BEFORE THE CORPORATION COMMISSION

OF THE STATE OF KANSAS

IN THE MATTER OF THE APPLICATION OF ATMOS ENERGY CORPORATION FOR ADJUSTMENT OF ITS NATURAL GAS RATES IN THE STATE OF KANSAS	**)** **)** **)** **)**	**DOCKET NO. 19-ATMG-525-RTS**

DIRECT TESTIMONY AND EXHIBITS OF

DR. J. RANDALL WOOLRIDGE

RE: COST OF CAPITAL
AND
RATE OF RETURN

ON BEHALF OF

THE CITIZENS' UTILITY RATEPAYER BOARD

REDACTED VERSION

OCTOBER 31, 2019

Atmos Energy Corporation
Docket No. 19-ATMG-525-RTS

Direct Testimony of
Dr. J. Randall Woolridge

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Q. PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.

A. My name is J. Randall Woolridge, and my business address is 120 Haymaker Circle, State College, PA 16801. I am a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration at the University Park Campus of Pennsylvania State University. I am also the Director of the Smeal College Trading Room and President of the Nittany Lion Fund, LLC. A summary of my educational background, research, and related business experience is provided in Appendix A.

I. SUBJECT OF TESTIMONY AND SUMMARY OF RECOMMENDATIONS

A. Overview

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I have been asked by the Citizens Utility Ratepayer Board ("CURB") to provide an opinion as to the overall fair rate of return or cost of capital for the Kansas jurisdictional gas utility operations of Atmos Energy Corporation ("Atmos" or "Company") and to evaluate Atmos' rate of return testimony in this proceeding.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First I will review my cost of capital recommendation for Atmos, and review the primary areas of contention between Atmos' rate of return position and CURB's.

Second, I provide an assessment of capital costs in today's capital markets. Third, I discuss my proxy group of gas utility companies for estimating the cost of capital for Atmos. Fourth, I present my recommendations for the Company's capital structure and debt cost rate. Fifth, I discuss the concept of the cost of equity capital, and then estimate the equity cost rate for Atmos. Finally, I critique the Company's rate of return analysis and testimony. I have a table of contents just after the title page for a more detailed outline.

Q. WHAT COMPRISES A UTILITY'S "RATE OF RETURN?"

A. A company's overall rate of return consists of three main categories: (1) capital structure (i.e., ratios of short-term debt, long-term debt, preferred stock and common equity); (2) cost rates for short-term debt, long-term debt, and preferred stock; and (3) common equity cost, otherwise known as ROE.

Q. WHAT IS A UTILITY'S ROE INTENDED TO REFLECT?

A. An ROE is most simply described as the allowed rate of profit for a regulated company. In a competitive market, a company's profit level is determined by a variety of factors, including the state of the economy, the degree of competition a company faces, the ease of entry into its markets, the existence of substitute or complementary products/services, the company's cost structure, the impact of technological changes, and the supply and demand for its services and/or products. For a regulated monopoly, the regulator determines the level of profit available to the utility. The United States Supreme Court established the guiding principles for establishing an appropriate level of profitability for regulated public utilities in

two cases: (1) *Bluefield*[1] and (2) *Hope*.[2] In those cases, the Court recognized that the fair rate of return on equity should be: (1) comparable to returns investors expect to earn on investments with similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain the company's credit and to attract capital.

Thus, the appropriate ROE for a regulated utility requires that the market-based cost of capital be determined. The market-based cost of capital for a regulated firm represents the return investors could expect from other investments, while assuming no more and no less risk. The purpose of all of the economic models and formulas in cost of capital testimony (including those presented later in my testimony) is to estimate, using the market data of similar-risk firms, the rate of return equity investors require for that risk-class of firms in order to set an appropriate ROE for a regulated firm.

B. Summary of Positions

Q. PLEASE REVIEW THE COMPANY'S PROPOSED RATE OF RETURN.

A. Atmos has proposed a capital structure consisting of 39.88% long-term debt and 60.12% common equity. Atmos has proposed a long-term debt cost rate of 4.57%. Mr. Dylan W. D'Ascendis has recommended a common equity cost rate, or ROE,

[1] *Bluefield Water Works and Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679, 43 S. Ct. 675, 67 L. Ed. 1176 (1923) ("Bluefield").

[2] *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591, 64 S. Ct. 281, 88 L. Ed. 333 (1944) ("Hope").

of 10.25% for Atmos. The Company's overall rate of return recommendation is 7.98%.

Q. PLEASE REVIEW YOUR RECOMMENDATIONS REGARDING THE APPROPRIATE MARKET-BASED RATE OF RETURN FOR ATMOS.

A. My rate of return recommendation is provided in Exhibit JRW-1. Panel A in Exhibit JRW-1 shows my primary recommendation and Panel B provides my alternative rate of return recommendation.

I show that the company's proposed capital structure includes a higher common equity ratio and lower financial risk than other gas distribution companies. Therefore, I am also proposing a capital structure that is more in line with the capital structures of other gas distribution companies and includes a common equity ratio of **(** Begin Confidential - [redacted] - End Confidential**)**. To estimate an equity cost rate for the Company, I have applied the Discounted Cash Flow Model ("DCF") and the Capital Asset Pricing Model ("CAPM") to my proxy group of gas distribution companies ("Gas Proxy Group"). My studies indicate that a cost of equity or ROE for the Company is in the range of 7.50% to 8.70%.

Q. WHAT IS YOUR RATE OF RETURN RECOMMENDATION FOR ATMOS?

A. Given my recommended capitalization ratios and senior capital cost rates, my primary rate of return or cost of capital recommendation for the Company is 6.81% and is summarized in Table 1 and Panel A of Exhibit JRW-1.

(Begin Confidential -**

Table 1
CURB's Primary Rate of Return Recommendation

Capital Source	Capitalization Ratios*	Cost Rate	Weighted Cost Rate
Long-Term Debt	[redacted]	[redacted]	[redacted]
Common Equity	[redacted]	[redacted]	[redacted]
Total Capitalization	**100.00%**		**6.81%**

- End Confidential)**

Q. PLEASE PROVIDE AN OVERVIEW OF THE PRIMARY ISSUES REGARDING RATE OF RETURN IN THIS PROCEEDING.

A. The primary issues related to the Company's rate of return include the following:

Capital Structure – Mr. D'Ascendis has proposed a capital structure consisting of 39.88% long-term debt and 60.12% common equity. The Company's proposed capital structure has a higher common equity ratio than other gas distribution companies, and thus a lower risk to investors.

Capital Market Conditions – Mr. D'Ascendis' analyses and ROE results and recommendations reflect the assumption of higher interest rates and capital costs. However, I show that despite the Federal Reserve's moves to increase the federal funds rate over the 2015-2018 time period, interest rates and capital costs remained at low levels. In 2019, interest rates have fallen dramatically with slow economic growth and low inflation. The Federal Reserve has cut the federal fund rate twice in July and September, and the 30-year yield has traded at all-time low levels.

Proxy Group - Mr. D'Ascendis has used a proxy group of only six gas distribution companies. I do not believe that this is a large enough group to

estimate an equity cost rate. I have used nine companies that *Value Line* lists as natural gas companies.

The Investment Risk of Atmos - Mr. D'Ascendis cites Atmos' capital spending as a risk factor to consider in assessing Atmos. However, I use credit ratings as an indication of risk. Moreover, Atmos' issuer credit rating of A from S&P is above the average issuer credit rating of A-/BBB+ for the proxy group. This suggests that Atmos is less risky than the average S&P bond rating for the two groups.

DCF Equity Cost Rate - The discounted cash flow (DCF) equity cost rate is estimated by summing the stock's dividend yield and investors' expected long-run growth rate in dividends paid per share. There are two errors in Mr. D'Ascendis' DCF analyses: (1) he relies exclusively on the overly optimistic and upwardly biased earnings-per-share (EPS) growth rate forecasts of Wall Street analysts and *Value Line*, and (2) he has combined abnormally high *Value Line* projected EPS for his proxy companies, computed from a three-year base period, with three-to-five-year projected growth rates of First Call and Zack's.

I also have used a traditional constant-growth DCF model. In developing a growth rate for my DCF model for the proxy group, I have reviewed thirteen growth rate measures including historic and projected growth rate measures and have evaluated growth in dividends, book value, and earnings per share. I give primary weight to analysts' projected EPS growth rates.

CAPM Approach - The CAPM approach requires an estimate of the risk-free interest rate, the beta, and the market or equity risk premium. There are three

primary issues with Mr. D'Ascendis' CAPM analyses: (1) he has used a non-traditional CAPM approach, the empirical CAPM (ECAPM), as an equity cost rate approach; (2) he employs excessively projected, long-term projected risk-free interest rate which is well in excess of current market rates; and (3) most significantly, his market risk premium of 9.56% is exaggerated, is much higher than published market risk premiums, and does not reflect current market fundamentals. With respect to the market risk premium, Mr. D'Ascendis has employed seven different approaches to estimate the MRP: (1) four methods use historical stock and bond return data; and (2) the other three approaches are based on projected stock market returns. As I show in the rebuttal section of this testimony, there are a number of empirical issues with using historical stock and bond returns to estimate an expected market risk premium. In addition, Mr. D'Ascendis' projected market returns are based on highly unrealistic assumptions about future earnings and economic growth and the resulting stock returns. On this point, he makes the assumption that the growth rates of the earnings per share of the S&P 500 can nearly triple that of GDP.

As I highlight in my testimony, there are three procedures for estimating a market or equity risk premium – historic returns, surveys, and expected return models. I have used an MRP of 5.75%, which: (1) factors in all three approaches – historic returns, surveys, and expected return models – to estimating a market premium; and (2) employs the results of many studies of the MRP. As I note, my MRP reflects the MRPs that are: (1) determined in recent academic studies by leading finance scholars; (2) employed by leading investment banks and

management consulting firms; and (3) found in surveys of companies, financial forecasters, financial analysts, and corporate CFOs.

Risk Premium Approach - Mr. D'Ascendis estimates an equity cost rate using a risk premium model approach. There are two issues with Mr. D'Ascendis' risk premium analysis: (1) the base yield is much higher than current utility bonds yields; and (2) most significantly, his risk premium is based on the same data and methodologies that he uses in his CAPM analyses and, therefore, includes the same errors.

Equity Cost Rate Models Applied to Non-Price Regulated Companies - Mr. D'Ascendis also estimates an equity cost rate by applying his equity cost rate approaches and methodologies to a group of "comparable risk" non-price regulated companies. As I note in the rebuttal section of this testimony, these companies are not truly comparable to Atmos and the analyses are based on the same flawed approached summarized above.

Other Issues - Mr. D'Ascendis concludes that his equity cost rate studies suggest a ROE of 9.80%. He then also considers two other factors in order to arrive at his 10.25% ROE recommendation. These factors include: (1) Atmos' size; and (2) flotation costs. The size adjustment is 0.40% and the flotation cost adjustment is 0.04%. As I discuss in my testimony, there is no need for a flotation cost adjustment and a small size premium is not appropriate for regulated public utilities.

II. CAPITAL MARKET CONDITIONS AND AUTHORIZED ROES

Q. PLEASE REVIEW THE FEDERAL RESERVE'S DECISIONS TO RAISE THE FEDERAL FUNDS RATE IN RECENT YEARS.

A. On December 16, 2015, the Federal Reserve increased its target rate for federal funds from 0.25 to 0.50 percent.[3] This increase came after the rate was kept in the 0.00 to 0.25 percent range for over five years in order to spur economic growth in the wake of the financial crisis associated with the Great Recession. As the economy has improved, with lower unemployment, steady but slow GDP growth, the Federal Reserve has increased the target federal funds rate on eight additional occasions: December 2016; March, June, and December of 2017; and March, June, September, and December of 2018.

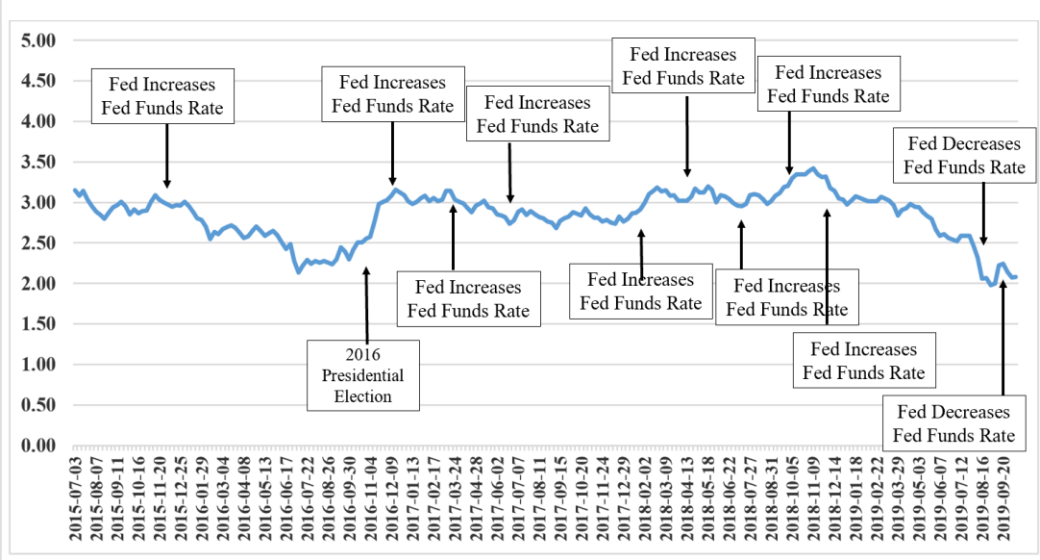
Q. HOW HAVE LONG-TERM RATES RESPONDED TO THE ACTIONS OF THE FEDERAL RESERVE?

A. Figure 1, below, shows the yield on 30-year Treasury bonds over the period of 2015-2019. I have highlighted the dates when the Federal Reserve increased the federal funds rate. The 30-year Treasury yield hit its lowest point in the 2015-2016 timeframe in the summer of 2016 and subsequently increased with improvements in the economy. Financial markets moved significantly in the wake of the results in the U.S. presidential election on November 8, 2016. The stock market gained more than 10% and the 30-year Treasury yield increased about 50

[3] The federal funds rate is set by the Federal Reserve and is the borrowing rate applicable to the most creditworthy financial institutions when they borrow and lend funds overnight to each other.

basis points to 3.2% by year-end 2016. However, over the past three years, even as the Federal Reserve has increased the federal funds rate, the yield on thirty-year bonds remained in the 2.8% to 3.4% range through 2018. These yields peaked at 3.48% in November of 2018, shortly before the December 2018 rate increase by the Federal Reserve.

Figure 1
Thirty-Year Treasury Yield and Federal Reserve Fed Funds Rate Increases
2015-2019



Q. PLEASE REVIEW LONG-TERM TREASURY YIELDS IN 2019.

A. Despite the Fed's efforts to stimulate the economy, economic growth and inflation have remained low, even with record low unemployment levels. The rate increase in December of 2018 was seen by many as maybe too aggressive. Also, with the imposition of trade tariffs aimed at China, and with continued slow growth in Europe, concerns have grown that a recession is on the horizon in the U.S. This led the Federal Reserve to cut the federal fund rate to the 2.0%-2.25% range in July of 2019. Thirty-year Treasury yields, which began the year in the 3.0% range,

have fallen to almost 2.0%. In fact, in August of 2019, the 30-year Treasury yield fell to record lows and even traded below 2.0%. The irony is, despite the record low levels, the 30-year Treasury yield in the U.S. is still somewhat higher than the government bond rates in Japan, the U.K., Germany, and much of the rest of Europe.

Q. WHY HAVE LONG-TERM TREASURY YIELDS REMAINED IN THE 2.0%-3.0% RANGE DESPITE THE FEDERAL RESERVE INCREASING SHORT-TERM RATES?

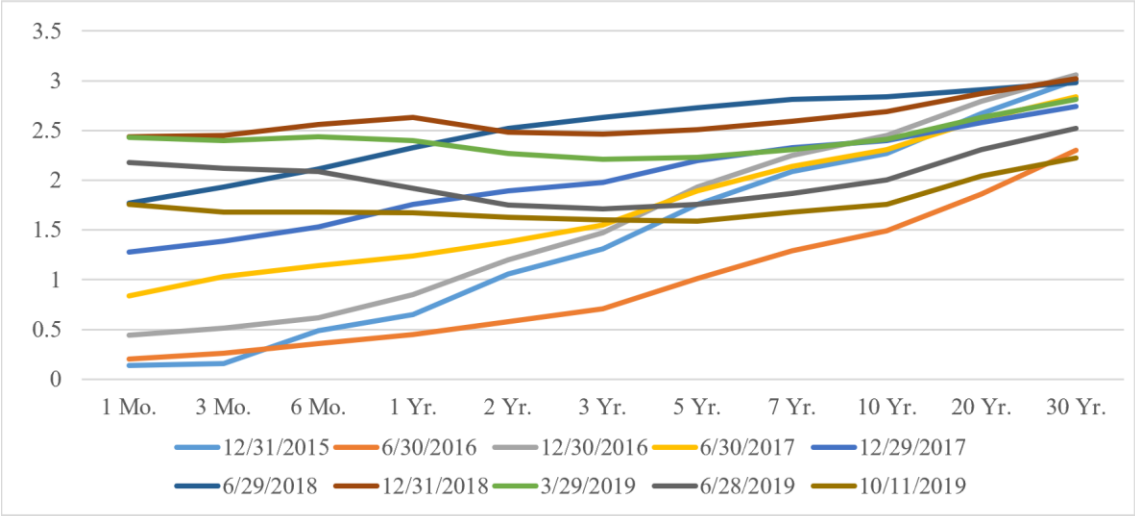
A. Whereas the Federal Reserve can directly affect short-term rates by adjustments to the federal funds rate, long-term rates are primarily driven by expected economic growth and inflation.[4] The relationship between short- and long-term rates is normally evaluated using the yield curve. The yield curve depicts the relationship between the yield-to-maturity and the time-to-maturity for U.S. Treasury bills, notes, and bonds. Figure 2, below, shows the yield curve on a semi-annual basis since the Federal Reserve started increasing the federal funds rate at the end of 2015. It shows that, from the time the Federal Reserve began increasing the federal fund rate in 2015 and until 2018, with the exception of mid-year 2016, the 30-year Treasury yield has remained in the 2.8%-3.4% range over this time frame despite the fact that short-term rates have increased from near 0.0% to about 2.50%. As such, long-term interest rates and capital costs did not increase in any

[4] Whereas economic growth picked up in 2018, partly in response to the personal and corporate tax cuts, projected real GDP growth for 2019 and beyond remains in the 2.0% to 2.5% range. In addition, inflation remains low and is also in the 2.0% to 2.5% range.

meaningful way even with the Federal Reserve's actions and the increase in short-term rates.

In 2019, with the large decline in long-term Treasury rates, the concern has been an "inverted yield curve." An inverted yield curve occurs when short-term Treasury yields are above long-term Treasury yields and is commonly associated with a pending recession. In Figure 2, the yields curve for October 11, 2019, is shown in black and is not quite inverted.

Figure 2
Semi-Annual Yield Curves
2015-2019



Date Source: https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2019

Q. WHAT DO YOU RECOMMEND THE COMMISSION DO REGARDING MR. D'ASCENDIS' USE OF FORECASTS OF HIGHER INTEREST RATES AND CAPITAL COSTS?

A. I suggest that the Commission set an equity cost rate based on current indicators of market-cost rates and not speculate on the future direction of interest rates.

Economists have been predicting that interest rates would be going up for a

decade, and they consistently have been wrong. For example, after the announcement of the end of the Quantitative Easing III ("QE III") program in 2014, all the economists in Bloomberg's interest rate survey forecasted interest rates would increase in 2014, and 100% of the economists were wrong. According to the *Market Watch* article:[5]

> The survey of economists' yield projections is generally skewed toward rising rates — only a few times since early 2009 have a majority of respondents to the Bloomberg survey thought rates would fall. But the unanimity of the rising rate forecasts in the spring was a stark reminder of how one-sided market views can become. It also teaches us that economists can be universally wrong.

Two other financial publications produced studies on how economists consistently predict higher interest rates, and yet they too have been wrong. The first study, entitled "How Interest Rates Keep Making People on Wall Street Look Like Fools," evaluated economists' forecasts for the yield on 10-year Treasury bonds at the beginning of the year for the last ten years.[6] The results demonstrated that economists consistently predict that interest rates will go higher, and interest rates have not fulfilled those predictions.

[5] Ben Eisen, "Yes, 100% of economists were dead wrong about yields, *Market Watch*," October 22, 2014**.** Perhaps reflecting this fact, *Bloomberg* reported that the Federal Reserve Bank of New York has stopped using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those interest rate forecasts. See Susanne Walker and Liz Capo McCormick, "Unstoppable $100 Trillion Bond Market Renders Models Useless," *Bloomberg.com* (June 2, 2014). http://www.bloomberg.com/news/2014-06-01/the-unstoppable-100-trillion-bond-market-renders-models-useless.html.

[6] Joe Weisenthal, "How Interest Rates Keep Making People on Wall Street Look Like Fools," Bloomberg.com, March 16, 2015. http://www.bloomberg.com/news/articles/2015-03-16/how-interest-rates-keep-making-people-on-wall-street-look-like-fools.

The second study tracked economists' forecasts for the yield on 10-year Treasury bonds on an ongoing basis from 2010 until 2015.[7] The study, entitled "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," indicates that economists are continually forecasting that interest rates are going up, yet they do not. Indeed, as Bloomberg has reported, economists' continued failure in forecasting increasing interest rates has caused the Federal Reserve Bank of New York to stop using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those interest rate forecasts.[8]

Obviously, investors are aware of the consistently wrong forecasts of higher interest rates, and therefore place little weight on such forecasts. Investors would not be buying long-term Treasury bonds or utility stocks at their current yields if they expected interest rates to suddenly increase, thereby producing higher yields and negative returns. For example, consider a utility that pays a dividend of $2.00 with a stock price of $50.00. The current dividend yield in that example is 4.0%. If, as Mr. D'Ascendis suggests, interest rates and required utility yields increase, the price of the utility stock would decline. In the example above, if higher return requirements led the dividend yield to increase from 4.0% to 5.0% in the next year, the stock price would have to decline to $40, which would be a -20% return on the stock. Obviously, investors would not buy the utility stock with an expected return of -20% due to

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[7] Akin Oyedele, "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," *Business Insider*, July 18, 2015. http://www.businessinsider.com/interest rate-forecasts-are-wrong-most-of-the-time-2015-7.

[8] "*Market Watch*," October 22, 2014.

higher dividend yield requirements.

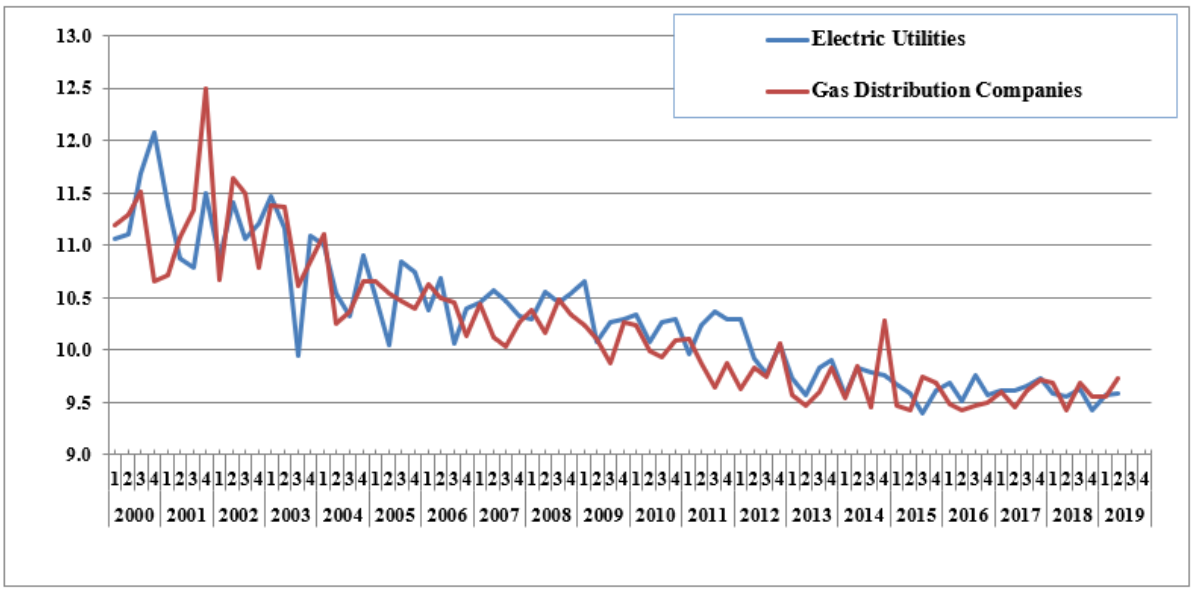
In sum, it is practically impossible to accurately forecast interest rates and prices of investments that are determined in financial markets, such as interest rates and prices for stocks and commodities. For interest rates, I am not aware of any study that suggests one forecasting service is consistently better than others or that interest rate forecasts are consistently better than just assuming the current interest rate will be the rate in the future. As discussed above, investors would not be buying long-term Treasury bonds or utility stocks at their current yields if they expected interest rates to suddenly increase, thereby producing higher yields and negative returns.

Q. PLEASE DISCUSS THE TREND IN AUTHORIZED RETURN ON EQUITY FOR ELECTRIC AND GAS COMPANIES.

A. Over the past five years, with historically low interest rates and capital costs, authorized ROEs for electric utility and gas distribution companies have slowly declined to reflect the low capital cost environment. In Figure 3, below, I have graphed the quarterly authorized ROEs for electric and gas companies from 2000 to 2018. There is a clear downward trend in the data. On an annual basis, these authorized ROEs for electric utilities have declined from an average of 10.01% in 2012, 9.8% in 2013, 9.76% in 2014, 9.58% in 2015, 9.60% in 2016, 9.68% in 2017, 9.56% in 2018, and 9.56% in the first half of 2019, according to Regulatory Research Associates.[9]

[9] *Regulatory Focus*, Regulatory Research Associates, 2019. The electric utility authorized ROEs exclude the authorized ROEs in Virginia, which include generation adders.

Figure 3
Authorized ROEs for Electric Utility and Gas Distribution Companies
2000-2019



Q. HOW HAVE THE LOWER AUTHORIZED ROES IMPACTED ELECTRIC AND GAS COMPANIES?

A. Moody's published an article on utility ROEs and credit quality in 2015. In the article, Moody's recognizes that authorized ROEs for electric and gas companies are declining due to lower interest rates. The article explains: [10]

> 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.

[10] Moody's Investors Service, "Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles," March 10, 2015.

Moody's indicates that with the lower authorized ROEs, electric and gas companies are earning ROEs of 9.0% to 10.0%, yet this is not impairing their credit profiles and is not deterring them from raising record amounts of capital. With respect to authorized ROEs, Moody's recognizes that utilities and regulatory commissions are having trouble justifying higher ROEs in the face of lower interest rates and cost recovery mechanisms.

> 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.[11]

Overall, this article further supports the prevailing/emerging belief that lower authorized ROEs are unlikely to hurt the financial integrity of utilities or their ability to attract capital.

Q. ARE UTILITIES ABLE TO ATTRACT CAPITAL WITH THE LOWER ROEs?

A. Moody's also highlights in the article that utilities are raising about $50 billion per year in debt capital, despite the lower ROEs. Furthermore, as indicated in Exhibit JRW-5, page 3, the companies in the Gas Proxy Group have been earning ROEs of about 9.0% in recent years. As shown on page 1 of Exhibit JRW-2, the market

[11] *Ibid*., p. 2.

to book ratio of utilities in the Gas Proxy Group is still well above 2.0, indicating that their stock is still in great demand.

