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MISSOURI PUBLIC SERVICE COMMISSION

FILE NO. GR-2024-0369

REBUTTAL TESTIMONY

OF

ANN E. BULKLEY

ON

BEHALF OF

UNION ELECTRIC COMPANY

D/B/A AMEREN MISSOURI

St. Louis, Missouri

April 2025

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REBUTTAL TESTIMONY

OF

ANN E. BULKLEY

FILE NO. GR-2024-0369

I. Introduction

Q: Are you the same Ann E. Bulkley that previously filed direct testimony in this proceeding?

A: Yes. I previously submitted direct testimony before the Missouri Public Service Commission ("Commission") in this proceeding on behalf of Ameren Missouri ("Company" or "Ameren Missouri"), a wholly-owned subsidiary of Ameren Corporation ("Ameren"), regarding the Company's natural gas operations.

Q: What is the purpose of your rebuttal testimony?

A: The purpose of my rebuttal testimony is to respond to the direct testimonies of Dr. Seoung Joun Won on behalf of the Missouri Public Service Commission Staff ("Staff"),[1] and David Murray on behalf of the Missouri Office of the Public Counsel ("OPC")[2] regarding their respective proposals for the return on equity for the Company in this proceeding. I have not attempted to respond to every position offered by these witnesses, and the fact that I may not have responded to any

[1] Missouri Public Service Commission, Direct Testimony of Seoung Joun Won, PhD, Case No. GR-2024-0369, February 28, 2025 ("Won Direct").

[2] Missouri Public Service Commission, Direct Testimony of David Murray, Case No. GR-2024-0369, February 28, 2025 ("Murray Direct").

particular position or statement made by these witnesses does not indicate my agreement with that position or statement.

Q: Are you sponsoring any exhibits in support of rebuttal direct testimony?

A: Yes. I am sponsoring Schedule AEB-R1, Attachments 1 through 13, which have been prepared by me or under my direction.

Q: Have you prepared cost of equity analyses to support your rebuttal testimony that reflect current market conditions?

A: Yes. As discussed in more detail herein, I have prepared updated cost of equity analyses based on market data through February 28, 2025 to rebut the cost of equity analyses of the other witnesses in this proceeding. These analyses validate the reasonableness of my recommended ROE range of 10.25 to 11.25 percent, and that the Company's proposed ROE of 10.25 percent is reasonable.[3] My conclusion continues to be based on not only the results of multiple cost of equity models, as well as other factors, including capital market conditions, the capital attraction and comparable return standards, and the Company's specific risks.

Q: How is the remainder of your rebuttal testimony organized?

A: The remainder of my testimony is organized as follows:

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[3] Missouri Public Service Commission, Direct Testimony of Ann E. Bulkley, Case No. GR-2024-0369, September 30, 2024 ("Bulkley Direct"), at 8.

- Section II provides a summary and overview of my rebuttal testimony and the important factors to be considered in establishing the authorized ROE for the Company.

- Section III provides cost of equity analyses based on market data as of February 28, 2025.

- Section IV discusses the changes in capital market conditions since my direct testimony and their effect on the cost of equity and authorized ROEs for comparable utilities nationwide relative to the witnesses' ROE recommendations in this proceeding.

- Section V provides my response to Dr. Won's cost of equity analyses and recommendations.

- Section VI provides my response to Mr. Murray's cost of equity analyses and recommendations.

- Section VII provides my response to these witnesses discussion of the Company's business and regulatory risks.

II. Summary and Overview

Q: What factors should be considered in evaluating the results of the cost of equity analyses and establishing the authorized ROE?

A: The primary factors that should be considered are: (1) the importance of providing a return that is comparable to returns on alternative investments with commensurate risk; (2) the need for a return that supports a utility's ability to attract needed capital at reasonable terms; (3) the effect of current and expected capital market conditions; and (4) achieving a reasonable balance between the interests of investors and customers.

Q: What are the ROE recommendations of the parties in this proceeding?

A: Figure 1 summarizes the results of the cost of equity analyses presented by Dr. Won and Mr. Murray in this proceeding, as well as each of their final ROE recommendations. As shown, Dr. Won conducts a Two-Step DCF analysis, a CAPM analysis and a Bond Yield Plus Risk Premium ("BYRP" or "Risk Premium") analysis. Dr. Won sets his ROE recommendation equal to the average result of his BYRP analysis of 9.64 percent while his recommended ROE range of 9.39 percent to 9.89 percent appears to be determined by adding/subtracting 25 basis points from his recommended ROE.[4] However, Dr. Won provides no support or reasoning as to why he selected 25 basis points. It is also unclear how Dr. Won considered the results of his DCF and CAPM analyses, which he claims support a cost of equity range of 8.25 percent to 9.93 percent (*i.e.,* determined by averaging the range of the DCF and CAPM results), in determination of his recommended ROE.[5]

Mr. Murray conducts a multi-stage DCF analysis and a CAPM analysis, and also a "rule of thumb" BYRP analysis as a check on the reasonableness of his other two cost of equity analyses. For his DCF and CAPM analyses, Mr. Murray relies on a individual results for Ameren Missouri's parent company, Ameren and a proxy group of six comparable natural gas utilities. While Mr. Murray's recommended ROE is significantly greater than any of the results of the cost of equity analyses that he conducts, Mr. Murray acknowledges his recommendation is based on

[4] Won Direct, at 48.

[5] *Id.*

several factors,[6] including a fair and reasonable range of 9.00 percent to 9.50 percent.

FIGURE 1: SUMMARY OF RESULTS OF THE COST OF EQUITY ANALYSES AND ROE RECOMMENDATIONS OF DR. WON AND MR. MURRAY

	Dr. Won	Mr. Murray
DCF Analysis		
Two-Step DCF	7.66% - 9.70%	n/a
Multi-Stage DCF (Utility Proxy Group)	n/a	7.83% - 8.23%
Multi-Stage DCF (Ameren)	n/a	7.78% - 7.90%
CAPM		
Utility Proxy Group	8.85% - 10.17%	8.31% - 9.12%
Ameren	n/a	8.11% - 8.88%
ECAPM	n/a	n/a
Bond Yield Plus Risk Premium	9.63% - 9.65%	8.70%
Recommended ROE Range	9.39% - 9.89%	9.00% - 9.50%
Recommended ROE	**9.64%**	**9.50%**

Q: What are your key conclusions and recommendations regarding the appropriate ROE for Ameren Missouri in this proceeding?

A: Nothing in the direct testimonies of either Dr. Won or Mr. Murray has caused me to change my conclusions or recommendations. Based on my review of the direct testimonies of these witnesses, my key conclusions regarding a reasonable ROE for the Company in this proceeding are as follows:

[6] Murray Direct, at 2-3.

- Updated cost of equity analyses based on market data through November 30, 2024 confirms that Company's requested ROE of 10.25 percent continues to be reasonable.
- While Dr. Won contends that his DCF and CAPM analyses support a cost of equity range of 8.25 percent to 9.93 percent, it appears he acknowledges that the results of these two models are understated. Dr. Won's recommendation of 9.64 percent is based on the average results of his BYRP analysis which is at the very high-end of the range that he indicated his DCF and CAPM analyses support.
- When Dr. Won's DCF, CAPM, and BYRP analyses are updated to reflect the most current data available and corrected for the issues that I discuss in detail herein, the estimated range of the cost of equity is 10.22 percent – 11.60 percent, the midpoint of which is 10.91 percent *which is substantially higher than the Company proposed cost of equity in this proceeding*.

- Mr. Murray's ROE recommendation lacks analytical foundation and simply represents his own unsupported opinion as to the appropriate ROE for Ameren Missouri. Specifically:
  - Mr. Murray conducts DCF and CAPM analyses, as well as a "rule of thumb" BYRP analysis, but does not rely on the results of any of these analyses for his ROE recommendation.
  - Despite a significant increase in interest rates over the past few years that indicates an increase in the cost of equity, which Mr. Murray acknowledges, he nonetheless recommends an ROE (9.50 percent) that is approximately 20 basis points below what he states is the average authorized ROE nationally for natural gas utilities in 2024 (9.72 percent).

III. Updated Cost of Equity Analyses

Q: Have you updated your cost of equity analyses to support your rebuttal testimony?

A: Yes. As shown in Figure 2 below (see also Schedule AEB-R1, Attachments 2 through 6), I have updated the results of the constant growth DCF, CAPM, ECAPM and BYRP analyses based on market data through February 28, 2025, using the same methodologies as in my direct testimony except for one modification. In my direct testimony, I relied on projected EPS growth rates provided by Yahoo!

Finance as one of the estimates of long-term growth in my constant growth DCF model; however, Yahoo! Finance no longer reports consensus projected 3 to 5-year EPS growth rates. As a result, in my rebuttal testimony, I am now instead relying on the consensus projected 3 to 5-year EPS growth rates reported by S&P Capital IQ Pro in my constant growth DCF model.

FIGURE 2: SUMMARY OF COST OF EQUITY ANALYTICAL RESULTS

Constant Growth DCF

	Minimum Growth Rate	Average Growth Rate	Maximum Growth Rate
Mean:			
30-Day Avg. Stock Price	9.39%	10.45%	11.31%
90-Day Avg. Stock Price	9.47%	10.53%	11.39%
180-Day Avg. Stock Price	9.63%	10.70%	11.56%
Average	9.50%	10.56%	11.42%
Median:			
30-Day Avg. Stock Price	9.47%	10.83%	11.40%
90-Day Avg. Stock Price	9.62%	10.96%	11.53%
180-Day Avg. Stock Price	9.76%	11.16%	11.72%
Average	9.62%	10.98%	11.55%

CAPM / ECAPM / BYRP

	30-Year Treasury Bond Yield		
	Current 30-Day Avg	Near-Term Projected	Longer-Term Projected
CAPM:			
Current *Value Line* Beta	11.47%	11.46%	11.43%
Current Bloomberg Beta	10.41%	10.39%	10.31%
Long-term Avg. *Value Line* Beta	10.43%	10.41%	10.33%
ECAPM:			
Current *Value Line* Beta	11.64%	11.64%	11.61%
Current Bloomberg Beta	10.85%	10.83%	10.77%
Long-term Avg. *Value Line* Beta	10.86%	10.84%	10.78%
Bond Yield Risk Premium:	10.58%	10.53%	10.34%

Q: Do the updated results support the Company's requested ROE of 10.25 percent in this proceeding?

A: Yes. The range of results reflecting the most updated market data continues to support the Company's requested ROE of 10.25 percent. The results of my updated DCF, CAPM and BYRP analyses are generally higher than the DCF, CAPM and BYRP results presented in my direct testimony.

IV. Capital Markets Conditions and Comparable Return

Q: Do you generally agree with Dr. Won's and Mr. Murray's characterizations of the changes in market conditions over the past few years and their effect on the cost of equity?

A: Yes. I generally agree with Dr. Won's and Mr. Murray's respective characterizations of the capital market conditions over the past few years and the fact that they both acknowledge the cost of equity for natural gas utilities has increased since the Company's last rate proceeding as a result of the changes in capital market conditions.[7] Dr. Won and Mr. Murray recognize that short-term and long-term interest rates are significantly higher since that time due to the Federal Reserve's efforts to combat persistently high inflation. As Dr. Won notes, inflation remains elevated above the Federal Reserve's target and that one of the most

[7] *See, e.g.*, Won Direct, at 4, range of 9.39 percent to 9.89 percent as compared to a range of 9.25 percent to 9.75 percent in Ameren Missouri's last rate proceeding (Missouri Public Service Commission, Case No. GR-2021-0241, Staff Cost of Service Report, September 2021, at 9); Murray Direct, at 3, cost of equity range of 7.80 percent to 8.50 percent as compared to a cost of equity range of 6.50 percent to7.00 percent in Ameren Missouri's last rate proceeding (Missouri Public Service Commission, Case No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at 5).

important factors in the economic conditions that impact the cost of equity is the interest rate as influenced by the Federal Reserve's monetary policy.[8] However, while Dr. Won and Mr. Murray summarize the capital market conditions over the past few years in a similar manner as I have done, it is our respective conclusions regarding those conditions that differ.

Q: What conclusions have Dr. Won and Mr. Murray drawn from the changes in market conditions?

A: While recognizing the increase in the cost of equity for natural gas utilities, Dr. Won contends that the results of the DCF and CAPM are "overstated:"

> In the past, interest rates were typically one of the main drivers of COE changes. Higher interest rates would normally mean higher COEs, all other things being equal. Currently, we observe higher COEs due to historically high interest rates in recent decades. The combined net result of the rise in interest rates and changes in overall market conditions is an increase in COE. Staff's COE estimates for the natural gas proxy group have also increased. The current COE, as estimated by the DCF and CAPM methods, is overstated when considering utility bond market conditions. Therefore, Staff is cautious about using COE estimates from DCF and CAPM to recommend a specific authorized ROE in this proceeding, as demonstrated later in this testimony.[9]

Similarly, Mr. Murray also acknowledges that there has been an increase in the natural gas utility industry's cost of equity in the past few years; however; he

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[8] Won Direct, at 9.

[9] *Id*., at 22.

contends that his recommended ROE of 9.50 percent in this proceeding is reasonable, despite recent increases in long-term bond yields, because natural gas and electric utility valuation levels are currently similar and the price-to-earnings ("P/E") ratio for the electric industry is trading similar to 2015 levels when the Commission separately authorized an ROE of 9.50 percent for Ameren Missouri and Evergy Metro.[10]

Q: Has Dr. Won provided any support for his contention that the results of the DCF and CAPM are "overstated" as a result of the current capital market conditions?

A: No. In fact, it is unclear how Dr. Won arrived at his conclusion that the results of the DCF and CAPM analyses are currently "overstated" based on the evidence presented in his testimony. First, Dr. Won's position is invalidated by the fact that his recommended ROE for the Company in this proceeding (*i.e.*, 9.64 percent) is actually greater than the result of his DCF analysis (*i.e.*, 8.68 percent) and the result of his CAPM analysis (*i.e.*, 9.51 percent).

Second, as noted above, Dr. Won has determined that interest rates as influenced by the Federal Reserve are "one of the most important factors" that affect a utility's cost of equity.[11] This is because utilities are considered bond proxies meaning the share price performance of utilities is inversely related to interest rates. For

[10] Murray Direct, at 2-3.

[11] Won Direct, at 9.

example, as interest rates increase(decrease), the share prices of utilities decrease(increase) and thus the cost of equity for utilities increases(decreases). Therefore, by extension, if Dr. Won believes the cost of equity produced by the DCF and CAPM is overstated, he must also believe that interest rates are expected to decline thus lowering the cost of equity. However, Dr. Won provides evidence to the contrary as he concludes that the Federal Reserve is expected to "maintain the current level of the federal fund rate until achieving the desired inflation rate."[12] Dr. Won's assumption that interest rates are expected to remain elevated over the near-term invalidates his conclusion that the results of the DCF and CAPM are "overstated."

Q: Is Mr. Murray's ROE recommendation of 9.50 percent in this proceeding consistent with the P/E ratio data that he references to support his recommendation?

A: No. As shown in Figure 3, I have calculated the P/E ratios for Mr. Murray's natural gas utility proxy group in this proceeding over the duration of the Company's last two natural gas rate proceedings. Additionally, since Mr. Murray contends that the valuations of natural gas and electric utilities are similar and uses the P/E ratios of electric utilities as a proxy for natural gas utilities, I have also calculated the P/E ratios for the electric utility proxy group companies in Ameren Missouri's recent electric proceeding over the duration of the Company's last four electric rate proceedings. I then compare the electric and natural gas proxy group P/E ratios

[12] *Id.,* at 21.

to his recommended ROEs in those proceedings. As shown, while Mr. Murray suggests that there should be an inverse relationship between the P/E ratios and the ROE, it is clear that Mr. Murray's historical recommendations for Ameren Missouri have not taken into consideration the P/E ratios of his proxy group. While the P/E ratios declined from 2019 through 2022, Mr. Murray's recommendation remained constant at 9.25 percent and even declined in one rate proceeding to 9.00 percent in 2021. Furthermore, while P/E ratios declined from approximately 21 in 2019 to approximately 17.9 in 2024, Mr. Murray's recommendation only increased 25 basis points from 9.25 percent to 9.50 percent. Therefore, it is clear that Mr. Murray does not rely on the P/E ratios in establishing his ROE recommendations.

FIGURE 3: COMPARISON OF MR. MURRAY'S P/E RATIOS AND ROE RECOMMENDATIONS[13]

Docket	Proxy Group	Filed	Order/Current	Proxy Group P/E	Murray's Recommended ROE
ER-2019-0335	Electric	7/3/2019	3/18/2020	21.89	9.25%
ER-2021-0240	Electric	3/31/2021	12/22/2021	20.19	9.00%
GR-2021-0241	Gas	3/31/2021	12/22/2021	18.23	9.25%
ER-2022-0337	Electric	8/1/2022	6/14/2023	19.34	9.25%
ER-2024-0319	Electric	6/28/2024	2/14/2025	17.98	9.50%
GR-2024-0369	Gas	9/30/2024	2/14/2025	17.83	9.50%

[13] Source: Mr. Murray's workpaper titled: Charts and Graphs in Testimony-GR-2024-0369.xlsx.

Q: Do you agree with Mr. Murray's reliance on the P/E ratios for electric utilities as a proxy for natural gas utilities in the current market environment?

A: No. In fact, Mr. Murray's use of the P/E ratios for electric utilities as a proxy for the P/E ratios of natural gas utilities is invalidated by the P/E ratios he calculated for his natural gas proxy group and representative electric proxy group. For example, since January 1, 2025, the P/E ratio for his natural gas proxy group is 17.64 while the P/E ratio for his representative electric proxy group is 18.15.[14] Further, Mr. Murray acknowledges that electric utilities have been trading at a premium to natural gas utilities since the fall of 2024.[15]

Although, Mr. Murray contends that the current premium is not due to a change in the risk of electric utilities relative to natural gas utilities but investors viewing electric utilities more favorably due to the expected load growth associated with data centers. Therefore, because the premium is not due to a change in the relative risk, Mr. Murray concludes that the cost of equity for electric utilities is not lower than the cost of equity for the natural gas utilities.[16] However, this explanation is unreasonable and inconsistent with other sections of his testimony. For example, in this instance when comparing the P/E ratios of natural gas utilities to the P/E ratios of electric utilities, Mr. Murray contends that the change in the P/E

[14] Id.

[15] Murray Direct, at 15-16

[16] *Id.*

ratios for electric utilities does not affect the cost of equity; however, when discussing his cost of equity results, Mr. Murray states that the increase in the valuations of natural gas and electric utilities stocks (i.e., price and P/E ratios) since the middle of 2024 is the reason his current cost of equity results are likely lower than the results in the recent proceedings of Liberty Utilities (Midstates Natural Gas) Corp. and Evergy Missouri West.[17] Mr. Murray can simply not have it both ways. Mr. Murray clearly believes that changes in the P/E affect the cost of equity; therefore, the recent increase in the P/E ratios of electric utilities relative to the P/E ratios of natural gas utilities means that the cost of equity for the electric utilities has declined relative to the cost of equity of the natural gas utilities.

Q: Has Mr. Murray accounted for the relative P/E ratios of natural gas utilities and electric utilities when determining his ROE recommendation in prior proceedings?

A: Yes. As shown in Figure 3, Mr. Murray provided testimony in both Ameren Missouri's electric and natural gas rate proceedings in 2021 where he recommended an ROE of 9.25 percent for Ameren Missouri's natural gas operations but a 9.00 percent ROE for Ameren Missouri's electric operations. Further, in his testimony in Ameren Missouri's natural gas rate proceeding, Mr. Murray concluded that he recommended a 9.25 percent ROE:

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[17] *Id.,* at 3.

> "[h]owever, due to the fact that LDC stocks had been trading at a discount to electric utilities, I consider an authorized ROE of as high as 9.5% as reasonable for this case.[18]

Therefore, counter to his position in the current proceeding, Mr. Murray concluded in Ameren Missouri's last rate proceeding that natural gas stocks were trading at a discount to electric utilities warranting a higher ROE for Ameren Missouri.

Q: Do changes in capital market conditions since the Company's last rate proceeding continue to indicate an increase in the cost of equity?

A: Yes. Changes in long-term bond yields since the Company's last rate proceeding continue to demonstrate an increase in the cost of equity. Specifically, as shown in Figure 4, long-term bond yields have increased substantially since the Commission's decision to adopt the settlement in the Company's last rate proceeding. Further, while the federal funds rate was reduced by the Federal Reserve at the Federal Open Market Committee ("FOMC") meetings in September, November, and December 2024, the FOMC did not reduce the federal funds rate at the January and March 2025 FOMC meetings and continues to indicate an expectation that there may be only two rate reductions before the end of 2025.[19]

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[18] Missouri Public Service Commission, Case No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at 2.

[19] Federal Reserve, Summary of Economic Projections, March 19, 2025, at 2.

FIGURE 4: CHANGE IN MARKET CONDITIONS SINCE AMEREN MISSOURI'S LAST RATE PROCEEDING[20]

Docket	Date	Federal Funds Rate	30-Day Avg 30 Year Treasury Bond Yield	Core Inflation Rate
GR-2021-0241	12/22/2021	4.33%	1.88%	5.50%
Direct	8/31/2024	5.33%	4.23%	3.29%
Rebuttal	2/28/2025	4.33%	4.63%	3.14%
	Change Dec-21 to Current:	*0.00%*	*2.75%*	*-2.36%*

Q: What is the expected path of the monetary policy over the near term?

A: At the March 2025 FOMC meeting, Chairman Powell noted that labor market conditions are "solid" and while inflation has declined it still remains above the Federal Reserve's target of 2 percent, as a result, the FOMC decided to maintain the current federal fund rate range of 4.25 percent to 4.50 percent.[21] Regarding the possible path of monetary policy, Chairman Powell continued to reiterate that policy is "not on any preset course;" but, he acknowledged increased uncertainly due to the implementation of significant policy changes (i.e., trade, immigration, fiscal policy and regulation) by the Trump administration.[22] Chairman Powell noted that the FOMC will continue to analyze incoming data to determine the effect of such policy changes and was in a good position to adjust the course of monetary policy if needed.[23] Thus, the FOMC's forecast of the federal funds rate remained

[20] St. Louis Federal Reserve Bank; Bureau of Labor Statistics.

[21] Transcript of Chair Powell's Press Conference, (March 19, 2025).

[22] *Id.*

[23] *Id.*

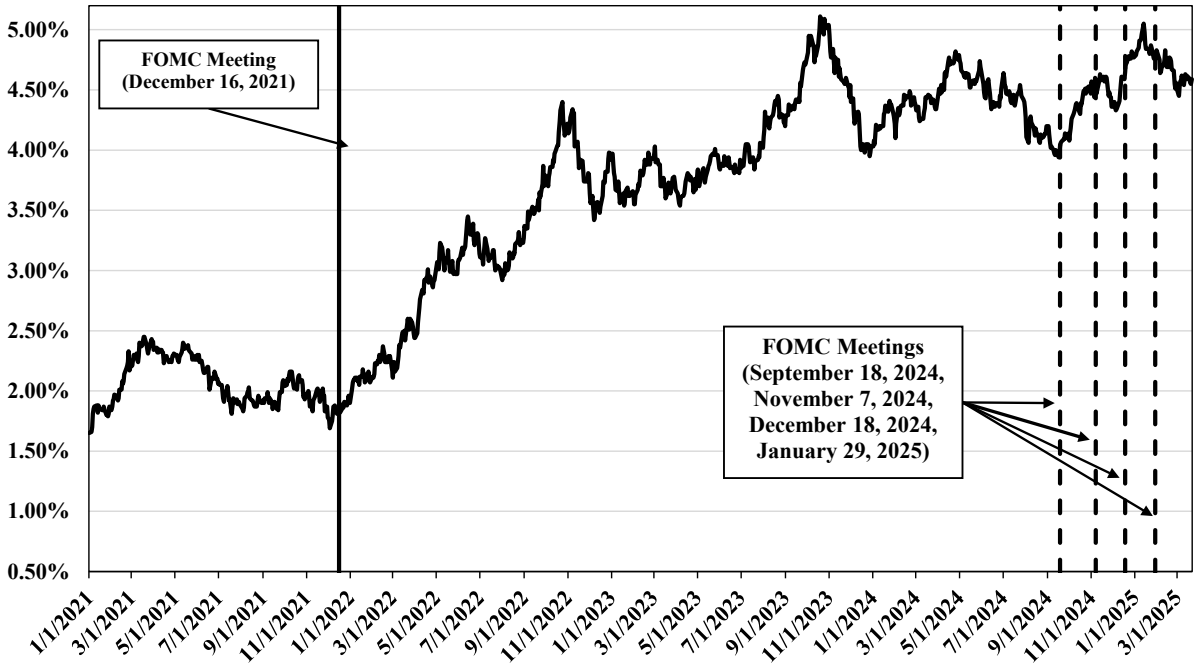
unchanged from the December 2024 meeting, forecasting just two rate cuts before the end of 2025.[24]

Q: What has happened to the yields on long-term government bonds since the FOMC reduced the federal funds rate in September 2024?

A: As shown in Figure 5, the yield on the 30-year Treasury bond declined prior to the time of the federal funds rate cut, but has increased since the September 2024 FOMC meeting. As of February 28, 2025, the 30-year Treasury bond yield was 4.59 percent, which is consistent with levels seen in May 2024, several months prior to the reductions in the federal funds rate.

[24] Federal Reserve, Summary of Economic Projections, March 19, 2025, at 2.

FIGURE 5: 30-YEAR TREASURY BOND YIELD, JULY 1, 2024 – MARCH 21, 2025[25]



Q: Why have long-term interest rates increased since the Federal Reserve reduced the federal funds rate in September 2024?

