BEFORE THE STATE 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

Atmos Energy Corporation

Docket No. 23-ATMG-359-RTS

Testimony and Exhibits of

J. Randall Woolridge, Ph. D.
For the Citizen's Utility Ratepayer Board

January 17, 2023

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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 the 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

Q. WHAT IS THE SCOPE 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 "the Company") and to evaluate the Company's rate of return testimony in this proceeding.[1]

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First, I review my cost of equity recommendation for Atmos and review the primary areas of contention between Atmos's rate of return position and my position. Second, I discuss selection of a proxy group of gas distribution and combination utility companies for estimating the market cost of equity for Atmos. Third, I discuss the capital structure of the Company. Fourth, I estimate the equity cost rate for Atmos. Finally, I critique the

[1] In my testimony, I use the terms "rate of return" and "cost of capital" interchangeably. This is because the required rate of return of investors on a company's capital is the cost of capital.

Company's rate of return analysis and testimony. Appendix A is my curriculum vitae.

A. Overview

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) cost of common equity, otherwise known as return on equity ("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 products and/or services. For a regulated monopoly, the regulator determines the level of profit available to the public utility. The United States Supreme Court established the guiding principles for determining an appropriate level of profitability for regulated public utilities in two cases: (1) *Hope* and (2) *Bluefield*.[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 other investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity;

[2] *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591 (1944) ("*Hope*") and *Bluefield Water Works and Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679 (1923) ("*Bluefield*").

and (3) adequate to maintain and support the company's credit and to attract capital.[3]

Thus, the appropriate ROE for a regulated utility requires determining the market-based cost of capital. 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 market data of similar-risk firms, the rate of return on equity that investors require for that risk class of firms in order to set an appropriate ROE for a regulated firm.

Q. PLEASE REVIEW THE ALTERNATIVE RECOMMENDATIONS REGARDING THE APPROPRIATE RATE OF RETURN FOR THE COMPANY.

A. Atmos has proposed a capital structure consisting of 38.86% long-term debt and 61.14% common equity and a long-term debt cost rate of 4.06%. Mr. Matthew R. Howard has applied the discounted cash flow model ("DCF"), capital asset pricing model ("CAPM") and risk premium approaches to a proxy group of six publicly held gas distribution companies. He recommends a common equity cost rate of 10.95% for the company. As shown in Table 1, Atmos has proposed an overall rate of return of 8.19%.

[3] *Id.*

Table 1
Atmos's Rate of Return Recommendation

Capital Source	Capitalization Ratios**	Cost Rate	Weighted Cost Rate
Long-Term Debt	**38.86%**	**3.86%**	**1.50%**
Common Equity	**61.14%**	**10.95%**	**6.69%**
Total Capitalization	**100.00%**		**8.19%**

I have reviewed the Company's proposed capital structure and found it has a much higher common equity ratio and less financial leverage than other gas distribution companies. As a result, I have adjusted the Company's proposed capitalization and used a capital structure that includes a common equity ratio of 55.00%. I have employed the Company's long-term debt cost rates of 4.06%. I have applied the DCF model and the CAPM to a proxy group of publicly held gas distribution companies ("Gas Proxy Group"). My analysis indicates an equity cost rate in the range of 8.70% to 9.40% is appropriate for the Company. Given that I rely primarily on the DCF model and the 2022 increase in interest rates, I recommend an ROE of 9.25%. With my proposed capital structure and senior capital cost rates, I recommend an overall fair rate of return or cost of capital of 6.91% for the company. This recommendation is provided in Table 2 and Exhibit JRW-1.

Table 2
CURB's Rate of Return Recommendation

Capital Source	Capitalization Ratios	Cost Rate	Weighted Cost Rate*
Long-Term Debt	**45.00%**	**4.06%**	**1.83%**
Common Equity	**55.00%**	**9.25%**	**5.09%**
Total Capitalization	**100.00%**		**6.91%**

B. Primary Rate of Return Issues in This Case

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:

1. <u>Capital Market Conditions:</u> Mr. Howard's analyses, ROE results, and recommendations are based on assumptions of higher interest rates and capital costs. However, despite the 2022 increase in inflation and interest rates, there are several factors suggesting the equity cost rate for utilities has not risen significantly. To support this contention, I show that: (1) despite the increase in year-over-year inflation, long-term inflation expectations are still below 2.25%; (2) the yield curve is currently inverted – which suggests that investors expect yields to decline and that a recession in the next year is likely, which would also put downward pressure on interest rates; (3) interest rates have fallen significantly, since their peak in October of 2022; (4) utility stock prices have held up very well in 2022 compared to the overall market; and (5) while authorized ROEs for utilities hit all-time lows in 2020 and 2021, these ROEs did not decline nearly as much as interest rates.

2. <u>Capital Structure</u>: The Company has proposed a capital structure with a common equity ratio of 61.14%. This includes a much higher common equity ratio and lower financial risk than the companies in the gas proxy group. Consequently, I have recommended a capital structure with a common equity ratio of 55.00%.

3. <u>DCF Approach</u>: Mr. Howard and I have both employed the traditional constant-growth DCF model. Mr. Howard has overstated his reported DCF results in several

ways: (1) by excessive reliance on the EPS growth rate forecasts of Wall Street analysts and *Value Line* as a DCF growth rate; and (2) by combining the abnormally high *Value Line* projected EPSs 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. On the other hand, when developing the DCF growth rate that I used in my analysis, I have reviewed thirteen growth rate measures, including historical and projected growth rate measures, and have evaluated growth in dividends, book value, and earnings per share.

4. <u>CAPM Approach</u>: The CAPM approach requires an estimate of the risk-free interest rate, beta, and the market or risk premium. There are several issues with Mr. Howard's CAPM/EACPM analyses: (1) he has employed the empirical CAPM ("ECAPM") version of the CAPM, which makes inappropriate adjustments to the risk-free rate and the market risk premium; and (2) he has computed a market risk premium of 11.48%. The market risk premium is larger than what is indicated by historic stock and bond return data and also those found in the published studies and surveys of the market risk premium. In addition, I demonstrate that the 11.48% market risk premium is based on totally unrealistic assumptions of future economic and earnings growth and stock returns.

As I highlight in my testimony, there are three commonly used procedures for estimating a market risk premium—historic returns, surveys, and expected return models. I have used a market risk premium of 6.00%, which factors in all three approaches—historic returns, surveys, and expected return models—to estimate a market premium. It also employs the results of many studies of the market risk

premium. As I note, the 6.00% figure reflects the market risk premiums: (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.

6. Risk Premium Approach: The equity cost rate using the risk-premium model ("RPM") is the sum of the base interest-rate yield plus a risk premium. With respect to the risk premium, Mr. Howard has employed two different approaches to estimate the market risk premium: (1) he estimates an expected return on the S&P Utility Index using the DCF model and analysts' EPS growth rate estimates; and (2) using the quarterly authorized ROEs for gas distribution companies from 1980 until 2022, he develops an equity cost rate by regressing the authorized returns on equity for gas companies on Moody's Aa bond yields.

7. Flotation Cost and Size Premium Adjustments: Mr. Howard also includes a flotation cost adjustment of 0.05% and a size premium of 0.20% in his ROE recommendation. As noted, the Company's S&P issued credit rating of A- is better than the average of the proxy group which indicates that the Company's investment risk, despite its size, is in line better than the proxy companies. With respect to flotation costs, Mr. Howard has not provided any evidence that the Company has paid flotation costs. Therefore, the Company should not be allowed to collect additional revenues in the form of a higher ROE for flotation costs which did not incur.

II. CAPITAL MARKET CONDITIONS AND AUTHORIZED ROES

A. Capital Market Conditions

Q. PLEASE PROVIDE A SUMMARY OF THE UTILITY CAPITAL MARKET INDICATORS IN EXHIBIT JRW-2.

A. The yields on A-rated public utility bonds have gradually declined in the past decade from 7.5% to the 3.0% range.[4] These yields bottomed out in the 3.0% range in 2020 and 2021. They increased with interest rates in general in 2022, and now are in the 4.75% range. The average dividend yield for gas companies is shown on page 2 of Exhibit JRW-2. These yields declined over the last decade, bottoming out at 2.7% in 2017. They have increased since that time, and were in the 3.5% range as of 2021. The average ROE for gas companies has been in the range of 8.0%-9.0% in recent years, while the average market-to-book ratio reached 2.25X in 2019, but decreased to the 1.50X range as of the end of 2021.[5]

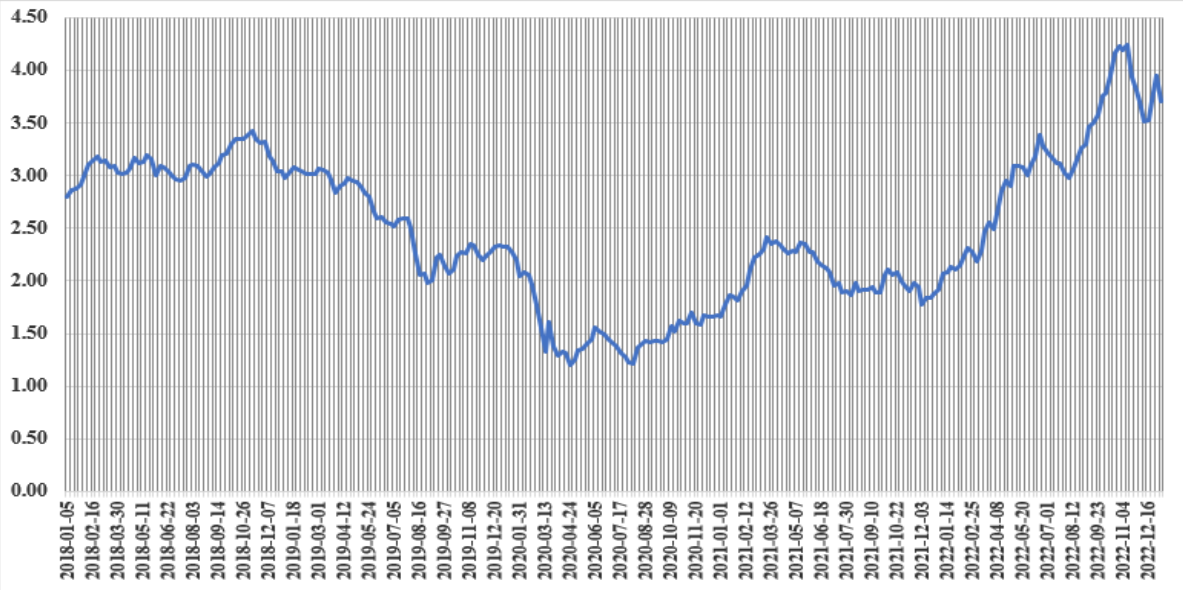
Q. PLEASE REVIEW INTEREST RATE MOVEMENTS IN RECENT YEARS.

A. Figure 1, below, shows 30-year Treasury yields over the past four years (2019 to 2022). These yields were in the 3.0% range at the end of 2018. These yields declined to the 2.25% range in 2019 due primarily to slow economic growth and low inflation. In 2020, with the advent of the COVID-19 pandemic in February of that year, 30-year Treasury yields declined to record low levels, declining about 100 basis points to the 1.25% range. They began their recovery in the summer of 2020 and increased to about

[4] Exhibit JRW-2 at 1.
[5] Exhibit JRW-2 at 3.

2.50% in the first quarter of 2021. They subsequently fell to below 2.0% in the fourth quarter of 2021 but have increased significantly in 2022 and peaked at 4.40% in October. They have since retreated to the 3.70% range.

Figure 1
30-Year Treasury Yields

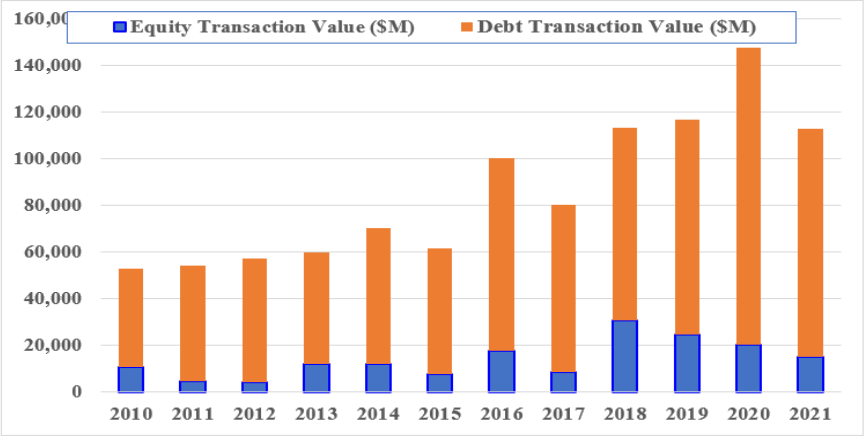


Data source: https://fred.stlouisfed.org/series/DGS30

Q. HAVE UTILITIES TAKEN ADVANTAGE OF THE LOWER BOND YIELDS TO RAISE CAPITAL?

A. Yes. Figure 2 shows the annual amounts of debt and equity capital raised by public utility companies over the past decade. Electric utility and gas distribution companies have taken advantage of the low interest rate and capital cost environment of recent years and raised record amounts of capital in the markets. In fact, in each of the last four years, public utilities have raised a total of over $100 billion in debt and equity.

Figure 2
Debt and Equity Capital Raised by Public Utilities
2010–2021



Source: S&P Global Market Intelligence, S&P Cap IQ, 2022.

Q. PLEASE DISCUSS THE INCREASE IN INTEREST RATES IN 2022.

A. Several factors have led to higher interest rates in 2022, generally tied to an improving economy and higher inflation. Real GDP growth increased 5.7% in 2021, compared to a decline of -3.4% in 2020. This recovery led to greater business activity, higher levels of business and consumer spending, and record increases in housing prices. Unemployment, which was 6.7% in 2020, declined to 3.6% in 2022. The recovery in the economy puts upward pressure on interest rates by increasing the demand for capital.

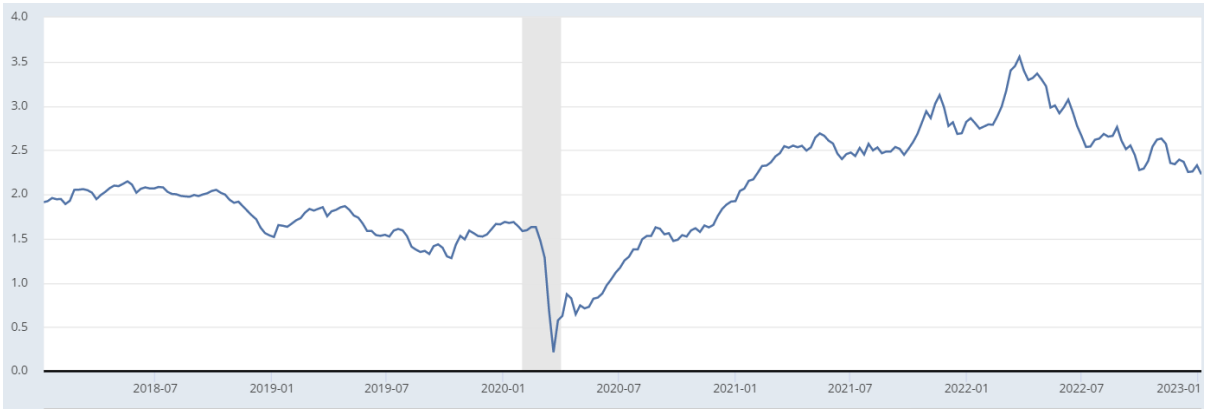
In addition, as reported extensively in the financial press, inflation has picked up significantly over the past year, putting additional pressure on interest rates. Reported year-over-year inflation has been as high as 9.20% in 2022. The high inflation reported in the past year primarily reflects three factors: (1) the recovering economy, as discussed above; (2) the production shutdowns during the pandemic led

to supply chain shortages as the global economy has recovered; and (3) the war in Ukraine has led to higher energy and gasoline prices worldwide.

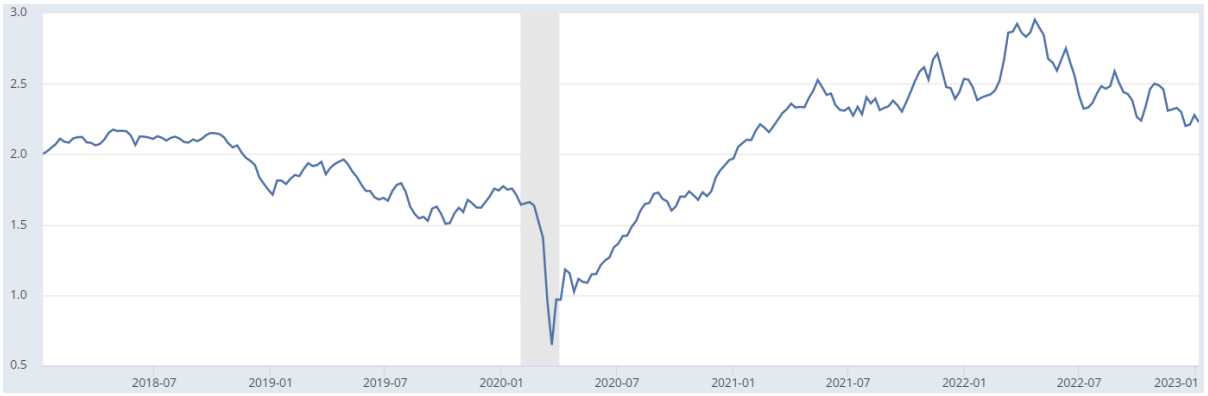
In response to the higher inflation, the Federal Reserve increased the discount rate in 2022 by 25 basis points in March, 50 basis points in May, 75 basis points in June, July, September, and November and 50 basis point in December. However, the Federal Reserve's actions on the discount rate only directly affect short-term rates. Long-term rates are more a function of expected economic growth and expected inflation. One conundrum is that, whereas the government is reporting annual year-over-year inflation rates as high as 9.20%, the 30-year Treasury yield is still only about 3.70%.

Investors' inflation expectations can be seen by looking at the difference between yields on ordinary Treasuries and the yields on inflation-protected Treasuries, known as TIPS. Panel A of Figure 3 shows the expected inflation rate over the next five years. You can see the big increase over the past year, but that it has fallen off with a current expected inflation rate of 2.18% over the next five years. Panels B and C of Figure 3 show the expected inflation rate over the next ten and thirty years. The expected inflation rates over the next ten and thirty years are 2.22% and 2.25%.

Figure 3
Panel A
5-Year Breakeven Inflation Rate



Panel B
10-Year Breakeven Inflation Rate



Panel C
30-Year Breakeven Inflation Rate

Source: https://fred.stlouisfed.org/.

Q. HOW HAVE UTILITY STOCK PERFORMED IN 2022?

A. The higher inflation and interest rates, combined with the potential of an economic recession, have hit the stock market in a negative way. The S&P 500 was down double digits in 2022. Figure 4 shows the S&P Utilities Index versus the S&P 500 Index over the past year. Over the past year, the S&P 500 is down about -16.00%, while utility stocks have performed relative well and are up 1.44%.[6]

Figure 4
S&P Utility Index vs. the S&P 500

Source: S&P Cap IQ.

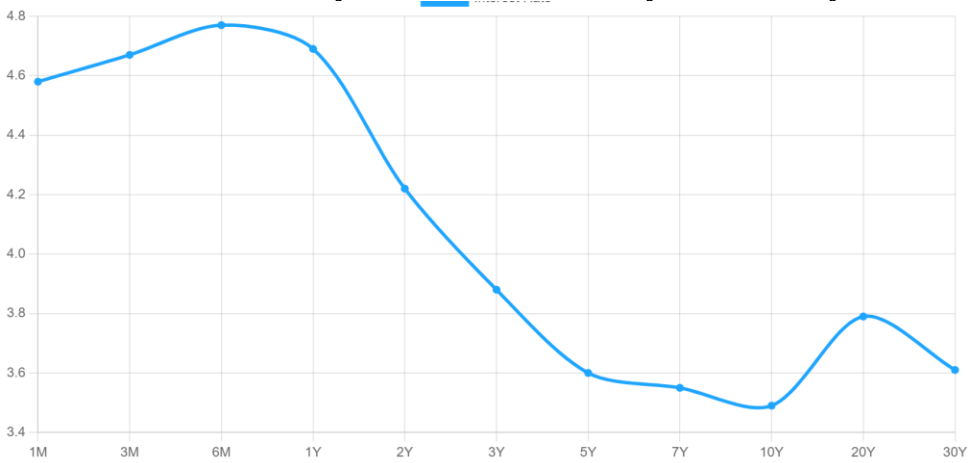
Q. DO YOU BELIEVE THAT INTEREST RATES WILL CONTINUE TO INCREASE INTO 2023?

