KY	—	—	—	5/17	—	0.5	(B)
8/22/16	Questar Gas Company	UT	—	—	—	—	—	—	(30)
9/1/16	UGI Utilities, Inc.	PA	—	—	—	9/17	—	27.0	(B)
9/2/16	CenterPoint Energy Resources Corp.	AR	4.53	9.50	30.85	9/15	Year-end	14.2	(B,*)
9/23/16	New Jersey Natural Gas Company	NJ	6.90	9.75	52.50	6/16	Year-end	45.0	(B)
9/27/16	Texas Gas Service Company	TX	7.28	9.50	60.10	9/15	Year-end	8.8	
9/29/16	Minnesota Energy Resources Corp.	MN	6.88	9.11	50.32	12/16	Average	6.8	(I,E)
2016	**3RD QUARTER: AVERAGES/TOTAL**		**6.59**	**9.47**	**48.44**			**106.3**	
	OBSERVATIONS		**5**	**4**	**4**			**8**	
10/26/16	Northern States Power Company - WI	WI	—	—	—	12/17	—	4.8	(15)
10/27/16	Columbia Gas of Maryland, Inc.	MD	—	—	—	4/16	—	3.7	(B)
10/27/16	Columbia Gas of Pennsylvania, Inc.	PA	—	—	—	12/17	—	35.0	(B)
10/28/16	Public Service Co. of North Carolina	NC	7.53	9.70	52.00	12/15	Year-end	19.1	(B)
11/9/16	Madison Gas and Electric Company	WI	—	9.80	—	12/17	—	3.1	
11/14/16	Atmos Energy Corporation	KY	—	—	—	9/17	Year-end	5.0	(LIR,31)
11/15/16	Texas Gas Service Company	TX	—	—	—	12/15	—	6.8	(B)
11/18/16	Wisconsin Power and Light Company	WI	7.84	10.00	52.20	12/18	Average	9.4	(B,Z)
11/23/16	Baltimore Gas and Electric Company	MD	—	—	—	12/18	Average	6.1	(B,Z,LIR,32)
11/29/16	Kansas Gas Service Company	KS	—	—	—	—	—	15.5	(B)
12/1/16	Pacific Gas and Electric Company	CA	—	—	—	12/15	Average	100.0	(Tr,I, 33)
12/9/16	DTE Gas Company	MI	5.76	10.10	38.65	10/17	Average	122.3	(I,*)
12/14/16	Columbia Gas of Maryland, Inc.	MD	7.53	9.70	54.29	12/17	Average	1.2	(LIR,32)
12/15/16	KeySpan Gas East Corporation	NY	6.42	9.00	48.00	12/17	Average	112.0	(B,34)
12/15/16	Brooklyn Union Gas Company	NY	6.15	9.00	48.00	12/17	Average	272.1	(B,35)
12/15/16	Avista Corporation	WA	—	—	—	—	—	0.0	(17)
12/20/16	Columbia Gas of Virginia, Inc.	VA	—	—	—	12/17	Average	1.3	(LIR,36)
12/22/16	Columbia Gas of Kentucky, Inc.	KY	—	—	—	—	—	18.1	(B)
12/22/16	Sierra Pacific Power Company	NV	5.75	9.50	48.03	12/15	—	-2.4	(B)
2016	**4TH QUARTER: AVERAGES/TOTAL**		**6.71**	**9.60**	**48.74**			**733.1**	
	OBSERVATIONS		**7**	**8**	**7**			**19**	
2016	**FULL YEAR: AVERAGES/TOTAL**		**6.95**	**9.50**	**49.56**			**1,235.9**	
	OBSERVATIONS		**24**	**24**	**23**			**54**	

Source: Regulatory Research Associates, an offering of S&P Global Market Intelligence

FOOTNOTES

A-	Average
B-	Order followed stipulation or settlement by the parties. Decision particulars not necessarily precedent-setting or specifically adopted by the regulatory body.
CWIP-	Construction work in progress
D-	Applies to electric delivery only
DCt	Date certain rate base valuation
E-	Estimated
F-	Return on fair value rate base
Hy-	Hypothetical capital structure utilized
I-	Interim rates implemented prior to the issuance of final order, normally under bond and subject to refund.
LIR	Limited-issue rider proceeding
M-	"Make-whole" rate change based on return on equity or overall return authorized in previous case.
R-	Revised
Te-	Temporary rates implemented prior to the issuance of final order.
Tr-	Applies to transmission service
U-	Double leverage capital structure utilized.
W-	Case withdrawn
YE-	Year-end
Z-	Rate change implemented in multiple steps.
*	Capital structure includes cost-free items or tax credit balances at the overall rate of return.

(1)	Rate increase approved in renewable resource cost recovery rider.
(2)	Case represents the company's transmission, distribution, and storage system improvement charge, or TDSIC rate adjutment mechanism. The case was dismissed by the Commission, with no rate change authorized.
(3)	Proceeding determines the revenue requirement for Rider B, which is the mechanism through which the company recovers costs associated with its plan to convert the Altavista, Hopewell, and Southampton Power Stations to burn biomass fuels.
(4)	Represents rate decrease associated with the company's Rider R proceeding, which is the mechanism through which the company recovers the investment in the Bear Garden generating facility.
(5)	This proceeding determines the revenue requirement for Rider S, which recognizes in rates the company's investment in the Virginia City Hybrid Energy Center.
(6)	Decrease authorized through a surcharge, Rider W, which reflects in rates investment in the Warren County Power Station.
(7)	Proceeding involves a new gas-fired generation facility, the Greensville County project, and creation of a new rider mechanism, Rider GV, to reflect the related revenue requirement in rates.
(8)	Rate increase effective 5/1/16; additional increases to be effective 5/1/17 and 5/1/18.
(9)	Settlement adopted with modifications. Rate increase effective retroactive to 1/1/16; additional increases to be effective 1/1/17 and 1/1/18.
(10)	Represents the company's joint expanded net energy cost, or ENEC, proceeding.
(11)	Represents rate decrease associated with the company's Rider BW proceeding, which is the mechanism through which the company recovers the investment in its Brunswick County Power Station.
(12)	Represents the rate increase associated with the company's Rider US-2, which is the mechanism through which the company recovers the revenue requirement associated with three new solar generation facilities.
(13)	Case involves the company's request to establish Rider U for recovery of investment and costs associated with a project to underground certain distribution lines.
(14)	The present case involves South Carolina Electric & Gas' request for a cash return on incremental V.C. Summer Units 2 and 3 construction work in progress (CWIP) and incorporates the 10.5% return on equity that was authorized in September 2015 for use in the Summer CWIP-related proceedings beginning in 2016.
(15)	The rate case is for the limited purpose of recovering anticipated increases in: generation and transmission fixed charges and fuel and purchased power expenses related to the interchange agreement with affiliate NSP-Minnesota; and, rate base investment.

FOOTNOTES (continued)

(16) Case is a consolidated expanded net energy cost proceeding for Monongahela Power and affiliate Potomac Edison.
(17) Rate increase rejected by commission.
(18) As a result of the commission's adoption of a settlement in another proceeding, the company withrew its rate increase request in this proceeding, and no rate change was implemented.
(19) No change in base rates was sought by the company, and on 12/23/16, the commission issued an order closing this docket.
(20) Case involves the company's G-RAC rider mechanism that addresses its investment in the Dresden Generating Plant, and establishes the revenue requirement for the rider to become effective 1/1/17.
(21) Case involves the company's gas system reliabillity surcharge, or GSRS, rider and reflects investments made from July 1, 2014 through Oct. 31, 2015.
(22) Case involves company's "compliance and system improvement adjustment" mechanism, and includes compliance-related investments made between Jan. 1 and June 30, 2015, and certain other investments made between July 1, 2014 and June 30, 2015.
(23) Case establishes the rates to be charged to customers under the company's transmission, distribution and storage system improvement charge rate adjustment mechanism, and reflects investments made between July 1, 2014 and June 30, 2015.
(24) Case involves the company's infrastructure system replacement surcharge rider and reflects incremental investments made from 6/1/15 through 1/31/16.
(25) Case involves the company's infrastructure system replacement surcharge rider and reflects incremental investments made from 9/1/15 through 2/29/16.
(26) Case establishes the rates to be charged to customers under the company's transmission, distribution and storage system improvement charge rate adjustment mechanism, and reflects investments made between 7/1/15 and 12/31/15.
(27) Settlement adopted with modifications. Rate decrease effective retroactive to 1/1/16; rate increases to be effective 1/1/17 and 1/1/18.
(28) Case involves company's "compliance and system improvement adjustment" mechanism, and includes compliance-related investments made between 7/1/15 and 12/31/15.
(29) Case involves the company's performance based ratemaking plan.
(30) On 8/22/16, the PSC approved the company's petition to withdraw the rate increase request, effectively closing the case. The request to withdraw the filing comported with provisions of a settlement filed in the Questar/Dominion Resources merger proceeding.
(31) Case is an annual update to the company's pipe replacement program rider.
(32) Case involves the company's strategic infrastrucure development and enhancement, or STRIDE, rider.
(33) Case involves the company's gas transmission and storage operations. The decision also authorized attrition rate increases of $246 million for 2016, $64 million for 2017 and $105 million for 2018.
(34) Adopted joint proposal provides for the company to implement a $112 million rate increase effective 1/1/17, a $19.6 million rate increase effective 1/1/18, and a $27 million rate increase effective 1/1/19.
(35) Adopted joint proposal provides for the company to implement a $272.1 million rate increase effective 1/1/17, a $41 million rate increase effective 1/1/18, and a $48.9 million rate increase effective 1/1/19.
(36) Case involves the company's investments under the Steps to Advance Virginia's Energy Plan.

Dennis Sperduto

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10 MARCH 2015

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ANALYST CONTACTS

Jim Hempstead 212-553-4318
Associate Managing Director
james.hempstead@moodys.com

Ryan Wobbrock 212-553-7104
AVP-Analyst
ryan.wobbrock@moodys.com

Jeffrey F. Cassella 212-553-1665
AVP-Analyst
jeffrey.cassella@moodys.com

Lesley Ritter 212-553-1607
Analyst
lesley.ritter@moodys.com

Jairo Chung 212-553-5123
Analyst
jairo.chung@moodys.com

Natividad Martel 212-553-4561
VP-Senior Analyst
natividad.martel@moodys.com

Susana Vivares 212-553-4694
VP-Senior Analyst
susana.vivares@moodys.com

Toby Shea 212-553-1779
VP-Senior Analyst
toby.shea@moodys.com

Swami Venkataraman, CFA 212-553-7950
VP-Sr Credit Officer
swami.venkat@moodys.com

US Regulated Utilities

Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles

The credit profiles of US regulated utilities will remain intact over the next few years despite our expectation that regulators will continue to trim the sector's profitability by lowering its authorized returns on equity (ROE). Persistently low interest rates and a comprehensive suite of cost recovery mechanisms ensure a low business risk profile for utilities, prompting regulators to scrutinise their profitability, which is defined as the ratio of net income to book equity. We view cash flow measures as a more important rating driver than authorized ROEs, and we note that regulators can lower authorized ROEs without hurting cash flow, for instance by targeting depreciation, or through special rate structures. Regulators can also adjust a utility's equity capitalization in its rate base. All else being equal, we think most utilities would prefer a thicker equity base and a lower authorized ROE over a small equity layer and a high authorized ROE.

» **More timely cost recovery helps offset falling ROEs**. Regulators continue to permit a robust suite of mechanisms that enable utilities to recoup prudently incurred operating costs, including capital investments such as environment related or infrastructure hardening expenditures. Strong cost recovery is credit positive because it ensures a stable financial profile. Despite lower authorized ROEs, we see the sector maintaining a ratio of Funds From Operations (FFO) to debt near 20%, a level that continues to support strong investment-grade ratings.

» **Utilities' cash flow is somewhat insulated from lower ROEs**. Net income represents about 30% - 40% of utilities' cash flow, so lower authorized returns won't necessarily affect cash flow or key financial credit ratios, especially when the denominator (equity) is rising. Regulators set the equity layer when capitalizing rate base, and the equity layer multiplied by the authorized ROE drives the annual revenue requirements. Across the sector, the ratio of equity to total assets has remained flat in the 30% range since 2007.

» **Utilities' actual financial performance remains stable**. Earned ROEs, which typically lag authorized ROEs, have not fallen as much as authorized returns in recent years. Since 2007, vertically integrated utilities, transmission and distribution only utilities, and natural gas local distribution companies have maintained steady earned ROE's in the 9% - 10% range. Holding companies with primarily regulated businesses also earned ROEs of around 9% - 10%, while returns for holding companies with diversified operations, namely unregulated generation, have fallen from 11% (over the past seven year average) to around 9% today.

Robust Suite of Cost Recovery Mechanisms Is Credit Positive

Over the past few years, the US regulatory environment has been very supportive of utilities. We think this is partly because regulators acknowledge that utility infrastructure needs a material amount of ongoing investment for maintenance, refurbishment and renovation. Utilities have also been able to garner support from both politicians and regulators for prudent investment in these critical assets because it helps create jobs, spurring economic growth. We also think regulators prefer to regulate financially healthy utilities.

Across the US, we continue to see regulators approving mechanisms that allow for more timely recovery of costs, a material credit positive. These mechanisms, which keep utilities' business risk profile low compared to most industrial corporate sectors, include: formulaic rate structures; special purpose trackers or riders; decoupling programs (which delink volumes from revenue); the use of future test years or other pre-approval arrangements. We also see a sustained increase in the frequency of rate case filings.

A supportive regulatory environment translates into a more transparent and stable financial profile, which in turn results in reasonably unfettered access to capital markets - for both debt and equity. Today, we think utilities enjoy an attractive set of market conditions that will remain in place over the next few years. By themselves, neither a slow (but steady) decline in authorized profitability, nor a material revision in equity market valuation multiples, will derail the stable credit profile of US regulated utilities.

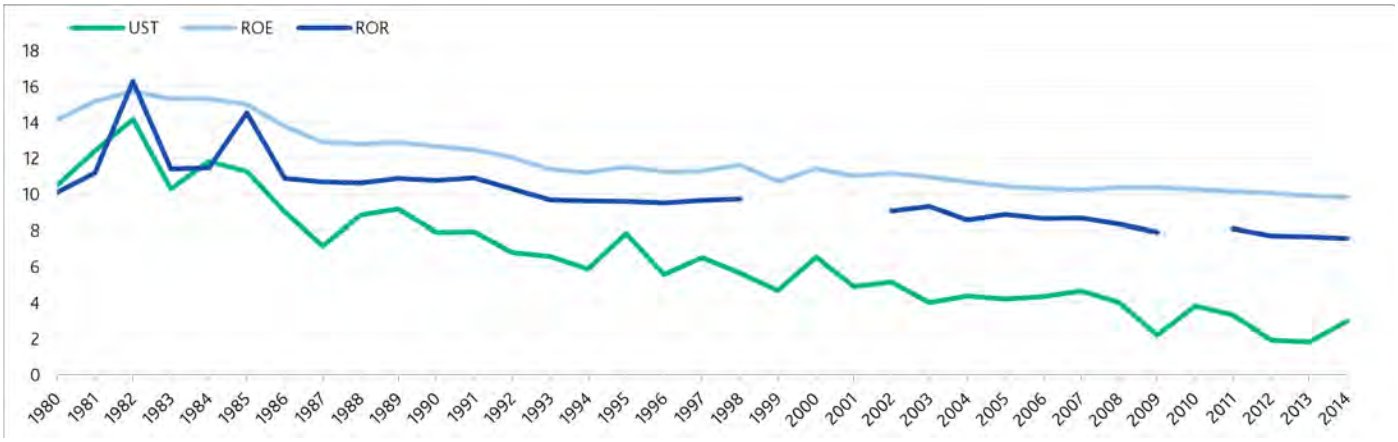
Cost recovery will help offset falling ROEs

Robust cost recovery mechanisms will help ensure that US regulated utilities' credit quality remains intact over the next few years. As a result, falling authorized ROEs are not a material credit driver at this time, but rather reflect regulators' struggle to justify the cost of capital gap between the industry's authorized ROEs and persistently low interest rates. We also see utilities struggling to defend this gap, while at the same time recovering the vast majority of their costs and investments through a variety of rate mechanisms.

In the table below, we show the US Treasury 10-year yield, which has steadily fallen from the 5% range in the summer of 2007 to the 2% range today. US utilities benefit from these lower interest rates because they borrow approximately $50 billion a year. For some utilities, a lower cost of debt translates directly into a higher return on equity, as long as their rate structure includes an embedded weighted average cost of capital (and the utilities can stay out of a general rate case proceeding).

Exhibit 1

Regulators hold up their end of the bargain by limiting reduction in return on equity (ROE) and overall rate of return (ROR) when compared with the decline in US Treasury 10-year yields



SOURCE: SNL Financial, LP, Moody's

As utilities increasingly secure more up-front assurance for cost recovery in their rate proceedings, we think regulators will increasingly view the sector as less risky. The combination of low capital costs, high equity market valuation multiples (which are better than or on par with the broader market despite the regulated utilities' low risk profile), and a transparent assurance of cost recovery tend to support the case for lower authorized returns, although because utilities will argue they should rise, or at least stay unchanged.

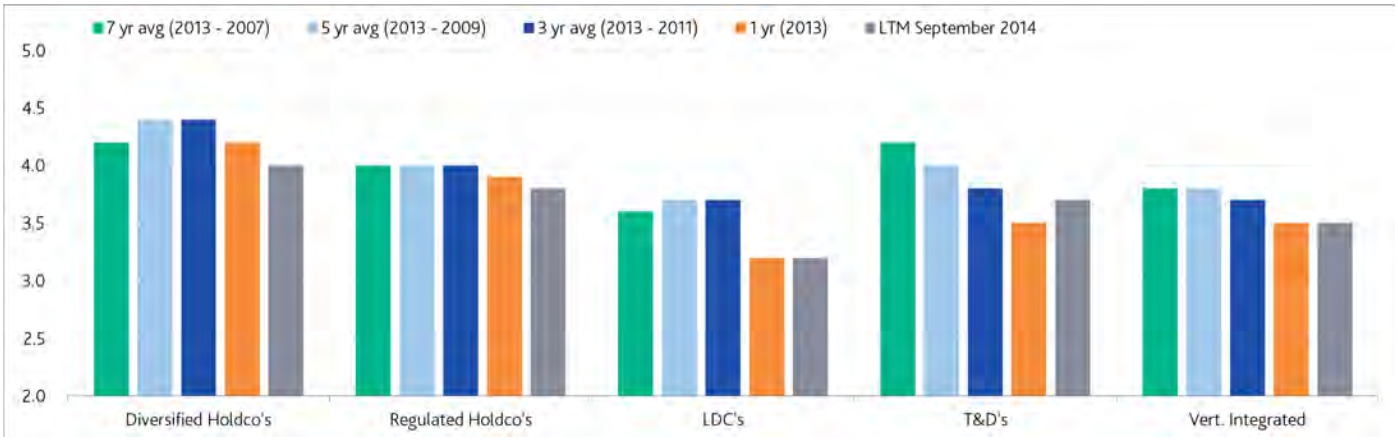
One of the arguments for keeping authorized ROEs steady is that lowering them would make utilities less attractive to providers of capital. Utility holding companies assert that they would rather invest in higher risk-adjusted opportunities than in a regulated utility with sub-par return prospects. We see a risk that this argument could lead to a more contentious regulatory environment, a material credit negative. We do not think this scenario will develop over the next few years.

Our default and recovery data provides strong evidence that regulated utilities are indeed less risky (from the perspective of a probability of default and expected loss given default, as defined by Moody's) than their non-financial corporate peers. On a global basis, we nonetheless see a material amount of capital looking for regulated utility investment opportunities, and the same is true in the US despite, despite a lower authorized return. This is partly because investors can use holding company leverage to increase their actual equity returns, by borrowing capital at today's low interest rates and investing in the equity of a regulated utility.

Despite the reduction in authorized ROEs, US utilities are thankful to their regulators for the robust suite of timely cost recovery mechanisms which allow them to recoup prudently incurred operating costs such as fuel, as well as some investment expenses. These recovery mechanisms drive a stable and transparent dividend policy, which translates into historically very high equity multiples. Moreover, cost recovery helps keep the sector's overall financial profile stable, thereby supporting strong investment-grade ratings.

Exhibit 2

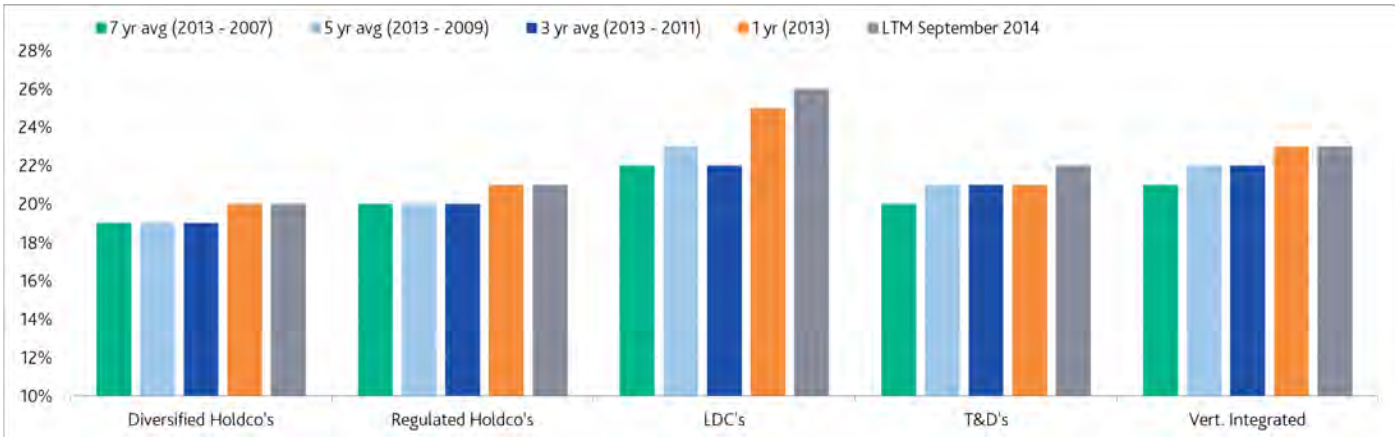
With better recovery mechanisms, the ratio of debt-to-EBITDA can rise, modestly, without negatively impacting credit profiles



SOURCE: Company filings; Moody's

Exhibit 3

The ratio of Funds From Operations to debt is rising, a material credit positive,
but the rise is partly funded by bonus depreciation and deferred taxes, which will eventually reverse



SOURCE: Company filings; Moody's

Utilities' cash flow is somewhat insulated from declining ROEs

Across all our utility group sub-sectors (see Appendix), net income - the numerator in the calculation of ROE – accounts for between 30% - 40% of cash flow. While net income is important, cash flow exerts a much greater influence over creditworthiness. This is primarily because cash flow takes into account depreciation and amortization expenses, along with other deferred tax adjustments. We note that deferred taxes have risen over the past few years, in part due to bonus depreciation elections, which will eventually reverse. From a credit perspective, there is a difference between the nominal amount of net income, which goes into cash flow, and the relationship of net income to book equity (a measure of profitability).

In the chart below, we highlight the ratio of net income to cash flow from operations (CFO) for our selected peer groups. Across all of the sectors, the longer term historical average of net income to CFO has fallen compared with the late 2000s, but has been rising over the more recent past. This is partly a function of deferred taxes, which have become a larger component of CFO over the past decade.

Exhibit 4

Net income as a % of cash flow from operations has been steadily rising (since 2011)

SOURCE: Company filings, Moody's

We can also envisage scenarios where regulators seek to achieve a reduction in authorized ROEs without harming credit profiles by focusing on utilities' equity layer. In the chart below, we illustrate median equity as a percentage of total assets for our selected peer groups. In our illustration, utilities will benefit from acquisition related goodwill on one hand, and impairments on the other.

Exhibit 5

Equity as a % of total assets, not capitalization, includes both goodwill and impairments

SOURCE: Company filings; Moody's

Utilities' actual financial performance remains stable

Earned ROE's, as reported by utilities and adjusted by Moody's, have been relatively flat over the past few years, despite the decline in authorized ROEs. This means utilities are closer to earning their authorized equity returns, which is positive from an equity market valuation perspective.

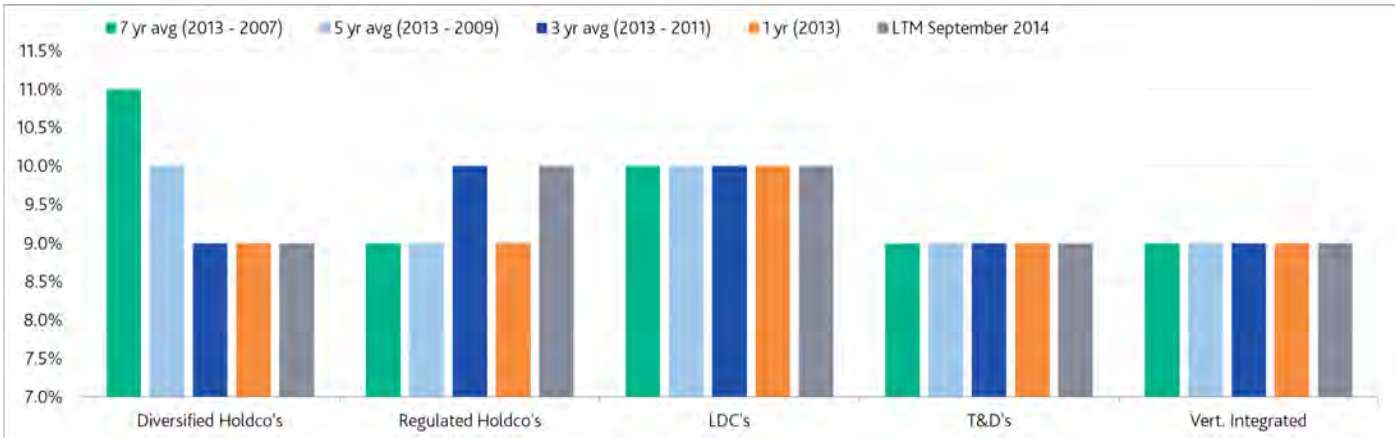
The authorized ROE is a popular focal point in many regulatory rate case proceedings. In addition, many regulatory jurisdictions look to established precedents that rely on various methodologies to determine an appropriate ROE, such as the capital asset pricing model or discounted cash flow analysis. In some jurisdictions where formulaic based rate structures point to lower ROEs for a longer projected period of time, regulators are incorporating a view that today's interest rate environment is "artificially" being held low.

Regardless, we think interest rates will go up, eventually. When they do, we also think authorized ROEs will trend up as well. However, just as authorized ROEs declined in a lagging fashion when compared to falling interest rates, we expect authorized ROEs to rise in a lagging fashion when interest rates rise.

Depending on alternative sources of risk-adjusted capital investment opportunities, this could spell trouble for utilities. For now, utilities can enjoy their (historically) high equity valuations, in terms of dividend yield and price-earnings ratios.

Exhibit 6

GAAP adjusted earned ROE's are relatively flat across all sub-sectors except Holding Companies with Diversified Operations, while the lower-risk LDC sector is outperforming



NOTE: GAAP adjusted ROE, not regulated ROE, does not adjust for goodwill or impairments.

Source: Company filings; Moody's

Appendix

Exhibit 7

Utilities with the highest earned ROEs (ranked by 7-year average)

Company Name	Sector	Rating	1-year average (2013) ROE	3-year average (2013 - 2011) ROE	5-year average (2013 - 2009) ROE	7-year average (2013 - 2007) ROE
CenterPoint Energy Houston Electric, LLC	T&D	A3	33%	32%	25%	23%
Questar Corporation	Holdco - Primarily Regulated	A2	14%	18%	20%	20%
AEP Texas Central Company	T&D	Baa1	14%	28%	22%	20%
Exelon Corporation	Holdco - Diversified	Baa2	7%	10%	14%	17%
CenterPoint Energy, Inc.	Holdco - Primarily Regulated	Baa1	7%	16%	15%	17%
Ohio Edison Company	T&D	Baa1	23%	18%	17%	16%
Public Service Enterprise Group	Holdco - Diversified	Baa2	11%	12%	14%	15%
Dayton Power & Light Company	T&D	Baa3	7%	9%	13%	15%
Dominion Resources Inc.	Holdco - Diversified	Baa2	13%	9%	12%	15%
Southern California Gas Company	LDC	A1	14%	13%	14%	15%
PECO Energy Company	T&D	A2	12%	12%	12%	14%
PPL Corporation	Holdco - Diversified	Baa3	9%	12%	11%	14%
UGI Utilities, Inc.	LDC	A2	15%	13%	13%	13%
Entergy Corporation	Holdco - Diversified	Baa3	7%	11%	12%	13%
Cleco Corporation	Holdco - Primarily Regulated	Baa1	10%	12%	13%	13%
Alabama Gas Corporation	LDC	A2	4%	11%	12%	13%
Entergy New Orleans, Inc.	Vertically Integrated Utility	Ba2	5%	10%	11%	12%
Entergy Gulf States Louisiana, LLC	Vertically Integrated Utility	Baa1	11%	13%	12%	12%
Piedmont Natural Gas Company, Inc.	LDC	A2	11%	11%	12%	12%
Ohio Power Company	T&D	Baa1	25%	14%	13%	12%
Southern Company (The)	Holdco - Primarily Regulated	Baa1	9%	11%	11%	12%
Georgia Power Company	Vertically Integrated Utility	A3	12%	12%	12%	12%
Alabama Power Company	Vertically Integrated Utility	A1	12%	12%	12%	12%
Southern California Edison Company	Vertically Integrated Utility	A2	8%	12%	12%	12%
NextEra Energy, Inc.	Holdco - Diversified	Baa1	10%	11%	11%	12%
Wisconsin Energy Corporation	Holdco - Primarily Regulated	A2	13%	13%	12%	12%
West Penn Power Company	T&D	Baa1	17%	13%	12%	12%
San Diego Gas & Electric Company	Vertically Integrated Utility	A1	9%	10%	11%	12%
Interstate Power and Light Company	Vertically Integrated Utility	A3	10%	9%	9%	12%

NOTE: GAAP adjusted ROE, not regulated ROE, does not adjust for goodwill or impairments.

SOURCE: Moody's; company filings

Exhibit 8

Highest (over 30%) and lowest (less than 20%) equity level as a % of total assets (ranked by 7-year average) [NOTE: Book equity is not adjusted for goodwill or impairments]

Company Name	Sector	Rating	1-year average (2013)	3-year average (2013 - 2011)	5-year average (2013 - 2009)	7-year average (2013 - 2007)
Duke Energy Ohio, Inc.	T&D	Baa1	48%	47%	48%	50%
Yankee Gas Services Company	LDC	Baa1	41%	42%	43%	43%
Texas-New Mexico Power Company	T&D	Baa1	43%	43%	43%	43%
Oncor Electric Delivery Company LLC	T&D	Baa1	40%	41%	41%	43%
Dayton Power & Light Company	T&D	Baa3	37%	38%	39%	40%
Pennsylvania Power Company	T&D	Baa1	25%	30%	34%	40%
Black Hills Power, Inc.	Vertically Integrated Utility	A3	38%	38%	37%	38%
ALLETE, Inc.	Vertically Integrated Utility	A3	38%	37%	37%	38%
Central Maine Power Company	T&D	A3	39%	38%	38%	38%
MGE Energy, Inc.	Holdco - Primarily Regulated	NR	39%	37%	38%	38%
Duke Energy Corporation	Holdco - Primarily Regulated	A3	36%	36%	37%	38%
Jersey Central Power & Light Company	T&D	Baa2	32%	33%	36%	38%
Oklahoma Gas & Electric Company	Vertically Integrated Utility	A1	36%	37%	37%	37%
Public Service Company of Colorado	Vertically Integrated Utility	A3	37%	37%	37%	37%
Virginia Electric and Power Company	Vertically Integrated Utility	A2	37%	37%	37%	35%
Wisconsin Public Service Corporation	Vertically Integrated Utility	A1	34%	34%	34%	35%
PacifiCorp	Vertically Integrated Utility	A3	36%	35%	35%	35%
UGI Utilities, Inc.	LDC	A2	35%	34%	34%	34%
Cleco Corporation	Holdco - Primarily Regulated	Baa1	37%	36%	34%	34%
Empire District Electric Company (The)	Vertically Integrated Utility	Baa1	35%	34%	34%	34%
Great Plains Energy Incorporated	Holdco - Primarily Regulated	Baa2	35%	35%	34%	34%
Nevada Power Company	Vertically Integrated Utility	Baa1	32%	33%	33%	33%
Tampa Electric Company	Vertically Integrated Utility	A2	34%	33%	33%	33%
Wisconsin Power and Light Company	Vertically Integrated Utility	A1	34%	33%	32%	33%
Questar Corporation	Holdco - Primarily Regulated	A2	29%	28%	31%	33%
Duke Energy Kentucky, Inc.	Vertically Integrated Utility	Baa1	31%	30%	33%	33%
Florida Power & Light Company	Vertically Integrated Utility	A1	36%	35%	34%	33%
Alabama Gas Corporation	LDC	A2	59%	40%	35%	33%
El Paso Electric Company	Vertically Integrated Utility	Baa1	34%	32%	32%	33%
IDACORP, Inc.	Holdco - Primarily Regulated	Baa1	34%	33%	33%	33%
PPL Electric Utilities Corporation	Vertically Integrated Utility	Baa1	34%	34%	34%	33%
Commonwealth Edison Company	T&D	Baa1	31%	32%	32%	33%
Georgia Power Company	Vertically Integrated Utility	A3	33%	33%	33%	33%
CMS Energy Corporation	Holdco - Primarily Regulated	Baa2	20%	19%	18%	18%
Hawaiian Electric Industries, Inc.	Holdco - Diversified		17%	16%	16%	16%
CenterPoint Energy, Inc.	Holdco - Primarily Regulated	Baa1	20%	19%	17%	15%
CenterPoint Energy Houston Electric, LLC	T&D	A3	9%	15%	15%	15%
AEP Texas Central Company	T&D	Baa1	13%	15%	14%	13%

SOURCE: Moody's; company filings

Exhibit 9

Highest (over 30%) and lowest (less than 15%) ratio of FFO to debt (ranked by 7-year average)

Company Name	Sector	Rating	1-year average (2013)	3-year average (2013 - 2011)	5-year average (2013 - 2009)	7-year average (2013 - 2007)
Dayton Power & Light Company	T&D	Baa3	32%	34%	42%	42%
Questar Corporation	Holdco - Primarily Regulated	A2	29%	30%	31%	42%
Pennsylvania Power Company	T&D	Baa1	30%	34%	32%	37%
Exelon Corporation	Holdco - Diversified	Baa2	28%	34%	37%	37%
Alabama Gas Corporation	LDC	A2	23%	27%	32%	36%
Florida Power & Light Company	Vertically Integrated Utility	A1	34%	35%	35%	35%
Southern California Gas Company	LDC	A1	42%	37%	35%	34%
Southern California Edison Company	Vertically Integrated Utility	A2	32%	33%	35%	32%
Madison Gas and Electric Company	Vertically Integrated Utility	A1	39%	35%	34%	31%
PECO Energy Company	T&D	A2	29%	31%	33%	31%
Dominion Resources Inc.	Holdco - Diversified	Baa2	16%	17%	16%	14%
Entergy Texas, Inc.	Vertically Integrated Utility	Baa3	15%	14%	12%	14%
Monongahela Power Company	T&D	Baa2	13%	16%	15%	14%
CMS Energy Corporation	Holdco - Primarily Regulated	Baa2	18%	16%	15%	14%
Appalachian Power Company	Vertically Integrated Utility	Baa1	15%	13%	14%	14%
Pennsylvania Electric Company	T&D	Baa2	15%	14%	12%	13%
NiSource Inc.	Holdco - Diversified	Baa2	15%	14%	14%	13%
Puget Energy, Inc.	Vertically Integrated Utility	Baa3	14%	12%	12%	13%
Toledo Edison Company	T&D	Baa3	10%	10%	8%	13%
Cleveland Electric Illuminating Company	T&D	Baa3	11%	11%	12%	13%
AEP Texas Central Company	T&D	Baa1	14%	15%	13%	12%

SOURCE: Moody's; company filings

Exhibit 10

Highest (over 4.5x) and lowest (less than 3.0x) ratio of debt to EBITDA (ranked by 1-year average, 2013, to focus on more recent performance)

Company Name	Sector	Rating	1-year average (2013)	3-year average (2013 - 2011)	5-year average (2013 - 2009)	7-year average (2013 - 2007)
Berkshire Hathaway Energy Company	Holdco - Diversified	A3	7.1	5.8	5.6	5.3
FirstEnergy Corp.	Holdco - Diversified	Baa3	6.0	5.2	4.8	4.4
Wisconsin Electric Power Company	Vertically Integrated Utility	A1	5.9	6.1	5.6	5.0
Entergy Texas, Inc.	Vertically Integrated Utility	Baa3	5.8	6.1	6.2	6.1
Monongahela Power Company	T&D	Baa2	5.6	5.2	5.7	6.0
NiSource Inc.	Holdco - Diversified	Baa2	5.2	5.5	5.4	5.5
PPL Corporation	Holdco - Diversified	Baa3	5.1	4.9	5.1	4.6
Appalachian Power Company	Vertically Integrated Utility	Baa1	5.0	5.0	5.2	5.4
Progress Energy, Inc.	Holdco - Primarily Regulated	Baa1	4.9	5.6	5.1	4.9
Puget Energy, Inc.	Vertically Integrated Utility	Baa3	4.9	5.6	5.9	5.6
Cleveland Electric Illuminating Company	T&D	Baa3	4.9	5.2	4.7	4.2
Northwest Natural Gas Company	LDC	A3	4.8	4.8	4.5	4.2
Jersey Central Power & Light Company	T&D	Baa2	4.7	5.5	4.2	3.6
NorthWestern Corporation	Vertically Integrated Utility	A3	4.7	4.5	4.4	4.3
Pepco Holdings, Inc.	Holdco - Primarily Regulated	Baa3	4.7	5.1	5.2	5.2
Laclede Gas Company	LDC	A3	4.7	5.5	5.3	5.6
Atlantic City Electric Company	T&D	Baa2	4.7	4.9	4.8	4.7
Nevada Power Company	Vertically Integrated Utility	Baa1	4.6	4.6	4.9	5.0
Black Hills Power, Inc.	Vertically Integrated Utility	A3	2.9	3.2	3.8	3.6
Virginia Electric and Power Company	Vertically Integrated Utility	A2	2.9	3.1	3.4	3.4
Duke Energy Kentucky, Inc.	Vertically Integrated Utility	Baa1	2.9	3.3	3.3	3.4
Texas-New Mexico Power Company	T&D	Baa1	2.9	2.9	3.2	3.3
Oklahoma Gas & Electric Company	Vertically Integrated Utility	A1	2.9	2.9	2.9	3.0
Cleco Power LLC	Vertically Integrated Utility	A3	2.9	3.2	3.6	3.7
Consumers Energy Company	Vertically Integrated Utility	A1	2.9	3.1	3.3	3.5
Alabama Power Company	Vertically Integrated Utility	A1	2.8	2.9	3.0	3.1
Public Service Electric and Gas Company	T&D	A2	2.8	3.0	3.2	3.3
Alabama Gas Corporation	LDC	A2	2.8	2.7	2.5	2.4
Pinnacle West Capital Corporation	Holdco - Primarily Regulated	Baa1	2.8	3.1	3.3	3.6
Cleco Corporation	Holdco - Primarily Regulated	Baa1	2.8	2.9	3.4	3.6
PECO Energy Company	T&D	A2	2.8	3.0	2.6	2.6
Northern States Power Company (Wisconsin)	Vertically Integrated Utility	A2	2.8	2.9	2.8	2.8
Duke Energy Carolinas, LLC	Vertically Integrated Utility	A1	2.8	3.1	3.2	3.1
UGI Utilities, Inc.	LDC	A2	2.7	3.0	3.1	3.3
Exelon Corporation	Holdco - Diversified	Baa2	2.7	2.8	2.5	2.5
West Penn Power Company	T&D	Baa1	2.7	3.3	3.3	3.4
Questar Corporation	Holdco - Primarily Regulated	A2	2.7	2.8	2.7	2.3
Tampa Electric Company	Vertically Integrated Utility	A2	2.6	2.7	2.8	2.9
Arizona Public Service Company	Vertically Integrated Utility	A3	2.6	2.9	3.1	3.3
New York State Electric and Gas Corporation	T&D	A3	2.6	2.9	3.2	4.3
Dayton Power & Light Company	T&D	Baa3	2.5	2.2	2.0	1.9
Florida Power & Light Company	Vertically Integrated Utility	A1	2.4	2.7	2.6	2.6
Ohio Power Company	T&D	Baa1	2.4	2.8	3.1	3.3
Madison Gas and Electric Company	Vertically Integrated Utility	A1	2.4	2.8	2.8	2.9
Pennsylvania Power Company	T&D	Baa1	2.4	2.3	2.4	2.2
MGE Energy, Inc.	Holdco - Primarily Regulated	NR	2.3	2.7	2.9	3.1
Rochester Gas & Electric Corporation	T&D	Baa1	2.3	2.9	3.0	3.5
Public Service Enterprise Group Incorporated	Holdco - Diversified	Baa2	2.3	2.3	2.3	2.4
NSTAR Electric Company	T&D	A2	2.2	2.6	2.7	2.8
Southern California Gas Company	LDC	A1	2.2	2.5	2.4	2.5
Mississippi Power Company	Vertically Integrated Utility	Baa1	(3.2)	3.5	3.4	3.1

Exhibit 11

List of Companies (NOTE: in our appendix tables, we exclude utilities with private ratings)

Company Name	Sector	Rating
Berkshire Hathaway Energy Company	Holdco - Diversified	A3
Black Hills Corporation	Holdco - Diversified	Baa1
Dominion Resources Inc.	Holdco - Diversified	Baa2
DTE Energy Company	Holdco - Diversified	A3
Entergy Corporation	Holdco - Diversified	Baa3
Exelon Corporation	Holdco - Diversified	Baa2
FirstEnergy Corp.	Holdco - Diversified	Baa3
Hawaiian Electric Industries, Inc.	Holdco - Diversified	NR
Integrys Energy Group, Inc.	Holdco - Diversified	A3
NextEra Energy, Inc.	Holdco - Diversified	Baa1
NiSource Inc.	Holdco - Diversified	Baa2
PPL Corporation	Holdco - Diversified	Baa3
Public Service Enterprise Group Incorporated	Holdco - Diversified	Baa2
Sempra Energy	Holdco - Diversified	Baa1
Alliant Energy Corporation	Holdco - Primarily Regulated	A3
Ameren Corporation	Holdco - Primarily Regulated	Baa2
American Electric Power Company, Inc.	Holdco - Primarily Regulated	Baa1
CenterPoint Energy, Inc.	Holdco - Primarily Regulated	Baa1
Cleco Corporation	Holdco - Primarily Regulated	Baa1
CMS Energy Corporation	Holdco - Primarily Regulated	Baa2
Consolidated Edison, Inc.	Holdco - Primarily Regulated	A3
Duke Energy Corporation	Holdco - Primarily Regulated	A3
Edison International	Holdco - Primarily Regulated	A3
Great Plains Energy Incorporated	Holdco - Primarily Regulated	Baa2
IDACORP, Inc.	Holdco - Primarily Regulated	Baa1
MGE Energy, Inc.	Holdco - Primarily Regulated	NR
Northeast Utilities	Holdco - Primarily Regulated	Baa1
Pepco Holdings, Inc.	Holdco - Primarily Regulated	Baa3
PG&E Corporation	Holdco - Primarily Regulated	Baa1
Pinnacle West Capital Corporation	Holdco - Primarily Regulated	Baa1
PNM Resources, Inc.	Holdco - Primarily Regulated	Baa3
Progress Energy, Inc.	Holdco - Primarily Regulated	Baa1
Questar Corporation	Holdco - Primarily Regulated	A2
SCANA Corporation	Holdco - Primarily Regulated	Baa3
Southern Company (The)	Holdco - Primarily Regulated	Baa1
Wisconsin Energy Corporation	Holdco - Primarily Regulated	A2
Xcel Energy Inc.	Holdco - Primarily Regulated	A3
Alabama Gas Corporation	LDC	A2
Atmos Energy Corporation	LDC	A2
DTE Gas Company	LDC	Aa3
Laclede Gas Company	LDC	A3
New Jersey Natural Gas Company	LDC	Aa2
Northern Natural Gas Company [Private]	LDC	A2
Northwest Natural Gas Company	LDC	A3
Piedmont Natural Gas Company, Inc.	LDC	A2
South Jersey Gas Company	LDC	A2
Southern California Gas Company	LDC	A1
Southwest Gas Corporation	LDC	A3
UGI Utilities, Inc.	LDC	A2
Washington Gas Light Company	LDC	A1
Wisconsin Gas LLC [Private]	LDC	A1
Yankee Gas Services Company	LDC	Baa1
AEP Texas Central Company	T&D	Baa1
AEP Texas North Company	T&D	Baa1
Atlantic City Electric Company	T&D	Baa2