A: Investors view key elements of President Trump's economic plan, such as tax cuts, immigration policy, and tariffs, as inflationary. According to a recent *Reuters* article, the increase in long-term government bond yields was initially related to investors responding to an increasing probability of a Trump Administration in 2025 and has continued since President Trump's re-election and inauguration.[26] The expectation of sustained elevated inflation creates uncertainty for the Federal Reserve, and

[25] S&P Capital IQ Pro.

[26] Davide Barbuscia and Lewis Krauskopf, "Bond rebound uncertain as Trump plans overshadow Fed rate cuts," Reuters, (November 8, 2024).

investors now generally expect the federal funds rate will decrease at a more gradual pace than initially anticipated.[27]

For example, at the time the article was published in November 2024, *Reuters* noted that investors now expect the federal funds rate to decline to 3.70 percent by the end of 2025 which was 100 basis points above investors' expectations in September 2024.[28] Furthermore, in the most recent published *Blue Chip Financial Forecasts* report, economists projected the federal funds rate to only decrease from 4.4 percent in Q1/2025 to 4.0 percent in Q4/2025 implying two rate cuts in 2025 consistent with the projections of the Federal Reserve.[29]

Q: What are investors' expectations for the yields on long-term government bonds over the near-term?

A: Economists consider the expected policy of the Federal Reserve in the development of their forecasts of long-term government bond yields. Currently, economists are projecting that long-term government bond yields will remain elevated. For example, the most recent consensus estimate published in the *Blue Chip Financial Forecasts* report for the average yield on the 30-year Treasury bond is 4.64 percent through 2Q/2026.[30] Additionally, the consensus estimate over the longer-term (*i.e.,* 2026-2030) as published in the December 2024 *Blue Chip*

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[27] Hansen, Sarah, "Will the Fed raise interest rates in 2025?," *Morningstar*. (January 3, 2025).

[28] Davide Barbuscia and Lewis Krauskopf, "Bond rebound uncertain as Trump plans overshadow Fed rate cuts," *Reuters*, (November. 8, 2024).

[29] *Blue Chip Financial Forecasts*, Vol. 44, No. 3, February 28, 2025, at 2.

[30] *Id.*

Financial Forecasts report was 4.30 percent.[31] This is important because it means that long-term interest rates: (1) are expected to remain elevated during the period that the Company's rates will be in effect; and (2) will remain at levels well above the levels at the time of the Company's last rate proceeding.

Q: Are authorized returns in other jurisdictions a relevant benchmark to evaluate the reasonableness of Dr. Won's and Mr. Murray's ROE recommendations?

A: Yes, they can be when the corresponding market conditions are considered. The *Hope* and *Bluefield* cases establish that authorized ROEs must be commensurate with other investments having corresponding risk. Therefore, the regulatory decisions of other utility regulatory commissions provide a range of reasonableness and a benchmark that investors consider in assessing the authorized ROE of one utility against the returns available from other regulated utilities with comparable risk.

Q: Do either Dr. Won or Mr. Murray agree that it is appropriate to consider previously authorized ROEs?

A: Yes. Dr. Won appears to benchmark his recommended ROE of 9.64 percent to average authorized returns for natural gas utilities in fully litigated, settled and all cases in 2024, which he states are 9.71 percent, 9.67 percent and 9.74 percent,

[31] *Blue Chip Financial Forecasts*, Vol. 43, No. 12, November 27, 2024, at 14.

respectively.[32] Similarly, Mr. Murray also considered the average authorized return for natural gas utilities in 2024, which he states was 9.72 percent.[33] Further, while the recent increase in interest rates since 2021 would indicate that authorized returns should also increase, Mr. Murray explains that investors do not expect authorized returns to increase because, when interest rates were declining during the period of 2010 through 2020, authorized returns did not decline by as much as they should have.[34]

Q: Do you have any concerns with the review of authorized returns conducted by Dr. Won and Mr. Murray?

A: Yes. Dr. Won and Mr. Murray rely primarily on annual average authorized returns instead of also considering the full range of authorized returns. For example, while Dr. Won relies on various averages of litigated and settled ROEs to suggest his recommendation is reasonable, he does not consider the full range of recent returns, nor does he consider the business risk of the Company.

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[32] Won Direct, at 50. Dr. Won appears to incorrectly report that the average authorized return for natural gas utilities in fully litigated cases in 2024 is 9.71 percent. However, based on his workpaper titled "S&P Authorized ROE_Jan 3 2025" Dr. Won calculates an average authorized return for natural gas utilities in fully litigated cases in 2024 of 9.86 percent as opposed to 9.71 percent.

[33] Murray Direct, at 5.

[34] *Id.* at 19-20.

Q: Have you reviewed recently authorized ROES for utilities?

A: Yes. I have analyzed the recently authorized returns for natural gas utilities and applied the following screening criteria:

- I excluded limited-issue rider cases because these cases address only a specific issue or issues, such as the construction of generation assets and the associated incremental risk, and not a utility's entire operations.
- I excluded jurisdictions that set ROEs using a formula as opposed to following an approach that is similar to what the Commission has typically considered in setting the ROE.
- I excluded returns awarded in Arizona, because the determinations in Arizona are based on fair value ratemaking adjustments. Therefore, the ROE that was established in the Arizona cases may have been set on a different basis.
- Lastly, I excluded authorized returns that reflect a utility-specific penalty, because an authorized ROE that includes a penalty is not indicative of a market-derived cost of equity.

As shown in Figure 6, since 2020, authorized ROEs for natural gas utilities have increased. Further, both Dr. Won's recommended ROE of 9.64 percent and Mr. Murray's recommended ROE of 9.50 percent are below the average authorized ROE for natural gas utilities in the United States in 2024. Finally, the Company's requested ROE of 10.25 percent is within the range of authorized ROEs for natural gas utilities in 2024. Neither Dr. Won nor Mr. Murray have provided any evidence to demonstrate that the Company's ROE should be below the mean authorized ROE in 2024.

FIGURE 6: RANGE OF ANNUAL AUTHORIZED ROES FOR NATURAL GAS UTILITIES, 2020 – 2024[35]

Year	Average	Min.	Max.	30-Year Treasury Bond Yield
2020	9.48%	8.80%	10.00%	1.56%
2021	9.56%	8.80%	10.24%	2.05%
2022	9.53%	9.00%	10.20%	3.12%
2023	9.58%	9.20%	10.25%	4.09%
2024	9.73%	9.30%	11.88%	4.41%

Q: Do you agree with Mr. Murray that investors do not expect authorized returns to increase?

A: No, I do not. First, Mr. Murray's conclusion is inconsistent with the trend in the average annual authorized returns for natural gas utilities since 2020 as shown in Figure 6 above. Second, Mr. Murray's conclusion is not consistent with the equity analyst report that he references as support. Specifically, Mr. Murray cited a report from Barclays that noted the following:

> **High Returns Unlikely as ROEs Sticky While Rates Were at Decade Lows**
>
> Simplistically, from 2010 to early 2020s long term risk free yields have only declined, while utility ROEs remained steady at an average 9.8% authorized rate on the electric side. Utilities were arguably over-earning during this timeframe in our view. ***We believe over a long term (10yr+) time horizon there should be a case for higher ROEs if risk free yields remain elevated or move higher, but we see it unlikely that regulated ROEs return to 12%+ levels anytime soon***. This likely leads to an extended CoC [cost of capital] crunch for the utility industry, which will pressure management

[35] S&P Capital IQ Pro.

> teams' abilities to raise capex budgets materially in the five-year window. Please see our additional work below highlighting the CoC crunch.[36]

In the referenced quote, Barclays does not conclude that authorized returns will remain at current levels. Instead, Barclays concludes that while they do not see returns exceeding 12 percent, ROEs are likely to increase from current levels if bond yields remain elevated. As noted above, according to the most recent consensus estimates published in the *Blue Chip Financial Forecasts* report, long-term government bond yields are expected to remain elevated through 2030. As a result, it is reasonable to conclude that investors do expect authorized returns to continue to increase.

Q: Are you aware of an example where capital attraction and willingness to invest have been hampered when a regulatory jurisdiction is perceived as not being credit supportive?

A: Yes. Illinois and Connecticut are two recent examples. First, approximately a year ago, the Illinois Commerce Commission ("ICC") rejected the multiyear grid plan proposals of Ameren Illinois Co. ("Ameren IL") and Commonwealth Edison Co. ("ComEd") and authorized lower-than-expected ROEs for both utilities. Specifically, the ICC authorized an ROE for Ameren IL of 8.72 percent and 8.905 percent for ComEd, which was a significant reduction from the Administrative Law

[36] Murray Direct, at 14. Referencing: Nicholas Campanella, *et al*., "U.S. Power & Utilities: Initiating Coverage: Down but Not Out," Barclays, August 22, 2023, at 23.

Judge's recommendations of 9.24 percent and 9.28 percent, respectively.[37] Market reactions to the ICC's decisions were universally negative and both parent companies considered shifting investment to their other utility operating subsidiaries outside of Illinois. Specifically, while the Standard & Poor's ("S&P") 500 Index was increasing, the share prices of the parent companies of both Ameren IL and ComEd (*i.e.*, Ameren Corp. and Exelon Corp., respectively) each dropped more than 7 percent on December 14, 2023 after the ICC's decision, and declined again by more than 4.4 percent and 6.4 percent the following day, respectively.[38] As of the market close on January 5, 2024, Ameren and Exelon's stock prices were, respectively, 8.9 percent and 11.4 percent below where their stock prices closed on December 13, 2023, or the day immediately prior to the ICC's decisions.[39]

In addition, the reactions of equity analysts were universally negative, and also questioned whether the parents of both Ameren IL and ComEd (*i.e.*, Ameren Corp. and Exelon Corp., respectively) will shift their capital spending out of the jurisdiction as a result of the uncertainty associated with the multiyear rate plan and low authorized ROEs. For example:

- Barclays characterized the ICC's ROE authorizations as "draconian" and "one of the lowest awarded in recent memory, especially in an elevated

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[37] Allison Good, "Ameren, Exelon shares fall after Illinois regulators reject grid plans," Platts, December 15, 2023.

[38] Yahoo! Finance; stock prices for AEE and EXC from November 1, 2023, through January 5, 2024.

[39] Ameren Corp.'s stock price closed at $81.32 on December 13, 2023 and $74.05 on January 5, 2023. Exelon Corp.'s stock price closed at $41.00 on December 13, 2023 and $36.31 on January 5, 2023.

interest rate and cost of capital environment."[40] Barclays also stated it found it hard to believe utilities "can deploy capital under the same magnitude on the updated grid plans to be filed, especially under the current proposed ROE framework."

- In its assessment of the impact on Exelon, the parent of ComEd, UBS stated that, "[t]he actions taken by the ICC today call into question, in our view, the regulatory backdrop in which EXC operates."[41]

- Wells Fargo stated that it was not mincing words, and that the ICC's orders were "onerous" and that:

> We now view IL as one of the worst regulatory jurisdictions in the U.S. (nipping at CT's heels). We think the totality of the recent orders suggest that the regulatory balancing act between customers and investors is currently heavily skewed toward customers. As a result, we wonder if AEE & EXC will allocate capital away from IL. Keep in mind, IL represents ~25% of both AEE's & EXC's total rate base."[42]

- In its evaluation of Ameren IL, BofA Securities characterized the ICC's decision as "punitive" and stated that it was a surprise based on numerous conversations with investors that believed the ICC may authorize an ROE above the ALJ's recommendation, not substantially lower, and that the downside surprise was one of the biggest in recent memory for their regulated utility coverage.[43] While BofA Securities acknowledged that Ameren IL represents less than 20 percent of Ameren Corp.'s consolidated rate base, it will nonetheless need offsets or capital expenditures elsewhere in order to hit its earnings growth rate targets.[44]

- After the decisions, Guggenheim questioned, "Is Illinois Becoming the Next Connecticut?" Guggenheim noted that investors questioned whether Illinois was "slowly becoming a CT-esque jurisdiction," and that equity and debt

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[40] Barclays, "AEE/EXC: Coal Stocking-Stuffer in Illinois," December 14, 2023.

[41] UBS, First Read Exelon Corp., "Negative Rate Case Outcome – Rating and PT Under Review," December 14, 2023.

[42] Wells Fargo, "The ICC Delivers a Lump of Coal for AEE & EXC," December 14, 2023.

[43] BofA Securities, Ameren Corporation, "Illinois delivers downside surprise," December 15, 2023. See Exh. AEB-17C.

[44] *Id*.

holders are going to be wary of Illinois as a jurisdiction going forward and that the ICC is "simply sending a negative message to investors."[45]

Also, after the ICC's decisions, Regulatory Research Associates ("RRA") lowered its rating of the Illinois regulatory jurisdiction from Average/2 to Average/3 due to the "concerning pattern of restrictive" rate actions in the state.

Q: Please summarize the changes in investment in Connecticut that have directly resulted from unconstructive regulation in that regulatory jurisdiction.

A: Connecticut, is viewed by research analysts, equity analysts, and investors as among the least credit supportive jurisdictions in the United States for utilities. This jurisdiction is the most recent example of where capital attraction and a willingness to invest have been hampered. For example:

- The two major utility holding companies operating in Connecticut (i.e., Eversource Energy ("Eversource") and Avangrid Inc. ("Avangrid")) have announced their unwillingness to continue discretionary investment in the state until the regulatory environment and cost recovery outcomes change.

- Avangrid's utility operating subsidiaries in Connecticut (*i.e.*, Connecticut Natural Gas Corporation ("CNG") and Southern Connecticut Gas Company ("SCG")) have recently experienced difficulty fully subscribing bond issuances, and while able to do so, the premiums were higher than anticipated.

- Eversource recently announced that it has agreed to sell its subsidiary Aquarion Water Company, Inc. for $2.4 billion to the Aquarion Water Authority and South Central Connecticut Regional Water Authority.

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[45] Guggenheim, "IL: Is Illinois Becoming the Next Connecticut? To Be Determined, but Taking a Neutral Stance on the State," December 15, 2023.

In May 2024, Eversource, which owns Connecticut Light & Power ("CL&P") and Aquarion Water in Connecticut, announced on its earnings call that it would be cutting investment by its utilities within the state due to "unreasonable, arbitrary decisions by the regulator (*i.e.*, the Public Utilities Regulatory Authority ("PURA")), and that the company had "grave concerns" regarding the Connecticut regulatory environment.[46] Eversource executives stated that the company is unwilling to place capital at risk within Connecticut given that the state's regulatory policy discourages investment.[47] Driving the reduction in utility investment is Eversource's view that utility regulators have been slow to approve the recovery of $635 million in storm costs incurred from 2018 through 2021, $400 million in uncollected bills from ratepayers, a rate reduction imposed on Aquarion Water in its most recent rate proceeding, and elimination of a program supporting electric vehicles.[48] Consequently, Eversource stated that is taking a "hard look" at its capital deployment priorities in Connecticut and plans to reduce its capital investment in Connecticut by $500 million over the next five years, which will likely come from reliability areas until "Connecticut's regulatory decisions come back into alignment with law and state policy."[49] Eversource indicated that it will not reduce safety spending, but that it has made significant investments in reliability over the

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[46] Mark Pazniokas, "Eversource escalates CT fight, saying it will cut investments," CT Mirror, May 2, 2024.

[47] Jared Anderson, "Eversource cutting investment in Connecticut by up to $500 million over 5 years," S&P Capital IQ Pro, May 3, 2024.

[48] Mark Pazniokas, "Eversource escalates CT fight, saying it will cut investments," CT Mirror, May 2, 2024.

[49] Jared Anderson, "Eversource cutting investment in Connecticut by up to $500 million over 5 years," S&P Capital IQ Pro, May 3, 2024.

past decade but is unwilling to continue doing so without a secure and predictable cost recovery path.[50]

Entering 2025, Eversource's subsidiary CL&P announced that it will spend approximately 15 percent less than previously planned on capital programs and reliability investments due to the state's adverse regulatory environment.[51] CL&P stated that its decision was made because the Connecticut utility regulator's decisions have failed to adhere to utility finance principles, economics, or law and were politically motivated solely to reduce rates. Due to the reduction in reliability spending, CL&P projects a decrease in service reliability over the next five years, although reliability will remain above baseline levels set by law.[52] In addition, Eversource and its subsidiaries, including its Connecticut-based subsidiaries CL&P, Yankee Gas and Aquarion Water, were downgraded by S&P in December 2024. Eversource and CL&P were downgraded one notch while Yankee Gas and Aquarion were downgraded two notches. S&P highlighted "a recent pattern of adverse regulatory developments for investor-owned utilities operating in Connecticut, which we believe has increased business risk for Eversource Energy and its Connecticut-based subsidiaries."[53]

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50 *Id*.

51 Noah Schwartz, "Eversource pares back Connecticut investment plan, risking grid reliability," S&P Capital IQ Pro, December 31, 2024.

52 *Id*.

53 S&P Global Ratings, "Eversource Energy Issuer Credit Rating Lowered To 'BBB+' From 'A-'; Subsidiaries Ratings Also Lowered; Outlooks Stable," December 9, 2024.

Similarly, United Illuminating, which is owned by Avangrid, noted in its ongoing rate proceeding in Connecticut that it has recently limited capital investments to only those that are considered "most critical" to maintaining safe and reliable service because any incremental capital investment over this level "will cause continuing degradation of the Company's financial integrity".[54] In addition, on December 6, 2024, S&P downgraded the credit ratings of both CNG and SCG, which are owned by Avangrid, (i.e., A to BBB+) two notches based primarily on the downward assessment of the Connecticut regulatory environment.[55]

Finally, Avangrid has indicated that it experienced difficulties in attracting adequate subscription levels for debt issuances by its Connecticut utilities that closed in December 2023, and the bonds priced at a higher coupon rate than anticipated.[56] Specifically, as stated in its currently pending rate proceeding:

> The debt issuance was a private offering in which four banks served as lead placement agents and worked with the Company to market the transaction to investors in advance of pricing. On the day of pricing, November 15th, the subscriptions sought for CNG and SCG were only 65% and 50% fulfilled, respectively. This compares to the offering for one of the other Avangrid utilities which was more than two-times subscribed. After some additional negotiation, the banks were able to get one investor to fill the remaining portions of the issuance sought for CNG and SCG and the full transaction priced on the following day; however, the credit spreads were wider than

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[54] Public Utilities Regulatory Authority, Docket No. 24-10-04, Direct Testimony of Charles J. Eves, Jr. November 12, 2024, at 7.

[55] S&P Global Ratings, Research Update: Connecticut Natural Gas Corp. And Southern Connecticut Gas Co. Downgraded to 'BBB+' on Final Rate Order, Outlook Stable, December 6, 2024.

[56] Public Utilities Regulatory Authority, Docket No. 23-11-02, Response of Connecticut Natural Gas Corporation to data request RRU-402, February 27, 2024.

> anticipated across the Avangrid Connecticut utilities, raising the financing cost by approximately 10-15 basis points. *The bankers informed Avangrid that the difficulty in fulfilling the necessary subscription levels and the wider credit spreads attracted were caused in part by the limited interest to invest in Connecticut utilities due to concerns over the regulatory environment and potential impacts to current ratings*.[57]

Q: What is your conclusion regarding the effect of regulation on the ability of a company to access capital and the cost of equity?

A: Recent examples demonstrate that there are significant financial consequences imposed by the market in jurisdictions where regulation has been unconstructive, resulting in increased costs to customers in the form of higher debt costs and limiting access to capital markets. Further, the effect of scaling back investment to meet minimum standards for safety and reliability, rather than having the ability to make strategic planned investment to improve and expand service can further increase costs to customers.

V. Response to Dr. Won

V.A. Proxy Group

Q: Does Dr. Won rely on the same proxy group that you have used for your cost of equity analyses?

A: No, although they are similar. Dr. Won relies on a proxy group that is based on a group of U.S. utilities that the *Value Line* classifies as natural utilities, to which he

[57] *Id.*; emphasis added.

then applies a set of screening criteria. Dr. Won's proxy group consists of 5 natural gas utilities which is similar to the proxy group that I rely on with the exception that Dr. Won has excluded NiSource Inc. ("NI"). Dr. Won indicates that NI fails his screening criterion that requires a company not have reduced its dividend payout since 2015.[58]

Q: Do you agree with Dr. Won's proxy group?

A: No. I do not agree with Dr. Won's proxy group. Specifically, while I agree that it is appropriate to require companies included in the proxy group pay consistent quarterly cash dividends, which includes ensuring a company has not recently cut its dividend, I disagree with the ***ten-year*** historical review that Dr. Won applies for his dividend. It is Dr. Won's reliance on a ten year period that results in his incorrect exclusion of NI.

Q: Why is it important to require a company included in the proxy group not have recently reduced its dividend?

A: There are two important reasons for requiring a company not have recently reduced its dividend:

- A change in a company's dividend is based on management decisions. For example, management could reduce the dividend to either conserve cash for capital investments or in response to a reduction in future earnings prospects. Management will use a reduction in the dividend to improve the company's financial position. As a result, the announcement of dividend

[58] Schedule SJW-d8.

cut can have an effect on a company's share price and thus the results produced by the cost of equity model.

- A requirement of the DCF model is that a company pay a consistent quarterly cash dividend as dividend payments are one of the primary inputs into the model. Therefore, a company that reduced its dividend would not be considered to have a stable dividend policy. Further, as noted above, a dividend cut is a signal regarding the financial strength of a firm and thus could raise questions regarding if further dividend cuts are needed. Thus, between the change in the dividend and possible change in the share price noted above, a dividend cut will have a substantial effect on the results produced by the DCF model.

Q: What is your concern with Dr. Won's use of a ten-year period in the application of his dividend screen?

A: As noted above, a recent cut in a company's dividend will affect the results produced by the cost of equity models and thus the company should be excluded from the proxy group. However, it is unlikely that a dividend cut that occurred ten years ago would affect the results of the cost of equity models that rely on current market data. For example, in the current proceeding, Dr. Won excluded NI because NI reduced its dividend in 2015 when the company spun—off Columbia Pipeline Partners LP. Although, in his Two-Step DCF model, Dr. Won relied on current dividends and average share prices for Q4/2024. Dr. Won has provided no evidence that the current market data for NI is affected by the dividend cut that occurred in 2015. Dr. Won's requirement that a company not have a dividend cut since 2015 unnecessarily reduces the size of the proxy group by excluding NI, which investors would consider comparable to Ameren Missouri.

Q: Has Dr. Won consistently relied on a period of ten years to apply his dividend reduction screen?

A: No. As Dr. Won has applied this screen in his testimony over time, he continually uses 2015 as his historical end date.[59] Therefore, Dr. Won's application of his dividend reduction screen increases the number of years that a company has had to demonstrate consistent or growing dividends from one rate proceeding to the next. For example, in the current proceeding, relying on the 2015 historical end date, Dr. Won required a company not have reduced its dividend in the last ten years; however, in Ameren Missouri gas's last rate case, Dr. Won filed testimony in September 2021 where he also used the test of no dividend reductions since 2015, resulted in a requirement that a company have consistent or increasing dividends for the prior six years.[60] Had Dr. Won relied on a six year period in the current proceeding, NI would have been included in his proxy group. Dr. Won's continually reliance on 2015 as the fixed historical end point for his dividend payment review means that NI will always be excluded from Dr. Won's proxy groups for natural gas utilities in Missouri, regardless of the fact that the dividends for this company have been stable or increasing for many years since 2015, which is unreasonable. As I noted above, Dr. Won has provided no evidence that the

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[59] Missouri Public Service Commission, Staff Report – Cost of Service, Case No. GR-2021-0241, September 2021, at 20. See also Missouri Public Service Commission, Direct Testimony of Seoung Joun Won, PhD, Case No. GR-2022-0179, August 2022, at 28.

[60] Missouri Public Service Commission, Staff Report – Cost of Service, Case No. GR-2021-0241, September 2021, at 20

cost of equity results for NI in the current proceeding would be affected by the company's dividend cut in 2015.

Q: Is the dividend reduction screen that Dr. Won applies when developing his proxy group for natural gas utilities consistent with the dividend reduction screen he applies to develop his proxy group in rate proceedings for electric and water utilities?

A: No. As shown in Figure 7, in Case No. GR-2024-0319 for Ameren Missouri's electric operations, Dr. Won required companies have a positive dividend since 2019 while in Case No. WR-2020-0344 for Missouri American Water Company, Dr. Won required companies not have reduced their dividend since 2017. Dr. Won applies a different screen depending on whether the ROE is being estimated for either a natural gas, water or electric utility. However, as noted previously, the reason for the dividend screen is to ensure that the market data used in the cost of equity models is not affected by the dividend cut. There is no evidence to suggest that the market would react differently based on the regulated business (water, natural gas or electric utility), such that it would make sense to change the duration of the dividend screen period. Further, while I disagree with the general idea of a fixed historical end point, such as Dr. Won has applied, had he applied in his testimony in the Missouri American Water and Ameren Missouri's electric proceedings noted previously, NI would meet the dividend reduction screens and would be included in the proxy group.

FIGURE 7: SUMMARY OF DR. WON'S DIVIDEND REDUCTION SCREEN

Applicant	Docket No.	Date	Dividend Reduction Screen
Missouri American Water	Case No. WR-2020-0344	11/24/2020	Have not reduced dividends since 2017[61]
Ameren Missouri – Electric	Case No. ER-2024-0319	12/3/2024	Positive dividend payout since 2019[62]
Ameren Missouri – Natural Gas	Case No. GR-2024-0369	2/28/2025	Not reduced dividends since 2015[63]

Q: Have you applied a screen requiring a company not have recently reduced its dividend?