A. No. Obviously, as discussed above, the current inflationary environment has pushed up interest rates significantly in 2022. Also, as noted above, the Federal Reserve has responded with a series of discount rate increases, with the intention of slowing the economy and cooling down inflation, which would lower interest rates. Figure 5 shows the yield curve, which plots the yield-to-maturity and time-to-maturity for Treasury

[6] The S&P Utilities Index is made up of the 29 utilities that are in the S&P 500. The index primarily is made up of electric utilities, but it does include two gas companies – Atmos and NiSource.

securities. The yield curve is usually upward sloping because investors require higher returns to commit capital for longer periods of time. Currently, the yield curve is said to be "inverted," which means that the yields on shorter-term maturity securities are higher than the yields on longer-term securities. This means that investors do not expect interest rates to remain where they are, but they should decline.

Figure 5
The Yield Curve
The Yield-to-Maturity and Time-to-Maturity for Treasury Securities

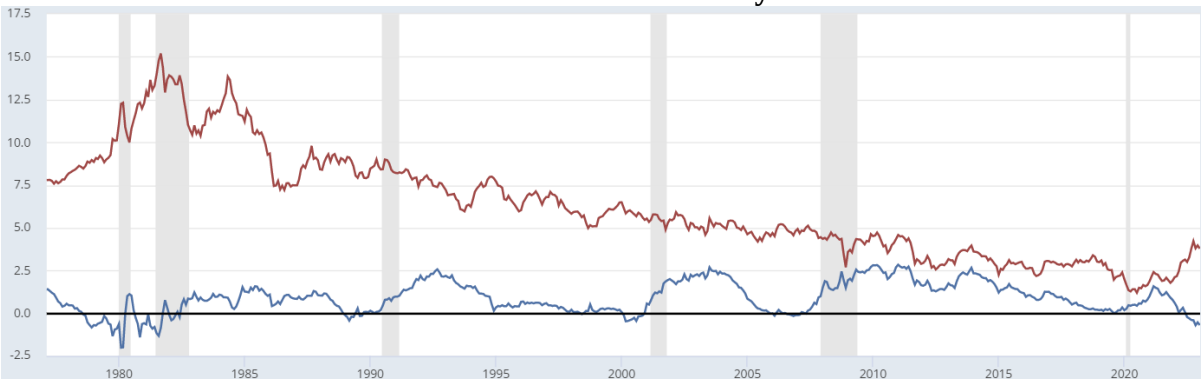


Source: https://www.ustreasuryyieldcurve.com/

The financial press has focused on another aspect of an inverted yield curve. An inverted yield curve also is an indicator of a pending recession, which would also put downward pressure on interest rates. An inverted yield curve is usually indicated when the two-year Treasury yield is above the ten-year Treasury yield. Figure 6 graphs two lines: (1) the 10-year Treasury yield minus the two-year Treasury yield (blue line); and (2) the 30-year Treasury yield (red line). In Figure 6, the shaded areas are economic recessions, as defined as two-straight quarters with negative GDP growth. In Figure 6, you can see that every time the yield curve inverted (2-year > 10-year) in the last fifty

years, a recession followed. In addition, you can see that interest rates, as indicated by the 30-year Treasury yield in Figure 6, decline during recessions. Since the yield curve is currently inverted, a recession and lower interest rates are likely to follow.

Figure 6
Treasury 10-Year Minus 2-Year Yields
And the 30-Year Treasury Yield



Q. PLEASE SUMMARIZE YOUR ASSESSMENT OF THE CURRENT CAPITAL MARKET SITUATION.

A. The U.S. economy, which declined nearly twenty percent in the first half of 2020, rebounded significantly in 2021 and rebounded in 2022. This rebound has seen big increases in consumer and business spending, lower unemployment, and higher housing prices. The rebounding economy has put pressure on prices. This has been further exacerbated by the post-COVID supply chain issues and the higher energy prices brought on by the Russia-Ukraine conflict.

Nonetheless, utilities took advantage of the low yields in 2020 and 2021 to raise record amounts of capital, and utility stocks have held up quite well in 2022 compared to the overall stock market, which was down over 15%. The big economic issue is reported year-over-year inflation. However, as I noted above, with an inverted yield

curve, the prospect of a recession is likely, which would lead to lower interest rates. In addition, while short-term inflation is expected to be high, the yields on TIPS suggest that longer-term inflation expectations are in the 2.25% range.

B. Authorized ROEs

Q. PLEASE DISCUSS THE TREND IN AUTHORIZED ROES FOR ELECTRIC AND GAS COMPANIES.

A. In Figure 7, I graph quarterly authorized ROEs for electric and gas companies from 2000 to 2021. Over the years, as interest rates have come down, authorized ROEs for electric utility and gas distribution companies have slowly declined to reflect a low-capital-cost environment. In 2020 and 2021, authorized ROEs for utilities hit an all-time low. The average annual authorized ROEs for electric utilities and gas distribution companies are shown in Table 3.

Figure 7
Authorized ROEs for Electric Utilities and Gas Distribution Companies
2000–2022

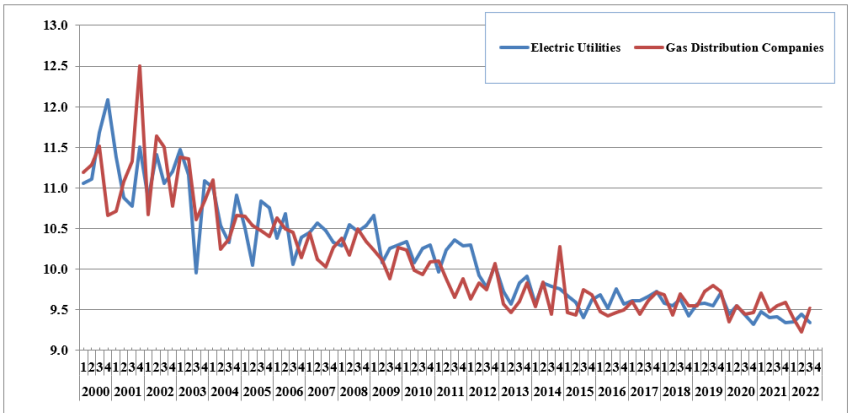


Table 3
Average Annual Authorized ROEs for Electric Utilities and Gas Distribution Companies
2010–2022

	Electric	Gas		Electric	Gas
2010	**10.37**	**10.15**	**2017**	**9.74**	**9.72**
2011	**10.29**	**9.92**	**2018**	**9.6**	**9.59**
2012	**10.17**	**9.94**	**2019**	**9.66**	**9.72**
2013	**10.03**	**9.68**	**2020**	**9.44**	**9.47**
2014	**9.91**	**11.48**	**2021**	**9.38**	**9.56**
2015	**11.48**	**9.6**	**2022**	**9.37**	**9.42**
2016	**9.77**	**9.54**			

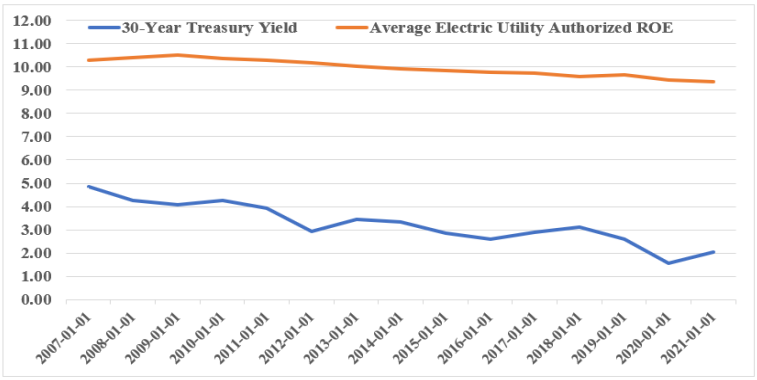
Source: S&P Global Market Intelligence, RRA Regulatory Focus, 2022.

Q. DO THE HIGHER INTEREST RATES IN 2022 MEAN AUTHORIZED ROES HAVE INCREASED SIGNIFICANTLY?

A. No, not necessarily. As I note above, authorized ROEs for utilities reached record low levels in 2020 and 2021 due to record low interest rates and capital costs. However, utility ROEs did not decline to the extent interest rates did over these two years. Figure 8 and Table 4 show the average annual 30-year Treasury yields and authorized ROEs for electric utilities and gas distribution companies. A key observation from Figure 8 and Table 3 is that authorized ROEs for electric utilities and gas distribution companies, despite hitting record lows in 2020–21, did not decline nearly as much as interest rates. The average daily 30-year Treasury yield declined from 3.11% in 2018 to 1.56% in 2020, a decrease of 155 basis points. However, the average authorized ROE for electric utilities declined only from 9.60% in 2018 and 9.66% in 2019, to 9.44% in 2020 and 9.38% in 2021. This means authorized electric ROEs declined by about 20 basis points, but the 30-year Treasury yield decreased by over 150 basis points. Likewise, the

average authorized ROE for gas distribution companies declined from 9.59% in 2018 and 9.72% in 2019, to 9.47% in 2020 and 9.56% in 2021. This means utility authorized gas ROEs declined by 10–15 basis points, but the 30-year Treasury yield decreased by over 150 basis points.

Figure 8
Authorized ROEs for Electric Utilities and 30-Year Treasury Yields
2007–2021



Authorized ROEs for Gas Distribution Companies and 30-Year Treasury Yield
2007–2021

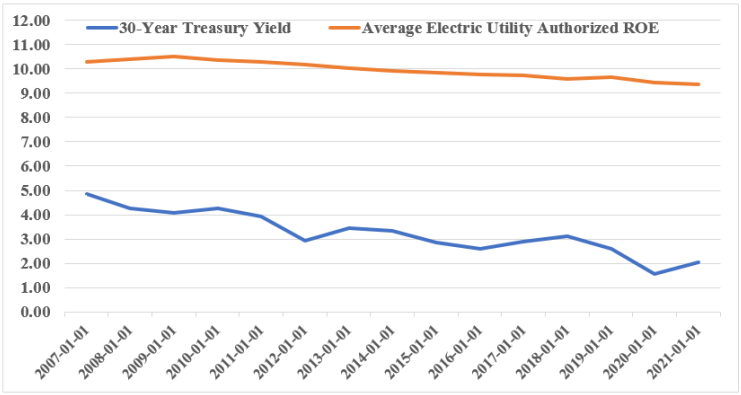


Table 4
Average Annual 30-Year Treasury Yields and Authorized ROEs
for Electric Utility and Gas Distribution Companies
2018–2021

	2018	2019	2020	2021
30-Year Treasury Yield	3.11%	2.58%	1.56%	2.06%
Average Electric ROE	9.60%	9.66%	9.44%	9.38%
Average Gas ROE	9.59%	9.71%	9.46%	9.56%

Q. PLEASE DISCUSS AUTHORIZED ROES IN KANSAS.

A. Table 5 shows the authorized ROEs reported by RRA in 2022 for electric utilities and gas companies in Kansas since 2010. Since 2014, the authorized ROEs in Kansas have ranged from 9.1% to 9.3%. In the Company's last rate case in 2020, Atmos received a ROE of 9.10% and a capital structure with a common equity ratio of 56.32%. In the Company's previous rate case in 2014, Atmos also received a ROE of 9.10%, with a capital structure with a common equity ratio of only 53.00%.

Table 5
Kansas Rate Cases
2010-2022

Company	TKR	Docket	Service	Type	Date	Decision	$ (M)	ROR	ROE (%)	CE (%)
Evergy Kansas Central Inc.	EVRG	D-09-WSEE-925-RTS	Electric	Vertically Integrated	1/27/2010	Settled	8.6	8.49	10.40	50.13
Evergy Kansas South	EVRG	D-09-WSEE-925-RTS	Electric	Vertically Integrated	1/27/2010	Settled	8.6	8.49	10.40	50.13
Evergy Metro Inc	EVRG	D-10-KCPE-415-RTS	Electric	Vertically Integrated	11/22/2010	Fully Litigated	21.8	8.37	10.00	49.66
Evergy Metro Inc	EVRG	D-12-KCPE-764-RTS	Electric	Vertically Integrated	12/13/2012	Fully Litigated	33.2	8.01	9.50	51.82
Evergy Kansas Central Inc.	EVRG	D-13-WSEE-629-RTS	Electric	Vertically Integrated	11/21/2013	Settled	30.7	8.40	10.00	52.63
Atmos Energy Corp.	ATO	D-14-ATMG-320-RTS	Natural Gas	Distribution	9/4/2014	Settled	4.3	7.75	9.10	53.00
Evergy Metro Inc	EVRG	D-15-KCPE-116-RTS	Electric	Vertically Integrated	9/10/2015	Fully Litigated	40.1	7.44	9.30	50.48
Evergy Kansas Central Inc.	EVRG	D-18-WSEE-328-RTS	Electric	Vertically Integrated	9/27/2018	Settled	(50.3)	7.06	9.30	51.24
Evergy Metro Inc	EVRG	D-18-KCPE-480-RTS	Electric	Vertically Integrated	12/13/2018	Settled	(3.9)	7.07	9.30	49.90
Atmos Energy Corp.	ATO	D-19-ATMG-525-RTS	Natural Gas	Distribution	2/24/2020	Fully Litigated	3.1	7.03	9.10	56.32

Source: S&P Global Market Intelligence, RRA *Regulatory Focus*, 2022.

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

A. Yes, I do. As I note previously, 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.[7] As page 3 of Exhibit JRW-2 shows, in recent years, gas distribution companies have been earning ROEs in the range of 8.0% to 10.0%. With such an ROE, gas companies such as those in the proxy group have strong investment grade credit ratings, their stocks sell well over book value, and they raise abundant amounts of capital. While my recommendation is a little below the average authorized ROE for electric utility and gas distribution companies, it reflects the interest rates and capital costs in the current market. Therefore, I believe that my ROE recommendation meets the criteria *Hope* and *Bluefield* established.

Q. WITH RESPECT TO THIS DISCUSSION, PLEASE DISCUSS THE RECENT *WALL STREET JOURNAL* ARTICLE ON UTILITIES' AUTHORIZED ROES IN THE CURRENT ENVIRONMENT.

A. The article, entitled "Utilities Have a High-Wire Act Ahead," discusses the issue utilities are facing today to meet the needs of their primary stakeholders – customers and investors.[8] For over a decade, utilities have invested and grown their rate bases without undue burden on ratepayers because low interest rates and natural gas prices have moderated rate increases. However, the big increase in gas prices and interest rates in 2022 means that this environment of the last decade is over.[9] Going forward, the greater financial burden on utility ratepayers associated with higher gas prices and

[7] *Fed. Power Comm'n v. Hope Natural Gas Co*., 320 U.S. 591 (1944); *Bluefield Water Works and Improvement Co. v. Pub. Serv. Comm'n of W. Va.*, 262 U.S. 679 (1923).
[8] Jinjoo Lee, "Utilities Have a High-Wire Act Ahead," *Wall Street Journal*, October 9, 2022, p. C1.
[9] Higher gas prices do not hurt the utilities because they are passed on to consumers in the form of higher rates.

interest rates will likely put the pressure on regulatory commissions to look hard at utility rate increase requests.

The article also highlights this utility rate issue in the context of a recent study on rate of return regulation. Werner and Jarvis (2022) evaluated the authorized ROEs in 3,500 electric and gas rate case decisions in the U.S. from 1980-2021. They compare the allowed rate of return on equity to a number of capital cost benchmarks (government and corporate bonds, CAPM equity cost rate estimates, and U.K. authorized ROEs) and focused on three questions: (1) To what extent are utilities being allowed to earn excess returns on equity by their regulators? (2) How has this return on equity affected utilities' capital investment decisions? (3) What impact has this had on the costs paid by consumers?[10]

The authors reported the following empirical results:

(1) The real (inflation-adjusted) return regulators allow equity investors to earn has been pretty steady over the last 40 years, while the many different cost of capital measures have been declining;

(2) The gap between the authorized ROEs and the benchmarks suggest that regulators have been approving ROEs that are from 0.50% - 5.50% above the cost of equity estimates;

(3) One potential explanation is that utilities have become riskier. However, the authors find that utility credit ratings, on average, have not changed much over the past 40 years;

(4) An extra 1.0% of allowed return on equity causes a utility's capital rate base to expand by an extra 5% on average. This supports the Averch-Johnson effect that utilities have the incentive to overinvest in capital projects if they are earning an outsized return on those investments;

[10] Karl Dunkle Werner and Stephen Jarvis, "Rate of Return Regulation Revisited," Working Paper, Energy Institute, University of California at Berkeley, 2022.

(5) Both the return on equity requested by utilities and the return granted by regulators respond more quickly to rises in market measures of capital cost than to declines. The time adjustment for decreases is twice as long as for increases;

(6) Authorized ROEs tend to be approved at round numbers (1.0, 0.5, 0.25), with 10.0% being the most common authorized ROE;

(7) Overall, based on the gap, consumers may be paying $2-20 billion per year more than if authorized ROEs had fallen in line with other capital market indicators; and

(8) The authors also indicate that their results are similar to those found in a previous study by Rode and Fischback (2019).[11]

In summary, these results indicate that over the past four decades authorized ROEs have not declined in line with capital costs and therefore past authorized ROEs have overstated the actual cost of equity capital. Hence, the Commission should not be concerned that my recommended ROE is below other authorized ROEs.

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, I have evaluated the return requirements of investors on the common stock of a proxy group of publicly held gas distribution companies ("gas proxy group").

Q. PLEASE DESCRIBE YOUR PROXY GROUP OF GAS DISTRIBUTION COMPANIES.

[11] David C. Rode and Paul S. Fischbeck, "Regulated Equity Returns: A Puzzle." *Energy Policy*, October, 2019.

A. My gas proxy group consists of eight natural gas distribution companies. The companies include Atmos Energy, Chesapeake Utilities, New Jersey Resources, NiSource, Inc. Northwest Natural Gas Company, ONE Gas, Inc., Southwest Gas, and Spire.

Summary financial statistics for the gas proxy group are listed on Panel A of page one of Exhibit JRW-3. The median operating revenues and net plant among members of the gas proxy group are $2.63 billion and $5.40 billion, respectively. The group receives 71 percent of revenues from regulated gas operations, has a BBB+ average issuer credit rating from S&P, an average common equity ratio of 41.0%, and a median earned return on common equity of 8.99%.

Q. HOW DOES YOUR GROUP COMPARE TO MR. HOWARD'S GROUP OF GAS DISTRIBUTION COMPANIES?

A. Mr. Howard has excluded Chesapeake Utilities, Inc. and Southwest Gas from the group of gas distribution companies covered by *Value Line*. Given the low number of available gas companies, I do not believe these companies should be eliminated from the *Value L*ine group of companies.

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

A. I believe that bond ratings provide a good assessment of the investment risk of a company. As shown in Exhibit JRW-3, page 1, Atmos's issuer credit rating of A- from S&P is above the average issuer credit rating of BBB+ for the proxy group. This suggests that Atmos is less risky than the average S&P bond rating for the group.

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-3, 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 (0.85), Financial Strength (A), Safety (2.0), Earnings Predictability (68), and Stock Price Stability (86).[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. WHAT ARE ATMOS'S RECOMMENDED CAPITAL STRUCTURE AND SENIOR CAPITAL COST RATES FOR RATEMAKING PURPOSES?

A. Atmos has proposed a capital structure consisting of 38.86% long-term debt and 61.14% common equity and a long-term debt cost rate of 4.06%.

Q. PLEASE DISCUSS THE CAPITAL STRUCTURE OF THE COMPANIES IN THE PROXY GROUP.

A. As shown on page 1 of Exhibit JRW-3, the average common equity ratio for the companies in the Gas Proxy Group is 41.0%. These are the capital structure ratios for the holding companies that trade in the markets and are used to estimate an equity cost rate for Atmos. These ratios indicate that the companies in the gas proxy group have, on average, a much lower common equity ratio than that proposed by Atmos. As such, Atmos's proposed capital structure has more common equity and less financial risk than the average capital structure of the companies in the proxy groups.

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

Q. IS IT APPROPRIATE TO USE THE COMMON EQUITY RATIOS OF THE PARENT HOLDING COMPANIES OR SUBSIDIARY OPERATING UTILITIES FOR COMPARISON PURPOSES WITH ATMOS'S PROPOSED CAPITALIZATION?

A. It is appropriate to use the common equity ratios of the utility holding companies because the *holding companies* are publicly traded, and their stocks are used in the cost-of-equity capital studies. The equities of the *operating utilities* are not publicly traded, and hence their stocks cannot be used to compute the cost of equity capital for Atmos.

Q. IS IT APPROPRIATE TO INCLUDE SHORT-TERM DEBT IN THE CAPITALIZATION IN COMPARING THE COMMON EQUITY RATIOS OF THE HOLDING COMPANIES WITH ATMOS'S PROPOSED CAPITALIZATION?