III. PROXY GROUP SELECTION

Q. PLEASE DESCRIBE YOUR APPROACH TO DEVELOPING A FAIR RATE OF RETURN RECOMMENDATION FOR ATMOS.

A. To develop a fair rate of return recommendation for the Company (market cost of equity), I have evaluated the return requirements of investors on the common stock of a proxy group of eight publicly-held gas distribution companies ("the Gas Proxy Group"). The Gas Proxy Group consists of nine natural gas distribution companies: Atmos Energy; Chesapeake Utilities, Inc.; New Jersey Resources; NiSource; Northwest Natural Holding Company; One Gas, Inc.; South Jersey Industries; Southwest Gas; and Spire, Inc.

Q. HOW DOES YOUR GROUP COMPARE THE MR. D'ASCENDIS' GROUP OF GAS DISTRIBUTION COMPANIES?

A. Mr. D'Ascendis has excluded Chesapeake Utilities, Inc., New Jersey Resources, and NiSource from the group of gas distribution companies covered by *Value Line*. I do not believe that this is a large enough group to estimate an equity cost rate.

Q. PLEASE DISCUSS THE FINANCIAL STATISTICS FOR YOUR PROXY GROUP.

A. Summary financial statistics for the Gas Proxy Group are listed on page 1 of Exhibit JRW-2. The median operating revenues and net plant among members of the Gas Proxy Group are $1,740.7 million and $3,665.2 million, respectively. On average, the group receives 68% of revenues from regulated gas operations, has a BBB+ average issuer credit rating from S&P, a median common equity ratio of 46.2%, and a median earned return on common equity of 8.9%.

Q. HOW DOES THE INVESTMENT RISK OF ATMOS COMPARE TO THAT OF YOUR GAS PROXY GROUP?

A. I believe that bond ratings provide a good assessment of the investment risk of a company. As shown in Exhibit JRW-4, page 1, Atmos' issuer credit rating of A from S&P is above the average issuer credit rating of A-/BBB+ for the proxy group. This suggests that Atmos is less risky than the average S&P bond rating for the two groups.

Q. PLEASE DISCUSS THE INVESTMENT RISK OF THE GAS PROXY GROUP AS MEASURED BY THE RISK METRICS PUBLISHED BY *VALUE LINE*.

A. On page 2 of Exhibit JRW-2, I show the riskiness of the Gas Proxy Group using five different risk measures from *Value Line*. The comparisons of the risk measures include Beta (0.66), Financial Strength (A), Safety (1.9), Earnings

Predictability (6), and Stock Price Stability (90).[12] In my opinion, these risk measures indicate that the group's investment risk is relatively low.

IV. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES

Q. PLEASE DESCRIBE ATMOS' PROPOSED CAPITAL STRUCTURE AND SENIOR CAPITAL COST RATES.

A. Atmos has proposed a capital structure consisting of 39.88% long-term debt and 60.12% common equity. Atmos has proposed a long-term debt cost rate of 4.57%.

Q. HOW DO ATMOS' PROPOSED CAPITAL STRUCTURE RATIOS COMPARE TO THE AVERAGE CAPITALIZATION RATIOS FOR COMPANIES IN THE GAS PROXY GROUP?

A. Atmos' proposed capital structure ratios include a common equity ratio of 60.12%. This capital structure is for March 31, 2019. As shown in Panels B and C of Exhibit JRW-3, the average common equity ratio including/excluding short-term debt for the four quarters ending for March 31, 2019 for the Gas Proxy Group was 48.89%/56.86%. As such, Atmos is proposing a capital structure that includes significantly more common equity in financing its gas operations than the average of the Gas Proxy Group.[13]

[12] These metrics are defined on page 3 of Exhibit JRW-2.

[13] As indicated in the response to Staff DR No. 1-308, short-term debt is included in the capital structure in four of the eight states in which Atmos distributes natural gas.

Q. PLEASE DISCUSS THE SIGNIFICANCE OF THE AMOUNT OF EQUITY THAT IS INCLUDED IN A UTILITY'S CAPITAL STRUCTURE.

A. A utility's decision as to the amount of equity capital it will incorporate into its capital structure involves fundamental trade-offs relating to the amount of financial risk the firm carries, the overall revenue requirements its customers are required to bear through the rates they pay, and the return on equity that investors will require.

Q. PLEASE DISCUSS A UTILITY'S DECISION TO USE DEBT VERSUS EQUITY TO MEET ITS CAPITAL NEEDS.

A. Utilities satisfy their capital needs through a mix of equity and debt. Because equity capital is more expensive than debt, the issuance of debt enables a utility to raise more capital for a given commitment of dollars than it could raise with just equity. Debt is, therefore, a means of "leveraging" capital dollars. However, as the amount of debt in the capital structure increases, financial risk increases and the risk of the utility, as perceived by equity investors also increases. Significantly for this case, the converse is also true. As the amount of debt in the capital structure decreases, the financial risk decreases. The required return on equity capital is a function of the amount of overall risk that investors perceive, including financial risk in the form of debt.

Q. WHY IS THIS RELATIONSHIP IMPORTANT TO THE UTILITY'S CUSTOMERS?

A. Just as there is a direct correlation between the utility's authorized return on equity and the utility's revenue requirements (the higher the return, the greater the

revenue requirement), there is a direct correlation between the amount of equity in the capital structure and the revenue requirements that customers are called on to bear through the payment of rates. Again, equity capital is more expensive than debt. Not only does equity command a higher cost rate, it also adds more to the income tax burden that ratepayers are required to pay through rates. As the equity ratio increases, the utility's revenue requirements increase and the rates paid by customers increase. If the proportion of equity is too high, rates will be higher than they need to be. For this reason, the utility's management should pursue a capital acquisition strategy that results in the proper balance in the capital structure.

Q. HOW HAVE UTILITIES TYPICALLY STRUCK THIS BALANCE?

A. Due to regulation and the essential nature of its output, a regulated utility is exposed to less business risk than other companies that are not regulated. This means that a utility can reasonably carry relatively more debt in its capital structure than can most unregulated companies. Thus, a utility should take appropriate advantage of its lower business risk to employ cheaper debt capital at a level that will benefit its customers through lower revenue requirements, thus lower rates.

Q. GIVEN THAT ATMOS HAS PROPOSED AN EQUITY RATIO THAT IS SIGNIFICANTLY HIGHER THAN THAT OF THE GAS PROXY GROUP, WHAT SHOULD THE COMMISSION DO IN THIS PROCEEDING?

A. When a regulated utility's actual capital structure contains a high equity ratio, the options are: (1) to impute a more reasonable capital structure and to reflect the imputed capital structure in revenue requirements; or (2) to recognize the

downward impact that an unusually high equity ratio will have on the financial risk of a utility and adjust for it by authorizing a lower common equity cost rate.

Q. PLEASE ELABORATE ON THIS "DOWNWARD IMPACT."

A. As I stated earlier, there is a direct correlation between the amount of debt in a utility's capital structure and the financial risk that an equity investor will associate with that utility. A relatively lower proportion of debt translates into a lower required return on equity, all other things being equal. Stated differently, a utility cannot expect to "have it both ways." Specifically, a utility cannot maintain an unusually high equity ratio and not expect to have the resulting lower risk reflected in its authorized return on equity. The fundamental relationship between lower risk and the appropriate authorized return should not be ignored.

Q. GIVEN THIS DISCUSSION, PLEASE DISCUSS YOUR CAPITAL STRUCTURE RECOMMENDATION FOR ATMOS.

A. As previously noted, Atmos' proposed capital structure consists of more common equity and less financial risk than any of the other proxy gas companies. As is the case for any gas company, Atmos' capital structure changes on an ongoing basis as the Company's financing needs change. Notably, on September 25th, Atmos issued $800 million of senior notes. This included $300 million of 2.625% senior notes due in 2029 and $500 million of 3.375% senior notes due in 2049.[14] This financing had a significant impact on Atmos' common equity ratio and long-term debt cost rate. Therefore, in my rate of return recommendation, I am

[14] S&P Global Market Intelligence, "Atmos Energy to sell $800M of senior notes," October 2, 2019.

recommending a capital structure and debt cost rate that includes this financing. My capital structure recommendation is presented in Table 2 and Panel D of Exhibit JRW-3.

(Begin Confidential -**

Table 2
CURB Capital Structure and Debt Cost Rate Recommendation

	Percent of Total	Cost
Long-Term Debt	[redacted]	[redacted]
Common Equity	[redacted]	
Total Capital	**100.00%**	

-End Confidential)**

Q. DO YOU BELIEVE THAT YOUR PROPOSED CAPITAL STRUCTURE IS FAIR TO ATMOS?

A. Yes, most definitely. There are a number of reasons why this is fair to Atmos: (1) it reflects Atmos' actual current capitalization; (2) it includes a common equity ratio that is in line with the average common equity ratio of the Gas Proxy Group; (3) it does not include short-term debt, despite the fact the Atmos must include short-term debt in four of the eight states that it operates; and (4) according to Regulatory Research Associates, the average authorized common equity ratio for gas-distribution companies in calendar year 2018 was 50.09%.[15]

[15] *Regulatory Focus*, Regulatory Research Associates, (2019).

V. THE COST OF COMMON EQUITY CAPITAL

A. Overview

Q. WHY MUST AN OVERALL COST OF CAPITAL OR FAIR RATE OF RETURN BE ESTABLISHED FOR A PUBLIC UTILITY?

A. In a competitive industry, the return on a firm's common equity capital is determined through the competitive market for its goods and services. Due to the capital requirements needed to provide utility services and the economic benefit to society from avoiding duplication of these services and the construction of utility infrastructure facilities, many public utilities are monopolies. Because of the lack of competition and the essential nature of their services, it is not appropriate to permit monopoly utilities to set their own prices. Thus, regulation seeks to establish prices that are fair to consumers and, at the same time, sufficient to meet the operating and capital costs of the utility, *i.e.*, provide an adequate return on capital to attract investors.

Q. PLEASE PROVIDE AN OVERVIEW OF THE COST OF CAPITAL IN THE CONTEXT OF THE THEORY OF THE FIRM.

A. The total cost of operating a business includes the cost of capital. The cost of common equity capital is the expected return on a firm's common stock that the marginal investor would deem sufficient to compensate for risk and the time value of money. In equilibrium, the expected and required rates of return on a company's common stock are equal.

Normative economic models of a company or firm, developed under very restrictive assumptions, provide insight into the relationship between a firm's performance or profitability, capital costs, and the value of the firm. Under the economist's ideal model of perfect competition, where entry and exit are costless, products are undifferentiated, and there are increasing marginal costs of production, firms produce up to the point where price equals marginal cost. Over time, a long-run equilibrium is established where price of the firm equals PPS average cost, including the firm's capital costs. In equilibrium, total revenues equal total costs, and because capital costs represent investors' required return on the firm's capital, actual returns equal required returns, and the market value must equal the book value of the firm's securities.

In a competitive market, firms can achieve competitive advantage due to product-market imperfections. Most notably, companies can gain competitive advantage through product differentiation (adding real or perceived value to products) and by achieving economies of scale (decreasing marginal costs of production). Competitive advantage allows firms to price products above average cost and thereby earn accounting profits greater than those required to cover capital costs. When these profits are in excess of those required by investors, or when a firm earns a return on equity in excess of its cost of equity, investors respond by valuing the firm's equity in excess of its book value.

James M. McTaggart, founder of the international management consulting firm Marakon Associates, described this essential relationship between the return on equity, the cost of equity, and the market-to-book ratio in the following manner:

> Fundamentally, the value of a company is determined by the cash flow it generates over time for its owners, and the minimum acceptable rate of return required by capital investors. This "cost of equity capital" is used to discount the expected equity cash flow, converting it to a present value. The cash flow is, in turn, produced by the interaction of a company's return on equity and the annual rate of equity growth. High return on equity (ROE) companies in low-growth markets, such as Kellogg, are prodigious generators of cash flow, while low ROE companies in high-growth markets, such as Texas Instruments, barely generate enough cash flow to finance growth.
>
> A company's ROE over time, relative to its cost of equity, also determines whether it is worth more or less than its book value. If its ROE is consistently greater than the cost of equity capital (the investor's minimum acceptable return), the business is economically profitable and its market value will exceed book value. If, however, the business earns an ROE consistently less than its cost of equity, it is economically unprofitable and its market value will be less than book value. [16]

As such, the relationship between a firm's return on equity, cost of equity, and market-to-book ratio is relatively straightforward. A firm that earns a return on equity above its cost of equity will see its common stock sell at a price above its book value. Conversely, a firm that earns a return on equity below its cost of equity will see its common stock sell at a price below its book value.

Q. PLEASE PROVIDE ADDITIONAL INSIGHTS INTO THE RELATIONSHIP BETWEEN ROE AND MARKET-TO-BOOK RATIOS.

A. This relationship is discussed in a classic Harvard Business School case study entitled "Note on Value Drivers." On page 2 of that case study, the author describes the relationship very succinctly:

[16] James M. McTaggart, "The Ultimate Poison Pill: Closing the Value Gap," *Commentary* (Spring 1986), p.3.

> For a given industry, more profitable firms – those able to generate higher returns per dollar of equity – should have higher market-to-book ratios. Conversely, firms which are unable to generate returns in excess of their cost of equity [(K)] should sell for less than book value.

Profitability	*Value*
If ROE > K	*then Market/Book > 1*
If ROE = K	*then Market/Book =1*
If ROE < K	*then Market/Book< 1*[17]

To assess the relationship by industry, as suggested above, I performed a regression study between estimated ROE and market-to-book ratios using natural gas distribution and electric utility companies. I used all companies in these two industries that are covered by *Value Line* and have estimated ROE and market-to-book ratio data. The results are presented in Exhibit JRW-4. The average R-square is 0.50.[18] This demonstrates the strong positive relationship between ROEs and market-to-book ratios for public utilities. Given that the market-to-book ratios have been above 1.0 for a number of years, this also demonstrates that utilities have been earning ROEs above the cost of equity capital for many years.

Q. WHAT ECONOMIC FACTORS HAVE AFFECTED THE COST OF EQUITY CAPITAL FOR PUBLIC UTILITIES?

A. Exhibit JRW-5 provides indicators of public utility equity cost rates over the past decade.

Page 1 shows the yields on long-term A-rated public utility bonds. These

[17] Benjamin Esty, "Note on Value Drivers," Harvard Business School, Case No. 9-297-082, April 7, 1997.

[18] R-square measures the percent of variation in one variable (e.g., market-to-book ratios) explained by another variable (e.g., expected ROE). R-squares vary between zero and 1.0, with values closer to 1.0 indicating a higher relationship between two variables.

yields decreased from 2000 until 2003, and then hovered in the 5.50%-6.50% range from mid-2003 until mid-2008. These yields peaked in November 2008 at 7.75% during the Great Recession. These yields have generally declined since then, dropping below 4.0% on four occasions - in mid-2013, in early 2015, in the summer of 2016, and in late 2017. These yields increased in 2018 but have fallen back and declined with interest rates in general. As of the third quarter of 2019, the yield was below 3.50%.

Page 2 of Exhibit JRW-5 provides the dividend yields for the companies in the Gas Proxy Group over the past seventeen years. The dividend yields for the gas group declined from 5.8% to 3.1% between the years 2000 to 2007, increased to about 4.0% in 2009, and have declined steadily since that time. The average dividend yield was 2.70% in both 2017 and 2018.

Average earned returns on common equity and market-to-book ratios for gas utilities are on page 3 of Exhibit JRW-5. For the gas group, earned returns on common equity have been in the range of 9.0% to 12.0% over these years. Over the past decade, the actual earned ROEs have declined from the 12.0% range to about 9.0%. The average market-to-book ratios for this group, which were about 1.25X in 2000 have increased to over 2.00X in both 2017 and 2018. This means that, for at least the last decade, returns on common equity have been greater than the cost of capital, or more than necessary to meet investors' required returns. This also means that customers have been paying more than necessary to support an appropriate profit level for regulated utilities.

Q. WHAT FACTORS DETERMINE INVESTORS' EXPECTED OR REQUIRED RATE OF RETURN ON EQUITY?

A. The expected or required rate of return on common stock is a function of market-wide as well as company-specific factors. The most important market factor is the time value of money, as indicated by the level of interest rates in the economy. Common stock investor requirements generally increase and decrease with like changes in interest rates. The perceived risk of a firm is the predominant factor that influences investor return requirements on a company-specific basis. A firm's investment risk is often separated into business risk and financial risk. Business risk encompasses all factors that affect a firm's operating revenues and expenses. Financial risk results from incurring fixed obligations in the form of debt in financing its assets.

Q. HOW DOES THE INVESTMENT RISK OF UTILITIES COMPARE WITH THAT OF OTHER INDUSTRIES?

A. Due to the essential nature of their service as well as their regulated status, public utilities are exposed to a lesser degree of business risk than other, non-regulated businesses. The relatively low level of business risk allows public utilities to meet much of their capital requirements through borrowing in the financial markets, thereby incurring greater than average financial risk. Nonetheless, the overall investment risk of public utilities is below most other industries.

Page 4 of Exhibit JRW-5 provides an assessment of investment risk for 97 industries as measured by beta, which, according to modern capital market theory, is the only relevant measure of investment risk. These betas come from the *Value*

Line Investment Survey. The study shows that the investment risk of utilities is very low. The average betas for electric, gas, and water utility companies are 0.60, 0.67, and 0.70, respectively.[19] As such, the cost of equity for utilities is the lowest of all industries in the U.S., based on modern capital market theory.

Q. WHAT IS THE COST OF COMMON EQUITY CAPITAL?

A. The costs of debt and preferred stock are normally based on historical or book values and can be determined with a great degree of accuracy. The cost of common equity capital, however, cannot be determined precisely and must instead be estimated from market data and informed judgment. This return requirement of the stockholder should be commensurate with the return requirement on investments in other enterprises having comparable risks.

According to valuation principles, the present value of an asset equals the discounted value of its expected future cash flows. Investors discount these expected cash flows at their required rate of return that, as noted above, reflects the time value of money and the perceived riskiness of the expected future cash flows. As such, the cost of common equity is the rate at which investors discount expected cash flows associated with common stock ownership.

Q. HOW CAN THE EXPECTED OR REQUIRED RATE OF RETURN ON COMMON EQUITY CAPITAL BE DETERMINED?

A. Models have been developed to ascertain the cost of common equity capital for a firm. Each model, however, has been developed using restrictive economic

[19] The beta for the *Value Line* Electric Utilities is the simple average of *Value Line*'s Electric East (0.55), Central (0.63), and West (0.62) group betas.

assumptions. Consequently, judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of common equity capital, in determining the data inputs for these models, and in interpreting the models' results. All of these decisions must take into consideration the firm involved as well as current conditions in the economy and the financial markets.

Q. HOW DID YOU ESTIMATE THE COST OF EQUITY CAPITAL FOR ATMOS?

A. Primarily, I rely on the DCF model to estimate the cost of equity capital. Given the investment valuation process and the relative stability of the utility business, the DCF model provides the best measure of equity cost rates for public utilities. I have also performed a capital asset pricing model ("CAPM") study; however, I give these results less weight because I believe that risk premium studies, of which the CAPM is one form, provide a less reliable indication of equity cost rates for public utilities.

Q. WHY DO YOU THINK THAT CAPM PROVIDES A LESS RELIABLE INDICATOR OF EQUITY COST RATES?

A. I believe that the CAPM provides a less reliable measure of a utility's equity cost rate because it requires an estimate of the market risk premium. As discussed below, there is a wide variation in estimates of the market risk premium found in studies by academics and investment firms as well as in surveys of market professionals.

B. DCF Approach

Q. PLEASE DESCRIBE THE THEORY BEHIND THE TRADITIONAL DCF MODEL.

A. According to the DCF model, the current stock price is equal to the discounted value of all future dividends that investors expect to receive from investment in the firm. As such, stockholders' returns ultimately result from current as well as future dividends. As owners of a corporation, common stockholders are entitled to a *pro rata* share of the firm's earnings. The DCF model presumes that earnings that are not paid out in the form of dividends are reinvested in the firm so as to provide for future growth in earnings and dividends. The rate at which investors discount future dividends, which reflects the timing and riskiness of the expected cash flows, is interpreted as the market's expected or required return on the common stock. Therefore, this discount rate represents the cost of common equity. Algebraically, the DCF model can be expressed as:

$$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_n}{(1+k)^n}$$

where P is the current stock price, D_n is the dividend in year n, and k is the cost of common equity.

Q. IS THE DCF MODEL CONSISTENT WITH VALUATION TECHNIQUES EMPLOYED BY INVESTMENT FIRMS?

A. Yes. Virtually all investment firms use some form of the DCF model as a valuation technique. One common application for investment firms is called the three-stage

DCF or dividend discount model ("DDM"). The stages in a three-stage DCF model are presented in Exhibit JRW-6. This model presumes that a company's dividend payout initially progresses through a growth stage, then proceeds through a transition stage, and finally assumes a maturity (or steady-state) stage. The dividend-payment stage of a firm depends on the profitability of its internal investments which, in turn, is largely a function of the life cycle of the product or service.

1. Growth stage: Characterized by rapidly expanding sales, high profit margins, and an abnormally high growth in earnings per share. Because of highly profitable expected investment opportunities, the payout ratio is low. Competitors are attracted by unusually high earnings, leading to a decline in the growth rate.

2. Transition stage: In later years, increased competition reduces profit margins and earnings growth slows. With fewer new investment opportunities, the company begins to pay out a larger percentage of earnings.

3. Maturity (steady-state) stage: Eventually, the company reaches a position where its new investment opportunities offer, on average, only slightly attractive ROEs. At that time, its earnings growth rate, payout ratio, and ROE stabilize for the remainder of its life. The constant-growth DCF model is appropriate when a firm is in the maturity stage of the life cycle.

In using this model to estimate a firm's cost of equity capital, dividends are projected into the future using the different growth rates in the alternative stages, and then the equity cost rate is the discount rate that equates the present value of the future dividends to the current stock price.

Q. HOW DO YOU ESTIMATE STOCKHOLDERS' EXPECTED OR REQUIRED RATE OF RETURN USING THE DCF MODEL?

A. Under certain assumptions, including a constant and infinite expected growth rate, and constant dividend/earnings and price/earnings ratios, the DCF model can be simplified to the following:

$$P = \frac{D_1}{k - g}$$

where D_1 represents the expected dividend over the coming year and g is the expected growth rate of dividends. This is known as the constant-growth version of the DCF model. To use the constant-growth DCF model to estimate a firm's cost of equity, one solves for "k" in the above expression to obtain the following:

$$k = \frac{D_1}{P} + g$$

Q. IN YOUR OPINION, IS THE CONSTANT-GROWTH VERSION OF THE DCF MODEL APPROPRIATE FOR PUBLIC UTILITIES?

A. Yes. The economics of the public utility business indicate that the industry is in the maturity or constant-growth stage of a three-stage DCF. The economics include the relative stability of the utility business, the maturity of the demand for

public utility services, and the regulated status of public utilities (especially the fact that their returns on investment are effectively set through the ratemaking process). The appropriate DCF valuation procedure for companies in this maturity stage is the constant-growth DCF. In the constant-growth version of the DCF model, the current dividend payment and stock price are directly observable. However, the primary problem and controversy in applying the DCF model to estimate equity cost rates entails estimating investors' expected dividend growth rate.

Q. WHAT FACTORS SHOULD ONE CONSIDER WHEN APPLYING THE DCF METHODOLOGY?

A. One should be sensitive to several factors when using the DCF model to estimate a firm's cost of equity capital. In general, one must recognize the assumptions under which the DCF model was developed in estimating its components (the dividend yield and the expected growth rate). The dividend yield can be precisely measured at any point in time; however, it tends to vary somewhat over time. Estimation of expected growth is considerably more difficult. One must consider recent firm performance, in conjunction with current economic developments and other information available to investors, to accurately estimate investors' expectations.

Q. WHAT DIVIDEND YIELDS HAVE YOU REVIEWED?

A. I have calculated the dividend yields for the companies in the proxy group using the current annual dividend and 30-day, 90-day, and 180-day average stock prices. These dividend yields are provided in page 2 of Exhibit JRW-7. For the Gas Proxy

Group, the median dividend yields using the 30-day, 90-day, and 180-day average stock prices range from 2.5% to 2.7%. As a result, I am using 2.60% as the dividend yield for the Gas Proxy Group.

Q. PLEASE DISCUSS THE APPROPRIATE ADJUSTMENT TO THE SPOT DIVIDEND YIELD.

A. According to the traditional DCF model, the dividend yield term relates to the dividend yield over the coming period. As indicated by Professor Myron Gordon, who is commonly associated with the development of the DCF model for popular use, this is obtained by: (1) multiplying the expected quarterly dividend over the coming quarter by 4, and (2) dividing the resulting annual dividend by the current stock price to determine the appropriate dividend yield for a firm that pays dividends on a quarterly basis.[20]

In applying the DCF model, some analysts adjust the current dividend for growth over the coming year as opposed to the coming quarter. This can be complicated because firms tend to announce changes in dividends at different times during the year. As such, the dividend yield that is computed based upon presumed growth over the coming quarter as opposed to the coming year can be quite different. Consequently, it is common for analysts to adjust the dividend yield by some fraction of the long-term expected growth rate.

[20] Federal Communications Commission, Docket No. 79-05, *Petition for Modification of Prescribed Rate of Return*, Direct Testimony of Myron J. Gordon and Lawrence I. Gould, p. 62 (Apr. 1980).

Q. GIVEN THIS DISCUSSION, WHAT ADJUSTMENT FACTOR DO YOU USE FOR YOUR DIVIDEND YIELD?

A. I adjust the dividend yield by one-half (1/2) of the expected growth so as to reflect growth over the coming year. The DCF equity cost rate ("K") is computed as:

$$K = [(D/P) * (1 + 0.5g)] + g$$

Q. PLEASE DISCUSS THE GROWTH RATE COMPONENT OF THE DCF MODEL.

A. There is debate as to the proper methodology to employ in estimating the growth component of the DCF model. By definition, this component is investors' expectation of the long-term dividend growth rate. Presumably, investors use some combination of historical and/or projected growth rates for earnings and dividends per share and for internal or book-value growth to assess long-term potential.

Q. WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE PROXY GROUP?

A. I have analyzed a number of measures of growth for companies in the proxy group. I reviewed *Value Line's* historical and projected growth rate estimates for earnings per share ("EPS"), dividends per share ("DPS"), and book value per share ("BVPS"). In addition, I utilized the average EPS growth rate forecasts of Wall Street analysts as provided by Yahoo and Zacks. These services solicit three-to-five-year earnings growth rate projections from securities analysts and compile and publish the means and medians of these forecasts. Finally, I assessed

prospective growth as measured by prospective earnings retention rates and earned returns on common equity.

Q. PLEASE DISCUSS HISTORICAL GROWTH IN EARNINGS AND DIVIDENDS AS WELL AS INTERNAL GROWTH.

A. Historical growth rates for EPS, DPS, and BVPS are readily available to investors and are presumably an important ingredient in forming expectations concerning future growth. However, one must use historical growth numbers as measures of investors' expectations with caution. In some cases, past growth may not reflect future growth potential. Also, employing a single growth rate number (for example, for five or ten years) is unlikely to accurately measure investors' expectations, due to the sensitivity of a single growth rate figure to fluctuations in individual firm performance as well as overall economic fluctuations (i.e., business cycles). However, one must appraise the context in which the growth rate is being employed. According to the conventional DCF model, the expected return on a security is equal to the sum of the dividend yield and the expected long-term growth in dividends. Therefore, to best estimate the cost of common equity capital using the conventional DCF model, one must look to long-term growth rate expectations.