A: Yes. For inclusion in my proxy group, I require a company not have reduced its dividend in the last three years. My use of a three-year period from the date of the analysis being conducted is sufficiently long enough to ensure that enough time has passed that it is unlikely that the results of the cost of equity estimation models would be affected by the dividend cut. Further, I rely on a three-year period when developing a proxy group to estimate the ROE for electric, natural gas and water utilities. NI met my dividend reduction screen and was included in my proxy group.

Q: Did Mr. Murray include NI in the proxy group he relied on to estimate the cost of equity for Ameren Missouri?

A: Yes.

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[61] Missouri Public Service Commission, Staff Report – Cost of Service, Case No. WR-2020-0344, November 24, 2020, at 23.

[62] Missouri Public Service Commission, Direct Testimony of Seoung Joun Won, PhD, Case No. ER-2024-0319, December 3, 2024, at 39.

[63] Won Direct, at 40.

Q: What is your conclusion with respect to the proxy group used to estimate the cost of equity for Ameren Missouri?

A: I continue to support the use of the screening criteria outlined in my direct testimony to develop the proxy group for Ameren Missouri. Dr. Won's inconsistent application of his dividend reduction screen results in the inappropriate exclusion of NI, a company which investors would view as comparable to Ameen Missouri. Therefore, the exclusion of NI renders Dr. Won's proxy less comparable to the Company than my proxy group.

V.B. Two-Step DCF Analysis

Q: Please summarize Dr. Won's specification of his DCF model.

A: Dr. Won conducts a two-step DCF analysis where he relies on (1) the average of the monthly high and low stock prices for his proxy companies as of October 2024 through December 2024; and (2) a growth rate for each proxy company that is based on a short-term growth rate to which he applies an 80 percent weighting and a long-term growth rate to which he applies a 20 percent weighting.[64] Dr. Won's short-term growth rate is an average of the projected earnings per share ("EPS"), dividend per share ("DPS"), and book value per share ("BVPS") growth rates for each of his proxy group companies published by *The Value Line Investment Survey* ("*Value Line*").[65] Dr. Won's long-term growth rate is a projected nominal gross domestic product ("GDP") growth rate of 3.90 percent as reported

[64] Won Direct, at 42 and Schedules SJW-d19 through SJW-d12.

[65] Schedule SJW-d10.

by the Congressional Budget Office in its Economic Outlook.[66] After calculating the cost of equity for each of his proxy group companies Dr. Won narrows the range of results by eliminating the highest and lowest individual company results. The upper bound of his range is set by averaging the two highest results produced by his analysis. The lower bound is set by averaging the s two lowest results produced by his analysis.[67] Dr. Won's estimated cost of equity is the midpoint between his derived upper and lower bounds, resulting in an estimate of 8.68 percent.[68]

Q: Are the results of Dr. Won's DCF analyses reasonable?

A: No. The result of Dr. Won's DCF analysis is significantly below the current average authorized ROE for natural gas utilities nationally, which as Dr. Won notes in Table 5 of his testimony was 9.74 percent for all natural gas utilities in 2024. While I disagree with Dr. Won's application of the two-step DCF model and his measure of central tendency, it is important to note that it appears that Dr. Won also recognizes that the results of his constant growth DCF analysis are not reasonable. Dr. Won's DCF results are below the cost of equity range that he believes his analyses support of 9.39 percent to 9.89 percent[69] and within that range his recommendation, which appears to be based on his Bond Yield Risk Premium

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66 Schedule SJW-d10.

67 Schedule SJW-d12.

68 *Id*.

69 Won Direct, at 4.

model,[70] is 96 basis points greater than the result of his DCF analysis. Although Dr. Won does not indicate specifically how he determines his recommended ROE of 9.64 percent for Ameren in this proceeding, the average result of his BYRP analyses is 9.64 percent. Thus, it appears that Dr. Won does not rely on the result of his DCF analysis. The *Hope* and *Bluefield* decisions, which Dr. Won acknowledges are standards to be followed in setting a just and reasonable return, require the authorized return to be comparable to other returns available to investors in companies with similar risk. Dr. Won's DCF result of 8.68 percent does not meet this standard.

Q: Why you do you disagree with Dr. Won's specification of his two-step DCF analysis?

A: Dr. Won references the FERC's ROE methodology, set forth in Opinion No. 575, as support for his two-step DCF analysis, however, he fails to follow that methodology.[71] Specifically, the FERC relies on a six month average stock price for purposes of calculating the dividend yield; however, Dr. Won uses a three month average stock price. In addition, I disagree with Dr. Won's short-term and long-term growth rates.

[70] Schedule SJW-d15.
[71] Won Direct, at 42.

Q: Are the annual dividends for each proxy company that Dr. Won relies on to estimate the dividend yield in his DCF analysis also outdated?

A: Yes. Dr. Won relies on the annual 2023 dividends (stated in dollars) published by *Value Line* for each of his proxy group companies. However, given that Dr. Won's testimony was filed in February 2025, it is appropriate to rely on more current dividend assumptions, particularly when current quarterly dividend data is readily available from public sources for each of the proxy group companies, including the fact that *Value Line* also publishes dividend data for each of his proxy group companies for 2025.

Q: Are Dr. Won's short-term growth rates consistent with the FERC methodology?

A: No. Dr. Won's short-term growth rates in his two-step DCF analysis are an average of the projected EPS, DPS, and BVPS growth rates for each of the proxy group companies as published by *Value Line*, which is not the methodology used by the FERC. As stated in Opinion No. 575, the FERC has consistently relied solely on projected EPS growth rates as the short-term growth rate.[72]

Q: Has Staff previously relied solely on EPS growth rates for the short-term growth rate in prior cases?

A: Yes. For example, in the 2019 Empire District Electric rate proceeding, Staff witness Mr. Chari relied solely on historical and projected EPS growth rates as

[72] *Entergy Arkansas, et al*., Opinion No. 575, 175 FERC ¶ 61,136 (2021), at P 131.

short-term growth rates in the DCF, and did not rely on either DPS or BVPS growth rates.[73] Similarly, in the Ameren Missouri 2021 rate proceeding, Staff witness Mr. Chari relied solely on projected EPS growth rates from both *Value Line* and S&P Global Market Intelligence as short-term growth rates, and did not rely on DPS or BVPS growth rates.[74]

Q: Why are projected EPS growth rates the appropriate growth rate in the DCF analysis?

A: It is appropriate to rely on analysts' projected EPS growth rates in the development of the DCF model for numerous reasons:

- Earnings are the fundamental determinant of a company's ability to pay dividends, and over the long-term dividend growth can only be sustained by earnings growth.[75] Therefore, EPS, not DPS or BVPS, should be relied on in the DCF analysis.
- Management decisions to conserve cash for capital investments, to manage the dividend payout for the purpose of minimizing future dividend reductions, or to signal future earnings prospects, can influence dividend growth rates in near-term periods. These decisions affect the dividends and the payout ratio in the short term, but are not necessarily indicative of a firm's long-term earnings growth.

  For example, forty S&P 500 companies suspended dividend payments in 2020 as a result of the increased uncertainty due to COVID-19.[76] These

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[73] Missouri Public Service Commission, Case No. ER-2019-0374, Staff Report, January 15, 2020, at 14.

[74] Missouri Public Service Commission, Case No. ER-2021-0240, Staff Report, September 3, 2021, at 25.

[75] As noted by Brigham and Houston: "Growth in dividends occurs primarily as a result of growth in earnings per share (EPS). Earnings growth, in turn, results from a number of factors, including (1) inflation, (2) the amount of earnings the company retains and invests, and (3) the rate of return the company earns on its equity (ROE)." Eugene F. Brigham and Joel F. Houston, Fundamentals of Financial Management, at 317 (Concise Fourth Edition, Thomson South-Western, 2004).

[76] Karen Langley, U.S. Companies Slashed Dividends at Fastest Pace in More Than a Decade, Wall Street Journal, July 8, 2020.

dividend suspensions occurred because companies believed earnings over the short term would decline and, therefore, elected to conserve cash to offset the financial effects of COVID-19.

- Given that BVPS is the inverse of DPS, estimates of BVPS growth are also highly influenced by dividend policy. All else equal, investing earnings in assets increases BVPS, while paying dividends and not investing in assets decreases BVPS.

- There is significant academic research demonstrating that EPS growth rates are most relevant in stock price valuation.[77] For example, Liu, *et al*. (2002) examined "the valuation performance of a comprehensive list of value drivers" and found that "forward earnings explain stock prices remarkably well" and were generally superior to other value drivers analyzed. Gleason, *et al*. (2012) found that the sell-side analysts with the most accurate stock price targets were those whom the researchers found to have more accurate earnings forecasts.

- Investment analysts report predominant reliance on EPS growth projections. In a survey completed by 297 members of the Association for Investment Management and Research, the majority of respondents ranked earnings as the most important variable in valuing a security (more important than cash flow, dividends, or book value).[78]

- Projected EPS growth rates such as those available from *S&P Cap IQ* and *Zacks Investment Research* ("*Zacks*") are based on consensus estimates available from multiple sources. In other words, projected EPS growth rates include the contributions of more than one analyst and thus the results are less likely to be biased in one direction or another. Moreover, the fact that projected EPS growth estimates are available from multiple sources on a

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[77] *See, e.g.*, Robert S. Harris, "Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return," *Financial Management*, Spring 1986, at 66; James H. Vander Weide and Willard T. Carleton, "Investor growth expectations: Analysts vs. history," *The Journal of Portfolio Management*, Spring, 1988; Robert S. Harris and Felicia C. Marston, "Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts," *Financial Management*, Summer, 1992; Advanced Research Center, "Investor Growth Expectations," Summer 2004; Eugene F. Brigham, Dilip K. Shome and Steve R. Vinson, "The Risk Premium Approach to Measuring a Utility's Cost of Equity," *Financial Management*, Vol. 14, No. 1, Spring, 1985; Roger A. Morin, *New Regulatory Finance*, Public Utilities Reports, Inc., 2006, at 299-303; Jing Liu, *et. al*., "Equity Valuation Using Multiples," *Journal of Accounting Research*, Vol. 40 No. 1, March 2002; C. A. Gleason, *et. al*., "Valuation Model Use and the Price Target Performance of Sell-Side Equity Analysts," *Contemporary Accounting Research*, September 2011; Bochun Jung, *et al*., "Do financial analysts' long-term growth forecasts matter? Evidence from stock recommendations and career outcomes," *Journal of Accounting and Economics*, Vol. 53 Issues 1-2, February-April 2012.

[78] Stanley B. Block, "A Study of Financial Analysts: Practice and Theory," *Financial Analysts Journal*, July/August 1999.

consensus basis attests to the importance of projected EPS growth rates to investors when developing long-term growth expectations.

For all of these reasons, projected EPS growth rates, not projected DPS or BVPS growth rates, should be used for purposes of estimating the cost of equity using the constant growth DCF analysis.

Q: Have other regulatory commissions relied on projected EPS growth rates as the estimate of perpetual growth in the constant growth DCF model, such as you have done?

A: Yes. For example, the Pennsylvania Public Utilities Commission ("Pennsylvania PUC") has historically preferred the use of analysts' projected EPS growth rates in the constant growth DCF analysis.[79] The Pennsylvania PUC has noted the following:

> Upon our consideration of the record evidence, we find that I&E's DCF calculation correctly used forecasted earnings growth rates instead of considering historical growth rates. The record indicates that growth rate forecasts are made by analysts who already factor historical data into their forecasts of earnings per share growth. Although past performance can yield valuable information, relying on it for a DCF analysis results in placing too much weight on past

[79] *See, e.g.,* Pennsylvania Public Utility Commission, Opinion and Order, October 4, 2018, at 93. *See, also*, Docket No. M-2018-3006643, Public Meeting held January 17, 2018, at 16, in which the Commission discusses the method it uses to set the ROE for the Distribution System Improvement Charge.

> performance. ***Thus, the best measure of growth for use in the DCF model are forecasted earnings growth rates***.[80]

Q: Do you agree with Dr. Won's GDP growth rate?

A: No. Dr. Won's two-stage DCF model assumes a long-term growth rate in perpetuity However, Dr. Won's GDP growth forecast only reflects growth for the 10-year period of 2024 through 2034, even though his two-stage DCF model extends into perpetuity.[81] In other words, the long-term growth rate only covers a small portion of the long-term period to which it is being applied. As a result, Dr. Won's projected GDP growth rate may not be indicative of the expected growth in GDP over the long term.

Q: Is the GDP growth rate that Dr. Won relies on supported by *Morningstar*, which Dr. Won has relied on elsewhere in his cost of equity analyses?

A: No. *Morningstar*, the former publisher of the SBBI Yearbook that is now owned by *Kroll*, which is a data source Dr. Won relies on in his CAPM analysis, recommends estimating a projected long-term nominal GDP growth rate by first calculating the historical growth in real GDP and then adding the expected inflation rate:

> Growth in real GDP (with only a few exceptions) has been reasonably stable over time; therefore, its historical performance is a good estimate of expected long-term future performance. ***By***

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[80] Pennsylvania Public Utility Commission, Docket No. Docket No. R-2020-3018929, Opinion and Order, June 17, 2021, at 160; emphasis added.

[81] Won Direct, at 11.

combining the inflation estimate with the real growth rate estimate, a long-term estimate of nominal growth is formed.[82]

Q: What is the resulting estimate of a long-term growth rate when the methodology outlined by *Morningstar* is applied?

A: As shown on Schedule AEB-R1, Attachment 9, when longer-term GDP growth is estimated consistent with the methodology outlined by *Morningstar*, the long-term nominal GDP growth rate is 5.50 percent. Specifically, the long-term nominal GDP growth rate is based on the real GDP growth rate of 3.18 percent from 1929 through 2024, and a projected inflation rate of 2.25 percent. The projected rate of inflation is based on three measures: (1) the average long-term projected growth rate in the Consumer Price Index ("CPI") of 2.20 percent, as reported by *Blue Chip Financial Forecasts*;[83] (2) the compound annual growth rate of the CPI for all urban consumers for 2035-2050 of 2.26 percent as projected by the Energy Information Administration ("EIA") in its Annual Energy Outlook 2023; and (3) the compound annual growth rate of the GDP chain-type price index for 2035-2050 of 2.30 percent, also reported by the EIA in the Annual Energy Outlook 2023.[84]

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[82] *Ibbotson and Associates*, Stocks, Bonds, Bills and Inflation, 1926-2012, 2013 Valuation Yearbook, at 52; emphasis added.

[83] *Blue Chip Financial Forecasts*, Vol. 43, No. 12, November 27, 2024, at 14.

[84] Energy Information Administration, Annual Energy Outlook 2023 at Table 20, March 16, 2023. Note, this is the most current Annual Energy Outlook currently available.

Q: Has Dr. Won applied a reasonable outlier test to his DCF results?

A: No. By establishing his upper and lower bounds as an average of the lowest two and highest two results in the data set, Dr. Won assumes that there are outliers in every data set. This is not a proper outlier test. An outlier test should demonstrate that the results of the analysis are outside a range that is established by reference to a neutral benchmark. For example, the use of the Interquartile Range method, would establish outlier boundaries based on a multiple above or below the first and third quartiles of the data set. A Z-score test would use standard deviations to identify whether or not there are outliers present. Each of these methodologies would establish a range that can be compared to the data set to determine if any observations fall outside of the range, and are thereby outliers. Dr. Won's approach of averaging the lowest and highest two results assumes that there are outliers in every data set, which is not a reasonable test of outliers.

Q: Are the upper and lower bounds that Dr. Won establishes for his DCF analysis consistent with the FERC's methodology for excluding high-end and low-end outliers?

A: No. Dr. Won's approach for establishing the upper and lower bounds of his results is arbitrary and inconsistent with the FERC methodology that he references as support for his two-step DCF approach. Specifically, as stated in the FERC's Opinion No. 575, the FERC excludes low-end and high-end outliers from the results of the DCF analysis, whereby cost of equity results lower than the yield on corporate Baa bonds plus 20 percent of the market risk premium in the CAPM are

excluded, as are cost of equity results higher than 200 percent of the median result of the DCF analysis. As shown on Schedule AEB-R1, Attachment 10, none of the results of Dr. Won's DCF analysis would be excluded pursuant to FERC's outlier methodology.

Q: How would the result of Dr. Won's two-step DCF analysis change when current data is utilized and the FERC's two-step DCF approach is accurately applied?

A: Schedule AEB-R1, Attachments 7 through 10 compare the stock prices, growth rates, and results of Dr. Won's two-step DCF analysis as filed in his testimony to his two-step DCF analysis after it has been (1) updated to include NiSource in the proxy group; (2) updated to reflect data through February 2025; and (3) corrected to rely solely on projected EPS growth rates for the short-term growth rates and the *Morningstar* methodology for the long-term growth rates and; (4) corrected to reflect the FERC upper and lower bound test.

As shown on Schedule AEB-R1, Attachment 10, page 4, when Dr. Won's analysis is updated with current data and corrected as discussed, the average resulting cost of equity for his proxy group is 10.29 percent. In addition, while Dr. Won's outlier test is inconsistent with the FERC's approach and is unsupported, even when his arbitrary approach for setting an upper and lower bound is maintained, the average cost of equity is 10.26 percent. Therefore, regardless of the measure of central tendency used, when his analysis is corrected and updated, the resulting cost of

equity is approximately 160 basis points higher than his stated result of 8.65 percent.

V.C. CAPM Analysis

Q: Please summarize Dr. Won's application of the CAPM.

A: Dr. Won's CAPM analysis relies on (1) a risk-free rate based on the average yield on the 30-year Treasury bond for the three months ending December 30, 2024; (2) betas for his proxy group published by *Value Line*; and, (3) an average of four measures of a market risk premium. Specifically, Dr. Won's first two estimates of the market risk premium are the long-term arithmetic average and geometric average market risk premia of 4.54 percent and 5.94 percent, respectively, calculated as the difference between the return on large company stocks and long-term government bonds from 1926 to 2023 based on data published by *Kroll*. The second two estimates of Dr. Won's market risk premium are the long-term arithmetic average and geometric average market risk premia of 5.23 percent and 6.80 percent, respectively, calculated as the difference between the return on the S&P 500 and long-term government bonds from 1928 to 2023 as published by Professor Damodaran of the NYU Stern School of Business. The results of Dr. Won's CAPM analyses range from 8.54 percent to 10.55 percent.[85] Dr. Won also applies an upper and lower bound to the results of his CAPM analysis similar to

[85] Schedule SJW-d13.

his DCF analysis and averages the upper and lower bounds to estimate a cost of equity of 9.51 percent.[86]

Q: Do you agree with Dr. Won's specification of his CAPM analysis?

A: No. There are several flaws with Dr. Won's CAPM analysis, including:

- Relying on historical data to estimate a forward-looking market return and market risk premium.
- Relying on a historical market risk premium that is unrelated to the current risk-free rate, and therefore does not correctly reflect the inverse relationship between interest rates and the market risk premium.
- Calculating the market risk premium incorrectly, by relying on the historical total return on long-term government bonds instead of the historical income-only return.
- Relying on historical geometric averages of the market return and market risk premia rather than arithmetic averages to estimate the cost of equity.

Each of these assumptions independently and combined cause the result of Dr. Won's CAPM analysis to be severely understated and unreliable.

Q: Why is it inappropriate to use an historical market risk premium in the CAPM to estimate the cost of equity?

A: The cost of equity that is being set in this proceeding is the return that investors expect on current and future investments in the Company. Therefore, the market return and market risk premium fundamentally should be forward-looking. Dr. Won has not provided any evidence that the historical average market return or the market risk premium that he relies on reflect the expected market conditions during

[86] Schedule SJW-d13.

the period in which the Company's proposed rates will be in effect. *Morningstar*, which is the prior publisher of the historical dataset relied on by Dr. Won for his CAPM that is now published by *Kroll*, specifically supports that the market risk premium should be a forward-looking, not historical, analysis:

> It is important to note that the expected equity risk premium, as it is used in discount rates and the cost of capital analysis, is a forward-looking concept. That is, the equity risk premium that is used in the discount rate should be reflective of what investors think the risk premium will be going forward.[87]

Given that the current and projected market conditions that both Dr. Won and I have discussed affect the current and projected equity risk premium, a forward-looking market return and market risk premium should be used in the CAPM analysis for estimating the cost of equity.

Q: Has *Kroll* also highlighted a potential inconsistency with relying on historical data for a forward-looking analysis such as the CAPM?

A: Yes. *Kroll* has stated that, "[i]n using a historical measure of the equity risk premium, one assumes that what has happened in the past is representative of what might be expected in the future."[88] As will be discussed in more detail, because the current long-term government bond yields are currently below those that Dr. Won relies on in his historical average market risk premium estimates, the market risk premium based on long-term historical average data is certainly not

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[87] *Morningstar Inc*., 2010 Ibbotson SBBI Valuation Yearbook, at 55.

[88] *Kroll*, 2022 SBBI Yearbook, at 198.

representative of what is expected in the future. Given the inverse relationship between interest rates and the market risk premium, and since the current interest rate that Dr. Won relies on for his risk-free rate is *lower* than the historical average, it is reasonable to expect that the current market risk premium should be *higher* than the historical average market risk premium.

Q: Is there also evidence that the use of a historical market premium can produce counter-intuitive results?

A: Yes. Figure 8 illustrates the problem with relying on a historical market risk premium such as Dr. Won has done. Specifically, the figure shows that from 2007-2009, the historical market risk premium decreased even as market volatility (the primary statistical measure of risk) significantly increased. Further, this figure demonstrates the significant swings in the annual equity risk premium that are averaged into the long-term historical average calculations. As shown, in 2008, the annual equity risk "premium" was actually negative, which implies a discount for equity holders relative to the cost of debt. It is incomprehensible that the perceived risk for equity was negative (implying a required equity return lower than the cost of debt) in the height of the financial market collapse when the overall market return for equities was negative 37 percent. The assumption that investors would expect or require an equity risk "premium" below the cost of debt during periods of increased volatility is counter-intuitive and leads to unreliable analytical results. In fact, as shown, this individual observation alone, which runs counter to

the theory of the equity risk premium, reduces the historical average market risk premium for the prior 80 years by 60 basis points.

FIGURE 8: HISTORICAL MARKET RISK PREMIUM AND MARKET VOLATILITY

	Market Volatility	Market Return	Annual Equity Risk Premium	Long-term Average Historical Market Risk Premium[89]
2007	17.54	5.49%	0.63%	7.10%
2008	32.69	-37.00%	-41.45%	6.50%
2009	31.48	26.46%	3.47%	6.70%

As noted earlier, the relevant objective in the application of the CAPM is to ensure that all three components of the model (*i.e.*, the risk-free rate, the beta, and the market risk premium) are consistent with market conditions and investor perceptions. The forecasted market risk premium estimates used in my CAPM analyses specifically address this concern.

Q: Has Dr. Won previously relied on a forward-looking estimate of the market risk premium in his CAPM analysis such as you have done in your direct testimony?

A: Yes. In Missouri-American Water's 2020 rate proceeding, Dr. Won relied on two estimates of a historical market risk premium, as well as an estimate of a forward-

[89] Ibbotson SBBI Yearbook. *Morningstar Inc*. 2008, at 28. *Ibbotson SBBI Yearbook*. *Morningstar Inc*. 2009, at 23; Ibbotson SBBI Yearbook. *Morningstar Inc*. 2010, at 23. The historical market risk premium equals the total return on large company stocks less the income-only return on long-term government securities.

looking market risk premium based on the market return of the S&P 500 less the current risk-free rate.[90]

Q: How would the results of Dr. Won's CAPM analysis changed if he had calculated the market risk premium in this proceeding in the same way that he had calculated it in the Missouri-American Water 2020 rate proceeding?

A: The results of Dr. Won's CAPM analysis would have been higher in this proceeding had he relied on a forward-looking market risk premium such as he had done previously.

Q: Recognizing that you disagree with the use of historical data to calculate the market risk premium for the reasons you noted previously, is Dr. Won's calculation of the historical market risk premia relied on in his CAPM analyses correct?

A: No. Dr. Won has incorrectly used that historical data to estimate a market risk premium in all four of his CAPM scenarios.

Q: Please explain the errors in Dr. Won's calculation of the historical market risk premia.

A: Dr. Won's estimates of the market risk premia are incorrect and understated because, when calculating a historical market risk premium, the market return

[90] Missouri Public Service Commission, Case No. WR-2020-0344, Staff Report Cost of Service, at 26 and Schedule SJW-14, columns [8] through [10].

should be reduced by the *income-only* return on the risk-free investment – *not the total return on that investment*. Specifically,

- In two of his CAPM scenarios, Dr. Won has calculated the market risk premia as the difference between the long-term average return on large company stocks and the long-term average *total* return on long-term government bonds.
- In his two other CAPM scenarios, Dr. Won has calculated the market risk premia as the difference between the long-term average total return on the S&P 500 and the long-term average *total* return on 30-year Treasury bonds.

Therefore, in all four of his CAPM scenarios, Dr. Won has incorrectly calculated the market risk premium but deducting the total return instead of the income-only return on the risk-free investment from the overall market return.

Q: Please explain why it is incorrect to reduce the market return by the total return on government bonds in estimating the market risk premium.

A: The market risk premium that is being estimated is the premium return that is necessary for an investor to hold equity as compared to a risk-free investment. Therefore, what is being measured is the incremental return needed by investors to hold equity rather than holding bonds. The problem with Dr. Won's use of the *total* return on long-term government bonds is that it includes both (i) the income return, which is the return expected by investors at the time of investment since the interest rate on the bond is known at that time; (ii) the changes in the bond's market price; and (iii) the reinvestment return. The capital appreciation and reinvestment portions of the return are not without risk. For example, in the case

of capital appreciation, the price of the bond could increase or decrease depending on the market.