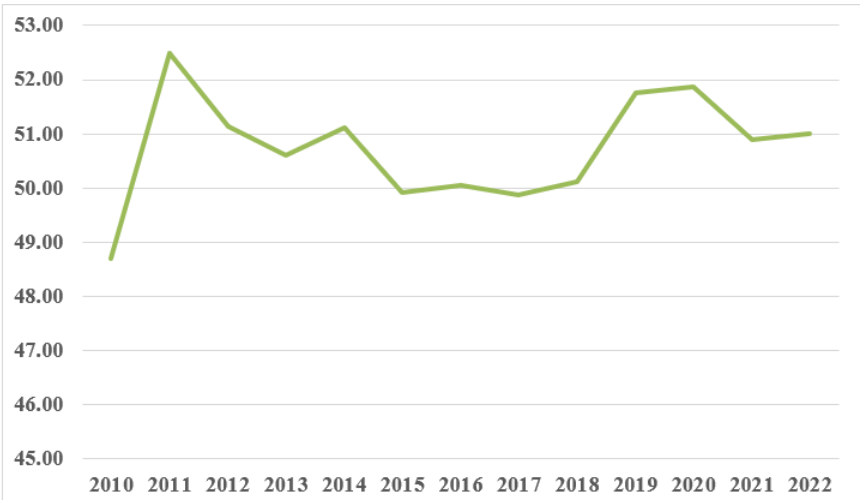
A. Yes. Short-term debt, like long-term debt, has a higher claim on the assets and earnings of the company and requires timely payment of interest and repayment of principal. Thus, in comparing the common equity ratios of the holding companies with Atmos's recommendation, it is appropriate to include short-term debt when computing the holding company common equity ratios. Additionally, the financial risk of a company is based on total debt, which includes both short-term and long-term debt.

Q. HOW DOES ATMOS'S RECOMMENDED COMMON EQUITY RATIO COMPARE TO THE AVERAGE COMMON EQITY RATIOS APPROVED BY STATE REGULATORY COMMISSIONS?

A. Figure 9 shows the average annual approved common equity ratios for gas distribution

companies in the U.S. since 2010. Over that period, the average annual common equity ratio has ranged from 48.7% to 52.49%, with an average for the entire period of 51.7%.[13] The average common equity ratio in the first three quarters of 2022 was 51.0%. As such, Atmos's proposed capital structure has much more common equity and less financial risk than those approved for gas companies by state regulatory commissions.

Figure 9
Average Gas Company Approved Common Equity Ratios
2010-2022



Source: S&P Global Market Intelligence, RRA Regulatory Focus, 2022.

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 return on equity that investors will require, and the overall revenue

[13] S&P Global Market Intelligence, RRA Regulatory Focus, 2022.

requirements its customers are required to bear through the rates they pay.

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, its 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 the customers are called on to bear. Again, equity capital is more expensive than debt. Not only does equity command a higher cost rate, but 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 to minimize the overall cost of capital.

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 regulated gas distribution company 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.

Q. GIVEN THAT THE COMPANY HAS PROPOSED AN EQUITY RATIO THAT IS MUCH HIGHER THAN THAT OF THE PROXY GROUP, AS WELL THE AVERAGE COMMON EQUITY RATIOS APPROVED FOR GAS COMPANIES, WHAT SHOULD THE COMMISSION DO IN THIS RATEMAKING 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 authorize a lower common equity cost rate than that for the proxy group.

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 low 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 the lower risk and the appropriate authorized return should not be ignored.

Q. GIVEN THIS DISCUSSION, WHAT CAPITALIZATION RATIOS ARE YOU RECOMMENDING FOR THE COMPANY?

A. I am using a capital structure with an imputed common equity ratio of 55.0%.[14] This provides the Company with a capital structure with a common equity ratio that is in between their proposed capitalization (61.14%) and the average authorized common equity ratio for approved for gas distribution companies, and is well above the average common equity ratio of the Gas Proxy Group (41.0%).

Q. WHAT SENIOR CAPITAL COST RATES ARE YOU USING FOR THE COMPANY?

A. I am using Atmos's proposed long-term debt cost rate of 4.06%.

[14] Exhibit JRW-4.

IV. EQUITY COST RATE CASH FLOW APPROACHES

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, most 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 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. [15]

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.

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

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:

> 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. [16]

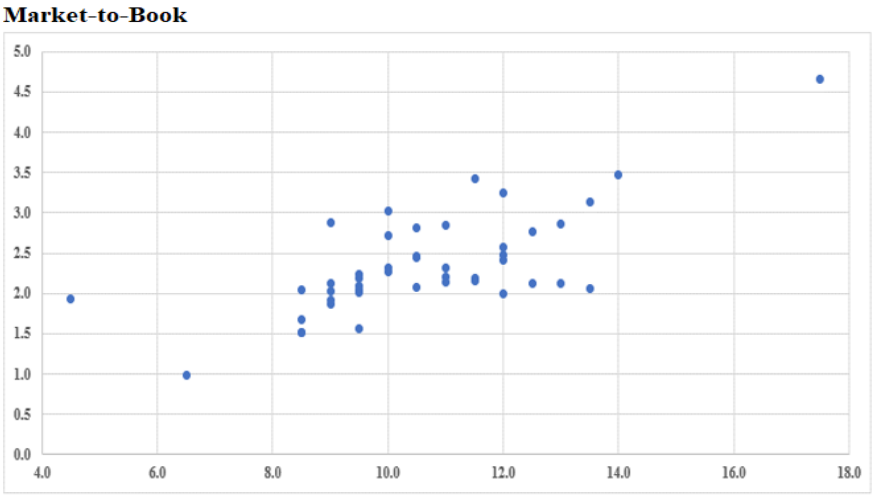
Profitability	*Value*
If ROE > K	*then Market/Book > 1*
If ROE = K	*then Market/Book =1*
If ROE < K	*then Market/Book< 1*

To assess the relationship by industry, as suggested above, I performed a regression study between estimated ROE and market-to-book ratios for a group of electric utility and gas distribution companies. The results are presented in Figure 10. The average R-square is 0.50.[17] 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.

[16] Benjamin C. Esty, *Note on Value Drivers*, HARVARD BUSINESS SCHOOL BACKGROUND NOTE 297-082, April 1997.

[17] 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 0 and 1.0, with values closer to 1.0 indicating a higher relationship between two variables.

Figure 10
The Relationship between Expected ROE and Market-to-Book Ratios
Electric Utilities and Gas Distribution Companies



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.

Table 6 provides an assessment of investment risk for 92 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 low compared to other industries.[18] The average betas for electric, gas, and water utility companies are 0.89, 0.87, and 0.78, 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.

[18] As I discuss in more detail below, 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.

[19] The beta for the *Value Line* electric utilities is the simple average of *Value Line*'s Electric East (0.89), Central (0.88), and West (0.89) group betas.

Table 6
Industry Average Betas*
Value Line Investment Survey Betas**

Industry Average Betas*
Value Line Investment Survey* Betas*
15-Jan-23

Rank	Industry	Beta	Rank	Industry	Beta	Rank	Industry	Beta
1	Hotel/Gaming	1.52	33	Paper/Forest Products	1.16	65	IT Services	1.05
2	Oilfield Svcs/Equip.	1.44	34	Heavy Truck & Equip	1.16	66	Packaging & Container	1.02
3	Insurance (Life)	1.40	35	Bank	1.16	67	Telecom. Equipment	1.02
4	Apparel	1.38	36	Computer Software	1.16	68	Information Services	1.01
5	Advertising	1.38	37	Bank (Midwest)	1.15	69	Retail Store	1.01
6	Petroleum (Integrated)	1.37	38	Engineering & Const	1.15	70	Med Supp Non-Invasive	1.01
7	Petroleum (Producing)	1.36	39	Diversified Co.	1.15	71	Environmental	1.00
8	Air Transport	1.34	40	Entertainment	1.15	72	Cable TV	1.00
9	Homebuilding	1.34	41	Chemical (Specialty)	1.14	73	Retail Building Supply	0.99
10	Metals & Mining (Div.)	1.33	42	Internet	1.14	74	Thrift	0.98
11	Shoe	1.31	43	Maritime	1.14	75	Educational Services	0.96
12	Auto Parts	1.30	44	Machinery	1.14	76	Entertainment Tech	0.95
13	Building Materials	1.30	45	Semiconductor	1.13	77	Drug	0.95
14	Retail (Hardlines)	1.29	46	Wireless Networking	1.13	78	Telecom. Services	0.93
15	Metal Fabricating	1.29	47	Computers/Peripherals	1.13	79	Trucking	0.91
16	Public/Private Equity	1.29	48	Toiletries/Cosmetics	1.12	80	Beverage	0.91
17	Natural Gas (Div.)	1.28	49	Medical Services	1.12	81	Tobacco	0.90
18	Steel	1.27	50	Electronics	1.12	82	Telecom. Utility	0.90
19	Recreation	1.25	51	Chemical (Basic)	1.12	83	Electric Utility (West)	0.89
20	Retail (Softlines)	1.25	52	E-Commerce	1.11	84	Electric Utility (East)	0.89
21	Restaurant	1.23	53	Automotive	1.11	85	Electric Util. (Central)	0.88
22	Furn/Home Furnishings	1.23	54	Insurance (Prop/Cas.)	1.10	86	Natural Gas Utility	0.87
23	Retail Automotive	1.22	55	Power	1.10	87	Biotechnology	0.85
24	Aerospace/Defense	1.22	56	Investment Co.(Foreign)	1.08	88	Household Products	0.81
25	Semiconductor Equip	1.22	57	Investment Co.(Foreign)	1.08	89	Retail/Wholesale Food	0.81
26	Chemical (Diversified)	1.21	58	Industrial Services	1.08	90	Water Utility	0.78
27	Financial Svcs. (Div.)	1.19	59	Precision Instrument	1.07	91	Food Processing	0.77
28	Pipeline MLPs	1.19	60	Publishing	1.07	92	Precious Metals	0.70
29	Electrical Equipment	1.19	61	Healthcare Information	1.06			
30	Oil/Gas Distribution	1.18	62	Human Resources	1.06			
31	R.E.I.T.	1.17	63	Railroad	1.06			
32	Med Supp Invasive	1.17	64	Reinsurance	1.05		Mean	1.11

* Industry averages for 92 industries using *Value Line*'s database of 1,705 companies - Updated 1-15-23.

** *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.

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 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 THE COMPANY?

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 an analysis using the capital asset pricing model ("CAPM"); 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.

B. Discounted Cash Flow (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 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:

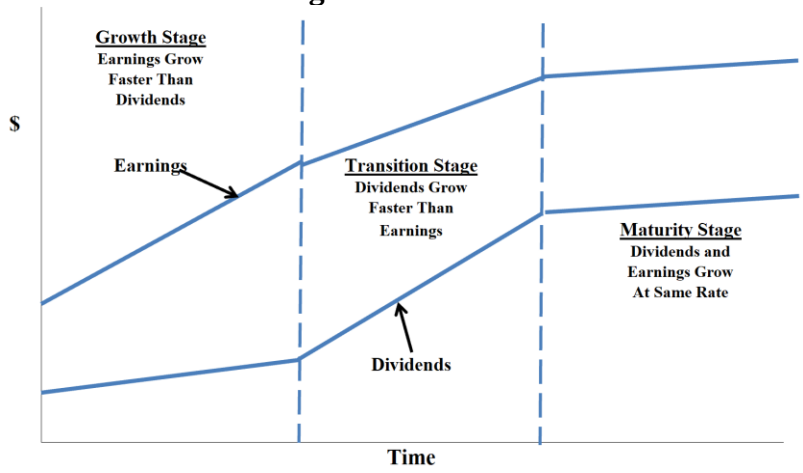
$$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_n}{(1+k)^n}$$

where P is the current stock price, D_1, D_2, D_n are the dividends in (respectively) year 1, 2, and in the future years 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 shown in Figure 11. This model presumes that a company's dividend payout progresses initially 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.

Figure 11
The Three-Stage Dividend Discount Model



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 the 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 more attractive ROEs. At that time, its earnings growth rate, payout ratio, and ROE stabilize for the remainder of its life. As I will explain below, the constant-growth DCF model is appropriate when a firm is in the maturity stage of the life cycle.

In using the 3-stage 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. PLEASE BRIEFLY EXPLAIN THE CONCEPT OF "PRESENT VALUE."

A. Present value is the concept that an amount of money today is worth more than that same amount in the future. In other words, money received in the future is not worth as much as an equal amount received today. Present value tells an investor how much he or she would need in today's dollars to earn a specific amount in the future.

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 P is the current stock price, D_1 represents the expected dividend over the coming year, k is investor's required return on equity, 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 DCF MODEL APPROPRIATE FOR PUBLIC UTILITIES?

A. Yes. The economics of the public utility business indicate that the industry is in the steady-state 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 DCF valuation procedure for companies in this 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 measured precisely 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 the 30-day, 90-day, and 180-day average stock prices. These dividend yields are provided in Exhibit JRW-5. I have shown the mean and median dividend yields using 30-day, 90-day, and 180-day average stock prices. For the Gas Proxy Group, the dividend yields range from 3.20% to 3.40%. Therefore, I will use 3.30% 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 paid over the coming period to the current stock price. 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 dividend over the coming quarter by 4, and (2) dividing this dividend by the current stock price to determine the appropriate dividend yield for a firm that pays dividends on a quarterly basis.[20]

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

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 computed based on 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.

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 to reflect growth over the coming year. The DCF equity-cost rate ("K") is computed as:

$$K = \left[\left(\frac{D}{P}\right) \times (1 + 0.5g)\right] + g$$

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' expectations 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 GROUPS?

A. I have analyzed a number of measures of growth for companies in the proxy groups. 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, Zacks, and S&P Cap IQ. These services solicit five-year earnings growth-rate projections from securities analysts and compile and publish the means and medians of these forecasts. Finally, I also 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). Thus, 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.

Q. PLEASE DEFINE AND EXPLAIN THE RELEVANCE OF INTERNAL GROWTH.

A. A company's internal (or "organic") growth occurs when a business expands its own operations rather than relying on takeovers and mergers. It can come about through various means, for example, increasing existing production capacity through investment in new capital and technology, or development and launch of new products.

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-run 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. PLEASE DISCUSS THE SERVICES THAT PROVIDE ANALYSTS' EPS FORECASTS.

A. Analysts' EPS forecasts for companies are collected and published by several different investment information services, including Institutional Brokers Estimate System ("I/B/E/S"), Bloomberg, FactSet, S&P Cap IQ, Zacks, First Call, and Reuters, among others. Thompson Reuters publishes analysts' EPS forecasts under different product names, including I/B/E/S, First Call, and Reuters. Bloomberg, FactSet, S&P Cap IQ,

and Zacks each publish their own set of analysts' EPS forecasts for companies. These services do not reveal (1) the analysts who are solicited for forecasts; nor (2) the identity of the analysts who actually provide the EPS forecasts that are used in the compilations published by the services. I/B/E/S, Bloomberg, FactSet, S&P Cap IQ, and First Call are fee-based services. These services usually provide detailed reports and other data in addition to analysts' EPS forecasts. In contrast, Thompson Reuters and Zacks provide limited EPS forecast data free-of-charge on the Internet. Yahoo finance (http://finance.yahoo.com) lists Thompson Reuters as the source of its summary EPS forecasts. Zacks (www.zacks.com) publishes its summary forecasts on its website. Zacks estimates are also available on other websites, such as MSN.money (http://money.msn.com).

Q. ARE YOU RELYING EXCLUSIVELY ON THE EPS FORECASTS OF WALL STREET ANALYSTS IN ARRIVING AT A DCF GROWTH RATE FOR THE PROXY GROUP?

A. No. There are several issues with using the EPS growth rate forecasts of Wall Street analysts as DCF growth rates. 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, dividend 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 study by Lacina, Lee, and Xu (2011) has shown that analysts' three-to-five year EPS growth-rate forecasts are not more accurate at forecasting future earnings than naïve

random walk forecasts of future earnings.[21] Employing data over a twenty-year period, these authors demonstrate that using the most recent year's actual EPS figure to forecast EPS in the next 3-5 years proved to be just as accurate as using the EPS estimates from analysts' three-to-five year EPS 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]

[21] M. Lacina, B. Lee & Z. Xu, *Advances in Business and Management Forecasting (Vol. 8),* Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp. 77-101. According to random walk theory in this context, annual changes in earnings are normally distributed and are independent of each other. Therefore, the theory presumes the past movement of earnings cannot be used to predict its future earnings.

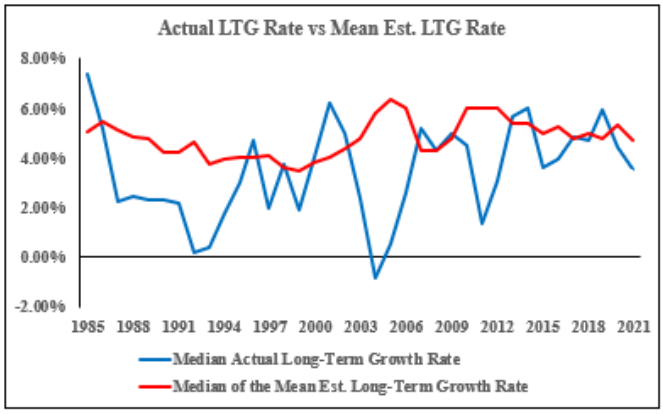
[22] The studies that demonstrate analysts' long-term EPS forecasts are overly-optimistic and upwardly biased include: R.D. Harris, "The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts," *Journal of Business Finance & Accounting*, pp. 725-55 (June/July 1999); P. DeChow, 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, *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).

Q. ARE ANALYSTS' PROJECTED EPS GROWTH RATES FOR UTILITIES LIKEWISE OVERLY OPTIMISTIC AND UPWARDLY BIASED?

A. Yes. I have completed a study of the accuracy of analysts' EPS growth rates for electric utilities and gas distribution companies over the 1985 to 2021 time period. In the study, I used the utilities listed in the electric utilities and gas distribution companies covered by *Value Line*. I collected the three-to-five-year projected EPS growth rate from I/B/E/S for each utility and compared that growth rate to the utility's actual subsequent three-to-five-year EPS growth rate. As shown in Figure 12, the mean forecasted EPS growth rate (depicted in the red line in Figure 12) is consistently greater than the achieved actual EPS growth rate over the time period, with the exception of short periods in 1996, 2001, 2007, 2013, and 2019. Over the entire period, the mean forecasted EPS growth rate is over 200 basis points above the actual EPS growth rate. As such, the projected EPS growth rates for electric and gas utilities are overly optimistic and upwardly based.

Figure 12
Mean Forecasted vs. Actual Long-Term EPS Growth Rates
Electric Utilities and Gas Distribution Companies
1985-2021



Source: S&P Global Market Intelligence, Capital IQ, I/B/E/S, 2022.

Q. ARE THE PROJECTED EPS GROWTH RATES 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 that these companies subsequently achieved.[24] Szakmary, Conover, and Lancaster (SCL) studied the predicted versus the projected stock returns, sales, profit margins, and earnings per share made by *Value Line* over the 1969 to 2001 time period. *Value Line* projects variables from a three-year base period (e.g., 2012 to 2014) to a future three-year projected period (e.g., 2016 to 2018). SCL used the 65 stocks included in the Dow Jones Indexes (30 Industrials, 20 Transports and 15 Utilities). SCL found that the projected annual stock returns for the Dow Jones stocks were "incredibly overoptimistic" and of no predictive value. The mean annual stock return of 20% for the Dow Jones stocks' *Value Line*'s forecasts was nearly double the realized annual stock return. The authors also found that *Value Line*'s forecasts of earnings per share and profit margins were "strikingly overoptimistic." *Value Line*'s forecasts of annual sales were higher than achieved levels, but not statistically significant. SCL concluded that the overly optimistic projected annual stock returns were attributable to *Value Line*'s upwardly biased forecasts of earnings per share and profit margins.

[24] Szakmary, A., Conover, C., & Lancaster, C., *An Examination of* Value Line*'s Long-Term Projections*, J. BANKING & FIN., May 2008, at 820–33.

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 therefore stock prices 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 I believe that investors are aware of the upward bias in analysts' long-term EPS growth-rate forecasts, stock prices reflect the bias. But the DCF growth rate needs to be adjusted downward from the projected EPS growth rate to reflect the upward bias in the DCF model.

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

A. The median historical growth measures for EPS, DPS, and BVPS for the Gas Proxy Group range from 4.0% to 6.8%, with an average of the medians of 5.3%.

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

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-5. Due to the presence of outliers,

the medians are used in the analysis. The range of the medians for the gas proxy group is from 5.3% to 7.5%, with an average of the medians of 6.4%.[25]

Also provided on page 4 of Exhibit JRW-5 are the prospective sustainable growth rates for the companies in the proxy group, as measured by *Value Line*'s average projected retention rate and return on shareholders' equity. As noted above, sustainable growth is a significant and primary driver of long-run earnings growth. For the gas and combination utilities proxy groups, the median prospective sustainable growth rate is 4.1%.

Q. PLEASE ASSESS GROWTH FOR THE PROXY GROUPS AS MEASURED BY ANALYSTS' FORECASTS OF EXPECTED THREE-TO-FIVE-YEAR EPS GROWTH.