Baltimore Gas and Electric Company	T&D	A3
CenterPoint Energy Houston Electric, LLC	T&D	A3
Central Hudson Gas & Electric Corporation	T&D	A2
Central Maine Power Company	T&D	A3
Cleveland Electric Illuminating Company (The)	T&D	Baa3
Commonwealth Edison Company	T&D	Baa1
Connecticut Light and Power Company	T&D	Baa1
Consolidated Edison Company of New York, Inc.	T&D	A2
Dayton Power & Light Company	T&D	Baa3
Delmarva Power & Light Company	T&D	Baa1
Duke Energy Ohio, Inc.	T&D	Baa1
Jersey Central Power & Light Company	T&D	Baa2
Metropolitan Edison Company	T&D	Baa1
Monongahela Power Company	T&D	Baa2
New York State Electric and Gas Corporation	T&D	A3
NSTAR Electric Company	T&D	A2
Ohio Edison Company	T&D	Baa1
Ohio Power Company	T&D	Baa1
Oncor Electric Delivery Company LLC	T&D	Baa1
Orange and Rockland Utilities, Inc.	T&D	A3
PECO Energy Company	T&D	A2
Pennsylvania Electric Company	T&D	Baa2
Pennsylvania Power Company	T&D	Baa1
Potomac Edison Company (The)	T&D	Baa2
Potomac Electric Power Company	T&D	Baa1
Public Service Electric and Gas Company	T&D	A2
Rochester Gas & Electric Corporation	T&D	Baa1
Texas-New Mexico Power Company	T&D	Baa1
Toledo Edison Company	T&D	Baa3
West Penn Power Company	T&D	Baa1
Western Massachusetts Electric Company	T&D	A3
Alabama Power Company	Vertically Integrated Utility	A1
ALLETE, Inc.	Vertically Integrated Utility	A3
Appalachian Power Company	Vertically Integrated Utility	Baa1
Arizona Public Service Company	Vertically Integrated Utility	A3
Avista Corp.	Vertically Integrated Utility	Baa1
Black Hills Power, Inc.	Vertically Integrated Utility	A3
Cleco Power LLC	Vertically Integrated Utility	A3
Consumers Energy Company	Vertically Integrated Utility	A1
DTE Electric Company	Vertically Integrated Utility	A2
Duke Energy Carolinas, LLC	Vertically Integrated Utility	A1
Duke Energy Florida, Inc.	Vertically Integrated Utility	A3
Duke Energy Kentucky, Inc.	Vertically Integrated Utility	Baa1
Duke Energy Progress, Inc.	Vertically Integrated Utility	A1
El Paso Electric Company	Vertically Integrated Utility	Baa1
Empire District Electric Company (The)	Vertically Integrated Utility	Baa1
Entergy Arkansas, Inc.	Vertically Integrated Utility	Baa2
Entergy Gulf States Louisiana, LLC	Vertically Integrated Utility	Baa1
Entergy Louisiana, LLC	Vertically Integrated Utility	Baa1
Entergy Mississippi, Inc.	Vertically Integrated Utility	Baa2
Entergy New Orleans, Inc.	Vertically Integrated Utility	Ba2
Entergy Texas, Inc.	Vertically Integrated Utility	Baa3
Florida Power & Light Company	Vertically Integrated Utility	A1
Georgia Power Company	Vertically Integrated Utility	A3
Gulf Power Company	Vertically Integrated Utility	A2
Hawaiian Electric Company, Inc.	Vertically Integrated Utility	Baa1
Idaho Power Company	Vertically Integrated Utility	A3
Indiana Michigan Power Company	Vertically Integrated Utility	Baa1
Interstate Power and Light Company	Vertically Integrated Utility	A3
Kansas City Power & Light Company	Vertically Integrated Utility	Baa1
Kentucky Power Company	Vertically Integrated Utility	Baa2

Madison Gas and Electric Company	Vertically Integrated Utility	A1
MidAmerican Energy Company	Vertically Integrated Utility	A1
Mississippi Power Company	Vertically Integrated Utility	Baa1
Nevada Power Company	Vertically Integrated Utility	Baa1
Northern States Power Company (Minnesota)	Vertically Integrated Utility	A2
Northern States Power Company (Wisconsin)	Vertically Integrated Utility	A2
NorthWestern Corporation	Vertically Integrated Utility	A3
Oklahoma Gas & Electric Company	Vertically Integrated Utility	A1
Pacific Gas & Electric Company	Vertically Integrated Utility	A3
PacifiCorp	Vertically Integrated Utility	A3
Portland General Electric Company	Vertically Integrated Utility	A3
PPL Electric Utilities Corporation	Vertically Integrated Utility	Baa1
Public Service Company of Colorado	Vertically Integrated Utility	A3
Public Service Company of New Hampshire	Vertically Integrated Utility	Baa1
Public Service Company of New Mexico	Vertically Integrated Utility	Baa2
Public Service Company of Oklahoma	Vertically Integrated Utility	A3
Puget Energy, Inc.	Vertically Integrated Utility	Baa3
Puget Sound Energy, Inc.	Vertically Integrated Utility	Baa1
San Diego Gas & Electric Company	Vertically Integrated Utility	A1
Sierra Pacific Power Company	Vertically Integrated Utility	Baa1
South Carolina Electric & Gas Company	Vertically Integrated Utility	Baa2
Southern California Edison Company	Vertically Integrated Utility	A2
Southwestern Electric Power Company	Vertically Integrated Utility	Baa2
Southwestern Public Service Company	Vertically Integrated Utility	Baa1
Tampa Electric Company	Vertically Integrated Utility	A2
Tucson Electric Power Company	Vertically Integrated Utility	Baa1
Union Electric Company	Vertically Integrated Utility	Baa1
Virginia Electric and Power Company	Vertically Integrated Utility	A2
Wisconsin Electric Power Company	Vertically Integrated Utility	A1
Wisconsin Power and Light Company	Vertically Integrated Utility	A1
Wisconsin Public Service Corporation	Vertically Integrated Utility	A1

ANALYST CONTACTS

NEW YORK	212-553-1653
Mihoko Manabe *Senior Vice President* mihoko.manabe@moodys.com	212-553-1942
Michael Haggarty *Associate Managing Director* michael.haggerty@moodys.com	212-553-7172
William L. Hess *Managing Director - Utilities* william.hess@moodys.com	212-553-3837

MOODY'S
INVESTORS SERVICE

Duke CFO magazine Global Business Outlook survey - U.S. - First Quarter, 2017

On February 20, 2017 the annual yield on 10-yr treasury bonds was 2.41%. Please complete the following: (Winsorized)

	Mean	SD	95% CI	Median	Minimum	Maximum	Total
Over the next 10 years, I expect the average annual S&P 500 return will be: There is a 1-in-10 chance it will be less than:	2.0	4.0	1.6 - 2.4	2	-9.5	13.5	322
Over the next 10 years, I expect the average annual S&P 500 return will be: Expected return:	6.6	4.2	6.1 - 7.1	6	-5	21.3	327
Over the next 10 years, I expect the average annual S&P 500 return will be: There is a 1-in-10 chance it will be greater than:	9.8	5.8	9.2 - 10.4	9	-7	28.7	326
Over the next year, I expect the average annual S&P 500 return will be: There is a 1-in-10 chance it will be less than:	-0.5	7.1	-1.3 - 0.2	1	-17.3	15.5	324
Over the next year, I expect the average annual S&P 500 return will be: Expected return:	6.1	4.3	5.7 - 6.6	5	-6.1	19.2	330
Over the next year, I expect the average annual S&P 500 return will be: There is a 1-in-10 chance it will be greater than:	10.8	5.9	10.2 - 11.4	10	-2.5	25	328

ATMOS ENERGY CORP. NYSE-ATO

RECENT PRICE 77.04 | P/E RATIO 21.7 (Trailing: 21.5 Median: 16.0) | RELATIVE P/E RATIO 1.10 | DIV'D YLD 2.4% | VALUE LINE

TIMELINESS 3 Lowered 9/16/16
SAFETY 1 Raised 6/6/14
TECHNICAL 3 Raised 1/13/17
BETA .70 (1.00 = Market)

2020-22 PROJECTIONS

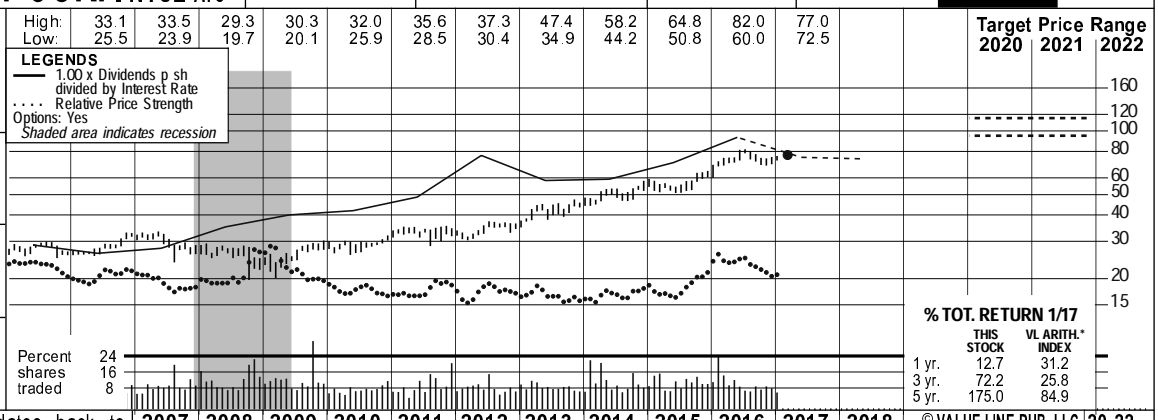
	Price	Gain	Ann'l Total Return
High	115	(+50%)	12%
Low	95	(+25%)	8%

Insider Decisions

	A	M	J	J	A	S	O	N	D
to Buy	0	0	0	0	0	0	0	0	0
Options	2	6	0	2	0	0	2	7	0
to Sell	0	1	0	0	2	0	0	0	1

Institutional Decisions

	1Q2016	2Q2016	3Q2016
to Buy	212	188	146
to Sell	142	148	168
Hld's(000)	71888	73716	74196



% TOT. RETURN 1/17

	THIS STOCK	VL ARITH.* INDEX
1 yr.	12.7	31.2
3 yr.	72.2	25.8
5 yr.	175.0	84.9

Atmos Energy's history dates back to 1906 in the Texas Panhandle. Over the years, through various mergers, it became part of Pioneer Corporation, and, in 1981, Pioneer named its gas distribution division Energas. In 1983, Pioneer organized Energas as a separate subsidiary and distributed the outstanding shares of Energas to Pioneer shareholders. Energas changed its name to Atmos in 1988. Atmos acquired Trans Louisiana Gas in 1986, Western Kentucky Gas Utility in 1987, Greeley Gas in 1993, United Cities Gas in 1997, and others.

CAPITAL STRUCTURE as of 12/31/16
Total Debt $3504.9 mill. **Due in 5 Yrs** $1530.0 mill.
LT Debt $2314.2 mill. **LT Interest** $140.0 mill.
(LT interest earned: 5.8x; total interest coverage: 5.8x)
Leases, Uncapitalized Annual rentals $17.1 mill.
Pfd Stock None
Pension Assets-9/16 $474.0 mill.
Oblig. $545.5 mill.
Common Stock 105,175,480 shs.
as of 2/3/17
MARKET CAP: $8.1 billion (Large Cap)

CURRENT POSITION ($MILL.)	2015	2016	12/31/16
Cash Assets	28.7	47.5	44.6
Other	602.3	634.2	934.8
Current Assets	631.0	681.7	979.4
Accts Payable	238.9	259.4	268.6
Debt Due	457.9	1079.8	1190.7
Other	458.0	449.1	490.5
Current Liab.	1154.8	1788.3	1949.8
Fix. Chg. Cov.	743%	768%	775%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '14-'16 to '20-'22
Revenues	-4.0%	-4.5%	2.0%
"Cash Flow"	4.5%	5.0%	4.5%
Earnings	6.0%	8.0%	6.0%
Dividends	2.5%	3.5%	6.5%
Book Value	5.0%	5.5%	3.5%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) A Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2014	1255.1	1964.3	942.7	778.8	4940.9
2015	1258.8	1540.1	686.4	656.8	4142.1
2016	906.2	1132.3	632.9	678.5	3349.9
2017	780.2	*1000*	*600*	*649.8*	*3030*
2018	*800*	*1030*	*640*	*680*	*3150*

Fiscal Year Ends	EARNINGS PER SHARE A B E Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2014	.95	1.38	.45	.23	2.96
2015	.96	1.35	.55	.23	3.09
2016	1.00	1.38	.69	.33	3.38
2017	1.08	*1.41*	*.71*	*.35*	*3.55*
2018	*1.13*	*1.46*	*.76*	*.40*	*3.75*

Cal-endar	QUARTERLY DIVIDENDS PAID C■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	.35	.35	.35	.37	1.42
2014	.37	.37	.37	.39	1.50
2015	.39	.39	.39	.42	1.59
2016	.42	.42	.42	.45	1.71
2017	.45				

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC	20-22
	66.03	79.52	53.69	53.12	48.15	38.10	42.88	49.22	40.82	32.23	*28.30*	*28.65*	Revenues per sh A	*45.85*
	4.14	4.19	4.29	4.64	4.72	4.76	5.14	5.42	5.81	6.19	*6.45*	*6.70*	"Cash Flow" per sh	*7.55*
	1.94	2.00	1.97	2.16	2.26	2.10	2.50	2.96	3.09	3.38	*3.55*	*3.75*	Earnings per sh A B	*4.50*
	1.28	1.30	1.32	1.34	1.36	1.38	1.40	1.48	1.56	1.68	*1.80*	*1.92*	Div'ds Decl'd per sh C■	*2.30*
	4.39	5.20	5.51	6.02	6.90	8.12	9.32	8.32	9.61	10.46	*11.00*	*11.35*	Cap'l Spending per sh	*12.75*
	22.01	22.60	23.52	24.16	24.98	26.14	28.47	30.74	31.48	33.32	*37.10*	*37.15*	Book Value per sh	*38.50*
	89.33	90.81	92.55	90.16	90.30	90.24	90.64	100.39	101.48	103.93	*107.00*	*110.00*	Common Shs Outst'g D	*120.00*
	15.9	13.6	12.5	13.2	14.4	15.9	15.9	16.1	17.5	20.8	*Bold figures are*		Avg Ann'l P/E Ratio	*23.5*
	.84	.82	.83	.84	.90	1.01	.89	.85	.88	1.09	*Value Line*		Relative P/E Ratio	*1.45*
	4.2%	4.8%	5.3%	4.7%	4.2%	4.1%	3.5%	3.1%	2.9%	2.4%	*estimates*		Avg Ann'l Div'd Yield	*2.2%*
	5898.4	7221.3	4969.1	4789.7	4347.6	3438.5	3886.3	4940.9	4142.1	3349.9	*3030*	*3150*	Revenues ($mill) A	*5500*
	170.5	180.3	179.7	201.2	199.3	192.2	230.7	289.8	315.1	350.1	*380*	*415*	Net Profit ($mill)	*540*
	35.8%	38.4%	34.4%	38.5%	36.4%	33.8%	38.2%	39.2%	38.3%	36.4%	*37.0%*	*37.5%*	Income Tax Rate	*40.0%*
	2.9%	2.5%	3.6%	4.2%	4.6%	5.6%	5.9%	5.9%	7.6%	10.5%	*12.5%*	*13.2%*	Net Profit Margin	*9.8%*
	52.0%	50.8%	49.9%	45.4%	49.4%	45.3%	48.8%	44.3%	43.5%	38.7%	*38.0%*	*39.0%*	Long-Term Debt Ratio	*45.0%*
	48.0%	49.2%	50.1%	54.6%	50.6%	54.7%	51.2%	55.7%	56.5%	61.3%	*62.0%*	*61.0%*	Common Equity Ratio	*55.0%*
	4092.1	4172.3	4346.2	3987.9	4461.5	4315.5	5036.1	5542.2	5650.2	5651.8	*6400*	*6700*	Total Capital ($mill)	*8400*
	3836.8	4136.9	4439.1	4793.1	5147.9	5475.6	6030.7	6725.9	7430.6	8280.5	*9000*	*9500*	Net Plant ($mill)	*11500*
	5.9%	5.9%	5.9%	6.9%	6.1%	6.1%	5.9%	6.4%	6.6%	7.2%	*7.0%*	*7.5%*	Return on Total Cap'l	*8.0%*
	8.7%	8.8%	8.3%	9.2%	8.8%	8.1%	8.9%	9.4%	9.9%	10.1%	*9.5%*	*10.0%*	Return on Shr. Equity	*11.5%*
	8.7%	8.8%	8.3%	9.2%	8.8%	8.1%	8.9%	9.4%	9.9%	10.1%	*9.5%*	*10.0%*	Return on Com Equity	*11.5%*
	3.0%	3.1%	2.7%	3.5%	3.3%	2.8%	4.0%	4.7%	4.9%	5.1%	*4.5%*	*5.0%*	Retained to Com Eq	*5.5%*
	65%	65%	68%	62%	62%	65%	56%	50%	51%	50%	*51%*	*51%*	All Div'ds to Net Prof	*51%*

BUSINESS: Atmos Energy Corporation is engaged primarily in the distribution and sale of natural gas to roughly three million customers through six regulated natural gas utility operations: Louisiana Division, West Texas Division, Mid-Tex Division, Mississippi Division, Colorado-Kansas Division, and Kentucky/Mid-States Division. Gas sales breakdown for fiscal 2016: 67%, residential; 28%, commercial; 2%, industrial; and 3% other. The company sold Atmos Energy Marketing, 1/17. Officers and directors own approximately 1.6% of common stock (12/16 Proxy). President and Chief Executive Officer: Kim R. Cocklin. Incorporated: Texas. Address: Three Lincoln Centre, Suite 1800, 5430 LBJ Freeway, Dallas, Texas 75240. Telephone: 972-934-9227. Internet: www.atmosenergy.com.

Atmos Energy began fiscal 2017 (ends September 30th) in decent shape. Particularly, first-quarter earnings per share climbed 8%, to $1.08, relative to the year-earlier total of $1.00. One contributor was the core natural gas distribution unit, which benefited from increased rates, primarily in the Mid-Tex, Louisiana, and West Texas divisions. Another positive there was customer growth across the Mid-Tex, Louisiana, and Tennessee service areas. Elsewhere, results of the pipeline and storage business were lifted by higher revenue from the Gas Reliability Infrastructure Program (GRIP) filings approved in fiscal 2016. Total operating expenses rose roughly 7% for the period, but that's to be expected as the company expands. At this point in time, full-year profits may well advance around 5%, to $3.55 a share. Regarding fiscal 2018, we think the bottom line can grow at a similar percentage rate, to $3.75 a share, assuming further expansion of operating margins.

Atmos Energy Marketing (AEM) was just sold to a subsidiary of Center-Point Energy. The deal involved the transfer of 800 delivered gas customers and AEM's related asset optimization business at an all-cash price of $38.3 million plus estimated working capital of $103.2 million. Proceeds are being used for infrastructure investment in the regulated segments. Since Atmos has now completely exited the nonregulated gas marketing business (treated as a discontinued operation for accounting purposes), its performance ought to be more stable. Note that we estimate the divestiture's impact on share net will not be substantial.

The stock, although neutrally ranked for Timeliness, has several things in its favor. For a start, long-term capital appreciation potential appears worthwhile, compared to the *Value Line* median, at the recent quotation. Moreover, the dividend is solid, and we see continued, steady hikes out to 2020-2022. Also, the payout ratio over that horizon should be in the 50% range, which is manageable. Other pluses include the 1 (Highest) Safety rank and good score for Price Stability. In all, we suggest those seeking decent, risk-adjusted long-term total return potential take a look.

Frederick L. Harris, III *March 3, 2017*

(A) Fiscal year ends Sept. 30th. (B) Diluted shrs. Excl. nonrec. items: '07, d2¢; '09, 12¢; '10, 5¢; '11, (1¢). Excludes discontinued operations: '11, 10¢; '12, 27¢; '13, 14¢; '17, 11¢.
Next egs. rpt. due early May.
(C) Dividends historically paid in early March, June, Sept., and Dec. ■ Div. reinvestment plan. Direct stock purchase plan avail.
(D) In millions.
(E) Qtrs may not add due to change in shrs outstanding.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	80
Earnings Predictability	95

CHESAPEAKE UTIL. NYSE-CPK

RECENT PRICE 66.00 | P/E RATIO 22.8 (Trailing: 24.4 Median: 15.0) | RELATIVE P/E RATIO 1.15 | DIV'D YLD 1.9% | VALUE LINE

TIMELINESS 3 Raised 2/3/17
SAFETY 2 New 6/5/15
TECHNICAL 3 Lowered 2/17/17
BETA .70 (1.00 = Market)

2020-22 PROJECTIONS

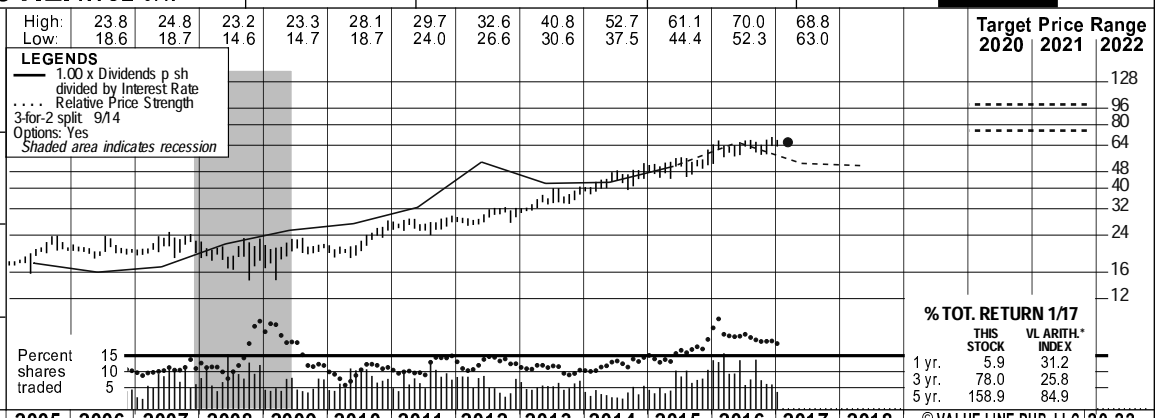
	Price	Gain	Ann'l Total Return
High	100	(+50%)	12%
Low	75	(+15%)	5%

Insider Decisions

	A	M	J	J	A	S	O	N	D
to Buy	0	0	0	0	0	0	0	0	0
Options	0	9	0	0	0	0	0	0	0
to Sell	0	0	1	0	0	1	0	0	2

Institutional Decisions

	1Q2016	2Q2016	3Q2016
to Buy	86	83	68
to Sell	66	72	74
Hld's(000)	8673	8755	9375



2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC	20-22
40.82	17.12	19.11	20.70	26.02	23.05	25.41	28.46	19.07	29.93	29.13	27.26	30.73	34.19	30.07	*28.80*	*30.30*	*31.70*	Revenues per sh	*40.00*
1.95	1.93	2.42	2.26	2.35	2.18	2.52	2.50	2.15	3.50	3.69	3.95	4.35	4.73	5.05	*4.95*	*5.40*	*5.85*	"Cash Flow" per sh	*7.50*
.83	.69	1.17	1.09	1.18	1.15	1.29	1.39	1.43	1.82	1.91	1.99	2.26	2.47	2.68	*2.75*	*2.95*	*3.15*	Earnings per sh A	*4.20*
.73	.73	.73	.75	.76	.77	.78	.81	.83	.87	.91	.96	1.01	1.07	1.12	1.19	*1.26*	*1.33*	Div'ds Decl'd per sh B■	*1.55*
3.61	1.77	1.39	2.07	3.74	4.87	3.08	3.00	1.89	3.18	3.28	5.00	6.72	6.66	9.47	*9.70*	*10.00*	*10.25*	Cap'l Spending per sh	*11.80*
8.26	8.03	8.59	9.07	9.60	11.08	11.76	12.02	14.89	15.84	16.78	17.82	19.28	20.59	23.45	*27.50*	*27.40*	*29.20*	Book Value per sh	*32.90*
8.09	8.31	8.49	8.60	8.82	10.03	10.17	10.24	14.09	14.29	14.35	14.40	14.46	14.59	15.27	*16.50*	*17.00*	*17.50*	Common Shs Outst'g C	*20.00*
15.0	18.6	12.7	15.0	16.8	17.9	16.7	14.2	14.2	12.2	14.2	14.8	15.6	17.7	19.1	*22.6*	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*20.5*
.77	1.02	.72	.79	.89	.97	.89	.85	.95	.78	.89	.94	.88	.93	.96	*1.19*			Relative P/E Ratio	*1.30*
5.8%	5.7%	4.9%	4.6%	3.8%	3.8%	3.6%	4.1%	4.1%	3.9%	3.4%	3.3%	2.9%	2.4%	2.2%	1.9%			Avg Ann'l Div'd Yield	*1.8%*
258.3	291.4	268.8	427.5	418.0	392.5	444.3	498.8	459.2	*475*	*515*	*555*	Revenues ($mill)	*800*
13.2	14.4	15.9	26.1	27.6	28.9	32.8	36.1	40.2	*43.0*	*48.0*	*53.0*	Net Profit ($mill)	*85.0*
39.4%	39.1%	41.8%	39.7%	39.4%	40.1%	40.2%	39.9%	39.5%	*40.0%*	*40.0%*	*40.0%*	Income Tax Rate	*41.5%*
5.1%	4.9%	5.9%	6.1%	6.6%	7.4%	7.4%	7.2%	8.8%	*9.1%*	*9.3%*	*9.5%*	Net Profit Margin	*10.6%*
34.6%	41.3%	32.0%	28.4%	31.4%	28.4%	29.7%	34.5%	29.4%	*25.0%*	*30.0%*	*30.0%*	Long-Term Debt Ratio	*30.0%*
65.4%	58.7%	68.0%	71.6%	68.6%	71.6%	70.3%	65.5%	70.6%	*75.0%*	*70.0%*	*70.0%*	Common Equity Ratio	*70.0%*
182.8	209.5	308.6	315.9	351.1	358.5	396.4	458.8	507.5	*605*	*665*	*730*	Total Capital ($mill)	*940*
260.4	280.7	436.4	462.8	487.7	541.8	631.2	689.8	855.0	*960*	*1060*	*1170*	Net Plant ($mill)	*1530*
8.4%	7.9%	6.1%	9.1%	8.9%	8.8%	8.8%	8.5%	8.9%	*8.0%*	*8.0%*	*8.0%*	Return on Total Cap'l	*10.0%*
11.1%	11.7%	7.6%	11.5%	11.5%	11.2%	11.8%	12.0%	11.2%	*9.5%*	*10.5%*	*10.5%*	Return on Shr. Equity	*13.0%*
11.1%	11.7%	7.6%	11.5%	11.5%	11.2%	11.8%	12.0%	11.2%	*9.5%*	*10.5%*	*10.5%*	Return on Com Equity	*13.0%*
5.2%	5.2%	3.8%	6.6%	6.6%	6.4%	7.1%	7.4%	6.8%	*5.0%*	*5.5%*	*6.0%*	Retained to Com Eq	*8.0%*
53%	55%	50%	42%	42%	43%	40%	38%	40%	*46%*	*45%*	*44%*	All Div'ds to Net Prof	*37%*

CAPITAL STRUCTURE as of 9/30/16
Total Debt $310.1 mill. **Due in 5 Yrs** $230.0 mill.
LT Debt $143.5 mill. **LT Interest** $9.0 mill.
(LT interest earned: 7.7x; total interest coverage: 7.7x) (25% of Cap'l)
Leases, Uncapitalized Annual rentals $1.3 mill.
Pfd Stock None
Pension Assets-12/15 $51.0 mill.
Oblig. $75.9 mill.
Common Stock 16,301,161 shs.
as of 10/31/16

MARKET CAP: $1.1 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2014	2015	9/30/16
Cash Assets	4.6	2.9	1.5
Other	117.8	109.6	100.7
Current Assets	122.4	112.5	102.2
Accts Payable	44.6	39.3	41.3
Debt Due	97.3	182.5	166.6
Other	52.3	57.8	55.2
Current Liab.	194.2	279.6	263.1
Fix. Chg. Cov.	865%	898%	885%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '13-'15 to '20-'22
Revenues	3.5%	4.0%	*3.5%*
"Cash Flow"	7.0%	11.5%	*7.0%*
Earnings	8.0%	10.0%	*8.0%*
Dividends	3.5%	5.0%	*5.5%*
Book Value	9.0%	8.0%	*6.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	186.3	100.5	91.6	120.4	498.8
2015	170.1	92.7	91.9	104.5	459.2
2016	146.3	102.3	108.3	*118.1*	*475*
2017	*170*	*110*	*110*	*125*	*515*
2018	*180*	*120*	*120*	*135*	*555*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	1.21	.35	.22	.69	2.47
2015	1.44	.35	.33	.56	2.68
2016	1.33	.52	.29	*.61*	*2.75*
2017	*1.41*	*.45*	*.42*	*.67*	*2.95*
2018	*1.47*	*.49*	*.47*	*.72*	*3.15*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	.243	.243	.257	.257	1.00
2014	.257	.257	.27	.27	1.05
2015	.27	.27	.288	.288	1.12
2016	.288	.288	.305	.305	1.19
2017	.305				

BUSINESS: Chesapeake Utilities Corporation consists of two units: Regulated Energy and Unregulated Energy. The Regulated Energy segment (65% of 2015 revenues) distributes natural gas in Delaware, Maryland, and Florida; distributes electricity in Florida; and transmits natural gas on the Delmarva Peninsula and in Florida. The Unregulated Energy operation (35% of 2015 revenues) wholesales and distributes propane; markets natural gas; and provides other unregulated energy services, including midstream services in Ohio. Officers and directors own 5.4% of common stock; T. Rowe Price, 8.3; BlackRock, 5.8% (3/16 Proxy). CEO: Michael P. McMasters. Inc.: Delaware. Address: 909 Silver Lake Boulevard, Dover, DE 19904. Tel.: (302) 734-6799. Internet: www.chpk.com.

***Value Line* looks for a stronger profit advance for Chesapeake Utilities in 2017.** That should be made possible partially by incremental benefits from the April, 2015 acquisition of Aspire Energy. Another plus is new projects, which include Eight Flags' CHP plant; continued natural gas infrastructure improvement initiatives; and additional expansions of the company's natural gas distribution and transmission systems. Generally favorable weather conditions would help, too. As a result, share net may well rise around 7%, to $2.95, relative to our anticipated 2016 tally of $2.75. (Please be aware that fourth-quarter earnings were expected to be released when we went to press.) Assuming further widening of operating margins, we think the bottom line can increase at a similar percentage rate, to $3.15 a share, in 2018.

The Financial Strength rating is decent, at B++. Through the first nine months of 2016, cash and equivalents stood at $1.5 million. Meanwhile, long-term debt was only 25% of total capital, and short-term commitments did not seem to pose a major obstacle. Also, Chesapeake possessed four unsecured bank credit facilities totaling $170 million. Lastly, it is able to issue more equity and debt, if the need arises. All things considered, *Value Line* believes the Delaware-headquartered firm is positioned to meet, for the time being, its capital requirements, such as investments in new plants and equipment and dividends.

Our 2020-2022 projections indicate that steady dividend hikes will take place. Too, the payout ratio over that span should be in the 35% to 40% range, which is reasonable. It's worth mentioning, however, that the current yield is not spectacular, when stacked against the other nine equities within our Natural Gas Utility Industry.

The stock has some notable characteristics. It holds a 2 (Above Average) rating for Safety. Furthermore, the Beta coefficient lies below the market average and the Price Stability score is relatively high, at 80 out of 100. Meanwhile, these shares' Timeliness rank now sits at 3 (Average), up one notch since our last full-page report in December.

Frederick L. Harris, III *March 3, 2017*

(A) Diluted shrs. Excludes nonrecurring items: '02, d23¢; '08, d7¢; '15, 6¢. Excludes discontinued operations: '03, d9¢; '04, d1¢. Next earnings report due early May.

(B) Dividends historically paid in early January, April, July, and October. ■ Dividend reinvestment plan. Direct stock purchase plan available.

(C) In millions, adjusted for split.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	90
Earnings Predictability	95

NISOURCE INC. NYSE-NI

RECENT PRICE 22.99 | P/E RATIO 22.5 (Trailing: 25.0 Median: 19.0) | RELATIVE P/E RATIO 1.14 | DIV'D YLD 3.0% | VALUE LINE

TIMELINESS – [F] Suspended 6/5/15
SAFETY 3 New 9/4/15
TECHNICAL – [F] Suspended 6/5/15
BETA NMF (1.00 = Market)

2020-22 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	30	(+30%)	*10%*
Low	19	(-15%)	*Nil*

Insider Decisions

	A	M	J	J	A	S	O	N	D
to Buy	0	0	0	0	0	0	0	0	0
Options	0	9	0	0	0	0	0	0	0
to Sell	0	0	0	0	0	1	0	0	0

Institutional Decisions

	1Q2016	2Q2016	3Q2016
to Buy	219	226	214
to Sell	165	181	188
Hld's(000)	264916	265637	261701

	High:	24.8	25.4	19.8	15.8	18.0	24.0	26.2	33.5	44.9	49.2	26.9	23.0
	Low:	19.5	17.5	10.4	7.8	14.1	17.7	22.3	24.8	32.1	16.0	19.0	21.7

LEGENDS
— 1.20 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2020 | 2021 | 2022

Percent shares traded 30 20 10

% TOT. RETURN 1/17

	THIS STOCK	VL ARITH.* INDEX
1 yr.	9.5	31.2
3 yr.	-29.2	25.8
5 yr.	13.8	84.9

NiSource acquired Columbia Energy on November 1, 2000, paying approximately $6 billion in cash and stock. Columbia shareholders who chose cash received $70 a share, plus a security with a face value of $2.60. Those who chose stock received $74 a share in NiSource common stock. Shareholders' selections were prorated to reflect a 30% stock portion of the transaction. In 2003, NiSource sold Columbia's exploration and production business.

CAPITAL STRUCTURE as of 12/31/16
Total Debt $7909.3 mill. **Due in 5 Yrs** $2598.8 mill.
LT Debt $6058.2 mill. **LT Interest** $450 mill.
(Interest cov. earned: 2.5x) (66% of Cap'l)

Leases, Uncapitalized Annual rentals $15.4 mill.
Pension Assets-12/16 $1.75 bill. **Oblig.** $2.22 bill.

Pfd Stock None

Common Stock 323,445,821 shs.
as of 2/14/16
MARKET CAP: $7.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2014	2015	12/31/16
Cash Assets	25.4	15.5	26.4
Other	2441.1	1561.7	1735.7
Current Assets	2466.5	1577.2	1762.1
Accts Payable	670.6	433.4	539.4
Debt Due	1843.5	1001.1	1851.1
Other	1440.8	1223.0	1061.7
Current Liab.	3954.9	2657.5	3452.2
Fix. Chg. Cov.	274%	210%	245%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '13-'15 to '20-'22
Revenues	-3.5%	-7.5%	*1.0%*
"Cash Flow"	-1.0%	-0.5%	*1.5%*
Earnings	-1.0%	3.5%	*2.0%*
Dividends	-0.5%	0.5%	*1.0%*
Book Value	-0.5%	-1.0%	*-4.0%*

Calendar	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC	20-22
	28.96	32.36	24.02	22.99	21.33	16.31	18.04	20.47	14.58	*13.91*	*16.15*	*16.90*	Revenues per sh	*18.95*
	3.20	3.32	2.96	3.19	2.98	3.13	3.41	3.60	2.27	*2.71*	*2.95*	*3.10*	"Cash Flow" per sh	*3.40*
	1.14	1.34	.84	1.06	1.05	1.37	1.57	1.67	.63	1.01	*1.15*	*1.25*	Earnings per sh [A]	*1.50*
	.92	.92	.92	.92	.92	.94	.98	1.02	.83	.64	*.70*	*.74*	Div'd Decl'd per sh [B] ■	*1.00*
	2.88	3.54	2.81	2.88	3.99	4.83	5.99	6.42	4.26	*4.57*	*4.60*	*4.90*	Cap'l Spending per sh	*5.45*
	18.52	17.24	17.54	17.63	17.71	17.90	18.77	19.54	12.04	*12.60*	*12.35*	*12.80*	Book Value per sh [C]	*12.75*
	274.18	274.26	276.79	279.30	282.18	310.28	313.68	316.04	319.11	*323.00*	*325.00*	*325.00*	Common Shs Outst'g [D]	*330.00*
	18.8	12.1	14.3	15.3	19.4	17.9	18.9	22.7	37.3	23.0	*Bold figures are*		Avg Ann'l P/E Ratio	*16.0*
	1.00	.73	.95	.97	1.22	1.14	1.06	1.19	1.88	1.20	*Value Line*		Relative P/E Ratio	*1.00*
	4.3%	5.7%	7.6%	5.7%	4.5%	3.8%	3.3%	2.7%	3.5%	2.8%	*estimates*		Avg Ann'l Div'd Yield	*4.2%*
	7939.8	8874.2	6649.4	6422.0	6019.1	5061.2	5657.3	6470.6	4651.8	4492.5	*5250*	*5500*	Revenues ($mill)	*6250*
	312.0	369.8	231.2	294.6	303.8	410.6	490.9	530.7	198.6	328.1	*375*	*405*	Net Profit ($mill)	*495*
	35.6%	33.4%	41.8%	32.4%	35.0%	34.4%	34.8%	36.9%	41.6%	35.7%	*35.5%*	*34.0%*	Income Tax Rate	*34.0%*
	6.6%	--	--	--	--	--	--	--	2.9%	*2.0%*	*2.0%*	*2.0%*	AFUDC % to Net Profit	*2.0%*
	52.4%	55.7%	55.1%	54.7%	55.6%	55.1%	56.3%	56.9%	60.7%	59.8%	*62.5%*	*63.0%*	Long-Term Debt Ratio	*66.0%*
	47.6%	44.3%	44.9%	45.3%	44.4%	44.9%	43.7%	43.1%	39.3%	30.2%	*37.5%*	*37.0%*	Common Equity Ratio	*34.0%*
	10671	10673	10819	10859	11264	12373	13480	14331	9792.0	10129.4	*10775*	*11240*	Total Capital ($mill)	*12405*
	10032	10276	10592	11097	11800	12916	14365	16017	12112	13068	*13100*	*13625*	Net Plant ($mill)	*15030*
	4.6%	5.2%	4.0%	4.5%	4.4%	5.0%	5.2%	5.3%	4.0%	3.2%	*5.5%*	*5.5%*	Return on Total Cap'l	*5.5%*
	6.1%	7.8%	4.8%	6.0%	6.1%	7.4%	8.3%	8.6%	5.2%	8.1%	*9.5%*	*10.0%*	Return on Shr. Equity	*12.0%*
	6.1%	7.8%	4.8%	6.0%	6.1%	7.4%	8.3%	8.6%	5.2%	8.1%	*9.5%*	*10.0%*	Return on Com Equity	*12.0%*
	1.2%	2.5%	NMF	.8%	.9%	2.5%	3.1%	3.4%	NMF	3.0%	*3.5%*	*4.0%*	Retained to Com Eq	*4.0%*
	81%	68%	110%	87%	85%	67%	62%	61%	NMF	63%	*61%*	*59%*	All Div'ds to Net Prof	*66%*

BUSINESS: NiSource Inc. is a holding company for Northern Indiana Public Service Company (NIPSCO), which supplies electricity and gas to the northern third of Indiana. Customers: 461,000 electric in Indiana, 3.4 million gas in Indiana, Ohio, Pennsylvania, Kentucky, Virginia, Maryland, Massachusetts through its Columbia subsidiaries. Revenue breakdown, 2015: electrical, 34%; gas, 66%; other, less than 1%. Generating sources, 2015: coal, 77.3%; purchased & other, 22.7%. 2015 reported depreciation rates: 3.0% electric, 1.8% gas. Has 7,596 employees. Chairman: Ian M. Rolland. President & Chief Executive Officer: Robert C. Skaggs, Jr. Incorporated: Indiana. Address: 801 East 86th Ave., Merrillville, Indiana 46410. Telephone: 877-647-5990. Internet: www.nisource.com.

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	2320.5	1335.1	1123.9	1691.1	6470.6
2015	1852.2	884.6	817.2	1097.8	4651.8
2016	1436.6	897.6	861.3	1297.0	4492.5
2017	*1750*	*950*	*950*	*1600*	*5250*
2018	*1850*	*1000*	*950*	*1700*	*5500*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	.85	.25	.10	.49	1.67
2015	.61	d.23	.05	.20	.63
2016	.58	.09	.07	.27	1.01
2017	*.55*	*.10*	*.10*	*.40*	*1.15*
2018	*.60*	*.10*	*.10*	*.45*	*1.25*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2012	.23	.23	.24	.24	.94
2013	.24	.24	.25	.25	.98
2014	.25	.25	.26	.26	1.02
2015	.26	.26	.155	.155	.83
2016	.155	.155	.165	.165	.64
2017	.175				

NiSource had decent fourth-quarter results. Revenues expanded to $1.297 billion, thanks to better rates cases across the company's coverage area, and improved infrastructure spending. Indeed, better rates were settled in Kentucky, while an interim rate was hiked in Virginia. Too, NiSource had several jurisdictions awaiting approvals for higher rates. Cooler weather across the midwestern states boosted consumption of natural gas, as well. However, an increase in maintenance and other operating expenses offset some of the gross profit expansion. Lower interest costs, due to earlier debt repayments, were a help, though. In all, earnings per share rose 35% to $0.27, year over year.

The company should benefit from infrastructure spending in the years ahead. New electric rates were enacted in Indiana, while NIPSCO submitted its resource plan for approval. This would allow for higher recoverable revenues, if approved. Too, the company ought to benefit from its system modernization efforts, which should allow it to invest $800 million on its improvement efforts over the next several years, while population growth in the coverage area should boost revenues. Profits ought to benefit significantly from the expected top-line expansion. Interest-rate increases could be a headwind, however, as several rate hikes are expected over the course of 2017, and possibly thereafter. Together with the extra debt load taken on to fund capital expenditures, this could cause a considerable increase in interest-related expense. Still, we think that the company will be able to earn $1.15 a share in 2017, and $1.50 by the end of the decade.

Shares of NiSource may appeal to income-seeking accounts. The dividend yield is above average and remains well covered by earnings. These shares offer little in terms of long-term appreciation potential, and are trading at an elevated price-to-earnings ratio when compared to others in the *Survey.* Thus, most long-term accounts would be best served waiting for a dip in price before making new equity commitments. Note that the Timeliness rank remains suspended due to the spinoff of its pipeline business in 2015.