Internally generated growth is a function of the percentage of earnings retained within the firm (the earnings retention rate) and the rate of return earned on those earnings (the return on equity). The internal growth rate is computed as the retention rate times the return on equity. Internal growth is significant in determining long-term earnings and, therefore, dividends. Investors recognize the

importance of internally generated growth and pay premiums for stocks of companies that retain earnings and earn high returns on internal investments.

Q. WHICH EPS FORECASTS SHOULD BE USED IN DEVELOPING A DCF GROWTH RATE?

A. The DCF growth rate is the long-term projected growth rate in EPS, DPS, and BVPS. Therefore, in developing an equity cost rate using the DCF model, the projected long-term growth rate is the projection used in the DCF model.

Q. WHY DO YOU NOT RELY EXCLUSIVELY ON THE EPS FORECASTS OF WALL STREET ANALYSTS IN ARRIVING AT A DCF GROWTH RATE FOR THE PROXY GROUP?

A. There are several reasons. First, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Nonetheless, over the very long term, dividends and earnings will have to grow at a similar growth rate. Therefore, consideration must be given to other indicators of growth, including prospective dividend growth, internal growth, as well as projected earnings growth. Second, a 2011 study by Lacina, Lee, and Xu has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting future earnings than just using last year's earnings figure as the projected future earnings number.[21] Employing data over a 20-year period, these authors demonstrate that using the most recent year's EPS figure to forecast EPS in the next 3-5 years proved to be just as accurate as using the EPS estimates from

[21] M. Lacina, B. Lee & Z. Xu (2011),*Advances in Business and Management Forecasting* Vol. 8, Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101.

analysts' long-term earnings growth rate forecasts. In the authors' opinion, these results indicate that analysts' long-term earnings growth rate forecasts should be used with caution as inputs for valuation and cost of capital purposes. Finally, and most significantly, it is well known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased. This has been demonstrated in a number of academic studies over the years.[22] Hence, using these growth rates as a DCF growth rate will provide an overstated equity cost rate. On this issue, a study by Easton and Sommers (2007) found that optimism in analysts' growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[23]

Q. ARE THE EPS GROWTH RATE FORECASTS OF VALUE LINE ALSO OVERLY OPTIMISTIC AND UPWARDLY BIASED?

A. Yes. a study by Szakmary, Conover, and Lancaster (2008) evaluated the accuracy of *Value Line*'s three-to-five-year EPS growth rate forecasts using companies in the Dow Jones Industrial Average over a thirty-year time period and found these forecasted EPS growth rates to be significantly higher than the EPS growth rates

[22] The studies that demonstrate analysts' long-term EPS forecasts are overly-optimistic and upwardly biased include: R.D. Harris, "The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts," *Journal of Business Finance & Accounting*, pp. 725-55 (June/July 1999); P. DeChow, A. Hutton, and R. Sloan, "The Relation Between Analysts' Forecasts of Long-Term Earnings Growth and Stock Price Performance Following Equity Offerings," *Contemporary Accounting Research* (2000); K. Chan, L., Karceski, J., & Lakonishok, J., "The Level and Persistence of Growth Rates," *Journal of Finance* pp. 643−684, (2003); M. Lacina, B. Lee and Z. Xu, (2011), *Advances in Business and Management Forecasting (Vol. 8)*, Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101; and Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, "Equity Analysts, Still Too Bullish," *McKinsey on Finance*, pp. 14-17, (Spring 2010).

[23] Peter D. Easton & Gregory A. Sommers, "Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts," 45 J. ACCT. RES. 983–1015 (2007).

that these companies subsequently achieved.[24]

Q. IS IT YOUR OPINION THAT STOCK PRICES REFLECT THE UPWARD BIAS IN THE EPS GROWTH RATE FORECASTS?

A. Yes, I do believe that investors are well aware of the bias in analysts' EPS growth rate forecasts and stock prices, therefore, reflect the upward bias.

Q. HOW DOES THAT AFFECT THE USE OF THESE FORECASTS IN A DCF EQUITY COST RATE STUDY?

A. According to the DCF model, the equity cost rate is a function of the dividend yield and expected growth rate. Because stock prices reflect the bias, it would affect the dividend yield. In addition, the DCF growth rate needs to be adjusted downward from the projected EPS growth rate to reflect the upward bias.

Q. PLEASE DISCUSS THE HISTORICAL GROWTH OF THE COMPANIES IN THE PROXY GROUP, AS PROVIDED BY *VALUE LINE*.

A. Page 3 of Exhibit JRW-7 provides the 5- and 10-year historical growth rates for EPS, DPS, and BVPS for the companies in the proxy group, as published in the *Value Line Investment Survey*. The median historical growth measures for EPS, DPS, and BVPS for the Gas Proxy Group, as provided in Panel A, range from 4.5% to 7.5%, with an average of the medians of 5.6%.

Q. PLEASE SUMMARIZE *VALUE LINE'S* PROJECTED GROWTH RATES FOR THE COMPANIES IN THE PROXY GROUP.

[24] Szakmary, A., Conover, C., & Lancaster, C. (2008). "An Examination of *Value Line*'s Long-Term Projections," *Journal of Banking & Finance*, May 2008, pp. 820-833.

A. *Value Line's* projections of EPS, DPS, and BVPS growth for the companies in the proxy group are shown on page 4 of Exhibit JRW-7. As stated above, due to the presence of outliers, the medians are used in the analysis. For the Gas Proxy Group, as shown in Panel A of page 4 of Exhibit JRW-7, the medians range from 5.0% to 9.0%, with an average of the medians of 6.8%.

Also provided on page 4 of Exhibit JRW-7 are the prospective sustainable growth rates for the companies in the proxy group as measured by *Value Line*'s average projected return on shareholders' equity and retention rate. As noted above, sustainable growth is a significant and primary driver of long-run earnings growth. For the Gas Proxy Group, the median prospective sustainable growth rate is 4.8%.

Q. PLEASE ASSESS GROWTH FOR THE PROXY GROUP AS MEASURED BY ANALYSTS' FORECASTS OF EXPECTED 5-YEAR EPS GROWTH.

A. Yahoo and Zacks collect, summarize, and publish Wall Street analysts' three-to-five-year EPS growth rate forecasts for the companies in the proxy group. These forecasts are provided for the companies in the proxy group on page 5 of Exhibit JRW-7. I have reported both the mean and median growth rates for the group. Since there is considerable overlap in analyst coverage between the two services, and not all of the companies have forecasts from the different services, I have averaged the expected three-to-five year EPS growth rates from the two services for each company to arrive at an expected EPS growth rate for each company. The mean/median of analysts' projected EPS growth rates for the gas group are 6.0%

and 6.5%, respectively.[25]

Q. PLEASE SUMMARIZE YOUR ANALYSIS OF THE HISTORICAL AND PROSPECTIVE GROWTH OF THE PROXY GROUP.

A. Page 6 of Exhibit JRW-7 shows the summary DCF growth rate indicators for the proxy group.

The historical growth rate indicators for my Gas Proxy Group imply a baseline growth rate of 5.6%. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 6.8%, and *Value Line*'s projected sustainable growth rate is 4.8%. The projected EPS growth rates of Wall Street analysts for the Gas Proxy Group are 6.0% and 6.5% as measured by the mean and median growth rates. The overall range for the projected growth rate indicators (ignoring historical growth) is 4.8 to 6.8%. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate growth rate for the Gas Proxy Group is 6.00%. This is at the high end of the range of projected growth rates.

Q. BASED ON THE ABOVE ANALYSIS, WHAT ARE YOUR INDICATED COMMON EQUITY COST RATES FROM THE DCF MODEL FOR THE PROXY GROUP?

A. My DCF-derived equity cost rates for the gas group are summarized on page 1 of Exhibit JRW-7 and in Table 3 below.

[25] Given the variation in the measures of central tendency of analysts' projected EPS growth rates for the proxy group, I have considered both the means and medians figures in the growth rate analysis.

Table 3
DCF-derived Equity Cost Rate/ROE

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Gas Proxy Group	**2.60%**	**1.0300**	**6.00%**	**8.70%**

The calculation for the Gas Proxy Group is the 2.60% dividend yield, times the one and one-half growth adjustment of 1.030, and a DCF growth rate of 6.00%, which results in an equity cost rate of 8.70%.

B. Capital Asset Pricing Model

Q. PLEASE DISCUSS THE CAPITAL ASSET PRICING MODEL ("CAPM").

A. The CAPM is a risk premium approach to gauging a firm's cost of equity capital. According to the risk premium approach, the cost of equity is the sum of the interest rate on a risk-free bond (R_f) and a risk premium (RP), as in the following:

$$k = R_f + RP$$

The yield on long-term U.S. Treasury securities is normally used as R_f. Risk premiums are measured in different ways. The CAPM is a theory of the risk and expected returns of common stocks. In the CAPM, two types of risk are associated with a stock: firm-specific risk or unsystematic risk, and market or systematic risk, which is measured by a firm's beta. The only risk that investors receive a return for bearing is systematic risk.

According to the CAPM, the expected return on a company's stock, which is also the equity cost rate (K), is equal to:

$$K = (R_f) + ß * [E(R_m) - (R_f)]$$

Where:

- *K* represents the estimated rate of return on the stock;
- $E(R_m)$ represents the expected return on the overall stock market. Frequently, the S&P 500 is used as a proxy for the "market";
- (R_f) represents the risk-free rate of interest;
- $[E(R_m) - (R_f)]$ represents the expected equity or MRP—the excess return that an investor expects to receive above the risk-free rate for investing in risky stocks; and
- *Beta*—(ß) is a measure of the systematic risk of an asset.

To estimate the required return or cost of equity using the CAPM requires three inputs: the risk-free rate of interest (R_f), the beta (ß), and the expected equity or MRP $[E(R_m) - (R_f)]$. R_f is the easiest of the inputs to measure – it is represented by the yield on long-term U.S. Treasury bonds. ß, the measure of systematic risk, is more difficult to measure, as there are different opinions about what adjustments, if any, should be made to historical betas due to their tendency to regress to 1.0 over time. And finally, an even more difficult input to measure is the expected equity or MRP ($E(R_m) - (R_f)$). I will discuss each of these inputs below.

Q. PLEASE DISCUSS EXHIBIT JRW-8.

A. Exhibit JRW-8 provides the summary results for my CAPM study. Page 1 shows the results and the following pages contain the supporting data.

Q. PLEASE DISCUSS THE RISK-FREE INTEREST RATE.

A. The yield on long-term U.S. Treasury bonds has usually been viewed as the risk-free rate of interest in the CAPM. The yield on long-term U.S. Treasury bonds, in

turn, has been considered to be the yield on U.S. Treasury bonds with 30-year maturities.

Q. WHAT RISK-FREE INTEREST RATE ARE YOU USING IN YOUR CAPM?

A. As shown on page 2 of Exhibit JRW-8, the yield on 30-year U.S. Treasury bonds has been in the 2.0% to 4.0% range over the 2013–2019 time period. The current 30-year Treasury yield is near the bottom of this range. Given the recent range of yields, I have chosen to use the top end of the range as my risk-free interest rate. Therefore, I am using 3.75% as the risk-free rate, or R_f, in my CAPM. This is equal to the normalized risk-free interest rate used by the investment advisory firm Duff & Phelps.[26]

Q. DOES YOUR 3.75% RISK-FREE INTEREST RATE TAKE INTO CONSIDERATION FORECASTS OF HIGHER INTEREST RATES?

A. No, it does not. As I stated before, forecasts of higher interest rates have been notoriously wrong for a decade. My 3.75% risk-free interest rate takes into account the range of interest rates in the past and effectively synchronizes the risk-free rate with the market risk premium. The risk-free rate and the market risk premium are interrelated in that the market risk premium is developed in relation to the risk-free rate. As discussed below, my market risk premium is based on the results of many studies and surveys that have been published over time. Therefore,

[26] https://www.duffandphelps.com/insights/publications/valuation-insights/valuation-insights-first-quarter-2019/us-equity-risk-premium-recommendation.

my risk-free interest rate of 3.75% is effectively a normalized risk-free rate of interest.

Q. WHAT BETAS ARE YOU EMPLOYING IN YOUR CAPM?

A. Beta (ß) is a measure of the systematic risk of a stock. The market, usually taken to be the S&P 500, has a beta of 1.0. The beta of a stock with the same price movement as the market also has a beta of 1.0. A stock whose price movement is greater than that of the market, such as a technology stock, is riskier than the market and has a beta greater than 1.0. A stock with below average price movement, such as that of a regulated public utility, is less risky than the market and has a beta less than 1.0. Estimating a stock's beta involves running a linear regression of a stock's return on the market return.

As shown on page 3 of Exhibit JRW-8, the slope of the regression line is the stock's ß. A steeper line indicates that the stock is more sensitive to the return on the overall market. This means that the stock has a higher ß and greater-than-average market risk. A less steep line indicates a lower ß and less market risk.

Several online investment information services, such as Yahoo and Reuters, provide estimates of stock betas. Usually these services report different betas for the same stock. The differences are usually due to the time period over which ß is measured, and any adjustments that are made to reflect the fact that betas tend to regress to 1.0 over time. In estimating an equity cost rate for the proxy group, I am using the betas for the companies as provided in the *Value Line Investment Survey*. As shown on page 3 of Exhibit JRW-8, the median beta for the companies in the Gas Proxy Group is 0.65.

Q. PLEASE DISCUSS THE MARKET RISK PREMIUM.

A. The market risk premium is equal to the expected return on the stock market (e.g., the expected return on the S&P 500, $E(R_m)$ minus the risk-free rate of interest (R_f)). The market risk premium is the difference in the expected total return between investing in equities and investing in "safe" fixed-income assets, such as long-term government bonds. However, while the market risk premium is easy to define conceptually, it is difficult to measure because it requires an estimate of the expected return on the market - $E(R_m)$. As is discussed below, there are different ways to measure $E(R_m)$, and studies have come up with significantly different magnitudes for $E(R_m)$. As Merton Miller, the 1990 Nobel Prize winner in economics indicated, $E(R_m)$ is very difficult to measure and is one of the great mysteries in finance.[27]

Q. PLEASE DISCUSS THE ALTERNATIVE APPROACHES TO ESTIMATING THE MARKET RISK PREMIUM.

A. Page 4 of Exhibit JRW-8 highlights the primary approaches to, and issues in, estimating the expected market risk premium. The traditional way to measure the market risk premium was to use the difference between historical average stock and bond returns. In this case, historical stock and bond returns, also called *ex post* returns, were used as the measures of the market's expected return (known as the *ex ante* or forward-looking expected return). This type of historical evaluation of stock and bond returns is often called the "Ibbotson approach" after Professor

[27] Merton Miller, "The History of Finance: An Eyewitness Account," *Journal of Applied Corporate Finance*, 2000, p. 3.

Roger Ibbotson, who popularized this method of using historical financial market returns as measures of expected returns. However, this historical evaluation of returns can be a problem because: (1) *ex post* returns are not the same as *ex ante* expectations; (2) market risk premiums can change over time, increasing when investors become more risk-averse and decreasing when investors become less risk-averse; and (3) market conditions can change such that *ex post* historical returns are poor estimates of *ex ante* expectations.

The use of historical returns as market expectations has been criticized in numerous academic studies as discussed later in my testimony. The general theme of these studies is that the large equity risk premium discovered in historical stock and bond returns cannot be justified by the fundamental data. These studies, which fall under the category "*Ex Ante* Models and Market Data," compute *ex ante* expected returns using market data to arrive at an expected equity risk premium. These studies have also been called "Puzzle Research" after the famous study by Mehra and Prescott in which the authors first questioned the magnitude of historical equity risk premiums relative to fundamentals.[28]

In addition, there are a number of surveys of financial professionals regarding the market risk premium. There have also been several published surveys of academics on the equity risk premium. *CFO Magazine* conducts a quarterly survey of CFOs, which includes questions regarding their views on the

[28] Rajnish Mehra & Edward C. Prescott, "The Equity Premium: A Puzzle," *Journal of Monetary Economics,* 145 (1985).

current expected returns on stocks and bonds. Usually, over 200 CFOs participate in the survey.[29] Questions regarding expected stock and bond returns are also included in the Federal Reserve Bank of Philadelphia's annual survey of financial forecasters, which is published as the *Survey of Professional Forecasters*.[30] This survey of professional economists has been published for almost fifty years. In addition, Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums they use in their investment and financial decision-making.[31]

Q. PLEASE PROVIDE A SUMMARY OF THE MARKET RISK PREMIUM STUDIES.

A. Derrig and Orr (2003), Fernandez (2007), and Song (2007) completed the most comprehensive review of the research on the market risk premium.[32] Derrig and Orr's study evaluated the various approaches to estimating market risk premiums, as well as the issues with the alternative approaches and summarized the findings

[29] DUKE/CFO Magazine Global Business Outlook Survey, (June 2019), https://www.cfosurvey.org/wp-content/uploads/2019/06/Q2-2019-US-Toplines-1.pdf.

[30] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters* (Mar. 22, 2019), https://www.philadelphiafed.org/-/media/research-and-data/real-time-center/survey-of-professional-forecasters/2019/spfq119.pdf?la=en. The Survey of Professional Forecasters was formerly conducted by the American Statistical Association ("ASA") and the National Bureau of Economic Research ("NBER") and was known as the ASA/NBER survey. The survey, which began in 1968, is conducted each quarter. The Federal Reserve Bank of Philadelphia, in cooperation with the NBER, assumed responsibility for the survey in June 1990.

[31] Pablo Fernandez, Vitaly Pershin, and Isabel Fernandez Acín, "Market Risk Premium and Risk-Free Rate used for 59 countries in 2019: a survey," *IESE Business School*, (Apr. 2019), available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3358901.

[32] *See* Richard Derrig & Elisha Orr, "Equity Risk Premium: Expectations Great and Small," Working Paper (version 3.0), Automobile Insurers Bureau of Massachusetts, (August 28, 2003); Pablo Fernandez, "Equity Premium: Historical, Expected, Required, and Implied," IESE Business School Working Paper, (2007); Zhiyi Song, "The Equity Risk Premium: An Annotated Bibliography," CFA Institute, (2007).

of the published research on the market risk premium. Fernandez examined four alternative measures of the market risk premium – historical, expected, required, and implied. He also reviewed the major studies of the market risk premium and presented the summary market risk premium results. Song provides an annotated bibliography and highlights the alternative approaches to estimating the market risk premium.

Page 5 of Exhibit JRW-8 provides a summary of the results of the primary risk premium studies reviewed by Derrig and Orr, Fernandez, and Song, as well as other more recent studies of the market risk premium. In developing page 5 of Exhibit JRW-8, I have categorized the studies as discussed on page 4 of Exhibit JRW-8. I have also included the results of studies of the "Building Blocks" approach to estimating the equity risk premium. The Building Blocks approach is a hybrid approach employing elements of both historical and *ex ante* models.

Q. PLEASE DISCUSS PAGE 5 OF EXHIBIT JRW-8.

A. Page 5 of Exhibit JRW-8 provides a summary of the results of the market risk premium studies that I have reviewed. These include the results of: (1) the various studies of the historical risk premium, (2) *ex ante* market risk premium studies, (3) market risk premium surveys of CFOs, financial forecasters, analysts, companies and academics, and (4) the Building Blocks approach to the market risk premium. There are results reported for over thirty studies, and the median market risk premium is 4.83%.

Q. PLEASE HIGHLIGHT THE RESULTS OF THE MORE RECENT RISK PREMIUM STUDIES AND SURVEYS.

A. The studies cited on page 5 of Exhibit JRW-8 include every market risk premium study and survey I could identify that was published over the past fifteen years and that provided a market risk premium estimate. Many of these studies were published prior to the financial crisis that began in 2008. In addition, some of these studies were published in the early 2000s at the market peak. It should be noted that many of these studies (as indicated) used data over long periods of time (as long as fifty years of data) and so were not estimating a market risk premium as of a specific point in time (e.g., the year 2001). To assess the effect of the earlier studies on the market risk premium, I have reconstructed page 5 of Exhibit JRW-8 on page 6 of Exhibit JRW-8; however, I have eliminated all studies dated before January 2, 2010. The median market risk premium estimate for this subset of studies is 5.09%.

Q. PLEASE SUMMARIZE THE MARKET RISK PREMIUM STUDIES AND SURVEYS.

A. As noted above, there are three approaches to estimating the market risk premium – historic stock and bond returns, ex ante or expected returns models, and surveys. The studies on pages 5 and 6 of Exhibit JRW-8 can be summarized in the following manners:

Historic Stock and Bond Returns - Historic stock and bond returns suggest a market risk premium in the 4.40% to 6.26% range, depending on whether one uses arithmetic or geometric mean returns.

Ex Ante Models - Market risk premium studies that use expected or ex ante return models indicate market risk premium in the range of 4.29% to 6.00%.

Surveys - Market risk premiums developed from surveys of analysts, companies, financial professionals, and academics find lower market risk premium, with a range from 1.85% to 5.7%.

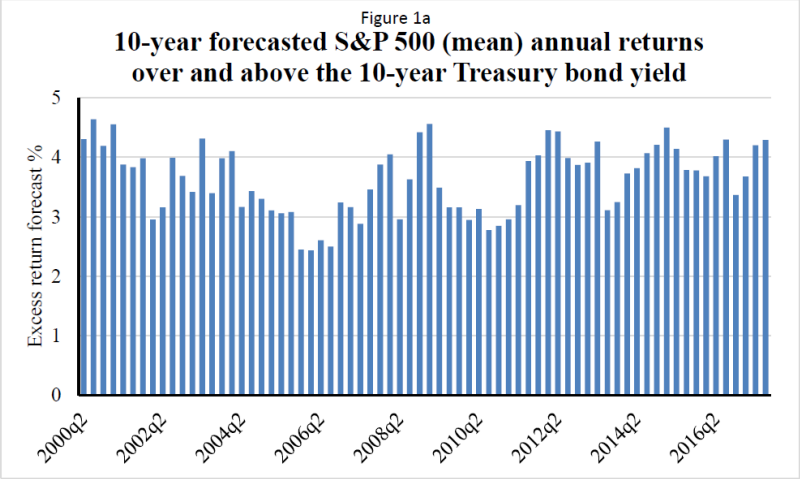
Q. PLEASE HIGHLIGHT THE EX ANTE MARKET RISK PREMIUM STUDIES AND SURVEYS THAT YOU BELIEVE ARE MOST TIMELY AND RELEVANT.

A. I will highlight several studies/surveys.

CFO Magazine conducts a quarterly survey of CFOs, which includes questions regarding their views on the current expected returns on stocks and bonds. In the June 2019 CFO survey conducted by *CFO Magazine* and Duke University, which included approximately 200 responses, the expected 10-year market risk premium was 4.05%.[33] Figure 4, below, shows the market risk premium associated with the CFO Survey, which has been in the 4.0% range in recent years.

[33] DUKE/CFO Magazine Global Business Outlook Survey, at 33, (June 2019), https://www.cfosurvey.org/wp-content/uploads/2019/06/Q2-2019-US-Toplines-1.pdf.

Figure 4
Market Risk Premium
CFO Survey



Source: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3151162

Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums they use in their investment and financial decision-making.[34] His survey results are included on pages 5 and 6 of Exhibit JRW-8. The results of his 2019 survey of academics, financial analysts, and companies, which included 4,000 responses, indicated a mean market risk premium employed by U.S. analysts and companies of 5.6%.[35] His estimated market risk premium for the U.S. has been in the 5.00%-5.50% range in recent years.

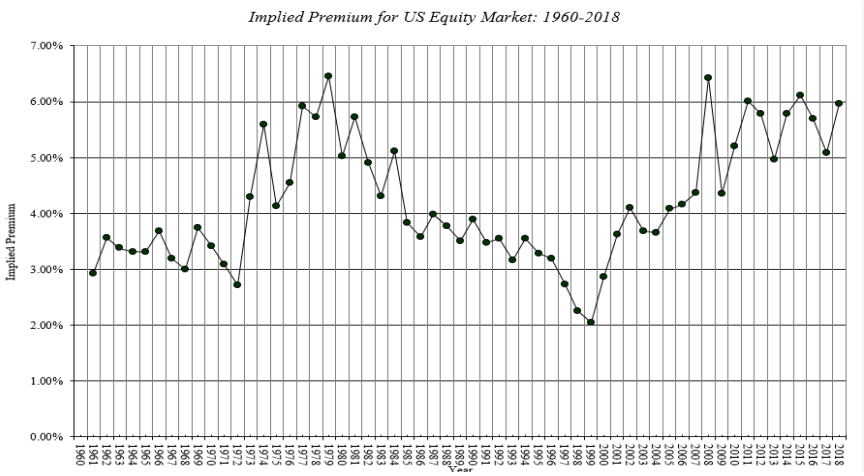
Professor Aswath Damodaran of NYU, a leading expert on valuation and the market risk premium, provides a monthly updated market risk premium which

[34] Pablo Fernandez, Vitaly Pershin, and Isabel Fernandez Acín, "Market Risk Premium and Risk-Free Rate used for 59 countries in 2019: a survey," *IESE Business School*, (Apr. 2019), available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3358901.

[35] *Ibid.* p. 3.

is based on projected S&P 500 EPS and stock price level and long-term interest rates. His estimated market risk premium, shown graphically in Figure 5, below, for the past twenty years, has primarily been in the range of 5.0% to 6.0% since 2010.

Figure 5
Damodaran Market Risk Premium



Source: http://pages.stern.nyu.edu/~adamodar/

Duff & Phelps, an investment advisory firm, provides recommendations for the risk-free interest rate and market risk premiums to be used in calculating the cost of capital data. Their recommendations over the 2008-2019 time periods are shown on page 7 of Exhibit JRW-8. Duff & Phelps' recommended market risk premium has been in the 5.0% to 6.0% range over the past decade. Most recently, in the first quarter of 2019, Duff & Phelps increased its recommended market risk premium from 5.0% to 5.50%.[36]

[36] Duff & Phelps, "U.S. Equity Risk Premium Recommendation," (Feb. 19, 2019), https://www.duffandphelps.com/insights/publications/cost-of-capital/recommended-us-equity-risk-premium-and-corresponding-risk-free-rates.

KPMG is one of the largest public accounting firms in the world. Its recommended market risk premium over the 2013-2019 time period is shown in Panel A of page 8 of Exhibit JRW-8. KPMG's recommended market risk premium has been in the 5.50% to 6.50% range over this time period. In the first quarter of 2019, KPMG increased its estimated market risk premium from 5.50% to 5.75%.[37]

Finally, the website *market-risk-premia.com* provides risk-free interest rates, implied market risk premiums, and overall cost of capital for thirty-six countries around the world. These parameters for the U.S. over the 2002-2019 time period are shown in Panel B of page 8 of Exhibit JRW-8. As of July 31, 2019, *market-risk-premia.com* estimated an implied cost of capital for the U.S. of 6.12% consisting of a risk-free rate of 2.02% and an implied market risk premium of 4.10.[38]

Q. GIVEN THESE RESULTS, WHAT MARKET RISK PREMIUM ARE YOU USING IN YOUR CAPM?

A. The studies on page 6 of Exhibit JRW-8, and more importantly the more timely and relevant studies just cited, suggest that the appropriate market risk premium in the U.S. is in the 4.0% to 6.0% range. I will use an expected market risk premium of 5.75%, which is in the upper end of the range, as the market risk premium. I gave most weight to the market risk premium estimates of the CFO Survey, Duff & Phelps, KPMG, the Fernandez survey, and Damodaran. This is a

[37] KPMG, "Equity Market Risk Premium Research Summary," (March 31, 2019), https://assets.kpmg/content/dam/kpmg/nl/pdf/2019/advisory/equity-market-risk-premium-research-summary-31032019.pdf.