A. Yahoo, Zacks, and S&P Cap IQ collect, summarize, and publish Wall Street analysts' three-to-five-year EPS growth-rate forecasts for the companies in the proxy groups. I have reported both the mean and median growth rates for the groups. Since there is considerable overlap in analyst coverage between the three services, and not all of the companies have forecasts from the different services, I have averaged the expected five-year EPS growth rates from the three services for each company to arrive at an expected EPS growth rate for each company. The mean and median of analysts' projected EPS growth rates for the proxy group are 6.1% and 6.4%, respectively.[26]

[25] I give less weight to the projected *Value Line* growth rates due to the unique methodology used to measure growth. *Value Line* projects from a three-year historic base period to a three-year future period. *Value Line*'s projected growth rates for gas companies are somewhat higher than Yahoo Finance and Zacks growth rates due to abnormally low earnings for several companies in the three-year historic period.

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

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

A. The historical growth rate indicators for my gas proxy group indicate a baseline growth rate of 5.3%.[27] The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 6.4%, and *Value Line*'s projected sustainable growth rate is 4.1%. The projected EPS growth rates of Wall Street analysts for the Gas Proxy Group are 6.1% and 6.4% as measured by the mean and median growth rates.[28] The overall range for the projected growth rate indicators (ignoring historical growth) is 4.1% to 6.4%. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate projected growth rate is 6.0%.

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

A. My DCF-derived equity cost rates for the groups are summarized on page 1 of Exhibit JRW-5 and in Table 7 below.

Table 7
DCF-Derived Equity Cost Rate/ROE

	Dividend Yield	1 + ½ Growth	DCF Growth	Equity Cost Rate
Gas Proxy Group	**3.30%**	**1.030**	**6.00%**	**9.40%**

[27] Exhibit JRW 5 at 6.
[28] *Id.*

The result for the Gas Proxy Group is the 3.30% dividend yield, times the one and one-half growth adjustment of 1.030, plus the DCF growth rate of 6.00%, which results in an equity cost rate of 9.40%.

C. Capital Asset Pricing Model (CAPM)

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:

$$K = \left(R_f\right) + \beta \times \left[E(R_m) - \left(R_f\right)\right]$$

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 'market' refers to the S&P 500);
(R_f) represents the risk-free rate of interest;
$[E(R_m) - (R_f)]$ represents the expected equity or market risk premium—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 market risk premium $[E(R_m) - (R_f)]$. 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 a little more difficult to measure because 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 market risk premium ($E(R_m) - (R_f)$). I will discuss each of these inputs below.

Q. PLEASE DISCUSS EXHIBIT JRW-6.

A. Exhibit JRW-6 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-6, the yield on 30-year U.S. Treasury bonds has been in the 1.3% to 4.25% range over the 2010–2022 time period. The current 30-year Treasury yield is above the average of this range. Duff & Phelps recommends using a normalized risk-free interest rate. Currently, Duff & Phelps is recommending a normalized risk-free interest rate of 3.50% or, if the spot 20-year Treasury yield is

above 3.50%, Duff & Phelps recommends using the spot 20-year Treasury yield.[29] However, they have also noted these yields are distorted currently. "We are aware of lack of liquidity issues in the U.S. Treasury market for the 20-year maturity, which is causing some distortion in the 20-year yield relative to that observed for 10- and 30-year maturities. The illiquidity and resulting yield distortion has also been highlighted in the financial press.[30] As shown in Figure 5 (page 14), the yield curve is currently inverted with a yield "hump" at the 20-year mark. The current 10-year, 20-year, and 30-year Treasury yields in the 3.45%, 3.80%, and 3.60% range.[31] Given the recent range of yields, and recognizing the "hump," I am using 3.75% as the risk-free rate, or R_f, in my CAPM.

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

A. No, it does not. The 3.75% percent 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.

[29] Duff & Phelps, *Cost of Capital Research Center* (2022).
[30] For example, see Duguid and Smith, "The market is just dead - Investors steer clear of 20-year Treasuries," *Financial Times*, July 22, 2022.
[31] Duff & Phelps, "Impact of High Inflation and Market Volatility on Cost of Capital Assumptions – October 2022 Update." - //efaidnbmnnnibpcajpcglclefindmkaj/https://www.kroll.com/-/media/cost-of-capital/impact-high-inflation-market-volatility-coc-assumptions-2022.pdf.

Q. PLEASE DISCUSS BETAS IN THE 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-6, 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: (1) the time period over which ß is measured; and (2) any adjustments that are made to reflect the fact that betas tend to regress to 1.0 over time.

Q. PLEASE DISCUSS THE 2020 CHANGE IN BETAS.

A. I have traditionally used the betas as provided in the *Value Line Investment Survey*. As discussed above, the betas for utilities recently increased significantly as a result of the volatility of utility stocks during the stock market meltdown associated with the novel coronavirus in March 2020. Utility betas as measured by *Value Line* have been

in the 0.55 to 0.70 range for the past 10 years. But utility stocks were much more volatile relative to the market in March and April of 2020, and this resulted in an increase of above 0.30 to the average utility beta.

Value Line defines their computation of beta as:[32]

> 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 ''Beta coefficient'' is derived from a regression analysis of the relationship between weekly percent-age 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. The Betas are adjusted for their long-term tendency to converge toward 1.00. Value Line then adjusts these Betas to account for their long-term tendency to converge toward 1.00.

However, there are several issues with *Value Line* betas:

1. *Value Line* betas are computed using weekly returns, and the volatility of utility stocks during March 2020 was impacted by using weekly and not monthly returns. Yahoo Finance uses five years of monthly returns to compute betas, and Yahoo Finance's betas for utilities are lower than *Value Lin*e's.
2. *Value Line* betas are computed using the New York Stock Exchange (NYSE) Index as the market. While about 3,000 stocks trade on the NYSE, most technology stocks are traded on the NASDAQ or over-the-counter market and not the NYSE. Technology stocks, which make up about 25 percent of the S&P 500, tend to be more volatile. If they were traded on the NYSE, they would increase the volatility of the measure of the

[32] https://www.valueline.com/investment-education/glossary/b.

market and thereby lower utility betas.

3. Major vendors of CAPM betas such as Merrill Lynch, *Value Line*, and Bloomberg publish adjusted betas. The so-called Blume adjustment cited by *Value Line* adjusts betas calculated using historical returns data to reflect the tendency of stock betas to regress toward 1.0 over time, which means that the betas of typical low beta stocks tend to increase toward 1.0, and the betas of typical high beta stocks tend to decrease toward 1.0.[33]

The Blume adjustment procedure is:

Regressed Beta = .67 * (Observed Beta) + 0.33

For example, suppose a company has an observed past beta of 0.50. The regressed (Blume-adjusted) beta would be:

Regressed Beta = .67 * (0.50) + 0.33 = 0.67

Blume offered two reasons for betas to regress toward 1.0. First, he suggested it may be a by-product of management's efforts to keep the level of firm's systematic risk close to that of the market. He also speculated that it results from management's efforts to diversify through investment projects.

Q. GIVEN THIS DISCUSSION, WHAT BETAS ARE YOU USING IN YOUR CAPM?

A. As shown on page 3 of Exhibit JRW-6, the median *Value Line* beta for the proxy group is 0.83. At present, I will continue to use *Value Line* betas in my CAPM, which I believe is a conservative approach.

[33] M. Blume, *On the Assessment of Risk*, J. OF FIN. (Mar. 1971).

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 I discus 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.[34]

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

A. Page 4 of Exhibit JRW-6 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 Roger Ibbotson, who popularized this

[34] Merton Miller, *The History of Finance: An Eyewitness Account*, J. APPLIED CORP. FIN., 3 (2000).

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, which I discuss later. 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.[35]

In addition, there are a number of surveys of financial professionals regarding the market risk premium, as well as several published surveys of academics on the equity risk premium. Duke University has published a CFO Survey on a quarterly basis for over 10 years.[36] Questions regarding expected stock and bond returns are also included in the Federal Reserve Bank of Philadelphia's annual survey of financial

[35] Rajnish Mehra & Edward C. Prescott, *The Equity Premium: A Puzzle*, J. Monetary Econ. 145 (1985).
[36] *The CFO Survey*, Duke University (Mar. 30, 2022), https://www.richmondfed.org/cfosurvey.

forecasters, which is published as the *Survey of Professional Forecasters*.[37] This survey of professional economists has been published for almost 50 years. In addition, Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums used in their investment and financial decision making.[38]

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

A. Derrig and Orr, Fernandez, and Song completed the most comprehensive reviews of the research on the market risk premium.[39] Derrig and Orr's study evaluated the various approaches to estimating market risk premiums, discussed the issues with the alternative approaches, and summarized the findings 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

[37] *Survey of Professional Forecasters*, Federal Reserve Bank of Philadelphia (Feb. 14, 2020), https://www.philadelphiafed.org/-/media/frbp/assets/surveys-and-data/survey-of-professional-forecasters/2020/spfq120.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.

[38] Pablo Fernandez, Teresa Garcia, and Pablo Acín, "Survey: Market Risk Premium and Risk-Free Rate Used for 95 Counties in 2022," IESE Business School Working paper, (June 2022).

[39] *See* Richard Derrig & Elisha Orr, *Equity Risk Premium: Expectations Great and Small (Version 3.0)*, Aug. 28, 2003 (https://www.casact.org/sites/default/files/database/forum_04wforum_04wf001.pdf); Pablo Fernandez, EQUITY PREMIUM: HISTORICAL, EXPECTED, REQUIRED, AND IMPLIED, IESE BUSINESS SCHOOL WORKING PAPER (2007); ZHIYI SONG, THE EQUITY RISK PREMIUM: AN ANNOTATED BIBLIOGRAPHY (The CFA Institute Research (2007).

results. Song provided an annotated bibliography and highlighted the alternative approaches to estimating the market risk premium.

Page 5 of Exhibit JRW-6 provides a summary of the results of the primary risk premium studies reviewed by Derrig and Orr, as well as other more recent studies of the market risk premium. In developing page 5 of Exhibit JRW-6, I have categorized the types of studies discussed on page 4 of Exhibit JRW-6. 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 PROVIDE A SUMMARY OF THE MARKET RISK PREMIUM STUDIES.

A. Page 5 of Exhibit JRW-6 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 30 studies, and the median market risk premium of these studies 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-6 include every market risk premium study and survey I could identify that was published over the past 20 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 50 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-6 on page 6 of Exhibit JRW-6; however, I have eliminated all studies dated before January 2, 2010. The median market risk premium estimate for this subset of studies is 5.16%.

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 page 6 of Exhibit JRW-6 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 6.71% 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 a market risk premium in the range of 3.47% to 6.00%.

Surveys: Market risk premiums developed from surveys of analysts, companies, financial professionals, and academics are lower, with a range from 3.88% to 5.70%.

Building Block: The mean reported market risk premiums reported in studies using the building blocks approach range from 3.00% to 5.21%.

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

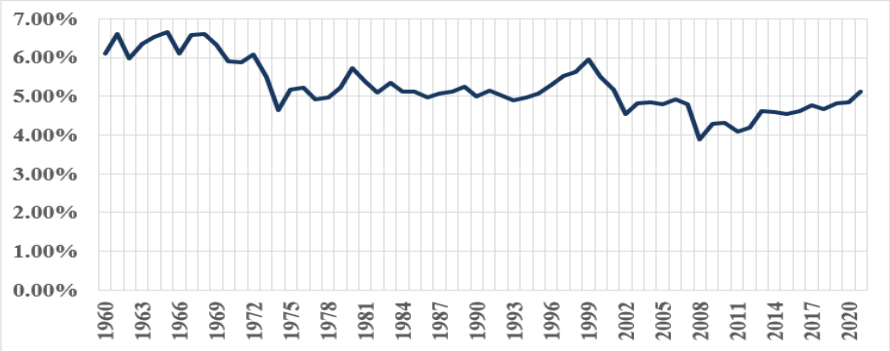
A. I will highlight several studies/surveys.

Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums used in their investment and financial decision-making.[40] His survey results are included on pages 5 and 6 of Exhibit JRW-6. The results of his 2022 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%.[41] His estimated market risk premium for the U.S. has been in the 5.00% to 5.60% range in recent years.

Professor Aswath Damodaran of New York University, a leading expert on valuation and the market risk premium, provides a monthly updated market risk premium 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 13, below, has primarily been in the range of 4.0% to 6.0% since 2010. As of January 1, 2023, his estimate of the implied market risk premium was 5.11%.[42]

[40] Pablo Fernandez, Teresa Garcia, and Pablo Acín, "Survey: Market Risk Premium and Risk-Free Rate Used for 95 Counties in 2022," IESE Business School Working paper, (June 2022).
[41] *Id.* at 3.
[42] Aswath Damodaran, Damodaran Online, N.Y. Univ., http://pages.stern.nyu.edu/~adamodar/.

Figure 13
Damodaran Market Risk Premium
1960–2021



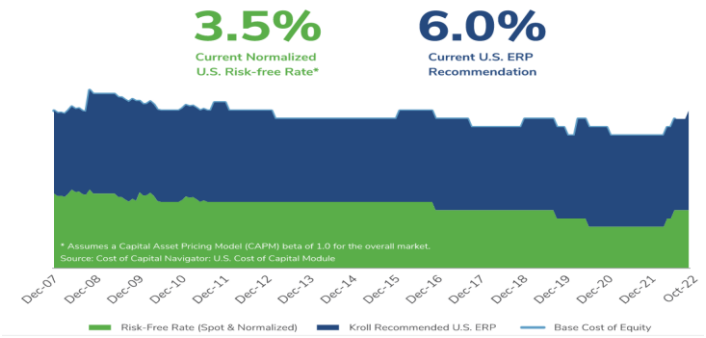
Source: Aswath Damodaran, Damodarian Online, N.Y. Univ., http://pages.stern.nyu.edu/~adamodar/.

Duff & Phelps, an investment advisory firm, provides recommendations for the normalized risk-free interest rate and market risk premiums to be used in calculating the cost-of-capital data. Its recommendations over the 2008–2021 time periods are shown on page 7 of Exhibit JRW-6 and are shown graphically in Figure 14. Over the past decade, Duff & Phelps' recommended normalized risk-free interest rates have been in the 2.50% to 4.50% range and market risk premiums have been in the 5.0% to 6.0% range. In early 2020, in the wake of the emergence of the novel coronavirus, Duff & Phelps decreased its recommended normalized risk-free interest rate from 3.0% to 2.50% and increased its market risk premium from 5.00% to 6.00%. Subsequently, on December 9, 2020, Duff & Phelps reduced its recommended market risk premium to 5.50%.[43] On October 18, 2022, Duff & Phelps once again increased its market risk premium to 6.00%.

[43] Carla Nunes, James P. Harrington, *Duff & Phelps Recommended U.S. Equity Risk Premium Decreased from 6.0% to 5.5%, Effective December 9, 2020*, COST OF CAPITAL RESOURCE CTR., KROLL, Dec. 10, 2020, https://www.duffandphelps.com/insights/publications/cost-of-capital/duff-and-phelps-recommended-us-equity-risk-premium-decreased-december-2020 ("DUFF & PHELPS 2020").

Finally, KPMG, the international accounting firm, regularly publishes an update to their market risk premium to be used in their valuation practice. KPMG's market risk premium is shown in Figure 15, which was as high as 6.75% in 2020, and was lowered to as low as 5.00% on September 30, 2021. KPMG increased its market risk premium to 6.0% on June 30, 2022, but lowered it to 5.75% on December 31, 2022.[44]

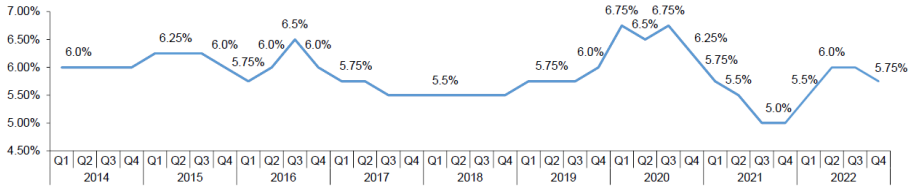
Figure 14
Duff & Phelps
Normalized Risk-Free Rate and Market Risk Premium Recommendations
2007–2022



Source: https://www.kroll.com/en/insights/publications/cost-of-capital/recommended-us-equity-risk-premium-and-corresponding-risk-free-rates.

[44] https://diaprodnlreports.blob.core.windows.net/report-5d9da61986db2894649a7ef2-media/document_63c179a19c35860e6d30e045.pdf?sv=2019-02-02&spr=https&st=2023-01-16T12%3A13%3A35Z&se=2023-01-16T13%3A22%3A35Z&sr=c&sp=r&sig=CWyi5ejFEMTC4fyqm4tH97zpZRTN9uZ4yxAOkiBAk%2Bk%3D&rscd=inline

Figure 15
KPGM
Market Risk Premium Recommendations
2013–2022



Source: KPMG: Equity Market Risk Premium, December 31, 2022.

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

A. The studies on page 6 of Exhibit JRW-6 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 6.00%, which is the upper end of the range. I gave most weight to the market risk-premium estimates of Duff & Phelps, KPMG, the Fernandez survey, and Damodaran. This is a conservatively high estimate of the market risk premium considering the many studies and surveys of the market risk premium.

Q. WHAT EQUITY COST RATES ARE INDICATED BY YOUR CAPM ANALYSIS?

A. The results of my CAPM study for the proxy groups are summarized on page 1 of Exhibit JRW-6 and in Table 8 below.

Table 8
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%**	**0.83**	**6.00%**	**8.70%**

For Gas Proxy Group, the risk-free rate of 3.75% plus the product of the beta of 0.83 times the equity risk premium of 6.00% results in an 8.70% equity cost rate.

D. Equity Cost Rate Summary

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

A. My DCF and CAPM results for the two proxy groups are shown in Table 9.

Table 9
ROEs Derived from DCF and CAPM Models

	DCF	CAPM
Gas Proxy Group	**9.40%**	**8.70%**

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

A. Given these results, I conclude that the appropriate equity cost rate for companies in the proxy groups is in the 8.70% to 9.40% range. However, since I rely primarily on the DCF model, I conclude that the appropriate equity cost rate for the Atmos is 9.25%.

Q. Please indicate why an equity cost rate of 9.25% is appropriate for the GAS DISTRIBUTION operations of Atmos.

A. There are a number of reasons why an equity cost rate of 9.25% is appropriate and fair for the company in this case:

1. I have employed a capital structure that has more equity and less financial risk than: (1) the average common equity ratio of the proxy group; and (2) the average common equity ratio approved for gas distribution companies;
2. The gas distribution industry is among the lowest risk industries in the U.S. as measured by beta.[45] As such, according to the CAPM the cost of equity capital for this industry is among the lowest in the U.S.
3. While the overall stock market is down about fifteen percent over the past year, public utility stocks have held up slightly over the past year. Hence, utility stocks have performed relatively well in the face of higher inflation and interest rates.
4. On an annual basis, the authorized ROEs for gas distribution companies have been 9.59% in 2018, 9.71% in 2019, 9.46% in 2020, 9.56% in 2021, and 9.42% in the first three quarters of 2022.[46] As discussed above, authorized ROEs have lagged behind capital market cost rates.

Q. DO YOU BELIEVE THAT YOUR 9.25% 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

[45] *See* Appendix B.
[46] S&P Global Market Intelligence, RRA *Regulatory Focus*, 2022.

to attract capital. Gas distribution companies have been earning in the 8.0% to 9.0% range in recent years. While my recommendation is below the average authorized ROEs for electric utility and gas distribution companies, it reflects the downward trend in authorized and earned ROEs of utilities.

VI. CRITIQUE OF COMPANY'S RATE OF RETURN TESTIMONY

Q. PLEASE SUMMARIZE THE COMPANY'S COST OF CAPITAL RECOMMENDATION.

A. Atmos has proposed a capital structure consisting of 38.86% long-term debt and 61.14% common equity and a long-term debt cost rate of 4.06%. Mr. Howard has recommended a common equity cost rate of 10.95% for the company. These recommendations are summarized on page 1 of Exhibit JRW-7.

Q. WHAT ARE THE PRIMARY AREAS OF DISAGREEMENT IN ESTIMATING THE RATE OF RETURN OR COST OF CAPITAL IN THIS PROCEEDING?

A. As reviewed above, the primary issues related to the Company's rate of return include the following: (1) capital structure; (2) capital market conditions; (3) DCF approach; (4) CAPM approach; (5) the risk premium approach; and (6) the size and flotation cost adjustments. The capital structure and capital market conditions were previously discussed. The other items are addressed below.

Q. PLEASE REVIEW MR. HOWARD'S EQUITY COST RATE APPROACHES AND RESULTS.

A. Mr. Howard uses three proxy groups and employs DCF, CAPM/ECAPM, and risk premium equity cost rate approaches. He includes adjustments for size and flotation costs.

Mr. Howard's equity cost rate estimates for Atmos are summarized on page 2 of Exhibit JRW-7. Based on these figures, he concludes that the appropriate equity cost rate is 10.95% for Atmos's gas distribution operations.