John E. Seibert III *March 3, 2017*

(A) Dil. EPS. Excl. nonrec. gains (losses): '05, (4¢); gains (losses) on disc. ops.: '05, 10¢; '06, (11¢); '07, 3¢; '08, ($1.14); '15, (30¢). Next egs. report due late April. Qtl'y egs. may not sum to total due to rounding.
(B) Div'ds historically paid in mid-Feb., May, Aug., Nov. ■ Div'd reinv. avail.
(C) Incl. intang in '15: $1944.4 million, $6.08/sh.
(D) In mill.
(E) Spun off Columbia Pipeline Group (7/15)
(F) Suspended due to spinoff of CPGX

Company's Financial Strength	B+
Stock's Price Stability	NMF
Price Growth Persistence	NMF
Earnings Predictability	NMF

NEW JERSEY RES. NYSE-NJR

RECENT PRICE 38.45 | P/E RATIO 24.8 (Trailing: 25.8 Median: 16.0) | RELATIVE P/E RATIO 1.25 | DIV'D YLD 2.7% | VALUE LINE

TIMELINESS 3 Lowered 10/28/16
SAFETY 1 Raised 9/15/06
TECHNICAL 4 Lowered 2/24/17
BETA .80 (1.00 = Market)

2020-22 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	35	(-10%)	1%
Low	25	(-35%)	-6%

Insider Decisions

	A	M	J	J	A	S	O	N	D
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	2	9	0
to Sell	0	1	0	0	0	0	0	0	2

Institutional Decisions

	1Q2016	2Q2016	3Q2016
to Buy	114	103	113
to Sell	114	107	89
Hld's(000)	51216	52551	52658

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC	20-22
High:	17.7	18.8	20.6	21.2	22.0	25.2	25.1	23.8	32.1	34.1	38.9	38.6								
Low:	13.8	15.2	12.3	15.0	16.7	19.8	19.3	19.5	21.9	26.8	30.5	33.7								
	25.61	22.06	31.14	30.44	38.10	39.81	36.31	45.37	31.17	32.05	36.30	27.08	38.38	44.40	32.09	21.90	*27.05*	*28.15*	Revenues per sh [A]	*30.75*
	1.06	1.07	1.19	1.25	1.31	1.37	1.22	1.81	1.58	1.63	1.70	1.86	1.93	2.73	2.52	2.46	*2.30*	*2.55*	"Cash Flow" per sh	*3.00*
	.65	.70	.79	.85	.88	.93	.78	1.35	1.20	1.23	1.29	1.36	1.37	2.08	1.78	1.61	*1.55*	*1.75*	Earnings per sh [B]	*2.15*
	.39	.40	.41	.43	.45	.48	.51	.56	.62	.68	.72	.77	.81	.86	.93	.98	*1.02*	*1.04*	Div'ds Decl'd per sh [C] ■	*1.12*
	.55	.51	.57	.72	.64	.64	.73	.86	.90	1.05	1.13	1.26	1.33	1.52	3.76	2.05	*2.15*	*2.20*	Cap'l Spending per sh	*2.40*
	4.40	4.35	5.13	5.62	5.30	7.50	7.75	8.64	8.29	8.81	9.36	9.80	10.65	11.48	12.99	13.58	*14.35*	*14.90*	Book Value per sh [D]	*17.80*
	79.99	83.00	81.70	83.22	82.64	82.88	83.22	84.12	83.17	82.35	82.89	83.05	83.32	84.20	85.19	85.88	*86.00*	*86.00*	Common Shs Outst'g [E]	*86.00*
	14.2	14.7	14.0	15.3	16.8	16.1	21.6	12.3	14.9	15.0	16.8	16.8	16.0	11.7	16.6	*21.3*	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*14.0*
	.73	.80	.80	.81	.89	.87	1.15	.74	.99	.95	1.05	1.07	.90	.62	.84	*1.17*			Relative P/E Ratio	*.90*
	4.2%	3.9%	3.7%	3.3%	3.1%	3.2%	3.0%	3.3%	3.5%	3.7%	3.3%	3.4%	3.7%	3.5%	3.1%	*2.9%*			Avg Ann'l Div'd Yield	*3.7%*
	3021.8	3816.2	2592.5	2639.3	3009.2	2248.9	3198.1	3738.1	2734.0	1880.9	*2325*	*2420*							Revenues ($mill) [A]	*2645*
	65.3	113.9	101.0	101.8	106.5	112.4	113.7	176.9	153.7	138.1	*135*	*150*							Net Profit ($mill)	*185*
	38.8%	37.8%	27.1%	41.4%	30.2%	7.1%	25.4%	30.2%	26.3%	*32.0%*	*32.0%*	*32.0%*							Income Tax Rate	*32.0%*
	2.2%	3.0%	3.9%	3.9%	3.5%	5.0%	3.6%	4.7%	5.6%	7.3%	*5.8%*	*7.0%*							Net Profit Margin	*7.0%*
	37.3%	38.5%	39.8%	37.2%	35.5%	39.2%	36.6%	38.2%	43.2%	47.7%	*47.0%*	*46.0%*							Long-Term Debt Ratio	*43.5%*
	62.7%	61.5%	60.2%	62.8%	64.5%	60.8%	63.4%	61.8%	56.8%	52.3%	*53.0%*	*54.0%*							Common Equity Ratio	*56.5%*
	1028.0	1182.1	1144.8	1154.4	1203.1	1339.0	1400.3	1564.4	1950.6	2230.1	*2290*	*2380*							Total Capital ($mill)	*2705*
	970.9	1017.3	1064.4	1135.7	1295.9	1484.9	1643.1	1884.1	2128.3	2407.7	*2455*	*2505*							Net Plant ($mill)	*2660*
	7.7%	10.7%	9.7%	9.7%	9.7%	9.2%	9.0%	12.1%	8.6%	6.9%	*7.0%*	*7.5%*							Return on Total Cap'l	*8.0%*
	10.1%	15.7%	14.6%	14.0%	13.7%	13.8%	12.8%	18.3%	13.9%	*11.8%*	*11.0%*	*12.0%*							Return on Shr. Equity	*12.0%*
	10.1%	15.7%	14.6%	14.0%	13.7%	13.8%	12.8%	18.3%	13.9%	11.8%	*11.0%*	*12.0%*							Return on Com Equity	*12.0%*
	3.6%	9.5%	7.2%	6.7%	6.2%	6.2%	5.2%	11.0%	7.0%	4.8%	*4.0%*	*5.0%*							Retained to Com Eq	*6.0%*
	64%	40%	50%	52%	55%	55%	59%	40%	50%	60%	*65%*	*59%*							All Div'ds to Net Prof	*52%*

LEGENDS
1.00 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
3-for-2 split 3/08
2-for-1 split 3/15
Options: Yes
Shaded area indicates recession

Target Price Range 2020 | 2021 | 2022

% TOT. RETURN 1/17

	THIS STOCK	VL ARITH.* INDEX
1 yr.	10.1	31.2
3 yr.	81.6	25.8
5 yr.	86.6	84.9

CAPITAL STRUCTURE as of 12/31/16
Total Debt $1408.1 mill. **Due in 5 Yrs** $360.8 mill.
LT Debt $1026.7 mill. **LT Interest** $31.0 mill.
Incl. $46.9 mill. capitalized leases.
(LT interest earned: 7.5x; total interest coverage: 7.5x)
Pension Assets-9/16 $311.9 mill. **Oblig.** $454.1 mill.
Pfd Stock None

Common Stock 86,313,212 shs.
as of 2/6/17
MARKET CAP: $3.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2015	2016	12/31/16
Cash Assets	4.9	37.5	46.9
Other	539.6	569.8	768.2
Current Assets	544.5	607.3	815.1
Accts Payable	273.2	269.8	283.1
Debt Due	77.5	183.2	381.4
Other	85.4	118.6	158.4
Current Liab.	436.1	571.6	822.9
Fix. Chg. Cov.	750%	750%	750%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '13-'15 to '20-'22
Revenues	1.5%	1.0%	*-1.0%*
"Cash Flow"	6.5%	7.5%	*3.0%*
Earnings	7.5%	6.5%	*2.5%*
Dividends	7.0%	7.0%	*3.5%*
Book Value	8.0%	6.5%	*6.0%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2014	878.4	1579.6	688.3	591.9	3738.1
2015	824.1	1013.1	458.5	438.3	2734.0
2016	444.3	574.2	393.2	469.2	1880.9
2017	541.0	*685*	*510*	*589*	*2325*
2018	*565*	*710*	*535*	*610*	*2420*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2014	.47	1.79	.05	d.23	2.08
2015	.65	1.16	.03	d.06	1.78
2016	.58	.91	.13	d.02	1.61
2017	.40	*.95*	*.17*	*.03*	*1.55*
2018	*.45*	*1.00*	*.22*	*.08*	*1.75*

Cal-endar	QUARTERLY DIVIDENDS PAID [C] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	--	.20	.20	.20	.60
2014	.21	.21	.21	.23	.86
2015	.23	.23	.23	.24	.93
2016	.24	.24	.24	.255	.98
2017	.255				

BUSINESS: New Jersey Resources Corp. is a holding company providing retail/wholesale energy svcs. to customers in New Jersey, and in states from the Gulf Coast to New England, and Canada. New Jersey Natural Gas had about 521,200 customers at 9/30/16 in Monmouth and Ocean and other N.J. counties. Fiscal 2016 volume: 337 bill. cu. ft. (18% interruptible, 17% residential and commercial and electric utility, 65% incentive programs). N.J. Natural Energy subsidiary provides unregulated retail/wholesale natural gas and related energy svcs. 2016 dep. rate: 2.6%. Has 1,034 empls. Off./dir. own about 1.5% of common (12/16 Proxy). Chrmn., CEO & Pres.: Laurence M. Downes. Inc.: NJ Addr.: 1415 Wyckoff Road, Wall, NJ 07719. Tel.: 732-938-1480. Web: www.njresources.com.

Since our December review, shares of New Jersey Resources have advanced nicely. Indeed, the stock's price climbed approximately 15.0% over that time frame. In comparison, the S&P 500 ticked a more modest 7.5% higher.

Meanwhile, the company registered mixed results for the fiscal first quarter (ended December 31, 2016). On the upside, NJR's top line increased almost 22%, thanks to similar upticks in both utility and nonutility volumes. This was bolstered by additional customer accounts at the New Jersey Natural Gas (NJNG) regulated utility division. In fact, that unit added 1,866 new customers in the first quarter of this year. At the same time, completed capital expansion projects are helping to drive the NJR Midstream and Clean Energy Venture segments. On the profitability front, overall operating expenses increased 570 basis points as a percentage of the top line. As a result of the margin compression the bottom line declined more than 30%, to $0.40 a share. This was below our earlier call of $0.60 a share.

Consequently, we have reduced our fiscal 2017 earnings outlook to $1.55 a share. This would equate to an annual profit downturn of roughly 3.5%. The primary factors driving the lower-than-expected results are overruns for gas expenses on both the utility and nonutility arms, as well as higher operation & maintenance, regulatory, and depreciation costs.

We have introduced our fiscal 2018 top and bottom lines at $2.42 billion and $1.75 a share, respectively. Management anticipates 24,000 to 27,000 new customer accounts to hit the books between 2017 and 2019. At the same time, recently completed capital projects like the new Ringer Hill Wind Farm, which should generate almost 40 megawatts of power, and the PennEast Pipeline, which is still in the works and is anticipated to be in service in the first quarter of 2019, augur well for prospects.

At this juncture, these neutrally ranked shares are not overly compelling. NJR lacks long-term upside potential based on our projections. And the dividend yield is only average for a utility.

Bryan J. Fong *March 3, 2017*

(A) Fiscal year ends Sept. 30th.
(B) Diluted earnings. Qtly egs may not sum to total due to change in shares outstanding. Next earnings report due late April.
(C) Dividends historically paid in early Jan., April, July, and October. 1Q '13 div'd paid in 4Q '12. ■ Dividend reinvestment plan available.
(D) Includes regulatory assets in 2016: $441.3 million, $5.13/share.
(E) In millions, adjusted for splits.

Company's Financial Strength	A+
Stock's Price Stability	80
Price Growth Persistence	55
Earnings Predictability	55

N.W. NAT'L GAS NYSE-NWN

RECENT PRICE 59.80 | P/E RATIO 26.7 (Trailing: 27.3 Median: 18.0) | RELATIVE P/E RATIO 1.35 | DIV'D YLD 3.1% | VALUE LINE

TIMELINESS 2 Raised 1/6/17
SAFETY 1 Raised 3/18/05
TECHNICAL 3 Lowered 12/23/16
BETA .65 (1.00 = Market)

2020-22 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	60	(Nil)	3%
Low	50	(-15%)	-1%

Insider Decisions

	A	M	J	J	A	S	O	N	D
to Buy	0	0	0	0	0	0	0	0	0
Options	0	4	6	1	0	0	0	0	0
to Sell	0	2	7	1	0	0	0	0	0

Institutional Decisions

	1Q2016	2Q2016	3Q2016
to Buy	98	118	93
to Sell	65	80	90
Hld's(000)	15946	16937	16984

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC	20-22
High:	43.7	52.8	55.2	46.5	50.9	49.0	50.8	46.6	52.6	52.3	66.2	60.7								
Low:	32.8	39.8	37.7	37.7	41.1	39.6	41.0	40.0	40.1	42.0	48.9	57.1								
	25.78	25.07	23.57	25.69	33.01	37.20	39.13	39.16	38.17	30.56	31.72	27.14	28.02	27.64	26.39	*23.45*	*25.15*	*26.00*	Revenues per sh	*29.65*
	3.86	3.65	3.85	3.92	4.34	4.76	5.41	5.31	5.20	5.18	5.00	4.94	5.04	5.05	4.91	*4.50*	*4.85*	*5.10*	"Cash Flow" per sh	*6.10*
	1.88	1.62	1.76	1.86	2.11	2.35	2.76	2.57	2.83	2.73	2.39	2.22	2.24	2.16	1.96	*2.15*	*2.35*	*2.50*	Earnings per sh A	*3.15*
	1.25	1.26	1.27	1.30	1.32	1.39	1.44	1.52	1.60	1.68	1.75	1.79	1.83	1.85	1.86	1.87	*1.88*	*1.92*	Div'ds Decl'd per sh B■	*2.05*
	3.23	3.11	4.90	5.52	3.48	3.56	4.48	3.92	5.09	9.35	3.76	4.91	5.13	4.40	4.37	*4.48*	*6.20*	*6.35*	Cap'l Spending per sh	*6.35*
	18.56	18.88	19.52	20.64	21.28	22.01	22.52	23.71	24.88	26.08	26.70	27.23	27.77	28.12	28.47	*27.40*	*28.45*	*28.70*	Book Value per sh D	*31.75*
	25.23	25.59	25.94	27.55	27.58	27.24	26.41	26.50	26.53	26.58	26.76	26.92	27.08	27.28	27.43	*29.00*	*29.00*	*30.00*	Common Shs Outst'g C	*30.00*
	12.9	17.2	15.8	16.7	17.0	15.9	16.7	18.1	15.2	17.0	19.0	21.1	19.4	20.7	23.7	*26.5*			Avg Ann'l P/E Ratio	*17.0*
	.66	.94	.90	.88	.91	.86	.89	1.09	1.01	1.08	1.19	1.34	1.09	1.09	1.19	*1.33*			Relative P/E Ratio	*1.05*
	5.1%	4.5%	4.6%	4.2%	3.7%	3.7%	3.1%	3.3%	3.7%	3.6%	3.9%	3.8%	4.2%	4.1%	4.0%	3.3%			Avg Ann'l Div'd Yield	*3.8%*
	1033.2	1037.9	1012.7	812.1	848.8	730.6	758.5	754.0	723.8	*680*	*730*	*780*	Revenues ($mill)	*890*
	74.5	68.5	75.1	72.7	63.9	59.9	60.5	58.7	53.7	*62.5*	*68.0*	*78.0*	Net Profit ($mill)	*95.0*
	37.2%	36.9%	38.3%	40.5%	40.4%	42.4%	40.8%	41.5%	40.0%	*35.2%*	*35.0%*	*35.0%*	Income Tax Rate	*35.0%*
	7.2%	6.6%	7.4%	8.9%	7.5%	8.2%	8.0%	7.8%	7.4%	*9.2%*	*9.3%*	*9.6%*	Net Profit Margin	*10.6%*
	46.3%	44.9%	47.7%	46.1%	47.3%	48.5%	47.6%	44.8%	42.5%	*43.0%*	*43.0%*	*43.0%*	Long-Term Debt Ratio	*43.0%*
	53.7%	55.1%	52.3%	53.9%	52.7%	51.5%	52.4%	55.2%	57.5%	*57.0%*	*57.0%*	*57.0%*	Common Equity Ratio	*57.0%*
	1106.8	1140.4	1261.8	1284.8	1356.2	1424.7	1433.6	1389.0	1357.7	*1390*	*1445*	*1500*	Total Capital ($mill)	*1660*
	1495.9	1549.1	1670.1	1854.2	1893.9	1973.6	2062.9	2121.6	2182.7	*2270*	*2360*	*2455*	Net Plant ($mill)	*2760*
	8.5%	7.7%	7.3%	7.0%	6.2%	5.7%	5.8%	5.8%	5.5%	*5.5%*	*6.0%*	*6.0%*	Return on Total Cap'l	*7.0%*
	12.5%	10.9%	11.4%	10.5%	8.9%	8.2%	8.1%	7.6%	6.9%	*8.0%*	*8.0%*	*8.5%*	Return on Shr. Equity	*10.0%*
	12.5%	10.9%	11.4%	10.5%	8.9%	8.2%	8.1%	7.6%	6.9%	*8.0%*	*8.0%*	*8.5%*	Return on Com Equity	*10.0%*
	6.0%	4.5%	5.0%	4.0%	2.4%	1.6%	1.5%	1.1%	.6%	*1.0%*	*1.5%*	*2.0%*	Retained to Com Eq	*3.5%*
	52%	59%	56%	61%	73%	80%	81%	85%	92%	*87%*	*80%*	*77%*	All Div'ds to Net Prof	*65%*

Bold figures are Value Line estimates

% TOT. RETURN 1/17

	THIS STOCK	VL ARITH.* INDEX
1 yr.	17.1	31.2
3 yr.	58.5	25.8
5 yr.	48.6	84.9

Target Price Range 2020 | 2021 | 2022: 120, 100, 80, 64, 48, 32, 24, 20, 16, 12, 8

LEGENDS
1.10 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
Options: Yes
Shaded area indicates recession

Percent shares traded: 15, 10, 5

CAPITAL STRUCTURE as of 9/30/16
Total Debt $790.1 mill. **Due in 5 Yrs** $360.0 mill.
LT Debt $530.2 mill. **LT Interest** $45.0 mill.

(Total interest coverage: 3.5x)

Pension Assets-12/15 $249.4 mill.
Oblig. $445.6 mill.

Pfd Stock None

Common Stock 27,557,756 shares
as of 10/21/16

MARKET CAP $1.6 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2014	2015	9/30/16
Cash Assets	9.5	4.2	6.2
Other	353.1	327.9	204.4
Current Assets	362.6	332.1	210.6
Accts Payable	91.4	73.2	55.9
Debt Due	274.7	295.0	259.9
Other	103.3	109.5	86.9
Current Liab.	469.4	477.7	402.7
Fix. Chg. Cov.	321%	300%	350%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '13-'15 to '20-'22
Revenues	- -	-5.5%	*1.0%*
"Cash Flow"	2.0%	-1.0%	*3.0%*
Earnings	1.0%	-5.0%	*6.0%*
Dividends	3.5%	3.0%	*1.5%*
Book Value	3.0%	2.5%	*1.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	293.4	133.1	87.2	240.3	754.0
2015	261.7	138.3	93.1	230.7	723.8
2016	255.5	99.2	87.7	*237.6*	*680*
2017	*255*	*130*	*95.0*	*250*	*730*
2018	*275*	*140*	*105*	*260*	*780*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	1.40	.04	d.32	1.04	2.16
2015	1.04	.08	d.24	1.08	1.96
2016	1.33	.07	d.29	*1.04*	*2.15*
2017	*1.35*	*.10*	*d.25*	*1.15*	*2.35*
2018	*1.40*	*.10*	*d.20*	*1.20*	*2.50*

Calendar	QUARTERLY DIVIDENDS PAID B ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	.455	.455	.455	.460	1.83
2014	.460	.460	.460	.465	1.85
2015	.465	.465	.465	.4675	1.86
2016	.4675	.4675	.4675	.470	1.87
2017	.470				

BUSINESS: Northwest Natural Gas Co. distributes natural gas to 90 communities, 704,000 customers, in Oregon (89% of customers) and in southwest Washington state. Principal cities served: Portland and Eugene, OR; Vancouver, WA. Service area population: 2.5 mill. (77% in OR). Company buys gas supply from Canadian and U.S. producers; has transportation rights on Northwest Pipeline system. Owns local underground storage. Rev. breakdown: residential, 35%; commercial, 22%; industrial, gas transportation, and other, 43%. Employs 1,092. BlackRock Inc. owns 10.0% of shares; officers and directors, 2.1% (4/16 proxy). CEO: Gregg S. Kantor. Inc.: Oregon. Address: 220 NW 2nd Ave., Portland, OR 97209. Telephone: 503-226-4211. Internet: www.nwnatural.com.

Northwest Natural Gas likely reported mixed year-end results. Note that earnings were to be reported after our press date. The company probably benefited from cooler temperatures than the in the prior year. Too, a higher net customer base likely allowed revenues to increase during the quarter. However, earnings per share likely fell, hurt by higher interest expense and an increased share count. Still, we think full-year profits improved.

The company should benefit from a few near-term factors. Growth in the Portland area population is expanding the customer base, while new housing construction remains robust. Also, usage of natural gas for other household tasks, including water heating, should help to further lift revenues. Combined, these elements ought to push earnings upward in 2017, to $2.35 a share.

Longer-term results should be boosted by the Mist Expansion plant. The company has taken a few steps to finance the project, including the sale of $150 million worth of medium- and long-term notes. It sold 1.012 million shares, helping to raise the equity portion of the early financing. This project is currently expected to cost $128 million, and ought to generate sales of 120 million cubic feet of natural gas per day. The expanded plant is expected to be in service by the 2018-2019 winter season, and stands to add nicely to the top line. Over the long haul, we expect earnings per share can reach $3.15 by the 2020-2022 period.

The dividend remains the top draw. The yield is above the *Value Line* median and remains well covered by earnings. Too, the company has raised the payout annually over the past 61 years, and appears likely to continue this trend. However, recent increases have been small, and future increases will likely be modest until the Mist facility expansion is put into service.

Shares of Northwest Natural Gas are ranked 2 (Above Average) for Timeliness. Too, these shares offer a decent yield, and are top-ranked for Safety. However, this issue does not offer much in terms of appreciation potential over the long haul.

John E. Seibert III *March 3, 2017*

(A) Diluted earnings per share. Excludes nonrecurring items: '00, $0.11; '06, ($0.06); '08, ($0.03); '09, 6¢; May not sum due to rounding. Next earnings report due in early May.
(B) Dividends historically paid in mid-February, May, August, and November.
■ Dividend reinvestment plan available.
(C) In millions.
(D) Includes intangibles. In 2015: $370.7 million, $13.52/share.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	20
Earnings Predictability	85

SOUTH JERSEY INDS. NYSE-SJI

RECENT PRICE 33.55 | P/E RATIO 24.7 (Trailing: 25.0 Median: 17.0) | RELATIVE P/E RATIO 1.25 | DIV'D YLD 3.3% | VALUE LINE

TIMELINESS 3 Lowered 2/3/17
SAFETY 2 Lowered 1/4/91
TECHNICAL 3 Lowered 2/24/17
BETA .80 (1.00 = Market)

2020-22 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	35	(+5%)	4%
Low	25	(-25%)	-3%

Insider Decisions

	A	M	J	J	A	S	O	N	D
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	1	0	0	0	0	0	0
to Sell	1	0	0	0	0	0	0	0	0

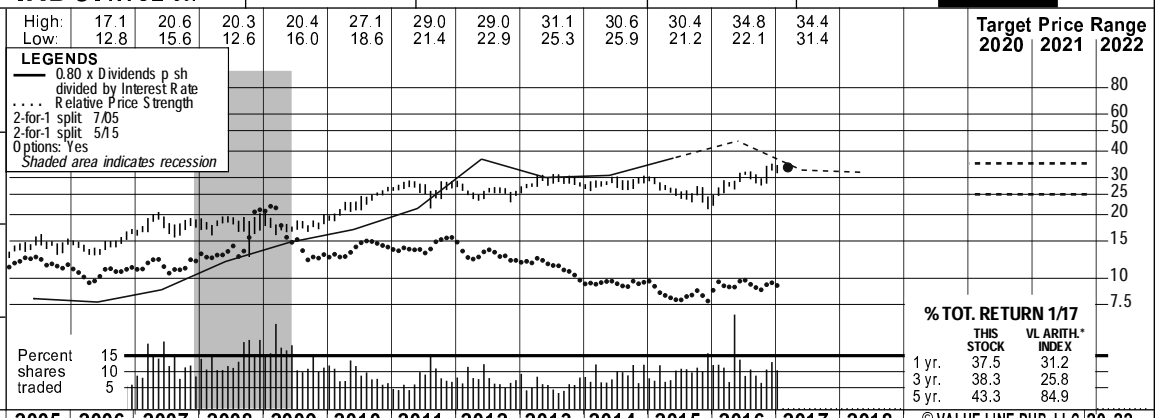
Institutional Decisions

	1Q2016	2Q2016	3Q2016
to Buy	109	129	91
to Sell	77	61	92
Hld's(000)	46585	56193	56455

	High:	17.1	20.6	20.3	20.4	27.1	29.0	29.0	31.1	30.6	30.4	34.8	34.4
	Low:	12.8	15.6	12.6	16.0	18.6	21.4	22.9	25.3	25.9	21.2	22.1	31.4

LEGENDS
0.80 x Dividends p sh divided by Interest Rate
Relative Price Strength
2-for-1 split 7/05
2-for-1 split 5/15
Options: Yes
Shaded area indicates recession

Target Price Range 2020 | 2021 | 2022



Percent shares traded 15 10 5

% TOT. RETURN 1/17

	THIS STOCK	VL ARITH.* INDEX
1 yr.	37.5	31.2
3 yr.	38.3	25.8
5 yr.	43.3	84.9

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC	20-22
17.65	10.35	13.17	14.75	15.89	15.88	16.15	16.18	14.19	15.48	13.71	11.16	11.18	12.98	13.52	12.95	*12.95*	*13.55*	Revenues per sh	*15.10*
.95	1.06	1.12	1.22	1.25	1.75	1.60	1.74	1.86	2.10	2.23	2.34	2.48	2.67	2.42	*2.35*	*2.50*	*2.65*	"Cash Flow" per sh	*3.10*
.57	.61	.68	.79	.86	1.23	1.05	1.14	1.19	1.35	1.45	1.52	1.52	1.57	1.44	1.34	*1.46*	*1.55*	Earnings per sh A	*1.85*
.37	.38	.39	.41	.43	.46	.51	.56	.61	.68	.75	.83	.90	.96	1.02	1.06	*1.10*	*1.15*	Div'ds Decl'd per sh B ■	*1.30*
1.41	1.74	1.18	1.34	1.60	1.26	.94	1.04	1.83	2.79	3.20	4.01	4.84	5.01	4.87	*3.20*	*3.55*	*3.90*	Cap'l Spending per sh	*5.25*
3.91	4.84	5.63	6.20	6.75	7.55	8.12	8.67	9.12	9.54	10.33	11.63	12.64	13.65	14.62	*16.25*	*19.50*	*22.00*	Book Value per sh C	*29.05*
47.44	48.83	52.92	55.52	57.96	58.65	59.22	59.46	59.59	59.75	60.43	63.31	65.43	68.33	70.97	*80.00*	*82.00*	*83.00*	Common Shs Outst'g D	*86.00*
13.6	13.5	13.3	14.1	16.6	11.9	17.2	15.9	15.0	16.8	18.4	16.9	18.9	18.0	17.9	21.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.0*
.70	.74	.76	.74	.88	.64	.91	.96	1.00	1.07	1.15	1.08	1.06	.95	.90	1.14			Relative P/E Ratio	*1.00*
4.7%	4.6%	4.3%	3.7%	3.0%	3.2%	2.8%	3.1%	3.4%	3.0%	2.8%	3.2%	3.1%	3.4%	3.9%	3.6%			Avg Ann'l Div'd Yield	*4.4%*
956.4	962.0	845.4	925.1	828.6	706.3	731.4	887.0	959.6	1036.5	*1060*	*1125*	Revenues ($mill)	*1300*
61.8	67.7	71.3	81.0	87.0	93.3	97.1	104.0	99.0	102.8	*115*	*125*	Net Profit ($mill)	*155*
41.9%	47.7%	23.0%	15.2%	22.4%	10.8%	--	--	5.9%	*25.0%*	*25.0%*	*25.0%*	Income Tax Rate	*25.0%*
6.5%	7.0%	8.4%	8.8%	10.5%	13.2%	13.3%	11.7%	10.3%	9.9%	*10.8%*	*11.1%*	Net Profit Margin	*11.9%*
42.7%	39.2%	36.5%	37.4%	40.5%	45.0%	45.1%	48.0%	49.2%	*39.0%*	*36.0%*	*35.5%*	Long-Term Debt Ratio	*36.0%*
57.3%	60.8%	63.5%	62.6%	59.5%	55.0%	54.9%	52.0%	50.8%	*61.0%*	*64.0%*	*64.5%*	Common Equity Ratio	*64.0%*
839.0	848.0	856.4	910.1	1048.3	1337.6	1507.4	1791.9	2043.9	*2125*	*2500*	*2825*	Total Capital ($mill)	*3900*
948.9	982.6	1073.1	1193.3	1352.4	1578.0	1859.1	2134.1	2448.1	*2600*	*2750*	*2900*	Net Plant ($mill)	*3500*
8.6%	8.9%	9.0%	9.5%	8.9%	7.4%	6.8%	6.4%	5.4%	*5.5%*	*5.0%*	*5.0%*	Return on Total Cap'l	*4.5%*
12.8%	13.1%	13.1%	14.2%	13.9%	12.7%	11.7%	11.2%	9.5%	*8.0%*	*7.0%*	*7.0%*	Return on Shr. Equity	*6.0%*
12.8%	13.1%	13.1%	14.2%	13.9%	12.7%	11.7%	11.2%	9.5%	*8.0%*	*7.0%*	*7.0%*	Return on Com Equity	*6.0%*
6.7%	6.7%	6.4%	7.1%	6.7%	5.8%	4.8%	4.3%	2.8%	*1.5%*	*1.5%*	*1.5%*	Retained to Com Eq	*1.5%*
48%	49%	51%	50%	52%	55%	59%	61%	71%	*82%*	*78%*	*76%*	All Div'ds to Net Prof	*72%*

CAPITAL STRUCTURE as of 9/30/16
Total Debt $1270.8 mill. **Due in 5 Yrs** $1140 mill.
LT Debt $808.7 mill. **LT Interest** $25.0 mill.
(Total interest coverage: 6.1x)

Leases, Uncapitalized Annual rentals $.8 mill.
Pension Assets-12/15 $184.8 mill.
Oblig. $254.2 mill.

Pfd Stock None

Common Stock 79,477,822 shs.
as of 11/1/16

MARKET CAP: $2.7 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2014	2015	9/30/16
Cash Assets	4.2	3.9	6.9
Other	562.5	427.4	350.9
Current Assets	566.7	431.3	357.8
Accts Payable	273.0	186.4	141.1
Debt Due	395.6	461.2	462.1
Other	181.6	184.9	209.2
Current Liab.	850.2	832.5	812.4
Fix. Chg. Cov.	432%	496%	572%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '13-'15 to '20-'22
Revenues	-1.5%	-4.0%	*2.5%*
"Cash Flow"	7.5%	6.0%	*3.0%*
Earnings	7.0%	4.0%	*3.0%*
Dividends	9.0%	9.5%	*4.5%*
Book Value	8.0%	8.5%	*11.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	350.2	133.3	122.4	281.1	887.0
2015	383.0	177.7	141.1	257.8	959.6
2016	333.0	154.4	219.1	330.0	1036.5
2017	*355*	*165*	*215*	*325*	*1060*
2018	*375*	*180*	*230*	*340*	*1125*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	1.01	.15	d.05	.47	1.57
2015	.86	.03	d.07	.62	1.44
2016	.80	.12	.05	.42	1.34
2017	*.80*	*.12*	*.02*	*.52*	*1.46*
2018	*.82*	*.14*	*.03*	*.56*	*1.55*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	--	.222	.222	.458	.90
2014	--	.237	.237	.488	.96
2015	--	.251	.251	.515	1.02
2016	--	.264	.264	.536	1.06
2017					

BUSINESS: South Jersey Industries, Inc. is a holding company. Its subsidiary, South Jersey Gas Co., distributes natural gas to 373,100 customers in New Jersey's southern counties. Gas revenue mix '15: residential, 45%; commercial, 22%; cogeneration and electric generation, 12%; industrial, 21%. Non-utility operations include: South Jersey Energy, South Jersey Resources Group, South Jersey Exploration, Marina Energy, South Jersey Energy Service Plus, and SJI Midstream. Has about 720 employees. Off./dir. own less than 1% of common shares; BlackRock, Inc., 10.5%; The Vanguard Group, Inc., 7.7% (3/16 proxy). Pres. & CEO: Michael J. Renna. Inc.: NJ. Address: 1 South Jersey Plaza, Folsom, NJ 08037. Tel.: 609-561-9000. Internet: www.sjindustries.com.

South Jersey Industries reported mixed results for the fourth quarter. Revenues increased roughly 28% on a year-to-year basis, to $330 million. However, earnings per share of $0.42 were no match for the prior-year tally. Stable bottom-line performance by South Jersey Gas was more than offset by lower earnings from the company's nonutility operations. Full-year earnings increased moderately, though the per share figure declined somewhat due to a greater share count. The company completed a public offering of common stock last May, the proceeds of which were intended to be used for capital expenditures for its regulated businesses.

We expect a measure of share net improvement this year. Bottom-line growth may well pick up in 2018. Utility South Jersey Gas will likely continue to gain from investment in infrastructure and customer additions. Natural gas remains the fuel of choice within its service territory, and this business will probably further benefit from customer conversions. Spending on infrastructure, and the ability to recover these investments through annual rate adjustments, should also benefit performance here. Meanwhile, SJ Energy Services ought to gain from the healthy performance of its energy production assets. In particular, we are optimistic about prospects for its solar portfolio. Elsewhere, SJ Energy Group should experience greater volumes and margins going forward. Five fuel management contracts contributed to earnings in 2016, and five more were expected to become operational within the next three years.

This stock does not stand out right now. The shares are ranked to perform in line with the broader market for the coming six to 12 months. Long-term total return potential is nothing to write home about, either. This issue presently trades at a price-to-earnings multiple that is somewhat greater than its historical average. But a pullback in the share price may offer patient investors a more attractive entry point. Moderate dividend growth will likely continue in the coming years. South Jersey earns good marks for Safety, Financial Strength, Price Stability, and Earnings Predictability. Volatility is below average, as well (Beta: 0.80).

Michael Napdi, CFA *March 3, 2017*

(A) Based on economic egs. from 2007 onward. GAAP EPS: '08, $1.29; '09, $0.97; '10, $1.11; '11, $1.49; '12, $1.49; '13, $1.28; '14, $1.46; '15, $1.52; '16, $1.56. Excl. nonrecur. gain (loss): '08, $0.16; '09, ($0.22); '10, ($0.24); '11, $0.04; '12, ($0.03); '13, ($0.24); '14, ($0.11); '15, $0.08; '16, $0.22. Egs. may not sum due to change in shares. Next egs. rpt. due early May. (B) Div'ds paid early April, July, Oct., and late Dec. ■ Div. reinvest. plan avail. (C) Incl. reg. assets. In 2015: $521.0 mill., $7.34 per shr. (D) In mill., adj. for split.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	35
Earnings Predictability	75

SOUTHWEST GAS NYSE-SWX

RECENT PRICE 83.83 | P/E RATIO 24.8 (Trailing: 26.2 Median: 16.0) | RELATIVE P/E RATIO 1.25 | DIV'D YLD 2.3% | VALUE LINE

TIMELINESS 3 Lowered 9/30/16
SAFETY 3 Lowered 1/4/91
TECHNICAL 4 Lowered 3/3/17
BETA .75 (1.00 = Market)

2020-22 PROJECTIONS

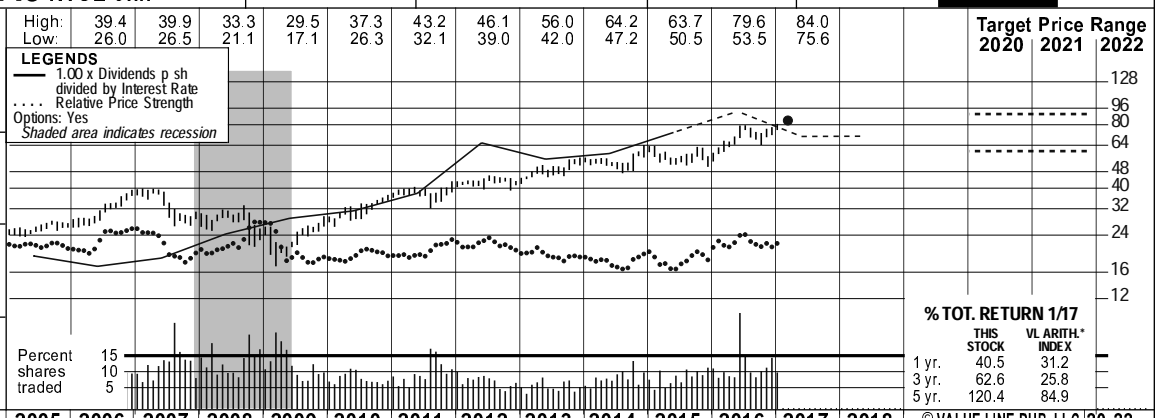
	Price	Gain	Ann'l Total Return
High	90	(+5%)	4%
Low	60	(-30%)	-5%

Insider Decisions

	A	M	J	J	A	S	O	N	D
to Buy	0	0	0	0	0	0	0	0	0
Options	0	1	1	0	1	1	0	3	0
to Sell	0	3	5	0	1	1	0	3	0

Institutional Decisions

	1Q2016	2Q2016	3Q2016
to Buy	108	111	110
to Sell	85	102	118
Hld's(000)	37942	37855	36730



2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC	20-22
42.98	39.68	35.96	40.14	43.59	48.47	50.28	48.53	42.00	40.18	41.07	41.77	42.08	45.61	52.00	*52.60*	*53.55*	*54.50*	Revenues per sh	*62.25*
4.79	5.07	5.11	5.57	5.20	5.97	6.21	5.76	6.16	6.46	6.81	7.73	8.24	8.47	8.62	*9.25*	*10.10*	*10.60*	"Cash Flow" per sh	*12.75*
1.15	1.16	1.13	1.66	1.25	1.98	1.95	1.39	1.94	2.27	2.43	2.86	3.11	3.01	2.92	*3.20*	*3.50*	*3.75*	Earnings per sh A	*4.75*
.82	.82	.82	.82	.82	.82	.86	.90	.95	1.00	1.06	1.18	1.32	1.46	1.62	*1.76*	*1.90*	*2.05*	Div'ds Decl'd per sh B■†	*2.50*
8.17	8.50	7.03	8.23	7.49	8.27	7.96	6.79	4.81	4.73	8.29	8.57	7.86	8.53	10.30	*11.25*	*11.75*	*12.20*	Cap'l Spending per sh	*13.60*
17.27	17.91	18.42	19.18	19.10	21.58	22.98	23.49	24.44	25.62	26.66	28.35	30.47	31.95	33.61	*34.90*	*36.20*	*37.50*	Book Value per sh	*39.60*
32.49	33.29	34.23	36.79	39.33	41.77	42.81	44.19	45.09	45.56	45.96	46.15	46.36	46.52	47.38	*48.00*	*49.00*	*50.00*	Common Shs Outst'g C	*53.00*
19.0	19.9	19.2	14.3	20.6	15.9	17.3	20.3	12.2	14.0	15.7	15.0	15.8	17.9	19.4	*19.4*	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.0*
.97	1.09	1.09	.76	1.10	.86	.92	1.22	.81	.89	.98	.95	.89	.94	.98	*.98*			Relative P/E Ratio	*1.00*
3.8%	3.6%	3.8%	3.5%	3.2%	2.6%	2.6%	3.2%	4.0%	3.2%	2.8%	2.8%	2.7%	2.7%	2.9%	*2.9%*			Avg Ann'l Div'd Yield	*3.3%*
2152.1	2144.7	1893.8	1830.4	1887.2	1927.8	1950.8	2121.7	2463.6	*2525*	*2625*	*2725*	Revenues ($mill)	*3300*
83.2	61.0	87.5	103.9	112.3	133.3	145.3	141.1	138.3	*155*	*175*	*190*	Net Profit ($mill)	*255*
36.5%	40.1%	34.0%	34.7%	36.2%	36.2%	35.0%	35.7%	36.4%	*35.0%*	*35.0%*	*35.0%*	Income Tax Rate	*35.0%*
3.9%	2.8%	4.6%	5.7%	6.0%	6.9%	7.4%	6.7%	5.6%	*6.1%*	*6.7%*	*7.0%*	Net Profit Margin	*7.5%*
58.1%	55.3%	53.5%	49.1%	43.2%	49.2%	49.4%	52.4%	49.3%	*49.0%*	*49.0%*	*49.0%*	Long-Term Debt Ratio	*49.0%*
41.9%	44.7%	46.5%	50.9%	56.8%	50.8%	50.6%	47.6%	50.7%	*51.0%*	*51.0%*	*51.0%*	Common Equity Ratio	*51.0%*
2349.7	2323.3	2371.4	2291.7	2155.9	2576.9	2793.7	3123.9	3143.5	*3275*	*3475*	*3675*	Total Capital ($mill)	*4100*
2845.3	2983.3	3034.5	3072.4	3218.9	3343.8	3486.1	3658.4	3891.1	*4080*	*4275*	*4500*	Net Plant ($mill)	*5250*
5.5%	4.5%	5.4%	6.1%	6.4%	6.4%	6.3%	5.7%	5.5%	*6.0%*	*6.0%*	*6.5%*	Return on Total Cap'l	*7.5%*
8.5%	5.9%	7.9%	8.9%	9.2%	10.2%	10.3%	9.5%	8.7%	*9.5%*	*10.0%*	*10.0%*	Return on Shr. Equity	*12.0%*
8.5%	5.9%	7.9%	8.9%	9.2%	10.2%	10.3%	9.5%	8.7%	*9.5%*	*10.0%*	*10.0%*	Return on Com Equity	*12.0%*
4.8%	2.1%	4.1%	5.1%	5.3%	6.1%	6.1%	5.0%	4.0%	*4.0%*	*4.5%*	*4.5%*	Retained to Com Eq	*6.0%*
44%	63%	48%	43%	43%	40%	41%	47%	54%	*55%*	*53%*	*54%*	All Div'ds to Net Prof	*52%*

CAPITAL STRUCTURE as of 9/30/16
Total Debt $1642.4 mill. **Due in 5 Yrs** $525.0 mill.
LT Debt $1592.9 mill. **LT Interest** $72.0 mill.
(Total interest coverage: 4.3x) (49% of Cap'l)
Leases, Uncapitalized Annual rentals $7.0 mill.
Pension Assets-12/15 $780.5 mill.
Oblig. $1117.4 mill.
Pfd Stock None

Common Stock 47,482,068 shs.
as of 10/28/16

MARKET CAP: $4.0 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2014	2015	9/30/16
Cash Assets	39.6	36.0	85.2
Other	567.2	522.2	459.1
Current Assets	606.8	558.2	544.3
Accts Payable	168.0	164.9	138.8
Debt Due	24.2	37.5	49.5
Other	277.9	332.6	424.7
Current Liab.	470.1	535.0	613.0
Fix. Chg. Cov.	395%	401%	411%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '13-'15 to '20-'22
Revenues	1.5%	1.5%	*4.0%*
"Cash Flow"	5.0%	6.5%	*6.0%*
Earnings	8.5%	10.0%	*6.5%*
Dividends	6.0%	9.0%	*8.0%*
Book Value	5.5%	5.5%	*3.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	608.4	453.1	432.5	627.7	2121.7
2015	734.2	538.6	505.4	685.4	2463.6
2016	731.2	547.7	540.0	*706.1*	*2525*
2017	*765*	*575*	*560*	*725*	*2625*
2018	*790*	*600*	*585*	*750*	*2725*

Calendar	EARNINGS PER SHARE A D Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	1.51	.21	.04	1.25	3.01
2015	1.53	.10	d.10	1.38	2.92
2016	1.58	.19	.05	*1.38*	*3.20*
2017	*1.68*	*.22*	*.10*	*1.50*	*3.50*
2018	*1.75*	*.27*	*.13*	*1.60*	*3.75*

Calendar	QUARTERLY DIVIDENDS PAID B■† Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	.295	.330	.330	.330	1.29
2014	.330	.365	.365	.365	1.43
2015	.365	.405	.405	.405	1.58
2016	.405	.450	.450	.450	1.76
2017	.450				

BUSINESS: Southwest Gas Holdings, Inc. is the parent holding company of Southwest Gas and Centuri Construction Group. Southwest Gas is a regulated gas distributor serving about 2.0 million customers in sections of Arizona, Nevada, and California. Centuri provides construction services. 2015 margin mix: residential and small commercial, 85%; large commercial and industrial, 4%; transportation, 11%. Total throughput: 2.1 billion therms. Has 5,876 employees. Off. & dir. own 1.3% of common stock; BlackRock Inc., 9.6%; The Vanguard Group, Inc., 7.4%; GAMCO Investors, Inc., 6.4% (3/16 Proxy). Chairman: Michael J. Melarkey. Pres. & CEO: John Hester. Inc.: CA. Addr.: 5241 Spring Mountain Road, Las Vegas, Nevada 89193. Tel.: 702-876-7237. Web: www.swgas.com.