As Dr. Won acknowledges in his testimony, "investors demand a greater return in exchange for taking on higher levels of risk," and that an investment in "a company's common stock equity is riskier than its corporate bonds because equity holders have residual claims on a company's assets and earnings, which means they are not guaranteed fixed returns and may face greater volatility in their investment."[91]

Therefore, the proper calculation of the market risk premium is the return on the market less the *income-only* return on the risk-free investment.

Q: How does this error affect the market risk premia that Dr. Won relies on?

A: By subtracting the total return on the risk-free investment from the market return, instead of the income-only return on the risk-free investment, Dr. Won has understated the market risk premium. To illustrate this point, in one of his estimates of the historical market risk premium, Dr. Won takes the arithmetic historical market return of 12.16 percent and deducts the arithmetic *total* return on long-term government bonds of 6.22 percent to derive a market risk premium of

[91] Won Direct, at 46.

5.94 percent.[92] However, when calculated correctly, the historical market risk premium is 7.31 percent – over more than 130 basis points higher.[93]

Q: Has the publisher of the historical data on which Dr. Won relies noted that his approach to deriving an historical market risk premium is not appropriate?

A: Yes. *Morningstar*, the former publisher of the historical data on which Dr. Won relies for purposes of his market risk premium and which is now owned by *Kroll*, states that a historical market risk premium is appropriately calculated by subtracting the *income-only* portion of the government bond return from the total return on large company stocks:

> Another point to keep in mind when calculating the equity risk premium is that the income return on the appropriate-horizon Treasury security, rather than the total return, is used in the calculation. The total return is comprised of three return components: the income return, the capital appreciation return, and the reinvestment return…The income return is thus used in the estimation of the equity risk premium because it represents the truly riskless portion of the return.[94]

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92 Schedule SJW-d13.

93 *Kroll*, Cost of Capital Navigator. Calculated correctly as the total return on the S&P 500 from 1926-2024 of 12.17 percent less the income-only return on long-term government bonds over this same period of 4.86 percent.

94 *Morningstar Inc.*, Ibbotson SBBI 2012 Valuation Yearbook, Market Results for Stocks, Bonds, Bills, and Inflation 1926-2011, at 55.

Q: Are Dr. Won's historical market risk premia consistent with the inverse relationship between interest rates and the market risk premium?

A: No. Dr. Won's use of a historical market risk premium in the CAPM with a current interest rate also disregards the demonstrated relationship between interest rates and the market risk premium. As just discussed, the market risk premium is the difference between the market return and the return on a risk-free investment. Therefore, at any point in time, the market risk premium is based on the relationship between the market return and the risk-free rate. Dr. Won calculates the cost of equity using the CAPM by relying on a long-term *historical* average market risk premia, which, while calculated incorrectly, attempts to reflect the long-term relationship between the risk free rate and the market risk premium. However, applying that historical market risk premium to a *current* risk-free rate is incorrect because Dr. Won's current risk-free rate bears no relationship to the historical average interest rates underlying the historical average market risk premia. The use of assumptions from different time periods fails to account for the inverse relationship that exists between the risk-free rate and the equity risk premium. Both academic literature and market evidence indicate that the equity risk premium is inversely related to the level of interest rates (*i.e.*, as interest rates increase, the equity risk premium decreases, and vice versa).[95]

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[95] *See e.g.*, S. Keith Berry, "Interest Rate Risk and Utility Risk Premia during 1982-93," *Managerial and Decision Economics*, Vol. 19, No. 2, March, 1998. *See also*, Robert S. Harris, "Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return," *Financial Management*, Spring 1986, at 66.

Q: Does Dr. Won acknowledge the historical relationship between interest rates and the market risk premium?

A: Yes. In Figure 6 of his testimony, Dr. Won specifically acknowledges this relationship when discussing his BYRP analysis.[96] Therefore, given that current interest rates on long-term government bonds are below the historical average interest rate of those same bonds, the market risk premium should be *greater than* the long-term historical average market risk premium – which is not the case for Dr. Won's CAPM analyses.

Q: How does this error of not reflecting the relationship between interest rates and the market risk premium affect the market risk premia that Dr. Won relies on?

A: As noted, one of Dr. Won's estimates of the historical market risk premium is based on the arithmetic historical market return less the arithmetic *total* return on long-term government bonds resulting in a market risk premium of 5.94 percent. However, as discussed, when calculated correctly by deducting the *income-only* return instead of the total return on the long-term government bonds, the historical market risk premium is actually 7.31 percent.

This same CAPM scenario can be used to demonstrate the extent to which Dr. Won has understated the market risk premium as a result of failing to reflect the relationship between interest rates and the market risk premium. Specifically, in

[96] Won Direct, at 47.

developing his CAPM analysis, Dr. Won relies on a 3-month average risk-free rate on long-term government bonds as of December 30, 2024 of 4.50 percent. However, this current risk-free rate is lower than the long-term historical average rate of 4.86 percent. Therefore, recognizing the inverse relationship between interest rates and the market risk premium, a relationship with which Dr. Won agrees, the current market risk premium should be *greater than* the long-term historical average of 7.31 percent. However, in Dr. Won's market risk premium of 5.94 percent in this scenario is substantially lower than the long-term historical average, which is inconsistent with the negative relationship that Dr. Won notes exists between these two assumptions.

Q: How does the understatement of the market risk premium affect Dr. Won's CAPM analyses?

A: By understating the historical market risk premia in two significant respects (*i.e.*, deducting the total return instead of income-only return on the risk-free investment and failing to reflect the inverse relationship between interest rates and the market risk premium), Dr. Won's CAPM results are also understated. As discussed subsequently herein, Mr. Murray's CAPM analyses suffer from this same flaw and also understate the cost of equity.

Q: Is it appropriate to rely on the geometric mean to estimate a historical market return for the CAPM?

A: No. Geometric and arithmetic means are used for different purposes. The geometric mean is used to determine the exact rate of compounded return

between a specific starting and ending point. The geometric mean is most appropriately used for series that exhibit serial correlation. It is also commonly referred to as a "holding period return." The arithmetic mean is the appropriate calculation to estimate the market risk premium because it is the simple average of single period rates of return and therefore best approximates the uncertainty associated with returns from year to year. The important distinction between the two methods is that the arithmetic mean assumes each periodic return is an independent observation and, therefore, incorporates uncertainty into the calculation of the long-term average. In contrast, the geometric mean does not incorporate the same degree of uncertainty because it assumes that returns remain constant from year to year.

Cooper (2006) reviewed the literature on the topic and noted the following rationale for using the arithmetic mean:

> Note that the arithmetic mean, not the geometric mean is the relevant value for this purpose. The quantity desired is the rate of return that investors expect over the next year for the random annual rate of return on the market. The arithmetic mean, or simple average, is the unbiased measure of the expected value of repeated observations of a random variable, not the geometric mean.…[The] geometric mean underestimates the expected annual rate of return.[97]

[97] Ian Cooper, "Arithmetic versus geometric mean estimators: Setting discount rates for capital budgeting," *European Financial Management 2.2*, 1996, at 158.

Furthermore, Pratt and Grabowski note the following in their review of the literature:

> The choice between which average to use is a matter of disagreement among practitioners. The arithmetic average receives the most support in the literature, though other authors recommend a geometric average. The use of the arithmetic average relies on the assumption that (1) market returns are serially independent (not correlated) and (2) the distribution of market returns is stable (not time-varying). Under these assumptions, an arithmetic average gives an unbiased estimate of expected future returns assuming expected conditions in the future are similar to conditions during the observation period. Moreover, the more observations available, the more accurate will be the estimate.[98]

Q: How do the results of Dr. Won's CAPM analysis change when the issues you have identified are corrected?

A: Schedule AEB-R1, Attachment 11 presents Dr. Won's CAPM analysis corrected for the issues that I have identified with his CAPM analyses. Specifically, I have adjusted Dr. Won's CAPM analysis to calculate the market risk premium as the historical arithmetic average market return from 1926 through 2024 minus the current estimate of the risk-free rate.[99] In addition, as presented on Schedule AEB-R1, Attachment 11, I have updated Dr. Won's CAPM analysis to reflect current market data as of the 3 months ending February 28, 2025, including the risk-free

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[98] Shannon P. Pratt and Roger J. Grabowski, *Cost of Capital: Applications and Examples*, Wiley, 2008, at 96.

[99] While I do not agree with the use of a historical market return and historical market risk premium to estimate the forward-looking cost of equity for all of the reasons discussed, at a minimum this calculation at least derives the market risk premium from the risk-free rate being used in the CAPM to estimate the cost of equity, which is more appropriate than the calculation performed by Dr. Won that fails to reflect the inverse relationship between interest rates and the market risk premium.

rate and the Value Line Betas. In addition, I have included NI in the proxy group for the reasons discussed previously in response to Dr. Won's proxy group analysis.

As shown on Schedule AEB-R1, Attachment 11 relying on the updated and corrected assumptions previously discussed, the average cost of equity including NiSource is 11.60 percent. The FERC outlier test demonstrates that there are no outliers in the data set. Applying Dr. Won's upper and lower bound, which artificially establish outliers, the range is 11.35 percent to 11.92 percent and the average cost of equity estimate is 11.64 percent.

V.D. BYRP Analysis

Q: Please summarize Dr. Won's BYRP analysis.

A: Dr. Won's BYRP analysis is similar to the BYRP analysis that I have also conducted, with the exception that he evaluates the inverse relationship between A-rated and Baa-rated utility bond yields and authorized ROEs for natural gas utilities to estimate the risk premium, while I evaluate the inverse relationship using 30-year Treasury bond yields and authorized ROEs for natural gas utilities to estimate the risk premium. In addition, Dr. Won's regression of the utility bond yields and authorized ROEs is based on authorized ROEs for the 10-year period

2014 to 2024,[100] while the regression analysis developed in my direct testimony relies on a longer data set of authorized ROEs from 1980 to current.

Q: Do you agree with Dr. Won's BYRP analysis?

A: No, while Dr. Won has conducted a regression analysis for his BYRP analysis, there are a elements of his analysis with which I disagree. Specifically:

- Dr. Won only utilizes an 11-year period of data for the analysis when a significantly longer period of utility bond yield and authorized ROE data is available that incorporates a much broader set of market conditions than has been considered in Dr. Won's analysis and is more appropriate to be considered in setting the return on equity.
- As shown in Figure 6 and Exhibit SJW-d14-2 of his testimony, Dr. Won has conducted a single regression of the risk premium and bond yield for both A-rated and Baa-rated utility bond yields, which he then uses to estimate a forward-looking market risk premium associated with both current A-rated and Baa-rated utility bond yields. However, it is unclear why Dr. Won did not conduct separate regressions of the risk premium and bond yield for A-rated versus Baa-rated utility bond yields, which would then be used separately to estimate a forward-looking market risk premium for the current A-rated bond yield and separately for the current Baa-rated bond yield.

Q: Have you adjusted Dr. Won's BYRP analysis to address the issues you just identified?

A: Yes. Schedule AEB-R1, Attachment 12 updates Dr. Won's BYRP analysis using the Baa-rated utility bond yield data that is available back to January 1993 and the corresponding quarterly authorized ROEs over that same period. As shown, when a longer period of data is appropriately utilized, when Dr. Won's regression results

[100] Won BYRP Model.xls, "Gas BYPRP Combined".

are applied to the current 30-day average of the Baa-rated public utility bond yield, the result of Dr. Won's BYRP analysis is an ROE of 10.22 percent.

V.E. Overall Cost of Equity Results

Q: Based on the various issues that you have identified with Dr. Won's DCF and CAPM analyses, what would the results of those analyses, when updated and corrected, indicate for an overall cost of equity for the Company in this proceeding?

A: Figure 9 presents the results of Dr. Won's analyses when they are updated to use the most current data available and corrected for the issues that I have discussed. Specifically, the changes to Dr. Won's two-step DCF, CAPM, and BYRP analyses are shown in Schedule AEB-R1, Attachments 10 through 12, respectively. As shown in Figure 9, the resulting average cost of equity is 10.71 percent – which is significantly higher than the Company's proposed ROE of 10.25 percent in this proceeding.

FIGURE 9: RESULTING COST OF EQUITY FROM DR. WON'S ADJUSTED COST OF EQUITY ANALYSES

	Analytical Results
Two-Step DCF Analysis	10.29%
CAPM Analysis	11.60%
BYRP Analysis	10.22%
Average	10.71%

VI. Response to Mr. Murray

VI.A. Overview

Q: Please summarize Mr. Murray's cost of equity analyses.

A: Mr. Murray estimates the cost of equity by conducting multiple scenarios of a multi-stage DCF and CAPM analysis. In these analyses, Mr. Murray relies on a proxy group of comparable natural gas utilities, as well as separately calculates results based on Ameren instead of a proxy group. Mr. Murray also uses an ad hoc "rule of thumb" bond risk premium approach as a reasonableness test on the results of his multi-stage DCF and CAPM analyses. While the results from Mr. Murray's cost of equity analyses range from 7.78 percent to 9.12 percent,[101] he considers a reasonable range for the Company's ROE to be 9.00 percent to 9.50 percent, and recommends an ROE of 9.50 percent.[102]

[101] Schedule DM-D-2 through Schedule DM-D-6.

[102] Murray Direct, at 36.

Q: Are the results of any of Mr. Murray's cost of equity models using a natural gas utility proxy group consistent with his ROE recommendation for the Company?

A: No. The results of all of Mr. Murray's cost of equity models are well below his recommended ROE in this proceeding.

Q: How does Mr. Murray reconcile the significant difference between the results of his cost of equity analyses and his overall ROE recommendation?

A: Mr. Murray's position is that regulators have authorized ROEs higher than the cost of equity.[103] As a result, Mr. Murray states that he first estimates Ameren Missouri's cost of equity, and then compares those estimates to both his own estimates from a recent rate case and authorized ROEs in recent years, with specific consideration given to Ameren Illinois' rate case, in order to determine if there has been a fundamental change in the cost of capital.[104]

Q: Do you agree with Mr. Murray that regulators consistently have authorized ROEs that overstate the cost of equity?

A: No. I disagree with Mr. Murray that regulatory commissions, including this Commission, have consistently erred for decades in establishing utilities' ROEs. While I agree with Mr. Murray that: (1) there is a distinction between the cost of equity and the ROE authorized by regulatory commissions in setting just and

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103 *Id*., at 5.

104 *Id*., at 6.

reasonable rates; (2) the cost of equity cannot be definitively determined and therefore must be estimated by analysts; and (3) there is significant disagreement as to the way in which to estimate the cost of equity; there is no basis to conclude that that regulators have consistently incorrectly authorized ROEs substantially higher than the cost of equity. For example, there is no evidence that Mr. Murray's estimate of the cost of equity, which includes the results of both his multi-stage DCF and CAPM analyses that are either well below or at the very low-end of the range of comparable ROEs that have been authorized by a regulatory commission in at least the last 40 years, is in fact reasonable and that regulatory commissions have been consistently approving unjust and unreasonable rates. In fact, Mr. Murray's conclusion is solely reliant on the assumption that he has "correctly" specified his cost of equity models, even though the cost of equity is not observable and his models produce results that even he does not rely on in establishing his recommended ROE.

Q: Are you aware of any other regulatory jurisdiction in the United States that has adopted Mr. Murray's views?

A: No. I am not aware of any regulatory commission in the United States – state or Federal – that has adopted Mr. Murray's position that regulatory commissions have consistently and predictably authorized ROEs that exceed the investor-required return.

Q: Are you aware of any regulatory commissions that have specifically disagreed with Mr. Murray's notion that there is and has been a substantial difference between authorized ROEs and the cost of equity for utilities?

A: Yes. For example, the Minnesota Public Utilities Commission clearly stated in a recent decision when the same argument was made by the Minnesota Department of Commerce, Division of Energy Resources that it did not agree that utility ROEs have exceeded the cost of equity historically:

> The Department's recommended cost of equity of 9.30% is informed by an underlying assumption that the cost of equity and the return on equity are distinct concepts in the sense that utility earnings exceed the cost of equity over time. This understanding, according to the Department, undermines the reliability of earnings' estimates in predicting long-term growth and instead justifies the use of a multi-stage DCF analysis that uses GDP to forecast the long-term cost of equity. ***The Commission does not share this concern***.[105]

In addition, in Docket No. G-011/GR-13-617, the Minnesota Administrative Law Judge and the Minnesota Public Utilities Commission rejected the Office of the Minnesota Attorney General's position that the DCF model yields inflated results when the market-to-book ratios for utilities significantly exceed one:

> As the Company and the Department pointed out, the relatively high market-to-book ratios of gas utilities' stock prices (and those of utilities generally) are mainly a function of regulators' using book value, not market value, to determine the value of their assets and the return those assets should yield. While rate-of-return regulation

[105] Minnesota Public Utilities Commission, Docket No. E-015/GR-21-335, Findings of Fact, Conclusions, and Order. February 28, 2023, at 45; emphasis added.

> is intended to function as a stand-in for the discipline of the market, there are unavoidable incongruities, and this is one.
>
> Still, investors, analysts, utilities and regulators understand this difference and factor it into their decision-making. And, as the Department and the Company pointed out, if utilities were in fact earning excessive profits due to excessive returns on equity, there would have been a run on utility stocks, eliminating excessive profits—the utility sector is not so removed from the rest of the economy that basic economic principles do not apply.
>
> For these reasons, the Commission rejects the OAG's argument that, in setting a cost of equity for MERC, it must adjust for the Company's market-value/book-value ratio exceeding one.[106]

Q: What has Mr. Murray stated regarding the "zone of reasonableness" for the ROE to be established in this proceeding?

A: Mr. Murray notes that the Commission has developed a "zone of reasonableness standard" with the starting point for establishing such zone as 100 basis points above and below a recent industry average authorized ROE. Mr. Murray contends that the zone of reasonableness in this proceeding should be 8.72 percent to 10.72 percent, based on the recent average authorized ROE of 9.72 percent.[107]

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[106] Minnesota Public Utilities Commission, Docket No. G-011/GR-13-617, Findings of Fact, Conclusions, and Order. October 28, 2014, at 34.

[107] Murray Direct, at 6.

Q: Do the results of Mr. Murray's multi-stage DCF or CAPM analyses fall within the zone of reasonableness that he suggests should be applicable in this proceeding?

A: As shown in Figure 10 and Figure 11, generally, no.[108] The majority of Mr. Murray's analytical results do not fall within the range that he suggests the Commission rely on in this proceeding, suggesting that the Commission disregard the results of Mr. Murray's cost of equity models. Further, as noted previously, by setting his recommended ROE well above the range of his results, Mr. Murray has also disregarded his own analyses Therefore, Mr. Murray's ROE recommendation in this proceeding is based simply on his own judgment and not on any of his cost of equity analyses.

[108] As shown in Figure 11, only the CAPM results using a 6.00% market risk premium, which Mr. Murray characterizes as "excessive," at page 32 of his direct testimony fall within the "zone of reasonableness".

FIGURE 10: COMPARISON OF THE RESULTS OF MR. MURRAY'S MULTI-STAGE DCF ANALYSES RELATIVE TO HIS PROPOSED ZONE OF REASONABLENESS[109]

	Cost of Equity	Mr. Murray Zone of Reasonableness	Within Zone?
Multi-Stage DCF			
Ameren / 3 month Avg. Stock Prices			
2.5% Perpetual Growth Rate	7.68%		No
3.0% Perpetual Growth Rate	7.78%		No
3.5% Perpetual Growth Rate	7.89%		No
Gas Proxy Group / 3 month Avg. Stock Prices			
2.0% Perpetual Growth Rate			
Average of All Companies But SWX	7.95%		No
Average of Mostly Pure Play	7.83%		No
Average of All Companies	8.01%	8.72% - 10.72%	No
2.7% Perpetual Growth Rate			
Average of All Companies But SWX	8.07%		No
Average of Mostly Pure Play	7.96%		No
Average of All Companies	8.13%		No
3.3% Perpetual Growth Rate			
Average of All Companies But SWX	8.18%		No
Average of Mostly Pure Play	8.07%		No
Average of All Companies	8.23%		No

[109] Schedule DM-D-2 through Schedule DM-D-5.

FIGURE 11: COMPARISON OF THE RESULTS OF MR. MURRAY'S CAPM ANALYSES RELATIVE TO HIS PROPOSED ZONE OF REASONABLENESS[110]

	Cost of Equity: Market Risk Premium = 5%	Mr. Murray Zone of Reasonableness	Within Zone?	Cost of Equity: Market Risk Premium = 6%	Mr. Murray Zone of Reasonableness	Within Zone?
CAPM						
20-Year Treas. Bond Yld. as Risk-Free Rate						
Ameren	8.19%		No	8.88%		Yes
LDC Average	8.39%		No	9.12%		Yes
					8.72% - 10.72%	
30-Year Treasury Bond Yield as Risk-Free Rate						
Ameren	8.11%	8.72% - 10.72%	No	8.80%		Yes
LDC Average	8.31%		No	9.04%		Yes
Kroll Risk-Free Rate & Equity Risk Premium						
Ameren	8.37%		No			
LDC Average	8.58%		No			

Q: Are the results of Mr. Murray's multi-stage DCF or CAPM analyses reasonable?

A: No. Given the results of Mr. Murray's cost of equity analyses, it is not surprising that he does not rely on them for purposes of developing his recommended ROE in this proceeding. The results of Mr. Murray's multi-stage DCF and CAPM analyses are either well below or at the very low-end of the range of comparable authorized ROEs that have been approved for natural gas utilities since at least 1980. I recognize that Mr. Murray contends that the results of his cost of equity analyses are reasonable based on his claim that utility commissions have consistently authorized ROEs well in excess of the cost of equity. However, as I have discussed, his position is based solely on his estimates of the cost of equity being correct which is very unlikely given the various methods relied on by analysts

[110] Schedule DM-D-6.

to estimate the cost of equity and his position has been specifically rejected previously.

Q: In prior Ameren Missouri rate proceedings, has Mr. Murray relied on the results of his cost of equity analyses for purposes of his ROE recommendation?

A: No. As seen in Figure 12, Mr. Murray's model results have consistently been below his ROE recommendation.

FIGURE 12: COMPARISON OF THE RESULTS OF MR. MURRAY'S COST OF EQUITY ESTIMATION METHODOLOGIES AND RECOMMENDED ROE IN PRIOR AMEREN MISSOURI RATE PROCEEDINGS

Methodology	Case No. GR-2024-0369	Case No. GR-2021-0241
Multi-Stage DCF (AEE, 3.5% long-term growth rate)[111]	7.89%	7.12%
Multi-Stage DCF (AEE, 3.0% long-term growth rate)[112]	7.78%	6.96%
Multi-Stage DCF (AEE, 2.5% long-term growth rate) [113]	7.68%	6.79%
Multi-Stage DCF (Gas Utility Group) [114]	7.83% - 8.23%	7.45% - 7.62%
CAPM[115]	8.11% - 9.12%	6.40% - 6.81%

[111] Murray Direct, at Schedule DM-D-2; File No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at Schedule DM-D-2.

[112] Murray Direct, at Schedule DM-D-2; File No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at Schedule DM-D-2.

[113] Murray Direct, at Schedule DM-D-2; File No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at Schedule DM-D-2.

[114] Murray Direct, at Schedule DM-D-3 through Schedule DM-D-5; File No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at Schedule DM-D-3.

[115] Murray Direct, at Schedule DM-D-6; File No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at Schedule DM-D-5.

Methodology	Case No. GR-2024-0369	Case No. GR-2021-0241
Rule of Thumb[116]	8.70%	5.75%
Cost of Equity Range[117]	7.80% - 8.50%	6.50% - 7.0%
ROE Recommendation[118]	9.50%	9.25%
Amount by which Mr. Murray's ROE recommendation is greater than his highest cost of equity model result	**1.00%**	**2.25%**

Q: Have Mr. Murray's ROE recommendations changed with the changes in capital market conditions over time?

A: No. As shown in Figure 13, Mr. Murray's recommended ROEs have consistently been between 9.00 percent and 9.50 percent since 2019 – regardless of capital market conditions, with exception of recommending 9.65 percent for Confluence Rivers in WR-2023-0006. While long-term interest rates have varied over this period and increased substantially beginning in late 2021, Mr. Murray's ROE recommendations have remained constant over the past five years and well above the results of his cost of equity modeling. This demonstrates two important points, first, that Mr. Murray does not rely on his own cost of equity analyses when recommending an appropriate ROE and second, Mr. Murray does not meaningfully

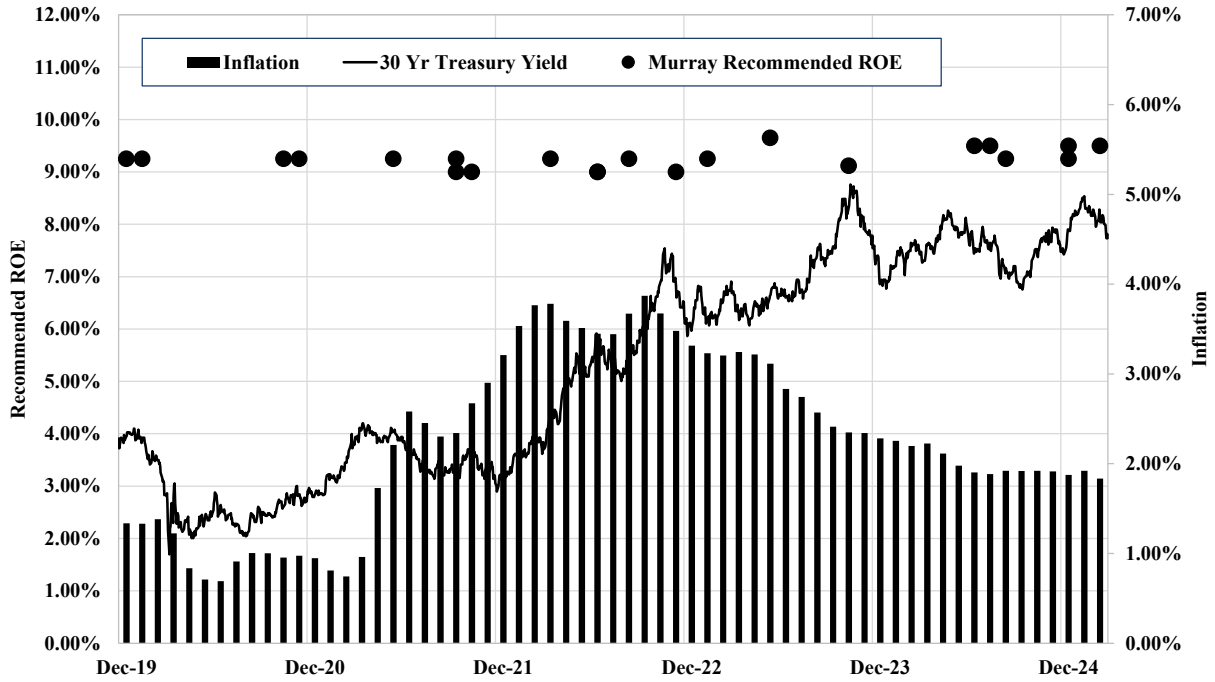
[116] Murray Direct, at 35; File No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at 30.