[38] Market-Risk-Premia.com, "Implied Market-risk-premia (market risk premium): USA," http://www.market-risk-premia.com/us.html.

conservatively high estimate of the market risk premium considering the many studies and surveys of the market risk premium.

Table 4
CAPM-derived Equity Cost Rate/ROE
$K = (R_f) + ß * [E(R_m) - (R_f)]$

	Risk-Free Rate	Beta	Equity Risk Premium	Equity Cost Rate
Gas Proxy Group	**3.75%**	**0.65**	**5.75%**	**7.50%**

For the Gas Proxy Group, the risk-free rate of 3.75% plus the product of the beta of 0.65 times the equity risk premium of 5.75% results in a 7.50% equity cost rate.

D. Equity Cost Rate Summary

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR EQUITY COST RATE STUDIES.

A. My DCF and CAPM analyses for the Gas Proxy Group indicate equity cost rates of 8.70% and 7.50%, respectively.

Table 5
ROEs Derived from DCF and CAPM Models

	DCF	CAPM
Gas Proxy Group	**8.70%**	**7.50%**

Q. GIVEN THESE RESULTS, WHAT IS YOUR ESTIMATED EQUITY COST RATE FOR THE GROUP?

A. I conclude that the appropriate equity cost rate for companies in the Gas Proxy Group is in the 7.50% to 8.70% range. However, since I rely primarily on the DCF model, I am using the upper end of the range as the equity cost rate for the group.

Q. ARE YOU RECOMMENDING AN EQUITY COST RATE IN THIS RANGE FOR ATMOS?

A. Yes. While this figure is at the high end of my range, I believe that this range accurately reflects current capital market data. This is reflective of the current capital market environment with historically low inflation, interest rates, and capital costs.

Q. PLEASE INDICATE WHY YOUR EQUITY COST RATE RECOMMENDATIONS ARE APPROPRIATE FOR THE GAS DISTRIBUTION OPERATIONS OF THE COMPANY.

A. There are a number of reasons why an equity cost rate of 8.70% is appropriate and fair for the Company in this case:

1. As shown on page 1 of Exhibit JRW-5, capital costs for utilities, as indicated by long-term utility bond yields, are still at historically low levels. In addition, given low inflationary expectations and slow global economic growth, interest rates are likely to remain at low levels for some time.

2. As shown on page 4 of Exhibit JRW-5, the gas distribution industry is among the lowest risk industries in the U.S. as measured by beta. Most notably, the betas for gas companies have been declining in recent years, which indicates the risk of the industry has declined. Overall, the cost of equity capital for this industry is the lowest in the U.S., according to the CAPM.

3. Atmos' S&P and Moody's issuer credit ratings of A and A2 indicate that its investment risk is below the average of the proxy group.

4. I have recommended an equity cost rate at the high end of the range of my ROE outcomes.

5. The authorized ROEs for gas distribution companies have declined from 9.94% in 2012, to 9.68% in 2013, 9.78% in 2014, 9.60% in 2015, 9.50% in 2016, 9.72% in 2017, 9.59% in 2018, and 9.55% in the first quarter of 2019.[39] In my opinion, authorized ROEs have lagged behind capital market cost rates, or in other words, authorized ROEs have been slow to reflect low capital market cost rates. However, the trend has been towards lower ROEs and the norm now is below 10%. Hence, I believe that my recommended ROE reflects our present historically low capital cost rates, and these low capital cost rates are finally being recognized as the norm by state utility regulatory commissions.

Q. DO YOU BELIEVE THAT YOUR 8.70% ROE RECOMMENDATION MEETS THE *HOPE* AND *BLUEFIELD* STANDARDS?

A. Yes, I do. As previously noted, according to the *Hope* and *Bluefield* decisions, returns on capital should be: (1) comparable to returns investors expect to earn on other investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital. As shown in Exhibit JRW-5, gas distribution companies have been earning in the 8.0% to 9.0% range in recent

[39] *Regulatory Focus*, Regulatory Research Associates, 2019.

years. While my recommendation is below the average authorized ROEs for gas distribution companies, it reflects the downward trend in authorized and earned ROEs of gas distribution companies. In addition, the average market-to-book ratio for the Gas Proxy Group is 2.20 which indicates the earned ROEs for the gas companies are well in excess of the returns investors require.

VI. CRITIQUE OF ATMOS' RATE OF RETURN TESTIMONY

Q. PLEASE REVIEW THE COMPANY'S PROPOSED RATE OF RETURN.

A. Atmos has proposed a capital structure consisting of 39.88% long-term debt and 60.12% common equity and a long-term debt cost rate of 4.57%. Mr. D'Ascendis has recommended a common equity cost rate, or ROE, of 10.25% for Atmos. The Company's overall rate of return recommendation is 7.98%. This is summarized in Exhibit JRW-10.

Q. WHAT ARE THE PRIMARY ISSUES REGARDING THE COMPANY'S COST OF CAPITAL POSITION?

A. The primary issues related to the Company's rate of return include the following:

Capital Structure – As previously discussed, the Company's proposed capital structure has a higher common equity ratio than other gas distribution companies, and thus a lower risk to investors.

Capital Market Conditions – Mr. D'Ascendis' analyses and ROE results and recommendations reflect the assumption of higher interest rates and capital costs. However, I have shown that interest rates have remained at historically low levels,

and economists' forecasts of higher interest rates – such as those used by Mr. D'Ascendis, have been wrong for over a decade.

Proxy Group - Mr. D'Ascendis' has used a proxy group of only six gas distribution companies. I do not believe that this is a large enough group to estimate an equity cost rate. I have used nine companies that *Value Line* lists as natural gas companies.

The Investment Risk of Atmos - Mr. D'Ascendis cites Atmos' capital spending as a risk factor to consider in assessing Atmos. However, I use credit ratings as an indication of risk. Atmos' issuer credit rating of A from S&P is above the average issuer credit rating of A-/BBB+ for the proxy group. This suggests that Atmos is less risky than the average S&P bond rating for the two groups.

DCF Equity Cost Rate - There are two errors in Mr. D'Ascendis' DCF analyses: (1) he relies exclusively on the overly optimistic and upwardly biased earnings-per-share (EPS) growth rate forecasts of Wall Street analysts and *Value Line*, and (2) he has combined abnormally high *Value Line* projected EPS for his proxy companies, computed from a three-year base period, with three-to-five-year projected growth rates of First Call and Zack's.

CAPM Approach - The CAPM approach requires an estimate of the risk-free interest rate, the beta, and the market or equity risk premium. There are three primary issues with Mr. D'Ascendis' CAPM analyses: (1) he has used a non-traditional CAPM approach, the ECAPM, as an equity cost rate approach; (2) he employs excessively projected, long-term projected risk-free interest rate which is well in excess of current market rates; and (3) most significantly, his market risk

premium of 9.56% is exaggerated, is much higher than published market risk premiums, and does not reflect current market fundamentals. With respect to the market risk premium, Mr. D'Ascendis has employed seven different approaches to estimate the MRP: (1) four methods use historical stock and bond return data; and (2) the other three are based on projected stock market returns. As I discuss below, there are a number of empirical issues with using historical stock and bond returns to estimate an expected market risk premium. In addition, Mr. D'Ascendis' projected market returns are based on highly unrealistic assumptions about future earnings and economic growth and the resulting stock returns. On this point, he makes the assumption that the growth rates of the earnings per share of the S&P 500 can nearly triple that of GDP.

Risk Premium Approach - Mr. D'Ascendis estimates an equity cost rate using a risk premium model approach. There are two issues with Mr. D'Ascendis' risk premium analysis: (1) The base yield is much higher than current utility bonds yields; and (2) most significantly, his risk premium is based on the same data and methodologies that he uses in his CAPM analyses and, therefore, include the same errors.

Equity Cost Rate Models Applied to Non-Price Regulated Companies - Mr. D'Ascendis also estimates an equity cost rate by applying his equity cost rate approaches and methodologies to a group of "comparable risk" non-price regulated companies. As I note below, these companies are not truly comparable to Atmos and the analyses are based on the same flawed approaches summarized above.

Other Issues - Mr. D'Ascendis concludes that his equity cost rate studies suggest a ROE of 9.80%. He then also considers two other factors in order to arrive at his 10.25% ROE recommendation. These factors include: (1) Atmos' size; and (2) flotation costs. The size adjustment is 0.40% and the flotation cost adjustment is 0.04%. As I discuss in my testimony, there is no need for a flotation cost adjustment and a small size premium is not appropriate for regulated public utilities.

The capital structure, gas proxy group, the investment risk of Atmos, and capital market conditions issues were addressed above. I discuss the other issues below.

Q. PLEASE REVIEW MR. D'ASCENDIS' EQUITY COST RATE APPROACHES AND RESULTS.

A. Mr. D'Ascendis has developed a proxy group of gas distribution companies and employed DCF, CAPM, and risk premium equity cost rate approaches. Mr. D'Ascendis' equity cost rate estimates for Atmos are summarized on page 2 of Exhibit JRW-9. Based on these figures, he concludes that the appropriate equity cost rate is 10.25% for Atmos.

A. DCF Approach

Q. PLEASE SUMMARIZE MR. D'ASCENDIS' DCF ESTIMATES.

A. On pages 25-26 of his testimony and in Schedule No. DWD-2, Mr. D'Ascendis develops an equity cost rate by applying the DCF model to the companies in his

proxy group. Mr. D'Ascendis' DCF results are summarized on page 2 of Exhibit JRW-9. He uses a constant-growth DCF model, a dividend yield based on 60-day average stock prices, and has relied on the forecasted EPS growth rates of Zacks, Yahoo, and *Value Line*. He reports mean and median results of 8.86% and 8.98% and uses the average of these two figures as his DCF equity cost rate, which is 8.92%.

Q. WHAT ARE THE ERRORS IN MR. D'ASCENDIS' DCF ANALYSES?

A. The primary errors in Mr. D'Ascendis' DCF analysis are: (1) he relies on the overly optimistic and upwardly biased three-to-five-year EPS growth rate forecasts of Wall Street analysts and *Value Line*, and (2) he has combined abnormally high *Value Line* projected EPS, computed from a three-year base period, with three-to-five- year projected growth rates of Yahoo and Zack's.

1. Wall Street Analysts' EPS Growth Rates

Q. PLEASE REVIEW MR. D'ASCENDIS' DCF GROWTH RATE.

A. In his constant-growth DCF model, Mr. D'Ascendis' DCF growth rate is the average of the EPS growth rate forecasts of: (1) Wall Street analysts as compiled by Yahoo and Zacks; and (2) *Value Line*.

Q. PLEASE DISCUSS MR. D'ASCENDIS' EXCLUSIVE RELIANCE ON THE PROJECTED GROWTH RATES OF WALL STREET ANALYSTS AND *VALUE LINE*.

A. It is highly unlikely that investors today would rely exclusively on the EPS growth rate forecasts of Wall Street analysts and ignore other growth rate measures in arriving at their expected growth rates for equity investments. As discussed previously, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Hence, consideration must be given to other indicators of growth, including historical prospective dividend growth, internal growth, as well as projected earnings growth.

2. The *Value Line* EPS Growth Rates

Q. PLEASE DISCUSS MR. D'ASCENDIS' DCF GROWTH RATE.

A. Table 6 and page 2 of Exhibit JRW-9 shows Mr. D'Ascendis' DCF growth rates from Zacks, Yahoo, and *Value Line*. The Zacks and Yahoo growth rates are the average of analysts' three-to-five-year projected growth rates compiled by First Call and Zack's. *Value Line* uses a different approach in estimating projected growth. *Value Line* projects growth from a three-year base period – 2015-2017 – to a projected three-year period for the period 2022-2024. Using this approach, the three-year based period can have a significant impact on the *Value L*ine growth rate if this base period includes years with abnormally high or low earnings. For all six of the proxy companies, the *Value* Line projected growth rates are larger than the Yahoo and Zack's growth rates.

Table 6
Mr. D'Ascendis' DCF Growth Rates

Company	*Value Line*	Zacks	Yahoo
Atmos Energy Corp.	7.50	6.50	6.45
Northwest Natural	NMF	4.50	4.00
ONE Gas, Inc.	9.00	5.90	5.00
South Jersey Industries	9.50	7.20	5.90
Southwest Gas	8.50	6.20	6.30
Spire Inc.	5.50	3.80	2.82
Mean	8.0%	5.7%	5.1%
Median	8.5%	6.1%	5.5%

* Source: Exhibit JRW-9, page 3.

To see why these growth rates are inflated, the *Value* Line projected EPS growth rate of 9.0% for One Gas (OGS) is demonstrated in Table 7. Panel A shows that *Value Line* had a 9.0% growth rate a three-year base period – 2015-2017 – to a projected three-year period for the period 2022-2024. Panel B of Table 9 shows that OGS' base period includes 2015, 2016, and 2017 EPS figures of $2.34, $2.65, and $3.02. The *Value* Line projected EPS growth rate of 9.0% OGS' is the compounded annual growth rate from *Value Line* EPS base three-year period average EPS figure of $2.64 to the projected 2022-2014 EPS figure of 4.75%. The actual growth rate is 8.80%, but *Value Line* averages growth rates to the nearest one-half percent.

Table 7
OGS's *Value Line* Projected EPS Growth Rate
Panel A

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '15-'17 to '22-'24
Revenues	- -	- -	*5.0%*
"Cash Flow"	- -	- -	*7.5%*
Earnings	- -	- -	*9.0%*
Dividends	- -	- -	*9.5%*
Book Value	- -	- -	*4.0%*

Panel B

ONE Gas, Inc.	2015	2016	2017	2018	2019	2020	2022-24
Earnings Per Share	2.24	2.65	3.02	3.25	3.45	3.70	4.75
3 Year Base and Projected Periods	2015-17						2022-24
Base and Projected EPS Figures	2.64						4.75
Base Period to Projected Period Growth Rate			8.8%				

* Source: Exhibit JRW-9, page 4.

Q. PLEASE SUMMARIZE THE IMPACT OF COMBINING THE DIFFERENT PROJECTED EPS GROWTH RATES ON MR. D'ASCENDIS' DCF RESULTS.

A. The impact of combining the EPS growth rates from Zacks and Yahoo and *Value Line* is highly significant for three reasons: (1) this approach inflates Mr. D'Ascendis' DCF results; and (2) the *Value Line* growth rates are all several percentage points higher than the Yahoo and Zack's projected growth rates because they do not measure growth from the present but from a historic (and stale) time period.[40]

B. Risk Premium Approach

Q. PLEASE DISCUSS MR. D'ASCENDIS' RISK PREMIUM ("RPM") APPROACH.

A. On pages 29-40 of his testimony and in Schedule DWD-4, Mr. D'Ascendis develops an equity cost rate by using the RPM model. Mr. D'Ascendis reports a RPM equity cost rate of 9.94%. This figure is the average of his two risk premium models: (1)

[40] I have used *Value Line*'s projected growth rates for EPS, DPS, and BVPS. However, due to the different periods of growth that are measured by *Value Li*ne compared to Yahoo and Zack's, I have analyzed the *Value Line* data separately from the other growth rate data, and I have used the medians of the growth rates for the proxy group to minimize the impact of outliers such as those discussed above.

a Predictive Risk Premium Model ("PRPM") result of 10.08%; and (2) an Adjusted Total Market Model ("ATMM") result of 9.80%. The PRPM uses a risk-free rate of 3.33%, and a risk premium of 6.75%. The ATMM uses an Aaa-rated projected utility bond yield of 4.25%, a credit risk adjustment of 0.41%, and an equity risk premium of 5.14%. The equity risk premium of 5.14% is the average of 5.29%, 4.87%, and 5.26% which are the risk premium studies summarized on pages 8 and 12 of Schedule DWD-4. The 5.29% equity risk premium is computed taking a Beta times the average of six different equity risk premium studies:

(1) 5.54% - Ibbotson historical stock-bond return study;

(2) 7.93% - a regression of the monthly returns of Ibbotson historical stocks and corporate bonds;

(3) 8.32% - Ibbotson historical stock-bond returns using his PRPM;

(4) 9.56% - using *Value Line*'s projected stock market return over the next five years minus the yield on Aaa corporate bond yields;

(5) 10.68% - applying the DCF model to the S&P 500 companies using *Value Line* projected EPS growth rates and subtracting the Aaa corporate bond yield; and

(6) 9.17% - applying the DCF model to the S&P 500 companies using Bloomberg projected EPS growth rates and subtracting the Aaa corporate bond yield.

Q. WHAT ARE THE ERRORS IN MR. D'ASCENDIS' RPM ANALYSIS?

A. There are two primary issues with Mr. D'Ascendis' alternative RPM analyses: (1) the projected base yield; and (2) the various risk premiums which are based on

historical and projected market returns.

1. Base Yield

Q. PLEASE DISCUSS MR. D'ASCENDIS' BASE YIELD IN HIS RPM ANALYSIS?

A. The base yield is the projected yield on long-term Treasury bonds of 3.33%. The primary issue is that this rate is over 100 basis points above the current risk-free interest rates. There are two issues here. First, as discussed previously, economists are always predicting that interest rates are going up, and yet they are almost always wrong. Obviously, investors are well aware of the consistently wrong forecasts of higher interest rates, and, therefore, place little weight on such forecasts. Second, investors would not be buying long-term Treasury bonds at their current yields if they expected interest rates to suddenly increase. If interest rates do increase, the prices of the bonds investors bought at today's yields go down, producing a negative return.

2. Risk Premiums

Q. WHAT IS THE SECOND ERROR IN COMPANY WITNESS D'ASCENDIS' RPM STUDIES?

A. The second and more significant error are his various risk premium approaches and studies.

Q. PLEASE CRITIQUE MR. D'ASCENDIS' PRPM.

A. Mr. D'Ascendis' PRPM estimates a risk premium based on historic stock and bond returns and his prediction of volatility. The inputs to the model are the historical returns on the common shares of each company in the proxy group minus the historical monthly yield on long-term U.S. Treasury securities for some undefined time period. Using a generalized form of ARCH, known as GARCH, each gas company's projected equity risk premium was determined using statistical software. His PRPM results for each company are provided in his Schedule DWD-4, page 2. The results indicate equity cost rates that ranging from 9.12% for Spire to 24.76% for One Gas. The average of the mean and median estimates, after excluding the high estimate for One Gas, is 10.08%.

Q. PLEASE ADDRESS THE PROBLEMS WITH MR. D'ASCENDIS' PRPM.

A. There are two primary issues with Mr. D'Ascendis' PRPM. First, it is based on the historical relationship between stock and bond returns. The errors associated with computing an expected equity risk premium using historical stock and bond returns are addressed in detail below. In short, there are a myriad of empirical problems, which result in historical market returns producing inflated estimates of expected risk premiums.

Second, the PRPM model produces very high and variable equity cost rate estimates. For example, the average beta used by Mr. D'Ascendis for gas companies is 0.62, which indicates these stocks are much less volatile than the overall stock market. Yet, noted above, the variation in the PRPM equity cost rates for the gas companies is 9.12% to 24.76%. These results make no economic sense for similar risk companies and hence do not provide reliable estimates of

equity cost rates.

Q. PLEASE IDENTIFY THE OTHER ERRORS IN THE RISK PREMIUMS IN MR. D'ASCENDIS' PRPM ANALYSIS AS WELL AS THE OTHER SIX RISK PREMIUM STUDIES THAT HE CONDUCTS.

A. There are two primary errors with Mr. D'Ascendis' PRPM and his six other risk premium studies. (1) the PRPM and risk premium studies (1) – (3) listed above are based on historic stock and bond returns/yields, and there are numerous well-known empirical issues with using historical returns to estimate a projected risk premium; and (2) risk premium studies (4) – (6) develop risk premiums using projected stock market returns. The primary issue with these three approaches is that the expected market returns are totally unrealistic and are based on excessive corporate earnings and economic growth rates.

Q. PLEASE ADDRESS THE ISSUES INVOLVED IN USING HISTORICAL STOCK AND BOND RETURNS/YIELDS TO COMPUTE A FORWARD-LOOKING OR *EX ANTE* RISK PREMIUM.

A. As indicated, the PRPM and risk premium studies (1)-(3) are based on historical stock and bond returns/yields. It is well-known and well-studied that using historical returns to measure an *ex ante* equity risk premium is erroneous and overstates the true market or equity risk premium.[41] This approach can produce

[41] These issues are addressed in a number of studies, including: Aswath. Damodaran, "Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2017 Edition" NYU Working Paper, 2017, pp. 30-44; See Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics*, pp. 371-86, (1983); Jay Ritter, "The Biggest Mistakes We Teach," *Journal of Financial Research* (Summer 2002); Bradford Cornell, *The Equity Risk Premium* (New York, John Wiley & Sons),1999, pp. 36-78; and J. P. Morgan, "The Most Important Number in Finance," p. 6.

differing results depending on several factors, including the measure of central tendency used, the time period evaluated, and the stock market index employed. In addition, there are a myriad of empirical problems in the approach, which result in historical market returns producing inflated estimates of expected risk premiums. Among the errors are the U.S. stock market survivorship bias (the "Peso Problem"), the company survivorship bias (only successful companies survive – poor companies do not survive), the measurement of central tendency (the arithmetic versus geometric mean, where geometric means tend to better capture negative returns and thus investor loss), the historical time horizon used, the change in risk and required return over time, the downward bias in bond historical returns, and unattainable return bias (the return computation procedure presumes monthly portfolio rebalancing). The bottom line is that there are a number of empirical problems in using historical stock and bond returns to measure an expected equity risk premium.

Q. WHAT SOURCE DID MR. D'ASCENDIS USE FOR HISTORICAL RETURNS IN HIS RISK PREMIUM APPROACHES (1), (2), AND (3)?

A. He says that he uses "Ibbotson" returns, but Ibbotson does not publish these returns anymore. These return series are now compiled and published by investment advisory firm Duff & Phelps.

Q. IS DUFF & PHELPS A RESPECTED FINANCIAL FIRM?

A. Yes. Duff & Phelps is a global investments advisory firm with offices in twenty-eight countries and 3,500 employees.

Q. WHAT IS DUFF & PHELPS' OPINION REGARDING THE USE OF HISTORICAL STOCK MARKET RETURNS TO ESTIMATE AN EQUITY RISK PREMIUM?

A. In its Client Update on the equity risk premium, dated March 16, 2016, Duff & Phelps made the following statements regarding using historical returns to compute an equity risk premium ("ERP") (emphasis added):[42]

> 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.

Q. DOES DUFF & PHELPS USE A HISTORIC STOCK MARKET RETURN FIGURE AS ITS RECOMMENDED EQUITY OR MARKET RISK PREMIUM?

A. No.

Q. WHAT DOES DUFF & PHELPS SAY ABOUT THE EXPECTED ERP AND HISTORICAL RETURNS?

A. Duff & Phelps provides details about its perspective on historical returns versus its estimation of the ERP (emphasis added):[43]

> 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

[42] Duff & Phelps, Client Alert, March 16, 2016, p. 37 (emphasis supplied). This document is attached as Exhibit JRW-18.

[43] Duff & Phelps, Client Alert, March 16, 2016, p. 35 (emphasis supplied).

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.

Q. DOES DUFF & PHELPS PUBLISH ITS RECOMMENDED ERP?

A. Yes. In fact, on the same site (https://www.duffandphelps.com/) at which they sell their annual valuation handbook used by Mr. D'Ascendis, Duff & Phelps publishes its estimate of the equity or market risk premium. Duff & Phelps increased its U.S. equity risk premium from 5.00% to 5.50%, as of December 31, 2018.[44] Page 7 of Exhibit JRW-8 of my testimony shows Duff & Phelps' equity risk premium recommendations. I find it puzzling that Mr. D'Ascendis would use the historical average annual stock return from the Duff & Phelps book and then ignore Duff & Phelps' recommendation as to the appropriate ERP.

Q. DO YOU AGREE THAT THE U.S. EQUITY RISK PREMIUM OF 5.50% IS A REASONABLE AND WELL-SUPPORTED NUMBER IN THE CURRENT CAPITALIZATION CLIMATE?

A. Yes.

Q. PLEASE ASSESS MR. D'ASCENDIS' MRPS DERIVED FROM USING (1) *VALUE LINE*'S PROJECTED STOCK MARKET RETURN AND (2) BY

[44] Duff & Phelps, "Duff & Phelps U.S. Equity Risk Premium Recommendation Increased from 5.0% to 5.5%, Effective December 31, 2018," Available at: https://www.duffandphelps.com/insights/publications/valuation-insights/valuation-insights-first-quarter-2019/us-equity-risk-premium-recommendation.

APPLYING THE DCF MODEL TO THE S&P 500 AND USING *VALUE LINE* AND BLOOMBERG PROJECTED EPS GROWTH RATES.

A. Mr. D'Ascendis develops three risk premiums using projected stock market returns. In approach (4), he uses *Value Line*'s projected stock market return over the next five years. In approaches (5) and (6), he calculates an expected market return by applying the DCF model to the S&P 500 using projected EPS growth rates from Bloomberg and from *Value Line.* As shown in Table 8, Mr. D'Ascendis uses expected stock market returns of 13.81%, 14.93%, and 13.42% for the three approaches and the resulting risk premiums are 9.56%, 10.68%, and 9.17%. Assuming a dividend yield of 2.0% for the S&P 500 in 2019, the implied projected EPS growth rates for the three approaches are 11.81%, 12.93%, and 11.42%.

Table 8
Risk Premiums Derived from Expected Market Returns
Using *Value Line* and Bloomberg Projected EPS Growth Rate

	VL Exp. Ret.	VL DCF Exp. Ret.	BL DCF Exp. Ret.
Dividend Yield	2.00%	2.00%	2.00%
+ Expected EPS Growth	11.81%	12.93%	11.42%
= Expected Market Return	13.81%	14.93%	13.42%
+ Risk-Free Rate	4.25%	4.25%	4.25%
= Market Risk Premium	9.56%	10.68%	9.17%

Q. ARE MR. D'ASCENDIS' RISK PREMIUMS REFLECTIVE OF THE MRPS FOUND IN STUDIES AND SURVEYS OF THE MRP?

A. No. These are well in excess of risk premiums: (1) found in studies of the risk premiums by leading academic scholars; (2) produced by analyses of historic stock and bond returns; and (3) found in surveys of financial professionals. Page 5 of

Exhibit JRW-8 provides the results of over thirty risk premiums studies from the past fifteen years. Historic stock and bond returns suggest risk premiums in the 4.5% to 7.0% range, depending on whether one uses arithmetic or geometric mean returns. There have been many studies using expected return (also called *ex ante*) models, and their MRP results vary from as low as 2.0% to as high as 7.31%. Finally, the MRPs developed from surveys of analysts, companies, financial professionals, and academics suggest lower MRPs, in a range from 1.91% to 5.70%. The bottom line is that there is no support in historic return data, surveys, academic studies, or reports for investment firms for an MRP as high as those used by Mr. D'Ascendis. As discussed below, the reason is that they are based on unrealistic long-term earnings per share growth rates,

Q. **PLEASE DIRECTLY ADDRESS MR. D'ASCENDIS' MRP DERIVED FROM USING *VALUE LINE*'S PROJECTED STOCK MARKET RETURN.**

A. In approach (4), Mr. D'Ascendis develops a market risk premium using *Value Line*'s projected stock market return over the next three-to-five-years. In the previously cited study by Szakmary, Conover, and Lancaster (2008), the authors also evaluated the accuracy of *Value Line*'s three-to-five-year predicted annual stock return for the stock market over a thirty-year time period and found these predicted stock market returns to be "extremely overoptimistic," well in excess of historic market returns, and were not significantly related to future realized returns.[45]

[45] Szakmary, A., Conover, C., & Lancaster, C. (2008). An Examination of *Value Line*'s Long-Term projections.