A. DCF Approach

Q. PLEASE SUMMARIZE MR. HOWARD'S DCF ESTIMATES.

A. Mr. Howard develops an equity cost rate by applying a DCF model to his proxy group. In the traditional DCF approach, the equity cost rate is the sum of the dividend yield and expected growth rate. For the DCF growth rate, Mr. Howard uses three measures of projected EPS growth—the projected EPS growth of Wall Street analysts as compiled by First Call, Zacks, and *Value Line*'s projected and historical EPS growth rates. His DCF estimates for his gas group is 9.72%.

Q. PLEASE EXPRESS YOUR CONCERNS WITH MR. HOWARD'S DCF STUDY.

A. I have several issues with Mr. Howard's DCF equity cost rate: (1) the excessive reliance on the EPS growth rate forecasts of Wall Street analysts and *Value Line* as a DCF growth rate; and (2) combining the abnormally high *Value Line* projected EPSs 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.

1. Analysts' EPS Growth Rates

Q. PLEASE DISCUSS MR. HOWARD'S 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 I previously indicated, 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.

In addition, a study by Lacina, Lee, and Xu (2011) has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting future earnings than naïve random walk forecasts of future earnings.[47] Accordingly, the weight given to analysts' projected EPS growth rates should be limited. And 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.[48] Therefore, using these growth rates as a DCF growth rate produces an overstated equity cost rate.

A recent study by Easton and Sommers (2007) found that optimism in analysts' earnings growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[49] Thus, exclusive reliance on these forecasts for a DCF growth rate results in failure of one the basic inputs in the equation. In addition, as noted above, a study by Szakmary, Conover, and Lancaster (2008) discovered that the three-to-five-year EPS growth rate forecasts of *Value Line*'s to be

[47] Michael Lacina, B. Brian Lee and Zhao Xu, *Advances in Business and Management Forecasting*, at 77–101 (Kenneth D. Lawrence, Ronald K. Klimberg eds., Emerald Grp. Publ'g Ltd. 2011).
[48] *See supra* note. 15 at 42.
[49] Peter D. Easton, & Gregory A. Sommers, *Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts*, J. of Accounting Research, 45, 983–1015 (2007).

significantly higher than the EPS growth rates that these companies subsequently achieved.[50]

Q. HAVE CHANGES IN REGULATIONS IMPACTING WALL STREET ANALYSTS AND THEIR RESEARCH IMPACTED THE UPWARD BIAS IN THEIR PROJECTED EPS GROWTH RATES?

A. No. A number of the studies I have cited above 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:[51]

> 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,

[50] Andrew C. Szakmary, C. Michelle Conover, & Carol Lancaster, *An Examination of Value Line's Long-Term Projections*, 32 *J. of Banking & Fin.* 820–33 (2008).

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

> 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 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.[52] 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.

2. *Value Line's* Projected EPS Growth Rates

Q. PLEASE DISCUSS MR. HOWARD'S DCF GROWTH RATE.

A. Table 10 shows Mr. Howard's DCF growth rates from First Call, Zacks, and *Value Line*. The First Call and Zacks growth rates are the average of analysts' three-to-five-year projected growth rates compiled by Yahoo and Zacks. *Value Line* uses a different approach in estimating projected growth. *Value Line* projects growth from a three-year base period – 2019-2021 – to a projected three-year period for the period 2025-2027. 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 most of the proxy companies, the *Value* Line projected growth rates are larger than the Yahoo and Zacks growth rates, and the average *Value L*ine EPS growth

[52] 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.

rate of 7.33% is more than 125 basis points larger than the average for First Call (6.17%) and Zacks (5.87%).

Table 10
Mr. Howard's EPS Growth Rates

Company	Ticker	[1] Annualized Dividend	[2] Average Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Zacks Earnings Growth	[6] First Call Earnings Growth	[7] Value Line Earnings Growth	[8] Average Earnings Growth	[9] Mean ROE
Atmos Energy Corporation	ATO	$2.72	$115.21	2.36%	2.45%	7.30%	8.61%	7.50%	7.80%	10.26%
New Jersey Resources Corporation	NJR	$1.45	$44.85	3.23%	3.32%	6.00%	6.00%	5.00%	5.67%	8.99%
NiSource Inc.	NI	$0.94	$30.37	3.09%	3.22%	7.20%	7.18%	9.50%	7.96%	11.18%
Northwest Natural Holding Company	NWN	$1.93	$50.78	3.80%	3.91%	4.70%	5.90%	6.50%	5.70%	9.61%
ONE Gas, Inc.	OGS	$2.48	$86.52	2.87%	2.95%	5.00%	5.00%	6.50%	5.50%	8.45%
Spire Inc.	SR	$2.74	$75.71	3.62%	3.73%	5.00%	4.30%	9.00%	6.10%	9.83%
Mean				3.16%	3.26%	5.87%	6.17%	7.33%	6.46%	9.72%
Median				3.16%	3.27%	5.50%	5.95%	7.00%	5.90%	9.72%

Source: Exhibit MRH-3, p. 1.

Q. WHAT SKEWS *VALUE LINE'S* GROWTH RATES?

A. The core of the problem is low EPS figures in at least one of the years in the three-year base period. In this testimony, Mr. Howard does not recognize this issue, and makes no adjustment for the abnormally high *Value Line* growth rates. The problem is that *Value Line* does not measure growth from the present but from a historical (and stale) time period.[53]

Q. PLEASE SUMMARIZE YOUR ASSESSMENT OF MR. HOWARD'S DCF EQUITY RATE STUDY.

A. Mr. Howard's DCF equity cost rates are overstated because he has (1) excessively relied on the EPS growth rate forecasts of Wall Street analysts and *Value Line* as a DCF growth rate; and (2) combined the abnormally high *Value Line* projected EPSs for his proxy companies, computed from a three-year base period, with three-to-five-year projected

[53] 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.

growth rates of First Call and Zack's.

B. CAPM Approach

Q. PLEASE DISCUSS MR. HOWARD'S CAPM.

A. On pages 25 to 31 of his testimony and Exhibit No. MRH-4, Mr. Howard applies the CAPM method to his groups. He reports results using both a traditional CAPM and an empirical CAPM. For his group, he calculates a CAPM equity cost rate using (1) a current and prospective risk-free bond rates of 3.02% and 3.44%, (2) betas from Value Line and Bloomberg, and (3) a market risk premium of 11.48%. He reports a CAPM/ECAPM ROE of 12.04% for his gas group.

Q. WHAT ARE THE ERRORS IN MR. HOWARD'S CAPM ANALYSIS?

A. The primary flaws with Mr. Howard's CAPM analysis are: (1) his use of the so-called ECAPM; and (2) most significantly, the equity or market risk premium of 11.48%.

1. ECAPM

Q. WHAT ISSUES DO YOU HAVE WITH MR. HOWARD'S ECAPM?

A. Mr. Howard has employed a variation of the CAPM which he calls the "ECAPM." The ECAPM, as popularized by rate of return consultant Dr. Roger Morin, 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 that are used to adjust the risk-free rate and market risk premium in applying the ECAPM. Mr. Howard 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 is another error in Mr. Howard's ECAPM. I am not aware of any tests of the CAPM that use adjusted betas such as those used by Mr. Howard. 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.

2. Market Risk Premium

Q. PLEASE REVIEW THE ERRORS IN MR. HOWARD'S EQUITY OR MARKET RISK PREMIUM USED IN HIS CAPM APPROACH.

A. The primary problem with Mr. Howard's CAPM analysis is the size of the market or equity risk premium. Mr. Howard develops a market risk premium of 11.48%, which is computed as the average risk premium of three measures of the expected stock market return. The primary error with Mr. Howard's equity or market risk premium is that Mr. Howard's projected market returns are significantly overstated.

Q. PLEASE CRITIQUE MR. HOWARD'S PROSPECTIVE EQUITY OR MARKET RISK PREMIUM OF 11.48%.

A. Mr. Howard computes an expected equity risk premium of 11.48% by applying the DCF model to the S&P 500 companies and the *Value Line* 1,700 companies, and the subtracting the risk-free rate of interest. This is summarized in Table 11, which shows the DCF expected market return (adjusted dividend yield plus projected EPS growth) and resulting market risk premium for the S&P 500 companies using Bloomberg and *Value Line*'s EPS

growth rates and the *Value Line*'s projected market returns for its 1,700 companies. The primary error is Mr. Howard's application of a DCF model to the S&P 500 is the use of analysts' projected EPS growth rates. Mr. Howard's 11.48% market risk premium is the average of the three approaches. Mr. Howard's average expected DCF growth rate of 12.70% is based on analysts' overly optimistic and upwardly biased projected EPS growth rates, and these inflated growth rates produce an unrealistic expected market return (14.50%) and market risk premium (11.48%).

Table 11
Mr. Howard's CAPM Prospective Market Risk Premium

	Bloomberg-500	Value Line-500	*VL* 1700	Average
Dividend Yield	1.80%	1.80%	1.80%	1.80%
+ Expected EPS Growth	10.55%	14.49%	13.05%	12.70%
= Expected Market Return	12.35%	16.29%	14.85%	14.50%
+ Risk-Free Rate	3.02%	3.02%	3.02%	3.02%
= Market Risk Premium	9.33%	13.27%	11.83%	11.48%

Q. PLEASE PROVIDE ADDITIONAL INSIGHTS INTO THE EXPECTED STOCK MARKET RETURN OF 14.50%.

A. Simply put, the assumption of a 14.50% expected stock market return is excessive and unrealistic. The compounded annual return in the U.S. stock market is about 10% (9.97% between 1928–2021according to Damodaran).[54] Howard's CAPM results assume that return on the U.S. stock market will be about **50 percent higher** in the future than it has been in the past. The extremely high expected stock market return, and the resulting market risk premium and equity cost rate results, is directly related to

[54] Aswath Damodaran, *Damodaran Online*, N.Y. Univ., http://pages.stern.nyu.edu/~adamodar/ (last visited July 20, 2022).

computing the expected stock market return as the sum of the adjusted dividend yield plus the expected EPS growth rate of 12.70%.

Q. HOW DO ISSUES WITH ANALYSTS' EPS GROWTH RATE FORECASTS IMPACT MR. HOWARD'S CAPM?

A. The key point is that Mr. Howard's CAPM market risk premium methodology is based entirely on the concept that analyst projections of companies' three-to-five year EPS growth rates reflect investors' expected *long-term* EPS growth for those companies. However, this assumption is highly unrealistic given the published 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.[55] Moreover, as I discuss above, the Lacina, Lee, and Xu 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 (and the single year forecasts are notoriously inaccurate). The overly optimistic inaccuracy of analysts' growth rate forecasts leads to an upward bias in equity cost estimates estimated at about 300 basis points.[56]

[55] Such studies include: R.D. Harris, *The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts*, *J. of Business Fin. & Accounting*, 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*, *J. of Fin.* 643−84 (2003); 8 Michael Lacina, B. Brian Lee, and Zhao Xu, *Advances in Business and Management Forecasting*, at 77–101 (Kenneth D. Lawrence, Ronald K. Klimberg, eds., Emerald Grp. Publ'g Ltd. 2011).

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

Q. IS MR. HOWARD'S MARKET RISK PREMIUM OF 11.48% REFLECTIVE OF THE MARKET RISK PREMIUMS FOUND IN PUBLISHED STUDIES AND SURVEYS?

A. No. This figure is well in excess of market risk premiums: (1) found in studies of the market 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 6 of Exhibit JRW-6 provides the results of over 30 market risk premiums studies from the past 15 years.[57] Historic stock and bond returns suggest a market risk premium in the 4.40%–6.71% 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 market risk premiums results vary from as low as 3.47% to as high as 6.0%. Finally, the market risk premiums developed from surveys of analysts, companies, financial professionals, and academics suggest even potentially lower market risk premiums, in a range from 3.88% 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 a market risk premium as high as the 11.48% used by Mr. Howard, which is derived from only one source—*Value Line Investment Survey*.

[57] *See* Woolridge, Exh. JRW-6 at 6.

Q. IS THERE OTHER EVIDENCE THAT INDICATES THAT MR. HOWARD'S MARKET RISK PREMIUM DEVELOPED USING ANALYSTS' PROJECTED EPS GROWTH RATES IS EXCESSIVE?

A. Yes. A long-term EPS growth rate of 12.70% is 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. Howard's projected EPS growth rate of 12.70%; (2) long-term EPS and GDP growth are directly linked; and (3) more recent trends in GDP growth, as well as projections of GDP growth, suggest slower economic and earnings growth in the near future, during the period when the rates from this case will be effective.

Long-Term Historic EPS and GDP Growth Have Been in the 6%–7% Range: In Exhibit JRW-8, 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-8, and a summary is shown in Table 12.

Table 12
GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

Nominal GDP	6.17%
S&P 500 Stock Price	7.07%
S&P 500 EPS	6.42%
S&P 500 DPS	5.65%
Average	6.33%

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. Howard's long-run growth rate projection of 12.70% is significantly overstated. This estimate suggests

that companies in the U.S. would be expected to: (1) increase their growth rate of EPS by almost 100 percent 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-8 and Table 11 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. Cornell 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, the study finds that long-term stock returns are determined by long-term earnings growth. Cornell concludes with the following observations:[58]

> 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.

Annual Growth rates in nominal GDP are shown on page 2 of Exhibit JRW-8. Nominal GDP growth was in the four percent range over the past decade until the COVID-19 Pandemic hit in 2020. Nominal GDP fell by 2.2% in 2020, before rebounding and growing by 10.0% in 2021. The components of nominal GDP growth

[58] Bradford Cornell, *Economic Growth and Equity Investing*, Fin. Analysts J. at 63 (Jan.-Feb. 2010).

are real GDP growth and inflation. Page 3 of Exhibit JRW-8 shows the annual real GDP growth rate between 1961 and 2021. Real GDP growth has gradually declined from the 5.0% to 6.0% range in the 1960s to the 2.0% to 3.0% range during the 2015–2019 period. Real GDP fell by 3.5% in 2020, but rebounded and grew by 5.7% in 2021.

The second component of nominal GDP growth is inflation. Page 4 of Exhibit JRW-8 shows inflation as measured by the annual growth rate in the Consumer Price Index (CPI) from 1961 to 2021. The large increase in prices from the late 1960s to the early 1980s is readily evident. Equally evident is the rapid decline in inflation during the 1980s as inflation declined from above ten percent to about four percent. Since that time, inflation has gradually declined and was in the 2.0% range or below from 2015 to 2020. Prices increased in 2021 with the rebounding economy, and increased by 4.7%. As previously discussed, inflation has jumped to 40-year highs in 2022 due to supply chain issues and the Russia-Ukraine conflict, but longer-term inflation is expected to be in the 2.0%–3.0% range.

The graphs on pages 2, 3, and 4 of Exhibit JRW-8 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 12 provides the compounded GDP growth rates for 10, 20, 30, 40 and 50 years. Whereas the 50-year compounded GDP growth rate is 5.94%, 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 13
Historical Nominal GDP Growth Rates

10-Year Average	**2.97%**
20-Year Average	**3.46%**
30-Year Average	**4.16%**
40-Year Average	**4.80%**
50-Year Average	**5.94%**

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-8. The mean 10-year nominal GDP growth forecast (as of February 2022) by economists in the recent *Survey of Financial Forecasters* is 4.70%.[59] The federal Energy Information Administration (EIA), in its projections used in preparing *Annual Energy Outlook*, forecasts long-term GDP growth of 4.5% for the period 2020 to 2050.[60] The Congressional Budget Office (CBO), in its forecasts for the period 2020 to 2030, projects a nominal GDP growth rate of 4.0%.[61] Finally, the Social Security Administration (SSA), in its Annual OASDI Report, provides a projection of nominal GDP from 2020 to 2095.[62] SSA's projected

[59] *Survey of Professional Forecasters*, Fed. Reserve Bank of Philadelphia, https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/ (last visited on July 20, 2022).
[60] U.S. Energy Info. Admin., *Annual Energy Outlook 2021*, Table: Macroeconomic Indicators (2021).
[61] Congressional Budget Office, *The 2021 Long-Term Budget Outlook* (July 15, 2021).
[62] Soc. Sec. Admin., *2021 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program*, Table VI.G4 (July 1, 2021). The 4.2 percent growth rate is the growth in projected GDP from 2020 to 2095.

growth GDP growth rate over this period is 4.2%. Overall, these forecasts suggest long-term GDP growth rate in the 4.0% to 4.5% range.

The bottom line is that the trends and projections suggest a long-term GDP growth rate in the 4.0% to 4.5% range. As such, Mr. Howard's average projected EPS growth rate of 12.70% is almost three times projected GDP growth.

Q. WHAT FUNDAMENTAL FACTORS 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: (a) the number of workers in the economy (employment); and (2) the productivity of those workers (usually defined as output per hour).[63] According to McKinsey, population and productivity growth drove real GDP growth over the past 50 years, at compound annual rates of 1.7% and 1.8%, respectively.

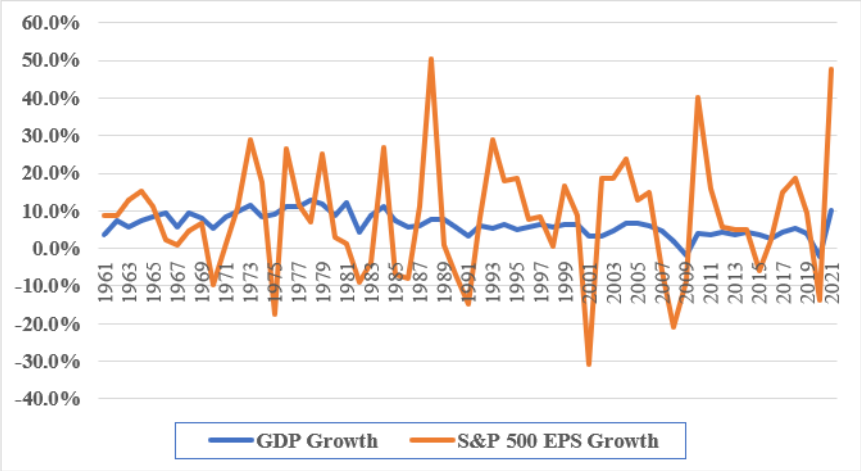
However, global economic growth is projected to slow significantly in the years to come. The primary factor leading to the decline is slow growth in employment (working-age population), which results from slower population growth and longer life expectancy. McKinsey estimates that employment growth will slow to 0.3% over the next 50 years. They conclude that even if productivity remains at the rapid rate of the past 50 years of 1.8%, real GDP growth will fall by 40% to 2.1%.

[63] James Manyika, et al., *Can Long-Term Growth be Saved*?, McKinsey Global Institute. (Jan. 1, 2015), https://www.mckinsey.com/featured-insights/employment-and-growth/can-long-term-global-growth-be-saved.

Q. OVER THE MEDIUM TO LONG RUN, IS S&P 500 EPS GROWTH LIKELY TO OUTPACE GDP GROWTH?

A. No. Figure 16 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.[64] Volatility aside, however, it is clear that over the medium to long run, S&P 500 EPS growth does not outpace GDP growth.

Figure 16
Average Annual Growth Rates
GDP and S&P 500 EPS
1960-2021



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

[64] 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*, 57 *J. of Accounting and Economics* 76–88 (2014).

A fuller understanding of the relationship between GDP and S&P 500 EPS growth requires consideration of at least three factors, as follows.

Corporate Profits are Constrained by GDP: In a *Fortune* magazine article, Milton Friedman, the winner of the 1976 Nobel Prize in Economic Sciences, 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."[65] In that same article, Friedman also noted that profits must move back down to their traditional share of GDP. In Table 14, I show that the aggregate net income levels for the S&P 500 companies, using 2021 figures, represent 6.22% of nominal GDP.

Table 14
S&P 500 Aggregate Net Income as a Percent of GDP

	2021 Value ($B)
Aggregate Net Income for S&P 500	$1,430.79
2021 Nominal U.S. GDP	$22,997.50
Net Income/GDP (%)	6.22%

Data Sources: 2021 Net Income for S&P 500 companies – *Value Line* (March 3, 2022).
2021 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

[65] 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/.

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, and the cut in corporate tax rates. 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.[66] These differences include: (a) corporate profits are about 2/3 manufacturing driven, while GDP is 2/3 services driven; (b) consumer discretionary spending accounts for a smaller share of S&P 500 profits (15%) than of GDP (23%); (c) corporate profits are more international-trade driven, while exports minus imports tend to drag on GDP; and (d) S&P 500 EPS is affected 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.[67]

[66] *See* the following studies: Burt White and Jeff Buchbinder, *The S&P and GDP are not the Same Thing*, LPL Fin. (Nov. 4, 2014, 11:31 AM), 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. 19, 2018, 1:04 PM), 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, 1:26 PM), http://fortune.com/2017/07/27/profits-economic-growth/.

[67] 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.

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 SHOWING THAT MR. HOWARD'S S&P 500 EPS GROWTH RATE OF 12.70% IS NOT REALISTIC.