[117] Murray Direct, at 3; File No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at 5.

[118] Murray Direct, at 3; File No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at 2.

recognize how changes in market conditions affect the investor-required return on equity.

FIGURE 13: MR. MURRAY'S ROE RECOMMENDATIONS COMPARED TO CHANGING MARKET CONDITIONS



VI.B. Proxy Group

Q: What proxy group does Mr. Murray utilize to estimate the cost of equity?

A: Mr. Murray states that the number of publicly-traded companies classified as LDCs is small with *Value Line* classifying only nine companies as natural gas utilities. Of the nine companies classified by *Value Line* as an LDC, Mr. Murray has included seven of those companies in his proxy group. Further, he also presents an average result for his multi-stage DCF model using two subsets of his seven company natural gas proxy group: (1) companies that he considers to be "mostly pure play"

natural gas utilities (*i.e.,* Atmos Energy Corporation, Spire, Inc., NiSource, Inc., Northwest Natural Holding Company and ONE Gas, Inc.); and (2) a subset that excludes only Southwest Gas Holdings, Inc.[119] Finally, instead of using a proxy group, Mr. Murray also separately estimates the cost of equity for the Company based on its parent, Ameren.[120]

Q: Do you agree with the proxy group on which Mr. Murray relies for his cost of equity analyses?

A: No. Specifically, I disagree with the limited and nontransparent screening criteria that Mr. Murray relied on to develop his first proxy group which results in the inclusion of New Jersey Resources Corporation ("NJR") which was excluded from my proxy group due to deriving less than 70 percent of operating income from regulated operations.[121] It appears that Mr. Murray acknowledges the unregulated operations of NJR as he does exclude NJR from his subset of "mostly pure play" natural gas utilities. Additionally, he provides no support for the use of the two subsets of his first proxy group as Mr. Murray does not indicate how he determinized if a company was a "mostly pure play" natural gas utility for inclusion in his first subset proxy group nor does he indicate why he excluded Southwest Gas Holdings, Inc. from his second subset proxy group. However, while I believe that Mr. Murray's proxy groups are less comparable to Ameren Missouri, given that

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[119] Murray Direct, at Schedule DM-D-3 through Schedule DM-D-5.

[120] *Id*., at 26-29.

[121] Schedule AEB-R1, Attachment 13.

Mr. Murray's ROE recommendation is not based on the results of any of his cost of equity analyses, there is no need to discuss my disagreements with his proxy groups further and I have limited my response to focus on those issues that cause the unreasonably low cost of equity results of Mr. Murray's multi-stage DCF and CAPM analyses.

VI.C. Multi-Stage DCF Model

Q: What is the DCF approach that Mr. Murray utilizes to estimate the cost of equity?

A: Mr. Murray utilizes a multi-stage DCF analysis that includes three stages, the first two of which have defined time horizons, while the third assumes cash flows in perpetuity. In the first stage, Mr. Murray relies on analysts' projected DPS from S&P Capital IQ through 2029. For the second stage, which is 2029 through 2039, Mr. Murray first estimates EPS by relying on a linear transition from analysts' projected 5-year EPS growth rate for each proxy company as reported by S&P to his assumed long-term growth rate in 2039. Next, Mr. Murray estimates payout ratios by also using a linear transition from the payout ratio in 2029 to a long-term payout ratio in 2039 that would allow the necessary earnings be retained to sustain his long-term growth rate. Finally, Mr. Murray estimates DPS for the second stage by multiplying his estimated EPS and payout ratios for 2029 through 2039. The third stage (*i.e.,* 2039 and after) relies on Mr. Murray's estimate of long-term growth. For his multi-stage DCF model for Ameren, My. Murray relies on long-term growth rates of 2.50 percent, 3.00 percent and 3.50 percent while for his

natural gas proxy group, Mr. Murray relies on long-term growth rates of 2.00 percent, 2.70 percent and 3.30 percent.[122] Mr. Murray performs his DCF with a three-month stock price period.[123] The results of Mr. Murray's multi-stage DCF analyses are shown previously in Figure 10.

Q: Do you agree with Mr. Murray's specification of his multi-stage DCF model?

A: No. I disagree with multiple aspects of Mr. Murray's multi-stage DCF model; however, as noted previously, he does not rely on the results of his DCF model for purposes of his ROE recommendation in this proceeding. Therefore, I recommend that the Commission also not rely on his multi-stage DCF results.

Q: Regardless of whether Mr. Murray relies on the results of his multi-stage DCF for purposes of his ROE recommendation, do the results of his multi-stage DCF analysis indicate that the cost of equity has increased for natural gas utilities since the Company's last rate proceeding?

A: Yes. While I disagree with the specification of Mr. Murray's multi-stage DCF model, the results of his analysis in the current proceeding indicate an increase in the cost of equity since the Company's last rate proceeding. Specifically, as shown in Figure 14, while Mr. Murray relied on different long-term growth rate assumptions for natural gas proxy group in his multi-stage DCF analysis in the current proceeding as compared to Company's last rate proceeding, the results

[122] Murray Direct, at 26-31.

[123] *Id*., at 27.

of Mr. Murray's multi-stage DCF analysis for his natural gas proxy group are approximately 50 basis points greater than the results of his multi-stage DCF analyses in the Company's last rate proceeding. Similarly, the results of his multi-stage DCF model for the Company's parent, Ameren, are 77 to 89 basis points greater than the results of his multi-stage DCF analysis for Ameren in the Company's last rate proceeding.

FIGURE 14: RESULTS OF MR. MURRAY'S MULTI-STAGE DCF ANALYSES IN THE CURRENT PROCEEDING AS COMPARED TO AMEREN MISSOURI'S LAST RATE PROCEEDING[124]

	Current Case	Prior Case	Basis Point Increase
Multi-Stage DCF			
Ameren / 3 month Avg. Stock Prices			
2.5% Perpetual Growth Rate	7.68%	6.79%	89
3.0% Perpetual Growth Rate	7.78%	6.96%	82
3.5% Perpetual Growth Rate	7.89%	7.12%	77
Gas Proxy Group / 3 month Avg. Stock Prices			
2.0% Perpetual Growth Rate			
Average of All Companies But SWX	7.95%	n/a	n/a
Average of Mostly Pure Play	7.83%	n/a	n/a
Average of All Companies	8.01%	n/a	n/a
2.7% Perpetual Growth Rate			
Average of All Companies But SWX	8.07%	n/a	n/a
Average of Mostly Pure Play	7.96%	n/a	n/a
Average of All Companies	8.13%	n/a	n/a
3.0% Perpetual Growth Rate			
Average of Mostly Pure Play	n/a	7.45%	n/a
Average of All Companies	n/a	7.62%	n/a
3.3% Perpetual Growth Rate			
Average of All Companies But SWX	8.18%	n/a	n/a
Average of Mostly Pure Play	8.07%	n/a	n/a
Average of All Companies	8.23%	n/a	n/a
Average of Gas Proxy Group Results			
Average of All Companies But SWX	8.07%	n/a	n/a
Average of Mostly Pure Play	7.95%	7.45%	50
Average of All Companies	8.12%	7.62%	50

[124] Murray Direct, at Schedule DM-D-2 through Schedule DM-D-5; File No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at Schedule DM-D-2 and Schedule DM-D-3.

Q: Does a multi-stage DCF such as Mr. Murray has conducted increase the accuracy of the DCF results?

A: No. First, the utility industry is considered a mature industry due to its regulated status and relatively stable demand. Thus, financial projections such as analysts' projected EPS growth rates are also likely to be relatively stable over the long term. In fact, as Mr. Murray acknowledges, the utility industry is characterized by slow, but steady growth in earnings.[125] Thus, the relative stability of the financial forecasts for utilities as recognized by Mr. Murray supports the use of the constant growth DCF model to estimate the cost of equity for a mature industry like utilities.

Second, since the cost of equity is not observable, it is not possible to conclude that the results of a multi-stage DCF model are more accurate than the results of a constant growth DCF model. The multi-stage DCF model introduces additional assumptions and potential analyst bias. Specifically, the multi-stage DCF model presented by Mr. Murray in this proceeding reflects the following additional assumptions that require subjective judgment:

- Specification of the Model: In this case, Mr. Murray presents a multi-stage DCF model with three stages of growth; however, there are other forms of the multi-stage DCF model such as the two-stage DCF model with only two stages of growth.
- Selection of the Growth Rates: Mr. Murray's multi-stage DCF model requires selecting a short-term, intermediate term and long-term growth rate.
- Duration of Each Stage of the Multi-Stage DCF Model: For his multi-stage DCF model with three stages of growth, Mr. Murray assumes first stage

[125] Murray Direct, at 12.

growth from years 1-5, second stage growth from years 6-15, and then perpetual growth thereafter.

Given the number of additional subjective assumptions required, it is reasonable to conclude that a multi-stage DCF analysis creates greater opportunity for an analyst to influence the results of the DCF model.

Q: Do you agree with the projected long-term growth rate that Mr. Murray uses in his DCF analysis?

A: No, there are multiple problems with the long-term growth rate that Mr. Murray relies on in his multi-stage DCF analysis. Most importantly, the methodology Mr. Murray uses to estimate the long-term growth rate is not supported by the publisher of the data he relies on for purposes of his CAPM analysis. In addition, it has not been shown to be reasonably representative of the growth expected to occur in the natural gas utility industry over the longer-term. As I will discuss below, his long-term growth rate is inconsistent with equity analysts' expectation of future EPS growth for natural gas utilities and is also contradictory of his own expectation of long-term growth for the industry.

Q: What is the approach for calculating long-term GDP growth recommended by the source that Mr. Murray relies on in his CAPM analysis?

A: *Morningstar*, the former publisher of the SBBI Yearbook that is now owned by *Kroll*, which is the data source Mr. Murray relies on in his CAPM analysis, recommends estimating the projected long-term nominal GDP growth rate by first calculating the historical growth in real GDP and then adding the expected inflation rate:

> Growth in real GDP (with only a few exceptions) has been reasonably stable over time; therefore, its historical performance is a good estimate of expected long-term future performance. *By combining the inflation estimate with the real growth rate estimate, a long-term estimate of nominal growth is formed*.[126]

Furthermore, regarding the use of long-term historical data, *Morningstar* notes:

> The 87-year period starting with 1926 is representative of what can happen: it includes high and low returns, volatile and quiet markets, war and peace, inflation and deflation, and prosperity and depression. Restricting attention to a shorter historical period underestimates the amount of change that could occur in a long future period. Finally, because historical event-types (not specific events) tend to repeat themselves, long-run capital market return studies can reveal a great deal about the future. Investors probably expect "unusual" events to occur from time to time, and their return expectations reflect this.[127]

Applying *Morningstar's* methodology, the long-term growth rate is 5.50 percent as shown in Schedule AEB-1R, Attachment 9**,** which is substantially higher than the long-term growth rate relied on by Mr. Murray.

Q: Has Mr. Murray acknowledged that the long-term growth rate assumption could have a significant effect on the result of the multi-stage DCF model?

A: Yes, Mr. Murray acknowledged in his testimony on behalf of Staff in Ameren Missouri's 2014/2015 Electric Rate Case that the, "[c]ost of equity estimates using multi-stage DCF methodologies are **extremely sensitive** to the assumed

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[126] *Ibbotson and Associates*, Stocks, Bonds, Bills and Inflation, 1926-2012, 2013 Valuation Yearbook, at 52; emphasis added.

[127] *Id.* at 59.

perpetual growth rate."[128] As I have demonstrated, investors expect the long-term growth rate for utilities to exceed the long-term growth rate range of 2.50 percent to 3.50 percent that he has relied on for his multi-stage DCF model. Therefore, Mr. Murray's reliance on a low long-term growth rate with the current stock prices of Ameren and the companies in his proxy group results in a significantly understated cost of equity estimate. If Mr. Murray were to assume a long-term growth rate more consistent with the result from applying the *Morningstar* methodology, he would have obtained a much higher cost of equity estimate for Ameren and the proxy group.

Q: Has Mr. Murray relied on a long-term growth rate in prior rate cases that is greater than the long-term growth rate range he is relying on in the current proceeding?

A: Yes. In Case Nos. GR-2017-0215 and GR-2017-0216, Mr. Murray, who was the Staff ROE witness in the case, relied on a constant growth DCF model and not a multi-stage DCF model to estimate the cost of equity for Spire Missouri. To develop the long-term growth estimate for his constant growth DCF model, Mr. Murray reviewed the long-term historical EPS, BVPS and DPS growth rates for the natural gas industry, historical and projected GDP growth and projected growth in EPS and DPS. Mr. Murray concluded that from 1968 through 2016, the natural gas industry achieved long-term growth in the range of 4.2 percent to 4.6

[128] Missouri Public Service Commission, Case No. ER-2014-0258, Staff Cost of Service Report, December 5, 2014, at 34; emphasis in original.

percent.[129] However, giving weight to current projected EPS and DPS growth rates, Mr. Murray assumed a long-term growth rate range of 4.2 percent to 5.0 percent for his constant growth DCF model.[130] This long-term growth rate range is substantially higher than the long-term growth rate range of 2.5 percent to 3.50 percent that Mr. Murray relied on to estimate his multi-stage DCF model for Ameren and 2.0 percent to 3.3 percent that he relies on to estimate his multi-stage DCF model for his proxy group of natural gas utilities.

Q: Do you agree with Mr. Murray that Ameren also considers sustainable growth for the utility industry to be in the range that Mr. Murray relies on in his multi-stage DCF analysis?

A: No.

** [redacted][131]

[redacted][132]

[129] Missouri Public Service Commission, Case No. GR-2017-0215 and Case No. GR-2017-0216, Staff Cost of Service Report (September 2017), at 39.

[130] Ibid.

[131] Murray Direct, at 23.

[132] ** [redacted] **

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Q: Why is Mr. Murray's long-term growth rate inconsistent with the stock prices he relies on to conduct his multi-stage DCF analysis?

A: The current natural gas utility stock prices relied on by Mr. Murray are only sustainable if the current long-term EPS growth are assumed to continue over the longer-term – not the low long-term growth rate assumed by Mr. Murray. For example, as discussed above, Mr. Murray's Multi-Stage DCF model assumes second stage growth for years 6-10 where the second stage growth trends the first stage growth (i.e., DPS growth) overtime to the long-term growth rate or third stage growth which begins in year 11 and continues in perpetuity. However, as I will discuss below, EPS growth, which is used by equity analysts to develop price targets for stocks including utilities, has been at levels that far exceed his long-term growth rate for periods of greater than 10 years. Therefore, by trending his first stage growth to his long-term growth rate in year 6 and starting his long-term growth rate in year 11 each of which is lower than long-term EPS growth, his Multi-Stage model will understate the cost of equity.

Looking at it in a different way, the only way to maintain the current stock price valuations with a low long-term growth rate is to assume an extremely low cost of equity, which is what Mr. Murray has done, but that is inconsistent with the market's expectation of natural gas utility stock prices. Instead, if Mr. Murray were to assume a long-term growth rate more consistent with current earnings growth projections, he would have obtained a much higher cost of equity estimate.

Q: Has Mr. Murray acknowledged that long-term EPS growth could be robust and significantly higher than his assumed long-term growth rate?

A: Yes. In Case No. WR-2024-0320 for Missouri-American Water Company, Mr. Murray referenced that American Water Works Company ("AWK") has sustained high growth over a "long -horizon:"

> American Water had been guiding investors to a 7% to 10% long-term compound annual growth rate ("CAGR") in earnings per share ("EPS") for most of the past decade, with guidance narrowed to 7% to 9% on American Water's 2021 earnings conference call for the third quarter.[133]

Q: Has Ameren also provided guidance on long-term EPS growth that is significantly greater than Mr. Murray's assumed long-term growth rate?

A: Yes. Ameren has provided guidance to investors that long-term EPS growth will be in the range of 6 percent to 8 percent since at least 2018 with the Company currently projecting that EPS growth will continue to be in the rage of 6 percent to

[133] Missouri Public Service Commission, Case No. WR-2024-0320, Direct Testimony of David Murray, December 6, 2024, at 14.

8 percent through 2029.[134] Further, equity analysts have reviewed the guidance provided by Ameren and have noted that they believe the Company will be able to maintain long-term EPS growth in the range of 6 percent to 8 percent. ** [redacted][135] [redacted][136]**

VI.D. CAPM Analysis

Q: How does Mr. Murray conduct his CAPM analysis?

A: Mr. Murray develops three separate specifications of the CAPM analysis. The first CAPM analysis uses a risk-free rate based on the average monthly yield on the 20-year Treasury bond for November 2024 through January 2025, 58 month (*i.e.,* 4 years and 10 months to exclude the market downturn due to COVID-19 in March 2020) raw betas for Ameren Missouri and the natural gas utility proxy group as calculated using the Beta Generator spreadsheet published by S&P that Mr. Murray then adjusts using the Blume adjustment, and a market risk premium of 5.00 percent and 6.00 percent, which he contends is consistent with the investment

[134] Ameren, Investor Presentations dated October 4, 2019, June 22, 2022 and March 1, 2025.

[135] J.P. Morgan, "Ameren Corporation: 4Q21 Earnings Preview: MO IRP & MISO Catalysts Underpin Top Tier Growth Outlook", January 26, 2022.

[136] J.P. Morgan, "Ameren Corporation:4Q in Review, Model Update: AEE", March 11, 2025. .

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community's consensus. The second CAPM analysis is the same as the first, except that it uses a risk-free rate based on the average monthly yield on the 30-year Treasury bond for November 2024 through January 2025. Mr. Murray's third CAPM analysis relies on the 20-year Treasury bond yield as of January 2025 as the risk-free rate consistent with *Kroll's* recommendation to use the spot yield if it exceeds their normalized risk-free rate of 3.50 percent, *Kroll's* recommended market risk premium of 5.00 percent, and the same betas as in his first two CAPM scenarios.[137] The results of Mr. Murray's CAPM analyses range from 8.11 percent to 8.88 percent for Ameren and 8.31 percent to 9.12 percent for the proxy group, and ultimately, he states that his CAPM analyses indicate a cost of equity in the 8.30 percent to 8.60 percent range for Ameren and his proxy group.[138]

Q: Do you agree with Mr. Murray's specification of the CAPM?

A: No. I disagree with several assumptions relied on by Mr. Murray in his CAPM analyses; however, it is important to recognize that he does not rely on the results of his CAPM model for purposes of his ROE recommendation in this proceeding. Therefore, I recommend that the Commission also not rely on his CAPM results.

[137] *Kroll* states that the risk-free rate should be the spot yield on the 20-year Treasury bond since the spot yield currently exceeds *Kroll*'s normalized risk-free rate.

[138] Murray Direct, at 35 and Schedule DM-D-6.

Q: Regardless of whether Mr. Murray relies on the results of his CAPM for purposes of his ROE recommendation, do the results of his CAPM indicate that the cost of equity has increased for natural gas utilities since the Company's last rate proceeding?

A: Yes. While I disagree with the market risk premia that Mr. Murray has relied on in his CAPM analysis for the reasons I will discuss in more detail below, the results of his CAPM analysis in the current proceeding indicate an increase in the cost of equity since the Company's last rate proceeding. Specifically, as shown in Figure 15, the results of Mr. Murray's CAPM analysis are approximately 177 basis points to 248 basis points greater than the results of his CAPM analysis in the Company's last rate proceeding.

FIGURE 15: RESULTS OF MR. MURRAY'S CAPM ANALYSES IN THE CURRENT PROCEEDING AS COMPARED TO AMEREN MISSOURI'S LAST RATE PROCEEDING[139]

	Current Case	Prior Case	Basis Point Increase
CAPM			
20-Year Treas. Bond Yld. as Risk-Free Rate			
Market Risk Premium = 5%			
Ameren	8.19%	n/a	n/a
LDC Average	8.39%	n/a	n/a
Mostly Regulated LDCs	n/a	n/a	n/a
Market Risk Premium = 6%			
Ameren	8.88%	6.40%	2.48%
LDC Average	9.12%	6.70%	2.42%
Mostly Regulated LDCs	n/a	6.53%	n/a
30-Year Treasury Bond Yield as Risk-Free Rate			
Market Risk Premium = 5%			
Ameren	8.11%	n/a	n/a
LDC Average	8.31%	n/a	n/a
Mostly Regulated LDCs	n/a	n/a	n/a
Market Risk Premium = 6%			
Ameren	8.80%	6.51%	2.29%
LDC Average	9.04%	6.81%	2.23%
Mostly Regulated LDCs	n/a	6.64%	n/a
Kroll Risk-Free Rate & Equity Risk Premium			
Ameren	8.37%	6.54%	1.83%
LDC Average	8.58%	6.81%	1.77%
Mostly Regulated LDCs	n/a	6.65%	n/a

[139] Murray Direct, at Schedule DM-D-6; File No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at Schedule DM-D-5.

Q: Does Mr. Murray's assumed market risk premia have similar flaws that you have identified in your response to Dr. Won?

A: Yes. Mr. Murray states that his estimated risk premia range of 5.0 percent and 6.0 percent is based on the range of historical arithmetic and geometric equity risk premia, as well as *Kroll*'s current recommended market risk premium.[140] However, the historical data referenced by Mr. Murray is the same data relied on by Dr. Won, and Mr. Murray's reliance on that information also suffers from the same issues that I have previously discussed in my response to Dr. Won (*i.e.*, the use of historical data to estimate a forward-looking market return and market risk premium; incorrectly mismatching a historically-derived market risk premium with a current risk-free rate; incorrectly calculating the market risk premia based on the total return on long-term government bonds instead of the income-only return; and relying on historical geometric averages of the market return and market risk premia to estimate the cost of equity).

Q: Does Mr. Murray's projected market risk premium from *Kroll* reflect the inverse relationship between interest rates and the market risk premium?

A: No. The projected market risk premia that Mr. Murray relies on from *Kroll* in his third CAPM scenario also fails to reflect the inverse relationship between interest rates and the market risk premium. For example, as noted previously in my response to Dr. Won, the historical arithmetic mean market risk premium from

[140] Murray Direct, at 32.

1926-2024 is 7.31 percent,[141] and the historical income-only return on government bonds used to calculate the historical market risk premium over that same period is 4.86 percent. Mr. Murray's assumed risk-free rate in this scenario is 4.92 percent.[142] The fact that the risk-free rate relied on by Mr. Murray in this CAPM scenario is *slightly greater than* the historical long-term average interest rate for those same bonds, the inverse relationship between interest rates and the market risk premium indicates that the projected market risk premium should be only *slightly less than* the long-term historical average of 7.31 percent. However, the projected market risk premium assumed by Mr. Murray of 5.00 percent in this CAPM scenario is materially *less than* (*i.e.,* 231 basis points) the historical average market risk premium of 7.31 percent, thereby understating the current market risk premium. Therefore, the result of Mr. Murray's CAPM analyses that rely on a projected market risk premium, which are in the range from 8.37 percent to 8.58 percent,[143] understate the cost of equity. Further, these results are *lower than any ROE authorized for a natural gas utility in at least 40 years*.

Q: Is there further evidence that Mr. Murray's assumed 6.00 percent market risk premium is unreasonable?

A: Yes. In his first two CAPM analyses where he relies on a market risk premium of 6.00 percent as an upper bound, Mr. Murray relies on risk-free rates of 4.74 percent

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[141] *Kroll*, Cost of Capital Navigator.

[142] Schedule DM-D-6, at 3.

[143] *Id*.

and 4.66 percent, respectively,[144] which implies an overall market return of 10.74 percent and 10.66 percent, respectively. However, in his workpapers, Mr. Murray notes that the long-term arithmetic historical market return is 12.16 percent, or significantly greater than the implied market returns on which the upper bound of his risk premium is based. Consequently, the implied market returns of the market risk premia relied on by Mr. Murray are well below, and cannot be reconciled with, the long-term historical returns for the market.

Q: Do you agree with Mr. Murray that any estimate of the market risk premium that falls outside of the range of 5.00 percent to 6.56 percent would not be consistent with the investment community's consensus?