Q. IN APPROACHES (5) AND (6), MR. MR. D'ASCENDIS USES ANALYSTS' EPS GROWTH RATE FORECASTS IN APPLYING THE DCF MODEL TO THE S&P 500 USING DATA FROM *VALUE LINE* AND BLOOMBERG. PLEASE, ONCE AGAIN, ADDRESS THE ISSUES WITH ANALYSTS' EPS GROWTH RATE FORECASTS.

A. The key point is that Mr. D'Ascendis' market risk premium methodology is based entirely on the concept that analyst projections of companies' three-to-five EPS growth rates reflect investors' expected *long-term* EPS growth for those companies. However, this is erroneous given the research on these projections. As previously noted, numerous studies have shown that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.[46] Moreover, a 2011 study showed that analysts' forecasts of EPS growth over the next three-to-five years' earnings are no more accurate than their forecasts of the next single year's EPS growth.[47] The overly-optimistic inaccuracy of analysts' growth rate forecasts leads to an upward bias in equity cost estimates of approximately 300 basis points.[48]

Journal of Banking & Finance, May 2008, pp. 820-833.

[46] Such studies include: R.D. Harris, "The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts," *Journal of Business Finance & Accounting*, pp. 725-55 (June/July 1999); P. DeChow, A. Hutton, and R. Sloan, "The Relation Between Analysts' Forecasts of Long-Term Earnings Growth and Stock Price Performance Following Equity Offerings," *Contemporary Accounting Research* (2000); K. Chan, L., Karceski, J., & Lakonishok, J., "The Level and Persistence of Growth Rates," *Journal of Finance*, pp. 643−684, (2003); M. Lacina, B. Lee, and Z. Xu, (2011), *Advances in Business and Management Forecasting (Vol. 8)*, Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101.

[47] M. Lacina, B. Lee, & Z. Xu, (2011), *Advances in Business and Management Forecasting*, Vol. 8, Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101.

[48] Peter D. Easton & Gregory A. Sommers, "Effect of Analysts' Optimism on Estimates of the Expected

Q. **HAVE CHANGES IN REGULATIONS IMPACTING WALL STREET ANALYSTS AND THEIR RESEARCH IMPACTED THE UPWARD BIAS IN THEIR THREE-TO-FIVE YEAR EPS GROWTH RATE FORECASTS?**

A. No. A number of the studies I have cited here demonstrate that the upward bias has continued despite changes in regulations and reporting requirements over the past two decades. This observation is highlighted by a 2010 McKinsey study entitled "Equity Analysts: Still Too Bullish," which involved a study of the accuracy of analysts' long-term EPS growth rate forecasts. The authors conclude that after a decade of stricter regulation, analysts' long-term earnings forecasts continue to be excessively optimistic. They made the following observation:[49]

> 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 expectations in their financial reporting and long-term strategic moves, this is a cautionary tale worth remembering. This pattern confirms our earlier findings that analysts typically lag behind events in revising their forecasts to reflect new economic conditions. When economic growth accelerates, the size of the forecast error declines; when economic growth slows, it increases. So as economic growth cycles up and down, the actual earnings S&P 500 companies report occasionally coincide with the analysts' forecasts, as they did, for example, in 1988, from 1994 to 1997, and from 2003 to 2006. *Moreover, analysts have been persistently overoptimistic for the past 25 years, with estimates ranging from 10 to 12 percent a year, compared with actual earnings growth of 6 percent. Over this time frame, actual*

Rate of Return Implied by Earnings Forecasts," 45, *Journal of Accounting Research,* pp. 983–1015 (2007).

[49] Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, "Equity Analysts, Still Too Bullish," *McKinsey on Finance,* pp. 14-17, (Spring 2010) (emphasis added).

> *earnings growth surpassed forecasts in only two instances, both during the earnings recovery following a recession. On average, analysts' forecasts have been almost 100 percent too high.*

This is the same observation made in a *Bloomberg Businessweek* article.[50]

The author concluded:

> ***The bottom line:*** *Despite reforms intended to improve Wall Street research, stock analysts seem to be promoting an overly rosy view of profit prospects.*

Q. IS THERE OTHER EVIDENCE THAT INDICATES THAT MR. D'ASCENDIS' RISK PREMIUMS COMPUTED BY USING *VALUE LINE*'S PROJECTED STOCK MARKET RETURN AND BY APPLYING THE DCF MODEL TO THE S&P 500 AND USING *VALUE LINE* AND BLOOMBERG PROJECTED EPS GROWTH RATES ARE EXCESSIVE?

A. Beyond my previous discussion of the upwardly biased nature of analysts' projected EPS growth rates, the fact is that long-term EPS growth rates of 11.81%, 12.93%, and 11.42% are inconsistent with both historic and projected economic and earnings growth in the U.S for several reasons: (1) long-term EPS and economic growth is about one-half of Mr. D'Ascendis' projected EPS growth rates of 11.81%, 12.93%, and 11.42%; (2) as discussed below, long-term EPS and GDP growth are directly linked; and (3) more recent trends in GDP growth, as well as

[50] Roben Farzad, "For Analysts, Things Are Always Looking Up," *Bloomberg Businessweek* (June 10, 2010), https://www.bloomberg.com/news/articles/2010-06-10/for-analysts-things-are-always-looking-up.

projections of GDP growth, suggest slower economic and earnings growth in the future.

Long-Term Historic EPS and GDP Growth have been in the 6%-7% Range - I performed a study of the growth in nominal GDP, S&P 500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960. The results are provided on page 1 of Exhibit JRW-10, and a summary is shown in Table 9, below.

Table 9
GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

Nominal GDP	**6.46**
S&P 500 Stock Price	**6.71**
S&P 500 EPS	**6.89**
S&P 500 DPS	**5.85**
Average	**6.48**

The results show that the historical long-run growth rates for GDP, S&P EPS, and S&P DPS are in the 6% to 7% range. By comparison, Mr. D'Ascendis' long-run growth rate projections of 11.81%, 12.93%, and 11.42% are at best overstated. These estimates suggest that companies in the U.S. would be expected to: (1) increase their growth rate of EPS by 100% in the future, and (2) maintain that growth indefinitely in an economy that is expected to grow at about one-third of his projected growth rates.

There is a Direct Link Between Long-Term EPS and GDP Growth - The results in Exhibit JRW-10 and Table 9 show that historically there has been a close link between long-term EPS and GDP growth rates. Brad Cornell of the California Institute of Technology published a study on GDP growth, earnings growth, and

equity returns. He finds that long-term EPS growth in the U.S. is directly related to GDP growth, with GDP growth providing an upward limit on EPS growth. In addition, he finds that long-term stock returns are determined by long-term earnings growth. He concludes with the following observations:[51]

> The long-run performance of equity investments is fundamentally linked to growth in earnings. Earnings growth, in turn, depends on growth in real GDP. This article demonstrates that both theoretical research and empirical research in development economics suggest relatively strict limits on future growth. In particular, real GDP growth in excess of 3 percent in the long run is highly unlikely in the developed world. In light of ongoing dilution in earnings per share, this finding implies that investors should anticipate real returns on U.S. common stocks to average no more than about 4–5 percent in real terms.

The Trend and Projections Indicate Slower GDP Growth in the Future - The components of nominal GDP growth are real GDP growth and inflation. Page 3 of Exhibit JRW-10 shows annual real GDP growth rate over the 1961 to 2018 time period. Real GDP growth has gradually declined from the 5.0%-6.0% range in the 1960s to the 2.0%-3.0% range during the most recent five-year period. The second component of nominal GDP growth is inflation. Page 4 of Exhibit JRW-10 shows inflation as measured by the annual growth rate in the Consumer Price Index (CPI) over the 1961 to 2018 time period. The large increase in prices from the late 1960s to the early 1980s is readily evident. Equally evident is the rapid

[51] Bradford Cornell, "Economic Growth and Equity Investing," *Financial Analysts Journal* (January-February 2010), p. 63.

decline in inflation during the 1980s as inflation declined from above 10% to about 4%. Since that time, inflation has gradually declined and has been in the 2.0% range or below during the past five years.

The graphs on pages 2, 3, and 4 of Exhibit JRW-10 provide clear evidence of the decline, in recent decades, in nominal GDP as well as its components, real GDP and inflation. To gauge the magnitude of the decline in nominal GDP growth, Table 10, below, provides the compounded GDP growth rates for 10, 20, 30, 40 and 50 years. Whereas the 50-year compounded GDP growth rate is 6.36%, there has been a monotonic and significant decline in nominal GDP growth over subsequent 10-year intervals. These figures strongly suggest that nominal GDP growth in recent decades has slowed and that a figure in the range of 4.0% to 5.0% is more appropriate today for the U.S. economy.

Table 10
Historical Nominal GDP Growth Rates

10-Year Average		**3.37%**
20-Year Average		**4.17%**
30-Year Average		**4.65%**
40-Year Average		**5.56%**
50-Year Average		**6.36%**

Long-Term GDP Projections also Indicate Slower GDP Growth in the Future - A lower range is also consistent with long-term GDP forecasts. There are several forecasts of annual GDP growth that are available from economists and government agencies. These are listed in Panel B of on page 5 of Exhibit JRW-10. The mean 10-year nominal GDP growth forecast (as of March 2019) by

economists in the recent *Survey of Financial Forecasters* is 4.25%.[52] The Energy Information Administration ("EIA"), in its projections used in preparing *Annual Energy Outlook,* forecasts long-term GDP growth of 4.20% for the period 2018-2050.[53] The Congressional Budget Office ("CBO"), in its forecasts for the period 2018 to 2048, projects a nominal GDP growth rate of 4.40%.[54] Finally, the Social Security Administration ("SSA"), in its Annual OASDI Report, provides a projection of nominal GDP from 2018-2095.[55] SSA's projected growth GDP growth rate over this period is 4.35%. Overall, these forecasts suggest long-term GDP growth rate in the 4.0% - 4.4% range. The trends and projections indicating slower GDP growth make Mr. D'Ascendis' market risk premiums computed using analysts' projected EPS growth rates look even more unrealistic. Simply stated, Mr. D'Ascendis' projected EPS growth rates of 11.81%, 12.93%, and 11.42% are almost three times projected GDP growth.

Q. WHAT ARE THE FUNDAMENTAL FACTORS THAT HAVE LED TO THE DECLINE IN PROSPECTIVE GDP GROWTH?

A. As addressed in a study by the consulting firm McKinsey & Co., two factors drive real GDP growth over time: (1) the number of workers in the economy

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52 https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/

53 U.S. Energy Information Administration, *Annual Energy Outlook 2019*, Table: Macroeconomic Indicators, https://www.eia.gov/outlooks/aeo/pdf/appa.pdf.

54 Congressional Budget Office, The *2019 Long-Term Budget Outlook*, June 15, 2019 https://www.eia.gov/outlooks/aeo/pdf/appa.pdf.

55 Social Security Administration, *2019 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program*, Table VI.G4, p. 211 (June 15, 2019), https://www.ssa.gov/oact/TR/2019/VI_G2_OASDHI_GDP.html#200732. The 4.35% represents the compounded growth rate in projected GDP from $21,485 trillion in 2019 to $546,311 trillion in 2095.

(employment); and (2) the productivity of those workers (usually defined as output per hour).[56] According to McKinsey, real GDP growth over the past 50 years was driven by population and productivity growth which grew at compound annual rates of 1.7% and 1.8%, respectively.

However, global economic growth is projected to slow significantly in the years to come. The primary factor leading to the decline is slow growth in employment (working-age population), which results from slower population growth and longer life expectancy. McKinsey estimates that employment growth will slow to 0.3% over the next fifty years. They conclude that even if productivity remains at the rapid rate of the past fifty years of 1.8%, real GDP growth will fall by 40 percent to 2.1%.

Q. PLEASE PROVIDE MORE INSIGHTS INTO THE RELATIONSHIP BETWEEN S&P 500 EPS AND GDP GROWTH.

A. Figure 6 shows the average annual growth rates for GDP and the S&P 500 EPS since 1960. The one very apparent difference between the two is that the S&P 500 EPS growth rates are much more volatile than the GDP growth rates, when compared using the relatively short, and somewhat arbitrary, annual conventions used in these data.[57] Volatility aside, however, it is clear that over the medium to long run, S&P 500 EPS growth does not outpace GDP growth.

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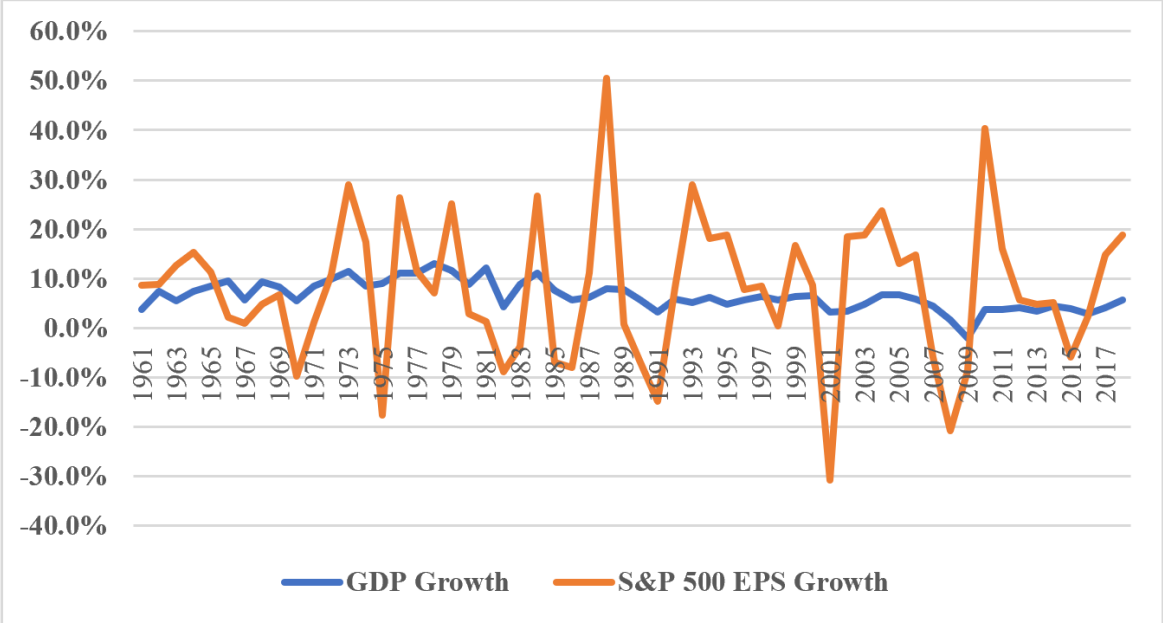
[56] McKinsey & Co., "Can Long-Term Growth be Saved?", McKinsey Global Institute, (Jan. 2015).

[57] Timing conventions such as years and quarters are needed for measurement and benchmarking but are somewhat arbitrary. In reality, economic growth and profit accrual occur on continuous bases. A 2014 study evaluated the timing relationship between corporate profits and nominal GDP growth. The authors found that aggregate accounting earnings growth is a leading indicator of the GDP growth with a quarter-ahead forecast horizon. *See* Yaniv Konchitchki and Panos N. Patatoukas, "Accounting Earnings and Gross Domestic Product," *Journal of Accounting and Economics* 57 (2014), pp. 76–88.

Figure 6
Average Annual Growth Rates
GDP and S&P 500 EPS
1960-2018



Data Sources: GDPA - http://research.stlouisfed.org/fred2/series/GDPA/downloaddata.
S&P EPS - http://pages.stern.nyu.edu/~adamodar/

A fuller understanding of the relationship between GDP and S&P 500 EPS growth requires consideration of several other factors.

Corporate Profits are Constrained by GDP – Milton Friedman, the noted economist, warned investors and others not to expect corporate profit growth to sustainably exceed GDP growth, stating, "Beware of predictions that earnings can grow faster than the economy for long periods. When earnings are exceptionally high, they don't just keep booming."[58] Friedman also noted in the *Fortune* interview that profits must move back down to their traditional share of GDP. In

[58] Shaun Tully, "Corporate Profits Are Soaring. Here's Why It Can't Last," Fortune, (Dec. 7, 2017), http://fortune.com/2017/12/07/corporate-earnings-profit-boom-end/.

Table 11, below, I show that currently the aggregate net income levels for the S&P 500 companies, using 2018 figures, represent 6.73% of nominal GDP.

Table 11
S&P 500 Aggregate Net Income as a Percent of GDP

Aggregate Net Income for S&P 500 Companies ($B)	**$1,406,400.00**
2018 Nominal U.S. GDP ($B)	**$20,891,000.00**
Net Income/GDP (%)	**6.73%**

Data Sources: 2018 Net Income for S&P 500 companies – *Value Line* (March 12, 2019).
2018 Nominal GDP – Moody's - https://www.economy.com/united-states/nominal-gross-domestic-product.

Short-Term Factors Impact S&P 500 EPS – The growth rates in the S&P 500 EPS and GDP can diverge on a year-to-year basis due to short-term factors that impact S&P 500 EPS in a much greater way than GDP. As shown above, S&P EPS growth rates are much more volatile than GDP growth rates. The EPS growth for the S&P 500 companies has been influenced by low labor costs and interest rates, commodity prices, the recovery of different sectors such as the energy and financial sectors, the cut in corporate tax rates, etc. These short-term factors can make it appear that there is a disconnect between the economy and corporate profits.

The Differences between the S&P 500 EPS and GDP – In the last two years, as the EPS for the S&P 500 has grown at a faster rate than U.S. nominal GDP, some have pointed to the differences between the S&P 500 and GDP.[59] These differences include: (1) corporate profits are about 2/3 manufacturing

[59] *See* the following studies: Burt White and Jeff Buchbinder, "The S&P and GDP are not the Same Thing," LPL Financial, (Nov. 4, 2014), https://www.businessinsider.com/sp-is-not-gdp-2014-11; Matt Comer, "How Do We Have 18.4% Earnings Growth In A 2.58% GDP Economy?," Seeking Alpha, (Apr. 2018), https://seekingalpha.com/article/4164052-18_4-percent-earnings-growth-2_58-percent-gdp-economy; Shaun Tully, "How on Earth Can Profits Grow at 10% in a 2% Economy?," Fortune, (July 27, 2017), http://fortune.com/2017/07/27/profits-economic-growth/.

driven, while GDP is 2/3 services driven; (2) consumer discretionary spending accounts for a smaller share of S&P 500 profits (15%) than of GDP (23%); (3) corporate profits are more international-trade driven, while exports minus imports tend to drag on GDP; and (d) S&P 500 EPS is impacted not just by corporate profits but also by share buybacks on the positive side (fewer shares boost EPS) and by share dilution on the negative side (new shares dilute EPS). While these differences may seem significant, it must be remembered that the Income Approach to measure GDP includes corporate profits (in addition to employee compensation and taxes on production and imports) and, therefore, effectively accounts for the first three factors.[60]

The bottom line is that despite the intertemporal short-term differences between S&P 500 EPS and nominal GDP growth, the long-term link between corporate profits and GDP is inevitable.

Q. PLEASE PROVIDE ADDITIONAL EVIDENCE ON HOW UNREALISTIC THE S&P 500 EPS GROWTH RATES ARE THAT MR. D'ASCENDIS USES TO COMPUTE HIS MRPS.

A. Beyond my previous discussion, I have performed the following analysis of S&P 500 EPS and GDP growth in Table 12 below. Specifically, I started with the 2018 aggregate net income for the S&P 500 companies and 2018 nominal GDP for the U.S. As shown in Table 11, the aggregate profit for the S&P 500 companies

[60] The Income Approach to measuring GDP includes wages, salaries, and supplementary labor income, corporate profits, interest and miscellaneous investment income, farmers' incomes, and income from non-farm unincorporated businesses

represented 6.73% of nominal GDP in 2018. In Table 12, I then projected the aggregate net income level for the S&P 500 companies and GDP as of the year 2050. For the growth rate for the S&P 500 companies, I used the average of Mr. D'Ascendis' growth rates, 11.81%, 12.93%, and 11.42%, which is 12.05%. As a growth rate for nominal GDP, I used the average of the long-term projected GDP growth rates from CBO, SSA, and EIA (4.0%, 4.4%, and 4.3%), which is 4.32%. The projected 2050 level for the aggregate net income level for the S&P 500 companies is $53.7 trillion. However, over the same period GDP only grows to $80.8 trillion. As such, if the aggregate net income for the S&P 500 grows in accordance with the growth rates used by Mr. D'Ascendis, and if nominal GDP grows at rates projected by major government agencies, the net income of the S&P 500 companies will represent growth from 6.73% of GDP in 2018 to 66.4% of GDP in 2050. Obviously, it is implausible for the net income of the S&P 500 to become such a large part of GDP.

Table 12
Projected S&P 500 Earnings and Nominal GDP
2018-2050
S&P 500 Aggregate Net Income as a Percent of GDP

	2018 Value	Growth Rate	No. of Years	2050 Value
Aggregate Net Income for S&P 500 Companies	**1,406,400.0**	**13.11%**	**32**	**53,666,321.6**
2018 Nominal U.S. GDP	**20,891,000.0**	**4.23%**	**32**	**80,775,130.2**
Net Income/GDP (%)	**6.73%**			**66.44%**

Data Sources: 2018 Aggregate Net Income for S&P 500 companies – *Value Line* (March 12, 2019).
2018 Nominal GDP – Moody's - https://www.economy.com/united-states/nominal-gross-domestic-product.
S&P 500 EPS Growth Rate - Average of D'Ascendis' growth rates - 11.81%, 12.93%, and 11.42%;
Nominal GDP Growth Rate – The average of the long-term projected GDP growth rates from CBO, SSA, and EIA (4.40%, 4.35%, and 4.20%).

Q. PLEASE PROVIDE A SUMMARY ANALYSIS ON GDP AND *VALUE LINE* AND S&P 500 EPS GROWTH RATES.

A. As noted above, the long-term link between corporate profits and GDP is inevitable. The short-term differences in growth between the two has been highlighted by some notable market observers, including Warren Buffet, who indicated that corporate profits as a share of GDP tend to go far higher after periods where they are depressed, and then drop sharply after they have been hovering at historically high levels. In a famous 1999 *Fortune* article, he made the following observation:[61]

> You know, someone once told me that New York has more lawyers than people. I think that's the same fellow who thinks profits will become larger than GDP. When you begin to expect the growth of a component factor to forever outpace that of the aggregate, you get into certain mathematical problems. In my opinion, you have to be wildly optimistic to believe that corporate profits as a percent of GDP can, for any sustained period, hold much above 6%. One thing keeping the percentage down will be competition, which is alive and well. In addition, there's a public-policy point: If corporate investors, in aggregate, are going to eat an ever-growing portion of the American economic pie, some other group will have to settle for a smaller portion. That would justifiably raise political problems--and in my view a major reslicing of the pie just isn't going to happen.

In sum, Mr. D'Ascendis' long-term S&P 500 EPS growth rates of 11.81%, 12.93%, and 11.42% are grossly overstated and are not credible. In the end, the big question remains as to whether corporate profits can grow faster than GDP. Jeremy Siegel, the renowned finance professor at the Wharton School of the University of Pennsylvania, believes that going forward, earnings per share can

[61] Carol Loomis, "Mr. Buffet on the Stock Market," *Fortune,* (Nov. 22, 1999), https://money.cnn.com/magazines/fortune/fortune_archive/1999/11/22/269071/.

grow about half a point faster than nominal GDP, or about 5.0%, due to the big gains in the technology sector. But he also believes that sustained EPS growth matching analysts' near-term projections is absurd: "The idea of 8% or 10% or 12% growth is ridiculous. It will not happen."[62]

C. CAPM Approach

Q. PLEASE DISCUSS MR. D'ASCENDIS' CAPM.

A. On pages 40-44 of his testimony and in Schedule DWD, Mr. D'Ascendis develops an equity cost rate by using the CAPM. Mr. D'Ascendis uses both the CAPM and the so-called empirical CAPM approaches ("ECAPM"). The CAPM and ECAPM results provide a CAPM equity cost rate of 9.67%. D'Ascendis uses a projected rate of 3.33% for the long-term Treasury bond, mean/median betas from Bloomberg of 0.62/0.61, and a market risk premium of 9.56%. The market risk premium is the average of six historical and projected market risk premiums which were reviewed above.[63]

Q. WHAT ARE THE ERRORS IN MR. D'ASCENDIS' CAPM ANALYSIS?

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62 Shaun Tully, "Corporate Profits Are Soaring. Here's Why It Can't Last," *Fortune*, (Dec. 7, 2017), http://fortune.com/2017/12/07/corporate-earnings-profit-boom-end/.

63 These include: (1) Ibbotson historical stock-bond return study; (2) a regression of the monthly returns of Ibbotson historical stocks and corporate bonds; (3) Ibbotson historical stock-bond returns using the PRPM; (4) *Value Line*'s projected stock market return over the next five years minus the yield on Aaa corporate bond yields; (5) applying the DCF model to the S&P 500 companies using Value Line projected EPS growth rates and subtracting the risk-free interest rate; and (6) applying the DCF model to the S&P 500 companies using Bloomberg projected EPS growth rates and subtracting the risk-free interest rate. The one difference is that the risk-free rate of 3.33% is the base yield.

A. There are three primary flaws with Mr. D'Ascendis' CAPM analyses: (1) the use of the so-called empirical CAPM ("ECAPM"); (2) the risk-free interest rate of 3.33%; and (3) the market risk premium of 9.56%. The risk-free interest rate and the market risk premium have already been addressed.

1. ECAPM

Q. WHAT ISSUES DO YOU HAVE WITH MR. D'ASCENDIS ECAPM?

A. Mr. D'Ascendis has employed a variation of the CAPM which he calls the 'ECAPM.' The ECAPM attempts to model the well-known finding of tests of the CAPM that have indicated the Security Market Line ("SML") is not as steep as predicted by the CAPM. As such, the ECAPM is nothing more than an ad hoc version of the CAPM and has not been theoretically or empirically validated in refereed journals. The ECAPM provides for weights which are used to adjust the risk-free rate and market risk premium in applying the ECAPM. Mr. D'Ascendis uses 0.25 and 0.75 factors to boost the equity risk premium measure, but provides no empirical justification for those figures.

Beyond the lack of any theoretical or empirical validation of the ECAPM, there are two errors in Mr. D'Ascendis' ECAPM. First, I am not aware of any tests of the CAPM that use adjusted betas such as those used by Mr. D'Ascendis. Adjusted betas address the empirical issues with the CAPM by increasing the expected returns for low beta stocks and decreasing the returns for high beta stocks. Second, a SML with a slope coefficient which is not as steep as predicted

by the CAPM is also consistent with a declining equity risk premium.

D. Equity Cost Rate Models Applied to Non-Price Regulated Companies

Q. PLEASE DISCUSS THE PROBLEM WITH MR. D'ASCENDIS' APPLICATION OF HIS EQUITY COST RATE MODELS TO THE NON-PRICE REGULATED GROUP OF COMPANIES.

A. At pages 44-48 of his testimony and in Schedule DWD-6 and DWD-7, Mr. D'Ascendis estimates an equity cost rate for the Company using a proxy group of sixteen non-price regulated companies which he claims are comparable in risk to Atmos. This group includes companies such as General Mills, Hormel, Hershey Foods, Kellogg, Altria, and Tootsie Roll.

This approach is fundamentally flawed for two reasons. First, while many of these companies are large and successful, their lines of business are vastly different from the regulated gas distribution business and they do not operate in a highly regulated environment. Second, while Mr. D'Ascendis claims to control for risk, the fact is that the average beta for the group is higher than the average beta for the gas group, and this leads to higher risk premium and CAPM equity cost rate estimates for Atmos. And third, the previously discussed upward bias in the EPS growth rate forecasts of Wall Street analysts is particularly severe for non-utility companies and, therefore, the DCF equity cost rate estimates for this group are particularly overstated.