A. Beyond my previous discussion, I have performed the following analysis of S&P 500 EPS and GDP growth in Table 15. Specifically, I started with the 2021 aggregate net income for the S&P 500 companies and 2021 nominal GDP for the U.S. As shown in Table 14 above, the aggregate profit for the S&P 500 companies represented 6.22% of nominal GDP in 2021. In Table 15, 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 Mr. Howard's average projected S&P 500 EPS growth rate of 12.70%. As a growth rate for nominal GDP, I used the average of the long-term projected GDP growth rates from SFF, CBO, SSA, and EIA (4.7%, 4.0%, 4.2%, and 4.5%, respectively), which is 4.35%. The projected 2050 level for the aggregate net income level for the S&P 500 companies is $51.67 trillion. Over the same period, GDP is expected to grow to $82.50 trillion. As such, if the aggregate net income for the S&P 500 grows in accordance with the growth rate used by Mr. Howard (12.70%), and if nominal GDP grows at rates projected by major government agencies (4.35%), the net income of the S&P 500 companies will represent growth from 6.22% of GDP in 2021 to 62.64% of GDP in 2050. It is totally unrealistic for the net income of the S&P 500 to become such a large component of GDP.

Table 15
Projected S&P 500 Earnings and Nominal GDP
2021-2050
S&P 500 Aggregate Net Income as a Percent of GDP

	2021 Value ($B)	Growth Rate	No. of Years	2050 Value ($B)
Aggregate Net Income for S&P 500	$1,430.79	12.70%	30	$ 51,676.60
2021 Nominal U.S. GDP	$22,997.50	4.35%	30	$ 82,500.06
Net Income/GDP (%)	6.22%			62.64%

Data Sources: 2021 Aggregate Net Income for S&P 500 companies – *Value Line* (Mar. 3, 2022). 021 Nominal GDP – Moody's - https://www.economy.com/united-states/nominal-gross-domestic-product.S&P 500 EPS Growth Rate - Mr. Howard's average projected S&P 500 EPS growth rate of 12.70%.

Nominal GDP Growth Rate – The average of the long-term projected GDP growth rates from SFF, CBO, SSA, and EIA (4.7%, 4.0%, 4.2%, and 4.0%).

Q. PLEASE PROVIDE A SUMMARY ASSESSMENT OF GDP AND S&P 500 EPS GROWTH RATES.

A. The long-term link between corporate profits and GDP is inevitable. The short-term differences in growth between the two indicate 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, Warren Buffet made the following observation:[68]

> 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%.

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

In sum, Mr. Howard's average long-term S&P 500 EPS growth rate of 12.70% is grossly overstated and has little (if any) basis in economic reality. In the end, the question remains 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 grow about half a point faster than nominal GDP, or about five percent, due to the big gains in the technology sector. But Siegel 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."[69]

C. Risk Premium Approach

Q. PLEASE DISCUSS MR. HOWARD'S RISK PREMIUM (RPM) APPROACH.

A. At pages 31 to 42 of his testimony and in Exhibit No. MRH-5, Mr. Howard estimates an equity cost rate for his proxy group 10.52% using the RPM approach. As a base yield, he uses current and prospective yield on utility bonds (4.67% and 5.32%) and risk premiums of 5.75% and 5.30%. His risk premium is based on two studies: (1) he estimates an expected return on the S&P Utility Index using the DCF model and analysts' EPS growth rate estimates; and (2) using the quarterly authorized ROEs for gas distribution companies from 1980 until 2022, he develops an equity cost rate by regressing the authorized returns on equity for gas companies on Moody's Aa bond yields. Mr. Howard then adds the risk premium established by regressing the authorized returns

[69] Shaun Tully, *Corporate Profits Are Soaring. Here's Why It Can't Last*, *Fortune* (Dec. 7, 2017, 3:30 AM), http://fortune.com/2017/12/07/corporate-earnings-profit-boom-end/.

on equity to his current and projected utility bond yields of 4.67% and 5.32%.

Q. WHAT ARE THE ERRORS IN MR. HOWARD'S RPM ANALYSIS?

A. The primary error in Mr. Howard's RPM analysis is the risk premiums of 5.75% and 5.30% for the gas group, which is based on historical and projected market returns.

1. Risk Premium

Q. PLEASE CRITIQUE MR. HOWARD'S RISK PREMIUM IN HIS RPM ANALYSIS.

A. The errors with Mr. Howard's first risk premium study, in which he develops an expected return by applying the DCF model to the S&P Utilities Index, suffers from the same errors which were addressed above with respect to the CAPM market risk premium. The approach generates expected return on the S&P Utilities Index of 12.31% based on dividend yield and projected growth. I have illustrated above that applying the DCF approach produces unrealistic expected market returns because it uses the upwardly biased EPS growth rate projections of Wall Street analysts.

The second approach regresses the quarterly authorized ROEs for gas distribution companies on Moody's Aa bond yields and adds the risk premium established by regressing the authorized returns on equity to current and projected utility bond yields of 4.67% and 5.32%. There are several problems with this approach for calculating the risk premium. First, this risk premium approach is a gauge of *commission* behavior and not *investor* behavior. Capital costs are determined in the marketplace through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the

risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also consider other utility- and rate case-specific information in setting ROEs. As such, Mr. Howard's approach and results reflect other factors such as capital structure, credit ratings and other risk measures, service territory, capital expenditures, energy supply issues, rate design, investment and expense trackers, and other factors used by utility commissions in determining an appropriate ROE in addition to capital costs. This may especially be true when the authorized ROE data includes the results of rate cases that are settled and not fully litigated. Second, since the stocks of gas distribution companies have been selling above book value for the last decade, it is obvious that the authorized ROEs of state utility commissions are above the returns that investors require. This observation is supported by the findings from the Werner and Jarvis study[70] and Rode and Fischback study[71] discussed on pages 20-1 of this testimony. Their results indicated that over the past four decades authorized ROEs have not declined in line with capital costs and therefore past authorized ROEs have overstated the actual cost of equity capital. Hence, using past authorized ROEs in a risk premium study will result in an inflated risk premium and RPM-derived equity cost rate.

Q. HOW DOES MR. HOWARD'S RISK PREMIUM RESULTS COMPARE TO THE CURRENT AUTHORIZED ROES FOR GAS COMPANIES.

A. Mr. Howard reports a ROE of 10.52% using the risk premium approach. As noted

[70] Karl Dunkle Werner and Stephen Jarvis, "Rate of Return Regulation Revisited," Working Paper, Energy Institute, University of California at Berkeley, 2022.

[71] David C. Rode and Paul S. Fischbeck, "Regulated Equity Returns: A Puzzle." *Energy Policy,* October 2019.

above, the average authorized ROE for gas distribution companies in 2022 is 9.50%.

Q. PLEASE SUMMARIZE YOUR ASSESSMENT OF MR. HOWARD'S RPM ANALYSIS.

A. Mr. Howard's RPM analysis produces an excessive equity cost rate for the Company primarily because the risk premium is based on flawed studies of historical and projected market returns and does not reflect the growth and expected return realities of the economy and capital markets.

E. Other Factors

Q. WHAT OTHER FACTORS DID MR. HOWARD INCLUDE IN HIS ROE RECOMMENDATION?

A. Mr. Howard also includes a flotation cost adjustment of 0.05% and a size premium of 0.20% in his ROE recommendation. As noted, the Company's S&P-issued credit rating of A- is better than the average of the proxy group which indicates that the Company's investment risk, despite its size, is faring better than the proxy companies. With respect to flotation costs, Mr. Howard has not provided any evidence that the Company has paid flotation costs. Therefore, the Company should not be allowed to collect additional revenues in the form of a higher ROE for flotation costs which they did not incur. Beyond these points, I also want to provide additional insights into the size adjustment and Flotation costs.

1. Size Adjustment

Q. PLEASE DISCUSS THE SIZE ADJUSTMENT.

A. Mr. Howard claims that Atmos deserves an incremental return due to its small size. As noted above, since S&P considers the Company's size in the credit rating process and given Atmos's S&P rating is equal to the average of the proxy groups, no adjustment is needed. However, Mr. Howard's size adjustment is based on the historical stock market returns studies as performed by Duff & Phelps (formerly Ibbotson Associates). One issue with this approach is that there are numerous errors in using historical market returns to compute risk premiums. These errors provide inflated estimates of expected risk premiums. As noted above, these include survivorship and unattainable return biases. The net result is that Ibbotson'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.[72] 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 their financial performance is therefore 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

[72] Annie Wong, *Utility Stocks and the Size Effect*, J. MIDWEST FIN. ASSOC. (1993), 95–101.

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. WHAT OTHER EVIDENCE CAN YOU PROVIDE REGARDING ISSUES RELATED TO THE SIZE PREMIUM?

A. Clifford Ang, in his publication, "The Absence of a Size Effect Relevant to the Cost of Equity," tested for a company-size effect over the time period of 1981 to 2016.[73] He used value-weighted, size-based decile returns obtained from French's Data Library, with the smallest size-based decile as a proxy for small stocks and the largest size-based decile as a proxy for large stocks. He found that small stocks underperformed large stocks by 12% over the period 1981 to 2016. He claims that this finding is consistent with other studies that have shown that the size effect vanished in the 1980s. He concluded that "practitioners should abandon the practice of augmenting or modifying the CAPM Cost of Equity with a size premium":[74]

> My review of the evidence and analysis strongly suggests the proponents of the size effect are nowhere close to meeting their burden. I find that investors use the CAPM and do not demand compensation for size when setting their required rate of return, which directly contradicts the need to augment or modify the CAPM Cost of Equity with a size premium. I show that small stocks do not outperform large stocks, which calls into question the very premise of

[73] Clifford Ang, *The Absence of a Size Effect Relevant to the Cost of Equity*, 37 BUS. VALUATION REV. 3, at 87 (2018), https://www.cliffordang.com/ang_bvr_2018.pdf.

[74] *Id.* at 6.

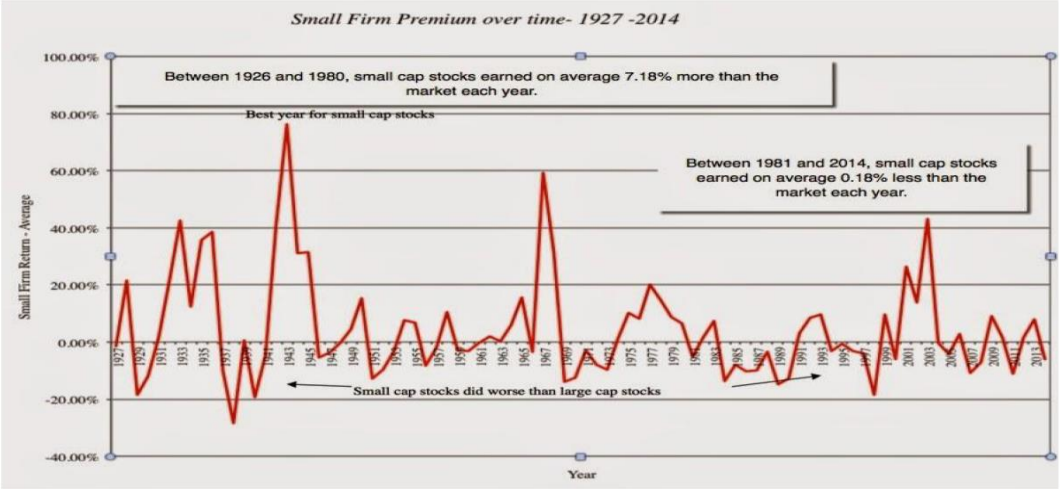
> a size effect. I also find that studies finding a size effect suffer from the twin fatal flaws of lacking a theoretical basis and data mining, which are very difficult, if not impossible, to overcome. Given the above, practitioners should abandon the practice of augmenting or modifying the CAPM Cost of Equity with a size premium.

In addition, Professor Damodaran, the New York University valuation guru, has provided a thorough analysis and review of the company-size effect, which he terms the small-firm or cap premium. Figure 17 traces the small-firm premium over the 1927 to 2014 time period.[75] Damodaran has studied the issue for years and makes a number of observations on the company-size premium or effect: (1) the effect has largely disappeared since 1980, which is the year that studies of the size effect were first published; (2) the small-firm premium tends to come and go over time; (3) the small-firm premium tends to be associated with the January effect (small companies earn abnormal returns only in the first two weeks of January); (4) the small-cap premium seems to actually be a microcap premium, as it disappears when companies with market capitalizations below $5 million are removed; (5) Damodaran does not find a small-cap premium when he estimates a small-firm required return; and (6) he has never used a small-cap premium when valuing small companies.

Professor Damodaran blames three factors for some analysts' continued use of a small-cap premium: (i) intuition (it *seems* smaller companies should be riskier); (ii) inertia (individuals and institutions are slow to change and to adopt new ideas); and (iii) bias (analysts prefer higher discount rates and lower valuations).

[75] Damodaran, *The Small Cap Premium: Where is the Beef*, 34 BUS. VALUATION REV. 4, at 152–57 (Winter 2015).

Figure 17
The Small Firm Premium
1927-2014



Source: Aswath Damodaran, "The Small Cap Premium - Where is the beef," *Business Valuation Review*: Winter 2015, Vol. 34, No. 4, pp. 152–57, 2015

Q. PLEASE SUMMARIZE YOUR EVIDENCE ON THE SMALL SIZE PREMIUM.

A. Mr. Howard has claimed that the Company deserves an incremental return due to its small size. However, he has not performed any empirical studies to support his contention that the Company is riskier due to its small size, and he does not point to any independent reports to support his claim. The size effect is usually associated with Duff & Phelps annual stock return study where they compute so-called size premiums based on the historical stock market returns for companies where size is measured by market capitalizations. As discussed above, the existence of a size premium in the stock market is an ongoing debate in investment circles, and many believe that it has disappeared over time. In addition, there is evidence that no such size premium exists for regulated public utilities. As such, the Commission should

reject the Company's request to have a ROE adder for its small size in the absence of any study that supports this claim.

2. Flotation Costs

Q. PLEASE DISCUSS MR. HOWARD'S CLAIM THAT ADJUSTMENT FOR FLOTATION COSTS IS JUSTIFIED.

A. Mr. Howard argues that a flotation cost adjustment of 0.05% is appropriate for Atmos. Flotation costs are the underwriting spread and fees associated with new offerings of common stock.

Q. DO YOU AGREE THAT AN ADJUSTMENT FOR FLOTATION COSTS IS JUSTIFIED IN THIS CASE?

A. No. First, Mr. Howard has not provided evidence that Atmos has paid flotation costs. As such, there is no need to consider flotation costs in arriving at an equity cost rate for the Company. The Company should not be rewarded with higher revenues (through a higher ROE) for expenses which it does not incur.

In addition, 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. In this case, a flotation cost adjustment is justified by reference to bonds and the manner in which issuance costs are recovered by including the amortization of bond flotation costs in annual financing costs. However, 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 1.5X actually suggests that there should be a flotation cost

reduction (and not 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, electric utility 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. These are thus 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, 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 that they pay is what matters when investors decide to buy a stock based on its expected return and risk prospects. The company is therefore not entitled to an adjustment to the allowed return to account for those costs.

(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, they have not accounted for other market transaction costs in determining a cost of equity for the Company. 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 their 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. SUMMMARY AND CONCLUSIONS

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 more common equity ratio and lower financial risk than other gas distribution companies. As a result, I have

employed a capital structure with a common equity ratio of 55.00%. 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 analyses indicate that an equity cost rate in the range of 8.70% to 9.40% is appropriate at this time. Since I rely primarily on the DCF approach, I am recommending an ROE of 9.25%, for the Company. Given my recommended capitalization ratios, senior capital cost rates, and the 9.25% ROE, my rate of return or cost of capital recommendation for the Company is 6.91% and is summarized in Table 2 and Exhibit JRW-1.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

VERIFICATION

STATE OF FLORIDA)
)
COUNTY OF MONROE) 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.

J. Randall Woolridge

SUBSCRIBED AND SWORN to before me this 17th day of January, 2023.

ELEANOR LYNN WILKINS
MY COMMISSION # HH 217253
EXPIRES: May 17, 2026

Notary Public

My Commission expires: 05-17-2026

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 co-authored 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 35 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.

J. Randall Woolridge

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302 Business Building
The Pennsylvania State University
University Park, PA 16802
814-865-1160

Home Address
120 Haymaker Circle
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*.

SUPPORTING EXHIBITS

JRW-1 thru JRW-8

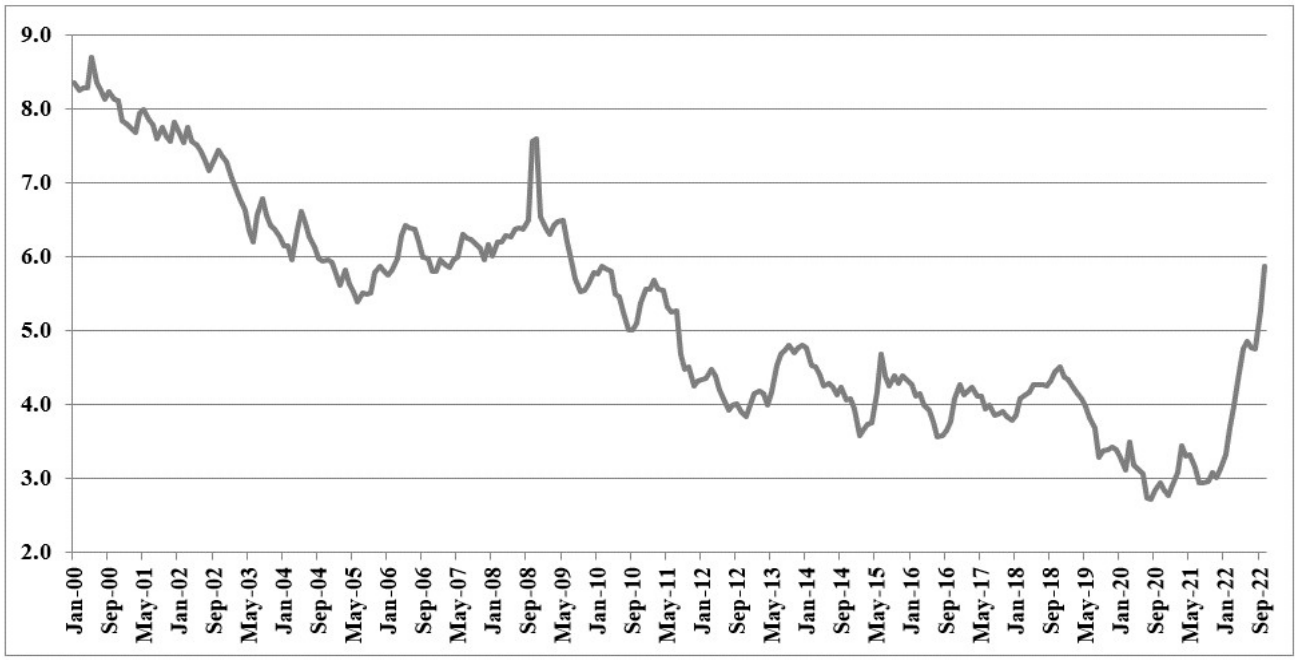
Exhibit JRW-1

Atmos Energy Corporation
Recommended Cost of Capital

Capital Source	Capitalization Ratios**	Cost Rate	Weighted Cost Rate*
Long-Term Debt	45.00%	4.06%	1.83%
Common Equity	55.00%	9.25%	5.09%
Total Capitalization	100.00%		6.91%

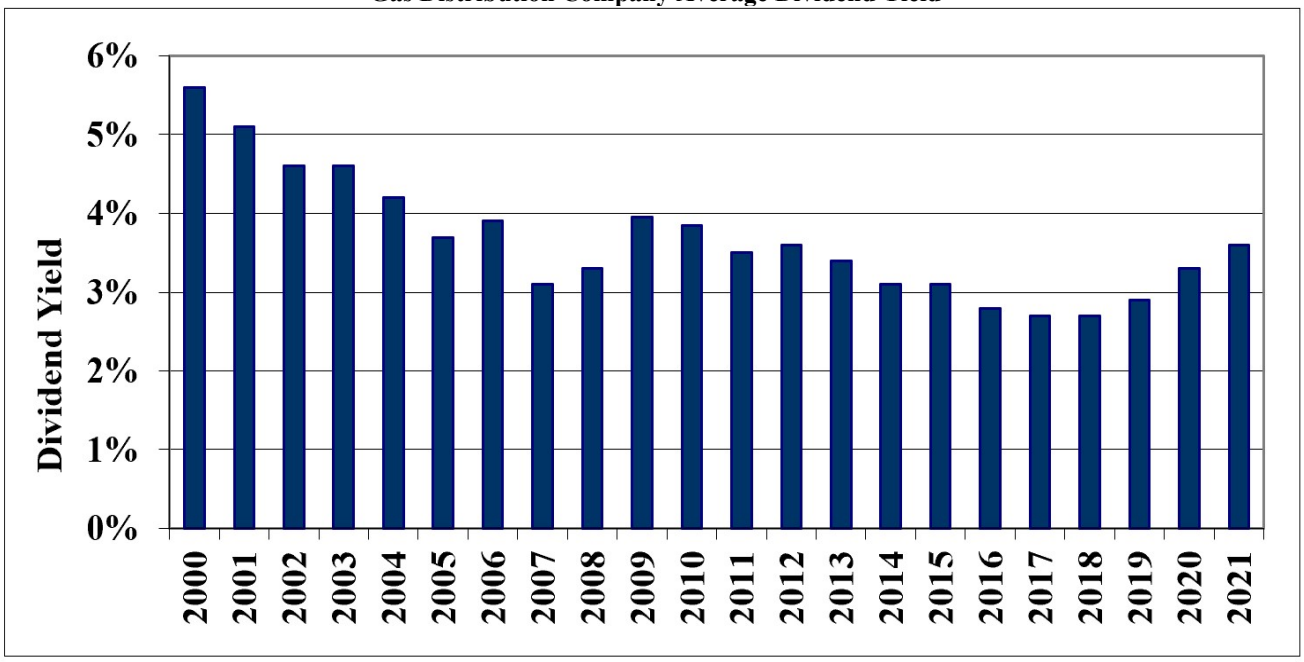
** Capital Structure Ratios are developed in Exhibit JRW-4.