A: No, I do not. Mr. Murray's has limited his range to market risk premia based only on two methodologies, the historical risk premia and *Kroll's* recommended market risk premium. However, there are many more methodologies that can be used to estimate the market risk premium. For example, the Federal Reserve Bank of New York published an analysis in 2015 that reviewed 20 methodologies over the period 1960 through 2013 for estimating the market risk premium.[145] Given that the study considered 20 methodologies to estimate the market risk premium, it is substantially more comprehensive than the review of Mr. Murray who only

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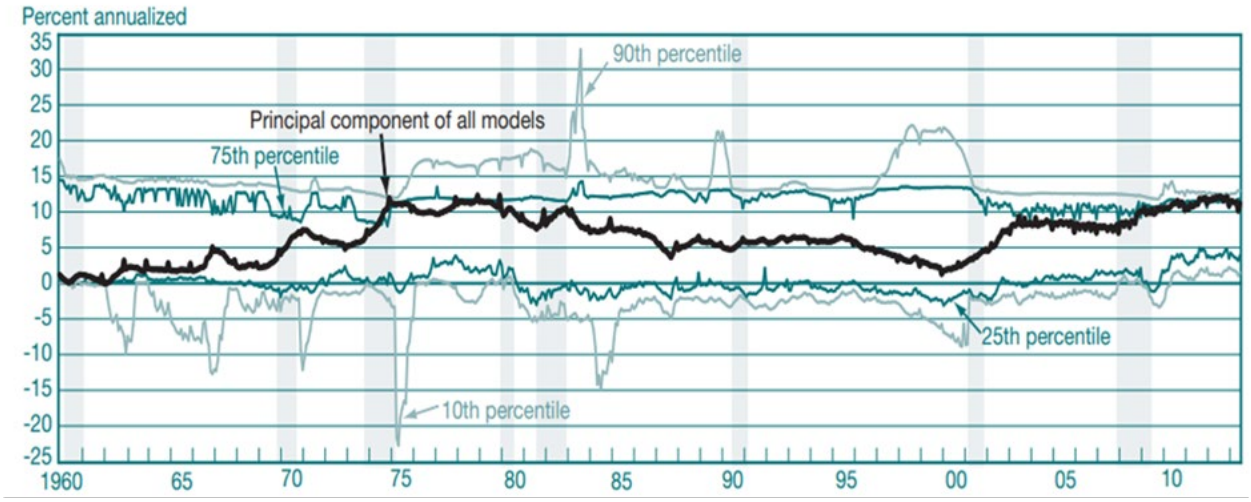
[144] *Id*., at 1-2.

[145] Duarte and Rosa, "The Equity Risk Premium: A Review of Models", Federal Reserve Bank of New York, December 2015.

considered the market risk premium estimates of two different sources. Specifically, the key conclusions from this study are:

- The 20 methodologies reviewed reflected a range for the market risk premium of between -1.0 percent to 14.5 percent.
- As shown in Figure 16, the principal component analysis of the 20 models (i.e., the bold black line) produced a range for the market risk premium of approximately 0 percent to over 10 percent from 1960 through 2013.
- The one-year-ahead market risk premium was consistently greater than 10 percent following the financial crisis of 2008/09.

FIGURE 16: THE FEDERAL RESERVE BANK OF NEW YORK, ONE-YEAR-AHEAD MARKET RISK PREMIUM[146]



Therefore, the Federal Reserve Bank of New York based on a more comprehensive review of possible methodologies found that the range of market risk premia is much wider than the range of 5.00 percent to 6.56 percent assumed by Mr. Murray.

[146] *Id.*, at 50.

Q: Is there economic support that the current market risk premium should be towards the high-end of the range estimated by the Federal Reserve Bank of New York?

A: Yes. The Federal Reserve Bank of New York found that the market risk premium was greater during periods of high inflation and inflation, while having declined, is still currently above the Federal Reserve's target of 2 percent. Specifically, in its study, the Federal Reserve Bank of New York noted the following:

> Chart 2 shows the first principal component of all twenty models in black (the black line is the same principal component shown in black in each of the panels of Chart 1). ***As expected, the principal component tends to peak during financial turmoil, recessions, and periods of low real GDP growth or high inflation***. It tends to bottom out after periods of sustained bullish stock markets and high real GDP growth. Evaluated by the first principal component, the one-year ahead ERP [equity risk premium] reaches a local peak in June 2012 at 12.2 percent. The surrounding months have ERP estimates of similar magnitude, with the most recent estimate in June 2013 at 11.2 percent. This behavior is not so clearly seen by simply looking at the collection of individual models in Chart 1, a finding that highlights the usefulness of principal component analysis. Similarly high levels were observed in the mid- and late 1970s, during a period of stagflation, while the recent financial crisis had slightly lower ERP estimates, closer to 10 percent.[147]

Thus, the Federal Reserve Bank of New York noted that the market risk premium is higher during periods of increased inflation. While inflation has declined as a result of the Federal Reserve's monetary policy over the past two years, as noted

[147] *Id.*; emphasis and clarification added.

above inflation fears have once again increased as result of the economic policy of the Trump administration. For example, increased tariffs on imported goods, restrictions on immigration and cuts in taxes all are likely to put upward pressure on inflation. In fact, Chairman Powell recently noted that "tariff inflation" would likely delay further progress on reducing inflation to the Federal Reserve's long-term goal of 2 percent.[148] Given that the principal component analysis produced a range over the period of 1960 to 2013 of 0 percent to 10 percent and that current economic conditions support a market risk premium towards the high-end of this range, it is clear that Mr. Murray's market risk premia of 5 percent and 6 percent are understated.

VI.E. "Rule of Thumb" BYRP Analysis

Q: Please summarize Mr. Murray's BYRP analysis.

A: Mr. Murray conducts a BYRP analysis that he characterizes as a simple "rule of thumb" methodology and uses this as a check on the reasonableness of his DCF and CAPM results. Mr. Murray's "rule of thumb" BYRP analysis estimates the cost of equity by adding an estimated equity risk premium to an average utility bond yield in order to estimate the cost of equity. He relies on the yield to maturity on Ameren Missouri's recent long-term bonds of 5.70 percent, and proposes to add a "rule of thumb" risk premium of 3.00 percent to 4.00 percent, although he contends that the risk premium should be no higher than 3.00 percent since utility stocks are

[148] Yahoo! Finance, 'The arrival of the tariff inflation': Powell doesn't shy from linking trade to prices as Fed shifts forecasts, March 19, 2025.

viewed by the investment community as bond substitutes. From this analysis, Mr. Murray concludes that his "rule of thumb" BYRP analysis supports a cost of equity 8.70 percent.[149]

Q: Is this "rule of thumb" approach employed by Mr. Murray reasonable?

A: No. Mr. Murray's specification of a simplistic BYRP approach fails to account for the effect of current market conditions on the market risk premium. As previously discussed, both academic literature and market evidence indicate that the equity risk premium is inversely related to the level of interest rates (*i.e.*, as interest rates increase, the equity risk premium decreases, and vice versa).[150] In fact, Dr. Won also demonstrates this inverse relationship regarding his BYRP analysis in Figure 6 of his testimony. Therefore, as shown in Schedule AEB-R1, Attachment 3, given that current yields on long-term government bonds are below the historical average yields on those same bonds (i.e., 4.86 percent), the market risk premium should be *greater than* the long-term historical average market risk premium – which is not the case for Mr. Murray's simplistic BYRP analysis.

Furthermore, Mr. Murray's "rule of thumb" does not provide any meaningful insight into the cost of equity for the Company in this proceeding given that multiple ranges for this "rule of thumb" have been offered in testimony in prior cases before the

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[149] Murray Direct, at 35.

[150] *See e.g.*, S. Keith Berry, "Interest Rate Risk and Utility Risk Premia during 1982-93," Managerial and Decision Economics, Vol. 19, No. 2, March, 1998. See also, Robert S. Harris, "Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return," Financial Management, Spring 1986, at 66.

Commission. For example, in the Company's last rate proceeding, Dr. Won testified that the "rule of thumb" risk premium ranged from 3.00 percent to 5.00 percent.[151] In addition, Dr. Won has previously testified that the range of the "rule of thumb" market risk premium was 4.00 percent to 6.00 percent.[152] Given Mr. Murray's position that the yield to maturity on Ameren Missouri's recent long-term bonds is about 5.70 percent, if Dr. Won's prior "rule of thumb" range of 4.00 percent to 6.00 percent were utilized, it would suggest that Mr. Murray's estimated cost of equity should be in the range of 9.70 percent to 11.70 percent, or an average of 10.70 percent – which is clearly not supportive of Mr. Murray's ROE recommendation and is in fact higher than the Company's requested ROE of 10.25 percent in this proceeding.

Lastly, Mr. Murray's simplistic "rule of thumb" produces material differences in the results that are inconsistent with his ROE recommendations over time. Specifically, in Ameren Missouri's last rate proceeding, Mr. Murray testified that his "rule of thumb" analysis suggested a cost of equity of 5.75 percent, and he recommended an ROE of 9.25 percent.[153] However, in this proceeding, Mr. Murray claims that this "rule of thumb" analysis indicates a cost of equity of 8.70

[151] Missouri Public Service Commission, Case No. GR-2021-0241, Staff Cost of Service Report, September 2021, at 24.

[152] Missouri Public Service Commission, Case No. WR-2020-0344, Staff Cost of Service Report, November 2020, at 27.

[153] Missouri Public Service Commission, Case No. GR-2021-0241, Direct Testimony of David Murray, September 3, 2021, at 30-31.

percent, while he is recommending an ROE of 9.50 percent.[154] In other words, while Mr. Murray suggests that this methodology offers a reasonableness check on his results, it yields a cost of equity result 295 basis points higher in the current proceeding than he indicated in Ameren Missouri's last rate proceeding, yet his ROE recommendation is just 25 basis points higher.

In summary Mr. Murray's "rule of thumb" analysis is not credible, and the results of this methodology do not offer any reasonable "check" on the results of his own models, nor does this result support his ROE recommendation.

VII. BUSINESS AND REGULATORY RISKS

Q: What have Dr. Won and Mr. Murray stated regarding the Company's business and regulatory risk?

A: The following summarizes the positions of these witnesses regarding the Company's business and regulatory risk:

- Dr. Won states that Ameren Missouri's credit ratings are comparable to those of the average natural gas utilities in the U.S., and thus Ameren Missouri is perceived to have similar credit risks as the average natural gas utilities in the U.S.[155] Dr. Won contends that this comparison of credit ratings suggests that Ameren Missouri's authorized ROE should fall within a reasonable range of the average authorized ROE of natural gas utilities in the U.S.[156]

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[154] Murray Direct, at 35-36.

[155] Won Direct, at 29.

[156] *Id*.

- Mr. Murray contends that the Company's business risk profile is reduced due to its use of a weather normalization adjustment rider ("WNAR") that was approved in Ameren Missouri's last rate proceeding.[157]

Q: Do you agree with these witnesses' assessments of the relative risk of the Company?

A: No. The estimation of the cost of equity conducted by Dr. Won and Mr. Murray in this proceeding is based on the market data for a proxy group of publicly traded risk -comparable companies. In this case, both Dr. Won and Mr. Murray estimate the cost of equity for those proxy companies to create a range of estimated market required returns. For the purposes of establishing the appropriate ROE for Ameren Missouri, it is therefore necessary to evaluate the Company's risk as compared to that of the proxy group of companies in order to determine where within the range of market data developed that Ameren Missouri's ROE should be estimated. A comparison of the Company's risk with or without any of the recovery mechanisms that it has available is by itself, an incomplete analysis and does not provide the Commission with any meaningful information about how the Company's ROE should compare to the range of market data that has been developed for the proxy group companies. Neither Dr. Won nor Mr. Murray have considered the relative risk of Ameren Missouri relative to the companies in the proxy group. Simply because the Company has a WNAR as noted by Mr. Murray does not provide any insight into the *relative* risk of the Company as compared to the proxy group. While

[157] Murray Direct, at 4.

regulatory mechanisms such as a WNAR that reduce fluctuations in revenue may help to mitigate an individual company's risk, that information alone is insufficient for the purpose that we consider in setting the ROE. Rather the relevant comparison is the Company's risk *relative* to the proxy group in setting the ROE.

In addition, while Dr. Won notes that the credit rating of Ameren Missouri is comparable to those of average natural gas utilities in the U.S., it is important to acknowledge that credit ratings are assessments of the likelihood that a company could default on its debt, whereas the topic of the current proceeding is to determine the riskiness and cost of the Company's equity, not debt. Also, while credit rating agencies consider the business risks of an individual company, they do not conduct a comparative analysis of business risks relative to the proxy group when establishing its debt credit rating. The development of the investor-required ROE is based on a proxy group of risk-comparable companies. In developing the proxy group, it is essential to balance the relative risk of the companies included in the proxy group with the overall size of the group. Therefore, it is always the case that the proxy companies do not have exactly the same risk profile as the subject company. As such, it is reasonable to review the relative risks of the proxy group companies and the subject company to determine how the subject company's risk profile compares with the group to determine the appropriate placement of the ROE within the range of results established using the proxy group companies, which neither Dr. Won nor Mr. Murray have done.

Q: Does this conclude your rebuttal testimony?

A: Yes.

SUMMARY OF RESULTS
OF THE COST OF EQUITY ANALYSES

Constant Growth DCF

	Minimum Growth Rate	Average Growth Rate	Maximum Growth Rate
Mean:			
30-Day Avg. Stock Price	9.39%	10.45%	11.31%
90-Day Avg. Stock Price	9.47%	10.53%	11.39%
180-Day Avg. Stock Price	9.63%	10.70%	11.56%
Average	9.50%	10.56%	11.42%
Median:			
30-Day Avg. Stock Price	9.47%	10.83%	11.40%
90-Day Avg. Stock Price	9.62%	10.96%	11.53%
180-Day Avg. Stock Price	9.76%	11.16%	11.72%
Average	9.62%	10.98%	11.55%

CAPM / ECAPM / BYRP

	30-Year Treasury Bond Yield		
	Current 30-Day Avg	Near-Term Projected	Longer-Term Projected
CAPM:			
Current *Value Line* Beta	11.47%	11.46%	11.43%
Current Bloomberg Beta	10.41%	10.39%	10.31%
Long-term Avg. *Value Line* Beta	10.43%	10.41%	10.33%
ECAPM:			
Current *Value Line* Beta	11.64%	11.64%	11.61%
Current Bloomberg Beta	10.85%	10.83%	10.77%
Long-term Avg. *Value Line* Beta	10.86%	10.84%	10.78%
Bond Yield Risk Premium:	10.58%	10.53%	10.34%

30-DAY CONSTANT GROWTH DCF

Company		[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Projected EPS Growth Rate	[6] Zacks Projected EPS Growth Rate	[7] S&P Capital IQ Projected EPS Growth Rate	[8] Average Projected EPS Growth Rate	[9] Cost of Equity: Minimum Growth Rate	[10] Cost of Equity: Mean Growth Rate	[11] Cost of Equity: Maximum Growth Rate
Atmos Energy Corporation	ATO	$3.48	$144.55	2.41%	2.49%	6.00%	7.10%	7.44%	6.85%	8.48%	9.34%	9.93%
NiSource Inc.	NI	$1.12	$38.46	2.91%	3.04%	9.50%	8.20%	7.93%	8.54%	10.96%	11.58%	12.55%
Northwest Natural Gas Company	NWN	$1.96	$40.45	4.85%	5.00%	6.50%	n/a	6.50%	6.50%	11.50%	11.50%	11.50%
ONE Gas, Inc.	OGS	$2.68	$71.16	3.77%	3.84%	4.00%	4.70%	2.63%	3.78%	6.45%	7.61%	8.55%
Southwest Gas Corporation	SWX	$2.48	$74.92	3.31%	3.46%	10.00%	6.60%	10.55%	9.05%	10.02%	12.51%	14.04%
Spire, Inc.	SR	$3.14	$72.47	4.33%	4.46%	4.50%	5.80%	6.82%	5.71%	8.93%	10.16%	11.30%
Mean										9.39%	10.45%	11.31%
Median										9.47%	10.83%	11.40%

Notes:
[1] Bloomberg Professional as of February 28 2025
[2] Bloomberg Professional 30-day average as of February 28 2025
[3] Equals [1]/[2]
[4] Equals [3] x (1 + 0.5 x [8])
[5] Value Line
[6] Zacks
[7] S&P Capital IQ Pro
[8] Equals average of [5], [6], [7]
[9] Equals [3] x (1 + 0.5 x (min([5], [6], [7])) + (min([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.5 x (max([5], [6], [7])) + (max([5], [6], [7])

90-DAY CONSTANT GROWTH DCF

Company		[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Projected EPS Growth Rate	[6] Zacks Projected EPS Growth Rate	[7] S&P Capital IQ Projected EPS Growth Rate	[8] Average Projected EPS Growth Rate	[9] Cost of Equity: Minimum Growth Rate	[10] Cost of Equity: Mean Growth Rate	[11] Cost of Equity: Maximum Growth Rate
Atmos Energy Corporation	ATO	$3.48	$142.20	2.45%	2.53%	6.00%	7.10%	7.44%	6.85%	8.52%	9.38%	9.98%
NiSource Inc.	NI	$1.12	$36.80	3.04%	3.17%	9.50%	8.20%	7.93%	8.54%	11.10%	11.72%	12.69%
Northwest Natural Gas Company	NWN	$1.96	$40.27	4.87%	5.03%	6.50%	n/a	6.50%	6.50%	11.53%	11.53%	11.53%
ONE Gas, Inc.	OGS	$2.68	$71.40	3.75%	3.82%	4.00%	4.70%	2.63%	3.78%	6.43%	7.60%	8.54%
Southwest Gas Corporation	SWX	$2.48	$73.60	3.37%	3.52%	10.00%	6.60%	10.55%	9.05%	10.08%	12.57%	14.10%
Spire, Inc.	SR	$3.14	$68.80	4.56%	4.69%	4.50%	5.80%	6.82%	5.71%	9.17%	10.40%	11.53%
Mean										9.47%	10.53%	11.39%
Median										9.62%	10.96%	11.53%

Notes:
[1] Bloomberg Professional as of February 28 2025
[2] Bloomberg Professional 90-day average as of February 28 2025
[3] Equals [1]/[2]
[4] Equals [3] x (1 + 0.5 x [8])
[5] Value Line
[6] Zacks
[7] S&P Capital IQ Pro
[8] Equals average of [5], [6], [7]
[9] Equals [3] x (1 + 0.5 x (min([5], [6], [7])) + (min([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.5 x (max([5], [6], [7])) + (max([5], [6], [7])

180-DAY CONSTANT GROWTH DCF

Company		[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Projected EPS Growth Rate	[6] Zacks Projected EPS Growth Rate	[7] S&P Capital IQ Projected EPS Growth Rate	[8] Average Projected EPS Growth Rate	[9] Cost of Equity: Minimum Growth Rate	[10] Cost of Equity: Mean Growth Rate	[11] Cost of Equity: Maximum Growth Rate
Atmos Energy Corporation	ATO	$3.48	$134.34	2.59%	2.68%	6.00%	7.10%	7.44%	6.85%	8.67%	9.52%	10.12%
NiSource Inc.	NI	$1.12	$34.00	3.29%	3.43%	9.50%	8.20%	7.93%	8.54%	11.36%	11.98%	12.95%
Northwest Natural Gas Company	NWN	$1.96	$38.91	5.04%	5.20%	6.50%	n/a	6.50%	6.50%	11.70%	11.70%	11.70%
ONE Gas, Inc.	OGS	$2.68	$69.06	3.88%	3.95%	4.00%	4.70%	2.63%	3.78%	6.56%	7.73%	8.67%
Southwest Gas Corporation	SWX	$2.48	$72.39	3.43%	3.58%	10.00%	6.60%	10.55%	9.05%	10.14%	12.63%	14.16%
Spire, Inc.	SR	$3.14	$65.84	4.77%	4.91%	4.50%	5.80%	6.82%	5.71%	9.38%	10.61%	11.75%
Mean										9.63%	10.70%	11.56%
Median										9.76%	11.16%	11.72%

Notes:
[1] Bloomberg Professional as of February 28 2025
[2] Bloomberg Professional 180-day average as of February 28 2025
[3] Equals [1]/[2]
[4] Equals [3] x (1 + 0.5 x [8])
[5] Value Line
[6] Zacks
[7] S&P Capital IQ Pro
[8] Equals average of [5], [6], [7]
[9] Equals [3] x (1 + 0.5 x (min([5], [6], [7])) + (min([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.5 x (max([5], [6], [7])) + (max([5], [6], [7])

CAPITAL ASSET PRICING MODEL
CURRENT RISK FREE RATE AND VALUE LINE BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM COE (K)	ECAPM COE (K)
Atmos Energy Corporation	ATO	4.73%	0.90	12.15%	7.42%	11.41%	11.60%
NiSource Inc.	NI	4.73%	0.95	12.15%	7.42%	11.78%	11.87%
Northwest Natural Gas Company	NWN	4.73%	0.90	12.15%	7.42%	11.41%	11.60%
ONE Gas, Inc.	OGS	4.73%	0.85	12.15%	7.42%	11.04%	11.32%
Southwest Gas Corporation	SWX	4.73%	0.95	12.15%	7.42%	11.78%	11.87%
Spire, Inc.	SR	4.73%	0.90	12.15%	7.42%	11.41%	11.60%
Mean						11.47%	11.64%
Median						11.41%	11.60%

Notes:
[1] Bloomberg Professional 30-day average as of February 28 2025
[2] Value Line
[3] Market Return
[4] Equals [3]-[1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
NEAR TERM PROJECTED RISK-FREE RATE AND VALUE LINE BETA

$$K = Rf + \beta (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q2 2025 - Q2 2026)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM COE (K)	ECAPM COE (K)
Atmos Energy Corporation	ATO	4.64%	0.90	12.15%	7.51%	11.40%	11.59%
NiSource Inc.	NI	4.64%	0.95	12.15%	7.51%	11.78%	11.87%
Northwest Natural Gas Company	NWN	4.64%	0.90	12.15%	7.51%	11.40%	11.59%
ONE Gas, Inc.	OGS	4.64%	0.85	12.15%	7.51%	11.03%	11.31%
Southwest Gas Corporation	SWX	4.64%	0.95	12.15%	7.51%	11.78%	11.87%
Spire, Inc.	SR	4.64%	0.90	12.15%	7.51%	11.40%	11.59%
Mean						11.46%	11.64%
Median						11.40%	11.59%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 44, No. 3, February 28, 2025, at 2
[2] Value Line
[3] Market Return
[4] Equals [3]-[1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
LONG-TERM PROJECTED RISK-FREE RATE AND VALUE LINE BETA

$$K = Rf + \beta (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2026 - 2030)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM COE (K)	ECAPM COE (K)
Atmos Energy Corporation	ATO	4.30%	0.90	12.15%	7.85%	11.37%	11.56%
NiSource Inc.	NI	4.30%	0.95	12.15%	7.85%	11.76%	11.86%
Northwest Natural Gas Company	NWN	4.30%	0.90	12.15%	7.85%	11.37%	11.56%
ONE Gas, Inc.	OGS	4.30%	0.85	12.15%	7.85%	10.98%	11.27%
Southwest Gas Corporation	SWX	4.30%	0.95	12.15%	7.85%	11.76%	11.86%
Spire, Inc.	SR	4.30%	0.90	12.15%	7.85%	11.37%	11.56%
Mean						11.43%	11.61%
Median						11.37%	11.56%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 43, No. 12, November 27, 2024, at 14
[2] Value Line
[3] Market Return
[4] Equals [3]-[1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
CURRENT RISK FREE RATE AND BLOOMBERG BETA

$$K = Rf + \beta (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM COE (K)	ECAPM COE (K)
Atmos Energy Corporation	ATO	4.73%	0.75	12.15%	7.42%	10.27%	10.74%
NiSource Inc.	NI	4.73%	0.79	12.15%	7.42%	10.57%	10.97%
Northwest Natural Gas Company	NWN	4.73%	0.70	12.15%	7.42%	9.93%	10.49%
ONE Gas, Inc.	OGS	4.73%	0.77	12.15%	7.42%	10.41%	10.85%
Southwest Gas Corporation	SWX	4.73%	0.83	12.15%	7.42%	10.88%	11.20%
Spire, Inc.	SR	4.73%	0.76	12.15%	7.42%	10.39%	10.83%
Mean						10.41%	10.85%
Median						10.40%	10.84%