E. Other Issues

1. Size Adjustment

Q. PLEASE DISCUSS MR. D'ASCENDIS'S SIZE ADJUSTMENT.

A. Mr. D'Ascendis includes a size adjustment of 0.40% to his indicated equity cost rate from his four approaches (DCF, risk premium, CAPM, and the results for the non-price regulated companies) to account for the size of Atmos. This adjustment is based on the historical stock market returns studies as performed by Duff & Phelps (formerly published by Morningstar and Ibbotson Associates). As previously discussed, there are numerous errors in using historical market returns to compute risk premiums. Among the errors are survivorship bias (only successful companies survive – poor companies do not survive) and unattainable return bias (the Ibbotson procedure presumes monthly portfolio rebalancing). These errors provide inflated estimates of expected risk premiums and, therefore, Duff & Phelps's size premiums are poor measures for risk adjustment to account for the size of the Company.

In addition, Professor Annie Wong has tested for a size premium in utilities and concluded that, unlike industrial stocks, utility stocks do not exhibit a significant size premium.[64] As explained by Professor Wong, there are several reasons why such a size premium would not be attributable to utilities. Utilities are regulated closely by state and federal agencies and commissions, and hence, their

[64] Annie Wong, "Utility Stocks and the Size Effect: An Empirical Analysis," *Journal of the Midwest Finance Association*, pp. 95-101, (1993).

financial performance is monitored on an ongoing basis by both the state and federal governments. In addition, public utilities must gain approval from government entities for common financial transactions such as the sale of securities. Furthermore, unlike their industrial counterparts, accounting standards and reporting are fairly standardized for public utilities. Finally, a utility's earnings are predetermined to a certain degree through the ratemaking process in which performance is reviewed by state commissions and other interested parties. Overall, in terms of regulation, government oversight, performance review, accounting standards, and information disclosure, utilities are much different than industrials, which could account for the lack of a size premium.

Q. PLEASE DISCUSS THE RELEVANT RESEARCH ON THE SIZE PREMIUM IN ESTIMATING THE EQUITY COST RATE.

A. As noted, there are errors in using historical market returns to compute risk premiums. With respect to the small firm premium, Richard Roll (1983) found that one-half of the historical return premium for small companies disappears once biases are eliminated and historical returns are properly computed. The error arises from the assumption of monthly portfolio rebalancing and the serial correlation in historical small firm returns.[65]

In another paper, Ching-Chih Lu (2009) estimated the size premium over the long-run. Lu acknowledges that many studies have demonstrated that smaller companies have historically earned higher stock market returns. However, Lu

[65] *See* Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics*, pp. 371-86, (1983).

highlights that these studies rebalance the size portfolios on an annual basis. This means that at the end of each year the stocks are sorted based on size, split into deciles, and the returns are computed over the next year for each stock decile. This annual rebalancing creates the problem. Using a size premium in estimating a CAPM equity cost rate requires that a firm carry the extra size premium in its discount factor for an extended period of time, not just for one year, which is the presumption with annual rebalancing. Through an analysis of small firm stock returns for longer time periods (and without annual rebalancing), Lu finds that the size premium disappears within two years. Lu's conclusion with respect to the size premium is:[66]

> However, an analysis of the evolution of the size premium will show that it is inappropriate to attach a fixed amount of premium to the cost of equity of a firm simply because of its current market capitalization. For a small stock portfolio which does not rebalance since the day it was constructed, its annual return and the size premium are all declining over years instead of staying at a relatively stable level. This confirms that a small firm should not be expected to have a higher size premium going forward sheerly because it is small now.

2. Flotation Costs

Q. PLEASE DISCUSS MR. D'ASCENDIS' ADJUSTMENT FOR FLOTATION COSTS.

[66] Ching-Chih Lu, "The Size Premium in the Long Run," 2009 Working Paper, SSRN abstract no. 1368705.

A. Mr. D'Ascendis argues that a flotation cost adjustment is appropriate for Atmos and he has added 0.04% to his ROE recommendation for Atmos. This is erroneous for several reasons.

First, it is commonly argued that a flotation cost adjustment (such as that used by the Company) is necessary to prevent the dilution of the existing shareholders. This is incorrect for several reasons:

(1) If an equity flotation cost adjustment is similar to a debt flotation cost adjustment, the fact that the market-to-book ratios for gas distribution companies are over 2.00X actually suggests that there should be a flotation cost reduction (and not an increase) to the equity cost rate. This is because when (a) a bond is issued at a price in excess of face or book value, and (b) the difference between market price and the book value is greater than the flotation or issuance costs, the cost of that debt is lower than the coupon rate of the debt. The amount by which market values of gas distribution companies are in excess of book values is much greater than flotation costs. Hence, if common stock flotation costs were exactly like bond flotation costs, and one was making an explicit flotation cost adjustment to the cost of common equity, the adjustment would be downward;

(2) If a flotation cost adjustment is needed to prevent dilution of existing stockholders' investment, then the reduction of the book value of stockholder investment associated with flotation costs can occur only when a company's stock is selling at a market price at/or below its book value. As noted above, gas distribution companies are selling at market prices

well in excess of book value. Hence, when new shares are sold, existing shareholders realize an increase in the book value per share of their investment, not a decrease;

(3) Flotation costs consist primarily of the underwriting spread or fee and not out-of-pocket expenses. On a per-share basis, the underwriting spread is the difference between the price the investment banker receives from investors and the price the investment banker pays to the company. Therefore, these are not expenses that must be recovered through the regulatory process. Furthermore, the underwriting spread is known to the investors who are buying the new issue of stock, and who are well aware of the difference between the price they are paying to buy the stock and the price that the Company is receiving. The offering price they pay is what matters when investors decide to buy a stock based on its expected return and risk prospects. Therefore, the company is not entitled to an adjustment to the allowed return to account for those costs; and

(4) Flotation costs, in the form of the underwriting spread, are a form of a transaction cost in the market. They represent the difference between the price paid by investors and the amount received by the issuing company. Whereas the Company believes that it should be compensated for these transaction costs, it has not accounted for other market transaction costs in determining its cost of equity. Most notably, brokerage fees that investors pay when they buy shares in the open market are another market transaction cost. Brokerage fees increase the effective stock price paid by

investors to buy shares. If the Company had included these brokerage fees or transaction costs in its DCF analysis, the higher effective stock prices paid for stocks would lead to lower dividend yields and equity cost rates. This would result in a downward adjustment to their DCF equity cost rate.

VII. CONCLUSION

Q. DR. WOOLRIDGE, PLEASE SUMMARIZE YOUR TESTIMONY ON THE APPROPRIATE COST OF CAPITAL FOR ATMOS.

A. I show that the company's proposed capital structure includes a higher common equity ratio and lower financial risk than other gas distribution companies. Therefore, I am also proposing a capital structure that is more in line with the capital structures of other gas distribution companies and includes a recent $800 million debt issue. To estimate an equity cost rate for the Company, I have applied the DCF and CAPM approaches to my proxy group of gas distribution companies. My studies indicate that a cost of equity or ROE for the Company is in the range of 7.50% to 8.70%. I believe that this range accurately reflects current capital market data.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

VERIFICATION

COMMONWEALTH OF PENNSYLVANIA)
)
COUNTY OF CENTRE) ss:

Dr. J. Randall Woolridge, being duly sworn upon his oath, deposes and states that he is a consultant for the Citizens' Utility Ratepayer Board, that he has read and is familiar with the foregoing *Direct Testimony*, and that the statements made herein are true and correct to the best of his knowledge, information, and belief.

Dr. J. Randall Woolridge

SUBSCRIBED AND SWORN to before me this 28th day of October, 2019.

Notary Public

My Commission expires:

11-10-2019

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
RONALD E FLEBOTTE
Notary Public
STATE COLLEGE BORO, CENTRE COUNTY
My Commission Expires Nov 10, 2019

Appendix A
Educational Background, Research, and Related Business Experience
J. Randall Woolridge

J. Randall Woolridge is a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed Faculty Fellow in Business Administration in the College of Business Administration of the Pennsylvania State University in University Park, PA. In addition, Professor Woolridge is Director of the Smeal College Trading Room and President and CEO of the Nittany Lion Fund, LLC.

Professor Woolridge received a Bachelor of Arts degree in Economics from the University of North Carolina, a Master of Business Administration degree from the Pennsylvania State University, and a Doctor of Philosophy degree in Business Administration (major area-finance, minor area-statistics) from the University of Iowa. He has taught Finance courses including corporation finance, commercial and investment banking, and investments at the undergraduate, graduate, and executive MBA levels.

Professor Woolridge's research has centered on empirical issues in corporation finance and financial markets. He has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance*, the *Journal of Financial Economics*, and the *Harvard Business Review*. His research has been cited extensively in the business press. His work has been featured in the *New York Times*, *Forbes*, *Fortune*, *The Economist*, *Barron's*, *Wall Street Journal*, *Business Week*, *Investors' Business Daily*, *USA Today*, and other publications. In addition, Dr. Woolridge has appeared as a guest to discuss the implications of his research on CNN's *Money Line*, CNBC's *Morning Call* and *Business Today*, and Bloomberg's *Morning Call*.

Professor Woolridge's stock valuation book, *The StreetSmart Guide to Valuing a Stock* (McGraw-Hill, 2003), was released in its second edition. He has also co-authored *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation, 1999) as well as a textbook entitled *Basic Principles of Finance* (Kendall Hunt, 2011).

Professor Woolridge has also consulted with corporations, financial institutions, and government agencies. In addition, he has directed and participated in university- and company-sponsored professional development programs for executives in 25 countries in North and South America, Europe, Asia, and Africa.

Over the past thirty-five years Dr. Woolridge has prepared testimony and/or provided consultation services in regulatory rate cases in the rate of return area in following states: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Washington, D.C. He has also testified before the Federal Energy Regulatory Commission.

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State College, PA 16801
814-238-9428

Academic Experience

Professor of Finance, the Smeal College of Business Administration, the Pennsylvania State University (July 1, 1990 to the present).

President, Nittany Lion Fund LLC, (January 1, 2005 to the present)
Director, the Smeal College Trading Room (January 1, 2001 to the present)
Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration (July 1, 1987 to the present).

Associate Professor of Finance, College of Business Administration, the Pennsylvania State University (July 1, 1984 to June 30, 1990).
Assistant Professor of Finance, College of Business Administration, the Pennsylvania State University (September, 1979 to June 30, 1984).

Education

Doctor of Philosophy in Business Administration, the University of Iowa. Major field: Finance.
Master of Business Administration, the Pennsylvania State University.
Bachelor of Arts, the University of North Carolina. Major field: Economics.

Books

James A. Miles and J. Randall Woolridge, *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation), 1999
Patrick Cusatis, Gary Gray, and J. Randall Woolridge, *The StreetSmart Guide to Valuing a Stock* (2nd Edition, McGraw-Hill), 2003.
J. Randall Woolridge and Gary Gray, *The New Corporate Finance, Capital Markets, and Valuation: An Introductory Text* (Kendall Hunt, 2003).

Research

Dr. Woolridge has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance,* the *Journal of Financial Economics,* and the *Harvard Business Review*.

EXHIBITS

JRW-1 THRU JRW-10

JRW-1 AND JRW-3.1 ARE REDACTED

Exhibit JRW-1

Atmos Energy Corporation
Recommended Cost of Capital

Capital Source	Capitalization Ratios*	Cost Rate	Weighted Cost Rate
Long-Term Debt			
Common Equity			
Total Capitalization	**100.00%**		**6.81%**

* Capital Structure Ratios are developed in Exhibit JRW-3.

Exhibit JRW-2

Atmos Energy Corporation

Gas Proxy Group

Company	Operating Revenue ($mil)	Percent Elec Revenue	Percent Gas Revenue	Net Plant ($mil)	Market Cap ($mil)	S&P Issuer Credit Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
Atmos Energy Company (NYSE-ATO)	$2,759.7	0%	96%	$9,259.2	$9.0	A	6.03	TX,LA,MS,CO,KS,KY	56.69%	13.9%	2.18
Chesapeake Utilities (NYSE-CPK)	$617.58	4%	43%	$1,126.03	$1.2	NR	6.73	DE,MD,FL	45.44%	11.3%	2.62
New Jersey Resources Corp. (NYSE-NJR)	$2,268.6	0%	25%	$2,609.7	$3.0	NR	4.04	NJ	49.33%	17.6%	2.87
Nisource Inc (NYSE-NI)	$51,114.5	33%	67%	$15,542.5	$9.6	BBB+	(0.78)	IN,OH,PA,KY,VA,MD,MA	36.48%	-1.0%	1.67
Northwest Natural Holdings (NYSE-NWN)	$762.2	0%	100%	$2,255.0	$1.7	NR	(1.24)	OR,WA	44.43%	8.6%	2.37
ONE Gas, Inc.(NYSE-OGS)	$1,539.6	0%	100%	$4,007.6	$3.8	A	6.56	OK,KS,TX	56.31%	8.6%	2.12
South Jersey Industries, Inc. (NYSE-SJI)	$1,243.1	0%	41%	$2,700.2	$2.5	BBB	0.37	NJ	28.94%	1.4%	1.92
Southwest Gas Corporation (NYSE-SWX)	$2,548.8	0%	47%	$4,523.7	$3.9	BBB+	4.32	AZ,NV,CA	49.55%	8.9%	1.88
Spire (NYSE-SR)	$1,740.7	0%	96%	$3,665.2	$3.2	A-	3.68	MO	46.17%	10.1%	1.61
Mean	$7,177.2	4%	68%	$5,076.6	$4.21	A-/BBB+	3.30		45.9%	8.8%	2.14
Median	$1,740.7	0%	67%	$3,665.2	$3.20	A-/BBB+	4.04		46.2%	8.9%	2.12

Data Source: Company 2018 SEC 10-K filings; *Value Line Investment Survey* , 2019.

Exhibit JRW-2

Atmos Energy Corporation

***Value Line* Risk Metrics**

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
Atmos Energy Company (NYSE-ATO)	**0.60**	**A+**	**1**	**100**	**100**
Chesapeake Utilities (NYSE-CPK)	**0.65**	**B++**	**2**	**90**	**75**
New Jersey Resources Corp. (NYSE-NJR)	**0.70**	**A+**	**1**	**45**	**85**
Nisource Inc (NYSE-NI)	**0.55**	**B+**	**3**	**35**	**100**
Northwest Natural Gas Co. (NYSE-NWN)	**0.60**	**A**	**1**	**5**	**95**
ONE Gas, Inc. (NYSE-OGS)	**0.65**	**A**	**2**	**95**	**95**
South Jersey Industries, Inc. (NYSE-SJI)	**0.80**	**A**	**2**	**65**	**80**
Southwest Gas Corporation (NYSE-SWX)	**0.70**	**B++**	**3**	**90**	**85**
Spire (NYSE-SR)	**0.65**	**B++**	**2**	**65**	**95**
Mean	**0.66**	**A**	**1.9**	**66**	**90**

Data Source: *Value Line Investment Survey* , 2018.

Value Line Risk Metrics

Beta

A relative measure of the historical sensitivity of a stock's price to overall fluctuations in the New York Stock Exchange Composite Index. A beta of 1.50 indicates a stock tends to rise (or fall) 50% more than the New York Stock Exchange Composite Index. The ''coefficient'' is derived from a regression analysis of the relationship between weekly percentage changes in the price of a stock and weekly percentage changes in the NYSE Index over a period of five years. In the case of shorter price histories, a smaller time period is used, but two years is the minimum. Betas are adjusted for their long-term tendency to converge toward 1.00.

Financial Strength

A relative measure of the companies reviewed by *Value Line* . The relative ratings range from A++ (strongest) down to C (weakest).

Safety Rank

A measurement of potential risk associated with individual common stocks. The Safety Rank is computed by averaging two other *Value Line* indexes the Price Stability Index and the Financial strength Rating. Safety Ranks range from 1 (Highest) to 5 (Lowest). Conservative investors should try to limit their purchases to equities ranked 1 (Highest) and 2 (Above Average) for Safety. .

Earnings Predictability

A measure of the reliability of an earnings forecast. Earnings Predictability is based upon the stability of year-to-year comparisons, with recent years being weighted more heavily than earlier ones. The most reliable forecasts tend to be those with the highest rating (100); the least reliable, the lowest (5). The earnings stability is derived from the standard deviation of percentage changes in quarterly earnings over an eight-year period. Special adjustments are made for comparisons around zero and from plus to minus.

Stock Price Stability

A measure of the stability of a stock's price. It includes sensitivity to the market (see Beta as well as the stock's inherent volatility. *Value Line's* Stability ratings range from 1 (highest) to 5 (lowest).

Source: *Value Line Investment Analyzer* .

Exhibit JRW-3

Atmos Energy Corporation
Capital Structure Ratios and Debt Cost Rates

Panel A - ATO's Proposed Capital Structure and Debt Cost Rates

	Percent of Total	Cost
Short-Term Debt	0.00%	
Long-Term Debt	39.88%	4.57%
Common Equity	60.12%	
Total Capital	100.00%	

Panel B - Proxy Group Average Including Short-Term Debt

	Percent of Total	Cost
Short-Term Debt	13.89%	
Long-Term Debt	37.22%	
Common Equity	48.89%	
Total Capital	100.00%	

Panel C - Proxy Group Average Excluding Short-Term Debt

	Percent of Total	Cost
Short-Term Debt	0.00%	
Long-Term Debt	43.14%	
Common Equity	56.86%	
Total Capital	100.00%	

Panel D - ATO Captial Structure and Debt Cost Rate with $800M, Oct. 4, Debt Issue

	Percent of Total	Cost
Long-Term Debt		
Common Equity		
Total Capital	100.00%	

Exhibit JRW-3

Atmos Energy Corporation
Capital Structure Study

Proxy Group Average	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Long-Term Debt	41.03%	42.68%	42.64%	45.35%	43.98%	43.14%
Common Equity	58.97%	57.32%	57.36%	54.65%	56.02%	56.86%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
ATO	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Long-Term Debt	35.67%	35.49%	34.33%	36.58%	39.05%	36.22%
Common Equity	64.33%	64.51%	65.67%	63.42%	60.95%	63.78%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
CPK	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Long-Term Debt	30.53%	32.23%	32.22%	37.87%	35.32%	33.63%
Common Equity	69.47%	67.77%	67.78%	62.13%	64.68%	66.37%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
NJR	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Long-Term Debt	40.48%	45.70%	45.42%	44.18%	42.92%	43.74%
Common Equity	59.52%	54.30%	54.58%	55.82%	57.08%	56.26%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
NWN	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Long-Term Debt	46.95%	47.38%	49.56%	48.08%	44.39%	47.27%
Common Equity	53.05%	52.62%	50.44%	51.92%	55.61%	52.73%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
OGS	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Long-Term Debt	30.66%	30.65%	30.71%	38.62%	38.50%	33.83%
Common Equity	69.34%	69.35%	69.29%	61.38%	61.50%	66.17%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
SJI	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Long-Term Debt	43.38%	51.96%	51.02%	62.53%	58.42%	53.46%
Common Equity	56.62%	48.04%	48.98%	37.47%	41.58%	46.54%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
SWX	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Long-Term Debt	51.53%	51.32%	52.18%	48.34%	47.31%	50.14%
Common Equity	48.47%	48.68%	47.82%	51.66%	52.69%	49.86%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
SR	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Long-Term Debt	49.06%	46.73%	45.72%	46.58%	45.91%	46.80%
Common Equity	50.94%	53.27%	54.28%	53.42%	54.09%	53.20%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Data Source: SNL/S&P Capital IQ

Exhibit JRW-3

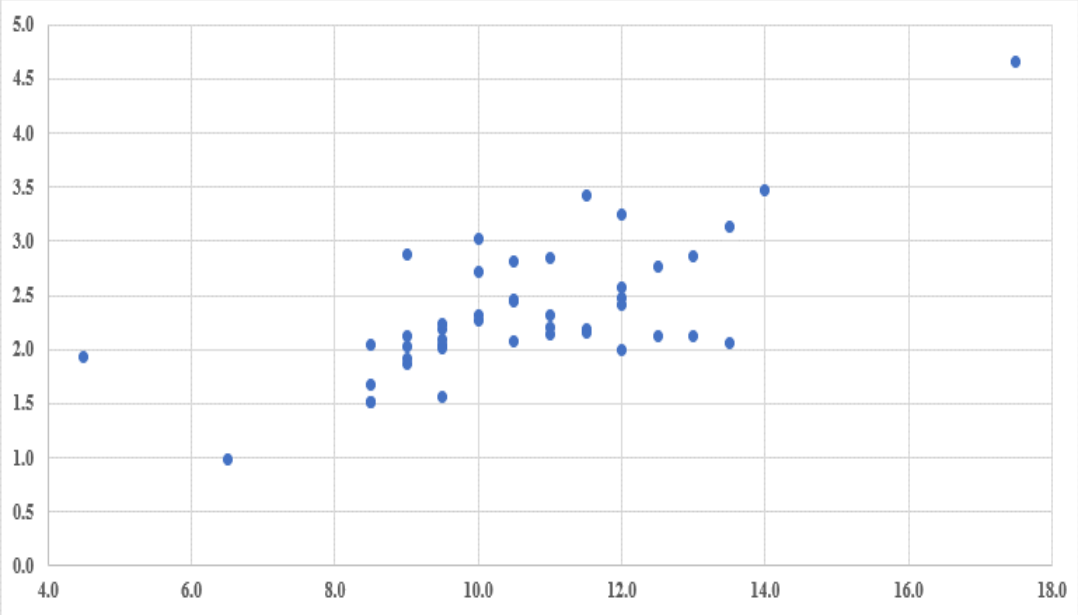
Atmos Energy Corporation
Capital Structure Study

Proxy Group Average	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Short-Term Debt	12.39%	13.38%	17.27%	14.40%	12.01%	13.89%
Long-Term Debt	36.32%	37.03%	35.37%	38.66%	38.73%	37.22%
Common Equity	51.29%	49.59%	47.36%	46.94%	49.25%	48.89%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
ATO	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Short-Term Debt	8.31%	9.46%	14.25%	7.27%	1.36%	8.13%
Long-Term Debt	32.70%	32.13%	29.44%	33.92%	38.52%	33.34%
Common Equity	58.98%	58.41%	56.31%	58.81%	60.12%	58.53%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
CPK	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Short-Term Debt	24.70%	24.65%	27.04%	26.86%	29.37%	26.52%
Long-Term Debt	22.99%	24.28%	23.51%	27.70%	24.95%	24.69%
Common Equity	52.32%	51.06%	49.45%	45.44%	45.68%	48.79%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
NJR	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Short-Term Debt	11.39%	3.53%	9.58%	15.62%	5.84%	9.19%
Long-Term Debt	35.87%	44.09%	41.06%	37.28%	40.41%	39.74%
Common Equity	52.74%	52.39%	49.35%	47.10%	53.75%	51.07%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
NWN	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Short-Term Debt	7.90%	7.79%	11.25%	14.43%	16.65%	11.60%
Long-Term Debt	43.25%	43.69%	43.98%	41.14%	37.00%	41.81%
Common Equity	48.86%	48.52%	44.76%	44.43%	46.35%	46.59%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
OGS	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Short-Term Debt	16.66%	14.26%	16.52%	8.26%	8.10%	12.76%
Long-Term Debt	25.55%	26.28%	25.64%	35.44%	35.39%	29.66%
Common Equity	57.79%	59.46%	57.84%	56.31%	56.51%	57.58%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
SJI	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Short-Term Debt	18.46%	38.59%	43.03%	22.91%	15.95%	27.79%
Long-Term Debt	35.37%	31.91%	29.06%	48.20%	49.10%	38.73%
Common Equity	46.17%	29.50%	27.90%	28.89%	34.95%	33.48%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
SWX	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Short-Term Debt	1.21%	1.35%	1.57%	4.07%	4.78%	2.60%
Long-Term Debt	50.91%	50.62%	51.36%	46.37%	45.05%	48.86%
Common Equity	47.89%	48.02%	47.07%	49.56%	50.17%	48.54%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
SR	Mar-31-18	Jun-30-18	Sep-30-18	Dec-31-18	Mar-31-19	Average
Short-Term Debt	10.52%	7.41%	14.93%	15.78%	14.05%	12.54%
Long-Term Debt	43.90%	43.27%	38.90%	39.23%	39.46%	40.95%
Common Equity	45.58%	49.32%	46.17%	44.99%	46.49%	46.51%
Total Capital	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Data Source: SNL/S&P Capital IQ

Exhibit JRW-4
Electric Utilities and Gas Distribution Companies

Market-to-Book



Expected Return on Equity
R-Square = .50, N=43

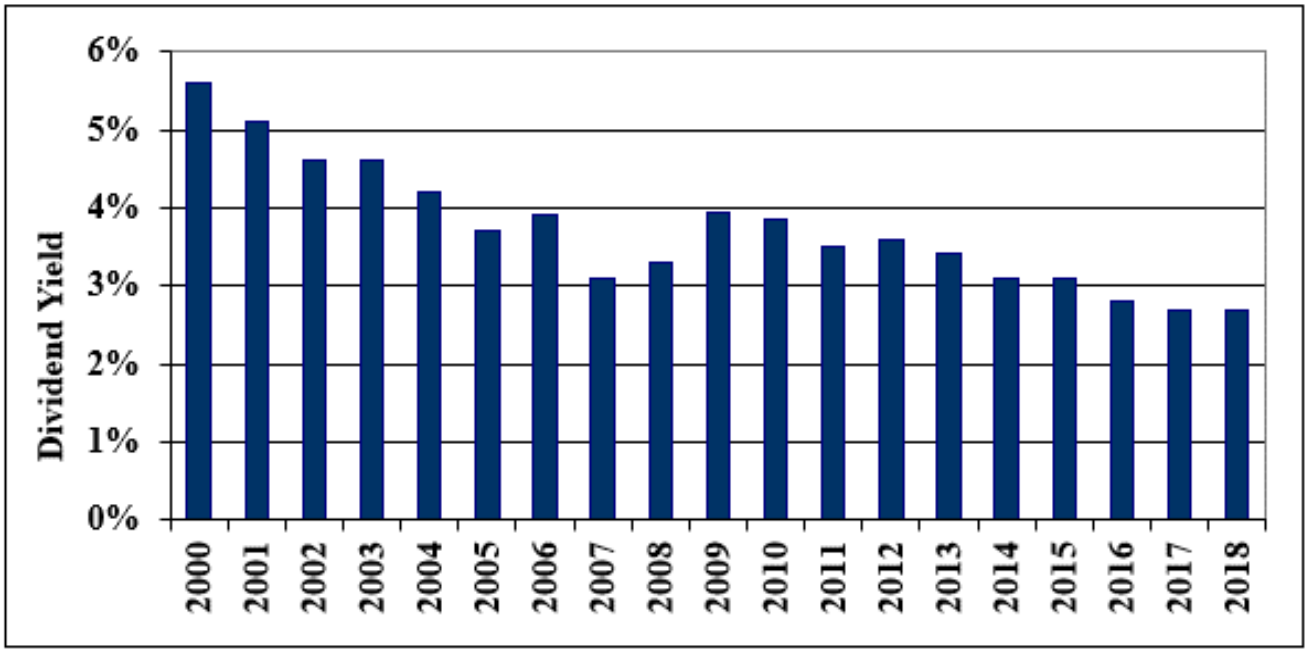
Source: Value Line Investment Survey, 2019.