Southwest Gas Holdings has completed its previously announced reorganization. Effective January 1st, Southwest has been reorganized into a holding company structure. Southwest Gas Holdings is now the parent company of Southwest, Centuri Construction Group, and their respective subsidiaries. This move provides further separation between the regulated and unregulated businesses, and additional financing flexibility.

The shares have continued to advance in price over the past three months. This is part of a considerable run-up in the stock price that began in December of 2015. The company reported healthy operating performance during 2016, supported by rate relief and customer additions. Southwest was scheduled to announce fourth-quarter earnings as this Issue went to press.

We anticipate healthy growth from 2017 onward. Long-term prospects look fairly solid here. The natural gas operation ought to continue to gain from customer growth, expansion projects, and infrastructure tracker mechanisms. Moreover, higher rates should provide support. The company has been active in seeking rate relief in the service territories that it operates. Such approved revenue increases provide compensation for greater costs and investment in infrastructure. Elsewhere, Centuri should benefit from the need to replace aging infrastructure. This business is a full-service underground piping contractor that has a robust base of large utility clients to sustain and grow its operation. Efforts by the company to control costs should also pay off.

This stock is neutrally ranked for year-ahead relative price performance. Appreciation potential is limited following the aforementioned run-up in the share price. Moreover, the dividend yield is below average for a utility, although growth in the payout has been solid. Top-line growth over the past decade has been underwhelming, though share earnings have advanced at a good pace during that time frame. Meantime, Southwest Gas earns favorable marks for Price Stability, Growth Persistence, and Earnings Predictability. A selloff may offer conservative investors a more attractive entry point.

Michael Napoli, CFA *March 3, 2017*

(A) Diluted earnings. Excl. nonrec. gains (losses): '02, (10¢); '05, (11¢); '06, 7¢. Next egs. report due early May. (B) Dividends historically paid early March, June, September, and December. ■† Div'd reinvestment and stock purchase plan avail. (C) In millions. (D) Totals may not sum due to rounding.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	90
Earnings Predictability	90

SPIRE INC. NYSE-SR

RECENT PRICE 64.55 | P/E RATIO 18.4 (Trailing: 20.0 Median: 15.0) | RELATIVE P/E RATIO 0.93 | DIV'D YLD 3.3% | VALUE LINE

TIMELINESS 3 Lowered 8/12/16
SAFETY 2 Raised 6/20/03
TECHNICAL 3 Lowered 10/7/16
BETA .70 (1.00 = Market)

2020-22 PROJECTIONS

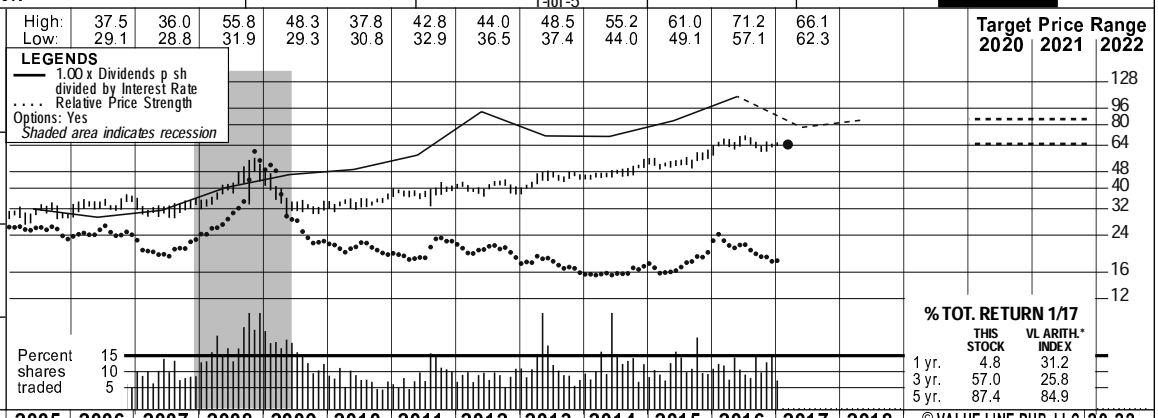
	Price	Gain	Ann'l Total Return
High	85	(+30%)	10%
Low	65	(Nil)	4%

Insider Decisions

	A	M	J	J	A	S	O	N	D
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	0	0	5
to Sell	0	0	0	0	0	0	0	0	0

Institutional Decisions

	1Q2016	2Q2016	3Q2016
to Buy	109	142	122
to Sell	104	83	97
Hld's(000)	35632	36826	36570



2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC	20-22
53.08	39.84	54.95	59.59	75.43	93.51	93.40	100.44	85.49	77.83	71.48	49.90	31.10	37.68	45.59	33.68	*40.45*	*44.80*	Revenues per sh [A]	*58.50*
3.00	2.56	3.15	2.79	2.98	3.81	3.87	4.22	4.56	4.11	4.62	4.58	3.12	3.87	6.15	6.16	*6.55*	*6.85*	"Cash Flow" per sh	*8.15*
1.61	1.18	1.82	1.82	1.90	2.37	2.31	2.64	2.92	2.43	2.86	2.79	2.02	2.35	3.16	3.24	*3.50*	*3.70*	Earnings per sh [A B]	*4.65*
1.34	1.34	1.34	1.35	1.37	1.40	1.45	1.49	1.53	1.57	1.61	1.66	1.70	1.76	1.84	1.96	*2.10*	*2.20*	Div'ds Decl'd per sh [C ■]	*2.50*
2.51	2.80	2.67	2.45	2.84	2.97	2.72	2.57	2.36	2.56	3.02	4.83	4.00	3.96	6.68	6.42	*6.90*	*7.00*	Cap'l Spending per sh	*7.10*
15.26	15.07	15.65	16.96	17.31	18.85	19.79	22.12	23.32	24.02	25.56	26.67	32.00	34.93	36.30	38.73	*40.65*	*42.25*	Book Value per sh [D]	*48.30*
18.88	18.96	19.11	20.98	21.17	21.36	21.65	21.99	22.17	22.29	22.43	22.55	32.70	43.18	43.36	45.65	*47.00*	*48.00*	Common Shs Outst'g [E]	*50.00*
14.5	20.0	13.6	15.7	16.2	13.6	14.2	14.3	13.4	13.7	13.0	14.5	21.3	19.8	16.5	19.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.0*
.74	1.09	.78	.83	.86	.73	.75	.86	.89	.87	.82	.92	1.20	1.04	.83	1.03			Relative P/E Ratio	*1.00*
5.7%	5.7%	5.4%	4.7%	4.4%	4.3%	4.4%	3.9%	3.9%	4.7%	4.3%	4.1%	4.0%	3.8%	3.5%	3.1%			Avg Ann'l Div'd Yield	*3.4%*
2021.6	2209.0	1895.2	1735.0	1603.3	1125.5	1017.0	1627.2	1976.4	1537.3	*1900*	*2150*	Revenues ($mill) [A]	*2925*
49.8	57.6	64.3	54.0	63.8	62.6	52.8	84.6	136.9	144.2	*165*	*175*	Net Profit ($mill)	*230*
33.4%	31.3%	33.6%	33.4%	31.4%	29.6%	25.0%	27.6%	31.2%	32.5%	*22.5%*	*23.5%*	Income Tax Rate	*24.0%*
2.5%	2.6%	3.4%	3.1%	4.0%	5.6%	5.2%	5.2%	6.9%	9.4%	*8.7%*	*8.3%*	Net Profit Margin	*7.9%*
45.3%	44.4%	42.9%	40.5%	38.9%	36.1%	46.6%	55.1%	53.0%	50.9%	*50.2%*	*50.0%*	Long-Term Debt Ratio	*49.0%*
54.6%	55.5%	57.1%	59.5%	61.1%	63.9%	53.4%	44.9%	47.0%	49.1%	*49.8%*	*50.0%*	Common Equity Ratio	*51.0%*
784.5	876.1	906.3	899.9	937.7	941.0	1959.0	3359.4	3345.1	3601.9	*3835*	*4050*	Total Capital ($mill)	*4755*
793.8	823.2	855.9	884.1	928.7	1019.3	1776.6	2759.7	2941.2	3300.9	*3465*	*3640*	Net Plant ($mill)	*4215*
8.5%	8.1%	8.7%	7.4%	8.1%	7.9%	3.3%	3.1%	5.1%	4.9%	*4.8%*	*5.0%*	Return on Total Cap'l	*5.5%*
11.6%	11.8%	12.4%	10.1%	11.1%	10.4%	5.0%	5.6%	8.7%	8.2%	*8.6%*	*8.5%*	Return on Shr. Equity	*9.5%*
11.6%	11.8%	12.4%	10.1%	11.1%	10.4%	5.0%	5.6%	8.7%	8.2%	*8.6%*	*8.5%*	Return on Com Equity	*9.5%*
4.3%	5.2%	5.9%	3.6%	4.9%	4.3%	1.0%	1.5%	3.7%	3.3%	*3.4%*	*3.5%*	Retained to Com Eq	*4.5%*
63%	56%	53%	64%	56%	59%	81%	73%	58%	59%	*60%*	*60%*	All Div'ds to Net Prof	*54%*

CAPITAL STRUCTURE as of 12/31/16
Total Debt $2577.7 mill. **Due in 5 Yrs** $400.0 mill.
LT Debt $1821.3 mill. **LT Interest** $70.0 mill.
(Total interest coverage: 4.1x)

Leases, Uncapitalized Annual rentals $11.0 mill.
Pension Assets-9/16 $540.5 mill.
Oblig. $724.5 mill.

Pfd Stock None
Common Stock 45,738,897 shs.
as of 1/30/16

MARKET CAP: $3.0 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2015	2016	12/31/16
Cash Assets	13.8	5.2	10.6
Other	516.3	564.4	805.0
Current Assets	530.1	569.6	815.6
Accts Payable	146.5	210.9	273.8
Debt Due	418.0	648.7	756.4
Other	289.3	301.7	312.0
Current Liab.	853.8	1161.3	1342.2
Fix. Chg. Cov.	365%	366%	407%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '14-'16 to '20-'22
Revenues	-6.5%	-13.0%	*7.0%*
"Cash Flow"	5.5%	4.0%	*7.0%*
Earnings	3.5%	1.5%	*8.0%*
Dividends	3.0%	3.5%	*5.0%*
Book Value	7.5%	8.5%	*4.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.)[A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2014	468.6	694.5	241.8	222.3	1627.2
2015	619.6	877.4	275.2	204.2	1976.4
2016	399.4	609.3	249.3	279.3	1537.3
2017	495.1	*754.9*	*250*	*400*	*1900*
2018	*600*	*800*	*300*	*450*	*2150*

Fiscal Year Ends	EARNINGS PER SHARE [A B F] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2014	1.09	1.59	.33	d.35	2.35
2015	1.09	2.18	.32	d.43	3.16
2016	1.08	2.31	.24	d.31	3.24
2017	.99	*2.45*	*.31*	*d.25*	*3.50*
2018	*1.05*	*2.55*	*.35*	*d.25*	*3.70*

Cal-endar	QUARTERLY DIVIDENDS PAID [C ■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	.425	.425	.425	.425	1.70
2014	.44	.44	.44	.44	1.76
2015	.46	.46	.46	.46	1.84
2016	.49	.49	.49	.49	1.96
2017	.525				

BUSINESS: Spire Inc., formerly known as the Laclede Group, Inc., is a holding company for natural gas utilities, which distributes natural gas across Missouri, including the cities of St. Louis and Kansas City. Has roughly 1.6 million customers. Acquired Missouri Gas 9/13, Alabama Gas Co 9/14. Utility therms sold and transported in fiscal 2016: 2.6 bill. Revenue mix for regulated operations: residential, 67%; commercial and industrial, 23%; transportation, 2%; other, 8%. Has around 3,078 employees. Officers and directors own 3.1% of common shares (1/17 proxy). Chairman: Edward Glotzbach; CEO: Suzanne Sitherwood. Inc.: Missouri. Address: 700 Market Street, St. Louis, Missouri 63101. Telephone: 314-342-0500. Internet: www.thelacledegroup.com.

Spire reported lackluster fiscal first-quarter results (ended December 31, 2016). Revenues rose to $495.1 million, aided by contributions of the MobileGas and Willmut Gas acquisitions. Winter weather was a bit cooler than the year-prior period, but costs ran higher, owing to commodity price increases. Also, the company had higher operating and maintenance expenses. These factors, alongside an increase in the share count, caused earnings per share to fall a bit to $0.99. The company should benefit from synergies in the second quarter, though higher interest rates and a greater total share count may harm earnings.

The company should have much-better results in the year ahead. Revenues ought to grow, thanks to the acquisitions of MobileGas and Willmut Gas, and synergies should be achieved by the back half of the year. Also, legislative changes in Missouri may allow for better regulatory outcomes, including the reduction of regulatory lag and better rate-making cases. The potential exists for a much-lower tax rate, too. Still, some factors, such as higher debt, an increased net share count, and costs of achieving synergies could keep a lid on fiscal 2017 income. Too, higher interest expense may be incurred due to a somewhat increased cost of funds. Still, we think the company will earn $3.50 per share in 2017.

Longer-term results will be helped by the construction of the Spire STL pipeline. The company has filed for FERC approval, which we expect will be received. This would allow for lower natural gas costs across the coverage area, and the project has higher allowable returns. Capital expenditures ought to be around $190 million-$210 million, funded with debt and equity sales. It is currently expected to be put into service by fiscal 2019.

Shares of Spire offer some appeal for income-seekers. The well-covered payout should grow at a decent rate over the coming years. However, these shares do not stand out for Timeliness (3) and are trading within our long-term Target Price Range. Some near-term uncertainty with interest expense and the integration of its acquisitions could weigh on results. Most investors should wait for a dip in price.

John E. Seibert III *March 3, 2017*

(A) Fiscal year ends Sept. 30th. (B) Based on diluted shares outstanding. Excludes nonrecurring loss: '06, 7¢. Excludes gain from discontinued operations: '08, 94¢. Next earnings report due late April. (C) Dividends historically paid in early January, April, July, and October. ■ Dividend reinvestment plan available. (D) Incl. deferred charges. In '16: $607.3 mill., $13.70/sh. (E) In millions. (F) Qtly. egs. may not sum due to rounding or change in shares outstanding in 2013, 2014, 2016.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	40
Earnings Predictability	90

WGL HOLDINGS NYSE-WGL

RECENT PRICE 82.37 | P/E RATIO 23.9 (Trailing: 24.7 Median: 15.0) | RELATIVE P/E RATIO 1.21 | DIV'D YLD 2.5% | VALUE LINE

TIMELINESS – Suspended 2/3/17
SAFETY 1 Raised 4/2/93
TECHNICAL – Suspended 2/3/17
BETA .80 (1.00 = Market)

2020-22 PROJECTIONS

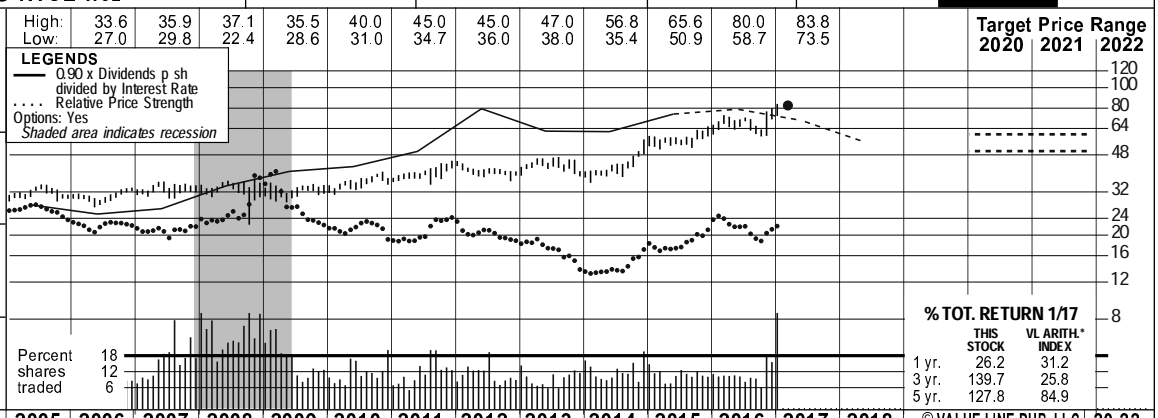
	Price	Gain	Ann'l Total Return
High	60	(-25%)	-4%
Low	50	(-40%)	-8%

Insider Decisions

	A	M	J	J	A	S	O	N	D
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	14	0	0
to Sell	0	1	0	0	0	0	0	0	0

Institutional Decisions

	1Q2016	2Q2016	3Q2016
to Buy	126	123	110
to Sell	121	106	104
Hld's(000)	34219	34930	34126



2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC	20-22
29.80	32.63	42.45	42.93	44.94	53.96	53.51	52.65	53.98	53.60	53.75	47.07	47.70	53.73	53.43	46.65	50.00	50.95	Revenues per sh A	53.65
3.24	2.63	4.00	3.87	3.97	3.84	3.89	4.34	4.44	4.11	4.01	4.53	4.29	4.80	5.60	5.89	5.85	6.20	"Cash Flow" per sh	6.60
1.88	1.14	2.30	1.98	2.13	1.94	2.09	2.44	2.53	2.27	2.25	2.68	2.31	2.68	3.16	3.27	3.45	3.65	Earnings per sh B	3.75
1.26	1.27	1.28	1.30	1.32	1.35	1.37	1.41	1.47	1.50	1.55	1.59	1.66	1.72	1.83	1.93	2.02	2.08	Div'ds Decl'd per sh C■	2.20
2.68	3.34	2.65	2.33	2.32	3.27	3.33	2.70	2.77	2.57	3.94	4.87	6.04	7.63	9.33	10.53	10.60	10.85	Cap'l Spending per sh	11.80
16.24	15.78	16.25	16.95	17.80	18.86	19.83	20.99	21.89	22.82	23.49	24.64	24.65	24.08	24.97	27.31	29.00	32.10	Book Value per sh D	37.60
48.54	48.56	48.63	48.67	48.65	48.89	49.45	49.92	50.14	50.54	51.20	51.52	51.70	51.76	49.78	50.37	52.00	53.00	Common Shs Outst'g E	55.00
14.7	23.1	11.1	14.2	14.7	15.5	15.6	13.7	12.6	15.1	17.0	15.3	18.2	15.2	17.0	20.0	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	15.0
.75	1.26	.63	.75	.78	.84	.83	.82	.84	.96	1.07	.97	1.02	.80	.86	1.10			Relative P/E Ratio	.95
4.6%	4.8%	5.0%	4.6%	4.2%	4.5%	4.2%	4.2%	4.6%	4.4%	4.1%	3.9%	3.9%	4.2%	3.4%	2.9%			Avg Ann'l Div'd Yield	4.1%
2646.0	2628.2	2706.9	2708.9	2751.5	2425.3	2466.1	2780.9	2659.8	2349.6	2600	2700	Revenues ($mill) A	2950
102.9	122.9	128.7	115.0	115.5	138.4	119.7	139.0	158.2	165.3	175	195	Net Profit ($mill)	205
39.1%	37.1%	39.1%	38.7%	42.4%	40.1%	30.2%	29.0%	39.9%	39.0%	39.0%	39.0%	Income Tax Rate	39.0%
3.9%	4.7%	4.8%	4.2%	4.2%	5.7%	4.9%	5.0%	5.9%	7.0%	7.0%	7.0%	Net Profit Margin	7.0%
37.9%	35.9%	33.3%	33.4%	32.3%	31.2%	28.7%	34.8%	42.6%	50.7%	48.0%	46.5%	Long-Term Debt Ratio	44.0%
60.3%	62.4%	65.0%	65.0%	66.2%	67.3%	69.8%	63.8%	56.1%	48.3%	51.0%	52.5%	Common Equity Ratio	55.0%
1625.4	1679.5	1687.7	1774.4	1818.1	1886.9	1826.8	1954.0	2215.6	1375.6	3030	3230	Total Capital ($mill)	3745
2150.4	2208.3	2269.1	2346.2	2489.9	2667.4	2907.5	3314.4	3672.7	4127.2	4635	5210	Net Plant ($mill)	7395
7.6%	8.5%	8.8%	7.6%	7.5%	8.3%	7.5%	8.1%	8.3%	6.7%	7.5%	7.5%	Return on Total Cap'l	7.0%
10.2%	11.4%	11.4%	9.7%	9.4%	10.7%	9.2%	10.9%	12.4%	12.0%	11.5%	11.5%	Return on Shr. Equity	10.0%
10.4%	11.6%	11.6%	9.9%	9.5%	10.8%	9.3%	11.0%	12.6%	12.0%	11.5%	11.5%	Return on Com Equity	10.0%
3.5%	5.0%	5.0%	3.3%	3.4%	4.8%	2.6%	4.3%	5.4%	5.3%	4.5%	5.0%	Retained to Com Eq	4.0%
66%	57%	57%	67%	64%	56%	72%	62%	58%	55%	60%	57%	All Div'ds to Net Prof	59%

CAPITAL STRUCTURE as of 12/31/16
Total Debt $2069.6 mill. **Due in 5 Yrs** $634.4 mill.
LT Debt $1435.3 mill. **LT Interest** $52.3 mill.
(LT interest earned: 6.2x; total interest coverage: 5.7x) (49% of Total Capital)
Pension Assets-9/16 $1,355.0 mill. **Oblig.** $1,393.6 mill.
Preferred Stock $28.2 mill. **Pfd. Div'd** $1.3 mill.

Common Stock 51,219,000 shs.
as of 1/31/17

MARKET CAP: $4.2 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2015	2016	12/31/16
Cash Assets	6.7	5.6	12.9
Other	774.7	837.9	1082.3
Current Assets	781.4	843.5	1095.2
Accts Payable	325.1	405.4	447.5
Debt Due	357.0	331.4	634.4
Other	300.8	290.1	340.1
Current Liab.	982.9	1026.9	1422.0
Fix. Chg. Cov.	535%	535%	535%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '13-'15 to '20-'22
Revenues	1.5%	-.5%	1.0%
"Cash Flow"	2.0%	2.5%	3.0%
Earnings	2.5%	2.5%	3.5%
Dividends	3.0%	3.5%	3.0%
Book Value	4.0%	2.5%	6.5%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) A Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2014	680.5	1174.0	467.5	458.9	2780.9
2015	749.2	1001.7	441.2	467.7	2659.8
2016	613.4	835.7	440.6	459.9	2349.6
2017	609.5	900	520	570.5	2600
2018	635	925	545	595	2700

Fiscal Year Ends	EARNINGS PER SHARE A B Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2014	.99	1.84	.02	d.17	2.68
2015	1.16	2.02	.22	d.23	3.16
2016	1.18	1.78	.33	d.01	3.27
2017	1.24	1.81	.38	.02	3.45
2018	1.29	1.86	.43	.07	3.65

Cal-endar	QUARTERLY DIVIDENDS PAID C ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	.40	.42	.42	.42	1.66
2014	.42	.44	.44	.44	1.74
2015	.44	.463	.463	.463	1.83
2016	.463	.488	.488	.488	1.93
2017	.488	.51			

BUSINESS: WGL Holdings, Inc. is the parent of Washington Gas Light, a natural gas distributor in Washington, D.C. and adjacent areas of VA and MD to resident'l and comm'l users (1,129,865 meters). Hampshire Gas, a federally regulated sub., operates an underground gas-storage facility in WV. Non-regulated subs.: Wash. Gas Energy Svcs. sells and delivers natural gas and provides energy-related products in the D.C. metro area; Wash. Gas Energy Sys. designs/installs comm'l heating, ventilating, and air cond. systems. The Vanguard Group owns 9.8% of common stock; Off./dir. less than 1% (1/17 proxy). Chrmn. & CEO: Terry D. McCallister. Inc.: D.C. and VA. Addr.: 101 Const. Ave., N.W., Washington, D.C. 20080. Tel.: 202-624-6410. Internet: www.wglholdings.com.

Since our December review, shares of WGL Holdings have advanced nicely. The stock's price ticked almost 25% higher over that interim. The bulk of this move came from the announcement of a pending acquisition (see below). In comparison, the S&P 500 climbed a more modest 7.5%.

The company has agreed to be purchased by AltaGas Ltd. for $88.25 a share in cash, or roughly $6.4 billion. The newly combined entity is expected to be valued at about $17 billion with approximately $3.4 billion in natural gas rate-based assets. The tender offer price represents a premium of almost 28%, when viewed against the closing price on November 28, 2016, the day prior to news reports of a potential acquisition of WGL. At this point, the boards of both companies have unanimously passed the deal. Assuming shareholder and regulatory approvals are achieved, the deal is anticipated to close during the second quarter of 2018. WGL stock is trading about $6.00 below the tender offer price. We feel this is due to the relatively extended closing date. That said, the equity will no longer be trading on earnings or fundamentals, but rather on news surrounding the pending transaction. Thus, we have suspended its Timeliness rank.

WGL Holdings posted mixed results for the fiscal first quarter (ended December 31st). On the downside, the top line fell just under 1%, to $609.5 million. This reflected a 13.5% rise in Utility volumes offset by a 13.2% decline in Non-Utility volumes. However, we view this downturn as more of a technicality owing to the year-over-year decline in natural gas prices. After accounting for increased customer growth, new base rates in Virginia, higher realized margins associated with its asset optimization plans, and higher recovery related to its accelerated pipe replacement program, non-GAAP operating earnings increased 5%, to $1.24 a share. This was modestly higher than our call. As a result, we have raised our 2017 share-net estimate by a nickel, to $3.45.

The stock is trading well above our 2020-2022 Target Price Range. Consequently, we think shareholders may want to lock in gains now and redeploy capital elsewhere, rather than wait this out.

Bryan J. Fong *March 3, 2017*

(A) Fiscal years end Sept. 30th.
(B) Based on diluted shares. Excludes non-recurring losses: '01, (13¢); '02, (34¢); '07, (4¢); '08, (14¢) discontinued operations: '06, (15¢). Qtly egs. may not sum to total, due to change in shares outstanding. Next earnings report due late April. (C) Dividends historically paid early February, May, August, and November. ■ Dividend reinvestment plan available. (D) Includes deferred charges and intangibles. '16: $726.8 million, $14.36/sh. (E) In millions.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	55
Earnings Predictability	75

Summary of
Discounted Cash Flow Analysis (DCF)

DCF formula: $K = (D_1/P_0) + g$

Gas Utility Proxy Group:

Dividend Yield (D_1/P_0):	**2.8%**	**see page**	**2 and 3**
Dividend Growth (g):	**5.9%**	**see page**	**4 and 5**

DCF Cost of Equity *(K):*	**8.7%**

Value Line Dividend Yield Data

Proxy Group Companies:	Value Line Forward Yield D_1/P_0 (March 3, 2017)	Market Watch (March 13, 2017)	NASDAQ (March 13, 2017)	Yahoo Finance (March 13, 2017)	Zack's (March 13, 2017)
Atmos Energy Corp. (ATO)	2.4%	2.3%	2.3%	2.3%	2.3%
Chesapeake Utilities (CPK)	1.9%	1.8%	1.8%	1.8%	1.8%
NiSource, Inc. (NI)	3.0%	3.0%	3.0%	3.0%	3.0%
New Jersey Resources (NJR)	2.7%	2.7%	2.7%	2.7%	2.7%
Northwest Natural Gas (NWN)	3.1%	3.2%	3.3%	3.3%	3.3%
South Jersey Industries (SJI)	3.3%	3.3%	3.3%	3.3%	3.3%
Southwest Gas (SWX)	2.3%	2.4%	2.2%	2.4%	2.2%
Spire, Inc.. (SR)	3.3%	3.3%	3.2%	3.2%	3.2%
WGL Holdings (WGL)	2.5%	2.5%	2.3%	2.4%	2.3%
Gas Utility Proxy Group Overall Average	**2.7%**	**2.7%**	**2.7%**	**2.7%**	**2.7%**

Forward Dividend Yields:

Average Dividend Yield, adjusted for growth by (1 + 0.5g)

$D_1/P_0 = D_0/P_0 * (1 + 0.5g) = 2.7\% * [1 + 0.5(0.059)] =$ **2.8%**

Value Line Forward Yield $(D_1/P_0) =$ **2.7%**

Use for forward yield (D_1/P_0):	**2.8%**

Summary of
Discounted Cash Flow Analysis (DCF)
Growth Estimates

Gas Utility Group:

From Standard Edition Value Line:

Average of Value Line forecasted growth rates	**4.8%**
Average of 5 year historical growth	**5.3%**
Average 10 year historical growth:	**5.5%**
Earnings Per Share (Average)	**5.4%**
Dividends Per Share (Average)	**4.6%**
Book Value Per Share (Average)	**5.9%**
Earnings Per Share (Forecasted Only)	**5.1%**
Dividends Per Share (Forecasted Only)	**4.3%**
Book Value Per Share (Forecasted Only)	**5.4%**

Nominal GDP Growth

From Federal Reserve Bank of St. Louis

Average % Growth in Nominal GDP (1948 to 2016)	**6.5%**
Average % Growth in Nominal GDP (1980 to 2016)	**5.4%**

Use DCF Growth Rate	**5.9%**

Value Line Growth Rates

STANDARD VALUE LINE COMPANIES

	Annual Growth - Past 10 Years			Annual Growth - Past 5 Years			Annual Growth - Value Line Projected			Average Growth Rates		
Company Name	Earnings Per Share	Dividends Per Share	Book Value Per Share	Earnings Per Share	Dividends Per Share	Book Value Per Share	Earnings Per Share	Dividends Per Share	Book Value Per Share	Past 10 Years	Past 5 Years	Value Line Projected
Atmos Energy Corp. (ATO)	6.0%	2.5%	5.0%	8.0%	3.5%	5.5%	6.0%	6.5%	3.5%	4.5%	5.7%	5.3%
Chesapeake Utilities (CPK)	8.0%	3.5%	9.0%	11.0%	5.0%	8.0%	8.0%	5.5%	6.5%	6.8%	8.0%	6.7%
NiSource, Inc. (NI)	-1.0%	-0.5%	-0.5%	3.5%	0.5%	-1.0%	2.0%	1.0%	-4.0%	N/A	2.0%	1.5%
New Jersey Resources (NJR)	7.5%	7.0%	8.0%	6.5%	7.0%	6.5%	2.5%	3.5%	6.0%	7.5%	6.7%	4.0%
Northwest Natural Gas (NWN)	1.0%	3.5%	3.0%	-5.0%	3.0%	2.5%	6.0%	1.5%	1.5%	2.5%	2.8%	3.0%
South Jersey Industries (SJI)	7.0%	9.0%	8.0%	4.0%	9.5%	8.5%	3.0%	4.5%	11.5%	8.0%	7.3%	6.3%
Southwest Gas (SWX)	8.5%	6.0%	5.5%	10.0%	9.0%	5.5%	6.5%	8.0%	3.0%	6.7%	8.2%	5.8%
Spire, Inc. (SR)	3.5%	3.0%	7.5%	1.5%	3.5%	8.5%	8.0%	5.0%	4.5%	4.7%	4.5%	5.8%
WGL Holdings (WGL)	2.5%	3.0%	4.0%	2.5%	3.5%	2.5%	3.5%	3.0%	6.5%	3.2%	2.8%	4.3%
Group Average	**5.5%**	**4.7%**	**6.3%**	**5.9%**	**4.9%**	**5.9%**	**5.1%**	**4.3%**	**5.4%**	**5.5%**	**5.3%**	**4.8%**

Source: *Value Line Investment Survey, March 3, 2017.*
Note: *Negative growth rates removed from calculations.*

Value Line Growth Rates

STANDARD VALUE LINE COMPANIES

	Earnings Per Share			Dividends Per Share			Book Value Per Share			Average Growth Rates		
Company Name	Annual Growth Rate - Past 10 Years	Annual Growth Rate - Past 5 Years	Annual Growth Rate - Projected	Annual Growth Rate - Past 10 Years	Annual Growth Rate - Past 5 Years	Annual Growth Rate - Projected	Annual Growth Rate - Past 10 Years	Annual Growth Rate - Past 5 Years	Annual Growth Rate - Projected	Earnings Per Share	Dividends Per Share	Book Value Per Share
Atmos Energy Corp. (ATO)	6.0%	8.0%	6.0%	2.5%	3.5%	6.5%	5.0%	5.5%	3.5%	6.7%	4.2%	4.7%
Chesapeake Utilities (CPK)	8.0%	10.0%	8.0%	3.5%	5.0%	5.5%	9.0%	8.0%	6.5%	8.7%	4.7%	7.8%
NiSource, Inc. (NI)	-1.0%	3.5%	2.0%	0.5%	0.5%	1.0%	-0.5%	-1.0%	-4.0%	2.8%	0.7%	N/A
New Jersey Resources (NJR)	7.5%	6.5%	2.5%	7.0%	7.0%	3.5%	8.0%	6.5%	6.0%	5.5%	5.8%	6.8%
Northwest Natural Gas (NWN)	1.0%	-5.0%	6.0%	3.5%	3.0%	1.5%	3.0%	2.5%	1.5%	3.5%	2.7%	2.3%
South Jersey Industries (SJI)	7.0%	4.0%	3.0%	9.0%	9.5%	6.5%	8.0%	8.5%	11.5%	4.7%	8.3%	9.3%
Southwest Gas (SWX)	8.5%	10.0%	6.5%	6.0%	9.0%	8.0%	5.5%	5.5%	3.0%	8.3%	7.7%	4.7%
Spire, Inc. (SR)	3.5%	1.5%	8.0%	3.0%	3.5%	5.0%	7.5%	8.5%	4.5%	4.3%	3.8%	6.8%
WGL Holdings (WGL)	2.5%	2.5%	3.5%	3.0%	3.5%	3.0%	4.0%	2.5%	6.5%	2.8%	3.2%	4.3%
Group Average	**5.5%**	**5.8%**	**5.1%**	**4.2%**	**4.9%**	**4.5%**	**6.3%**	**5.9%**	**5.4%**	**5.4%**	**4.6%**	**5.9%**

Source: Value Line Investment Survey, March 3, 2017.

Note: Negative growth rates removed from calculations.

Growth in Nominal Gross Domestic Product, 1948 to 2016

Year	% Change in Nominal GDP
1948	7.90%
1949	-3.40%
1950	18.30%
1951	11.50%
1952	7.10%
1953	1.50%
1954	3.60%
1955	9.40%
1956	5.40%
1957	3.20%
1958	5.50%
1959	5.90%
1960	2.40%
1961	7.60%
1962	5.50%
1963	6.80%
1964	6.70%
1965	10.70%
1966	8.00%
1967	5.80%
1968	9.90%
1969	7.30%
1970	4.90%
1971	9.50%
1972	11.60%
1973	11.10%
1974	8.40%
1975	10.20%
1976	9.80%
1977	11.90%
1978	14.60%
1979	10.00%
1980	9.90%
1981	9.90%
1982	3.80%
1983	11.40%
1984	9.30%
1985	7.40%
1986	4.90%
1987	7.60%
1988	7.80%
1989	6.50%
1990	4.60%
1991	4.30%
1992	6.70%
1993	5.00%
1994	6.30%
1995	4.30%
1996	6.30%
1997	6.10%
1998	6.10%
1999	6.50%
2000	5.50%
2001	2.20%
2002	3.80%
2003	6.50%
2004	6.30%
2005	6.50%
2006	5.10%
2007	4.40%
2008	-0.90%
2009	0.20%
2010	4.60%
2011	3.70%
2012	3.30%
2013	4.30%
2014	4.10%
2015	3.00%
2016	3.50%
Avg. % Change 1948 to 2016	6.51%
Avg. % Change 1980 to 2016	5.43%

Source: Federal Reserve Economic Data, https://fred.stlouisfed.org, Federal Reserve Bank of St. Louis, Economic Research Division

CAPM Cost of Equity Summary

CAPM Formula: $K = R_f + \beta(R_m - R_f)$

Risk Free Rate (R_f)	4.00%
Beta (β)	0.74
Risk Premium *(Geometric Approach - Long Term Bonds)*	4.50%
Risk Premium *(Arithmetic Approach - Long Term Bonds)*	6.00%
Risk Premium *(Long Term Bonds)*	**5.25%**
Required Return (K) *(Long Term Bonds)*	7.87%

Yields on U.S. Treasury Securities
Recent Months

Month	Treasury Bonds	10 Year Treasury Bonds	20 Year Treasury Bonds	30 Year Treasury Bonds
March 2016	1.38%	1.89%	2.28%	2.68%
April 2016	1.26%	1.81%	2.21%	2.62%
May 2016	1.30%	1.81%	2.22%	2.63%
June 2016	1.17%	1.64%	2.02%	2.45%
July 2016	1.07%	1.50%	1.82%	2.23%
August 2016	1.13%	1.56%	1.89%	2.26%
September 2016	1.18%	1.63%	2.02%	2.35%
Octobert 2016	1.27%	1.76%	2.17%	2.50%
November 2016	1.60%	2.14%	2.54%	2.86%
December 2016	1.96%	2.49%	2.84%	3.11%
January 2017	1.92%	2.43%	2.75%	3.02%
February 2017	1.90%	2.42%	2.76%	3.03%
Average Last 3 months	**1.93%**	**2.45%**	**2.78%**	**3.05%**
Average Last 6 months	**1.64%**	**2.15%**	**2.51%**	**2.81%**
Average Last 12 months	**1.43%**	**1.92%**	**2.29%**	**2.65%**

Source: *www.federalreserve.gov.*

Duff and Phelps Normalized Risk Free Rate =	**4.00%**

Risk Free Rate (R_f) Range and Estimate

	Yield Calculations
Range	**2.65% to 4.00%**
Risk Free Rate (R_f)	**4.00%**

Beta for Proxy Group

Company Name	**Value Line Forward Betas (March 3, 2017)**
Atmos Energy Corp. (ATO)	0.70
Chesapeake Utilities (CPK)	0.70
NiSource, Inc. (NI)	N/A
New Jersey Resources (NJR)	0.80
Northwest Natural Gas (NWN)	0.65
South Jersey Industries (SJI)	0.80
Southwest Gas (SWX)	0.75
Spire, Inc. (SR)	0.70
WGL Holdings (WGL)	0.80
Group Average	**0.74**

Market Risk Premiums

Total Returns, 1926-2016

	Stocks	Long-term Bonds
Geometric Mean	10.00%	5.50%
Arithmetic Mean	12.00%	6.00%

Market Risk Premiums (R_m - R_f)

		Long-term Bonds
Geometric Mean		4.50%
Arithmetic Mean		6.00%
Average Market Risk Premium		**5.25%**

Source: W*iley & Sons, Duff & Phelps, 2017 SBBI Classic Ibbotson Yearbook Preview, Exhibit 8*

DUFF&PHELPS

Client Alert

March 16, 2016

Duff & Phelps Increases U.S. Equity Risk Premium Recommendation to 5.5%, Effective January 31, 2016

Contents

Section 01

Executive Summary

Executive Summary

5.5%

The Duff & Phelps U.S. Equity Risk Premium Recommendation effective January 31, 2016

Duff & Phelps Increases U.S. Equity Risk Premium Recommendation to 5.5%, Effective January 31, 2016

- Equity Risk Premium: Increased from 5.0% to 5.5%
- Risk-Free Rate: 4.0% (normalized)
- Base U.S. Cost of Equity Capital: 9.5% (4.0% + 5.5%)

The Equity Risk Premium (ERP) is a key input used to calculate the cost of capital within the context of the Capital Asset Pricing Model (CAPM) and other models.[1,2] The ERP is used as a building block when estimating the cost of capital (i.e., "discount rate", "expected return", "required return"), and is an essential ingredient in any business valuation, project evaluation, and the overall pricing of risk. Duff & Phelps regularly reviews fluctuations in global economic and financial conditions that warrant periodic reassessments of the ERP.

Based on current market conditions, Duff & Phelps is increasing its U.S. ERP recommendation from 5.0% to 5.5% when developing discount rates as of January 31, 2016 and thereafter until such time that evidence indicates equity risk in financial markets has materially changed and new guidance is issued.

[1] The equity risk premium (ERP), sometimes referred to as the "market" risk premium, is defined as the return investors expect as compensation for assuming the additional risk associated with an investment in a diversified portfolio of common stocks *in excess* of the return they would expect from an investment in risk-free securities.

[2] The cost of capital is the expected rate of return required in order to attract funds to a particular investment.

4.0%

The Duff & Phelps concluded normalized risk-free rate, as of January 31, 2016

Duff & Phelps developed its current ERP recommendation in conjunction with a "normalized" 20-year yield on U.S. government bonds of 4.0% as a proxy for the risk-free rate (R_f) implying a 9.5% (4.0% + 5.5%) "base" U.S. cost of equity capital estimate at the end of January 2016.[3] The use of the spot yield-to-maturity of 2.4% as of January 29, 2016 would result in an overall discount rate that is likely inappropriately low vis-à-vis the risks currently facing investors.[4]

Duff & Phelps last changed its U.S. ERP recommendation on February 28, 2013.[5] On that date, our recommendation was lowered to 5.0% (from 5.5%) in response to evidence that suggested a *reduced* level of risk in financial markets relative to the heightened uncertainty observed in the aftermath of the 2008 global financial crisis, and during the ensuing Euro sovereign debt crisis (which was severely felt from 2010 until 2012).

During 2015, we started seeing some signs of increased risk in financial markets. While the evidence was somewhat mixed as of December, 31, 2015, we can now see clear indications that equity risk in financial markets has increased significantly as of January 31, 2016. Exhibit 1 summarizes the factors considered in our U.S. ERP recommendation.[6]

Exhibit 1: Factors Considered in U.S. ERP Recommendation

Factor	Change	Effect on ERP
U.S. Equity Markets	↓	↑
Implied Equity Volatility	↑	↑
Corporate Spreads	↑	↑
Historical Real GDP Growth and Forecasts	↔	↔
Unemployment Environment	↓	↓
Consumer and Business Sentiment	↔	↔
Sovereign Credit Ratings	↔	↔
Damodaran Implied ERP Model	↑	↑
Default Spread Model	↑	↑

[3] A risk-free rate is the return available on a security that the market generally regards as free of the risk of default. We discuss the background for using a normalized risk-free rate and our concluded normalized risk-free rate in Section 3 "Estimating the Risk-Free Rate", starting on page 9.
[4] The 20-year constant-maturity U.S. Treasury yield was 2.36%, as of January 29, 2016. Source: Board of Governors of the Federal Reserve System website at: http://www.federalreserve.gov/releases/h15/data.htm.
[5] To access the Client Alert report documenting Duff & Phelps' prior U.S. ERP recommendation, visit: www.duffandphelps.com/costofcapital.
[6] Some of the factors in Exhibit 1 are discussed in greater detail later in this report.

Taking these factors together, we find support for increasing our ERP recommendation relative to our previous recommendation.[7]

TO BE CLEAR:

- The Duff & Phelps U.S. ERP recommendation as of January 31, 2016 (and thereafter, until further notice) is 5.5%, matched with a normalized risk-free rate of 4.0%. This implies a 9.5% (4.0% + 5.5%) "base" U.S. cost of equity capital estimate as of January 31, 2016.

- Many valuations are done at year-end. The Duff & Phelps U.S. ERP recommendation for use with December 31, 2015 valuations is 5.0%, matched with a normalized risk-free rate of 4.0%. This implies a 9.0% (4.0% + 5.0%) "base" U.S. cost of equity capital estimate as of December 31, 2015.

[7] The Duff & Phelps ERP estimate is made in relation to a risk-free rate (either "spot" or "normalized"). A "normalized" risk-free rate can be developed using longer-term averages of Treasury bond yields and the build-up framework outlined in Section 3 "Estimating the Risk-Free Rate", starting on page 9.

Section 02

Overview of Duff & Phelps ERP Methodology

Overview of Duff & Phelps ERP Methodology

A Two-Dimensional Process

There is no single universally accepted methodology for estimating the ERP; consequently there is wide diversity in practice among academics and financial advisors with regards to ERP estimates. For this reason, Duff & Phelps employs a two-dimensional process that takes into account a broad range of economic information and multiple ERP estimation methodologies to arrive at its recommendation.

First, a reasonable range of normal or unconditional ERP is established. Second, based on current economic conditions, we estimate where in the range the true ERP likely lies (top, bottom, or middle).