Notes:
[1] Bloomberg Professional 30-day average as of February 28 2025
[2] Bloomberg Professional
[3] Market Return
[4] Equals [3]-[1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
NEAR TERM PROJECTED RISK-FREE RATE AND BLOOMBERG BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q2 2025 - Q2 2026)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM COE (K)	ECAPM COE (K)
Atmos Energy Corporation	ATO	4.64%	0.75	12.15%	7.51%	10.25%	10.73%
NiSource Inc.	NI	4.64%	0.79	12.15%	7.51%	10.55%	10.95%
Northwest Natural Gas Company	NWN	4.64%	0.70	12.15%	7.51%	9.91%	10.47%
ONE Gas, Inc.	OGS	4.64%	0.77	12.15%	7.51%	10.39%	10.83%
Southwest Gas Corporation	SWX	4.64%	0.83	12.15%	7.51%	10.87%	11.19%
Spire, Inc.	SR	4.64%	0.76	12.15%	7.51%	10.37%	10.82%
Mean						10.39%	10.83%
Median						10.38%	10.82%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 44, No. 3, February 28, 2025, at 2
[2] Bloomberg Professional
[3] Market Return
[4] Equals [3]-[1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
LONG-TERM PROJECTED RISK-FREE RATE AND BLOOMBERG BETA

$$K = Rf + \beta (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2026 - 2030)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM COE (K)	ECAPM COE (K)
Atmos Energy Corporation	ATO	4.30%	0.75	12.15%	7.85%	10.17%	10.66%
NiSource Inc.	NI	4.30%	0.79	12.15%	7.85%	10.48%	10.90%
Northwest Natural Gas Company	NWN	4.30%	0.70	12.15%	7.85%	9.80%	10.39%
ONE Gas, Inc.	OGS	4.30%	0.77	12.15%	7.85%	10.31%	10.77%
Southwest Gas Corporation	SWX	4.30%	0.83	12.15%	7.85%	10.81%	11.15%
Spire, Inc.	SR	4.30%	0.76	12.15%	7.85%	10.29%	10.76%
Mean						10.31%	10.77%
Median						10.30%	10.76%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 43, No. 12, November 27, 2024, at 14
[2] Bloomberg Professional
[3] Market Return
[4] Equals [3]-[1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
CURRENT RISK FREE RATE AND LONG-TERM VALUE LINE BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM COE (K)	ECAPM COE (K)
Atmos Energy Corporation	ATO	4.73%	0.76	12.15%	7.42%	10.39%	10.83%
NiSource Inc.	NI	4.73%	0.78	12.15%	7.42%	10.48%	10.90%
Northwest Natural Gas Company	NWN	4.73%	0.73	12.15%	7.42%	10.11%	10.62%
ONE Gas, Inc.	OGS	4.73%	0.75	12.15%	7.42%	10.30%	10.76%
Southwest Gas Corporation	SWX	4.73%	0.84	12.15%	7.42%	10.95%	11.25%
Spire, Inc.	SR	4.73%	0.75	12.15%	7.42%	10.33%	10.78%
Mean						10.43%	10.86%
Median						10.36%	10.81%

Notes:
[1] Bloomberg Professional 30-day average as of February 28 2025
[2] Schedule AEB-R1, Attachment 4
[3] Market Return
[4] Equals [3]-[1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
NEAR-TERM PROJECTED RISK FREE RATE AND LONG-TERM VALUE LINE BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q2 2025 - Q2 2026)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM COE (K)	ECAPM COE (K)
Atmos Energy Corporation	ATO	4.64%	0.76	12.15%	7.51%	10.37%	10.82%
NiSource Inc.	NI	4.64%	0.78	12.15%	7.51%	10.46%	10.89%
Northwest Natural Gas Company	NWN	4.64%	0.73	12.15%	7.51%	10.09%	10.60%
ONE Gas, Inc.	OGS	4.64%	0.75	12.15%	7.51%	10.28%	10.74%
Southwest Gas Corporation	SWX	4.64%	0.84	12.15%	7.51%	10.93%	11.24%
Spire, Inc.	SR	4.64%	0.75	12.15%	7.51%	10.31%	10.77%
Mean						10.41%	10.84%
Median						10.34%	10.79%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 44, No. 3, February 28, 2025, at 2
[2] Schedule AEB-R1, Attachment 4
[3] Market Return
[4] Equals [3]-[1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL
LONG-TERM PROJECTED RISK FREE RATE AND LONG-TERM VALUE LINE BETA

$$K = Rf + \beta (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2026 - 2030)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM COE (K)	ECAPM COE (K)
Atmos Energy Corporation	ATO	4.30%	0.76	12.15%	7.85%	10.29%	10.75%
NiSource Inc.	NI	4.30%	0.78	12.15%	7.85%	10.39%	10.83%
Northwest Natural Gas Company	NWN	4.30%	0.73	12.15%	7.85%	9.99%	10.53%
ONE Gas, Inc.	OGS	4.30%	0.75	12.15%	7.85%	10.19%	10.68%
Southwest Gas Corporation	SWX	4.30%	0.84	12.15%	7.85%	10.88%	11.20%
Spire, Inc.	SR	4.30%	0.75	12.15%	7.85%	10.22%	10.71%
Mean						10.33%	10.78%
Median						10.26%	10.73%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 43, No. 12, November 27, 2024, at 14
[2] Schedule AEB-R1, Attachment 4
[3] Market Return
[4] Equals [3]-[1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

HISTORICAL VALUE LINE BETA

Company	Ticker	[1] 12/31/2013	[2] 12/31/2014	[3] 12/31/2015	[4] 12/31/2016	[5] 12/31/2017	[6] 12/31/2018	[7] 12/31/2019	[8] 12/31/2020	[9] 12/31/2021	[10] 12/31/2022	[11] 12/31/2023	[12] 12/31/2024	[13] Average
Atmos Energy Corporation	ATO	0.80	0.80	0.80	0.70	0.70	0.60	0.60	0.80	0.80	0.80	0.85	0.90	0.76
NiSource Inc.	NI	0.85	0.85	NMF	NMF	0.60	0.50	0.55	0.85	0.85	0.85	0.90	0.95	0.78
Northwest Natural Gas Company	NWN	0.65	0.7	0.65	0.65	0.7	0.6	0.6	0.8	0.85	0.8	0.8	0.9	0.73
ONE Gas, Inc.	OGS	NA	NA	NA	0.70	0.70	0.65	0.65	0.80	0.80	0.80	0.80	0.85	0.75
Southwest Gas Corporation	SWX	0.8	0.85	0.8	0.75	0.80	0.70	0.70	0.95	0.95	0.90	0.90	0.95	0.84
Spire, Inc.	SR	0.65	0.7	0.7	0.70	0.70	0.65	0.65	0.85	0.85	0.85	0.85	0.90	0.75
Mean		0.75	0.78	0.74	0.70	0.70	0.62	0.63	0.84	0.85	0.83	0.85	0.91	0.77

Notes:
[1] Value Line, dated December 26, 2013.
[2] Value Line, dated December 31, 2014.
[3] Value Line, dated December 30, 2015.
[4] Value Line, dated December 29, 2016.
[5] Value Line, dated December 28, 2017.
[6] Value Line, dated December 27, 2018.
[7] Value Line, dated December 26, 2019.
[8] Value Line, dated December 30, 2020.
[9] Value Line, dated December 29, 2021.
[11] Value Line, dated December 29, 2023.
[12] Value Line, Dated December 27, 2024.
[13] Average ([1] - [12])

MARKET RISK PREMIUM DERIVED FROM S&P 500 INDEX

[1] Estimate of the S&P 500 Dividend Yield	1.31%
[2] Estimate of the S&P 500 Growth Rate	10.78%
[3] S&P 500 Estimated Required Market Return	12.15%

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Bloomberg Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
LyondellBasell Industries NV	LYB	323.45	76.83	24,850.37	0.07%	6.98%	0.00%	11.14%	0.01%
American Express Co	AXP	702.53	300.96	211,434.06	0.56%	0.93%	0.01%	15.09%	0.08%
Verizon Communications Inc	VZ	4,209.70	43.10	181,438.24	0.48%	6.29%	0.03%	1.01%	0.00%
Texas Pacific Land Corp	TPL	22.98	1,426.35	32,784.37		0.45%			
Broadcom Inc	AVGO	4,687.36	199.43	934,799.44		1.18%		22.21%	
Boeing Co/The	BA	750.07	174.63	130,985.49				30.85%	
Solventum Corp	SOLV	172.75	79.75	13,777.14	0.04%			0.64%	0.00%
Caterpillar Inc	CAT	477.93	343.95	164,384.72	0.44%	1.64%	0.01%	7.23%	0.03%
JPMorgan Chase & Co	JPM	2,796.11	264.65	739,989.48		1.89%			
Chevron Corp	CVX	1,760.60	158.62	279,266.14		4.31%			
Coca-Cola Co/The	KO	4,301.00	71.21	306,274.24	0.82%	2.86%	0.02%	5.69%	0.05%
AbbVie Inc	ABBV	1,765.35	209.03	369,012.13	0.98%	3.14%	0.03%	13.85%	0.14%
Walt Disney Co/The	DIS	1,807.79	113.80	205,726.37	0.55%	0.88%	0.00%	16.18%	0.09%
Corpay Inc	CPAY	70.25	367.05	25,785.23	0.07%			12.58%	0.01%
Extra Space Storage Inc	EXR	211.98	152.56	32,340.21	0.09%	4.25%	0.00%	1.62%	0.00%
Exxon Mobil Corp	XOM	4,339.14	111.33	483,076.82		3.56%			
Phillips 66	PSX	407.70	129.69	52,874.40		3.55%			
General Electric Co	GE	1,073.29	206.98	222,149.67	0.59%	0.70%	0.00%	18.22%	0.11%
HP Inc	HPQ	942.98	30.87	29,109.94	0.08%	3.75%	0.00%	1.55%	0.00%
Home Depot Inc/The	HD	993.36	396.60	393,967.61	1.05%	2.32%	0.02%	5.11%	0.05%
Monolithic Power Systems Inc	MPWR	48.78	611.01	29,805.07		1.02%			
International Business Machines Corp	IBM	927.26	252.44	234,078.61	0.62%	2.65%	0.02%	3.46%	0.02%
Johnson & Johnson	JNJ	2,407.62	165.02	397,304.91		3.01%			
Lululemon Athletica Inc	LULU	116.67	365.61	42,654.83	0.11%			9.55%	0.01%
McDonald's Corp	MCD	714.46	306.56	219,025.21	0.58%	2.31%	0.01%	9.12%	0.05%
Merck & Co Inc	MRK	2,526.04	92.25	233,026.84	0.62%	3.51%	0.02%	14.65%	0.09%
3M Co	MMM	542.90	155.12	84,214.65	0.22%	1.88%	0.00%	6.59%	0.01%
American Water Works Co Inc	AWK	194.95	135.97	26,506.99	0.07%	2.25%	0.00%	7.83%	0.01%
Bank of America Corp	BAC	7,604.68	46.10	350,575.62		2.26%			
Pfizer Inc	PFE	5,667.34	26.43	149,787.81		6.51%		-2.32%	
Procter & Gamble Co/The	PG	2,344.85	173.84	407,629.04	1.08%	2.32%	0.03%	6.24%	0.07%
AT&T Inc	T	7,178.18	27.41	196,754.00	0.52%	4.05%	0.02%	5.16%	0.03%
Travelers Cos Inc/The	TRV	226.73	258.49	58,606.55	0.16%	1.62%	0.00%	1.10%	0.00%
RTX Corp	RTX	1,332.12	132.99	177,159.01	0.47%	1.89%	0.01%	8.65%	0.04%
Analog Devices Inc	ADI	495.98	229.06	113,610.06	0.30%	1.73%	0.01%	11.79%	0.04%
Walmart Inc	WMT	8,033.39	98.61	792,172.22	2.11%	0.95%	0.02%	8.22%	0.17%
Cisco Systems Inc	CSCO	3,978.29	64.11	255,048.33	0.68%	2.56%	0.02%	4.69%	0.03%
Intel Corp	INTC	4,330.00	23.73	102,750.90				28.44%	
General Motors Co	GM	995.00	49.13	48,884.44	0.13%	0.98%	0.00%	8.53%	0.01%
Microsoft Corp	MSFT	7,433.98	396.99	2,951,216.61	7.85%	0.84%	0.07%	13.09%	1.03%
Dollar General Corp	DG	219.93	74.18	16,314.09		3.18%		-11.33%	
Cigna Group/The	CI	273.68	308.85	84,525.59	0.22%	1.96%	0.00%	5.07%	0.01%
Kinder Morgan Inc	KMI	2,221.96	27.10	60,215.20		4.24%			
Citigroup Inc	C	1,884.48	79.95	150,664.14		2.80%			
American International Group Inc	AIG	593.33	82.94	49,211.04	0.13%	1.93%	0.00%	12.18%	0.02%
Altria Group Inc	MO	1,690.66	55.85	94,423.45	0.25%	7.31%	0.02%	4.48%	0.01%
HCA Healthcare Inc	HCA	248.34	306.30	76,067.12	0.20%	0.94%	0.00%	9.26%	0.02%
International Paper Co	IP	526.13	56.35	29,647.18		3.28%			
Hewlett Packard Enterprise Co	HPE	1,313.41	19.81	26,018.63	0.07%	2.62%	0.00%	4.65%	0.00%
Abbott Laboratories	ABT	1,734.32	138.01	239,353.97	0.64%	1.71%	0.01%	10.26%	0.07%
Aflac Inc	AFL	546.59	109.47	59,835.02	0.16%	2.12%	0.00%	4.59%	0.01%
Air Products and Chemicals Inc	APD	222.48	316.15	70,335.68	0.19%	2.26%	0.00%	9.90%	0.02%
Super Micro Computer Inc	SMCI	593.48	41.46	24,605.74					
Royal Caribbean Cruises Ltd	RCL	269.13	246.10	66,232.59	0.18%	1.22%	0.00%	18.10%	0.03%
Hess Corp	HES	308.29	148.94	45,916.96		1.34%			
Lennox International Inc	LII	35.58	601.05	21,385.15		0.77%			
Archer-Daniels-Midland Co	ADM	479.71	47.20	22,642.17	0.06%	4.32%	0.00%	7.27%	0.00%
Automatic Data Processing Inc	ADP	406.87	315.18	128,237.57	0.34%	1.95%	0.01%	9.07%	0.03%
Verisk Analytics Inc	VRSK	140.28	296.91	41,649.40		0.61%			
AutoZone Inc	AZO	16.78	3,493.01	58,620.25	0.16%			9.66%	0.02%
Linde PLC	LIN	472.91	467.05	220,873.37	0.59%	1.28%	0.01%	10.52%	0.06%
Avery Dennison Corp	AVY	78.99	187.97	14,848.62	0.04%	1.87%	0.00%	8.96%	0.00%
Enphase Energy Inc	ENPH	132.47	57.33	7,594.53	0.02%			9.00%	0.00%
MSCI Inc	MSCI	77.65	590.51	45,854.28		1.22%			
Ball Corp	BALL	282.82	52.49	14,845.37	0.04%	1.52%	0.00%	11.85%	0.00%
Axon Enterprise Inc	AXON	76.25	528.45	40,296.84				27.80%	
Dayforce Inc	DAY	157.70	61.99	9,775.82					
Carrier Global Corp	CARR	863.99	64.80	55,986.39	0.15%	1.39%	0.00%	13.57%	0.02%
Bank of New York Mellon Corp/The	BK	716.32	88.95	63,716.72	0.17%	2.11%	0.00%	12.56%	0.02%
Otis Worldwide Corp	OTIS	396.52	99.78	39,564.62		1.56%			
Baxter International Inc	BAX	511.63	34.51	17,656.18	0.05%	1.97%	0.00%	14.67%	0.01%
Becton Dickinson & Co	BDX	287.14	225.53	64,757.65	0.17%	1.84%	0.00%	9.31%	0.02%
Berkshire Hathaway Inc	BRK/B	1,338.05	513.83	687,531.07					
Best Buy Co Inc	BBY	213.80	89.91	19,222.36	0.05%	4.18%	0.00%	4.65%	0.00%
Boston Scientific Corp	BSX	1,475.78	103.79	153,171.01	0.41%			12.77%	0.05%
Bristol-Myers Squibb Co	BMY	2,029.31	59.62	120,987.58	0.32%	4.16%	0.01%	3.00%	0.01%
Brown-Forman Corp	BF/B	303.54	33.11	10,050.14		2.74%		-2.87%	
Coterra Energy Inc	CTRA	764.15	26.99	20,624.45	0.05%	3.26%	0.00%	15.54%	0.01%
Hilton Worldwide Holdings Inc	HLT	240.60	264.96	63,748.45	0.17%	0.23%	0.00%	13.66%	0.02%

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Bloomberg Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
Carnival Corp	CCL	1,164.20	23.93	27,859.37	0.07%			18.95%	0.01%
Builders FirstSource Inc	BLDR	113.62	138.99	15,792.23	0.04%			8.55%	0.00%
UDR Inc	UDR	331.13	45.18	14,960.61	0.04%	3.76%	0.00%	1.98%	0.00%
Clorox Co/The	CLX	123.19	156.39	19,265.66	0.05%	3.12%	0.00%	8.97%	0.00%
Paycom Software Inc	PAYC	57.26	219.47	12,567.89	0.03%	0.68%	0.00%	7.82%	0.00%
CMS Energy Corp	CMS	298.79	73.05	21,826.95	0.06%	2.97%	0.00%	7.73%	0.00%
Colgate-Palmolive Co	CL	811.54	91.17	73,987.78	0.20%	2.19%	0.00%	5.69%	0.01%
EPAM Systems Inc	EPAM	56.72	206.14	11,692.56					
Conagra Brands Inc	CAG	477.32	25.54	12,190.76		5.48%		-3.22%	
Airbnb Inc	ABNB	440.00	138.87	61,103.10	0.16%			12.83%	0.02%
Consolidated Edison Inc	ED	346.71	101.52	35,198.17	0.09%	3.35%	0.00%	5.26%	0.00%
Corning Inc	GLW	856.56	50.15	42,956.68	0.11%	2.23%	0.00%	14.54%	0.02%
GoDaddy Inc	GDDY	141.36	179.50	25,373.39					
Cummins Inc	CMI	137.48	368.18	50,617.81	0.13%	1.98%	0.00%	5.37%	0.01%
Caesars Entertainment Inc	CZR	212.01	33.22	7,043.08				97.08%	
Danaher Corp	DHR	714.71	207.76	148,488.12	0.40%	0.62%	0.00%	8.67%	0.03%
Target Corp	TGT	458.21	124.24	56,928.25	0.15%	3.61%	0.01%	11.09%	0.02%
Deere & Co	DE	271.41	480.79	130,493.10		1.35%			
Dominion Energy Inc	D	852.05	56.62	48,243.10	0.13%	4.72%	0.01%	14.42%	0.02%
Dover Corp	DOV	137.23	198.77	27,276.29	0.07%	1.04%	0.00%	10.22%	0.01%
Alliant Energy Corp	LNT	256.69	64.53	16,564.36	0.04%	3.15%	0.00%	6.15%	0.00%
Steel Dynamics Inc	STLD	152.24	135.07	20,563.73	0.05%	1.48%	0.00%	14.29%	0.01%
Duke Energy Corp	DUK	771.00	117.49	90,584.79	0.24%	3.56%	0.01%	6.80%	0.02%
Regency Centers Corp	REG	181.37	76.70	13,910.71	0.04%	3.68%	0.00%	4.59%	0.00%
Eaton Corp PLC	ETN	392.00	293.32	114,981.44	0.31%	1.42%	0.00%	9.87%	0.03%
Ecolab Inc	ECL	283.00	269.01	76,129.04	0.20%	0.97%	0.00%	12.49%	0.03%
Revvity Inc	RVTY	120.15	112.15	13,474.52	0.04%	0.25%	0.00%	8.81%	0.00%
Dell Technologies Inc	DELL	357.34	102.76	36,719.97	0.10%	2.04%	0.00%	12.40%	0.01%
Emerson Electric Co	EMR	563.90	121.61	68,575.88	0.18%	1.74%	0.00%	12.99%	0.02%
EOG Resources Inc	EOG	553.93	126.94	70,315.41		3.07%		-5.46%	
Aon PLC	AON	216.00	409.12	88,370.37	0.24%	0.66%	0.00%	10.68%	0.03%
Entergy Corp	ETR	430.41	87.31	37,579.32	0.10%	2.75%	0.00%	7.83%	0.01%
Equifax Inc	EFX	124.02	245.20	30,410.65		0.64%			
EQT Corp	EQT	597.44	48.17	28,778.73	0.08%	1.31%	0.00%	9.58%	0.01%
IQVIA Holdings Inc	IQV	176.10	188.80	33,247.68	0.09%			8.80%	0.01%
Gartner Inc	IT	76.82	498.32	38,280.04					
FedEx Corp	FDX	240.85	262.90	63,319.62	0.17%	2.10%	0.00%	14.88%	0.03%
FMC Corp	FMC	124.84	36.90	4,606.63		6.29%			
Brown & Brown Inc	BRO	285.93	118.54	33,894.38	0.09%	0.51%	0.00%	9.12%	0.01%
Ford Motor Co	F	3,892.60	9.55	37,174.29	0.10%	1.57%	0.00%	0.18%	0.00%
NextEra Energy Inc	NEE	2,057.03	70.17	144,341.53	0.38%	3.23%	0.01%	7.52%	0.03%
Franklin Resources Inc	BEN	525.40	20.25	10,639.31		6.32%			
Garmin Ltd	GRMN	192.40	228.93	44,047.00		1.57%		21.60%	
Freeport-McMoRan Inc	FCX	1,437.07	36.91	53,042.36	0.14%	1.63%	0.00%	14.30%	0.02%
Dexcom Inc	DXCM	390.77	88.37	34,532.52	0.09%			19.18%	0.02%
General Dynamics Corp	GD	270.35	252.60	68,290.61	0.18%	2.25%	0.00%	13.45%	0.02%
General Mills Inc	GIS	551.23	60.62	33,415.64	0.09%	3.96%	0.00%	0.29%	0.00%
Genuine Parts Co	GPC	138.78	124.88	17,331.10	0.05%	3.30%	0.00%	7.06%	0.00%
Atmos Energy Corp	ATO	158.73	152.13	24,147.32	0.06%	2.29%	0.00%	7.01%	0.00%
WW Grainger Inc	GWW	48.22	1,021.21	49,239.39	0.13%	0.80%	0.00%	5.85%	0.01%
Halliburton Co	HAL	868.09	26.37	22,891.58		2.58%		-2.16%	
L3Harris Technologies Inc	LHX	188.31	206.11	38,813.37	0.10%	2.33%	0.00%	12.47%	0.01%
Healthpeak Properties Inc	DOC	699.56	20.46	14,313.09	0.04%	5.96%	0.00%	4.91%	0.00%
Insulet Corp	PODD	70.23	272.27	19,120.46				25.86%	
Fortive Corp	FTV	340.29	79.54	27,066.68	0.07%	0.40%	0.00%	7.56%	0.01%
Hershey Co/The	HSY	147.80	172.71	25,526.04		3.17%		-9.26%	
Synchrony Financial	SYF	388.75	60.68	23,589.32	0.06%	1.65%	0.00%	15.34%	0.01%
Hormel Foods Corp	HRL	549.91	28.63	15,743.99	0.04%	4.05%	0.00%	7.27%	0.00%
Arthur J Gallagher & Co	AJG	254.70	337.74	86,022.38		0.77%			
Mondelez International Inc	MDLZ	1,293.53	64.23	83,083.12	0.22%	2.93%	0.01%	0.40%	0.00%
CenterPoint Energy Inc	CNP	651.73	34.38	22,406.38	0.06%	2.56%	0.00%	7.85%	0.00%
Humana Inc	HUM	120.64	270.42	32,624.75	0.09%	1.31%	0.00%	6.50%	0.01%
Willis Towers Watson PLC	WTW	99.69	339.65	33,860.61	0.09%	1.08%	0.00%	7.49%	0.01%
Illinois Tool Works Inc	ITW	293.50	263.98	77,478.13	0.21%	2.27%	0.00%	1.21%	0.00%
CDW Corp/DE	CDW	132.49	178.20	23,610.12	0.06%	1.40%	0.00%	6.38%	0.00%
Trane Technologies PLC	TT	224.29	353.70	79,331.71	0.21%	1.06%	0.00%	9.97%	0.02%
Interpublic Group of Cos Inc/The	IPG	372.65	27.07	10,087.61		4.88%			
International Flavors & Fragrances Inc	IFF	255.68	81.81	20,917.37	0.06%	1.96%	0.00%	7.72%	0.00%
Generac Holdings Inc	GNRC	59.61	136.15	8,116.45					
NXP Semiconductors NV	NXPI	253.62	215.59	54,677.96	0.15%	1.88%	0.00%	4.62%	0.01%
Kellanova	K	345.22	82.33	28,421.63	0.08%	2.77%	0.00%	4.55%	0.00%
Broadridge Financial Solutions Inc	BR	117.02	241.22	28,227.25		1.46%			
Kimberly-Clark Corp	KMB	331.68	142.01	47,102.53	0.13%	3.55%	0.00%	3.87%	0.00%
Kimco Realty Corp	KIM	674.12	22.10	14,897.97	0.04%	4.52%	0.00%	3.40%	0.00%
Oracle Corp	ORCL	2,796.96	166.06	464,462.51	1.24%	0.96%	0.01%	10.49%	0.13%
Kroger Co/The	KR	723.61	64.82	46,904.15	0.12%	1.97%	0.00%	3.79%	0.00%
Lennar Corp	LEN	233.51	119.63	27,934.99	0.07%	1.67%	0.00%	9.85%	0.01%
Eli Lilly & Co	LLY	948.17	920.63	872,913.75		0.65%		28.50%	
Charter Communications Inc	CHTR	141.95	363.57	51,607.46	0.14%			18.16%	0.02%
Loews Corp	L	212.86	86.67	18,448.69		0.29%			
Lowe's Cos Inc	LOW	564.65	248.64	140,394.58	0.37%	1.85%	0.01%	1.53%	0.01%
Hubbell Inc	HUBB	53.67	371.59	19,942.37		1.42%			
IDEX Corp	IEX	75.78	194.33	14,727.11		1.42%			
Marsh & McLennan Cos Inc	MMC	491.13	237.84	116,810.63	0.31%	1.37%	0.00%	8.88%	0.03%
Masco Corp	MAS	211.98	75.18	15,936.92	0.04%	1.65%	0.00%	9.14%	0.00%
S&P Global Inc	SPGI	315.00	533.74	168,128.10		0.72%			
Medtronic PLC	MDT	1,282.54	92.02	118,019.65	0.31%	3.04%	0.01%	6.49%	0.02%
Viatris Inc	VTRS	1,193.69	9.23	11,017.75		5.20%		-3.79%	