Exhibit JRW-5
Long-Term 'A' Rated Public Utility Bonds

Data Source: Mergent Bond Record

Exhibit JRW-5

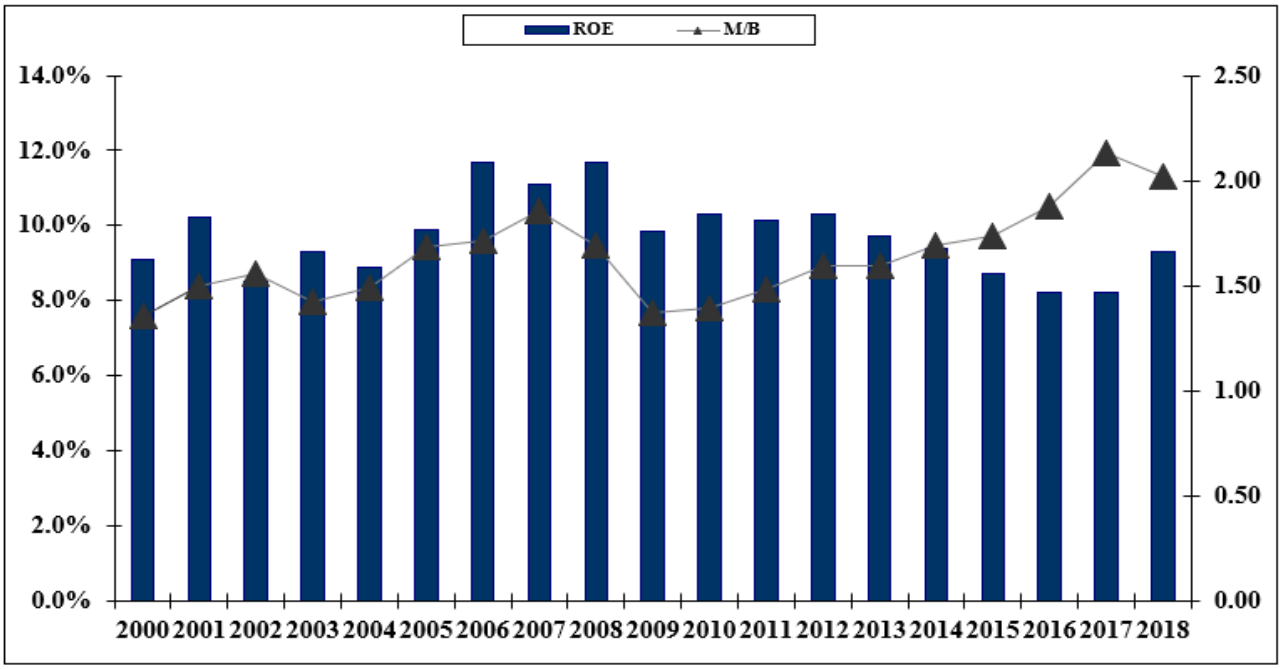
Gas Distribution Company Average Dividend Yield



Data Source: ***Value Line Investment Survey.***

Exhibit JRW-5

Gas Distribution Company Average Return on Equity and Market-to-Book Ratios



Data Source: ***Value Line Investment Survey.***

Exhibit JRW-5
Industry Average Betas*
Value Line Investment Survey* Betas*
22-Jan-19

Rank	Industry	Beta	Rank	Industry	Beta	Rank	Industry	Beta
1	Petroleum (Producing)	1.71	34	Telecom. Equipment	1.15	67	Medical Services	1.01
2	Metals & Mining (Div.)	1.64	35	Internet	1.15	68	Recreation	1.01
3	Natural Gas (Div.)	1.63	36	Financial Svcs. (Div.)	1.15	69	IT Services	1.01
4	Oilfield Svcs/Equip.	1.61	37	Retail (Hardlines)	1.14	70	Med Supp Non-Invasive	0.99
5	Maritime	1.51	38	Semiconductor Equip	1.14	71	Telecom. Services	0.99
6	Steel	1.49	39	Entertainment Tech	1.13	72	Retail Store	0.98
7	Oil/Gas Distribution	1.40	40	Publishing	1.13	73	Pharmacy Services	0.98
8	Metal Fabricating	1.37	41	Computer Software	1.13	74	Information Services	0.97
9	Chemical (Specialty)	1.34	42	Paper/Forest Products	1.13	75	Investment Co.(Foreign)	0.96
10	Chemical (Diversified)	1.33	43	Precision Instrument	1.12	76	Healthcare Information	0.96
11	Pipeline MLPs	1.33	44	Public/Private Equity	1.12	77	Funeral Services	0.95
12	Heavy Truck & Equip	1.31	45	Retail Automotive	1.12	78	Med Supp Invasive	0.95
13	Chemical (Basic)	1.30	46	Power	1.12	79	Reinsurance	0.92
14	Building Materials	1.30	47	Wireless Networking	1.12	80	Environmental	0.91
15	Petroleum (Integrated)	1.30	48	Retail Building Supply	1.11	81	Cable TV	0.90
16	Homebuilding	1.28	49	Bank (Midwest)	1.11	82	Insurance (Prop/Cas.)	0.90
17	Railroad	1.27	50	Packaging & Container	1.11	83	Thrift	0.89
18	Auto Parts	1.27	51	Furn/Home Furnishings	1.11	84	Restaurant	0.88
19	Biotechnology	1.27	52	Human Resources	1.10	85	Tobacco	0.88
20	Engineering & Const	1.25	53	Drug	1.10	86	Household Products	0.86
21	Office Equip/Supplies	1.24	54	Advertising	1.10	87	Investment Co.	0.85
22	Hotel/Gaming	1.24	55	Shoe	1.09	88	Beverage	0.83
23	Automotive	1.24	56	Bank	1.09	89	Food Processing	0.82
24	Insurance (Life)	1.24	57	Newspaper	1.08	90	R.E.I.T.	0.82
25	Semiconductor	1.21	58	Toiletries/Cosmetics	1.08	91	Precious Metals	0.82
26	Machinery	1.20	59	Entertainment	1.07	92	Retail/Wholesale Food	0.80
27	Air Transport	1.20	60	Telecom. Utility	1.07	93	Water Utility	0.70
28	Electrical Equipment	1.20	61	Foreign Electronics	1.07	94	Natural Gas Utility	0.67
29	Electronics	1.20	62	Aerospace/Defense	1.05	95	Electric Util. (Central)	0.63
30	Trucking	1.19	63	Industrial Services	1.05	96	Electric Utility (West)	0.62
31	E-Commerce	1.18	64	Apparel	1.05	97	Electric Utility (East)	0.55
32	Computers/Peripherals	1.16	65	Educational Services	1.03			
33	Diversified Co.	1.16	66	Retail (Softlines)	1.02		Mean	1.10

***** **Industry averages for 97 industries using *Value Line*'s database of 1,710 companies.**

****** ***Value Line*** **computes betas using monthly returns regressed against the New York Stock Exchange Index for five years. These betas are then adjusted as follows: *VL* Beta = [{(2/3) * Regressed Beta} + {(1/3) * (1.0)}] to account to tendency for Betas to regress toward average of 1.0. See M. Blume, "On the Assessment of Risk," *Journal of Finance*, March 1971.**

Exhibit JRW-6
DCF Model

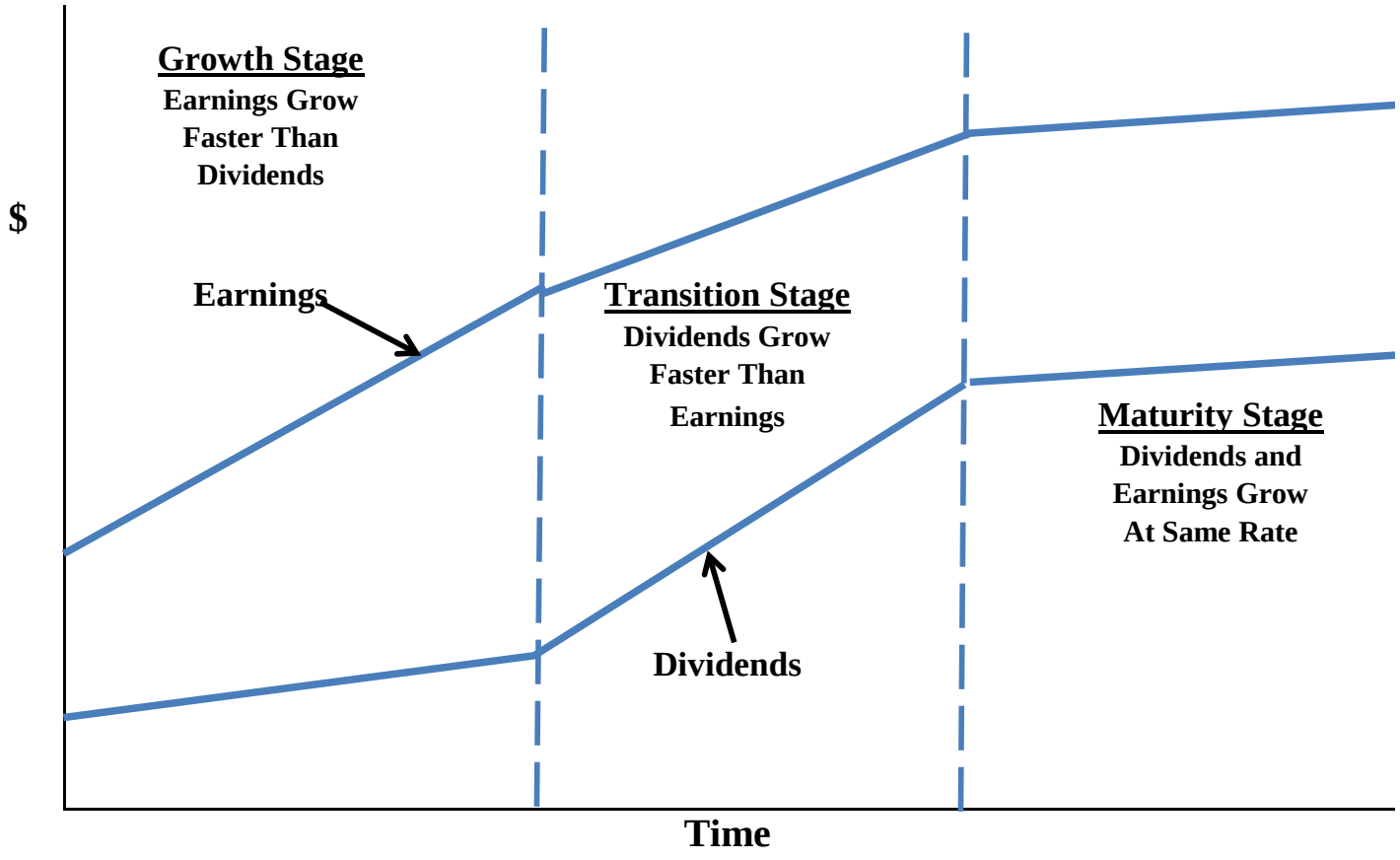


Exhibit JRW-7

Atmos Energy Corporation
Discounted Cash Flow Analysis

Gas Proxy Group

Dividend Yield*	**2.60%**
Adjustment Factor	**1.03**
Adjusted Dividend Yield	**2.68%**
Growth Rate**	**6.00%**
Equity Cost Rate	**8.70%**

*** Page 2 of Exhibit JRW-8**

**** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW-8**

Exhibit JRW-7

Atmos Energy Corporation
Monthly Dividend Yields

Gas Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
Atmos Energy Company (NYSE-ATO)	$2.10	1.9%	1.9%	2.0%
Chesapeake Utilities (NYSE-CPK)	$1.62	1.7%	1.7%	1.8%
New Jersey Resources Corp. (NYSE-NJR)	$1.25	2.8%	2.6%	2.6%
Nisource Inc (NYSE-NI)	$0.80	2.7%	2.7%	2.8%
Northwest Natural Gas Co. (NYSE-NWN)	$1.90	2.7%	2.7%	2.8%
One Gas, Inc. (NYSE-OGS)	$2.00	2.2%	2.2%	2.2%
South Jersey Industries, Inc. (NYSE-SJI)	$1.15	3.6%	3.5%	3.6%
Southwest Gas Corporation (NYSE-SWX)	$2.18	2.4%	2.4%	2.5%
Spire (NYSE-SR)	$2.37	2.8%	2.8%	2.9%
Mean		2.5%	2.5%	2.6%
Median		2.7%	2.6%	2.6%

Data Sources: http://quote.yahoo.com, October, 2019.

Exhibit JRW-7

Atmos Energy Corporation
DCF Equity Cost Growth Rate Measures
***Value Line* Historic Growth Rates**

Gas Proxy Group

Company	*Value Line* Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
Atmos Energy Company (NYSE-ATO)	6.5	3.5	5.5	10.0	5.5	7.0
Chesapeake Utilities (NYSE-CPK)	9.0	5.0	10.0	8.0	6.0	10.5
New Jersey Resources Corp. (NYSE-NJR)	7.0	7.5	7.0	5.5	6.5	8.0
Nisource Inc (NYSE-NI)	-3.0	-2.5	-3.5	-7.5	-5.5	-6.5
Northwest Natural Gas Co. (NYSE-NWN)	-10.5	2.5	2.0	-18.0	1.0	
ONE Gas, Inc. (NYSE-OGS)						
South Jersey Industries, Inc. (NYSE-SJI)	1.5	8.0	6.5	-2.5	6.0	6.0
Southwest Gas Corporation (NYSE-SWX)	7.0	8.5	5.5	4.5	10.5	6.0
Spire (NYSE-SR)	4.0	4.0	7.5	7.5	5.0	8.0
Mean	2.7	4.6	5.1	0.9	4.4	5.6
Median	5.3	4.5	6.0	5.0	5.8	7.0
	Average of Median Figures =			5.6		

Data Source: *Value Line Investment Survey.*

Exhibit JRW-7

Atmos Energy Corporation
DCF Equity Cost Growth Rate Measures
***Value Line* Projected Growth Rates**

Gas Proxy Group

Company	*Value Line* Projected Growth Est'd. '16-'18 to '22-'24			*Value Line* Sustainable Growth		
	Earnings	Dividends	Book Value	Return on Equity	Retention Rate	Internal Growth
Atmos Energy Company (NYSE-ATO)	7.5	7.0	7.0	10.0%	52.0%	5.2%
Chesapeake Utilities (NYSE-CPK)	9.0	9.0	9.0	10.0%	57.0%	5.7%
New Jersey Resources Corp. (NYSE-NJR)	3.5	4.0	6.5	11.5%	47.0%	5.4%
Nisource Inc (NYSE-NI)	12.5	9.0	7.5	9.0%	33.0%	3.0%
Northwest Natural Gas Co. (NYSE-NWN)	27.0	2.5	1.0	12.0%	37.0%	4.4%
ONE Gas, Inc. (NYSE-OGS)	8.0	8.5	4.5	10.0%	44.0%	4.4%
South Jersey Industries, Inc. (NYSE-SJI)	10.5	4.0	4.5	12.0%	40.0%	4.8%
Southwest Gas Corporation (NYSE-SWX)	9.0	5.0	7.5	10.0%	55.0%	5.5%
Spire (NYSE-SR)	5.5	4.0	4.5	9.0%	47.0%	4.2%
Mean	10.3	5.9	5.8	10.4%	45.8%	4.7%
Median	9.0	5.0	6.5	10.0%	47.0%	4.8%
Average of Median Figures =		6.8			Median =	4.8%

*** 'Est'd. '16-'18 to '22-'24' is the estimated growth rate from the base period 2016 to 2018 until the future period 2021 to 2023.**

Data Source: *Value Line Investment Survey.*

Exhibit JRW-7

Atmos Energy Corporation
DCF Equity Cost Growth Rate Measures
Analysts Projected EPS Growth Rate Estimates

Gas Proxy Group

Company	Yahoo	Zacks	Mean
Atmos Energy Company (NYSE-ATO)	7.0%	7.0%	7.0%
Chesapeake Utilities (NYSE-CPK)	6.0%	7.0%	6.5%
New Jersey Resources Corp. (NYSE-NJR)	6.0%	8.0%	7.0%
Nisource Inc (NYSE-NI)	4.7%	5.4%	5.0%
Northwest Natural Gas Co. (NYSE-NWN)	4.0%	5.0%	4.5%
ONE Gas, Inc. (NYSE-OGS)	5.0%	6.1%	5.6%
South Jersey Industries, Inc. (NYSE-SJI)	4.6%	8.5%	6.6%
Southwest Gas Corporation (NYSE-SWX)	8.2%	7.3%	7.7%
Spire (NYSE-SR)	3.2%	5.5%	4.4%
Mean	5.4%	6.6%	6.0%
Median	5.0%	7.0%	6.5%

Data Sources: www.zacks.com, http://quote.yahoo.com, October, 2019.

Exhibit JRW-7

Atmos Energy Corporation
DCF Growth Rate Indicators

Electric and Gas Proxy Groups

Growth Rate Indicator	Gas Proxy Group
Historic *Value Line* Growth in EPS, DPS, and BVPS	5.6%
Projected *Value Line* Growth in EPS, DPS, and BVPS	6.8%
Sustainable Growth ROE * Retention Rate	4.8%
Projected EPS Growth from Yahoo and Zacks - Mean/Median	6.0%/6.5%

Exhibit JRW-8

Atmos Energy Corporation
Capital Asset Pricing Model

Gas Proxy Group

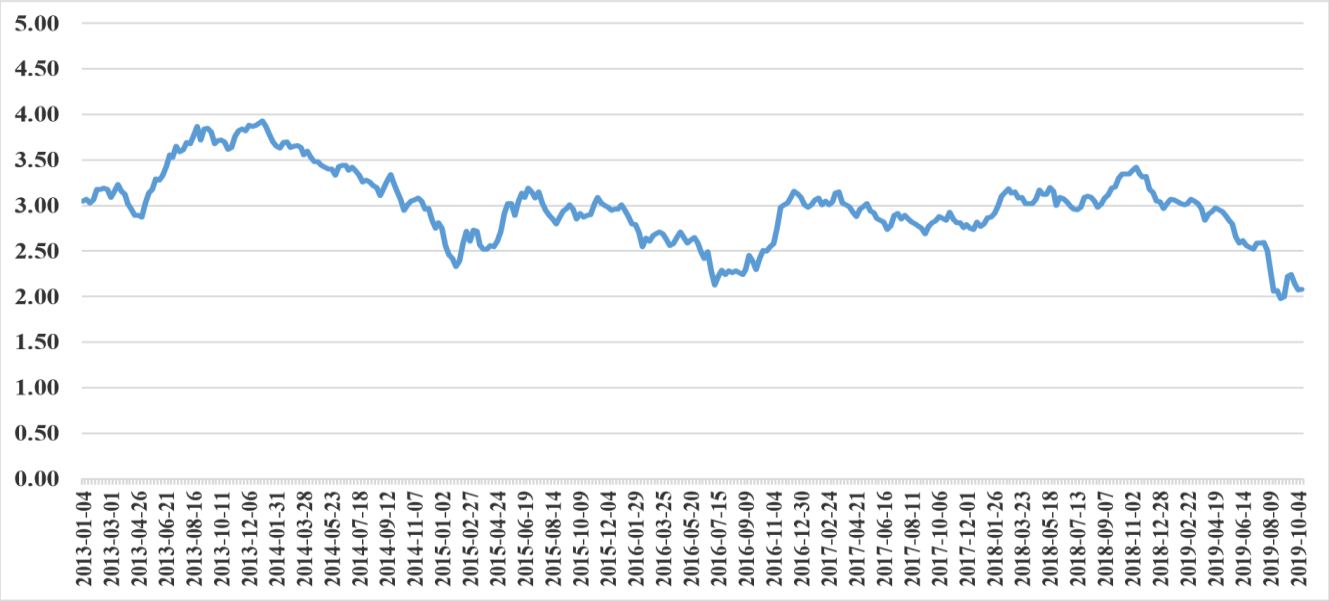
Risk-Free Interest Rate	**3.75%**
Beta*	**0.65**
Ex Ante Equity Risk Premium**	**5.75%**
CAPM Cost of Equity	**7.5%**

* See page 3 of Exhibit JRW-9

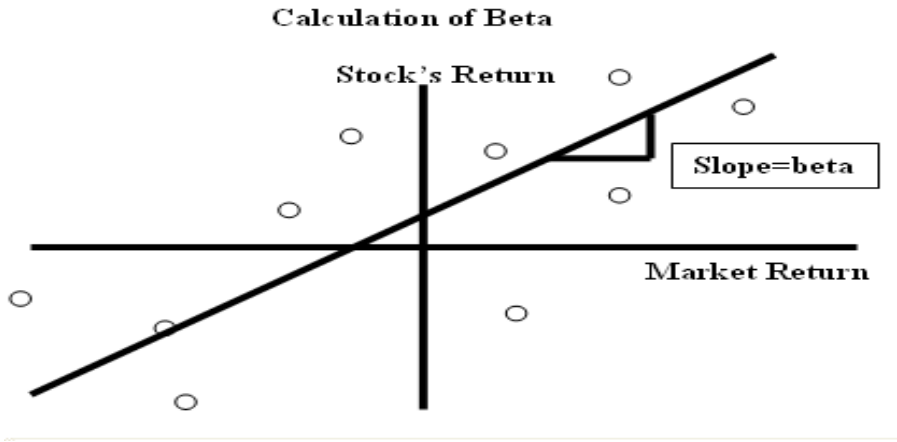
** See pages 5 and 6 of Exhibit JRW-9

Exhibit JRW-8

Thirty-Year U.S. Treasury Yields
2013-2019



Source: Federal Reserve Bank of St. Louis, FRED Database.



Gas Proxy Group

Company	Beta
Atmos Energy Company (NYSE-ATO)	0.60
Chesapeake Utilities (NYSE-CPK)	0.65
New Jersey Resources Corp. (NYSE-NJR)	0.70
Nisource Inc (NYSE-NI)	0.55
Northwest Natural Gas Co. (NYSE-NWN)	0.60
ONE Gas, Inc. (NYSE-OGS)	0.65
South Jersey Industries, Inc. (NYSE-SJI)	0.80
Southwest Gas Corporation (NYSE-SWX)	0.70
Spire (NYSE-SR)	0.65
Mean	0.66
Median	0.65

Data Source: *Value Line Investment Survey* , 2019.

Exhibit JRW-8
Risk Premium Approaches

	Historical Ex Post Returns	**Surveys**	**Expected Return Models and Market Data**
Means of Assessing The Market Risk Premium	Historical Average Stock Minus Bond Returns	Surveys of CFOs, Financial Forecasters, Companies, Analysts on Expected Returns and Market Risk Premiums	Use Market Prices and Market Fundamentals (such as Growth Rates) to Compute Expected Returns and Market Risk Premiums
Problems/Debated Issues	Time Variation in Required Returns, Measurement and Time Period Issues, and Biases such as Market and Company Survivorship Bias	Questions Regarding Survey Histories, Responses, and Representativeness Surveys may be Subject to Biases, such as Extrapolation	Assumptions Regarding Expectations, Especially Growth

Source: Adapted from Antti Ilmanen, Expected Returns on Stocks and Bonds," *Journal of Portfolio Management*, (Winter 2003).

Exhibit JRW-8

Capital Asset Pricing Model
Market Risk Premium

Category	Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Median
Historical Ris	**Historical Risk Premium**										
		Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
						Geometric				4.40%	
		Damodaran	2019	1928-2018	Historical Stock Returns - Bond Returns	Arithmetic				6.26%	
						Geometric				4.66%	
		Dimson, Marsh, Staunton Credit Suisse Repo	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
						Geometric					
		Bate	2008	1900-2007	Historical Stock Returns - Bond Returns	Geometric				4.50%	
		Shiller	2006	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				7.00%	
						Geometric				5.50%	
		Siegel	2005	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				6.10%	
						Geometric				4.60%	
		Dimson, Marsh, and Staunton	2006	1900-2005	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
		Goyal & Welch	2006	1872-2004	Historical Stock Returns - Bond Returns					4.77%	
		Median									5.50%
Ex Ante Mode	**Ex Ante Models (Puzzle Research)**										
		Claus Thomas	2001	1985-1998	Abnormal Earnings Model					3.00%	
		Arnott and Bernstein	2002	1810-2001	Fundamentals - Div Yld + Growth					2.40%	
		Constantinides	2002	1872-2000	Historical Returns & Fundamentals - P/D & P/E					6.90%	
		Cornell	1999	1926-1997	Historical Returns & Fundamental GDP/Earnings		3.50%	5.50%	4.50%	4.50%	
		Easton, Taylor, et al	2002	1981-1998	Residual Income Model					5.30%	
		Fama French	2002	1951-2000	Fundamental DCF with EPS and DPS Growth		2.55%	4.32%		3.44%	
		Harris & Marston	2001	1982-1998	Fundamental DCF with Analysts' EPS Growth					7.14%	
		McKinsey	2002	1962-2002	Fundamental (P/E, D/P, & Earnings Growth)		3.50%	4.00%		3.75%	
		Siegel	2005	1802-2001	Historical Earnings Yield	Geometric				2.50%	
		Grabowski	2006	1926-2005	Historical and Projected		3.50%	6.00%	4.75%	4.75%	
		Maheu & McCurdy	2006	1885-2003	Historical Excess Returns, Structural Breaks,		4.02%	5.10%	4.56%	4.56%	
		Bostock	2004	1960-2002	Bond Yields, Credit Risk, and Income Volatility		3.90%	1.30%	2.60%	2.60%	
		Bakshi & Chen	2005	1982-1998	Fundamentals - Interest Rates					7.31%	
		Donaldson, Kamstra, & Kramer	2006	1952-2004	Fundamental, Dividend yld., Returns,, & Volatility		3.00%	4.00%	3.50%	3.50%	
		Campbell	2008	1982-2007	Historical & Projections (D/P & Earnings Growth)		4.10%	5.40%		4.75%	
		Best & Byrne	2001	Projection	Fundamentals - Div Yld + Growth					2.00%	
		Fernandez	2007	Projection	Required Equity Risk Premium					4.00%	
		DeLong & Magin	2008	Projection	Earnings Yield - TIPS					3.22%	
		Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
		Duff & Phelps	2019	Projection	Normalized with 3.5% Long-Term Treasury Yield					5.50%	
		Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
		American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
		Market Risk Premia	2019	Projection	Fundamental Economic and Market Factors					4.29%	
		KPMG	2019	Projection	Fundamental Economic and Market Factors					5.50%	
		Damodaran	2019	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					5.32%	
		Social Security									
		Office of Chief Actuary		1900-1995							
		John Campbell	2001	1860-2000	Historical & Projections (D/P & Earnings Growth)	Arithmetic	3.00%	4.00%	3.50%	3.50%	
				Projected for 75 Years		Geometric	1.50%	2.50%	2.00%	2.00%	
		Peter Diamond	2001	Projected for 75 Years	Fundamentals (D/P, GDP Growth)		3.00%	4.80%	3.90%	3.90%	
		John Shoven	2001	Projected for 75 Years	Fundamentals (D/P, P/E, GDP Growth)		3.00%	3.50%	3.25%	3.25%	
		Median									4.29%
Surveys	**Surveys**										
		New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
		Survey of Financial Forecasters	2019	10-Year Projection	About 20 Financial Forecastsers					1.85%	
		Duke - CFO Magazine Survey	2019	10-Year Projection	Approximately 200 CFOs					4.05%	
		Welch - Academics	2008	30-Year Projection	Random Academics		5.00%	5.74%	5.37%	5.37%	
		Fernandez - Academics, Analysts, and Compar	2019	Long-Term	Survey of Academics, Analysts, and Companies					5.60%	
		Median									5.37%
Building Bloc	**Building Block**										
		Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
						Geometric			4.20%		
		Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
		Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
		Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
						Geometric			3.60%		
		Median									4.06%
Mean	**Mean**										**4.80%**
Median	**Median**										**4.83%**