Long-term research indicates that the ERP is cyclical.[8] We use the term *normal*, or *unconditional* ERP to mean the long-term average ERP without regard to current market conditions. This concept differs from the *conditional* ERP, which reflects current economic conditions.[9] The "unconditional" ERP range versus a "conditional" ERP is further distinguished as follows:

"What is the range?"

- **Unconditional ERP Range** – The objective is to establish a reasonable range for a normal or unconditional ERP that can be expected over an entire business cycle. Based on an analysis of academic and financial literature and various empirical studies, we have concluded that a reasonable long-term estimate of the normal or unconditional ERP for the U.S. is in the range of 3.5% to 6.0%.[10]

"Where are we in the range?"

- **Conditional ERP** – The objective is to determine where within the unconditional ERP range the conditional ERP should be, based on current economic conditions. Research has shown that ERP fluctuates during the business cycle. When the economy is near (or in) a recession, the conditional ERP is at the higher end of the normal, or unconditional ERP range. As the economy improves, the conditional ERP moves back toward the middle of the range and at the peak of an economic expansion, the conditional ERP approaches the lower end of the range.

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[8] See for example John Cochrane's "Discount Rates. American Finance Association Presidential Address" on January 8, 2011, where he presented research findings on the cyclicality of discount rates in general. His remarks were published as Cochrane, J. H. (2011), *Presidential Address: Discount Rates*. The Journal of Finance, 66: 1047–1108.

[9] The "conditional" ERP is the ERP estimate published by Duff & Phelps as the "Duff & Phelps Recommended ERP".

[10] See Shannon P. Pratt and Roger J. Grabowski, *Cost of Capital: Applications and Examples*, Fifth Edition, Chapter 8 "Equity Risk Premium", and accompanying Appendices 8A and 8B, for a detailed discussion of the ERP.

Section 03

Estimating the Risk-Free Rate

Estimating the Risk-Free Rate

The Risk-free Rate and Equity Risk Premium: Interrelated Concepts[11]
A risk-free rate is the return available, as of the valuation date, on a security that the market generally regards as free of the risk of default.

For valuations denominated in U.S. dollars, valuation analysts have typically used the spot yield to maturity (as of the valuation date) on U.S. government securities as a proxy for the risk-free rate. The two most commonly used risk-free bond maturities have been the 10- and 20-year U.S. government bond yields.

The use of (i) long-term U.S. government bonds, and (ii) an ERP estimated relative to yields on long-term bonds most closely match the investment horizon and risks that confront business managers who are making capital allocation decisions and valuation analysts who are applying valuation methods to value a "going concern" business.

The risk-free rate and the ERP are interrelated concepts. All ERP estimates are, by definition, developed *in relation* to the risk-free rate. Specifically, the ERP is the extra return investors expect as compensation for assuming the additional risk associated with an investment in a diversified portfolio of common stocks, compared to the return they would expect from an investment in risk-free securities.

This brings us to an important concept. When developing cost of capital estimates, the valuation analyst should match the term of the risk-free rate used in the CAPM or build-up formulas with the duration of the expected net cash flows of the business, asset, or project being evaluated. Further, the term of the risk-free rate should also match the term of the risk-free rate used to develop the ERP, as illustrated in Exhibit 2.

Exhibit 2: The Risk-Free Rate and ERP Should be Consistent with the Duration of the Net Cash Flows of the Business, Asset, or Project Being Evaluated

Term of risk-free rate used in CAPM or Build-up equation	=	Expected duration of the net cash flows of the business, asset, or project being evaluated	=	Term of risk-free rate used to develop the ERP

[11] This section was extracted from Chapter 3 of the Duff & Phelps *2016 Valuation Handbook – Guide to Cost of Capital* (Hoboken, NJ: John Wiley & Sons, 2016). The discussion in this section was based on information available at the time of writing (through February 23, 2016). Events and market conditions may have changed since then relative to when this report is issued.

In many of the cases in which one is valuing a business, a "going concern" assumption is made (the life of the business is assumed to be indefinite), and therefore selecting longer-term U.S. government bond yields (e.g., 20 years) as the proxy for the risk-free rate is appropriate.

The risk-free rate and the ERP, like all components of the cost of equity capital (and the cost of equity capital itself), are *forward-looking* concepts. The reason that the cost of capital is a forward-looking concept is straightforward: when we value a company (for instance), we are trying to value how much we would pay (now) for the *future* economic benefits associated with owning the company. Since we will ultimately use the cost of capital to discount these future economic benefits (usually measured as expected cash flows) back to their present value, the cost of capital itself must *also* be forward-looking.

Spot Risk-Free Rates versus Normalized Risk-Free Rates

Beginning with the financial crisis of 2008 (the "Financial Crisis"), analysts have had to reexamine whether the "spot" rate is still a reliable building block upon which to base their cost of equity capital estimates. The Financial Crisis challenged long-accepted practices and highlighted potential problems of simply continuing to use the spot yield-to-maturity on a safe government security as the risk-free rate, without any further adjustments.

During periods in which risk-free rates appear to be abnormally low due to flight to quality or massive central bank monetary interventions, valuation analysts may want to consider normalizing the risk-free rate. By "normalization" we mean estimating a risk-free rate that more likely reflects the *sustainable* average return of long-term U.S. Treasuries.

Why Normalize the Risk-Free Rate?

The yields of U.S. government bonds in certain periods during and after the Financial Crisis may have been *artificially* repressed, and therefore likely unsustainable. Many market participants will agree that nominal U.S. government bond yields in recent periods have been artificially low. The Federal Reserve Bank ("Fed"), the central bank of the United States, kept a zero interest rate policy (dubbed "ZIRP" in the financial press) for seven years, from December 2008 until December 2015.

Even members of the Federal Open Market Committee (FOMC) have openly discussed the need to "normalize" interest rates over the last couple of years.[12] For example, at an April 2015 conference, James Bullard, President of the Federal

[12] The FOMC is a committee within the Federal Reserve System, charged under U.S. law with overseeing the nation's open market operations (i.e., the Fed's buying and selling of U.S. Treasury securities).

Reserve Bank of St. Louis, discussed "Some Considerations for U.S. Monetary Normalization", where he stated:[13]

> *"Now may be a good time to begin normalizing U.S. monetary policy so that it is set appropriately for an improving economy over the next two years."*

John C. Williams, President of the Federal Reserve Bank of San Francisco (not currently an FOMC member), has also been very vocal about the need to start normalizing interest rates. During 2015, he gave several presentations and speeches, where he mentioned the need to normalize interest rates. For example, in a series of presentations delivered in September and October 2015, he said:[14]

> *"(...) an earlier start to raising rates would allow us to engineer a smoother, more gradual process of policy normalization."*

In a more recent speech, he acknowledged, however, that even after normalization takes place, interest rates may simply be lower than in pre-Financial Crisis years. Discussing the Fed's short-term benchmark interest rate (the target federal funds rate), he elaborated on that topic:[15,16]

> *"As we make our way back to normal, we should consider what "normal" will look like for interest rates.(...) The evidence is building that the new normal for interest rates is quite a bit lower than anyone in this room is accustomed to.(...) That doesn't mean they'll be zero, but compared with the pre-recession "normal" funds rate of, say, between 4 and 4.5 percent, we may now see the underlying r-star guiding us towards a fed funds rate of around 3–3½ percent instead."*[17]

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[13] "Some Considerations for U.S. Monetary Policy Normalization", presentation at the 24th Annual Hyman P. Minsky Conference in Washington, D.C., April 15, 2015. A copy of the presentation can be found here: https://www.stlouisfed.org/~/media/Files/PDFs/Bullard/remarks/Bullard-Minsky-15-April-2015.pdf. For a list of speeches and presentations by President James Bullard, visit: https://www.stlouisfed.org/from-the-president/speeches-and-presentations.

[14] This series of presentations was entitled "The Economic Outlook: Live Long and Prosper". See for example, the presentation at UCLA Anderson School of Management, Los Angeles, California on September 28, 2015. A copy of the remarks can be found here: http://www.frbsf.org/our-district/press/presidents-speeches/williams-speeches/2015/september/economic-outlook-live-long-and-prosper-ucla/. For a list of speeches and presentations by President John C. Williams, visit: http://www.frbsf.org/our-district/press/presidents-speeches/williams-speeches/.

[15] The federal funds rate is the interest rate at which depository institutions lend balances to each other overnight. The target federal funds rate is a short-term rate and is used as the benchmark interest rate to implement U.S. monetary policies, such as raising or reducing interest rates.

[16] "After the First Rate Hike", Presentation to California Bankers Association, Santa Barbara, California on January 8, 2016. A copy of the remarks can be found here: http://www.frbsf.org/our-district/press/presidents-speeches/williams-speeches/2016/january/after-the-first-rate-hike-economic-outlook/.

[17] The so-called r^* (r-star) stands for the longer-run value of the neutral rate. President Williams defined r-star as essentially what inflation-adjusted interest rates (i.e. real rates) will be once the economy is back to full strength.

While the views of regional Fed Presidents or individual FOMC members do not reflect the official positions of the committee, the reality is that the minutes of 2014 and 2015 FOMC meetings repeated the term "policy normalization" several times, in the context of deciding if and when to raise interest rates.[18]

At its December 15–16, 2015 meeting, the Fed decided to raise the target range for the federal funds rate for the first time in nine years, from a range of 0.00%–0.25% to 0.25%–0.50% (a 25 basis point increase). In support of its decision, the Fed highlighted the considerable improvement in the labor market over the course of the year, and reiterated its expectation that inflation would rise over the medium-term to its target rate of 2.0%.[19]

Even then, officials were very cautious on how to characterize the timing of nominalization policies, seemingly signaling that further increase in interest rates will be gradual.

Nevertheless, in conjunction with the December 15–16, 2015 meeting, FOMC members also submitted their projections of the most likely outcomes for real GDP growth, unemployment rate, inflation, and the federal funds rate for each year from 2015 to 2018 and over the longer run. All of the 17 FOMC participants believed that the target level for the federal funds rate should increase further during 2016, with the median projection suggesting it could rise by another 100 basis points. The median estimate for the longer-term federal funds rate is 3.5% (note: the federal funds rate is a short-term interest rate). However, given the recent headwinds in global financial markets, investors are projecting a much slower pace of rate hikes.[20]

So what does it mean when someone says the current U.S. Treasury yields are not "normal"? And even if interest rates are not considered "normal", why is that any different from other periods in history? Remember, the risk-free rate is intended to adjust the cost of equity capital for expected future inflation. Typically, valuation analysts use a 20-year U.S. government bond yield when developing a U.S. dollar-denominated cost of equity capital. Therefore, the risk-free rate should reflect an average expected return over those years.

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[18] To access minutes of FOMC meetings visit:
http://www.federalreserve.gov/monetarypolicy/fomccalendars.htm.

[19] Minutes of the Federal Open Market Committee December 15–16, 2015", Board of Governors of the Federal Reserve System. For details visit:
http://www.federalreserve.gov/monetarypolicy/fomccalendars.htm.

[20] See, for example, the CME Group FedWatch Tool. The FedWatch Tool is based on CME Group 30-Day Fed Fund futures prices, which are used to express the market's views on the likelihood of changes in U.S. monetary policy. This tool allows market participants to view the probability of an upcoming federal funds rate hike up to one year out. For details visit:
http://www.cmegroup.com/trading/interest-rates/countdown-to-fomc.html.

To be clear, in most circumstances we would prefer using the "spot" yield (i.e., the yield available in the market) on a safe government security as a proxy for the risk-free rate.[21] However, during times of flight to quality and/or high levels of central bank intervention (such as the period beginning with the Financial Crisis) those *lower* observed yields imply a *lower* cost of capital (all other factors held the same), just the opposite of what one would expect in times of relative economy-wide distress and uncertainty. During these periods, using a non-normalized risk-free rate (with no corresponding adjustments to the ERP) would likely lead to an *underestimated* cost of equity capital, and so a "normalization" adjustment may be a reasonable approach to address the apparent inconsistency.

Why isn't the Current Spot Risk-Free Rate Considered "Normal"?

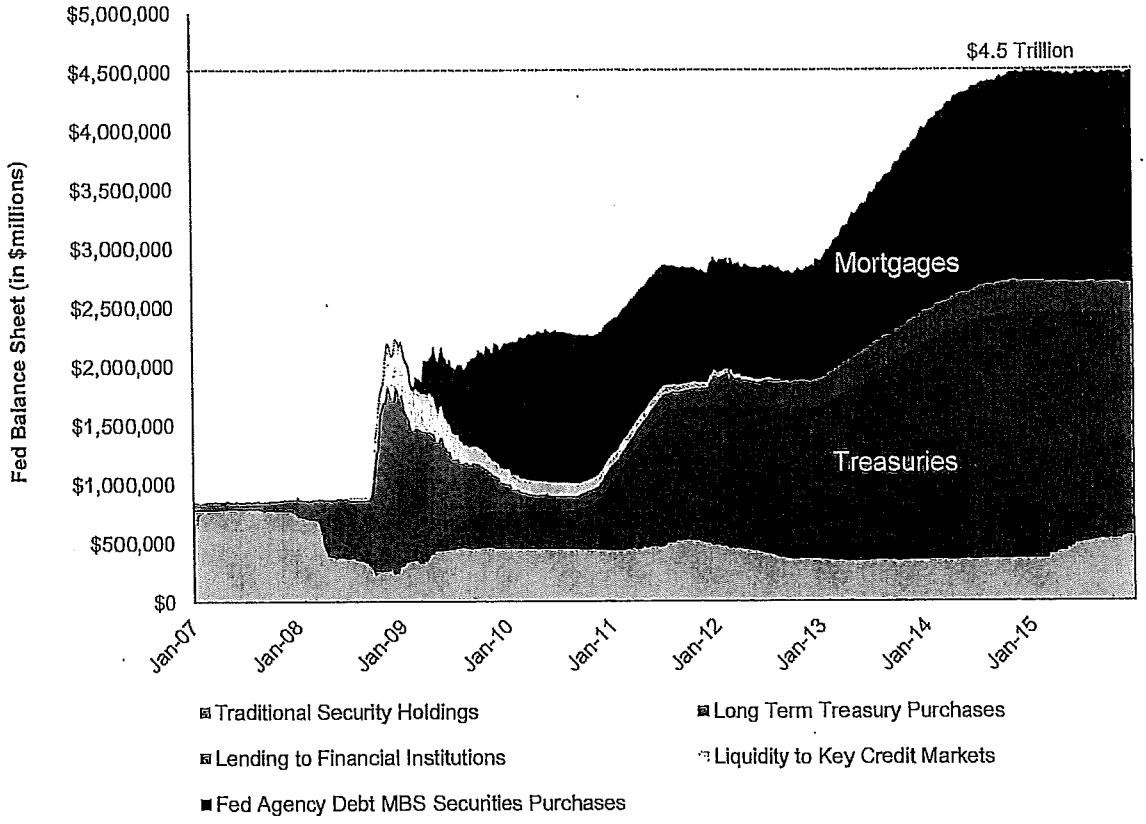
Part of the reason that U.S. Treasury yields are likely "artificially repressed" is that the "Fed" has been *telling* us that its actions are intended to push rates down, and thus boost asset prices (e.g., stocks, housing). For example, at the September 13, 2012 FOMC press conference, the Fed Chairman at the time, Ben Bernanke, stated:

> *"...the tools we have involve affecting financial asset prices...To the extent that home prices begin to rise, consumers will feel wealthier, they'll feel more disposed to spend ... So house prices is one vehicle. Stock prices – many people own stocks directly or indirectly...and if people feel that their financial situation is better because their 401(k) looks better or for whatever reason, their house is worth more, they are more willing to go out and spend, and that's going to provide the demand that firms need in order to be willing to hire and to invest."*

In Exhibit 3, the balance sheet of the U.S. Federal Reserve is shown over time. Since the Financial Crisis, the Fed has been purchasing massive quantities of U.S. Treasuries and mortgage backed securities (MBS) through a series of so-called quantitative easing (QE) measures. At the end of December 2015, the Fed's balance sheet summed to $4,491,440 million ($4.5 *trillion*), virtually unchanged from December 2014.[22]

[21] Government bond yields can be found at the Board of Governors of the Federal Reserve System website at: http://www.federalreserve.gov/releases/h15/data.htm.
[22] Source of underlying data: Federal Reserve Bank of Cleveland. To learn more, visit: https://www.clevelandfed.org.

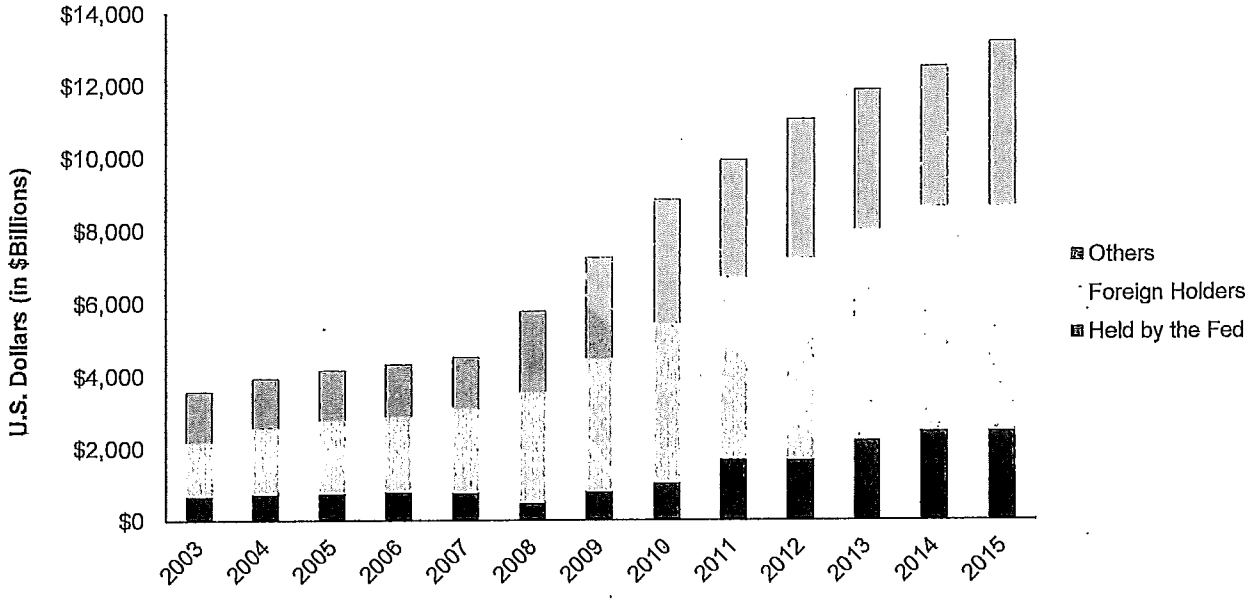
Exhibit 3: Balance Sheet of the Federal Reserve (vis-à-vis Credit Easing Policy Tools)
January 2007–December 2015



In the post-crisis period, some analysts estimated that the Fed's purchases accounted for a growing majority of new Treasury issuance. In early 2013 in the online version of the *Financial Times*, one analyst wrote, "*The Fed, the biggest buyer in the market, has been the driver of artificially low Treasury yields*".[23] In Exhibit 4 we show the aggregate dollar amount of marketable securities issued by the U.S. Department of Treasury (e.g., bills, notes, bonds, inflation-indexed securities, etc.) from 2003 through December 2015. We also display how much of the U.S. public debt is being held by the Fed, foreign investors (including official foreign institutions), and other investors.[24]

[23] Michael Mackenzie, "Fed injects new sell-off risk into Treasuries", FT.com, January 8, 2013.
[24] Source of underlying data: Federal Reserve Bank of St. Louis Economic Research; U.S. Department of the Treasury. Compiled by Duff & Phelps LLC. Sources included: (i) Board of Governors of the Federal Reserve System (U.S.), U.S. Treasury securities held by the Federal Reserve: All Maturities [TREAST], retrieved from FRED, Federal Reserve Bank of St. Louis at https://research.stlouisfed.org/fred2/series/TREAST/, January 29, 2016; (ii) Monthly Statements of the Public Debt (MSPD) retrieved from https://www.treasurydirect.gov/govt/reports/pd/mspd/mspd.htm, January 29, 2016; and (iii) U.S. Department of the Treasury International Capital (TIC) System's Portfolio Holdings of U.S. and Foreign Securities – A. Major Foreign Holders of U.S. Treasury Securities retrieved from http://www.treasury.gov/resource-center/data-chart-center/tic/Pages/ticsec2.aspx, February 17, 2016.

Exhibit 4: Marketable U.S. Treasury Securities Held by the Public
December 2003–December 2015

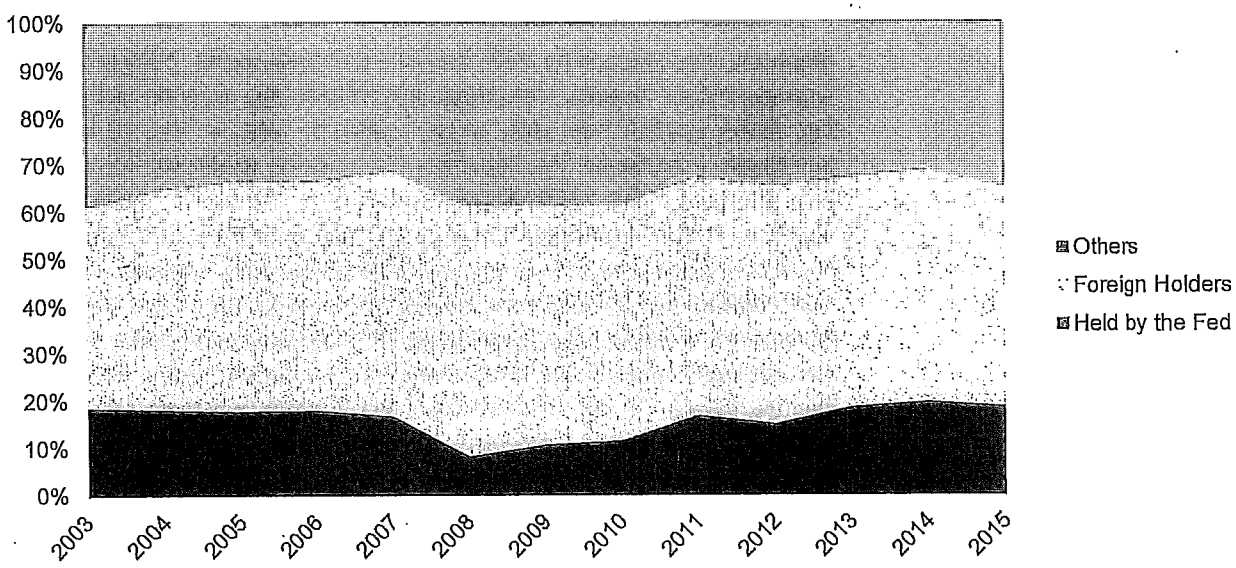


Notably, the issuance of marketable interest-bearing debt by the U.S. government to the public increased almost threefold between the end of 2007 and 2015. Keeping everything else constant (ceteris paribus), the law of supply and demand would tell us that the dramatic increase in supply would lead to a significant decline in government bond prices, which would translate into a surge in yields. But that is not what happened. During the same period, the Fed more than tripled its holdings of U.S. Treasury securities, representing a 16% compound annual growth rate through the end of 2015.[25] Between 2003 and 2008, the Fed's holdings of U.S. Treasuries had held fairly constant in the vicinity of $700 to $800 billion, with December 2008 being the significant exception, when holdings dropped to approximately $476 billion. The first QE program was announced by the FOMC in November 2008, and formally launched in mid-December 2008. After that period, the various QE programs implemented by the Fed have contributed to absorb a sizable portion of the increase in U.S. Treasuries issuance. It is noted that for the first time since 2008, the Fed's holding of marketable U.S. Treasury securities stayed constant at the end of 2015 (in dollar amount) relative to the prior year. Nevertheless, the share held by the Fed at the end of 2015 continues to be at similar levels as those of 2013 and 2014.

[25] If the comparison had been made between 2008 and 2015, the increase would be even more staggering: holdings by the Fed increased 417%, or a 26% compound annual growth rate.

Likewise, broad demand for safe government debt by foreign investors, amid the global turmoil that followed the Financial Crisis, has absorbed another considerable fraction of new U.S. Treasuries issuance. How significant are these purchases by the Fed and foreign investors? Exhibit 5 shows the same information as in Exhibit 4, but displays the relative share of each major holder of marketable U.S. Treasuries since 2003 until 2015.[26]

Exhibit 5: Relative Holdings of Marketable U.S. Treasury Securities Held by the Public (in percentage terms)
December 2003–December 2015



At the end of 2015, the relative share of U.S. Treasuries held by the Fed and foreign investors was almost 19% and 47% respectively, for a combined 65%. This combined level is actually close to the 69% observed at the end of 2007, prior to the onset of the Financial Crisis. However, as indicated above, the dollar amount of U.S. Treasuries has tripled after 2007, meaning that the Fed and foreign investors have absorbed over two-thirds of the available stock in the post-crisis period. Interestingly, a look at the composition of foreign investors reveals that since 2006 over two-thirds are actually foreign official institutions (i.e., central banks and central governments of foreign countries).[27,28] Thus, a great majority of U.S. Treasuries are currently being held by either foreign government arms or central banks around the world (including the Fed).

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[26] Source of underlying data: Federal Reserve Bank of St. Louis Economic Research; U.S. Department of the Treasury. Compiled by Duff & Phelps LLC.
[27] Source: Treasury International Capital (TIC) System's Portfolio Holdings of U.S. and Foreign Securities – A. Major Foreign Holders of U.S. Treasury Securities retrieved from http://www.treasury.gov/resource-center/data-chart-center/tic/Pages/ticsec2.aspx, February 17, 2016.
[28] For a description of foreign official institutions, visit "TIC Country Codes and Partial List of Foreign Official Institutions" at: http://www.treasury.gov/resource-center/data-chart-center/tic/Pages/foihome.aspx.

A team of researchers has recently studied the impact that this massive amount of U.S. Treasury purchases by foreign investors and the Fed have had on long-term real rates. Specifically, using data through November 2012, the authors estimated that by 2008 foreign purchases of U.S. Treasuries had cumulatively reduced 10-year real yields by around 80 basis points. The subsequent Fed purchases through the various QE programs implemented in the 2008–2012 period was estimated to incrementally depress 10-year real yields by around 140 basis points. Combining the impact of Fed and foreign investor purchases of U.S. Treasuries, real 10-year yields were depressed by 2.2% at the end of 2012, according to these authors' estimates.[29]

When the Fed concluded its third round of QE measures (in October 2014) and signaled that an increase in the target federal funds rate might be on the horizon, the salient question was what would happen to rates as one of the largest purchasers in the market (the Fed) discontinued its QE operations. All other things held the same, rates would be expected to rise. But again, that is not what happened. In fact, the yield on 10-year U.S. Treasury bonds dropped from 2.4% at the end of October to 2.2% at the end of December 2014. Likewise, the 20-year yield dropped from 2.8% to 2.5% over the same period. Even more concerning is the behavior of interest rates following the Fed's decision on December 16, 2015 to raise its target range for the federal funds rate for the first time in nine years. At first, the yield on 10- and 20-year U.S. Treasury bonds increased, reaching 2.3% and 2.7% respectively at December 31, 2015. In fact, yields had already been rising since October 2015, in anticipation of such a rate hike decision. However, by January 31, 2016, 10- and 20-year yields were back at 1.9% and 2.4%, respectively.

Why is that?

It may be useful to first distinguish short-term drivers versus long-term trends in interest rates.

It is almost undisputed that aggressive monetary policies implemented as a response to the Financial Crisis drove long-term interest rates in the U.S. and several advanced economies to historically low levels. But many economists claim that the current low rate environment is not just a cyclical story and that we can expect to see a lower level of interest rates in the long term (although not as low as today's). A number of explanatory factors and theories have emerged, some more pessimistic than others.

[29] Kaminska, Iryna and Zinna, Gabriele, "Official Demand for U.S. Debt: Implications for U.S. Real Interest Rates". IMF Working Paper No. 14/66 (April 2014).

It is not our place to select which, amongst the various theories, is more (or less) correct. Instead, we suggest that valuation specialists read different sources to get acquainted with such theories. A recent survey conducted by the Council of Economic Advisers lists various factors that could help explain why long-term interest rates are currently so low. According to the study, the following is a list of possible factors, bifurcated between those that are likely transitory in nature and those that are likely longer-lived:[30, 31]

Factors that Are Likely Transitory

- Fiscal, Monetary, and Foreign-Exchange Policies
- Inflation Risk and the Term Premium
- Private-sector Deleveraging

Factors that Are Likely Longer-Lived

- Lower Global Long-run Output and Productivity Growth
- Shifting Demographics
- The Global "Saving Glut"
- Safe Asset Shortage
- Tail Risks and Fundamental Uncertainty

The report concludes that it remains an open question whether the underlying factors linked to the currently low rates are transitory, or do they imply that the long-run equilibrium for long-term interest rates is lower than before the Financial Crisis.

The bottom line is that the future path of interest rates is currently uncertain.[32] So, for now, we will focus on some the factors that may be keeping interest rates ultra-low in the near term and discuss whether one can expect an increase from these levels in the medium term.

[30] The Council of Economic Advisers, an agency within the Executive Office of the President of the United States, is charged with providing economic advice to the U.S. President on the formulation of both domestic and international economic policy.
[31] "Long-Term Interest Rates: A Survey", July 2015. The full report can be accessed here: https://www.whitehouse.gov/sites/default/files/docs/interest_rate_report_final_v2.pdf. See also "The Decline in Long-Term Interest Rates", July 14, 2015, a short blog article by Maurice Obstfeld and Linda Tesar discussing the various possible drivers of low long-term interest rates listed in the report. The article can be accessed here: https://www.whitehouse.gov/blog/2015/07/14/decline-long-term-interest-rates.
[32] For another analysis of current long-term interest rates, see Jonathan Wilmot, "When bonds aren't bonds anymore", *Credit Suisse Global Investment Returns Yearbook 2016*, February 2016.

First of all, the size of the Fed's balance sheet is still considered enormous by historical standards and the Fed has expressed the intent to keep its holdings for a long time. For example, at its December 2015 meeting, when announcing the increase by 25 basis points of the target range for the federal funds rate from 0.00%–0.25% to 0.25%–0.50%, the FOMC still stated that:[33]

> *"The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction, and it anticipates doing so until normalization of the level of the federal funds rate is well under way. This policy, by keeping the Committee's holdings of longer-term securities at sizable levels, should help maintain accommodative financial conditions."*

Translation: the Fed is keeping the size of its balance sheet constant for the foreseeable future, because it still wants to keep long-term interest rates low.

A report released in November 2014 (following the conclusion of QE3) by Standard & Poor's (S&P) appears to concur with our interpretation:[34]

> *"Since QE works via a stock effect, as long as a central bank is maintaining a certain stock of QE, it is still "doing" QE. If a central bank has reached the maximum point of expanding its balance sheet, it is a little perverse to describe it as having "ended QE." Rather, what it will have ended are the asset purchases required to get it to the point of having done the maximum amount of QE it has decided to put in place."*

So, while the process of rate normalization has formally begun, the Fed is planning for a very gradual increase in interest rates. For example, in the minutes of the same December 2015 meeting, the FOMC also stated that:

> *"The Committee expects that economic conditions will evolve in a manner that will warrant only gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run."*

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[33] Press Release of FOMC's Monetary Policy Statement, December 16, 2015. For details visit: http://www.federalreserve.gov/monetarypolicy/fomccalendars.htm.

[34] S&P *Ratings Direct* report entitled "Economic Research: The Fed Is Continuing, Not 'Ending,' Quantitative Easing", November 4, 2014.

Secondly, another phenomenon has helped push U.S. interest rates lower over time: purchases of U.S. Treasury securities by foreign investors have grown at a fast pace over the last several years.[35] While 2015 was the first time in many years when net purchases increased by only a negligible amount, the reality is that the total share of U.S. Treasuries owned by foreign investors is still very high (refer back to Exhibit 4). Should foreign demand for U.S. Treasury securities drop, it would still take some years for such significant holdings to be unwound (especially given the level of globalization of the world economy). Notably, there are academic studies that document a significant impact of foreign investors on U.S. interest rates even prior to the onset of 2008 Financial Crisis. One such study (not to be confused with the research cited above) estimated that absent the substantial foreign inflows into U.S. government bonds, the (nominal) 10-year Treasury yield would be 80 basis points higher using data through 2005.[36] The impact of foreign financial flows on long-term interest rates is not confined to the U.S. A recent research paper estimates that the increase in foreign holdings of Eurozone bonds between early 2000 and mid-2006 is associated with a reduction of Eurozone long-term interest rates by 1.55%.[37]

Thirdly, an environment of geopolitical and economic uncertainty led to flight to quality movements during certain periods of 2015, which helped drive interest rates even lower for major safe havens countries. Flight to quality has been particularly acute in early 2016.

Global investors had enough reasons to seek safe haven investments during 2015. In general, political conflicts continued in 2015 in various regions of the world. Major examples include (i) the face-off between the Eurozone and Greece's new radical left-leaning government, which culminated in Greece defaulting on its sovereign debt with the International Monetary Fund (IMF), being forced to accept a third bail-out package, and barely escaping an exit from the Eurozone; (ii) the escalation of the civil war in Syria, leading to a refugee crisis, with an increasing number of refugees seeking asylum in neighboring Middle Eastern countries and in the European Union; and (iii) the strengthening of the Islamic State of Iraq and Syria (ISIS), which continued to launch terrorist attacks across the globe, with the greatest shock felt in November when ISIS carried out a series of coordinated attacks in Paris, France.

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[35] Source: Treasury International Capital (TIC) System's Portfolio Holdings of U.S. and Foreign Securities – A. Major Foreign Holders of U.S. Treasury Securities retrieved from http://www.treasury.gov/resource-center/data-chart-center/tic/Pages/ticsec2.aspx, February 17, 2016.

[36] Warnock, Francis E., and Veronica Cacdac Warnock, "International Capital Flows and U.S. Interest Rates," *Journal of International Money and Finance* 28 (2009): 903-919.

[37] Carvalho, Daniel and Michael Fidora, "Capital inflows and euro area long-term interest rates", ECB Working Paper 1798, June 2015. Note that the 'euro' was introduced to financial markets on January 1, 1999 as the new 'single currency' of what is now known as the Eurozone.

In addition, concerns about a slowing global economy and deflationary pressures have also led global investors to seek safe haven investments, such as government bonds issued by the U.S., Germany, and Switzerland, to name a few. Oil prices continued to tumble from its mid-2014 highs, reinforcing investor anxiety over stagnant growth in the Eurozone and Japan, as well as a deceleration in China and several other emerging-market countries.

Mid-August 2015 caught global markets by surprise, when China announced a devaluation of the yuan, following dramatic sell-offs of Chinese equities throughout the month of July. The surprise yuan devaluation was followed by a few days of disappointing news about China's economy. The apparent slowdown in China's economy (i) raised fears of a further global economic slowdown, (ii) significantly depressed commodity prices (China is the world's largest importer of several raw materials), and (iii) weighed heavily on world financial markets. The Fed's announcement in September that it would not raise rates (when the market participant consensus had been predicting a rate hike), took into consideration the increased economic uncertainty implied by the tumult observed in global markets.

On the other hand, the sharp decline in oil prices has put additional pressure in an already very low inflation environment, considered by many as bordering on deflation territory. For perspective, the price of Brent crude oil was at $115/barrel in mid-June 2014; since then prices declined to $38/barrel at the end of 2015, a cumulative 67% decline in the space of a year and a half. The collapse of oil prices has continued in early 2016.[38] The potential benefit of lower oil prices to oil-importing nations has not (yet, at least) been felt on economic growth. Worryingly, should major economic regions such as the Eurozone enter into a deflationary path, one could use Japan's "lost decades" as a parallel to what might happen in the future.

Deflation risks and economic stagnation are precisely what led central banks in Japan and Eurozone to recently boost their respective monetary easing policies. In October 2014, Japan's central bank surprised the world by announcing a second easing program self-dubbed as "quantitative and qualitative easing" (QQE).[39] In November, after the announcement of a second consecutive quarter of economic contraction, Japan's prime minister Shinzo Abe also proclaimed snap parliamentary elections, explicitly seeking endorsement to continue with the government's expansionary economic policies (also known as "Abenomics"). While Abe's party managed to keep its two-third majority in the December 2014 elections, the QQE measures failed to spur real economic growth in 2015, with headline inflation far below the Bank of Japan's (BOJ) 2.0% target.

[38] Source: S&P *Capital IQ* database.
[39] For a list of BOJ's monetary policy decisions, visit: http://www.boj.or.jp/en/mopo/mpmdeci/index.htm/.

In another surprise move, the BOJ announced on January 29, 2016 a landmark decision to implement a negative interest rate policy (dubbed "NIRP" in the financial press), in conjunction with its QQE. The BOJ now joins the European Central Bank (ECB), as well as the Danish, the Swedish, and the Swiss central banks in adopting this new form of unconventional monetary policies. NIRP entails financial institutions paying interest on the liabilities that the central bank issues to them. The main idea of NIRP is to discourage savings, while creating incentives for consumers to increase their spending and companies to expand their investment. However, the consequence of such measures is to also pressure interest rates further downwards. According to an S&P research report:[40]

> *"Negative interest rate policy appears to be able to exert downward pressure on the whole yield curve via the portfolio rebalance effect, as security prices, perturbed by the central bank's fixing of one price, adjust to restore equilibrium."*

According to recent Bloomberg calculations, more than $7 trillion of government bonds globally offered negative yields in early February 2016, making up about 29% of the Bloomberg Global Developed Sovereign Bond Index.[41]

In the Eurozone, lackluster growth trends, coupled with deflation fears, induced the ECB to cut its benchmark rate to a new record low in early June 2014, while also announcing an unprecedented measure to charge negative interest rates on deposits held at the central bank.[42] Responding to a weak third quarter, the ECB again cut its benchmark rate to 0.05% in September 2014, and revealed details for two different securities purchase programs. The continued threat of deflation led the ECB to announce a larger scale sovereign debt buying program in January 2015, consisting of €60 billion in monthly asset purchases. This program was launched in March with an original target end-date of September 2016. Real GDP growth did accelerate in the first quarter of 2015, with consumer price inflation and job growth also showing signs of improvement. However, growth decelerated once again in the second and third quarters. The November terrorist attacks in Paris, the Syrian refugee crisis, and the mounting political uncertainty in Spain and Portugal were all risk factors affecting the Eurozone at the end of 2015. Inflation was also virtually stagnant in October and November. As a result, the ECB announced on December 3, 2015 a further cut of the already-negative deposit facility rate and an extension of monthly asset purchases to March 2017; markets were nevertheless disappointed, as a further expansion of the QE program had been anticipated.

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[40] Standard & Poor's *Ratings Direct* report entitled "Negative Interest Rates: Why Central Banks Can Defy 'Time Preference'", February 3, 2016.
[41] World's Negative-Yielding Bond Pile Tops $7 Trillion: Chart", February 9, 2015. This article can be accessed here: http://www.bloomberg.com/news/articles/2016-02-09/world-s-negative-yielding-bond-pile-tops-7-trillion-chart.
[42] For a list of ECB's monetary policy decisions, visit: https://www.ecb.europa.eu/press/govcdec/html/index.en.html.

Markets are now expecting the ECB to expand its QE policies at its March 2016 meeting.[43]

The current economic conditions in the Eurozone and Japan are in stark contrast with the recent performance of the U.S. economy. Over the last two years, the U.S. economy has been expanding at a healthy pace (albeit below its long-term potential). That, coupled with solid jobs gains, made the Fed more confident that a rise in short-term interest rates was in order, back in December 2015. The divergence in economic growth and monetary policies in the U.S. versus other major economic regions is actually contributing to some of the decline in U.S. Treasury yields. Ultimately, U.S. government bonds continue to offer more-attractive yields than bonds issued by other safe-haven countries, and a stronger dollar enables foreign investors to pick up extra returns on U.S. investments.

Looking forward to 2016, many of the forces behind disappointing U.S. stock market performance during 2015, such as low commodity prices, sluggish global growth, and shrinking corporate profits (partly due to a strong U.S. dollar), may still be present in the coming year. This could contribute to a downward pressure in global interest rates, including those in the U.S.

So, are artificially repressed U.S. Treasury yields sustainable? Sustainability implies that something can go on forever, but Stein's Law tells us that "If something cannot go on forever, it will stop".[44] A possible corollary of Stein's Law is that if the accommodative monetary policy (including the massive QE programs) by the Fed since the Financial Crisis "cannot go on forever", then the Fed may really not have much of a choice in whether to "stop" or not. Put simply, things that are destined to stop will stop by their own accord, one way or another. Whether it will be a "graceful dismount" is yet to be seen.

In the short-term, there are probably still enough significant factors that will keep interest rates at artificially low levels. However, in the medium-term, borrowing any major setback in the global economy, investors seem to be expecting U.S. interest rates to start rising, albeit slowly, after 2016.

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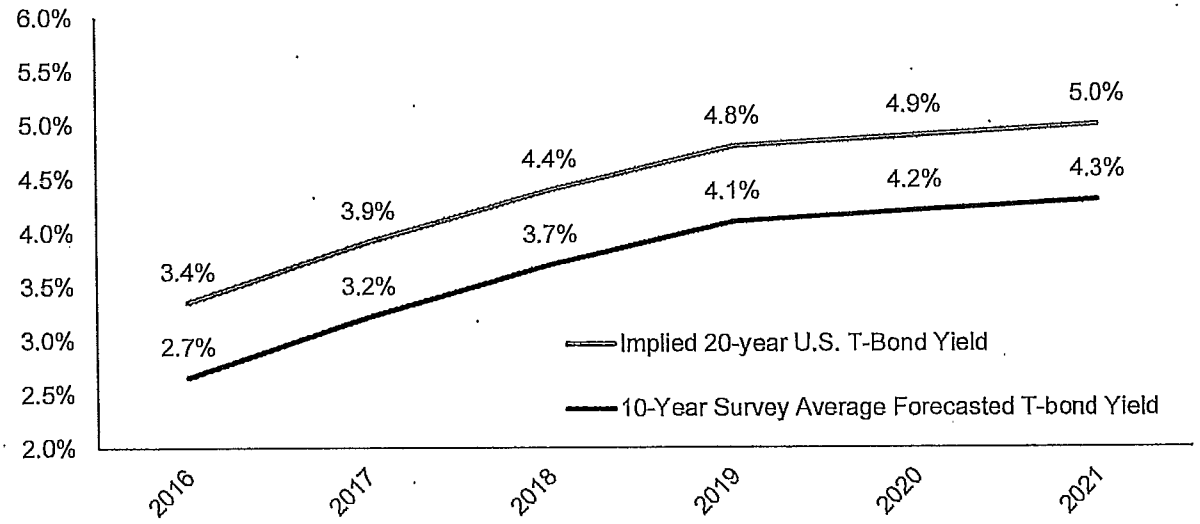
[43] The discussion in this section was based on information available at the time of writing (through February 23, 2016). Events and market conditions may have changed since then relative to when this report is issued.

[44] Professor Herbert Stein was a member and later chairman of the Council of Economic Advisers under Presidents Nixon and Ford. Source: Michael M. Weinstein, "Herbert Stein, Nixon Adviser And Economist, Is Dead at 83", *New York Times*, September 09, 1999.

We compiled consensus forecasts from reputable sources published close to year-end 2015. Exhibit 6 displays the average of consensus forecasts for 10-year U.S. Treasury bond yields through 2021 from a variety of surveys.[45,46,47] We then added a maturity premium to the 10-year yield, to arrive at an implied forecast for the 20-year government bond yield.[48]

Exhibit 6: Average forecasted 10-year U.S. Treasury Bond Yield and Implied 20-year U.S. Risk-free Rate (in percentage terms) at year-end 2015



[45] Sources: "Survey of Professional Forecasters: Fourth Quarter 2015", Federal Reserve Bank of Philadelphia (November 13, 2015); "The Livingston Survey: December 2015", Federal Reserve Bank of Philadelphia (December 10, 2015); "US Consensus Forecast ", Consensus Economics Inc. (January 11, 2016); *Blue Chip Economic Indicators* (January 10, 2016); *Blue Chip Financial Forecasts* (December 1, 2015); S&P *Capital IQ*™ database. Note that while some of the sources were released in 2016, the underlying surveys had been conducted in early January 2016, still reflecting expectations close to year-end 2015.

[46] Not all surveys provided consensus forecasts through 2021. At a minimum, all five sources included forecasts for 2016.