Exhibit JRW-2
Long-Term 'A' Rated Public Utility Bonds



Data Source: Mergent Bond Record

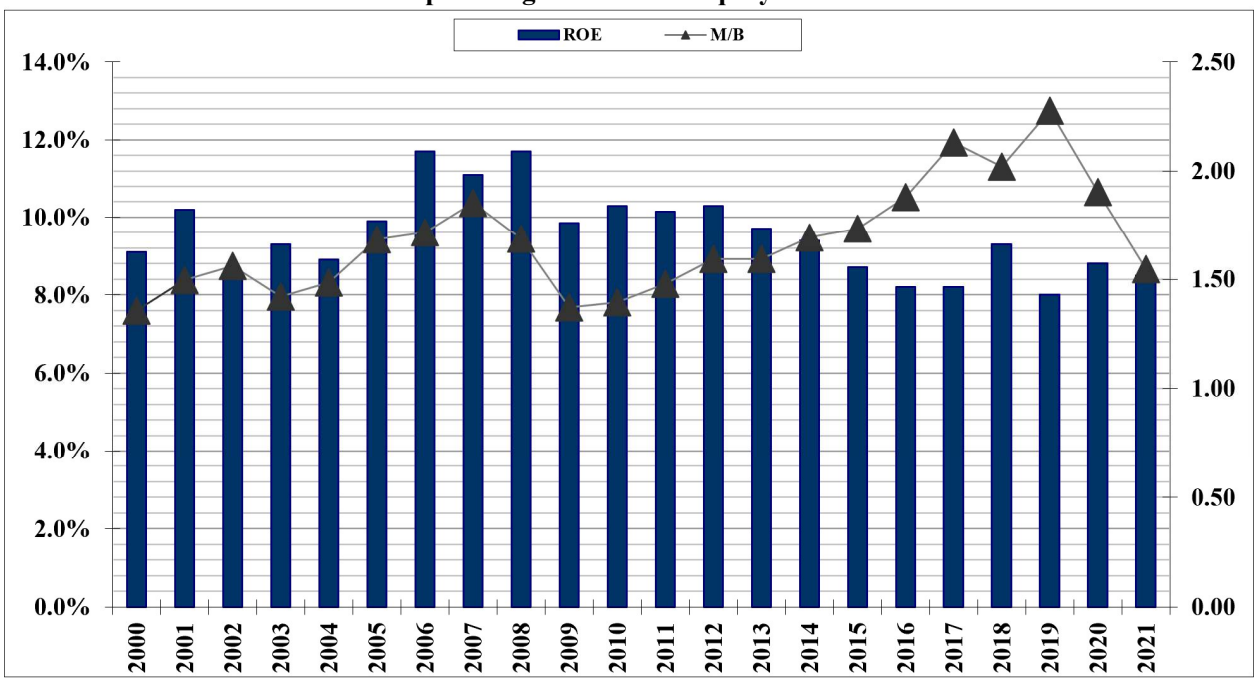
Exhibit JRW-2
Gas Distribution Company Average Dividend Yield



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

Exhibit JRW-2

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



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

Exhibit JRW-3
Atmos Energy Corporation
Summary Financial Statistics for Proxy Group

Panel A
Gas Proxy Group

	Operating Revenue ($bil)	Percent Elec Revenue	Percent Gas Revenue	Net Plant ($bil)	Market Cap ($bil)	S&P Issuer Credit Rating	Moody's Issuer Credit Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Earned Return on Equity	Market to Book Ratio
Atmos Energy Company (NYSE-ATO)	$4.20	0%	95%	$15.29	$17.45	A-	NR	7.84	TX,LA,MS,CO,KS,KY	52.95	8.94	1.67
Chesapeake Utilities (NYSE-CPK)	$0.65	12%	41%	$1.76	$1.81	NR	NR	0.00	DE,MD,FL	50.82	11.03	2.56
New Jersey Resources Corp. (NYSE-NJR)	$5.55	0%	34%	$4.39	$18.99	BBB+	NR	2.84	NJ	30.81	10.27	2.00
NiSource Inc (NYSE-NI)	$2.91	35%	65%	$17.92	$4.82	NR	Baa2	0.00	N,OH,PA,KY,VA,MD,MA	36.75	15.95	2.61
Northwest Natural Holdings (NYSE-NWN)	$0.96	0%	95%	$2.95	$3.11	NR	NR	0.00	OR,WA	41.83	7.84	1.53
ONE Gas, Inc.(NYSE-OGS)	$2.35	0%	100%	$5.22	$5.48	A-	NR	4.73	OK,KS,TX	44.09	9.04	1.71
Southwest Gas Company (NYSE-SWX)	$4.62	0%	43%	$7.71	$9.07	BBB-	Baa2	1.89	AZ,NV,CA	34.77	4.56	1.26
Spire (NYSE-SR)	$2.20	0%	95%	$5.59	$5.94	A-	NR	3.00	MO	35.90	8.06	1.44
Mean	$2.93	6%	71%	$7.60	$8.33	BBB+	Baa2	2.54		41.0	9.46	1.85
Median	$2.63	0%	80%	$5.40	$5.71	BBB+	Baa2	2.37		39.3	8.99	1.69

Data Source: S&P Cap IQ. Data is for trailing twelve months (TTM).

Exhibit JRW-3
Atmos Energy Corporation
***Value Line* Risk Metrics**

Gas Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
Atmos Energy Company (NYSE-ATO)	0.80	A+	1	100	95
Chesapeake Utilities (NYSE-CPK)	0.75	A	2	95	90
New Jersey Resources Corp. (NYSE-NJR)	0.95	A+	2	55	85
NiSource Inc (NYSE-NI)	0.85	B+	2	50	100
Northwest Natural Gas Co. (NYSE-NWN)	0.80	A	1	10	85
ONE Gas, Inc. (NYSE-OGS)	0.80	A	2	100	95
South Jersey Industries, Inc. (NYSE-SJI)	1.00	A	3	70	50
Southwest Gas Company (NYSE-SWX)	0.90	A	3	90	80
Spire (NYSE-SR)	0.80	B++	2	45	90
Mean	0.85	A	2.0	68	86

Data Source: *Value Line Investment Survey* , 2022.

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* .

Capital Structure Ratios and Debt Cost Rates

Panel A
Atmos' Proposed Capital Structure and Debt Cost Rate

Capital Source	Capitalization Ratios**	Cost Rate
Long-Term Debt	38.86%	4.06%
Common Equity	61.14%	
Total Capitalization	100.00%	

Panel B
CURB's Proposed Capital Structure and Debt Cost Rate

	Capitalization	Cost
Long-Term Debt	45.00%	4.06%
Common Equity	55.00%	
Total Capitalization	100.00%	

Exhibit JRW-5

Atmos Energy Corporation
Discounted Cash Flow Analysis

Gas Proxy Group

Dividend Yield*	**3.30%**
Adjustment Factor	**1.03**
Adjusted Dividend Yield	**3.40%**
Growth Rate**	**6.00%**
Equity Cost Rate	**9.40%**

*** Page 2 of Exhibit JRW-5**

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

Exhibit JRW-5

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 Corporation (NYSE-ATO)	ATO	$2.96	2.6%	2.7%	2.6%
Chesapeake Utilities Corp. (NYSE-CPK)	CPK	$2.14	1.8%	1.8%	1.7%
New Jersey Resources Corp. (NYSE-NJR)	NI	$0.94	3.5%	3.4%	3.3%
NiSource Inc. (NYSE-NI)	NJR	$1.56	3.2%	3.5%	3.5%
Northwest Natural Gas Co. (NYSE-NWN)	NWN	$1.94	4.0%	4.1%	3.9%
One Gas, Inc. (NYSE-OGS)	OGS	$2.48	3.1%	3.2%	3.1%
Southwest Gas Corporation (NYSE-SWX)	SWX	$2.48	3.7%	3.4%	3.1%
Spire (NYSE-SR)	SR	$2.88	4.1%	4.2%	4.0%
Mean			3.3%	3.3%	3.2%
Median			3.3%	3.4%	3.2%

Data Sources: S&P Cap IQ., December 23, 2022.

Exhibit JRW-5

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)	8.5	5.5	8.5	8.5	8.0	11.0
Chesapeake Utilities (NYSE-CPK)	9.5	7.0	9.5	9.5	8.5	10.5
New Jersey Resources Corp. (NYSE-NJR)	5.0	6.5	7.5	2.5	6.5	7.0
NiSource Inc (NYSE-NI)	3.0	-1.0	-3.0	4.0		-2.5
Northwest Natural Gas Co. (NYSE-NWN)	-1.0	1.5	1.0	2.5	0.5	0.5
ONE Gas, Inc. (NYSE-OGS)*				9.5	13.5	3.5
South Jersey Industries, Inc. (NYSE-SJI)	1.0	6.0	5.5	0.5	3.5	2.0
Southwest Gas Company (NYSE-SWX)	5.5	8.5	6.5	4.5	7.0	7.0
Spire (NYSE-SR)	2.0	4.5	6.5	2.5	6.0	4.5
Mean	4.2	4.8	5.3	4.9	6.7	4.8
Median	4.0	5.8	6.5	4.0	6.8	4.5
	Average of Median Figures =			5.3		

Data Source: *Value Line Investment Survey.*

Exhibit JRW-5

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

Gas Proxy Group

Company	*Value Line* Projected Growth Est'd. '19-'21 to '25-'27			*Value Line* Sustainable Growth		
	Earnings	Dividends	Book Value	Return on Equity	Retention Rate	Internal Growth
Atmos Energy Company (NYSE-ATO)	7.5	7.0	7.5	9.0%	52.0%	4.7%
Chesapeake Utilities (NYSE-CPK)	7.5	8.5	6.0	11.5%	58.0%	6.7%
New Jersey Resources Corp. (NYSE-NJR)	5.0	5.0	4.5	13.5%	40.0%	5.4%
NiSource Inc (NYSE-NI)	9.5	4.5	5.0	12.0%	50.0%	6.0%
Northwest Natural Gas Co. (NYSE-NWN)	6.5	0.5	4.0	8.5%	40.0%	3.4%
ONE Gas, Inc. (NYSE-OGS)	6.5	6.5	8.0	8.5%	41.0%	3.5%
Southwest Gas Company (NYSE-SWX)	10.0	5.5	7.5	6.0%	45.0%	2.7%
Spire (NYSE-SR)	9.0	5.0	7.0	8.0%	35.0%	2.8%
Mean	7.7	5.3	6.2	9.6%	45.1%	4.4%
Median	7.5	5.3	6.5	8.8%	43.0%	4.1%
Average of Median Figures =		6.4			Median =	4.1%

* 'Est'd. '19-'21 to '25-'27' is the estimated growth rate from the base period 2019 to 2021 until the future period 2025 to 2027.

Data Source: *Value Line Investment Survey.*

Exhibit JRW-5

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

Gas Proxy Group

Company		Yahoo	Zacks	S&P Cap IQ	Mean
Atmos Energy Company (NYSE-ATO)	ATO	8.2%	7.5%	7.5%	7.7%
Chesapeake Utilities (NYSE-CPK)	CPK	7.0%	NA	8.1%	7.5%
New Jersey Resources Corp. (NYSE-NJR)	NI	6.0%	6.0%	7.1%	6.4%
NiSource Inc (NYSE-NI)	NJR	6.4%	6.8%	6.2%	6.4%
Northwest Natural Gas Co. (NYSE-NWN)	NWN	4.3%	4.3%	4.3%	4.3%
ONE Gas, Inc. (NYSE-OGS)	OGS	5.0%	5.0%	5.0%	5.0%
Southwest Gas Company (NYSE-SWX)	SWX	4.0%	5.0%	6.2%	5.1%
Spire (NYSE-SR)	SR	8.0%	5.0%	6.0%	6.3%
Mean		6.1%	5.7%	6.3%	6.1%
Median		6.2%	5.0%	6.2%	6.4%

Data Sources: www.zacks.com, http://quote.yahoo.com, S&P Cap IQ, December 23, 2022.

Exhibit JRW-5

Atmos Energy Corporation
DCF Growth Rate Indicators

Growth Rate Indicator	Gas Proxy Group
Historic *Value Line* Growth in EPS, DPS, and BVPS	5.3%
Projected *Value Line* Growth in EPS, DPS, and BVPS	6.4%
Sustainable Growth ROE * Retention Rate	4.1%
Projected EPS Growth from Yahoo, Zacks, and S&P Cap IQ - Mean/Median	6.1%/6.4%

Exhibit JRW-6

Atmos Energy Corporation
Capital Asset Pricing Model

Gas Proxy Group

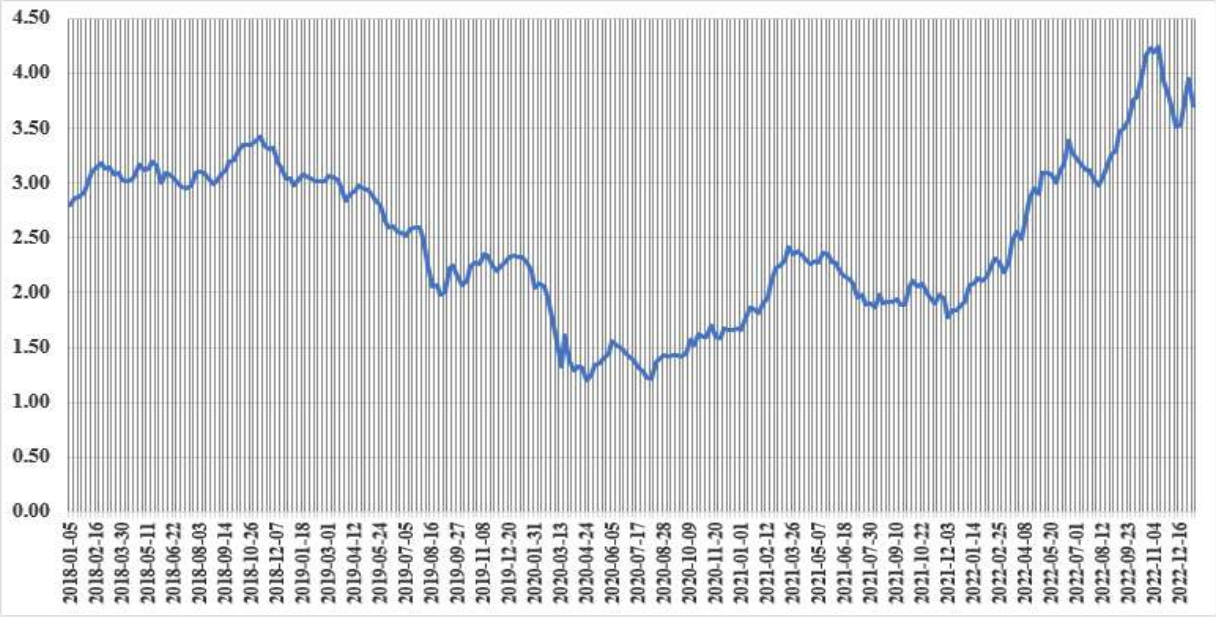
Risk-Free Interest Rate	**3.75%**
Beta*	**0.83**
Ex Ante Market Risk Premium**	**6.00%**
CAPM Cost of Equity	**8.7%**

* See page 3 of Exhibit JRW-6

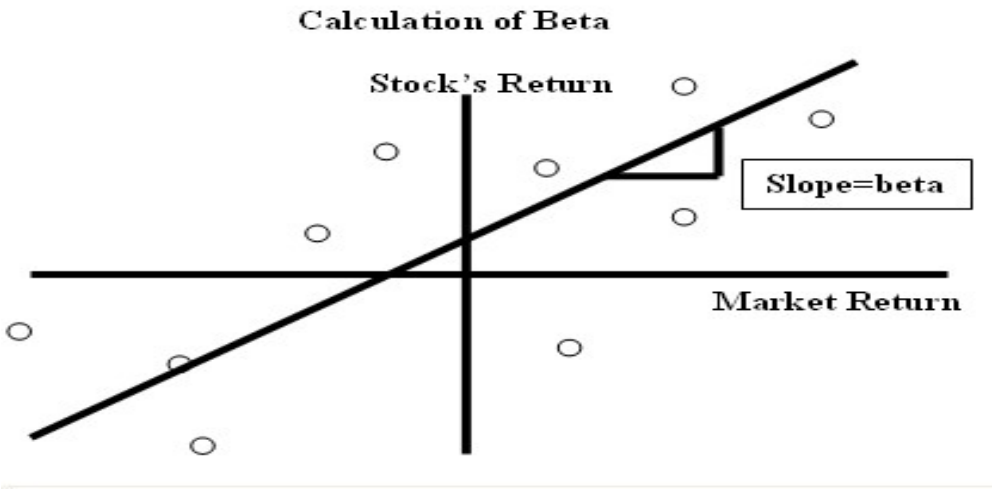
** See pages 5 and 6 of Exhibit JRW-6

Exhibit JRW-6

Thirty-Year U.S. Treasury Yields
2018-2022



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



Gas Proxy Group

Company	Beta
Atmos Energy Company (NYSE-ATO)	**0.80**
Chesapeake Utilities (NYSE-CPK)	**0.80**
New Jersey Resources Corp. (NYSE-NJR)	**0.95**
NiSource Inc (NYSE-NI)	**0.85**
Northwest Natural Gas Co. (NYSE-NWN)	**0.80**
ONE Gas, Inc. (NYSE-OGS)	**0.80**
Southwest Gas Company (NYSE-SWX)	**0.90**
Spire (NYSE-SR)	**0.85**
Mean	**0.84**
Median	**0.83**

Data Source: *Value Line Investment Survey* , 2023.

Exhibit JRW-6
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).

CAPM Study

Market Risk Premium - 2000-2022

Category	Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Median
Historical Risk	**Historical Risk Premium**										
		Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
						Geometric				4.40%	
		Damodaran	2022	1928-2021	Historical Stock Returns - Bond Returns	Arithmetic				6.71%	
						Geometric				5.17%	
		Dimson, Marsh, Staunton Credit Suisse Report	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 Model	**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					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	2022	Projection	Normalized with 2.5% Long-Term Treasury Yield					6.00%	
		Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					\	
		American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
		Market Risk Premia	2022	Projection	Fundamental Economic and Market Factors					3.47%	
		KPMG	2022	Projection	Fundamental Economic and Market Factors					5.75%	
		Damodaran -1-1-23	2022	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					5.11%	
		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									3.95%
Surveys	**Surveys**										
		New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
		Survey of Financial Forecasters	2022	10-Year Projection	About 20 Financial Forecastsers					3.88%	
		Duke - CFO Magazine Survey	2020	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 Compani	2022	Long-Term	Survey of Academics, Analysts, and Companies					5.60%	
		Median									5.37%
Building Block	**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**										**4.72%**
Median	**Median**										**4.83%**

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CAPM Study

Market Risk Premium Results - 2010-2022

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	2022	1928-2021	Historical Stock Returns - Bond Returns	Arithmetic				6.71%	
					Geometric				5.17%	
	Dimson, Marsh, Staunton _Credit Suisse Report	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
					Geometric					
	Median									5.56%
Ex Ante Models (Puzzle Research)										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2022	Projection	Normalized with 2.5% Long-Term Treasury Yield					6.00%	
	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	2022	Projection	Fundamental Economic and Market Factors					3.47%	
	KPMG	2022	Projection	Fundamental Economic and Market Factors					5.75%	
	Damodaran -1-1-23	2022	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					5.11%	
	Median									5.50%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2022	10-Year Projection	About 20 Financial Forecastsers					3.88%	
	Duke - CFO Magazine Survey	2020	10-Year Projection	Approximately 200 CFOs					4.05%	
	Fernandez - Academics, Analysts, and Companies	2022	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										**4.98%**
Median										**5.16%**

CAPM Study

Duff & Phelps Equity Risk Premium Estimates

KROLL

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

For additional information, please visit kroll.com/cost-of-capital-resource-center

Date	Risk-free Rate (R_f)	R_f (%)	Kroll Recommended U.S. ERP (%)	What Changed
Current Guidance:				
October 18, 2022 – UNTIL FURTHER NOTICE*	Normalized 20-year U.S. Treasury yield*	3.50*	6.00	*ERP*
June 16, 2022 – October 17, 2022	Normalized 20-year U.S. Treasury yield	3.50	5.50	*Rf*
April 7, 2022 – June 15, 2022	Normalized 20-year U.S. Treasury yield	3.00	5.50	*Rf*
December 7, 2020 – April 6, 2022	Normalized 20-year U.S. Treasury yield	2.50	5.50	*ERP*
June 30, 2020 – December 6, 2020	Normalized 20-year U.S. Treasury yield	2.50	6.00	*Rf*
March 25, 2020 – June 29, 2020	Normalized 20-year U.S. Treasury yield	3.00	6.00	*ERP*
December 19, 2019 – March 24, 2020	Normalized 20-year U.S. Treasury yield	3.00	5.00	*ERP*
September 30, 2019 – December 18, 2019	Normalized 20-year U.S. Treasury yield	3.00	5.50	*R_f*
December 31, 2018 – September 29, 2019	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*

*** We recommend using the spot 20-year U.S. Treasury yield as the proxy for the risk-free rate, if the prevailing yield as of the valuation date is higher than our recommended U.S. normalized risk-free rate of 3.5%. This guidance is effective when developing USD-denominated discount rates as of June 16, 2022 and thereafter.**

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

To learn more about cost of capital issues, and to ensure that you are using the most recent Kroll's Global Cost of Capital Inputs, visit kroll.com/cost-of-capital-resource-center.