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Exhibit JRW-8

Capital Asset Pricing Model
Market Risk Premium

Summary of 2010-19 Equity Risk Premium Studies

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Average
Historical Risk Premium										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2019	1928-2018	Historical Stock Returns - Bond Returns	Arithmetic				6.26%	
					Geometric				4.66%	
	Dimson, Marsh, Staunton _Credit Suisse Report	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
					Geometric					
	Median									5.36%
Ex Ante Models (Puzzle Research)										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2019	Projection	Normalized with 3.5% Long-Term Treasury Yield					5.50%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Market Risk Premia	2019	Projection	Fundamental Economic and Market Factors					4.29%	
	KPMG	2019	Projection	Fundamental Economic and Market Factors					5.50%	
	Damodaran	2019	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					5.32%	
	Median									5.50%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2019	10-Year Projection	About 20 Financial Forecastsers					1.85%	
	Duke - CFO Magazine Survey	2019	10-Year Projection	Approximately 200 CFOs					4.05%	
	Fernandez - Academics, Analysts, and Companies	2019	Long-Term	Survey of Academics, Analysts, and Companies					5.60%	
	Median									4.83%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Median									4.06%
Mean										**4.94%**
Median										**5.09%**

Source: https://www.duffandphelps.com/-/media/assets/pdfs/publications/valuation/coc/us-recommended-erp-and-risk-free-rate-table-as-of-september-5-2017.ashx?la=en

Duff & Phelps Risk-Free Interest Rates and Equity Risk Premium Estimates

Duff & Phelps Recommended U.S. Equity Risk Premium (ERP) and Corresponding Risk-free Rates (R_f); January 2008–Present

For additional information, please visit
www.duffandphelps.com/CostofCapital

Date	Risk-free Rate (R_f)	R_f (%)	Duff & Phelps Recommended ERP (%)	What Changed
Current Guidance: December 31, 2018 – UNTIL FURTHER NOTICE	**Normalized 20-year U.S. Treasury yield**	**3.50**	**5.50**	**ERP**
September 5, 2017 – December 30, 2018	Normalized 20-year U.S. Treasury yield	3.50	5.00	ERP
November 15, 2016 – September 4, 2017	Normalized 20-year U.S. Treasury yield	3.50	5.50	R_f
January 31, 2016 – November 14, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
December 31, 2015	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2014	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.00	
February 28, 2013 – January 30, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.00	ERP
December 31, 2012	Normalized 20-year U.S. Treasury yield	4.00	5.50	
January 15, 2012 – February 27, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
December 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	6.00	
September 30, 2011 – January 14, 2012	Normalized 20-year U.S. Treasury yield	4.00	6.00	ERP
July 1 2011 – September 29, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
June 1, 2011 – June 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
May 1, 2011 – May 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2010 – April 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
June 1, 2010 – November 30, 2010	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2009	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2009 – May 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	ERP
June 1, 2009 – November 30, 2009	Spot 20-year U.S. Treasury yield	Spot	6.00	R_f
December 31, 2008	Normalized 20-year U.S. Treasury yield	4.50	6.00	
November 1, 2008 – May 31, 2009	Normalized 20-year U.S. Treasury yield	4.50	6.00	R_f
October 27, 2008 – October 31, 2008	Spot 20-year U.S. Treasury yield	Spot	6.00	ERP
January 1, 2008 – October 26, 2008	Spot 20-year U.S. Treasury yield	Spot	5.00	Initialized

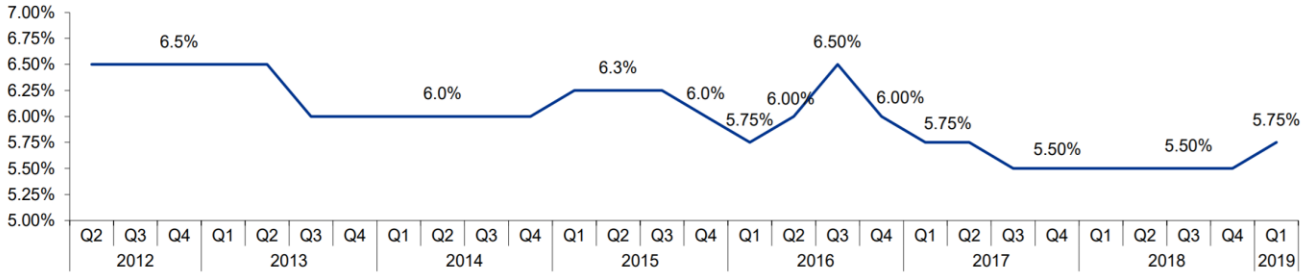
"Normalized" in this context means that in months where the risk-free rate is deemed to be abnormally low, a proxy for a longer-term sustainable risk-free rate is used.

Source: https://www.duffandphelps.com/-/media/assets/pdfs/publications/valuation/coc/erp-risk-free-rates-jan-2008-present.ashx?la=en

Panel A
KPMG Market Risk Premium Recommendation

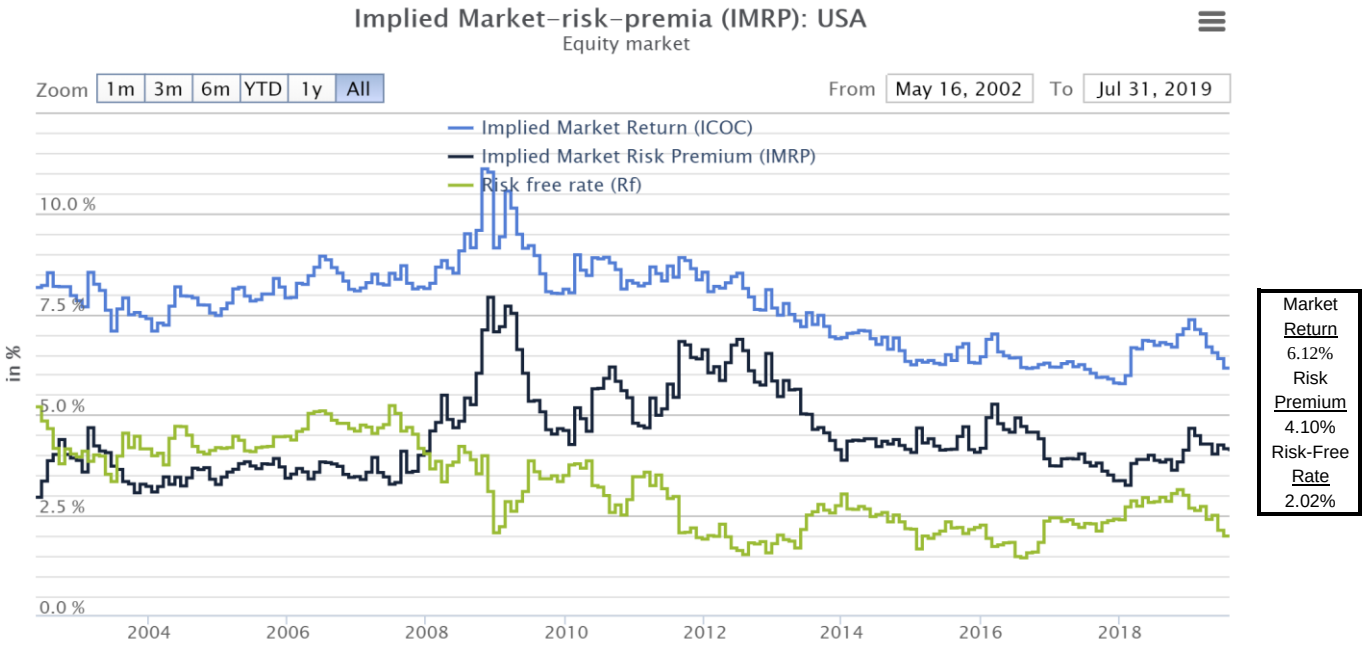
Historic MRP estimates

Please find an overview of the historic MRP estimates by KPMG in the graph below.



Source: https://assets.kpmg/content/dam/kpmg/nl/pdf/2019/advisory/equity-market-risk-premium-research-summary-31032019.pdf

Panel B
Market-Risk-Premia.com Implied Market Risk Premium
31-Jul-19



Source: http://www.market-risk-premia.com/us.html

Atmos Energy Corporation Rate of Return Recemmendation

Capital Source	Capitalization Ratios*	Cost Rate	Weighted Cost Rate
Short-Term Debt	**0.00%**	**0.00%**	**0.00%**
Long-Term Debt	**39.88%**	**4.57%**	**1.82%**
Common Equity	**60.12%**	**10.25%**	**6.16%**
Total Capitalization	**100.00%**		**7.98%**

* Capital Structure Ratios are developed in Exhibit JRW-3.

Principal Methods	ROE Results
Discounted Cash Flow Model (DCF)	8.92%
Risk Premium Model (RPM)	9.94%
Capital Asset Pricing Model (CAPM)	9.67%
Market Models Applied to Comparable Risk, Non-Price Regulated Companies	10.59%
Indicated Common Equity Cost Rate before Adjustment for Company-Specific Risk	9.80%
Size Risk Adjustment	0.40%
Flotation Cost Adjustment	0.04%
Indicated Common Equity Cost Rate	10.24%
Recommended Common Equity Cost Rate	10.25%

Company	*Value Line*	Zacks	Yahoo
Atmos Energy Corp.	7.50	6.50	6.45
Northwest Natural	NMF	4.50	4.00
ONE Gas, Inc.	9.00	5.90	5.00
South Jersey Industries	9.50	7.20	5.90
Southwest Gas	8.50	6.20	6.30
Spire Inc.	5.50	3.80	2.82
Mean	8.0%	5.7%	5.1%
Median	8.5%	6.1%	5.5%

OGS's *Value Line* Projected EPS Growth Rate

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '15-'17 to '22-'24
Revenues	- -	- -	*5.0%*
"Cash Flow"	- -	- -	*7.5%*
Earnings	- -	- -	*9.0%*
Dividends	- -	- -	*9.5%*
Book Value	- -	- -	*4.0%*

ONE Gas, Inc.	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2022-24**
Earnings Per Share	**2.24**	**2.65**	**3.02**	**3.25**	**3.45**	**3.70**	**4.75**
3 Year Base and Projected Per	**2015-17**						**2022-24**
Base and Projected EPS Figu	**2.64**						**4.75**
Base Period to Projected Period Growth Rate			**8.8%**				

Growth Rates
GDP, S&P 500 Price, EPS, and DPS

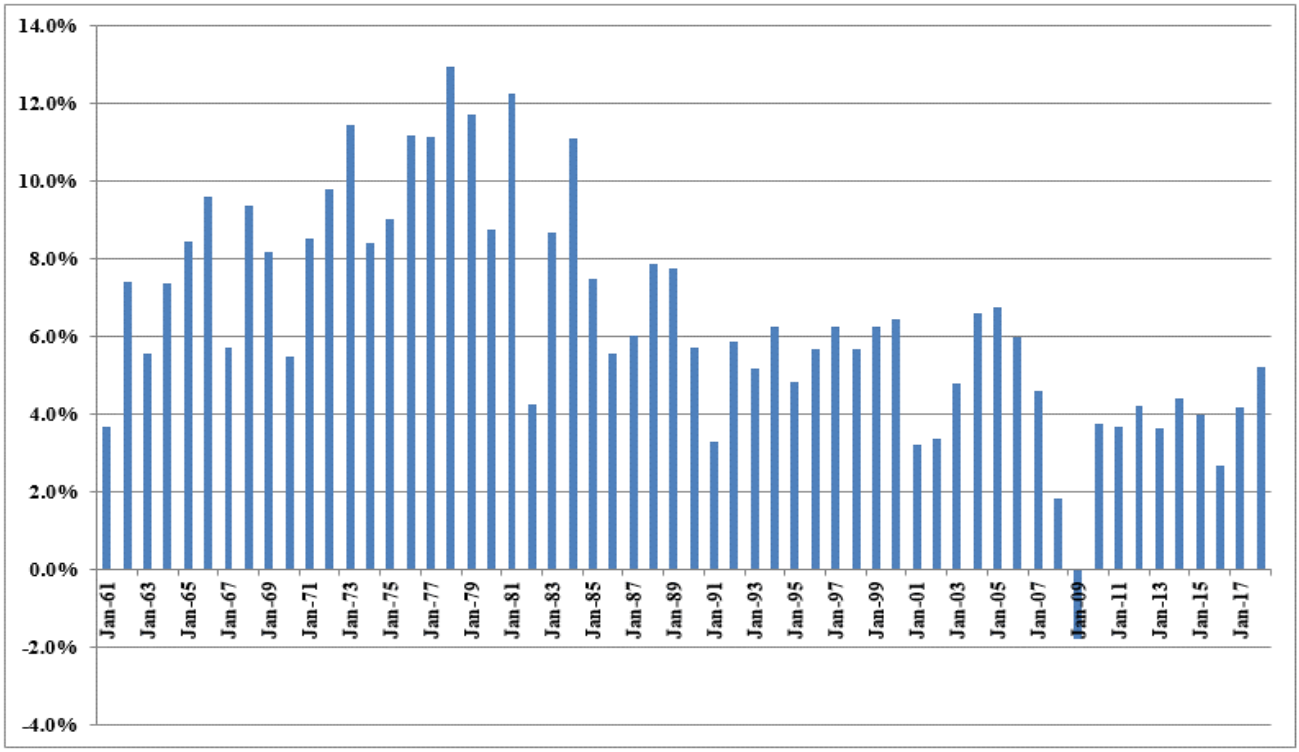
		GDP	S&P 500	S&P 500 EPS	S&P 500 DPS	
	1960	542.38	58.11	3.10	1.98	
1	1961	562.21	71.55	3.37	2.04	
2	1962	603.92	63.10	3.67	2.15	
3	1963	637.45	75.02	4.13	2.35	
4	1964	684.46	84.75	4.76	2.58	
5	1965	742.29	92.43	5.30	2.83	
6	1966	813.41	80.33	5.41	2.88	
7	1967	859.96	96.47	5.46	2.98	
8	1968	940.65	103.86	5.72	3.04	
9	1969	1017.62	92.06	6.10	3.24	
10	1970	1073.30	92.15	5.51	3.19	
11	1971	1164.85	102.09	5.57	3.16	
12	1972	1279.11	118.05	6.17	3.19	
13	1973	1425.38	97.55	7.96	3.61	
14	1974	1545.24	68.56	9.35	3.72	
15	1975	1684.90	90.19	7.71	3.73	
16	1976	1873.41	107.46	9.75	4.22	
17	1977	2081.83	95.10	10.87	4.86	
18	1978	2351.60	96.11	11.64	5.18	
19	1979	2627.33	107.94	14.55	5.97	
20	1980	2857.31	135.76	14.99	6.44	
21	1981	3207.04	122.55	15.18	6.83	
22	1982	3343.79	140.64	13.82	6.93	
23	1983	3634.04	164.93	13.29	7.12	
24	1984	4037.61	167.24	16.84	7.83	
25	1985	4338.98	211.28	15.68	8.20	
26	1986	4579.63	242.17	14.43	8.19	
27	1987	4855.22	247.08	16.04	9.17	
28	1988	5236.44	277.72	24.12	10.22	
29	1989	5641.58	353.40	24.32	11.73	
30	1990	5963.14	330.22	22.65	12.35	
31	1991	6158.13	417.09	19.30	12.97	
32	1992	6520.33	435.71	20.87	12.64	
33	1993	6858.56	466.45	26.90	12.69	
34	1994	7287.24	459.27	31.75	13.36	
35	1995	7639.75	615.93	37.70	14.17	
36	1996	8073.12	740.74	40.63	14.89	
37	1997	8577.55	970.43	44.09	15.52	
38	1998	9062.82	1229.23	44.27	16.20	
39	1999	9630.66	1469.25	51.68	16.71	
40	2000	10252.35	1320.28	56.13	16.27	
41	2001	10581.82	1148.09	38.85	15.74	
42	2002	10936.42	879.82	46.04	16.08	
43	2003	11458.25	1111.91	54.69	17.88	
44	2004	12213.73	1211.92	67.68	19.41	
45	2005	13036.64	1248.29	76.45	22.38	
46	2006	13814.61	1418.30	87.72	25.05	
47	2007	14451.86	1468.36	82.54	27.73	
48	2008	14712.85	903.25	65.39	28.05	
49	2009	14448.93	1115.10	59.65	22.31	
50	2010	14992.05	1257.64	83.66	23.12	
51	2011	15542.58	1257.60	97.05	26.02	
52	2012	16197.01	1426.19	102.47	30.44	
53	2013	16784.85	1848.36	107.45	36.28	
54	2014	17521.75	2058.90	113.01	39.44	
55	2015	18219.30	2043.94	106.32	43.16	
56	2016	18707.19	2238.83	108.86	45.03	
57	2017	19485.39	2673.61	124.94	49.73	
58	2018	20500.64	2506.85	148.34	53.61	Average
	Growth Rates	**6.46**	**6.71**	**6.89**	**5.85**	**6.48**

Nominal GDP	**6.46**
S&P 500 Stock Price	**6.71**
S&P 500 EPS	**6.89**
S&P 500 DPS	**5.85**
Average	**6.48**

A -http://research.stlouisfed.org/fred2/series/GDPA/downloaddata
, EPS and DPS - http://pages.stern.nyu.edu/~adamodar/

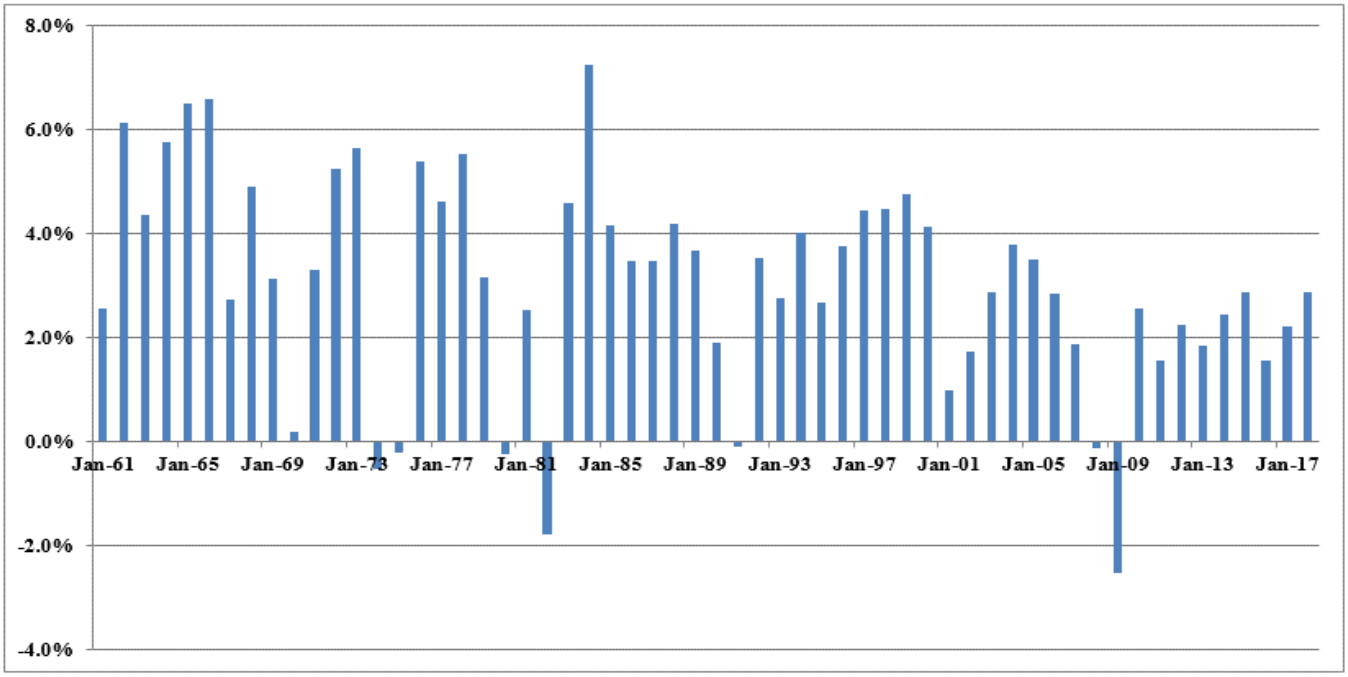
10-Year Average	**3.37%**
20-Year Average	**4.17%**
30-Year Average	**4.65%**
40-Year Average	**5.56%**
50-Year Average	**6.36%**

Nominal GDP Growth Rates
Annual Growth Rates - 1961-2018



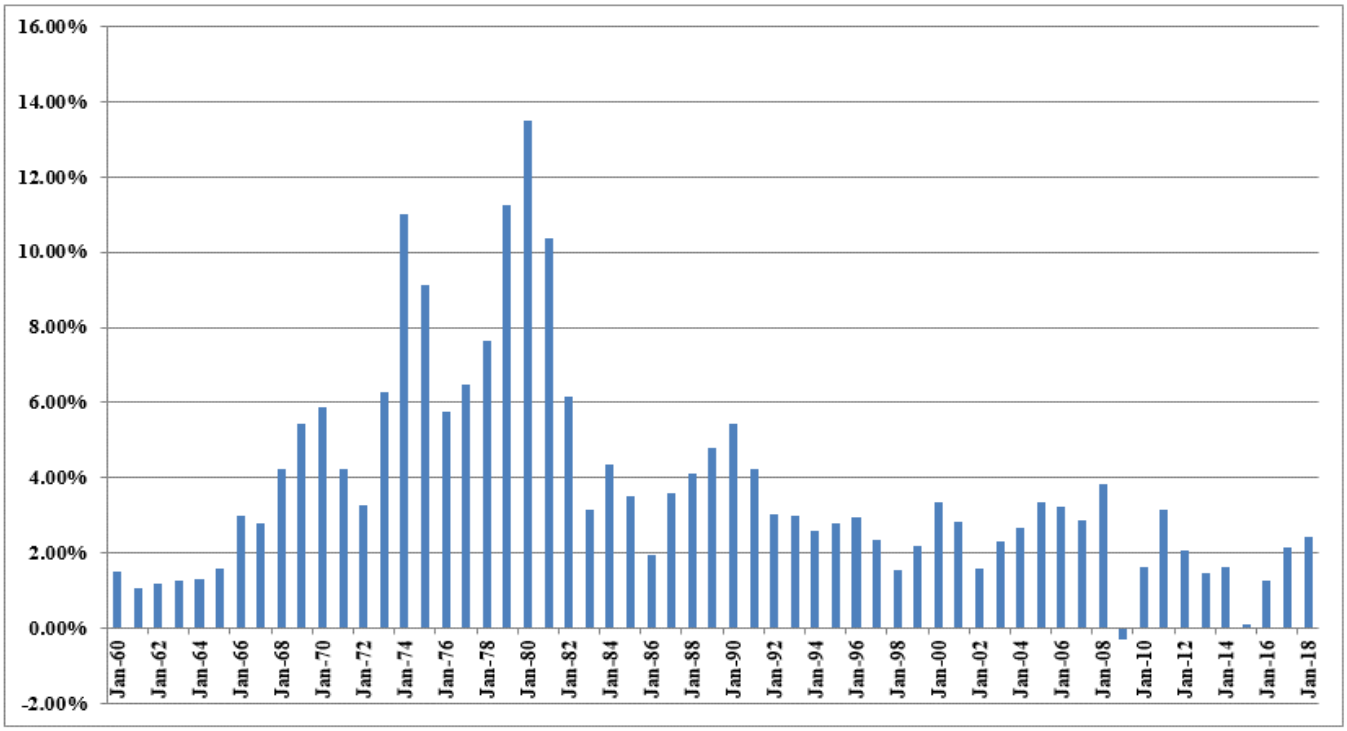
Data Sources: GDPA -https://fred.stlouisfed.org/series/GDPA

Annual Real GDP Growth Rates
1961-2018



Data Sources: GDPC1 - https://fred.stlouisfed.org/series/GDPCA

Annual Inflation Rates
1961-2018



Data Sources: CPIAUCSL - https://fred.stlouisfed.org/series/CPIAUCSL

Panel A
Historic GDP Growth Rates

10-Year Average		**3.37%**
20-Year Average		**4.17%**
30-Year Average		**4.65%**
40-Year Average		**5.56%**
50-Year Average		**6.36%**

Calculated using GDP data on Page 1 of Exhibit JRW-10

Panel B
Projected GDP Growth Rates

	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	**2019-2049**	**4.40%**
Survey of Financial Forecasters	**Ten Year**	**4.25%**
Social Security Administration	**2018-2095**	**4.35%**
Energy Information Administration	**2018-2050**	**4.20%**

Sources:

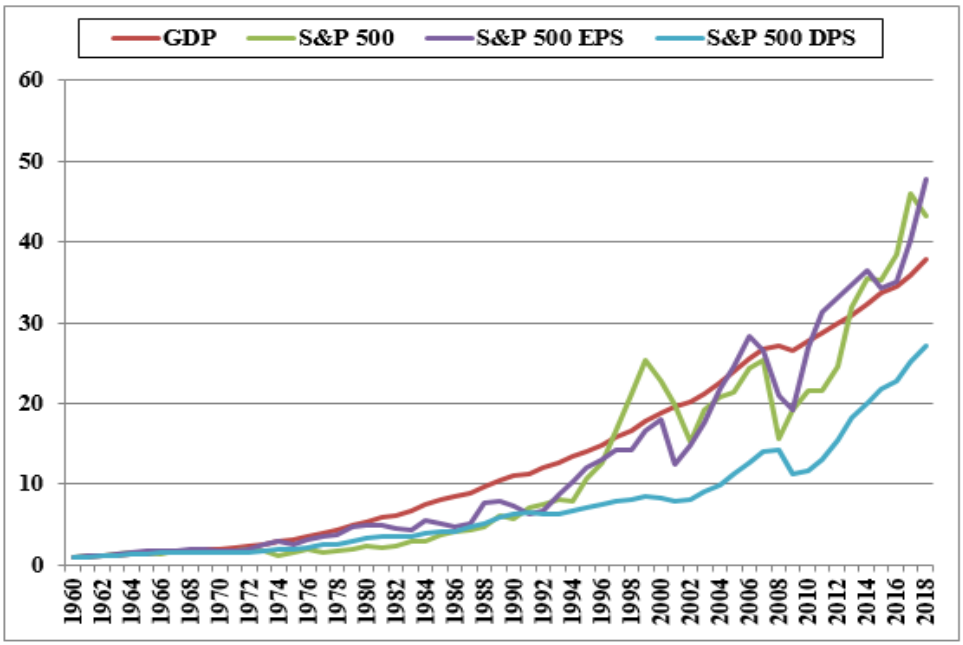
Congressional Budget Office,The *2019 Long-Term Budget Outlook* , June 15, 2019.
https://www.cbo.gov/system/files/2019-06/55331-LTBO-2.pdf

U.S. Energy Information Administration, *Annual Energy Outlook 2019* , Table: Macroeconomic Indicators,
https://www.eia.gov/outlooks/aeo/pdf/appa.pdf

Social Security Administration, 2019 Annual Report of the Board of Trustees of the Old-Age,
Survivors, and Disability Insurance (OASDI) Program, Table VI.G4, p. 211(June 15, 2019),
https://www.ssa.gov/oact/TR/2019/VI_G2_OASDHI_GDP.html#200732
in projected GDP from $21,485 trillion in 2019 to $546,331 trillion in 2095.

https://www.philadelphiafed.org/-/media/research-and-data/real-time-center/survey-of-professional-forecasters/2019/sp

Long-Term Growth of GDP, S&P 500, S&P 500 EPS, and S&P 500 DPS



	GDP	S&P 500	S&P 500 EPS	S&P 500 DPS
Growth Rates	6.47	6.95	6.70	5.82

CERTIFICATE OF SERVICE

19-ATMG-525-RTS

I, the undersigned, hereby certify that a true and correct copy of the above and foregoing document was served by electronic service on this 31st day of October, 2019, to the following:

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