[47] Sources of underlying data: Survey of Professional Forecasters; Livingston Survey; U.S. Consensus Forecast; *Blue Chip Economic Indicators*; and *Blue Chip Financial Forecasts*; S&P *Capital IQ* database. Compiled by Duff & Phelps LLC.

[48] A maturity premium of approximately 70 basis points was added to the 10-year yield. This was based on the average yield spread between the 20 and the 10-year U.S. Treasury constant maturity bonds from December 2008 through December 2015. Had more recent data been used, when the yield spread declined to a range of 40 to 50 basis points, this would not have materially changed our main conclusion. While the magnitude of the maturity premium can be debated, using even the most recent 40 to 50 basis points average yield spread would imply that at year-end 2015 market participants expected the 20-year yield to reach close to 4.1% by 2018 (3.7% + approximately 0.4%).

The Congressional Budget Office (CBO), a non-partisan agency supporting the U.S. Congressional budgeting process, is more optimistic on how fast rates will rise. In its report "The Budget and Economic Outlook: 2016 to 2026", the CBO estimates the 10-year yield to average 3.5% in 2017, which would imply a 20-year yield around 4.2% using a maturity premium of 70 basis points. Its long-term forecast for the 10-year yield is 4.1% starting in 2019, again implying a long-term 20-year yield around 4.8%.[49]

Methods of Risk-free Rate Normalization

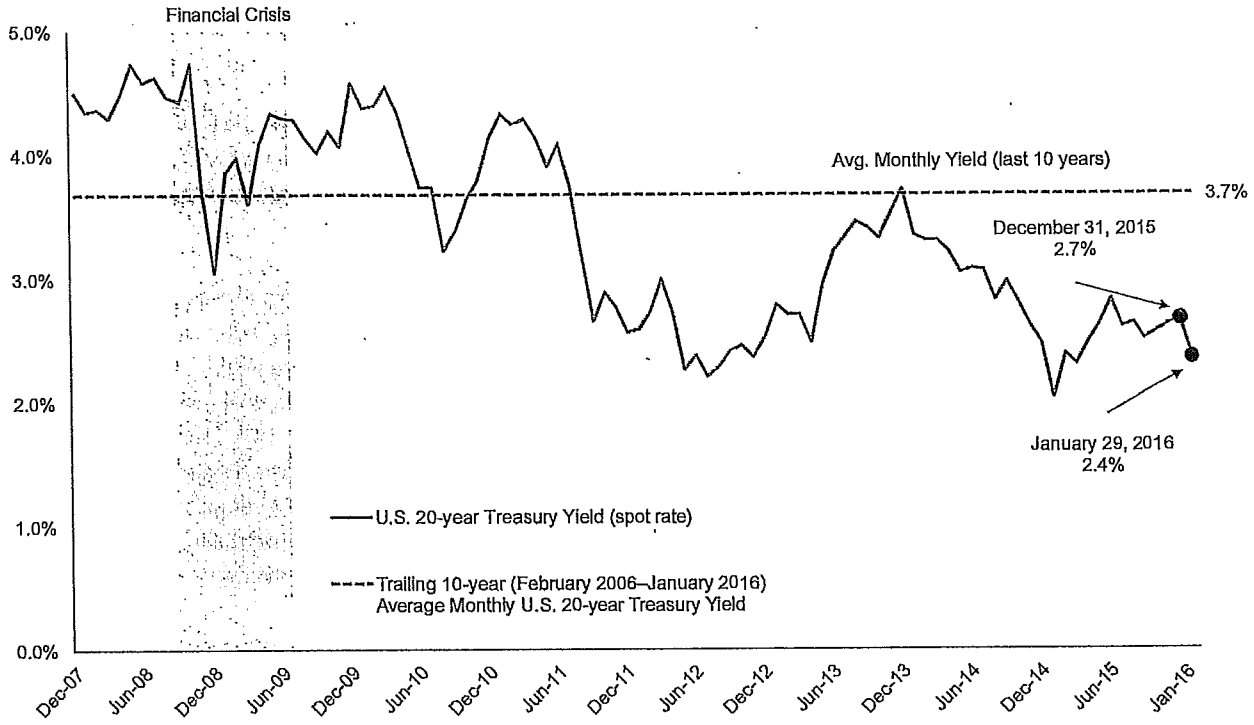
Normalization of risk-free rates can be accomplished in a number of ways, including (i) simple averaging, or (ii) various "build-up" methods.

The first normalization method entails calculating averages of yields to maturity on long-term government securities over various periods. This method's implied assumption is that government bond yields revert to the mean. In Exhibit 7, the solid blue line is the spot yield on a 20-year U.S. government bond (December 2007–January 2016), whereas the dashed black line shows a 3.7% average monthly yield of the 20-year U.S. government bond over the previous 10 years ending on January 2016 (at the end of December 2015, the long-term average would still be 3.7%).[50] Government bond spot yields at the end of December 2015, and even more so at the end of January 2016, were lower than the monthly average over the last 10 years. Taking the average over the last 10 years is a simple way of "normalizing" the risk-free rate. An issue with using historical averages, though, is selecting an appropriate comparison period that can be used as a reasonable proxy for the future.

[49] "The Budget and Economic Outlook: 2016 to 2026", released January 25, 2016. Again, using a maturity premium of 40 basis points would imply a 20-year yield of 3.9% in 2017 and a long-term 20-year yield of 4.5% starting in 2019. For more details on this report, visit: https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/51129-2016Outlook_OneCol-2.pdf.

[50] Source of underlying data: 20-year U.S. government bond series. Board of Governors of the Federal serve System website at: http:// www.federalreserve.gov/releases/h15/data.htm.

Exhibit 7: Spot and Average Yields on 20-year U.S. Government
December 2007–January 2016



The second normalization method entails using a simple build-up method, where the components of the risk-free rate are estimated and then added together. Conceptually, the risk-free rate can be (loosely) illustrated as the return on the following two components:[51]

Risk-Free Rate = Real Rate + Expected Inflation

Some academic studies have suggested the long-term "real" risk-free rate to be somewhere in the range of 1.2% to 2.0% based on the study of inflation swap rates and/or yields on long-term U.S. Treasury Inflation Protected Securities (TIPS).[52,53,54,55]

The second component, *expected inflation*, can also be estimated in a number of ways. Monetary policymakers and academics have been monitoring several measures of market expectations of future inflation. One method of estimating long-term inflation is to take the difference between the yield on a 20-year U.S. government bond yield and the yield of a 20-year U.S. TIPS. This is also known as the "breakeven inflation".[56] This calculation is shown in Exhibit 8 over the time period July 2004–January 2016.[57] Over this period, the average monthly breakeven long-term inflation estimate using this method was 2.3% (3.8% government bond yield – 1.5% TIPS). As of December 31, 2015, the average monthly breakeven long-term inflation estimate was also 2.3%.

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[51] This is a simplified version of the "Fisher equation", named after Irving Fisher. Fisher's "*The Theory of Interest*" was first published by Macmillan (New York), in 1930.

[52] TIPS are marketable securities whose principal is adjusted relative to changes in the Consumer Price Index (CPI).

[53] Haubrich, Joseph, George Pennacchi, and Peter Ritchken, "Inflation Expectations, Real Rates, and Risk Premia: Evidence from Inflation Swaps," *Review of Financial Studies* Vol. 25 (5) (2012): 1588-1629. The results of the authors' work is updated on a monthly basis and published in the Federal Reserve Bank of Cleveland's website. The 'Inflation Expectations' monthly series published in the 'Inflation Central' section of the website, contains an expected 10-year Real Risk Premia (as predicted by the model), which would be a proxy for the maturity premium of the 10-year real yield over the short-term real risk-free rate. For example, in December 2015, this expected 10-year Real Risk Premia was 1.2%. The 'Inflation Central' is located here: https://www.clevelandfed.org/en/our-research/inflation-central.aspx.

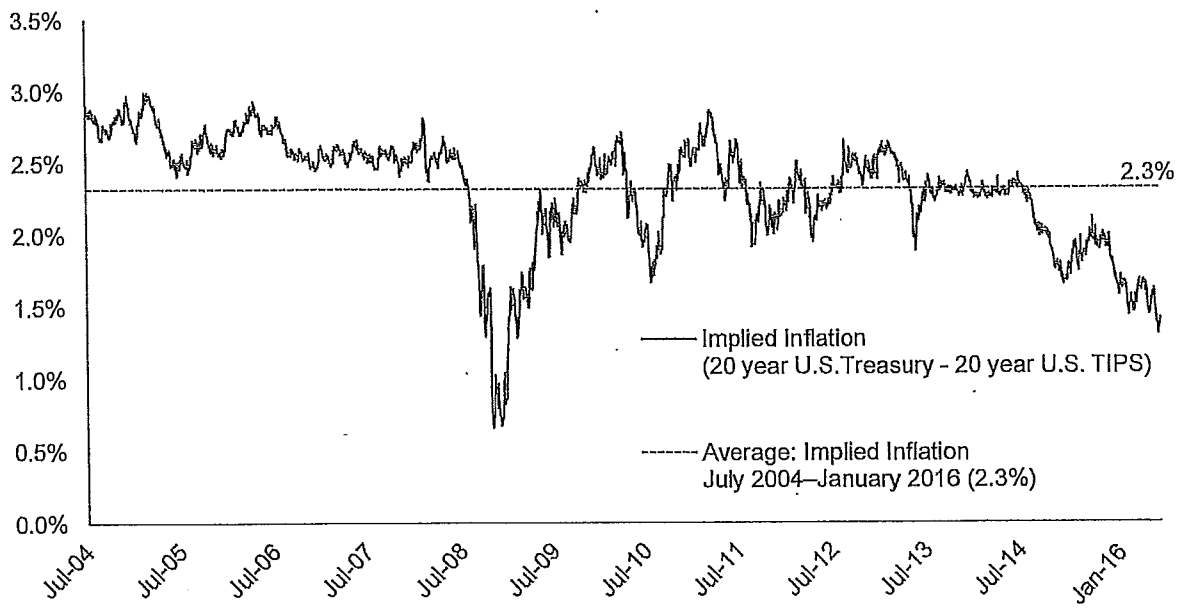
[54] Andrew Ang and Geert Bekaert "The Term Structure of Real Rates and Expected Inflation," *The Journal of Finance*, Vol. LXIII (2) (April 2008).

[55] Olesya V Grishchenko and Jing-zhi Huang "Inflation Risk Premium: Evidence From the TIPS Market," *The Journal of Fixed Income*, Vol. 22 (4) (2013): 5-30.

[56] Breakeven inflation is based on the differential between nominal and TIPS yields with equivalent maturity. However, several studies have documented that the breakeven inflation has not been a good predictor for inflation expectations. The differential between nominal and real rates is not only complicated by a liquidity premium, but also by the potential presence of the inflation risk premium, with both of these premiums varying through time. For a more detailed list of academic studies documenting the magnitude of the liquidity premium and the inflation risk premium, refer back to Chapter 7 of Shannon P. Pratt and Roger J. Grabowski, *Cost of Capital: Applications and Examples*, 5th ed. (Hoboken, NJ: John Wiley & Sons, 2014).

[57] Source of underlying data: 20-year U.S. government bond series and 20-year TIPS series, Board of Governors of the Federal Reserve System website at: http://www.federalreserve.gov/releases/h15/data.htm. Calculated by Duff & Phelps LLC.

Exhibit 8: Breakeven Long-Term Inflation Estimate (20 year Government Bond Yield – 20 year TIPS Yield)
July 2004–January 2016



Additionally, in the U.S., there are a number of well-established surveys providing consensus estimates for expected inflation. One academic study has examined various methods for forecasting inflation over the period 1952–2004 and found that surveys significantly outperform other forecasting methods.[58] Exhibit 9 outlines some of the most prominent surveys in this area.[59] Altogether, the year-end 2015 estimates of longer-term inflation range from 1.8% to 2.6%.

[58] Ang, A., G. Bekaert, and M. Wei. "Do macro variables, asset markets, or surveys forecast inflation better?" *Journal of Monetary Economics*. 54, 1163-1212.

[59] Sources of underlying data: "The Livingston Survey: December 2015," Federal Reserve Bank of Philadelphia (December 10, 2015); "Survey of Professional Forecasters: Fourth Quarter 2015," Federal Reserve Bank of Philadelphia (November 13, 2015); *Blue Chip Financial Forecasts* Vol. 34 (12) (December 1, 2015); Federal Reserve Bank of Cleveland (estimates as of December 2015); Bloomberg.

Exhibit 9: Long-term Expected Inflation Estimates Year-end 2015 (approx.)

Source	Estimate (%)
Livingston Survey (Federal Reserve Bank of Philadelphia)	2.3
Survey of Professional Forecasters (Federal Reserve Bank of Philadelphia)	2.2
Cleveland Federal Reserve	1.8
Blue Chip Financial Forecasts	2.3
University of Michigan Survey 5-10 Year Ahead Inflation Expectations	2.6
Range of Expected Inflation Forecasts	1.8% – 2.6%

Adding the estimated ranges for the "real" risk-free rate and longer-term inflation together produces an estimated normalized risk-free rate range of 3.0% to 4.6%, with a midpoint of 3.8% (or 4.0%, if rounding to the nearest 50 basis points).

Range of Estimated Long-term Real Rate	1.2% to 2.0%
Range of Estimated Expected Inflation Forecasts	1.8% to 2.6%
Range of Estimated Long-term Normalized Risk-free Rate	3.0% to 4.6%
Midpoint	3.8%

Spot Yield or Normalized Yield?

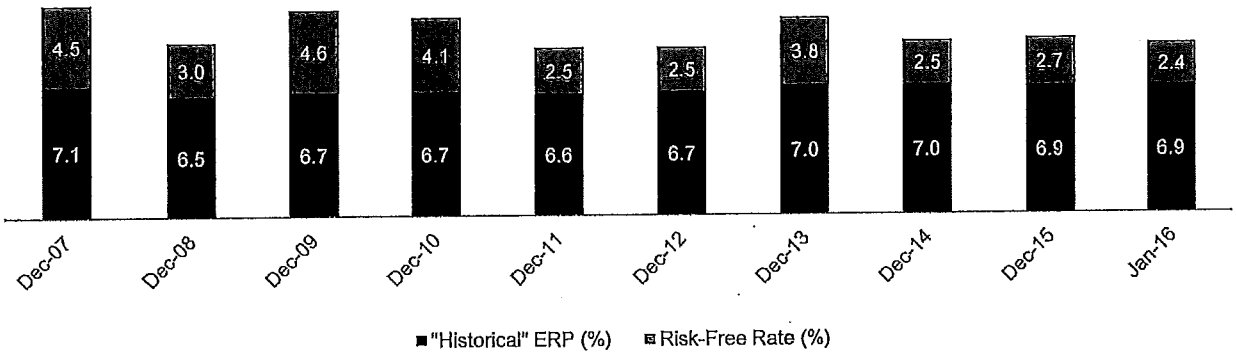
Should the valuation analyst use the current market yield on risk-free U.S. government bonds (e.g., "spot" yield equal to 2.7% at December 31, 2015 or 2.4% at January 31, 2016) or use a "normalized" risk-free yield when estimating the cost of equity capital?

As stated earlier, in most circumstances we would prefer to use the "spot" yield on U.S. government bonds available in the market as a proxy for the U.S. risk-free rate. However, during times of flight to quality and/or high levels of central bank intervention, those lower observed yields imply a lower cost of capital (all other factors held the same) – just the opposite of what one would expect in times of relative economic distress – so a "normalization" adjustment may be considered appropriate. By "normalization" we mean estimating a rate that more likely reflects the sustainable average return of long-term risk-free rates. *If spot yield-to-maturity were used at these times, without any other adjustments, one would arrive at an overall discount rate that is likely inappropriately low vis-à-vis the risks currently facing investors.* Exhibit 10 shows the potential problems of simply using the spot yield-to-maturity on 20-year U.S. government bonds in conjunction with unadjusted U.S. historical equity risk premia.[60] Data is displayed for year-end 2007 through year-end 2015, as well as end of January 2016. For example, in December 2008, at the height of the Financial Crisis (when risks were arguably at all-time highs), using the 1926–2008 historical ERP of 6.5% together with the spot 20-year yield of 3.0% would result in a base cost of equity capital of 9.5%. In contrast, the base cost of equity would be 11.6% (4.5% plus 7.1%) at year-end 2007, implying that risks were actually higher at the end of 2007 than at the end of 2008. From both a theoretical and practical standpoint, the reality is that investors likely perceived risks to be much higher in December 2008, relative to the December 2007. This demonstrates that a mechanical application of the data may result in nonsensical results.[61]

[60] Source of underlying data: Morningstar *Direct* database. Used with permission. Risk-free rate data series used: Long-term Gov't Bonds (IA SBBI US LT Govt YLD USD). All rights reserved. Calculations performed by Duff & Phelps LLC

[61] More detailed information on historical and forward-looking ERPs can be found later in this report.

Exhibit 10: Spot 20-year U.S. Treasury Yield in Conjunction with Unadjusted "Historical" Equity Risk Premium



Adjustments to the ERP or to the risk-free rate are, in principle, a response to the same underlying concerns and should result in broadly similar costs of capital. Adjusting the risk-free rate in conjunction with the ERP is only one of the alternatives available when estimating the cost of equity capital.

For example, one could use a spot yield for the risk-free rate, but *increase* the ERP or other adjustment to account for higher (systematic) risk. If the valuation analyst chooses to use the spot yield to estimate the cost of capital during periods when those yields are less than "normal," the valuation analyst must use an estimated ERP that is *matched* to (or implied by) those *below-normal* yields. However we note that the most commonly used data sources for ERP estimates are long-term series measured when interest rates were largely not subject to such market intervention. Using those data series with an abnormally low spot yield creates a mismatch.

Alternatively, if the valuation analyst chooses to use a normalized risk-free rate in estimating the cost of capital, the valuation analyst must again use an estimated ERP that is *matched* to those *normalized* yields. Normalizing the risk-free rate is likely a more direct (and more easily implemented) analysis than adjusting the ERP due to a *temporary* reduction in the yields on risk-free securities, while *longer-term* trends may be more appropriately reflected in the ERP.

4.0%

The Duff & Phelps concluded normalized risk-free rate, as of January 31, 2016

We examined interest rates for the months since the Financial Crisis began. We also estimated a "normalized" yield each month using trailing averages and a build-up model. Considering longer-term averages of Treasury bond yields, and the build-up framework outlined above, Duff & Phelps has currently concluded on a 4.0% "normalized" risk free rate in developing its U.S. ERP (as compared to the 2.4% "spot rate" as of January 31, 2016). The 4.0% normalized risk-free rate should be used in conjunction with the 5.5% ERP recommendation outlined herein, implying a 9.5% (4.0% + 5.5%) base cost of equity capital for the U.S. as of January 31, 2016 and thereafter (until further guidance is issued) .

Exhibit 11 (in Section 4 of this report) displays the month by month spot yields on 20-year U.S. government bonds and the matching "normalized" yields (as suggested by Duff & Phelps) for months in which the normalized yields are greater than the corresponding spot yields. The months in which we believe a valuation analyst should consider using a normalized risk-free rate (or at least consider whether adjustments are warranted) are highlighted in bold and the "normalized" yields are shown in these months.

Section 04

Basis for U.S. ERP Recommendation as of January 31, 2016

Basis for U.S. Recommended ERP as of January 31, 2016

Unconditional ERP

ERP is a forward-looking concept. It is an expectation as of the valuation date for which no market quotes are directly observable. While an analyst can observe premiums realized over time by referring to historical data (i.e., realized return approach or ex post approach), such realized premium data do not represent the ERP expected in prior periods, nor do they represent the current ERP estimate. Rather, realized premiums represent, at best, only a sample from prior periods of what may have then been the expected ERP.

To the extent that realized premiums on the average equate to expected premiums in prior periods, such samples may be representative of current expectations. But to the extent that prior events that are not expected to recur caused realized returns to differ from prior expectations, such samples should be adjusted to remove the effects of these nonrecurring events. Such adjustments are needed to improve the predictive power of the sample.

Alternatively, the analyst can derive forward-looking estimates for the ERP from sources such as: (i) data on the underlying expectations of growth in corporate earnings and dividends; (ii) projections of specific analysts as to dividends and future stock prices; or (iii) surveys (an ex-ante approach). The goal of these approaches is to estimate the true expected ERP as of the valuation date.

Duff & Phelps recognizes that making any ERP estimate requires a great degree of judgment. In arriving at our recommended ERP, we weigh both economic and financial markets evidence. We choose to change our recommendations when the preponderance of evidence indicates a change is justified. We try to avoid making a change in one month to only find the evidence reversing itself the following month.

As indicated in Section 2 "Overview of Duff & Phelps ERP Methodology", based on the analysis of academic and financial literature and various empirical studies, we have concluded that a reasonable long-term estimate of the normal or unconditional U.S. ERP is in the range of 3.5% to 6.0%.

From 5.0% to 5.5%

The change in the Duff & Phelps recommended U.S. Equity Risk Premium effective January 31, 2016

Conditional ERP

As previously stated, based on recent economic and financial market conditions (further described below), we are updating our estimated *conditional* ERP as of January 31, 2016. Specifically, Duff & Phelps is increasing its recommended U.S. ERP from 5.0% to 5.5% (while maintaining a *normalized* risk-free rate of 4.0%) when developing discount rates as of January 31, 2016 and thereafter, until further guidance is issued.

Exhibit 11 displays the Duff & Phelps U.S. ERP recommendations issued since 2008 until the present, along with an indication of whether spot yields on 20-year U.S. government bonds or "normalized" yields (as suggested by Duff & Phelps) were used. In months in which we believe a valuation analyst should consider using a normalized risk-free rate (or at least consider whether adjustments are warranted), we show the "normalized" yields that match the Duff & Phelps recommended U.S. ERP.

Exhibit 11: Duff & Phelps Recommended U.S. ERP and Corresponding Risk Free Rates
January 2008–Present

	Duff & Phelps Recommended ERP	*Risk Free Rate*
Change in ERP Guidance (current guidance) ✓ January 31, 2015 – UNTIL FURTHER NOTICE	5.5%	4.0% Normalized 20-year Treasury yield *
Year-end 2015 Guidance December 31, 2015	5.0%	4.0% Normalized 20-year Treasury yield *
Change in ERP Guidance February 28, 2013 – January 30, 2016	5.0%	4.0% Normalized 20-year Treasury yield *
Change in ERP Guidance January 15, 2012 – February 27, 2013	5.5%	4.0% Normalized 20-year Treasury yield *
Change in ERP Guidance September 30, 2011 – January 14, 2012	6.0%	4.0% Normalized 20-year Treasury yield *
July 1, 2011 – September 29, 2011	5.5%	4.0% Normalized 20-year Treasury yield *
June 1, 2011 – June 30, 2011	5.5%	Spot 20-year Treasury Yield
May 1, 2011 – May 31, 2011	5.5%	4.0% Normalized 20-year Treasury yield *
December 1, 2010 – April 30, 2011	5.5%	Spot 20-year Treasury Yield
June 1, 2010 – November 30, 2010	5.5%	4.0% Normalized 20-year Treasury yield *
Change in ERP Guidance December 1, 2009 – May 31, 2010	5.5%	Spot 20-year Treasury Yield
June 1, 2009 – November 30, 2009	6.0%	Spot 20-year Treasury Yield
November 1, 2008 – May 31, 2009	6.0%	4.5% Normalized 20-year Treasury yield *
Change in ERP Guidance October 27, 2008 – October 31, 2008	6.0%	Spot 20-year Treasury Yield
January 1, 2008 – October 26, 2008	5.0%	Spot 20-year Treasury Yield

* Normalized in this context means that in months where the risk-free rate is deemed to be abnormally low, a proxy for a longer-term sustainable risk-free rate is used. To ensure the most recent ERP recommendation (and associated risk-free rate) is used, visit: www.duffandphelps.com/costofcapital.

To Be Clear:

December 31, 2015 (i.e., "year-end") Valuations: Duff & Phelps recommends a 5.0% U.S. ERP, matched with a normalized yield on 20-year U.S. government bonds equal to 4.0%, implying a 9.0% base cost of equity capital in the United States as of December 31, 2015.

January 31, 2016 Valuations: Duff & Phelps recommend a 5.5% U.S. ERP, matched with a normalized yield on 20-year U.S. government bonds equal to 4.0%, implying a 9.5% base cost of equity capital in the United States as of January 31, 2016 (and thereafter, until further notice).

Basis for Duff & Phelps Recommended U.S. ERP[62]

In estimating the conditional ERP, valuation analysts cannot simply use the long-term historical ERP, without further analysis. A better alternative would be to examine approaches that are sensitive to the current economic conditions.

As previously discussed, Duff & Phelps employs a multi-faceted analysis to estimate the conditional ERP that takes into account a broad range of economic information and multiple ERP estimation methodologies to arrive at its recommendation.[63]

First, a reasonable range of normal or unconditional ERP is established.

Second, based on current economic conditions, Duff & Phelps estimates where in the range the true ERP likely lies (top, bottom, or middle) by examining the current state of the economy (both by examining the level of stock indices as a forward indicator and examining economic forecasts), as well as the implied equity volatility and corporate spreads as indicators of perceived risk.

For example, since December 31, 2014, while the evidence was somewhat mixed, on balance we saw indications that equity risk in financial markets had stayed relatively constant through the end of 2015, when estimated against a normalized risk-free rate of 4.0%. Exhibit 12-A summarizes the primary economic and financial market indicators we analyzed at December 31, 2015 and how they have moved since December 31, 2014, with the corresponding relative impact on ERP indications:

[62] This discussion was extracted from Chapter 3 of the Duff & Phelps *2016 Valuation Handbook – Guide to Cost of Capital* (Hoboken, NJ: John Wiley & Sons, 2016). The discussion in this section was based on information available at the time of writing (through February 23, 2016). Events and market conditions may have changed since then relative to when this report is issued.

[63] To ensure you are always using the most recent ERP recommendation, visit: www.duffandphelps.com/costofcapital.

Exhibit 12-A: Economic and Financial Market Indicators Considered in Duff & Phelps' U.S. ERP Recommendation *as of December 31, 2015*

Factor	Change	Effect on ERP
U.S. Equity Markets	↔	↔
Implied Equity Volatility	↔	↔
Corporate Spreads	↑	↑
Historical Real GDP Growth and Forecasts	↔	↔
Unemployment Environment	↓	↓
Consumer and Business Sentiment	↔	↔
Sovereign Credit Ratings	↔	↔
Damodaran Implied ERP Model	↑	↑
Default Spread Model	↑	↑

Recent economic indicators point to a positive, yet below-pace, real growth for the U.S. economy. The economy has been expanding at a modest rate, but generally better than other major developed economies, and with the risks of a recession seemingly tempered. The employment situation is reaching a level of stability, with the U.S. economy reaching close to full employment. Consumer confidence and business sentiment are generally stable, with the former still above its long-term average.

On the other hand, inflation has been persistently below the Fed's target of 2.0%. The sharp decline in oil prices since 2014 has put additional pressure in an already very low inflation environment.

Concerns about a slowing global economy and deflationary pressures have troubled investors in 2015. Tumbling oil and other commodity prices have reinforced investor anxiety over stagnant growth in the Eurozone and Japan, as well as a deceleration in several emerging-market countries, with a particular focus on China (considered by many analysts as the engine of growth for the global economy). Global financial markets reacted negatively to these trends in August and September of 2015, but settled down towards year-end. As a result, the Fed saw sufficient support to raise its benchmark interest rate in December 2015, the first time since the beginning of the 2008 global financial crisis.

Since early 2016, however, broad equity indices (e.g., the S&P 500) across the globe have suffered significant losses, market volatility has spiked, and credit spreads of U.S. high-yield over U.S. investment grade corporate bonds continued to widen substantially (now affecting companies outside the oil and mining sectors). This has led global investors to seek safe haven investments, such as securities issued by the U.S., Germany, and United Kingdom governments, to name a few, causing sharp declines in government bond yields for these countries. Financial markets are now attaching a lower probability of further interest rate increases by the Fed in the near term.

We show in Exhibit 12-B the primary economic and financial market indicators as of January 31, 2016 and how they have moved since year-end 2014, with the corresponding relative impact on ERP indications.

Exhibit 12-B: Economic and Financial Market Indicators Considered in Duff & Phelps' ERP Recommendation *as of January 31, 2016*

Factor	Change	Effect on ERP
U.S. Equity Markets	↓	↑
Implied Equity Volatility	↑	↑
Corporate Spreads	↑	↑
Historical Real GDP Growth and Forecasts	↔	↔
Unemployment Environment	↓	↓
Consumer and Business Sentiment	↔	↔
Sovereign Credit Ratings	↔	↔
Damodaran Implied ERP Model	↑	↑
Default Spread Model	↑	↑

Finally, we examine other indicators that may provide a more quantitative view of where we are within the range of reasonable long-term estimates for the U.S. ERP.

Duff & Phelps currently uses several models as corroborating evidence. We reviewed these indicators both at year-end 2015 and at the end of January 2016.

- **Damodaran Implied ERP Model** – Professor Aswath Damodaran calculates implied ERP estimates for the S&P 500 and publishes his estimates on his website. Prof. Damodaran estimates an implied ERP by first solving for the discount rate that equates the current S&P 500 index level with his estimates of cash distributions (dividends and stock buybacks) in future years. He then subtracts the current yield on 10-year U.S. government bonds. Duff & Phelps then converts his estimate to an arithmetic average equivalent measured against the 20-year U.S. government bond rate.

  Prof. Damodaran has recently added new capabilities to his implied equity risk premium calculator. The new features introduced last year allow the user to select a variety of base projected cash flow yields, as a well as several expected growth rate choices for the following five years in the forecast. Each option for cash flow yields is independent of the growth rate assumptions, which means that the user can select up to 35 different combinations to estimate an implied ERP. More recently, Prof. Damodaran added a new feature that allows the terminal year's projected cash flows to be adjusted to what he considers a more sustainable payout ratio. This sustainable payout is computed using the long-term growth rate (g) and the trailing 12-month return on equity (ROE), as follows: Sustainable Payout = 1 – g/ROE. If the user selects this option, the payout ratio over the next (projected) five years is based on a linear interpolation between today's payout ratio and the Sustainable Payout. Otherwise, the terminal year payout ratio will be the same as today's value throughout the entire forecast.

  Exhibit 13 shows the current options that a user can select to arrive at an implied ERP indication. Each of these combinations can then be adjusted for a sustainable payout, if the user so decides.[64]

[64] Source of underlying data: Downloadable dataset entitled "Spreadsheet to compute ERP for current month". To obtain a copy, visit: http://people.stern.nyu.edu/adamodar/.

Exhibit 13: Professor Damodaran's Implied Equity Risk Premium Calculator Cash Flow Yield (Dividends + Buybacks) and Growth Rate Options

S&P 500 Cash Flow Yield (Dividends + Buybacks)	S&P Earnings Growth Rates for Years 1 through 5 in the Projections	Adjustment for Sustainable Payout
Trailing 12 months Dividend + Buyback Yield	Historical Growth Rate for the last 10 years	Adjust Cash Flow Yield for Sustainable Payout
Average Dividend + Buyback Yield for the last 10 years	Bottom-up Forecasted Growth Rate for next 5 years	Do Not Adjust Cash Flow Yield for Sustainable Payout
Average Dividend + Buyback Yield for the last 5 years	Top-Down Forecasted Growth Rate for next 5 years	
Average Payout for the last 10 years	Fundamental Growth Rate (based on Current ROE)	
Average Payout for the last 5 years	Fundamental Growth Rate (based on 10-Year Average ROE)	
Average Payout using S&P 500 Normalized Earnings		
Trailing 12 months Dividend + Buyback Yield, Net of Stock Issuance		

Note: ROE = Return on Equity

Based on Prof. Damodaran's estimates of the trailing 12-month cash flow yield (dividends plus buybacks) of S&P 500 constituents – as published on the home page of his website – his implied ERP (converted into an arithmetic average equivalent) was approximately 7.16% measured against an abnormally low 20-year U.S. government bond yield (2.67%), as of December 31, 2015.[65] The equivalent normalized implied ERP estimate was 5.83% measured against a normalized 20-year U.S. government bond yield (4.0%), which represents an increase of 44 basis points relative to the prior year's indication.[66] Testing the various available options outlined in Exhibit 13 – but not adjusting for a Sustainable Payout in the terminal year – we obtained a range of indications for a normalized arithmetic average implied ERP estimate between 3.77% and 6.42% (once again, measured against a normalized 20-year U.S. government bond yield of 4.0%), representing an increase in the range observed last year. Alternatively, if projected cash flows were adjusted for a Sustainable Payout, the implied ERP indications would narrow to a range between 4.45% and 5.33%.

Performing these same steps as of January 31, 2016 would result in increased ERP indications, if computed against spot yields, but similar ones when using a normalized risk-free rate. For example, the implied arithmetic average ERP measured against the spot 20-year U.S. government bond yield (2.36%) was 7.49%, using a trailing 12-month cash flow yield.[67] Against a normalized 20-year U.S. government bond yield (4.0%), this implied ERP would be 5.85% as of January 31, 2016.[68] Similarly, we obtained a range of normalized arithmetic average implied ERP estimates between 3.71% and 6.48% (unadjusted for Sustainable Payout and measured against a normalized 20-year U.S. government bond yield of 4.0%).

---

[65] Damodaran's implied rate of return (based on the actual 10-year yield) on the S&P 500 = 8.39% as of January 1, 2016, minus 2.67% actual rate on 20-year U.S. government bonds plus an adjustment to equate the geometric average ERP to its arithmetic equivalent. The result reflects conversion of the implied ERP to an arithmetic average equivalent.

[66] Damodaran's implied rate of return (based on the actual 10-year yield) on the S&P 500 = 8.39% as of January 1, 2016 minus 4.00% normalized rate on 20-year U.S. government bonds plus an adjustment to equate the geometric average ERP to its arithmetic equivalent. The result reflects conversion of the implied ERP to an arithmetic average equivalent.

[67] Damodaran's implied rate of return (based on the actual 10-year yield) on the S&P 500 = 8.41% as of February 1, 2016, minus 2.36% actual rate on 20-year U.S. government bonds plus an adjustment to equate the geometric average ERP to its arithmetic equivalent. The result reflects conversion of the implied ERP to an arithmetic average equivalent.

[68] Damodaran's implied rate of return (based on the actual 10-year yield) on the S&P 500 = 8.41% as of February 1, 2016 minus 4.00% normalized rate on 20-year U.S. government bonds plus an adjustment to equate the geometric average ERP to its arithmetic equivalent. The result reflects conversion of the implied ERP to an arithmetic average equivalent.

[**Note:** Appendix A summarizes the U.S. ERP implied by the Damodaran model since December 31, 2008, as converted by Duff & Phelps into an arithmetic average equivalent against normalized 20-year U.S. government bonds.]

- **Default Spread Model (DSM)** – The Default Spread Model is based on the premise that the long term average ERP (the unconditional ERP) is constant and deviations from that average over an economic cycle can be measured by reference to deviations from the long term average of the default spread (Baa - Aaa).[69]

  At the end of December 2015 and January 2016, the conditional ERP calculated using the DSM model was 5.51% and 5.65% respectively. For perspective, the last time this model resulted in an implied ERP in excess of 5.5% was back in August 2012. This model notably removes the risk-free rate itself as an input in the estimation of ERP. However, the ERP estimate resulting from the DSM is still interpreted as an estimate of the relative return of stocks in excess of risk-free securities.

[**Note:** Appendix B summarizes the conditional U.S. ERP (CERP) implied by the Default Spread Model since December 31, 2008.]

- **Hassett Implied ERP (Hassett)** – Stephen Hassett has developed a model for estimating the implied ERP, as well as the estimated S&P 500 index level, based on the current yield on long-term U.S. government bonds and a risk premium factor (RPF).[70] The RPF is the empirically derived relationship between the risk-free rate, S&P 500 earnings, real interest rates, and real GDP growth to the S&P 500 index over time. The RPF appears to change only infrequently. The model can be used monthly to estimate the S&P 500 index level and the conditional ERP based on the current level of interest rates.[71]

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[69] The Default Spread Model presented herein is based on Jagannathan, Ravi, and Wang, Zhenyu," The Conditional CAPM and the Cross -Section of Expected Returns," *The Journal of Finance*, Volume 51, Issue 1, March 1996: 3-53. See also Elton, Edwin J. and Gruber, Martin J., Agrawal, Deepak, and Mann, Christopher "Is There a Risk Premium in Corporate bonds?", Working Paper, http://pages.stern.nyu.edu/~eelton/working_papers/corp%20bonds/Is%20there%20a%20risk%20premium%20in%20corporate%20bonds.pdf. Duff & Phelps uses (as did Jagannathan, Ravi, and Wang) the spread of high-grade corporates against lesser grade corporates. Corporate bond series used in analysis herein: Barclays US Corp Baa Long Yld USD (Yield) and Barclays US Corp Aaa Long Yld USD (Yield); Source: Morningstar *Direct*.

[70] Stephen D. Hassett, "The RPF Model for Calculating the Equity Risk Premium and Explaining the Value of the S&P with Two Variables," *Journal of Applied Corporate Finance* 22, 2 (Spring 2010): 118–130.

[71] For a more detailed description of Hassett's Risk Premium Factor model see Pratt and Grabowski, op.cit., Chapter 8A, "Deriving ERP Estimates": 167-168".

Hassett's analysis uses the spot 10-year risk-free rate for the period from January 2008 through July 2011; thereafter, his analysis uses a normalized yield on U.S. Treasuries of 4.5% (2.0% real risk-free rate plus 2.5% inflation).[72] Using a normalized 4.5% risk-free rate at both December 2015 and January 2016, the S&P 500 index appeared to be slightly overvalued based on the Hassett model's predictions. Alternatively, based on the S&P 500 index level at the end of December 2015, the implied risk-free rate commensurate with the index closing price was 3.90%. At the end of January 2016, the implied risk-free rate was slightly up at 4.08%. Both of these indications for the risk-free rate are very close to the Duff & Phelps concluded normalized risk-free rate of 4.0% at both dates.

While these additional models may be useful in suggesting the direction of changes in the conditional ERP, they are, like all methods of estimating the ERP, imperfect. The Damodaran Implied ERP Model, the Default Spread Model, and the Hassett Implied ERP Model all utilize assumptions that are subjective in nature. For example, the Damodaran Implied ERP Model assumes a long-term growth rate for dividends and buybacks that is largely a matter of judgment. Likewise, in the default spread model, the changes in spread are applied to a "benchmark" ERP estimate; the choice of that benchmark ERP is largely a matter of judgment.

Again, the inherent "imperfection" of any single ERP estimation model is precisely why Duff & Phelps takes into account a broad range of economic information and multiple ERP estimation methodologies to arrive at our conditional ERP recommendation.

Taking these factors together, we find support for increasing our ERP recommendation relative to our previous recommendation

TO BE CLEAR:

- Many valuations are done at year-end. The Duff & Phelps U.S. ERP recommendation for use with December 31, 2015 valuations is 5.0%, matched with a normalized risk-free rate of 4.0%. This implies a 9.0% (4.0% + 5.0%) "base" U.S. cost of equity capital estimate as of December 31, 2015.

- The Duff & Phelps U.S. ERP recommendation as of January 31, 2016 (and thereafter, until further notice) is 5.5%, matched with a normalized risk-free rate of 4.0%. This implies a 9.5% (4.0% + 5.5%) "base" U.S. cost of equity capital estimate as of January 31, 2016.

5.5%

The Duff & Phelps U.S. Equity Risk Premium Recommendation effective January 31, 2016

[72] "Dissecting S&P 500 2015 Performance Using The RPF Model" by Steve Hassett, Retrieved from: http://seekingalpha.com/article/3811186-dissecting-s-and-p-500-2015-performance-using-rpf-model.

Section 05

Conclusion

Conclusion

Duff & Phelps U.S. Equity Risk Premium and Risk-Free Rate Guidance as of January 31, 2016

- Equity Risk Premium: Increase from 5.0% to 5.5%
- Risk-Free Rate: 4.0% (normalized)
- Base U.S. Cost of Equity Capital: 9.5% (4.0% + 5.5%)

Based on the foregoing, we find evidence to adjust our ERP recommendation upwards to 5.5% relative to our previous guidance issued on February 28, 2013, when the U.S. ERP was adjusted downward (from 5.5% to 5.0%). During 2015, we started seeing some signs of increased risk in financial markets. As further explained below, while the evidence was somewhat mixed as of December, 31, 2015, we can now see clear indications that equity risk in financial markets has increased significantly as of January 31, 2016. Exhibit 14 summarizes the factors considered in our U.S. ERP recommendation.[73]

Exhibit 14: Factors Considered in U.S. ERP Recommendation

Factor	Change	Effect on ERP
U.S. Equity Markets	↓	↑
Implied Equity Volatility	↑	↑
Corporate Spreads	↑	↑
Historical Real GDP Growth and Forecasts	↔	↔
Unemployment Environment	↓	↓
Consumer and Business Sentiment	↔	↔
Sovereign Credit Ratings	↔	↔
Damodaran Implied ERP Model	↑	↑
Default Spread Model	↑	↑

[73] Exhibit 14 is identical to the previous Exhibit 1 (see "Executive Summary") as well as to Exhibit 12-B, and is reproduced here for reader convenience. The factors listed in Exhibit 14 are the factors that were considered the most relevant at the end of January 2016. The factors that Duff & Phelps considers in its monthly review of its ERP recommendation can vary, depending on the economic situation at the time.

Recent economic indicators point to a positive, yet below-pace, real growth for the U.S. economy. The U.S. economy has been expanding at a modest rate, but generally better than other major developed economies, and with the risks of a recession seemingly tempered. The employment situation is reaching a level of stability, with the U.S. economy reaching close to full employment. Consumer confidence and business sentiment are generally stable, with the former still above its long-term average.

On the other hand, inflation has been persistently below the Federal Reserve Bank's (Fed) target of 2.0%. The sharp decline in oil prices since 2014 has put additional pressure in an already very low inflation environment. For perspective, the price of Brent crude oil was at $115/barrel in mid-June 2014; since then prices declined to $38/barrel at the end of 2015, a cumulative 67% decline in the space of a year and a half.

Concerns about a slowing global economy and deflationary pressures have troubled investors in 2015. Tumbling oil and other commodity prices have reinforced investor anxiety over stagnant growth in the Eurozone and Japan, as well as a deceleration in several emerging-market countries, with a particular focus on China (considered by many analysts as the engine of growth for the global economy). Global financial markets reacted negatively to these trends in August and September of 2015, but settled down towards year-end. Since the beginning of 2016, however, broad equity indices (e.g., the S&P 500) across the globe have suffered significant losses, market volatility has spiked, and credit spreads of U.S. high-yield bonds over U.S. investment grade corporate bonds continued to widen substantially (now affecting companies outside the oil and mining sectors).

This has led global investors to seek safe haven investments, such as securities issued by the U.S., Germany, and United Kingdom governments, to name a few, causing sharp declines in government bond yields for these countries. Despite the fact that in December 2015 the Fed decided to raise U.S. interest rates for the first time since the beginning of the 2008 global financial crisis, financial markets are now attaching a lower probability of further increases in the near term.