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Source: https://www.kroll.com/-/media/cost-of-capital/kroll-us-erp-rf-table-2022.pdf

Capital Source	Capitalization Ratios**	Cost Rate	Weighted Cost Rate
Long-Term Debt	38.86%	4.06%	1.58%
Common Equity	61.14%	10.95%	6.69%
Total Capitalization	100.00%		8.27%

Atmos ROE Results

	Mean	Median
Discounted Cash Flow	9.72%	9.72%
Midpoint	9.72%	
Capital Asset Pricing Model	12.09%	11.99%
Midpoint	12.04%	
Risk Premium Model	10.52%	
Recommended Range Prior to the Application of a Size Premium	9.75% - 12.05%	
Size Premium	0.20%	
Credit Risk Adjustment	-.0.07%	
Flotation Cost Adjustment	0.05%	
Recommended Range Applicable to Atmos Energy	9.90% - 12.20%	
Recommended Return on Equity	**10.95%**	

GDP and S&P 500 Growth Rates

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	1,017.62	92.06	6.10	3.24	
10	1970	1,073.30	92.15	5.51	3.19	
11	1971	1,164.85	102.09	5.57	3.16	
12	1972	1,279.11	118.05	6.17	3.19	
13	1973	1,425.38	97.55	7.96	3.61	
14	1974	1,545.24	68.56	9.35	3.72	
15	1975	1,684.90	90.19	7.71	3.73	
16	1976	1,873.41	107.46	9.75	4.22	
17	1977	2,081.83	95.10	10.87	4.86	
18	1978	2,351.60	96.11	11.64	5.18	
19	1979	2,627.33	107.94	14.55	5.97	
20	1980	2,857.31	135.76	14.99	6.44	
21	1981	3,207.04	122.55	15.18	6.83	
22	1982	3,343.79	140.64	13.82	6.93	
23	1983	3,634.04	164.93	13.29	7.12	
24	1984	4,037.61	167.24	16.84	7.83	
25	1985	4,338.98	211.28	15.68	8.20	
26	1986	4,579.63	242.17	14.43	8.19	
27	1987	4,855.22	247.08	16.04	9.17	
28	1988	5,236.44	277.72	24.12	10.22	
29	1989	5,641.58	353.40	24.32	11.73	
30	1990	5,963.14	330.22	22.65	12.35	
31	1991	6,158.13	417.09	19.30	12.97	
32	1992	6,520.33	435.71	20.87	12.64	
33	1993	6,858.56	466.45	26.90	12.69	
34	1994	7,287.24	459.27	31.75	13.36	
35	1995	7,639.75	615.93	37.70	14.17	
36	1996	8,073.12	740.74	40.63	14.89	
37	1997	8,577.55	970.43	44.09	15.52	
38	1998	9,062.82	1,229.23	44.27	16.20	
39	1999	9,631.17	1,469.25	51.68	16.71	
40	2000	10,250.95	1,320.28	56.13	16.27	
41	2001	10,581.93	1,148.09	38.85	15.74	
42	2002	10,929.11	879.82	46.04	16.08	
43	2003	11,456.45	1,111.91	54.69	17.88	
44	2004	12,217.20	1,211.92	67.68	19.407	
45	2005	13,039.20	1,248.29	76.45	22.38	
46	2006	13,815.58	1,418.30	87.72	25.05	
47	2007	14,474.23	1,468.36	82.54	27.73	
48	2008	14,769.86	903.25	65.39	28.05	
49	2009	14,478.07	1,115.10	59.65	22.31	
50	2010	15,048.97	1,257.64	83.66	23.12	
51	2011	15,599.73	1,257.60	97.05	26.02	
52	2012	16,253.97	1,426.19	102.47	30.44	
53	2013	16,843.20	1,848.36	107.45	36.28	
54	2014	17,550.69	2,058.90	113.01	39.44	
55	2015	18,206.02	2,043.94	106.32	43.16	
56	2016	18,695.11	2,238.83	108.86	45.03	
57	2017	19,479.62	2,673.61	124.94	49.73	
58	2018	20,527.16	2,506.85	148.34	53.61	
59	2019	21,372.58	3,230.78	162.35	58.80	
60	2020	20,893.75	3,756.07	138.12	56.70	
61	2021	22,997.50	4,766.18	206.38	59.20	Average
	Growth Rates	**6.17%**	**7.07%**	**6.42%**	**5.65%**	**6.33%**

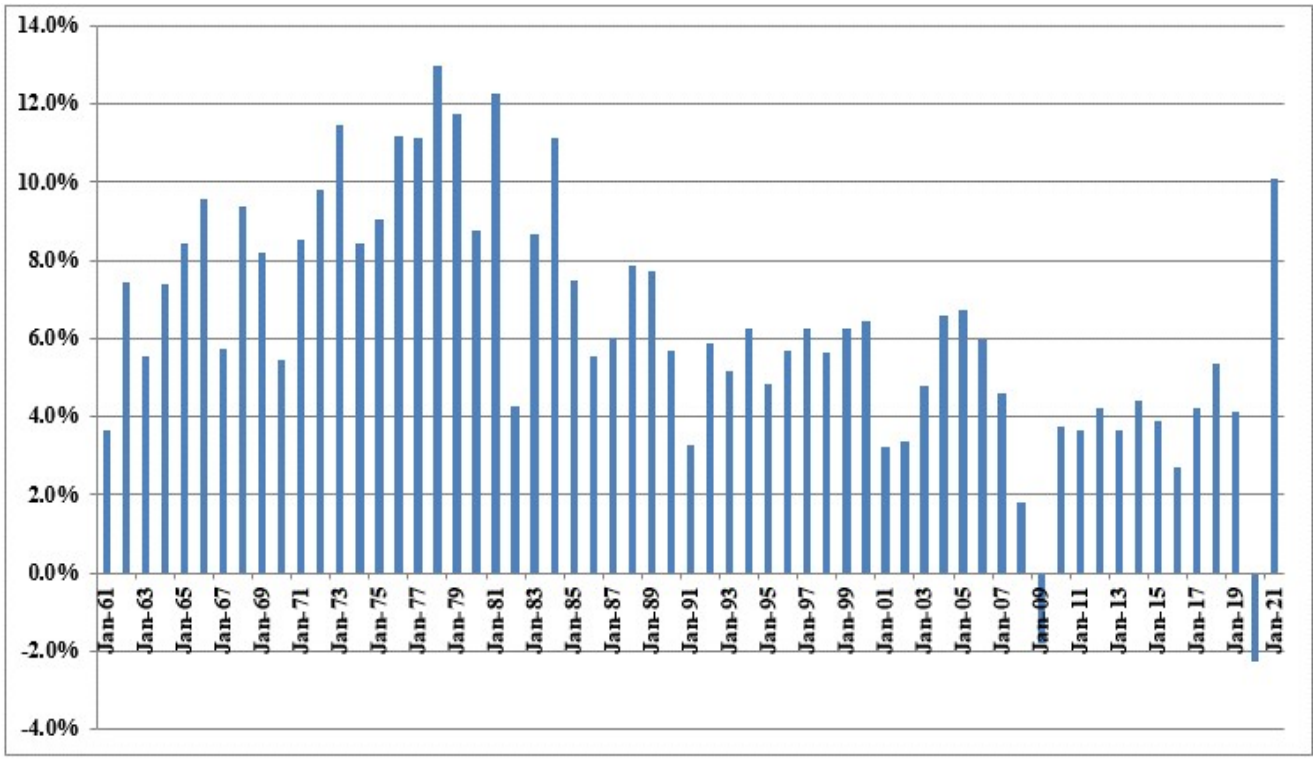
Data Sources: GDPA -http://research.stlouisfed.org/fred2/series/GDPA/downloaddata
S&P 500, EPS and DPS - http://pages.stern.nyu.edu/~adamodar/

10-Year Average	**2.97%**	**11.56%**	**3.59%**	**8.10%**
20-Year Average	**3.46%**	**6.11%**	**6.55%**	**6.62%**
30-Year Average	**4.16%**	**7.60%**	**6.78%**	**5.04%**
40-Year Average	**4.80%**	**8.93%**	**5.67%**	**5.44%**
50-Year Average	**5.94%**	**7.48%**	**6.63%**	**5.94%**

Nominal GDP	**6.17%**
S&P 500 Stock Price	**7.07%**
S&P 500 EPS	**6.42%**
S&P 500 DPS	**5.65%**
Average	**6.33%**

Annual Nominal GDP Growth Rates

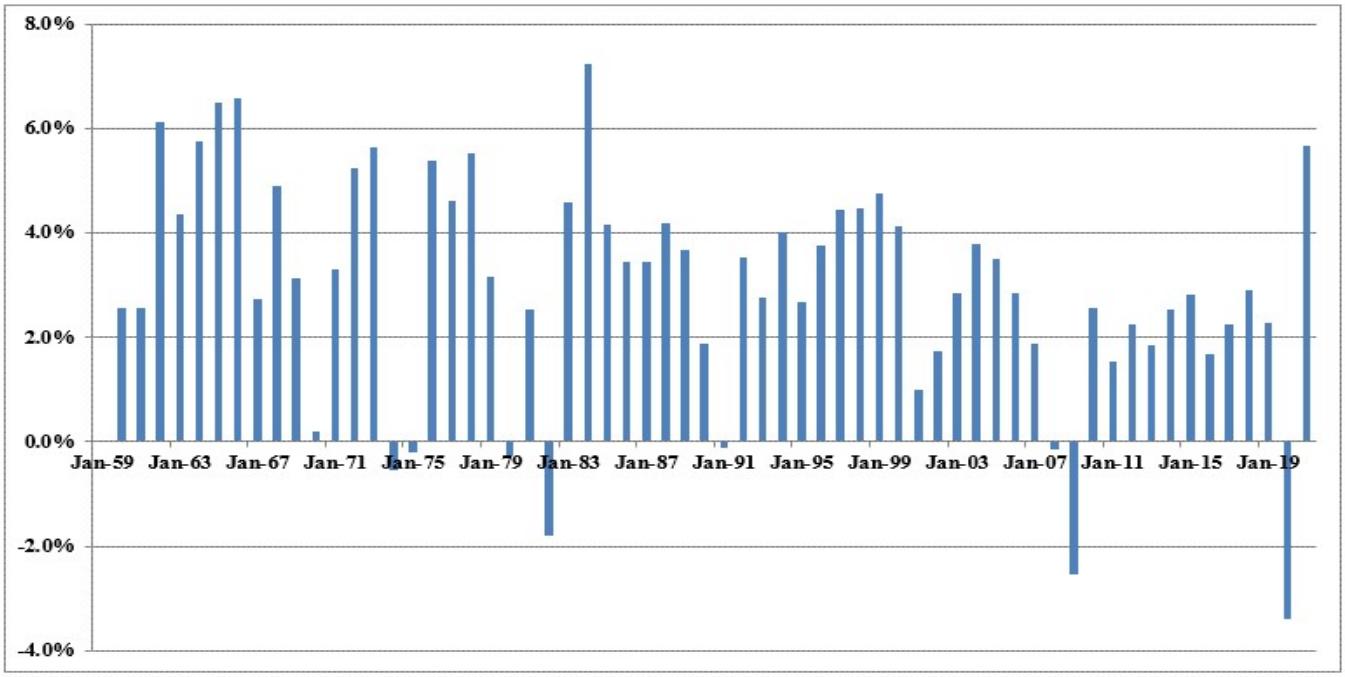
Annual Growth Rates - 1961-2021



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

Real GDP Growth Rates

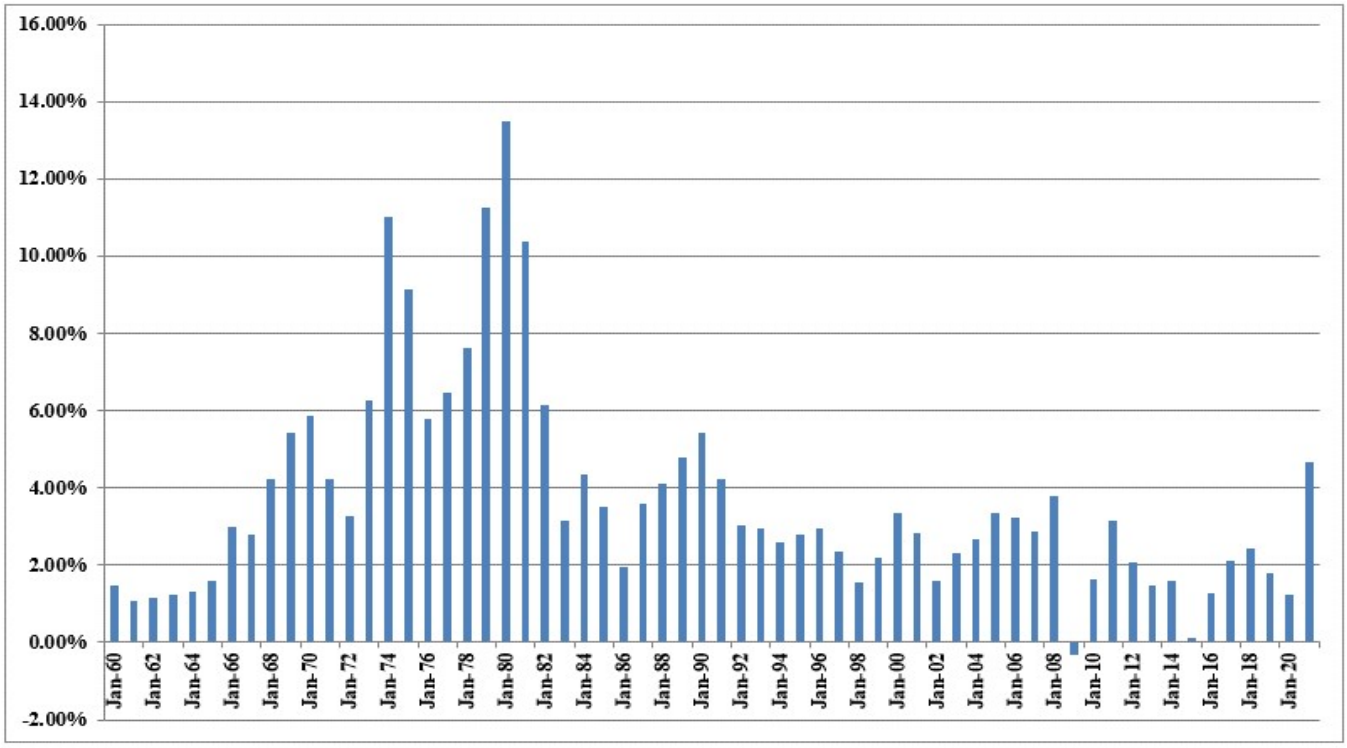
Annual D'Ascendisl GDP Growth Rates
1961-2021



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

Inflation Rates

Annual Inflation Rates
1961-2021



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

Projected Nominal GDP Growth Rates

Panel A
Historic GDP Growth Rates

10-Year Average	**3.96%**
20-Year Average	**3.96%**
30-Year Average	**4.49%**
40-Year Average	**5.05%**
50-Year Average	**6.15%**

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

Panel B
Projected GDP Growth Rates

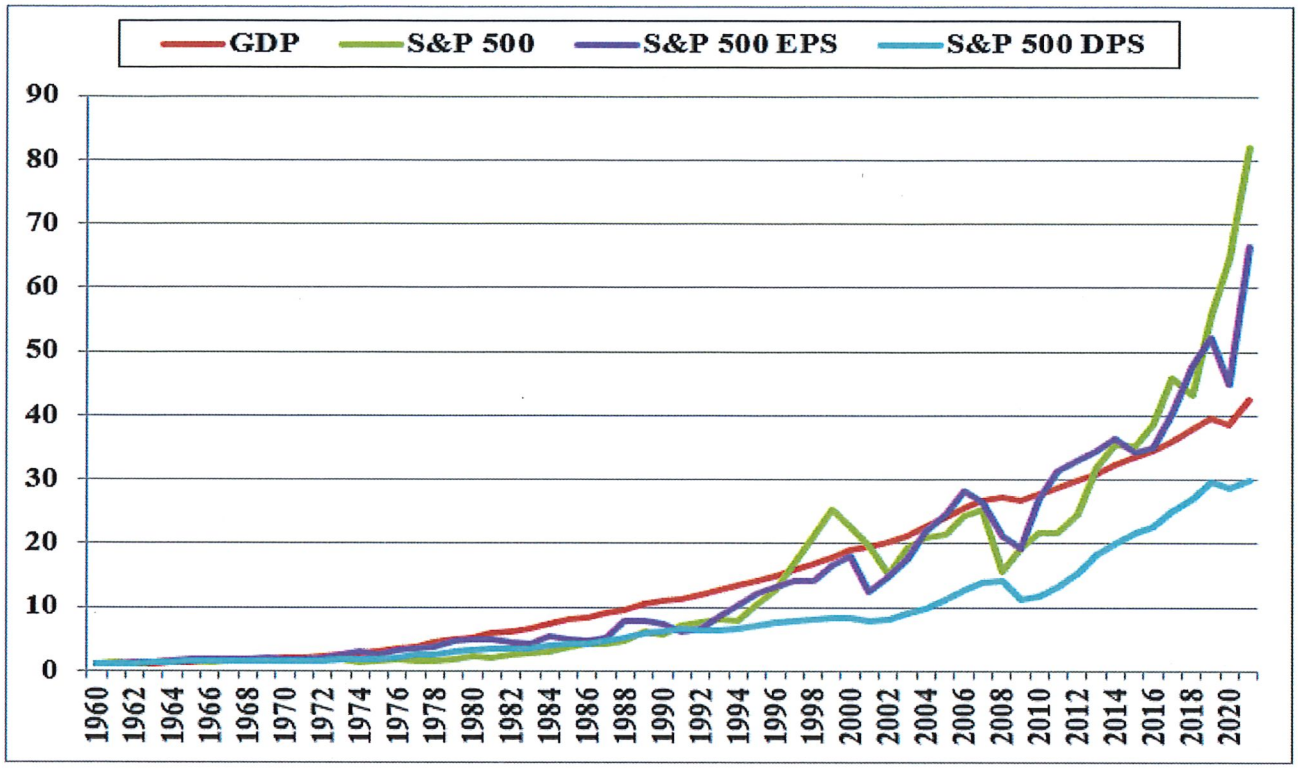
	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	**2020-30**	**4.0%**
Survey of Financial Forecasters	**Ten Year**	**4.7%**
Social Security Administration	**2020-2095**	**4.2%**
Energy Information Administration	**2020-2050**	**4.5%**

Sources:

Congressional Budget Office,The *2021 Long-Term Budget Outlook* , July 15, 2021.
U.S. Energy Information Administration, *Annual Energy Outlook 2021* , Table: Macroeconomic Indicators,
Social Security Administration, 2021 Annual Report of the Board of Trustees of the Old-Age,
Survivors, and Disability Insurance (OASDI) Program, Table VI.G4,
The 4.2% growth rate is the growth in projected GDP from 20 trillion in 2020 to $444 trillion in 2095.
https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/

GDP and S&P 500 Growth Rates

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



CERTIFICATE OF SERVICE

23-ATMG-359-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 17th day of January, 2023, to the following:

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