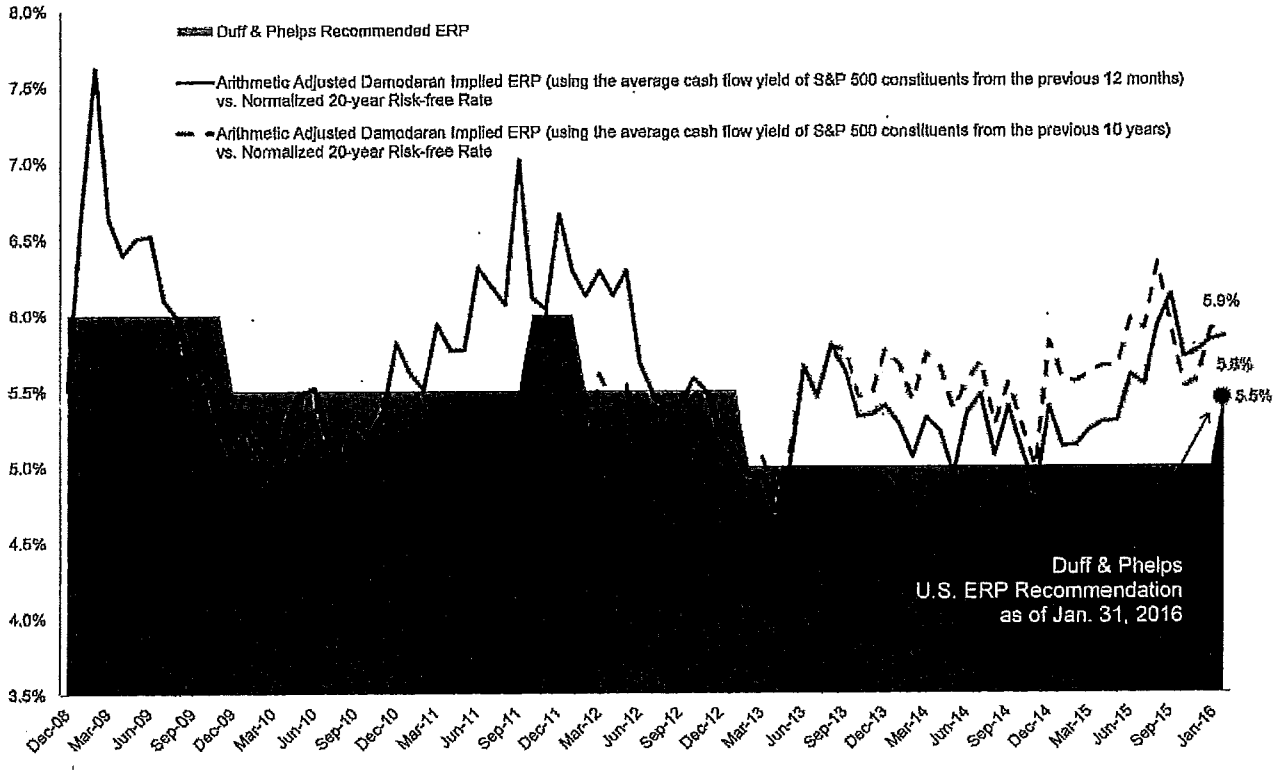
Duff & Phelps monitors two additional quantitative models as corroboration of the qualitative factors discussed above: 1) the Damodaran Implied ERP Model and (2) the Default Spread Model. Both of these models indicated a higher ERP at the end of January 2016 relative to our prior recommendation issued back February 2013.

Taken together, we found sufficient support for increasing our ERP recommendation relative to our previous recommendation. Accordingly, Duff & Phelps recommends a U.S. Equity Risk Premium of 5.5% when developing discount rates as of January 31, 2016 and thereafter, to be used in conjunction with a normalized risk-free rate of 4.0%.

Section 06

Appendices

Appendix A – Damodaran Implied ERP Model



Additional Indicators: The Damodaran Implied ERP Model

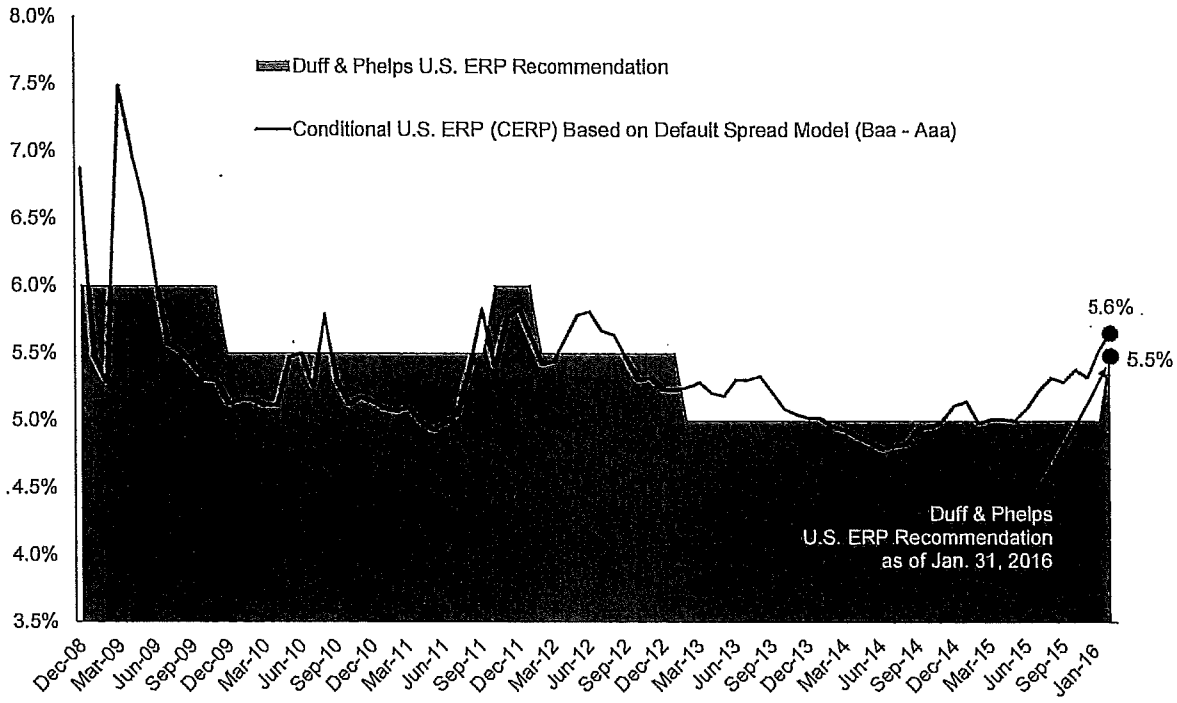
The graph illustrates the Damodaran Implied U.S. ERP model over the time period December 2008 through January 2016 (estimated using a "normalized" 20-year U.S. Treasury yield) as compared to the Duff & Phelps U.S. ERP recommendation.

- At the end of January 2016, the U.S. ERP implied by the Damodaran Model was 5.8% using the average cash flow yield of S&P 500 constituents from the *previous 12 months*, and a normalized 4.0% risk free rate.

- At the end of January 2016, the U.S. ERP implied by the Damodaran Model was 5.9% using the average cash flow yield of S&P 500 constituents from the *previous 10 years*, and a normalized 4.0% risk free rate.

Duff & Phelps regularly reviews fluctuations in global economic and financial conditions that warrant periodic reassessments of ERP. As of January 31, 2016, Duff & Phelps' U.S. ERP recommendation is 5.5%, used in conjunction with a 4.0% normalized risk-free rate.

Appendix B – Default Spread Model



Additional Indicators: The Default Spread Model

The graph illustrates the Default Spread Model used to estimate a conditional U.S. ERP (CERP) over the time period December 2008 through January 2016 as compared to the Duff & Phelps U.S. ERP recommendation. This model notably removes the risk-free rate itself as an *input* in the estimation of ERP. However, the ERP estimate resulting from the Default Spread Model is still interpreted as an estimate of the relative return of stocks *in excess* of risk-free securities.

- At the end of January 2016, the U.S. ERP implied by the Default Spread Model was 5.6%.

Duff & Phelps regularly reviews fluctuations in global economic and financial conditions that warrant periodic reassessments of ERP. As of January 31, 2016, Duff & Phelps' U.S. ERP recommendation is 5.5%, used in conjunction with a 4.0% normalized risk-free rate.

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Report Authors
Roger J. Grabowski, FASA
Managing Director

Carla S. Nunes, CFA
Managing Director

James P. Harrington
Director

Report Contributors

Kevin Madden
Analyst

Table 2-1.

CBO's Economic Projections for Calendar Years 2017 to 2027

	Actual, 2015	Estimated, 2016[a]	Forecast 2017	Forecast 2018	Projected Annual Average 2019-2020	Projected Annual Average 2021-2027
			Percentage Change From Fourth Quarter to Fourth Quarter			
Gross Domestic Product						
Real[b]	1.9	1.8	2.3	1.9	1.6	1.9
Nominal	3.0	3.5	4.1	3.8	3.5	4.0
Inflation						
PCE price index	0.4	1.5	1.9	2.0	2.0	2.0
Core PCE price index[c]	1.4	1.8	1.9	2.0	2.0	2.0
Consumer price index[d]	0.4	1.8 [e]	2.3	2.3	2.4	2.4
Core consumer price index[c]	2.0	2.2 [e]	2.2	2.3	2.3	2.3
GDP price index	1.1	1.6	1.8	1.9	1.9	2.0
Employment Cost Index[f]	2.1	2.5	3.0	3.2	3.2	3.1
			Fourth-Quarter Level			
Unemployment Rate (Percent)	5.0	4.7 [e]	4.5	4.4	5.0 [g]	4.9 [h]
			Percentage Change From Year to Year			
Gross Domestic Product						
Real[b]	2.6	1.6	2.3	2.0	1.6	1.9
Nominal	3.7	2.9	4.2	3.9	3.5	3.9
Inflation						
PCE price index	0.3	1.1	1.9	2.0	2.0	2.0
Core PCE price index[c]	1.4	1.7	1.8	1.9	2.0	2.0
Consumer price index[d]	0.1	1.3 [e]	2.4	2.3	2.3	2.4
Core consumer price index[c]	1.8	2.2 [e]	2.2	2.3	2.3	2.3
GDP price index	1.1	1.3	1.9	1.9	1.9	2.0
Employment Cost Index[f]	2.3	2.4	2.7	3.1	3.2	3.1
			Annual Average			
Unemployment Rate (Percent)	5.3	4.9 [e]	4.6	4.4	4.7	4.9
Payroll Employment (Monthly change, in thousands)[i]	231	188 [e]	138	94	37	64
Interest Rates (Percent)						
Three-month Treasury bills	0.1	0.3 [e]	0.7	1.1	2.0	2.8
Ten-year Treasury notes	2.1	1.8 [e]	2.3	2.5	3.0	3.6
Tax Bases (Percentage of GDP)						
Wages and salaries	43.5	44.1	44.2	44.3	44.4	44.3
Domestic economic profits	9.4	9.1	8.9	8.4	8.0	7.5

Sources: Congressional Budget Office; Bureau of Economic Analysis; Bureau of Labor Statistics; Federal Reserve.

Economic projections for each year from 2017 to 2027 appear in Appendix C.

GDP = gross domestic product; PCE = personal consumption expenditures.

a. Values for 2016 do not reflect the values for GDP and related series released by the Bureau of Economic Analysis since early December 2016.

b. Nominal GDP adjusted to remove the effects of inflation.

c. Excludes prices for food and energy.

d. The consumer price index for all urban consumers.

e. Actual value for 2016.

f. The employment cost index for wages and salaries of workers in private industries.

g. Value for the fourth quarter of 2020.

h. Value for the fourth quarter of 2027.

i. Calculated as the monthly average of the fourth-quarter-to-fourth-quarter change in payroll employment.

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Market Results Through 2016

Preview Version

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2017 SBBI Yearbook

Stocks, Bonds, Bills, and Inflation

(Preview Version)

U.S. Capital Markets Performance by Asset Class 1926–2016

This document is an abbreviated "Preview Version" of the key year-end (December 31, 2016) U.S. capital markets data available in the hardcover *2017 Stocks, Bonds, Bills, and Inflation (SBBI) Yearbook ("2017 SBBI Yearbook").*

This document is made available to purchasers who have pre-ordered the *2017 SBBI Yearbook*. The purpose of this document is to provide key year-end 2016 U.S. capital markets data to pre-order purchasers while the hardcover *2017 SBBI Yearbook* is being printed.

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About the Data

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The six books are:[3]

U.S. and International Valuation Theory and Data

- *Cost of Capital: Applications and Examples (5th edition)*
- *Valuation Handbook – U.S. Guide to Cost of Capital*
- *Valuation Handbook – U.S. Industry Cost of Capital*
- *Valuation Handbook – International Guide to Cost of Capital*
- *Valuation Handbook – International Industry Cost of Capital*

U.S. Capital Markets Performance Data

- *Stocks, Bonds, Bills, and Inflation (SBBI) Yearbook*

All six Duff & Phelps books are published by John Wiley & Sons (Hoboken, NJ). Each of the six books is summarized in the following sections.

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[2] Morningstar previously published two "Ibbotson SBBI" yearbooks: (i) The *SBBI "Classic" Yearbook*, which is now produced by Duff & Phelps and published by John Wiley & Sons as the "SBBI Yearbook" starting in 2016 (the word "Classic" was dropped from the title), and (ii) the *SBBI "Valuation"* Yearbook, which was discontinued by Morningstar in 2013. The former *SBBI Valuation Yearbook* was replaced by the *Valuation Handbook – U.S. Guide to Cost of Capital*, also produced by Duff & Phelps and published by John Wiley & Sons, starting in 2014.

[3] In years 2014 through 2016, the four books comprising the Valuation Handbook series were named as follows: *Valuation Handbook – Guide to Cost of Capital*, *Valuation Handbook – Industry Cost of Capital*, *International Valuation Handbook – Guide to Cost of Capital*, and *International Valuation Handbook – Industry Cost of Capital*. Starting with the 2017 Valuation Handbook editions, the names of the four books were changed to: *Valuation Handbook – U.S. Guide to Cost of Capital*, *Valuation Handbook – U.S. Industry Cost of Capital*, *Valuation Handbook – International Guide to Cost of Capital*, and *Valuation Handbook – International Industry Cost of Capital*, respectively. For simplicity, in all 2017 books, intra-year updates, marketing materials, online tools, etc., the new names are used (even when referring to pre-2017 editions).

Cost of Capital: Applications and Examples 5th edition

To learn more about the latest theory and practice in cost of capital estimation, see C*ost of Capital: Applications and Examples* 5th edition, by Shannon P. Pratt and Roger J. Grabowski (John Wiley & Sons, Inc., 2014).

The *Cost of Capital: Examples and* Applications, 5th Edition is the authoritative, comprehensive overview of valuation theory, best practices, and proper use of data. This book puts an emphasis on practical application.

The *Cost of Capital: Applications and Examples* 5th edition is a one-stop shop for background and current thinking on the development and uses of rates of return on capital. This book contains expanded materials on estimating the basic building blocks of the cost of equity capital, the risk-free rate, and equity risk premium, plus in-depth discussion of the volatility created by the 2008 financial crisis, the subsequent recession and uncertain recovery, and how those events have fundamentally changed how we need to interpret the inputs to the models we use to develop these estimates.

The *Cost of Capital: Applications and Examples* 5th edition includes case studies providing comprehensive discussion of cost of capital estimates for valuing a business and damages calculations for small and medium-sized businesses, cross-referenced to the chapters covering the theory and data. This book puts an emphasis on practical application. To that end, this updated edition provides readers with exclusive access to a companion website filled with supplementary materials, allowing you to continue to learn in a hands-on fashion long after closing the book.

The *Cost of Capital: Applications and Examples* has been published since 1998, and is updated every three to four years. The 6th edition of this book is scheduled to be available in early 2018.

> *"Shannon Pratt and Roger Grabowski have produced a remarkably comprehensive review of the subject…it is a work that valuation practitioners, CFOs, and others will find an invaluable reference."*
>
> **– Professor Richard Brealey,** Emeritus Professor of Finance, London Business School (from the Foreword)
>
> *"Estimating the cost of capital is critical in determining the valuation of assets, in evaluating the capital structure of corporations, and in estimating the long-run expected return of investments. Shannon Pratt and Roger Grabowski have the most thorough text on the subject, not only providing various estimation methods, but also numerous ways to use the cost of capital."*
>
> **– Professor Roger G. Ibbotson,** Professor Emeritus of Finance at the Yale School of Management, Chairman and Chief Investment Officer of Zebra Capital LLC, and former Chairman and founder of Ibbotson Associates, now part of Morningstar, Inc.

Valuation Handbook – U.S. Guide to Cost of Capital

This annual book includes the U.S. cost of capital data inputs (equity risk premia, size premia, industry risk premia, risk premia over the risk-free rate, risk-free rates) that were previously published in the Morningstar/Ibbotson *Stocks, Bonds, Bills, and Inflation (SBBI) Valuation Yearbook* and the Duff & Phelps *Risk Premium Report*.

The *Valuation Handbook – U.S. Guide to Cost of Capital* can be used to develop cost of equity capital estimates (using both the build-up method and CAPM) for an individual business, business ownership interest, security, or intangible asset. Includes many examples for using the data properly.

The *Valuation Handbook – U.S. Guide to Cost of Capital* has been published since 2014, and is updated annually with data through December 31 of the previous year (e.g., the *2014 Valuation Handbook – U.S. Guide to Cost of Capital* is "data through" December 31, 2013; the *2015 Valuation Handbook – U.S. Guide to Cost of Capital* is "data through" December 31, 2014. etc.). This book includes three optional intra-year quarterly updates (March, June, and September).

Valuation Handbook – U.S. Industry Cost of Capital

This annual book provides industry-level cost of capital estimates (cost of equity capital, cost of debt capital, and weighted average cost of capital, or WACC), plus detailed industry-level statistics for sales, market capitalization, capital structure, various levered and unlevered beta estimates (e.g., ordinary-least squares (OLS) beta, sum beta, peer group beta, downside beta, etc.), valuation (trading) multiples, financial and profitability ratios, equity returns, aggregate forward-looking earnings-per share (EPS) growth rates, and more. Over 300 critical industry-level data points are calculated for approximately 180 U.S. industries (depending on data availability). Industries are organized by standard industrial classification (SIC) code.

The *Valuation Handbook – U.S. Industry Cost of Capital* can be used to benchmark, augment, and support the analyst's own custom analysis of the industry in which a subject business, business ownership interest, security, or intangible asset resides.

The *Valuation Handbook – U.S. Industry Cost of Capital* has been published since 2014, and is updated annually with data through March 31 of the current year (e.g., the *2014 Valuation Handbook – U.S. Industry Cost of Capital* is "data through" March 31, 2014; the *2015 Valuation Handbook – U.S. Industry Cost of Capital* is "data through" March 31, 2015, etc.). This book includes three optional intra-year quarterly updates (June, September, and December).

Valuation Handbook – International Guide to Cost of Capital

This annual book provides country-level equity risk premia (ERPs), relative volatility (RV) factors, and country risk premia (CRPs).

This book can be used to estimate country-level cost of equity capital globally, for up to 188 countries, from the perspective of investors based in any one of up to 56 countries (depending on data availability).

The *Valuation Handbook – International Guide to Cost of Capital* has been published since 2014, and is updated annually with data through December of the previous year and March of the current year (e.g., the *2014 Valuation Handbook – International Guide to Cost of Capital* is "data through" December 31, 2013 and March 31, 2014; the *2015 Valuation Handbook – International Guide to Cost of Capital* is "data through" December 31, 2014 and March 31, 2015 etc.). This book includes one optional semi-annual update with data through June and September.

> *"Measuring the impact of country risk in determining the international cost of capital is one of the most vexing issues in finance. Any company doing international cost of capital estimation must, at minimum, consult the International Valuation Handbook – Guide to Cost of Capital".*
>
> – **Campbell R. Harvey**, Professor of International Business at the Fuqua School of Business, Duke University

Valuation Handbook – International Industry Cost of Capital

This annual book provides the same type of rigorous industry-level analysis published in the U.S.-centric *Valuation Handbook – U.S. Industry Cost of Capital*, on a global scale.

This book includes industry-level analyses for four global economic areas: (i) the "World," (ii) the European Union, (iii) the Eurozone, and (iv) the United Kingdom.[4] Industries in the book are identified by their Global Industry Classification Standard (GICS) code. Each of the four global economic area's industry analyses are presented in three currencies: (i) the euro (€ or EUR), (ii) the British pound (£ or GBP), and (iii) the U.S. dollar ($ or USD).

This annual book provides industry level cost of capital estimates (cost of equity capital, cost of debt capital, and weighted average cost of capital, or WACC), plus detailed industry-level statistics for sales, market capitalization, capital structure, various levered and unlevered beta estimates (e.g., ordinary-least squares (OLS) beta, sum beta, peer group beta, downside beta, etc.), valuation (trading) multiples, financial and profitability ratios, equity returns, aggregate forward-looking earnings-per share (EPS) growth rates, and more. Over 300 critical industry-level data points are calculated for each industry (depending on data availability). Industries are organized by global industry classification standard (GICS) code.

[4] In the *Valuation Handbook – International Industry Cost of Capital*, "World" companies are defined as companies that (i) are components of the MSCI ACWI IMI, and (ii) satisfy the rigorous screening requirements that are employed to define the company sets used therein.

The *Valuation Handbook – International Industry Cost of Capital* can be used to benchmark, augment, and support the analyst's own custom analysis of the industry in which a subject business, business ownership interest, security, or intangible asset resides.

The *Valuation Handbook – International Industry Cost of Capital* has been published since 2015, and is updated annually with data through March 31 of the current year (e.g., the *2015 Valuation Handbook – International Industry Cost of Capital* is "data through" March 31, 2015; the *2016 Valuation Handbook – International Industry Cost of Capital* is "data through" March 31, 2016, etc.). This book includes one optional semi-annual update with data through September.

To learn more about cost of capital issues, and to ensure that you are using the most recent Duff & Phelps Recommended ERP, visit www.duffandphelps.com/CostofCapital.

Stocks, Bonds, Bills, and Inflation (SBBI) Yearbook

This annual book has been the definitive annual resource for historical U.S. capital markets performance data for over 30 years.

Starting with the 2016 edition, the *Stocks, Bonds, Bills, and Inflation (SBBI) Yearbook* is now produced by Duff & Phelps and published by John Wiley & Sons. The *SBBI Yearbook* was previously published by Morningstar, Inc. under the name "Ibbotson *Stocks, Bonds, Bills, and Inflation (SBBI) Classic Yearbook*".[5]

This book includes returns, index values, and statistical analyses of U.S. large company stocks, small company stocks, long-term corporate bonds, long-term government bonds, intermediate-term government bonds, U.S. Treasury bills, and inflation from January 1926 to present (monthly).

Anyone serious about investments or investing needs an appreciation of capital market history. Such an appreciation, which can be gained from this book, is equally valuable to the individual and institutional investor, practitioners and scholars in finance, economics, and business; portfolio strategists; and security analysts seeking to benchmark their own investment performance. The *SBBI Yearbook* is a thinking person's guide to using historical data to understand the financial markets and make decisions.

[5] The *SBBI Yearbook* was published by Morningstar, Inc. from 2007 through 2015, and by Ibbotson Associates in years prior to 2007.

Purchasing Information

U.S. and International Valuation Theory and Data

- *Cost of Capital: Applications and Examples (5th edition)*
- *Valuation Handbook – U.S. Guide to Cost of Capital*
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Results for 2016 Capital Markets

Large-Cap Stocks

The market for U.S. large-capitalization stocks is represented herein by the S&P 500 Total Return Index ("total return" includes the reinvestment of dividends).

U.S. Large-cap stocks posted a total return of 11.96% in 2016, up from 1.38% in 2015. Nine months of 2016 produced positive returns; March delivered the highest return at 6.78%, while January's -4.96% was the lowest. An index of large-cap stock total returns, started at $1.00 on December 31, 1925, increased to $6,035.12 by the end of 2016, up from $5,390.43 at the end of 2015.

Small-Cap Stocks

U.S. small-cap stocks posted a total return of 25.65% in 2016, up from -3.60% in 2015. Nine months of 2016 produced positive returns; November delivered the highest return at 13.19%, while January's -6.80% was the lowest. An index of small-cap stocks total returns, started at $1.00 on December 31, 1925, increased to $33,212.31 by the end of 2016, up from $26,433.35 at the end of 2015.

Long-term Corporate Bonds

U.S. long-term corporate bonds posted a total return of 6.70% in 2016, up from -1.02% in 2015. Nine months of 2016 produced positive returns; March delivered the highest return at 4.23%, while November's -5.10% was the lowest. An index of long-term corporate bonds total returns, started at $1.00 on December 31, 1925, increased to $200.40 by the end of 2016, up from $187.82 at the end of 2015.

The bond default premium, or net return from investing in long-term corporate bonds rather than investing in long-term government bonds of equal maturity, was 4.86% in 2016, compared with -0.37% in 2015.

Long-term Government Bonds

U.S. long-term government bonds posted a total return of 1.75% in 2016, up from -0.65% in 2015. Five months of 2016 produced positive returns; June delivered the highest return at 5.90%, while November's -5.99% was the lowest. An index of long-term government bonds total returns, started at $1.00 on December 31, 1925, increased to $134.35 by the end of 2016, up from $132.03 at the end of 2015.

Intermediate-term Government Bonds

U.S. intermediate-term government bonds posted a total return of 1.92% in 2016, up from 1.79% in 2015. Six months of 2016 produced positive returns; January delivered the highest return at 2.33%, while November's -1.89% was the lowest. An index of intermediate-term government bonds total returns, started at $1.00 on December 31, 1925, increased to $95.78 by the end of 2016, up from $93.97 at the end of 2015.

Treasury Bills

U.S. Treasury bills posted a total return of 0.20% in 2016, up from the 0.02% posted in 2015. All 12 months of 2016 produced positive returns; December delivered the highest return at 0.02534%, while January's 0.00604% was the lowest. An index of Treasury Bills total returns, started at $1.00 on December 31, 1925, increased to $20.63 by the end of 2016, up from $20.59 at the end of 2015.

Inflation[6]

Inflation increased to 2.07% in 2016, compared to 0.73% in 2015. The result is lower than the long-term historical annual average (1926–2016) of 3.0%. Inflation has remained below 5% for 34 of the last 35 years (the exception was the 6.11% rate in 1990). A cumulative inflation index, beginning at $1.00 at year-end 1925, finished 2016 at $13.47, up from $13.20 at year-end 2015. That is, a "basket" of consumer goods and services that cost $1.00 in 1925 would cost $13.47 today. The two baskets are not identical, but are intended to be comparable.

[6] The inflation rate used for the single month of December 2015 in last year's *2016 SBBI Yearbook* (0.00105760) was an estimate in the data provider's database. The value has been revised to -0.00341710, representing a difference of -0.00447470, or -0.4%. We use the revised December 2015 value in all calculations in the *2017 SBBI Yearbook*; this may cause slight differences in year-end 2015 inflation calculations as appeared in the *2016 SBBI Yearbook* when compared to year-end 2015 inflation calculations as appear in the *2017 SBBI Yearbook*. For example, the annual inflation rate reported for calendar year (January–December) 2015 in last year's *2016 SBBI Yearbook* was 1.18% using the *estimated* December 2015 value, but the annual inflation rate reported for calendar year (January–December) 2015 is reported as 0.73% in the *2017 SBBI Yearbook* using the *revised* December 2015 value. Longer-term statistics are unaffected (e.g., the long-term 1926–2015 average annual inflation rate (2.98%) is identical using both the *estimated* and the *revised* December 2015 monthly value). This issue does not recur in the *2017 SBBI Yearbook*; the inflation rate used for the single month of December 2016 herein is *not* an estimate; it is taken directly from the United States Department of Labor, Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers, or CPI-U, not seasonally adjusted, at https://www.bls.gov/cpi/.

Exhibit 1: Wealth Indexes of Investments in the U.S. Capital Markets Index
(Year-end 1925 = $1.00)
1926–2016

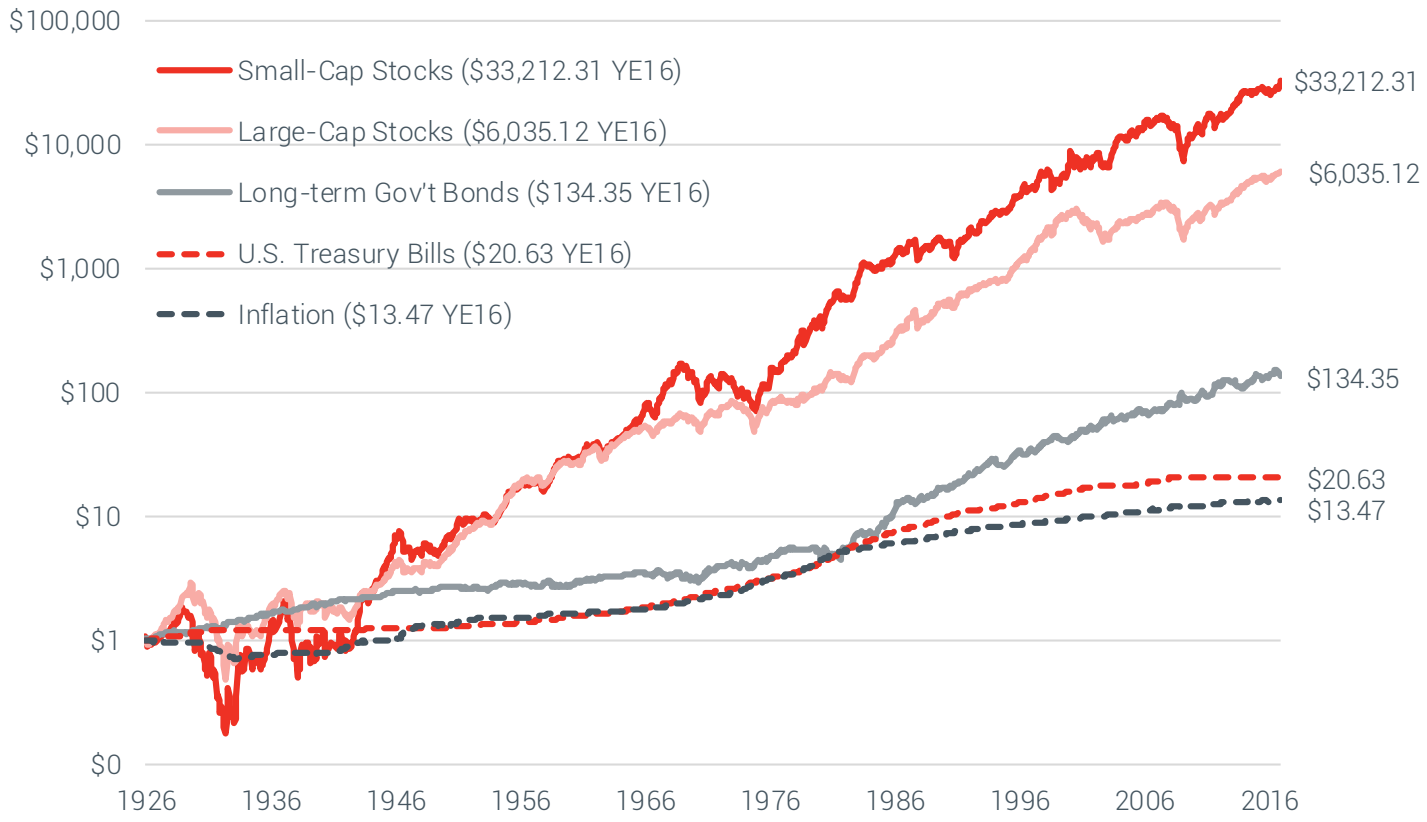


Exhibit 2: Basic Series: Annual Total Returns in Percent (%)
2007–2016

	Large-Cap Stocks	Small-Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
2007	5.49	-5.22	2.60	9.88	10.05	4.66	4.08
2008	-37.00	-36.72	8.78	25.87	13.11	1.60	0.09
2009	26.46	28.09	3.02	-14.90	-2.40	0.10	2.72
2010	15.06	31.26	12.44	10.14	7.12	0.12	1.50
2011	2.11	-3.26	17.95	27.10	8.81	0.04	2.96
2012	16.00	18.24	10.68	3.43	1.66	0.06	1.74
2013	32.39	45.07	-7.07	-12.78	-3.68	0.02	1.51
2014	13.69	2.92	17.28	24.71	3.00	0.02	0.76
2015	1.38	-3.60	-1.02	-0.65	1.79	0.02	0.73
2016	11.96	25.65	6.70	1.75	1.92	0.20	2.07

Exhibit 3: Portfolios: Annual Total Returns in Percent (%)
2007–2016

	100% Large Stocks	90/10	70/30	50/50	30/70	10/90	100% Long-term Gov't Bonds
2007	5.49	6.03	7.03	7.95	8.79	9.54	9.88
2008	-37.00	-32.14	-21.55	-9.72	3.43	18.02	25.87
2009	26.46	21.86	12.97	4.49	-3.58	-11.23	-14.90
2010	15.06	14.97	14.52	13.70	12.53	11.02	10.14
2011	2.11	4.69	9.81	14.88	19.85	24.72	27.10
2012	16.00	14.86	12.48	10.00	7.43	4.78	3.43
2013	32.39	27.14	17.16	7.85	-0.84	-8.94	-12.78
2014	13.69	14.80	17.03	19.24	21.44	23.62	24.71
2015	1.38	1.35	1.18	0.84	0.36	-0.28	-0.65
2016	11.96	11.04	9.13	7.13	5.04	2.87	1.75

Exhibit 4: Basic Series: Monthly and Quarterly Returns in Percent (%)

	Large-cap Stocks			Small-cap Stocks	Long-term Corp Bonds	Long-term Gov't bonds			Intermediate-term Gov't bonds			U.S. Treasury Bills	Inflation
2016 Monthly Returns	**Total Return**	**Income Return**	**Capital Appreciation Return**	**Total Return**	**Total Return**	**Total Return**	**Income Return**	**Capital Appreciation Return**	**Total Return**	**Income Return**	**Capital Appreciation Return**	**Total Return**	**Rate**
Dec-15	-1.58	0.18	-1.75	-4.90	0.00	-0.22	0.22	-0.44	-0.17	0.14	-0.31	0.01	-0.34
Jan-16	-4.96	0.11	-5.07	-6.80	0.67	4.76	0.21	4.55	2.33	0.15	2.18	0.01	0.17
Feb-16	-0.13	0.28	-0.41	1.10	2.32	2.94	0.20	2.75	0.57	0.12	0.45	0.02	0.08
Mar-16	6.78	0.18	6.60	7.08	4.23	-0.03	0.18	-0.22	0.45	0.11	0.34	0.02	0.43
Apr-16	0.39	0.12	0.27	1.08	1.46	-0.53	0.17	-0.70	-0.10	0.10	-0.20	0.01	0.47
May-16	1.80	0.26	1.53	1.07	0.16	0.82	0.20	0.63	-0.21	0.11	-0.33	0.01	0.40
Jun-16	0.26	0.17	0.09	-0.17	3.77	5.90	0.18	5.72	1.75	0.11	1.64	0.02	0.33
Jul-16	3.69	0.13	3.56	5.02	2.45	0.81	0.14	0.66	0.04	0.08	-0.04	0.02	-0.16
Aug-16	0.14	0.26	-0.12	1.59	0.16	-1.40	0.16	-1.56	-0.64	0.09	-0.74	0.02	0.09
Sep-16	0.02	0.14	-0.12	0.72	-1.19	-1.24	0.15	-1.40	0.27	0.10	0.17	0.02	0.24
Oct-16	-1.82	0.12	-1.94	-3.53	-2.63	-3.14	0.16	-3.31	-0.52	0.10	-0.62	0.02	0.12
Nov-16	3.70	0.29	3.42	13.19	-5.10	-5.99	0.18	-6.16	-1.89	0.11	-1.99	0.01	-0.16
Dec-16	1.98	0.16	1.82	4.06	0.59	-0.57	0.22	-0.79	-0.07	0.15	-0.22	0.03	0.03
2016 Annual Returns													
2016	11.96	2.26	9.54	25.65	6.70	1.75	2.30	-0.40	1.92	1.36	0.58	0.20	2.07
2016 Quarterly Returns													
Q1-16	1.35	0.55	0.77	0.90	7.36	7.80	0.61	7.18	3.38	0.39	2.99	0.05	0.68
Q2-16	2.46	0.55	1.90	1.99	5.46	6.21	0.55	5.64	1.43	0.32	1.10	0.04	1.21
Q3-16	3.85	0.54	3.31	7.46	1.39	-1.85	0.45	-2.29	-0.34	0.27	-0.61	0.06	0.17
Q4-16	3.82	0.56	3.25	13.63	-7.05	-9.46	0.53	-9.98	-2.47	0.35	-2.81	0.06	0.00

Exhibit 5: Portfolios: Monthly and Quarterly Returns in Percent (%)

2016 Monthly Returns	100% Large Stocks	90/10	70/30	50/50	30/70	10/90	100% Long-term Gov't Bonds
Dec-15	-1.58	-1.44	-1.17	-0.90	-0.63	-0.35	-0.22
Jan-16	-4.96	-3.99	-2.05	-0.10	1.84	3.78	4.76
Feb-16	-0.13	0.17	0.79	1.40	2.02	2.64	2.94
Mar-16	6.78	6.10	4.74	3.38	2.01	0.65	-0.03
Apr-16	0.39	0.30	0.11	-0.07	-0.25	-0.44	-0.53
May-16	1.80	1.70	1.50	1.31	1.12	0.92	0.82
Jun-16	0.26	0.82	1.95	3.08	4.21	5.34	5.90
Jul-16	3.69	3.40	2.82	2.25	1.67	1.09	0.81
Aug-16	0.14	-0.01	-0.32	-0.63	-0.94	-1.25	-1.40
Sep-16	0.02	-0.11	-0.36	-0.61	-0.87	-1.12	-1.24
Oct-16	-1.82	-1.96	-2.22	-2.48	-2.75	-3.01	-3.14
Nov-16	3.70	2.73	0.80	-1.14	-3.08	-5.02	-5.99
Dec-16	1.98	1.72	1.21	0.70	0.19	-0.32	-0.57
2016 Annual Returns							
2016	11.96	11.04	9.13	7.13	5.04	2.87	1.75
2016 Quarterly Returns							
Q1-16	1.35	2.04	3.40	4.72	5.99	7.21	7.80
Q2-16	2.46	2.84	3.60	4.36	5.10	5.84	6.21
Q3-16	3.85	3.27	2.12	0.98	-0.16	-1.29	-1.85
Q4-16	3.82	2.46	-0.25	-2.92	-5.56	-8.17	-9.46

Exhibit 6: Basic Series: Monthly Index Values
(Year-end 1925 = $1.00)
1926–2016

	Large-cap Stocks		Small-cap Stocks	Long-term Corp Bonds	Long-term Gov't bonds		Intermediate-term Gov't bonds		U.S. Treasury Bills	Inflation
	Total Return	Capital App Return	Total Return	Total Return	Total Return	Capital App Return	Total Return	Capital App Return	Total Return	Rate
Dec-15	5,390.425	160.180	26,433.349	187.822	132.032	1.375	93.970	1.673	20.586	13.195
Jan-16	5,122.930	152.053	24,635.881	189.073	138.310	1.437	96.162	1.709	20.588	13.217
Feb-16	5,116.018	151.425	24,906.876	193.454	142.383	1.477	96.712	1.717	20.592	13.228
Mar-16	5,463.079	161.419	26,670.283	201.640	142.335	1.474	97.146	1.723	20.596	13.285
Apr-16	5,484.258	161.854	26,958.322	204.581	141.583	1.463	97.049	1.719	20.598	13.348
May-16	5,582.745	164.336	27,246.776	204.915	142.751	1.472	96.842	1.714	20.600	13.402
Jun-16	5,597.211	164.484	27,200.456	212.640	151.175	1.557	98.534	1.742	20.604	13.446
Jul-16	5,803.573	170.342	28,565.919	217.848	152.393	1.567	98.573	1.741	20.608	13.424
Aug-16	5,811.721	170.134	29,020.117	218.207	150.253	1.543	97.937	1.728	20.612	13.436
Sep-16	5,812.820	169.924	29,229.062	215.605	148.383	1.521	98.199	1.731	20.616	13.469
Oct-16	5,706.787	166.623	28,197.276	209.938	143.722	1.471	97.688	1.721	20.620	13.486
Nov-16	5,918.137	172.317	31,916.497	199.235	135.120	1.380	95.846	1.686	20.622	13.465
Dec-16	6,035.116	175.453	33,212.307	200.404	134.349	1.369	95.777	1.683	20.628	13.469

Exhibit 7: Portfolios: Monthly Index Values
(Year-end 1925 = $1.00)
1926–2016

	100% Large Stocks	90/10	70/30	50/50	30/70	10/90	100% Long-term Gov't Bonds
Dec-15	5,390.425	4,372.613	2,579.192	1,317.611	583.874	224.548	132.032
Jan-16	5,122.930	4,198.116	2,526.392	1,316.245	594.616	233.044	138.310
Feb-16	5,116.018	4,205.381	2,546.325	1,334.738	606.633	239.189	142.383
Mar-16	5,463.079	4,461.997	2,666.985	1,379.786	618.836	240.739	142.335
Apr-16	5,484.258	4,475.208	2,669.997	1,378.817	617.268	239.688	141.583
May-16	5,582.745	4,551.229	2,710.166	1,396.884	624.157	241.897	142.751
Jun-16	5,597.211	4,588.700	2,763.060	1,439.909	650.424	254.807	151.175
Jul-16	5,803.573	4,744.659	2,841.049	1,472.254	661.287	257.594	152.393
Aug-16	5,811.721	4,743.992	2,831.874	1,462.951	655.066	254.375	150.253
Sep-16	5,812.820	4,738.896	2,821.676	1,453.987	649.396	251.531	148.383
Oct-16	5,706.787	4,646.209	2,759.054	1,417.887	631.562	243.960	143.722
Nov-16	5,918.137	4,773.266	2,781.041	1,401.711	612.119	231.723	135.120
Dec-16	6,035.116	4,855.456	2,814.759	1,411.565	613.304	230.991	134.349

Exhibit 8: Basic Series and Portfolios: Summary Statistics of Annual Total Returns in Percent (%)
1926–2016

Asset Class	Geometric Mean	Arithmetic Mean	Standard Deviation
Large-cap Stocks	10.0	12.0	19.9
Small-cap Stocks	12.1	16.6	31.9
Long-term Corp Bonds	6.0	6.3	8.4
Long-term Gov't Bonds	5.5	6.0	9.9
Inter-term Gov't bonds	5.1	5.3	5.6
U.S. Treasury Bills	3.4	3.4	3.1
Inflation	2.9	3.0	4.1
90% Stocks, 10% Bonds	9.8	11.3	17.9
70% Stocks, 30% Bonds	9.1	10.1	14.2
50% Stocks, 50% Bonds	8.3	8.9	11.1
30% Stocks, 70% Bonds	7.3	7.7	9.2
10% Stocks, 90% Bonds	6.2	6.5	9.2

Exhibit 9: Derived Series: Monthly and Quarterly Returns in Percent (%)

					Inflation-Adjusted Total Returns (%)					
2016 Monthly Returns	**Equity Risk Premium** *	**Small Cap Premium**	**Bond Default Premium**	**Bond Horizon Premium**	**Large-cap Stocks**	**Small-cap Stocks**	**Long-term Corp Bonds**	**Long-term Gov't bonds**	**Inter-term Gov't bonds**	**U.S. Treasury Bills**
Dec-15	-1.59	-3.38	0.22	-0.23	-1.24	-4.57	0.34	0.12	0.17	0.35
Jan-16	-4.97	-1.93	-3.90	4.75	-5.12	-6.95	0.50	4.58	2.16	-0.16
Feb-16	-0.16	1.24	-0.61	2.92	-0.22	1.02	2.23	2.86	0.49	-0.06
Mar-16	6.76	0.28	4.27	-0.05	6.33	6.62	3.78	-0.46	0.02	-0.41
Apr-16	0.38	0.69	2.00	-0.54	-0.09	0.60	0.98	-1.00	-0.57	-0.46
May-16	1.78	-0.71	-0.66	0.81	1.39	0.66	-0.24	0.42	-0.61	-0.39
Jun-16	0.24	-0.43	-2.01	5.88	-0.07	-0.50	3.43	5.55	1.41	-0.31
Jul-16	3.67	1.29	1.63	0.79	3.85	5.19	2.62	0.97	0.20	0.18
Aug-16	0.12	1.45	1.59	-1.42	0.05	1.50	0.07	-1.49	-0.74	-0.07
Sep-16	0.00	0.70	0.05	-1.27	-0.22	0.48	-1.43	-1.48	0.03	-0.22
Oct-16	-1.84	-1.74	0.53	-3.16	-1.95	-3.65	-2.75	-3.26	-0.64	-0.11
Nov-16	3.69	9.15	0.94	-6.00	3.87	13.37	-4.95	-5.84	-1.73	0.17
Dec-16	1.95	2.04	1.16	-0.60	1.94	4.03	0.55	-0.60	-0.11	-0.01
2016 Annual Returns										
2016	11.74	12.22	4.86	1.55	9.68	23.09	4.53	-0.31	-0.15	-1.84
2016 Quarterly Returns										
Q1-16	1.30	-0.45	-0.41	7.75	0.66	0.22	6.63	7.08	2.68	-0.63
Q2-16	2.42	-0.46	-0.71	6.17	1.23	0.77	4.19	4.94	0.21	-1.16
Q3-16	3.79	3.47	3.30	-1.90	3.68	7.28	1.22	-2.01	-0.51	-0.11
Q4-16	3.77	9.44	2.66	-9.51	3.82	13.63	-7.05	-9.46	-2.47	0.05

* In this exhibit, equity risk premium is calculated as the geometric difference between large-cap stock total returns and U.S. Treasury bill total returns.

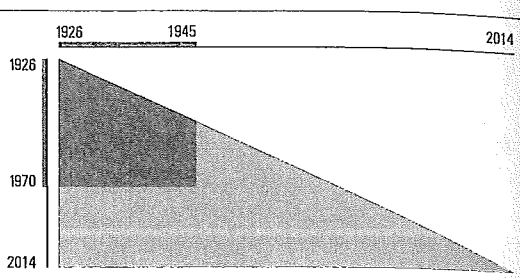
Exhibit 10: Derived Series: Monthly Index Values
(Year-end 1925 = $1.00)
1926–2016

	Inflation-Adjusted Total Returns (%)					
	Large-cap Stocks	Small-cap Stocks	Long-term Corp Bonds	Long-term Gov't bonds	Inter-term Gov't bonds	U.S. Treasury Bills
Dec-15	408.513	2,003.251	14.234	10.006	7.122	1.560
Jan-16	387.600	1,863.949	14.305	10.465	7.276	1.558
Feb-16	386.759	1,882.903	14.625	10.764	7.311	1.557
Mar-16	411.226	2,007.568	15.178	10.714	7.313	1.550
Apr-16	410.872	2,019.674	15.327	10.607	7.271	1.543
May-16	416.565	2,033.059	15.290	10.652	7.226	1.537
Jun-16	416.277	2,022.959	15.815	11.243	7.328	1.532
Jul-16	432.324	2,127.954	16.228	11.352	7.343	1.535
Aug-16	432.534	2,159.805	16.240	11.182	7.289	1.534
Sep-16	431.578	2,170.139	16.008	11.017	7.291	1.531
Oct-16	423.178	2,090.926	15.568	10.657	7.244	1.529
Nov-16	439.534	2,370.407	14.797	10.035	7.118	1.532
Dec-16	448.075	2,465.838	14.879	9.975	7.111	1.531

Table C-7 (page 1 of 6)
Inflation:
Rates of Return for all holding periods
Percent per annum compounded annually

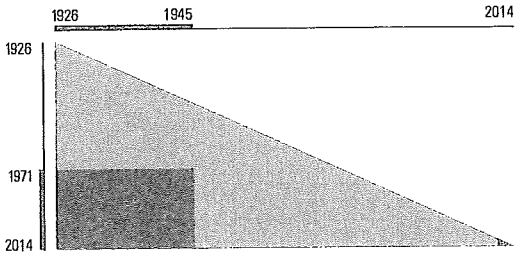
from 1926 to 2014

Attachment BEL-10
Cause No. 44891
Page 1 of 6



To the end of	From the beginning of 1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1926	-1.5																			
1927	-1.8	-2.1																		
1928	-1.5	-1.5	-1.0																	
1929	-1.1	-1.0	-0.4	0.2																
1930	-2.1	-2.2	-2.3	-3.0	-6.0															
1931	-3.4	-3.7	-4.2	-5.2	-7.8	-9.5														
1932	-4.4	-4.9	-5.4	-6.5	-8.6	-9.9	-10.3													
1933	-3.8	-4.1	-4.5	-5.1	-6.4	-6.6	-5.0	0.5												
1934	-3.2	-3.4	-3.6	-4.0	-4.8	-4.5	-2.7	1.3	2.0											
1935	-2.6	-2.7	-2.8	-3.0	-3.5	-3.0	-1.3	1.8	2.5	3.0										
1936	-2.2	-2.3	-2.3	-2.5	-2.9	-2.3	-0.8	1.7	2.1	2.1	1.2									
1937	-1.8	-1.8	-1.8	-1.9	-2.1	-1.6	-0.2	2.0	2.3	2.4	2.2	3.1								
1938	-1.9	-1.9	-1.9	-2.0	-2.2	-1.7	-0.6	1.2	1.3	1.1	0.5	0.1	-2.8							
1939	-1.8	-1.8	-1.8	-1.8	-2.0	-1.6	-0.6	0.9	1.0	0.8	0.2	-0.1	-1.6	-0.5						
1940	-1.6	-1.6	-1.6	-1.6	-1.8	-1.3	-0.4	0.9	1.0	0.8	0.4	0.2	-0.8	0.2	1.0					
1941	-0.9	-0.9	-0.8	-0.8	-0.9	-0.4	0.6	1.9	2.0	2.0	1.9	2.0	1.7	3.3	5.2	9.7				
1942	-0.3	-0.3	-0.2	-0.1	-0.1	0.4	1.3	2.6	2.8	2.9	2.9	3.2	3.2	4.8	6.6	9.5	9.3			
1943	-0.2	-0.1	0.0	0.1	0.1	0.6	1.5	2.6	2.9	2.9	2.9	3.2	3.2	4.4	5.7	7.3	6.2	3.2		
1944	0.0	0.0	0.2	0.2	0.2	0.7	1.5	2.6	2.8	2.9	2.8	3.1	3.0	4.1	5.0	6.0	4.8	2.6	2.1	
1945	0.1	0.2	0.3	0.4	0.4	0.8	1.6	2.6	2.7	2.8	2.8	3.0	2.9	3.8	4.5	5.2	4.2	2.5	2.2	2.3
1946	0.9	1.0	1.2	1.3	1.3	1.8	2.6	3.6	3.9	4.0	4.1	4.4	4.5	5.5	6.4	7.3	6.8	6.2	7.3	9.9
1947	1.2	1.4	1.5	1.7	1.7	2.2	3.0	4.0	4.2	4.4	4.5	4.8	5.0	5.9	6.7	7.5	7.2	6.8	7.7	9.6
1948	1.3	1.4	1.6	1.7	1.8	2.3	3.0	3.9	4.1	4.3	4.4	4.6	4.8	5.6	6.2	6.9	6.5	6.1	6.7	7.8
1949	1.2	1.3	1.4	1.5	1.6	2.0	2.7	3.5	3.7	3.8	3.9	4.1	4.2	4.9	5.4	5.9	5.5	4.9	5.2	5.8
1950	1.3	1.5	1.6	1.7	1.8	2.2	2.9	3.7	3.9	4.0	4.0	4.2	4.3	4.9	5.4	5.9	5.5	5.0	5.3	5.8
1951	1.5	1.6	1.8	1.9	2.0	2.4	3.0	3.8	4.0	4.1	4.1	4.3	4.4	5.0	5.5	5.9	5.5	5.1	5.4	5.8
1952	1.5	1.6	1.8	1.9	1.9	2.3	2.9	3.6	3.8	3.9	4.0	4.1	4.2	4.7	5.1	5.5	5.1	4.7	4.9	5.2
1953	1.5	1.6	1.7	1.8	1.9	2.2	2.8	3.5	3.6	3.7	3.8	3.9	4.0	4.4	4.8	5.1	4.7	4.3	4.4	4.7
1954	1.4	1.5	1.6	1.7	1.8	2.1	2.7	3.3	3.4	3.5	3.5	3.7	3.7	4.1	4.4	4.7	4.3	3.9	4.0	4.2
1955	1.4	1.5	1.6	1.7	1.7	2.1	2.6	3.2	3.3	3.4	3.4	3.5	3.5	3.9	4.2	4.4	4.0	3.6	3.7	3.8
1956	1.4	1.5	1.6	1.7	1.8	2.1	2.6	3.2	3.3	3.3	3.3	3.5	3.5	3.8	4.1	4.3	3.9	3.6	3.6	3.7
1957	1.5	1.5	1.7	1.8	1.8	2.1	2.6	3.2	3.3	3.3	3.3	3.4	3.5	3.8	4.0	4.2	3.9	3.5	3.6	3.7
1958	1.5	1.6	1.7	1.8	1.8	2.1	2.6	3.1	3.2	3.3	3.3	3.4	3.4	3.7	3.9	4.1	3.8	3.4	3.4	3.5
1959	1.5	1.6	1.7	1.8	1.8	2.1	2.5	3.0	3.1	3.2	3.2	3.3	3.3	3.6	3.8	3.9	3.6	3.3	3.3	3.4
1960	1.5	1.6	1.7	1.7	1.8	2.1	2.5	3.0	3.1	3.1	3.1	3.2	3.2	3.5	3.7	3.8	3.5	3.2	3.2	3.3
1961	1.4	1.5	1.6	1.7	1.8	2.0	2.4	2.9	3.0	3.0	3.0	3.1	3.1	3.4	3.5	3.7	3.4	3.1	3.1	3.1
1962	1.4	1.5	1.6	1.7	1.7	2.0	2.4	2.8	2.9	3.0	3.0	3.0	3.0	3.3	3.4	3.6	3.3	3.0	3.0	3.0
1963	1.4	1.5	1.6	1.7	1.7	2.0	2.4	2.8	2.9	2.9	2.9	3.0	3.0	3.2	3.4	3.5	3.2	2.9	2.9	2.9
1964	1.4	1.5	1.6	1.7	1.7	2.0	2.3	2.8	2.8	2.9	2.9	2.9	2.9	3.1	3.3	3.4	3.1	2.8	2.8	2.9
1965	1.4	1.5	1.6	1.7	1.7	2.0	2.3	2.7	2.8	2.8	2.8	2.9	2.9	3.1	3.2	3.3	3.1	2.8	2.8	2.8
1966	1.5	1.6	1.7	1.7	1.8	2.0	2.4	2.8	2.8	2.8	2.8	2.9	2.9	3.1	3.2	3.3	3.1	2.8	2.8	2.8
1967	1.5	1.6	1.7	1.8	1.8	2.0	2.4	2.8	2.8	2.8	2.8	2.9	2.9	3.1	3.2	3.3	3.1	2.8	2.8	2.8
1968	1.6	1.7	1.8	1.8	1.9	2.1	2.4	2.8	2.9	2.9	2.9	3.0	3.0	3.1	3.3	3.4	3.1	2.9	2.9	2.9
1969	1.7	1.8	1.9	1.9	2.0	2.2	2.5	2.9	3.0	3.0	3.0	3.0	3.0	3.2	3.4	3.5	3.2	3.0	3.0	3.0
1970	1.8	1.9	2.0	2.0	2.1	2.3	2.6	3.0	3.0	3.1	3.1	3.1	3.1	3.3	3.4	3.5	3.3	3.1	3.1	3.1

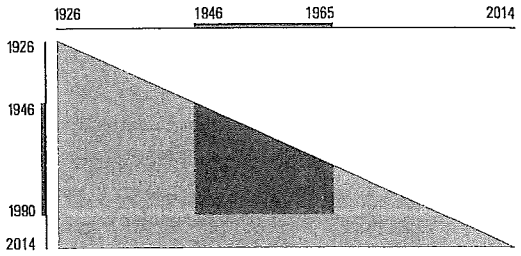
Table C-7 (page 2 of 6)
Inflation:
Rates of Return for all holding periods
Percent per annum compounded annually



from 1926 to 2014

To the end of	From the beginning of 1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1971	1.8	1.9	2.0	2.1	2.1	2.3	2.6	3.0	3.0	3.1	3.1	3.1	3.1	3.3	3.4	3.5	3.3	3.1	3.1	3.1
1972	1.9	1.9	2.0	2.1	2.1	2.3	2.6	3.0	3.1	3.1	3.1	3.1	3.1	3.3	3.4	3.5	3.3	3.1	3.1	3.2
1973	2.0	2.1	2.2	2.2	2.3	2.5	2.8	3.1	3.2	3.2	3.2	3.3	3.3	3.5	3.6	3.7	3.5	3.3	3.3	3.3
1974	2.2	2.3	2.4	2.4	2.5	2.7	3.0	3.3	3.4	3.4	3.4	3.5	3.5	3.7	3.8	3.9	3.7	3.6	3.6	3.6
1975	2.3	2.4	2.5	2.5	2.6	2.8	3.1	3.4	3.5	3.5	3.5	3.6	3.6	3.8	3.9	4.0	3.8	3.7	3.7	3.7
1976	2.3	2.4	2.5	2.6	2.6	2.8	3.1	3.4	3.5	3.6	3.6	3.6	3.6	3.8	3.9	4.0	3.9	3.7	3.7	3.8
1977	2.4	2.5	2.6	2.7	2.7	2.9	3.2	3.5	3.6	3.6	3.6	3.7	3.7	3.9	4.0	4.1	3.9	3.8	3.8	3.9
1978	2.5	2.6	2.7	2.8	2.8	3.0	3.3	3.6	3.7	3.7	3.8	3.8	3.8	4.0	4.1	4.2	4.1	3.9	4.0	4.0
1979	2.7	2.8	2.9	3.0	3.0	3.2	3.5	3.8	3.9	4.0	4.0	4.0	4.1	4.2	4.4	4.4	4.3	4.2	4.2	4.3
1980	2.9	3.0	3.1	3.2	3.2	3.4	3.7	4.0	4.1	4.1	4.2	4.2	4.2	4.4	4.5	4.6	4.5	4.4	4.4	4.5
1981	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.1	4.2	4.2	4.3	4.3	4.4	4.5	4.6	4.7	4.6	4.5	4.5	4.6
1982	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.1	4.2	4.2	4.2	4.3	4.3	4.5	4.6	4.7	4.6	4.5	4.5	4.6
1983	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.1	4.2	4.2	4.2	4.3	4.3	4.5	4.6	4.7	4.6	4.5	4.5	4.6
1984	3.0	3.1	3.2	3.3	3.4	3.5	3.8	4.1	4.2	4.2	4.2	4.3	4.3	4.5	4.6	4.7	4.6	4.5	4.5	4.5
1985	3.1	3.1	3.2	3.3	3.4	3.5	3.8	4.1	4.2	4.2	4.2	4.3	4.3	4.5	4.6	4.7	4.5	4.4	4.5	4.5
1986	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.0	4.1	4.1	4.2	4.2	4.2	4.4	4.5	4.6	4.5	4.4	4.4	4.4
1987	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.0	4.1	4.1	4.2	4.2	4.2	4.4	4.5	4.6	4.5	4.4	4.4	4.4
1988	3.1	3.1	3.2	3.3	3.4	3.5	3.8	4.0	4.1	4.1	4.2	4.2	4.3	4.4	4.5	4.6	4.5	4.4	4.4	4.4
1989	3.1	3.2	3.3	3.3	3.4	3.5	3.8	4.1	4.1	4.2	4.2	4.2	4.3	4.4	4.5	4.6	4.5	4.4	4.4	4.4
1990	3.1	3.2	3.3	3.4	3.4	3.6	3.8	4.1	4.2	4.2	4.2	4.3	4.3	4.4	4.5	4.6	4.5	4.4	4.4	4.5
1991	3.1	3.2	3.3	3.4	3.4	3.6	3.8	4.1	4.1	4.2	4.2	4.2	4.3	4.4	4.5	4.6	4.5	4.4	4.4	4.5
1992	3.1	3.2	3.3	3.4	3.4	3.6	3.8	4.1	4.1	4.2	4.2	4.2	4.2	4.4	4.5	4.5	4.4	4.3	4.4	4.4
1993	3.1	3.2	3.3	3.3	3.4	3.6	3.8	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.5	4.4	4.3	4.3	4.4
1994	3.1	3.2	3.3	3.3	3.4	3.5	3.8	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.5	4.4	4.3	4.3	4.4
1995	3.1	3.2	3.3	3.3	3.4	3.5	3.7	4.0	4.0	4.1	4.1	4.1	4.2	4.3	4.4	4.4	4.3	4.3	4.3	4.3
1996	3.1	3.2	3.3	3.3	3.4	3.5	3.7	4.0	4.0	4.1	4.1	4.1	4.1	4.3	4.4	4.4	4.3	4.2	4.3	4.3
1997	3.1	3.2	3.2	3.3	3.4	3.5	3.7	3.9	4.0	4.0	4.0	4.1	4.1	4.2	4.3	4.4	4.3	4.2	4.2	4.2
1998	3.1	3.1	3.2	3.3	3.3	3.5	3.7	3.9	4.0	4.0	4.0	4.0	4.1	4.2	4.3	4.3	4.2	4.1	4.2	4.2
1999	3.1	3.1	3.2	3.3	3.3	3.5	3.7	3.9	3.9	4.0	4.0	4.0	4.0	4.2	4.2	4.3	4.2	4.1	4.1	4.2
2000	3.1	3.1	3.2	3.3	3.3	3.5	3.7	3.9	3.9	4.0	4.0	4.0	4.0	4.1	4.2	4.3	4.2	4.1	4.1	4.2
2001	3.1	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.9	3.9	3.9	4.0	4.0	4.1	4.2	4.2	4.1	4.1	4.1	4.1
2002	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.9	3.9	3.9	4.0	4.0	4.1	4.2	4.2	4.1	4.0	4.0	4.1
2003	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.8	3.9	3.9	3.9	3.9	4.0	4.1	4.2	4.1	4.0	4.0	4.0
2004	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.8	3.9	3.9	3.9	3.9	4.0	4.1	4.2	4.1	4.0	4.0	4.0
2005	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.8	3.9	3.9	3.9	3.9	4.0	4.1	4.1	4.1	4.0	4.0	4.0
2006	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.8	3.8	3.8	3.9	3.9	4.0	4.1	4.1	4.0	4.0	4.0	4.0
2007	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.8	3.8	3.9	3.9	3.9	4.0	4.1	4.1	4.0	4.0	4.0	4.0
2008	3.0	3.1	3.1	3.2	3.2	3.3	3.5	3.7	3.8	3.8	3.8	3.8	3.8	3.9	4.0	4.1	4.0	3.9	3.9	3.9
2009	3.0	3.1	3.1	3.2	3.2	3.3	3.5	3.7	3.8	3.8	3.8	3.8	3.8	3.9	4.0	4.0	4.0	3.9	3.9	3.9
2010	3.0	3.0	3.1	3.2	3.2	3.3	3.5	3.7	3.7	3.7	3.8	3.8	3.8	3.9	4.0	4.0	3.9	3.8	3.9	3.9
2011	3.0	3.0	3.1	3.2	3.2	3.3	3.5	3.7	3.7	3.7	3.7	3.8	3.8	3.9	3.9	4.0	3.9	3.8	3.8	3.9
2012	3.0	3.0	3.1	3.1	3.2	3.3	3.5	3.6	3.7	3.7	3.7	3.8	3.8	3.9	3.9	4.0	3.9	3.8	3.8	3.8
2013	3.0	3.0	3.1	3.1	3.2	3.3	3.4	3.6	3.7	3.7	3.7	3.7	3.7	3.8	3.9	3.9	3.8	3.8	3.8	3.8
2014	2.9	3.0	3.1	3.1	3.1	3.2	3.4	3.6	3.6	3.6	3.7	3.7	3.7	3.8	3.8	3.9	3.8	3.7	3.7	3.8

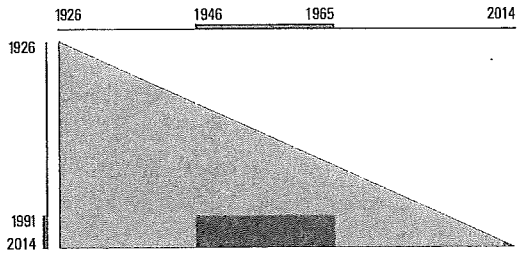
Table C-7 (page 3 of 6)
Inflation:
Rates of Return for all holding periods
Percent per annum compounded annually



from 1926 to 2014

To the end of	From the beginning of 1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1946	18.2																			
1947	13.5	9.0																		
1948	9.8	5.8	2.7																	
1949	6.8	3.2	0.4	-1.8																
1950	6.6	3.8	2.2	1.9	5.8															
1951	6.5	4.3	3.1	3.2	5.8	5.9														
1952	5.6	3.7	2.6	2.6	4.2	3.3	0.9													
1953	5.0	3.2	2.3	2.2	3.3	2.4	0.8	0.6												
1954	4.4	2.8	1.9	1.8	2.5	1.7	0.3	0.1	-0.5											
1955	4.0	2.5	1.7	1.6	2.1	1.4	0.3	0.2	-0.1	0.4										
1956	3.9	2.5	1.8	1.7	2.2	1.7	0.8	0.8	0.9	1.6	2.9									
1957	3.8	2.6	2.0	1.9	2.3	1.9	1.2	1.3	1.4	2.1	2.9	3.0								
1958	3.6	2.5	1.9	1.9	2.3	1.8	1.3	1.3	1.5	2.0	2.5	2.4	1.8							
1959	3.5	2.4	1.9	1.8	2.2	1.8	1.3	1.4	1.5	1.9	2.3	2.1	1.6	1.5						
1960	3.3	2.4	1.9	1.8	2.1	1.8	1.3	1.4	1.5	1.8	2.1	1.9	1.6	1.5	1.5					
1961	3.2	2.2	1.8	1.7	2.0	1.7	1.3	1.3	1.4	1.7	1.9	1.7	1.4	1.2	1.1	0.7				
1962	3.1	2.2	1.7	1.7	1.9	1.6	1.3	1.3	1.4	1.6	1.8	1.6	1.3	1.2	1.1	0.9	1.2			
1963	3.0	2.2	1.7	1.7	1.9	1.6	1.3	1.3	1.4	1.6	1.8	1.6	1.4	1.3	1.3	1.2	1.4	1.6		
1964	2.9	2.1	1.7	1.6	1.9	1.6	1.3	1.3	1.4	1.6	1.7	1.6	1.4	1.3	1.2	1.2	1.4	1.4	1.2	
1965	2.8	2.1	1.7	1.7	1.9	1.6	1.3	1.4	1.4	1.6	1.7	1.6	1.4	1.4	1.4	1.3	1.5	1.6	1.6	1.9
1966	2.9	2.2	1.8	1.8	2.0	1.7	1.5	1.5	1.6	1.7	1.9	1.8	1.6	1.6	1.6	1.7	1.9	2.0	2.2	2.6
1967	2.9	2.2	1.9	1.8	2.0	1.8	1.6	1.6	1.7	1.8	2.0	1.9	1.8	1.8	1.8	1.9	2.1	2.2	2.4	2.8
1968	3.0	2.3	2.0	2.0	2.2	2.0	1.7	1.8	1.9	2.0	2.2	2.1	2.0	2.1	2.1	2.2	2.4	2.6	2.8	3.3
1969	3.1	2.5	2.2	2.2	2.4	2.2	2.0	2.0	2.1	2.3	2.5	2.4	2.4	2.4	2.5	2.6	2.9	3.1	3.4	3.8
1970	3.2	2.6	2.3	2.3	2.5	2.3	2.2	2.2	2.3	2.5	2.7	2.6	2.6	2.7	2.8	2.9	3.2	3.4	3.7	4.1
1971	3.2	2.6	2.4	2.4	2.5	2.4	2.2	2.3	2.4	2.6	2.7	2.7	2.7	2.7	2.8	3.0	3.2	3.4	3.6	4.0
1972	3.2	2.7	2.4	2.4	2.6	2.4	2.3	2.3	2.4	2.6	2.7	2.7	2.7	2.8	2.9	3.0	3.2	3.4	3.6	3.9
1973	3.4	2.9	2.6	2.6	2.8	2.7	2.6	2.6	2.8	2.9	3.1	3.1	3.1	3.2	3.3	3.4	3.7	3.9	4.1	4.4
1974	3.7	3.2	3.0	3.0	3.2	3.1	3.0	3.1	3.2	3.4	3.5	3.6	3.6	3.7	3.9	4.0	4.3	4.6	4.8	5.2
1975	3.8	3.3	3.1	3.1	3.3	3.2	3.1	3.2	3.4	3.5	3.7	3.7	3.8	3.9	4.1	4.2	4.5	4.7	5.0	5.4
1976	3.8	3.4	3.2	3.2	3.4	3.3	3.2	3.3	3.4	3.6	3.8	3.8	3.8	4.0	4.1	4.3	4.5	4.8	5.0	5.3
1977	3.9	3.5	3.3	3.3	3.5	3.4	3.3	3.4	3.6	3.7	3.9	3.9	4.0	4.1	4.2	4.4	4.7	4.9	5.1	5.4
1978	4.1	3.7	3.5	3.5	3.7	3.6	3.5	3.6	3.8	3.9	4.1	4.2	4.2	4.3	4.5	4.7	4.9	5.1	5.4	5.7
1979	4.3	3.9	3.8	3.8	4.0	3.9	3.9	4.0	4.1	4.3	4.5	4.5	4.6	4.8	4.9	5.1	5.4	5.6	5.9	6.2
1980	4.5	4.2	4.0	4.1	4.3	4.2	4.2	4.3	4.4	4.6	4.8	4.9	4.9	5.1	5.3	5.5	5.7	6.0	6.2	6.6
1981	4.7	4.3	4.2	4.2	4.4	4.4	4.3	4.4	4.6	4.8	4.9	5.0	5.1	5.3	5.4	5.6	5.9	6.1	6.4	6.7
1982	4.6	4.3	4.2	4.2	4.4	4.3	4.3	4.4	4.5	4.7	4.9	5.0	5.1	5.2	5.4	5.5	5.8	6.0	6.2	6.5
1983	4.6	4.3	4.2	4.2	4.4	4.3	4.3	4.4	4.5	4.7	4.9	4.9	5.0	5.1	5.3	5.5	5.7	5.9	6.1	6.4
1984	4.6	4.3	4.1	4.2	4.4	4.3	4.3	4.4	4.5	4.7	4.8	4.9	5.0	5.1	5.2	5.4	5.6	5.8	6.0	6.3
1985	4.6	4.3	4.1	4.2	4.3	4.3	4.3	4.4	4.5	4.6	4.8	4.9	4.9	5.0	5.2	5.3	5.5	5.7	5.9	6.1
1986	4.5	4.2	4.1	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.7	4.7	4.8	4.9	5.0	5.2	5.4	5.5	5.7	5.9
1987	4.5	4.2	4.1	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.7	4.7	4.8	4.9	5.0	5.1	5.3	5.5	5.6	5.8
1988	4.5	4.2	4.1	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.7	4.7	4.8	4.9	5.0	5.1	5.3	5.4	5.6	5.8
1989	4.5	4.2	4.1	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.7	4.7	4.8	4.9	5.0	5.1	5.3	5.4	5.6	5.7
1990	4.5	4.2	4.1	4.2	4.3	4.3	4.2	4.3	4.4	4.6	4.7	4.8	4.8	4.9	5.0	5.1	5.3	5.4	5.6	5.8

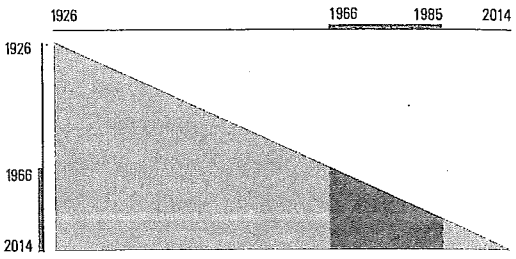
Table C-7 (page 4 of 6)
Inflation:
Rates of Return for all holding periods
Percent per annum compounded annually



from 1926 to 2014

To the end of	From the beginning of 1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1991	4.5	4.2	4.1	4.1	4.3	4.3	4.2	4.3	4.4	4.5	4.7	4.7	4.8	4.8	5.0	5.1	5.2	5.4	5.5	5.7
1992	4.5	4.2	4.1	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.6	4.7	4.7	4.8	4.9	5.0	5.1	5.3	5.4	5.6
1993	4.4	4.2	4.1	4.1	4.2	4.2	4.1	4.2	4.3	4.4	4.6	4.6	4.6	4.7	4.8	4.9	5.1	5.2	5.3	5.5
1994	4.4	4.1	4.0	4.1	4.2	4.2	4.1	4.2	4.3	4.4	4.5	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.4
1995	4.4	4.1	4.0	4.0	4.2	4.1	4.1	4.2	4.2	4.4	4.5	4.5	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.3
1996	4.3	4.1	4.0	4.0	4.1	4.1	4.1	4.1	4.2	4.3	4.4	4.5	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2
1997	4.3	4.0	3.9	4.0	4.1	4.0	4.0	4.1	4.2	4.3	4.4	4.4	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1
1998	4.2	4.0	3.9	3.9	4.0	4.0	4.0	4.0	4.1	4.2	4.3	4.3	4.4	4.4	4.5	4.6	4.7	4.8	4.9	5.0
1999	4.2	4.0	3.9	3.9	4.0	4.0	3.9	4.0	4.1	4.2	4.3	4.3	4.3	4.4	4.5	4.5	4.6	4.7	4.8	4.9
2000	4.2	3.9	3.9	3.9	4.0	4.0	3.9	4.0	4.1	4.2	4.2	4.3	4.3	4.4	4.4	4.5	4.6	4.7	4.8	4.9
2001	4.1	3.9	3.8	3.8	3.9	3.9	3.9	3.9	4.0	4.1	4.2	4.2	4.2	4.3	4.4	4.4	4.5	4.6	4.7	4.8
2002	4.1	3.9	3.8	3.8	3.9	3.9	3.8	3.9	4.0	4.1	4.1	4.2	4.2	4.3	4.3	4.4	4.5	4.6	4.6	4.7
2003	4.1	3.8	3.8	3.8	3.9	3.8	3.8	3.9	3.9	4.0	4.1	4.1	4.1	4.2	4.3	4.3	4.4	4.5	4.6	4.7
2004	4.1	3.8	3.7	3.8	3.9	3.8	3.8	3.8	3.9	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.5	4.5	4.6
2005	4.0	3.8	3.7	3.8	3.9	3.8	3.8	3.8	3.9	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.4	4.5	4.6
2006	4.0	3.8	3.7	3.7	3.8	3.8	3.8	3.8	3.9	4.0	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.5	4.5
2007	4.0	3.8	3.7	3.7	3.8	3.8	3.8	3.8	3.9	4.0	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.5	4.5
2008	4.0	3.7	3.7	3.7	3.8	3.7	3.7	3.8	3.8	3.9	4.0	4.0	4.0	4.0	4.1	4.2	4.2	4.3	4.4	4.4
2009	3.9	3.7	3.6	3.7	3.8	3.7	3.7	3.7	3.8	3.9	3.9	4.0	4.0	4.0	4.1	4.1	4.2	4.3	4.3	4.4
2010	3.9	3.7	3.6	3.6	3.7	3.7	3.6	3.7	3.8	3.8	3.9	3.9	3.9	4.0	4.0	4.1	4.1	4.2	4.3	4.3
2011	3.9	3.7	3.6	3.6	3.7	3.7	3.6	3.7	3.7	3.8	3.9	3.9	3.9	4.0	4.0	4.0	4.1	4.2	4.2	4.3
2012	3.9	3.7	3.6	3.6	3.7	3.6	3.6	3.7	3.7	3.8	3.8	3.9	3.9	3.9	4.0	4.0	4.1	4.1	4.2	4.2
2013	3.8	3.6	3.5	3.6	3.6	3.6	3.6	3.6	3.7	3.7	3.8	3.8	3.8	3.9	3.9	4.0	4.0	4.1	4.1	4.2
2014	3.8	3.6	3.5	3.5	3.6	3.6	3.5	3.6	3.6	3.7	3.8	3.8	3.8	3.8	3.9	3.9	4.0	4.0	4.1	4.1

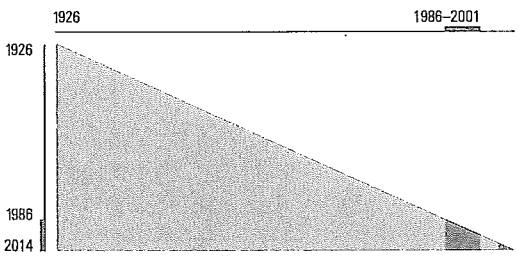
Table C-7 (page 5 of 6)
Inflation:
Rates of Return for all holding periods
Percent per annum compounded annually



from 1926 to 2014

To the end of	From the beginning of 1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1966	3.4																			
1967	3.2	3.0																		
1968	3.7	3.9	4.7																	
1969	4.3	4.6	5.4	6.1																
1970	4.5	4.8	5.4	5.8	5.5															
1971	4.3	4.5	4.9	5.0	4.4	3.4														
1972	4.2	4.3	4.6	4.6	4.1	3.4	3.4													
1973	4.8	5.0	5.3	5.4	5.2	5.2	6.1	8.8												
1974	5.6	5.9	6.3	6.5	6.6	6.9	8.1	10.5	12.2											
1975	5.7	6.0	6.4	6.6	6.7	6.9	7.8	9.3	9.6	7.0										
1976	5.6	5.9	6.2	6.4	6.4	6.6	7.2	8.2	8.0	5.9	4.8									
1977	5.7	5.9	6.2	6.4	6.4	6.6	7.1	7.9	7.7	6.2	5.8	6.8								
1978	6.0	6.2	6.5	6.7	6.7	6.9	7.4	8.1	7.9	6.9	6.9	7.9	9.0							
1979	6.5	6.7	7.0	7.3	7.4	7.6	8.1	8.8	8.8	8.1	8.4	9.7	11.1	13.3						
1980	6.9	7.1	7.4	7.7	7.8	8.1	8.6	9.3	9.3	8.8	9.2	10.3	11.6	12.9	12.4					
1981	7.0	7.2	7.6	7.8	7.9	8.1	8.6	9.2	9.3	8.9	9.2	10.1	10.9	11.5	10.7	8.9				
1982	6.8	7.0	7.3	7.5	7.6	7.8	8.2	8.7	8.7	8.2	8.4	9.0	9.5	9.6	8.3	6.4	3.9			
1983	6.6	6.8	7.1	7.2	7.3	7.5	7.8	8.2	8.2	7.7	7.8	8.2	8.5	8.4	7.2	5.5	3.8	3.8		
1984	6.5	6.7	6.9	7.0	7.1	7.2	7.5	7.9	7.8	7.3	7.4	7.7	7.8	7.6	6.5	5.1	3.9	3.9	4.0	
1985	6.4	6.5	6.7	6.8	6.9	7.0	7.2	7.5	7.4	7.0	7.0	7.3	7.3	7.1	6.1	4.8	3.8	3.8	3.9	3.8
1986	6.1	6.2	6.4	6.5	6.5	6.6	6.8	7.1	6.9	6.5	6.5	6.6	6.6	6.3	5.3	4.2	3.3	3.2	2.9	2.4
1987	6.0	6.2	6.3	6.4	6.4	6.5	6.7	6.9	6.8	6.3	6.3	6.4	6.4	6.1	5.2	4.2	3.5	3.4	3.3	3.1
1988	6.0	6.1	6.2	6.3	6.3	6.4	6.5	6.7	6.6	6.2	6.1	6.3	6.2	5.9	5.1	4.3	3.6	3.6	3.5	3.4
1989	5.9	6.0	6.2	6.2	6.2	6.3	6.4	6.6	6.5	6.1	6.0	6.1	6.1	5.8	5.1	4.3	3.7	3.7	3.7	3.7
1990	5.9	6.0	6.1	6.2	6.2	6.3	6.4	6.6	6.5	6.1	6.0	6.1	6.1	5.8	5.2	4.5	4.0	4.0	4.1	4.1
1991	5.8	5.9	6.0	6.1	6.1	6.1	6.2	6.4	6.3	5.9	5.9	5.9	5.9	5.6	5.0	4.4	3.9	3.9	3.9	3.9
1992	5.7	5.8	5.9	5.9	5.9	6.0	6.1	6.2	6.1	5.7	5.7	5.7	5.7	5.4	4.8	4.2	3.8	3.8	3.8	3.8
1993	5.6	5.7	5.8	5.8	5.8	5.8	5.9	6.0	5.9	5.6	5.5	5.6	5.5	5.2	4.7	4.1	3.7	3.7	3.7	3.7
1994	5.5	5.6	5.7	5.7	5.7	5.7	5.8	5.9	5.8	5.4	5.4	5.4	5.3	5.1	4.6	4.0	3.6	3.6	3.6	3.6
1995	5.4	5.5	5.5	5.6	5.5	5.6	5.6	5.7	5.6	5.3	5.2	5.2	5.2	4.9	4.4	3.9	3.6	3.5	3.5	3.5
1996	5.3	5.4	5.5	5.5	5.5	5.5	5.6	5.6	5.5	5.2	5.1	5.1	5.1	4.8	4.4	3.9	3.6	3.5	3.5	3.5
1997	5.2	5.3	5.3	5.4	5.3	5.3	5.4	5.5	5.3	5.1	5.0	5.0	4.9	4.7	4.2	3.8	3.4	3.4	3.4	3.3
1998	5.1	5.1	5.2	5.2	5.2	5.2	5.3	5.3	5.2	4.9	4.8	4.8	4.7	4.5	4.1	3.6	3.3	3.3	3.3	3.2
1999	5.0	5.1	5.1	5.1	5.1	5.1	5.2	5.2	5.1	4.8	4.7	4.7	4.6	4.4	4.0	3.6	3.3	3.3	3.2	3.2
2000	5.0	5.0	5.1	5.1	5.1	5.0	5.1	5.2	5.0	4.8	4.7	4.7	4.6	4.4	4.0	3.6	3.3	3.3	3.2	3.2
2001	4.9	4.9	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.6	4.6	4.5	4.5	4.3	3.9	3.5	3.2	3.2	3.1	3.1
2002	4.8	4.8	4.9	4.9	4.9	4.8	4.9	4.9	4.8	4.6	4.5	4.5	4.4	4.2	3.8	3.4	3.2	3.1	3.1	3.1
2003	4.7	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.7	4.5	4.4	4.4	4.3	4.1	3.7	3.4	3.1	3.1	3.0	3.0
2004	4.7	4.7	4.8	4.8	4.7	4.7	4.8	4.8	4.7	4.4	4.3	4.3	4.2	4.1	3.7	3.4	3.1	3.1	3.0	3.0
2005	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.8	4.6	4.4	4.3	4.3	4.2	4.0	3.7	3.4	3.1	3.1	3.1	3.0
2006	4.6	4.6	4.7	4.7	4.6	4.6	4.7	4.7	4.6	4.3	4.3	4.2	4.1	4.0	3.6	3.3	3.1	3.1	3.0	3.0
2007	4.6	4.6	4.7	4.7	4.6	4.6	4.6	4.7	4.6	4.3	4.2	4.2	4.1	4.0	3.7	3.4	3.1	3.1	3.1	3.0
2008	4.5	4.5	4.6	4.5	4.5	4.5	4.5	4.5	4.4	4.2	4.1	4.1	4.0	3.8	3.5	3.2	3.0	3.0	3.0	2.9
2009	4.4	4.5	4.5	4.5	4.5	4.4	4.5	4.5	4.4	4.2	4.1	4.1	4.0	3.8	3.5	3.2	3.0	3.0	3.0	2.9
2010	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.3	4.1	4.0	4.0	3.9	3.7	3.4	3.2	3.0	2.9	2.9	2.9
2011	4.3	4.4	4.4	4.4	4.4	4.3	4.4	4.4	4.3	4.1	4.0	3.9	3.9	3.7	3.4	3.2	3.0	2.9	2.9	2.9
2012	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.2	4.0	3.9	3.9	3.8	3.7	3.4	3.1	2.9	2.9	2.9	2.8
2013	4.2	4.3	4.3	4.3	4.2	4.2	4.2	4.2	4.1	3.9	3.8	3.8	3.7	3.6	3.3	3.1	2.9	2.8	2.8	2.8
2014	4.2	4.2	4.2	4.2	4.2	4.1	4.2	4.2	4.1	3.9	3.8	3.8	3.7	3.5	3.3	3.0	2.8	2.8	2.8	2.7

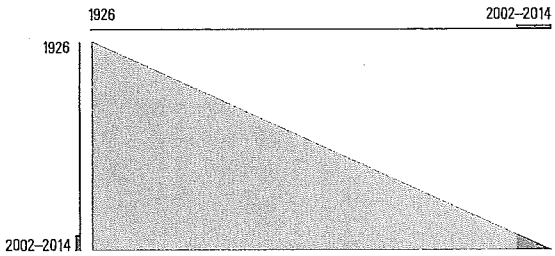
Table C-7 (page 6 of 6)-a
Inflation:
Rates of Return for all holding periods
Percent per annum compounded annually



from 1926 to 2014

To the End of	From the beginning of 1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1986	1.1															
1987	2.8	4.4														
1988	3.3	4.4	4.4													
1989	3.6	4.5	4.5	4.6												
1990	4.1	4.9	5.1	5.4	6.1											
1991	4.0	4.5	4.6	4.6	4.6	3.1										
1992	3.8	4.3	4.2	4.2	4.0	3.0	2.9									
1993	3.7	4.0	4.0	3.9	3.7	2.9	2.8	2.7								
1994	3.6	3.9	3.8	3.7	3.5	2.8	2.8	2.7	2.7							
1995	3.5	3.7	3.6	3.5	3.3	2.8	2.7	2.7	2.6	2.5						
1996	3.4	3.7	3.6	3.5	3.3	2.9	2.8	2.8	2.8	2.9	3.3					
1997	3.3	3.5	3.4	3.3	3.1	2.7	2.6	2.6	2.6	2.5	2.5	1.7				
1998	3.2	3.3	3.2	3.1	3.0	2.6	2.5	2.4	2.4	2.3	2.2	1.7	1.6			
1999	3.1	3.3	3.2	3.1	2.9	2.6	2.5	2.5	2.4	2.4	2.3	2.0	2.1	2.7		
2000	3.1	3.3	3.2	3.1	3.0	2.7	2.6	2.6	2.6	2.5	2.5	2.3	2.6	3.0	3.4	
2001	3.0	3.2	3.1	3.0	2.9	2.6	2.5	2.5	2.4	2.4	2.4	2.2	2.3	2.5	2.5	1.6
2002	3.0	3.1	3.0	2.9	2.8	2.5	2.5	2.5	2.4	2.4	2.4	2.2	2.3	2.5	2.4	2.0
2003	2.9	3.1	3.0	2.9	2.7	2.5	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.4	2.3	1.9
2004	3.0	3.1	3.0	2.9	2.8	2.5	2.5	2.5	2.5	2.4	2.4	2.3	2.4	2.5	2.5	2.3
2005	3.0	3.1	3.0	2.9	2.8	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.5	2.6	2.6	2.5
2006	3.0	3.1	3.0	2.9	2.8	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.5	2.6	2.6	2.5
2007	3.0	3.1	3.0	3.0	2.9	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.7	2.8	2.8	2.7
2008	2.9	3.0	2.9	2.8	2.7	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.5	2.5	2.4
2009	2.9	3.0	2.9	2.8	2.7	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.5	2.5	2.4
2010	2.8	2.9	2.8	2.8	2.7	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.5	2.4	2.3
2011	2.8	2.9	2.8	2.8	2.7	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.5	2.5	2.4
2012	2.8	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.3
2013	2.7	2.8	2.7	2.7	2.6	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.3
2014	2.7	2.7	2.7	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2

Table C-7 (page 6 of 6)-b
Inflation:
Rates of Return for all holding periods
Percent per annum compounded annually



from 1926 to 2014

To the End of	From the beginning of 2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
2002	2.4												
2003	2.1	1.9											
2004	2.5	2.6	3.3										
2005	2.7	2.8	3.3	3.4									
2006	2.7	2.8	3.1	3.0	2.5								
2007	2.9	3.0	3.3	3.3	3.3	4.1							
2008	2.5	2.5	2.7	2.5	2.2	2.1	0.1						
2009	2.5	2.6	2.7	2.6	2.3	2.3	1.4	2.7					
2010	2.4	2.4	2.5	2.4	2.2	2.1	1.4	2.1	1.5				
2011	2.5	2.5	2.6	2.5	2.3	2.3	1.8	2.4	2.2	3.0			
2012	2.4	2.4	2.5	2.4	2.2	2.2	1.8	2.2	2.1	2.3	1.7		
2013	2.3	2.3	2.4	2.3	2.1	2.1	1.7	2.1	1.9	2.1	1.6	1.5	
2014	2.3	2.2	2.3	2.2	2.0	2.0	1.7	2.0	1.8	1.9	1.5	1.4	1.3

CERTIFICATE OF SERVICE

This is to certify that a copy of the foregoing ***Indiana Office of Utility Consumer Counselor Public's Exhibit No. 4 Testimony of Bradley E. Lorton*** has been served upon the following counsel of record in the captioned proceeding by electronic service on April 20, 2017.

Clayton C. Miller
Bamberger, Foreman, Oswald & Hahn, LLP
201 N. Illinois Street, Suite 1225
Indianapolis, IN 46204
cmiller@bamberger.com

S. Mark Kerney
Ohio Valley Gas Corporation
111 Energy Park Drive
P. O. Box 469
Winchester, IN 47394-0469
mkerney@ovgc.com

Scott Franson
Deputy Consumer Counselor

INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR
115 West Washington Street
Suite 1500 South
Indianapolis, IN 46204
infomgt@oucc.in.gov
317/232-2494 – Phone
317/232-5923 – Facsimile