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CVS Health Corp	CVS	1,260.80	65.72	82,859.45	0.22%	4.05%	0.01%	6.31%	0.01%
DuPont de Nemours Inc	DD	418.05	81.36	34,012.48	0.09%	2.02%	0.00%	8.02%	0.01%
Micron Technology Inc	MU	1,114.17	93.63	104,319.92		0.49%			
Motorola Solutions Inc	MSI	166.94	440.22	73,488.98	0.20%	0.99%	0.00%	7.04%	0.01%
Cboe Global Markets Inc	CBOE	104.70	210.80	22,071.12	0.06%	1.20%	0.00%	13.35%	0.01%
Newmont Corp	NEM	1,126.86	42.59	47,989.86		2.35%		34.25%	
NIKE Inc	NKE	1,181.24	79.03	93,353.33		2.02%		-5.68%	
NiSource Inc	NI	469.94	40.81	19,178.24	0.05%	2.74%	0.00%	8.25%	0.00%
Norfolk Southern Corp	NSC	226.43	245.75	55,646.19	0.15%	2.20%	0.00%	12.12%	0.02%
Principal Financial Group Inc	PFG	225.57	89.04	20,084.87	0.05%	3.37%	0.00%	13.66%	0.01%
Eversource Energy	ES	366.79	62.26	22,835.12	0.06%	4.83%	0.00%	4.61%	0.00%
Northrop Grumman Corp	NOC	144.76	459.68	66,541.28	0.18%	1.79%	0.00%	5.70%	0.01%
Wells Fargo & Co	WFC	3,288.19	78.32	257,530.77	0.69%	2.04%	0.01%	16.95%	0.12%
Nucor Corp	NUE	230.54	137.47	31,691.76	0.08%	1.60%	0.00%	19.06%	0.02%
Occidental Petroleum Corp	OXY	938.50	48.84	45,836.39	0.12%	1.97%	0.00%	12.00%	0.01%
Omnicom Group Inc	OMC	196.49	82.76	16,261.57	0.04%	3.38%	0.00%	5.45%	0.00%
ONEOK Inc	OKE	624.34	100.39	62,677.45	0.17%	4.10%	0.01%	7.39%	0.01%
Raymond James Financial Inc	RJF	204.91	154.67	31,693.43	0.08%	1.29%	0.00%	15.42%	0.01%
PG&E Corp	PCG	2,193.58	16.34	35,843.04	0.10%	0.61%	0.00%	9.84%	0.01%
Parker-Hannifin Corp	PH	128.76	668.51	86,080.58	0.23%	0.98%	0.00%	7.54%	0.02%
Rollins Inc	ROL	484.22	52.39	25,368.55		1.26%			
PPL Corp	PPL	738.29	35.21	25,995.33	0.07%	3.10%	0.00%	7.36%	0.01%
Aptiv PLC	APTV	229.45	65.12	14,941.55	0.04%			12.53%	0.00%
ConocoPhillips	COP	1,272.38	99.15	126,156.50		3.15%			
PulteGroup Inc	PHM	202.46	103.28	20,909.86	0.06%	0.85%	0.00%	0.98%	0.00%
Pinnacle West Capital Corp	PNW	119.10	92.54	11,021.43	0.03%	3.87%	0.00%	5.96%	0.00%
PNC Financial Services Group Inc/The	PNC	395.75	191.92	75,952.26	0.20%	3.33%	0.01%	8.09%	0.02%
PPG Industries Inc	PPG	226.95	113.22	25,695.68	0.07%	2.40%	0.00%	7.69%	0.01%
Progressive Corp/The	PGR	585.81	282.00	165,198.84	0.44%	0.14%	0.00%	15.41%	0.07%
Veralto Corp	VLTO	247.55	99.76	24,695.65		0.44%			
Public Service Enterprise Group Inc	PEG	498.56	81.15	40,458.26	0.11%	3.11%	0.00%	8.20%	0.01%
Cooper Cos Inc/The	COO	199.96	90.38	18,072.10	0.05%			10.42%	0.01%
Edison International	EIX	385.02	54.44	20,960.68	0.06%	6.08%	0.00%	7.33%	0.00%
Schlumberger NV	SLB	1,359.86	41.66	56,651.57	0.15%	2.74%	0.00%	1.25%	0.00%
Charles Schwab Corp/The	SCHW	1,813.57	79.53	144,233.04		1.36%			
Sherwin-Williams Co/The	SHW	251.51	361.48	90,915.89	0.24%	0.87%	0.00%	6.20%	0.02%
West Pharmaceutical Services Inc	WST	72.30	232.34	16,799.06	0.04%	0.36%	0.00%	5.83%	0.00%
J M Smucker Co/The	SJM	106.42	110.53	11,762.23	0.03%	3.91%	0.00%	4.55%	0.00%
Snap-on Inc	SNA	52.39	341.17	17,875.00	0.05%	2.51%	0.00%	4.26%	0.00%
AMETEK Inc	AME	230.66	189.30	43,663.82	0.12%	0.66%	0.00%	8.60%	0.01%
Uber Technologies Inc	UBER	2,089.01	76.01	158,785.56					
Southern Co/The	SO	1,094.63	89.79	98,287.13	0.26%	3.21%	0.01%	6.75%	0.02%
Truist Financial Corp	TFC	1,305.35	46.35	60,503.01	0.16%	4.49%	0.01%	8.22%	0.01%
Southwest Airlines Co	LUV	592.66	31.06	18,408.05		2.32%		51.04%	
W R Berkley Corp	WRB	379.23	63.00	23,891.24	0.06%	0.51%	0.00%	8.92%	0.01%
Stanley Black & Decker Inc	SWK	154.41	85.69	13,231.11		3.83%			
Public Storage	PSA	175.42	303.62	53,259.66	0.14%	3.95%	0.01%	2.10%	0.00%
Arista Networks Inc	ANET	1,261.12	93.05	117,347.46	0.31%			14.64%	0.05%
Sysco Corp	SYY	489.23	75.54	36,956.41		2.70%			
Corteva Inc	CTVA	692.25	62.81	43,480.03	0.12%	1.08%	0.00%	15.89%	0.02%
Texas Instruments Inc	TXN	910.33	195.99	178,416.16	0.47%	2.78%	0.01%	12.68%	0.06%
Textron Inc	TXT	182.57	74.73	13,643.66	0.04%	0.11%	0.00%	10.03%	0.00%
Thermo Fisher Scientific Inc	TMO	377.26	528.96	199,556.07	0.53%	0.33%	0.00%	9.24%	0.05%
TJX Cos Inc/The	TJX	1,124.16	124.76	140,249.96	0.37%	1.20%	0.00%	7.62%	0.03%
Globe Life Inc	GL	83.85	127.43	10,684.80		0.85%			
Johnson Controls International plc	JCI	660.14	85.66	56,547.52	0.15%	1.73%	0.00%	9.69%	0.01%
Ulta Beauty Inc	ULTA	46.37	366.36	16,989.04	0.05%			0.34%	0.00%
Union Pacific Corp	UNP	604.29	246.69	149,071.41	0.40%	2.17%	0.01%	10.20%	0.04%
Keysight Technologies Inc	KEYS	172.91	159.53	27,583.88	0.07%			12.64%	0.01%
UnitedHealth Group Inc	UNH	914.71	474.96	434,451.77	1.16%	1.77%	0.02%	11.45%	0.13%
Blackstone Inc	BX	722.00	161.16	116,357.96		3.57%		22.47%	
Ventas Inc	VTR	437.14	69.18	30,241.34	0.08%	2.78%	0.00%	9.17%	0.01%
Labcorp Holdings Inc	LH	83.70	251.04	21,012.05	0.06%	1.15%	0.00%	10.01%	0.01%
Vulcan Materials Co	VMC	132.11	247.31	32,672.04	0.09%	0.79%	0.00%	13.04%	0.01%
Weyerhaeuser Co	WY	725.58	30.10	21,839.90		2.79%			
Williams Cos Inc/The	WMB	1,219.37	58.18	70,942.91	0.19%	3.44%	0.01%	5.96%	0.01%
Constellation Energy Corp	CEG	315.12	250.55	78,951.98	0.21%	0.62%	0.00%	12.46%	0.03%
WEC Energy Group Inc	WEC	317.75	106.69	33,900.97	0.09%	3.35%	0.00%	7.54%	0.01%
Adobe Inc	ADBE	435.30	438.56	190,905.17	0.51%			13.61%	0.07%
Vistra Corp	VST	340.23	133.66	45,474.64		0.67%		26.11%	
AES Corp/The	AES	711.03	11.59	8,240.80	0.02%	6.07%	0.00%	6.40%	0.00%
Expeditors International of Washington Inc	EXPD	138.03	117.36	16,199.44	0.04%	1.24%	0.00%	4.35%	0.00%
Amgen Inc	AMGN	537.20	308.06	165,491.35	0.44%	3.09%	0.01%	6.91%	0.03%
Apple Inc	AAPL	15,022.07	241.84	3,632,938.13	9.67%	0.41%	0.04%	14.47%	1.40%
Autodesk Inc	ADSK	215.00	274.21	58,955.15	0.16%			14.19%	0.02%
Cintas Corp	CTAS	403.54	207.50	83,735.37		0.75%			
Comcast Corp	CMCSA	3,771.58	35.88	135,324.23	0.36%	3.68%	0.01%	3.56%	0.01%
Molson Coors Beverage Co	TAP	190.16	61.29	11,654.78	0.03%	3.07%	0.00%	9.01%	0.00%
KLA Corp	KLAC	132.89	708.84	94,195.44	0.25%	0.96%	0.00%	15.45%	0.04%
Marriott International Inc/MD	MAR	275.70	280.45	77,318.75	0.21%	0.90%	0.00%	10.85%	0.02%
Fiserv Inc	FI	561.29	235.69	132,290.19	0.35%			15.74%	0.06%
McCormick & Co Inc/MD	MKC	252.52	82.61	20,860.51	0.06%	2.18%	0.00%	6.37%	0.00%
PACCAR Inc	PCAR	524.80	107.24	56,279.83		1.23%		-2.82%	
Costco Wholesale Corp	COST	443.90	1,048.61	465,476.79	1.24%	0.44%	0.01%	8.86%	0.11%
Stryker Corp	SYK	381.58	386.19	147,362.04	0.39%	0.87%	0.00%	9.83%	0.04%
Tyson Foods Inc	TSN	286.19	61.34	17,554.61		3.26%		21.06%	
Lamb Weston Holdings Inc	LW	142.64	51.87	7,398.77		2.85%		-11.26%	
Applied Materials Inc	AMAT	812.44	158.07	128,422.53	0.34%	1.01%	0.00%	10.64%	0.04%

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Bloomberg Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
Cardinal Health Inc	CAH	241.57	129.48	31,278.22	0.08%	1.56%	0.00%	9.07%	0.01%
Cincinnati Financial Corp	CINF	156.52	147.81	23,135.81	0.06%	2.35%	0.00%	3.05%	0.00%
Paramount Global	PARA	630.01	11.36	7,156.89		1.76%		45.00%	
DR Horton Inc	DHI	315.12	126.81	39,960.68	0.11%	1.26%	0.00%	7.26%	0.01%
Electronic Arts Inc	EA	260.62	129.12	33,650.94	0.09%	0.59%	0.00%	5.98%	0.01%
Erie Indemnity Co	ERIE	46.19	428.07	19,772.16		1.28%			
Fair Isaac Corp	FICO	24.42	1,886.35	46,061.16					
Fastenal Co	FAST	573.45	75.73	43,427.45	0.12%	2.27%	0.00%	10.52%	0.01%
M&T Bank Corp	MTB	164.33	190.37	31,284.16	0.08%	2.84%	0.00%	11.88%	0.01%
Xcel Energy Inc	XEL	574.55	72.10	41,425.25	0.11%	3.16%	0.00%	7.52%	0.01%
Fifth Third Bancorp	FITB	665.62	43.47	28,934.43		3.40%			
Gilead Sciences Inc	GILD	1,246.27	114.31	142,460.65		2.76%		23.77%	
Hasbro Inc	HAS	139.53	64.41	8,987.21	0.02%	4.35%	0.00%	6.73%	0.00%
Huntington Bancshares Inc/OH	HBAN	1,453.76	16.47	23,943.40	0.06%	3.76%	0.00%	12.50%	0.01%
Welltower Inc	WELL	641.31	153.51	98,447.20	0.26%	1.75%	0.00%	16.50%	0.04%
Biogen Inc	BIIB	146.37	140.50	20,565.68					
Northern Trust Corp	NTRS	195.70	110.22	21,569.80	0.06%	2.72%	0.00%	8.91%	0.01%
Packaging Corp of America	PKG	89.80	213.09	19,135.74		2.35%			
Paychex Inc	PAYX	360.06	151.67	54,610.77	0.15%	2.58%	0.00%	7.11%	0.01%
QUALCOMM Inc	QCOM	1,106.00	157.17	173,830.02	0.46%	2.16%	0.01%	15.26%	0.07%
Ross Stores Inc	ROST	329.93	140.32	46,295.67		1.05%		98.30%	
IDEXX Laboratories Inc	IDXX	81.33	437.11	35,549.38	0.09%			12.27%	0.01%
Starbucks Corp	SBUX	1,135.90	115.81	131,548.58	0.35%	2.11%	0.01%	9.20%	0.03%
KeyCorp	KEY	1,105.12	17.11	18,909.59	0.05%	4.79%	0.00%	18.11%	0.01%
Fox Corp	FOXA	217.85	57.60	12,547.98	0.03%	0.94%	0.00%	10.04%	0.00%
Fox Corp	FOX	235.58	54.07	12,737.87	0.03%	1.00%	0.00%	10.04%	0.00%
State Street Corp	STT	288.47	99.23	28,624.79	0.08%	3.06%	0.00%	10.32%	0.01%
Norwegian Cruise Line Holdings Ltd	NCLH	439.94	22.72	9,995.55				58.74%	
US Bancorp	USB	1,559.89	46.90	73,158.72	0.19%	4.26%	0.01%	10.34%	0.02%
A O Smith Corp	AOS	117.66	66.48	7,821.97		2.05%			
Gen Digital Inc	GEN	616.30	27.33	16,843.52	0.04%	1.83%	0.00%	11.23%	0.01%
T Rowe Price Group Inc	TROW	222.63	105.72	23,536.92		4.81%			
Waste Management Inc	WM	402.12	232.78	93,604.43	0.25%	1.42%	0.00%	10.93%	0.03%
Constellation Brands Inc	STZ	180.70	175.50	31,713.65	0.08%	2.30%	0.00%	8.68%	0.01%
Invesco Ltd	IVZ	447.60	17.39	7,783.80	0.02%	4.72%	0.00%	12.05%	0.00%
Intuit Inc	INTU	279.56	613.84	171,606.34	0.46%	0.68%	0.00%	13.97%	0.06%
Morgan Stanley	MS	1,612.86	133.11	214,687.21	0.57%	2.78%	0.02%	11.82%	0.07%
Microchip Technology Inc	MCHP	537.82	58.86	31,656.02		3.09%		-33.30%	
Crowdstrike Holdings Inc	CRWD	246.33	389.66	95,984.45				38.99%	
Chubb Ltd	CB	400.41	285.48	114,309.64	0.30%	1.28%	0.00%	3.70%	0.01%
Hologic Inc	HOLX	224.39	63.39	14,224.06	0.04%			9.04%	0.00%
Citizens Financial Group Inc	CFG	437.14	45.77	20,007.76		3.67%		21.23%	
Jabil Inc	JBL	109.18	154.92	16,913.94	0.05%	0.21%	0.00%	12.52%	0.01%
O'Reilly Automotive Inc	ORLY	57.73	1,373.64	79,301.19	0.21%			10.30%	0.02%
Allstate Corp/The	ALL	265.03	199.15	52,779.94		2.01%		93.83%	
Equity Residential	EQR	379.71	74.17	28,162.74	0.07%	3.64%	0.00%	4.03%	0.00%
BorgWarner Inc	BWA	218.68	29.66	6,486.17	0.02%	1.48%	0.00%	5.61%	0.00%
Keurig Dr Pepper Inc	KDP	1,356.75	33.52	45,478.29	0.12%	2.74%	0.00%	6.60%	0.01%
Host Hotels & Resorts Inc	HST	699.11	16.13	11,276.59		4.96%		-0.80%	
Incyte Corp	INCY	193.52	73.50	14,224.04					
Simon Property Group Inc	SPG	326.27	186.09	60,715.61	0.16%	4.51%	0.01%	1.29%	0.00%
Eastman Chemical Co	EMN	115.17	97.85	11,269.23	0.03%	3.39%	0.00%	10.17%	0.00%
AvalonBay Communities Inc	AVB	142.25	226.18	32,175.19	0.09%	3.09%	0.00%	5.26%	0.00%
Prudential Financial Inc	PRU	354.00	115.10	40,745.40	0.11%	4.69%	0.01%	7.89%	0.01%
United Parcel Service Inc	UPS	739.87	119.03	88,067.18	0.23%	5.51%	0.01%	8.46%	0.02%
Walgreens Boots Alliance Inc	WBA	864.15	10.68	9,229.16				-21.88%	
STERIS PLC	STE	98.25	219.26	21,542.47		1.04%			
McKesson Corp	MCK	125.33	639.55	80,152.49	0.21%	0.44%	0.00%	13.47%	0.03%
Lockheed Martin Corp	LMT	235.39	447.07	105,233.97		2.95%			
Cencora Inc	COR	193.71	253.54	49,113.89	0.13%	0.87%	0.00%	9.83%	0.01%
Capital One Financial Corp	COF	381.33	200.55	76,475.27	0.20%	1.20%	0.00%	15.77%	0.03%
The Campbell's Company	CPB	298.11	40.06	11,942.26	0.03%	3.89%	0.00%	4.11%	0.00%
Waters Corp	WAT	59.41	377.34	22,418.12	0.06%			7.42%	0.00%
Nordson Corp	NDSN	56.91	210.29	11,967.97		1.48%			
Dollar Tree Inc	DLTR	215.04	72.86	15,667.72	0.04%			7.94%	0.00%
Darden Restaurants Inc	DRI	117.15	200.46	23,483.25	0.06%	2.79%	0.00%	9.85%	0.01%
Evergy Inc	EVRG	229.75	68.91	15,831.79	0.04%	3.87%	0.00%	5.36%	0.00%
Match Group Inc	MTCH	250.43	31.71	7,941.11		2.40%			
NVR Inc	NVR	2.99	7,245.58	21,667.54	0.06%			6.01%	0.00%
NetApp Inc	NTAP	203.41	99.81	20,302.50	0.05%	2.08%	0.00%	8.16%	0.00%
Old Dominion Freight Line Inc	ODFL	212.55	176.50	37,514.21	0.10%	0.63%	0.00%	12.00%	0.01%
DaVita Inc	DVA	80.00	147.88	11,830.40	0.03%			10.03%	0.00%
Hartford Insurance Group Inc/The	HIG	285.39	117.76	33,607.17	0.09%	1.77%	0.00%	8.76%	0.01%
Iron Mountain Inc	IRM	293.74	93.17	27,367.84	0.07%	3.37%	0.00%	4.00%	0.00%
Estee Lauder Cos Inc/The	EL	234.17	71.91	16,839.41	0.04%	1.95%	0.00%	8.85%	0.00%
Cadence Design Systems Inc	CDNS	274.11	250.50	68,664.05	0.18%			14.79%	0.03%
Tyler Technologies Inc	TYL	43.01	608.43	26,170.89					
Universal Health Services Inc	UHS	57.75	175.05	10,109.35	0.03%	0.46%	0.00%	11.19%	0.00%
Skyworks Solutions Inc	SWKS	160.74	66.66	10,715.00		4.20%		-9.02%	
Quest Diagnostics Inc	DGX	110.98	172.90	19,188.11	0.05%	1.85%	0.00%	9.07%	0.00%
Rockwell Automation Inc	ROK	113.07	287.15	32,468.90	0.09%	1.82%	0.00%	12.57%	0.01%
Kraft Heinz Co/The	KHC	1,194.99	30.71	36,698.14		5.21%		-3.50%	
American Tower Corp	AMT	467.46	205.62	96,118.56	0.26%	3.15%	0.01%	13.39%	0.03%
Regeneron Pharmaceuticals Inc	REGN	107.51	698.74	75,119.82	0.20%	0.50%	0.00%	2.86%	0.01%
Amazon.com Inc	AMZN	10,597.73	212.28	2,249,685.99	5.99%			13.61%	0.81%
Jack Henry & Associates Inc	JKHY	72.90	173.59	12,654.31	0.03%	1.34%	0.00%	9.25%	0.00%
Ralph Lauren Corp	RL	39.88	271.14	10,813.86	0.03%	1.22%	0.00%	13.79%	0.00%
BXP Inc	BXP	158.21	70.93	11,221.81	0.03%	5.53%	0.00%	1.55%	0.00%

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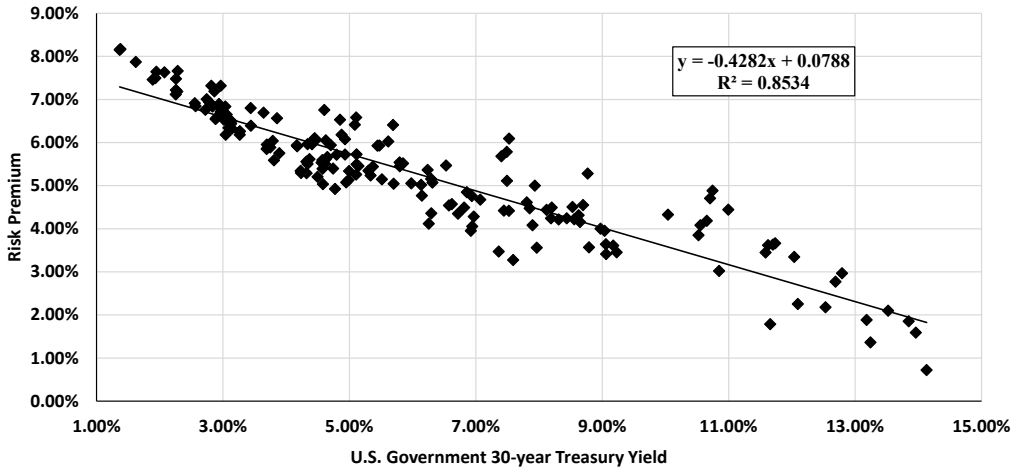
Amphenol Corp	APH	1,211.08	66.60	80,658.00	0.21%	0.99%	0.00%	15.74%	0.03%
Howmet Aerospace Inc	HWM	405.02	136.60	55,326.08		0.29%		27.36%	
Valero Energy Corp	VLO	314.98	130.73	41,177.01		3.46%			
Synopsys Inc	SNPS	154.62	457.28	70,704.67	0.19%			11.18%	0.02%
CH Robinson Worldwide Inc	CHRW	118.71	101.62	12,062.87	0.03%	2.44%	0.00%	17.95%	0.01%
Accenture PLC	ACN	625.48	348.50	217,979.76	0.58%	1.70%	0.01%	7.94%	0.05%
TransDigm Group Inc	TDG	56.08	1,367.20	76,678.85	0.20%			13.51%	0.03%
Yum! Brands Inc	YUM	279.10	156.37	43,643.17	0.12%	1.82%	0.00%	10.30%	0.01%
Prologis Inc	PLD	926.18	123.92	114,771.61	0.31%	3.26%	0.01%	6.63%	0.02%
FirstEnergy Corp	FE	576.70	38.77	22,358.56	0.06%	4.38%	0.00%	3.61%	0.00%
VeriSign Inc	VRSN	94.60	237.88	22,503.45					
Quanta Services Inc	PWR	148.20	259.63	38,476.73	0.10%	0.15%	0.00%	13.20%	0.01%
Henry Schein Inc	HSIC	124.18	72.17	8,961.84	0.02%			5.92%	0.00%
Ameren Corp	AEE	266.51	101.56	27,066.81	0.07%	2.80%	0.00%	6.59%	0.00%
ANSYS Inc	ANSS	87.65	333.25	29,209.96	0.08%			11.53%	0.01%
FactSet Research Systems Inc	FDS	38.03	461.74	17,560.00		0.90%			
NVIDIA Corp	NVDA	24,400.00	124.92	3,048,048.00		0.03%		33.16%	
Cognizant Technology Solutions Corp	CTSH	494.62	83.33	41,216.31	0.11%	1.49%	0.00%	6.14%	0.01%
Intuitive Surgical Inc	ISRG	356.66	573.15	204,417.94	0.54%			16.58%	0.09%
Take-Two Interactive Software Inc	TTWO	176.50	211.98	37,413.56				60.65%	
Republic Services Inc	RSG	312.28	237.02	74,017.78	0.20%	0.98%	0.00%	8.71%	0.02%
eBay Inc	EBAY	466.00	64.74	30,168.84	0.08%	1.79%	0.00%	8.92%	0.01%
Goldman Sachs Group Inc/The	GS	312.04	622.29	194,178.77	0.52%	1.93%	0.01%	9.26%	0.05%
SBA Communications Corp	SBAC	107.62	217.90	23,449.36	0.06%	2.04%	0.00%	17.51%	0.01%
Sempra	SRE	651.46	71.57	46,624.80	0.12%	3.60%	0.00%	7.21%	0.01%
Moody's Corp	MCO	180.00	503.94	90,709.20		0.75%			
ON Semiconductor Corp	ON	421.42	47.05	19,827.86				-0.17%	
Booking Holdings Inc	BKNG	32.82	5,016.01	164,601.37	0.44%	0.77%	0.00%	15.92%	0.07%
F5 Inc	FFIV	57.65	292.43	16,859.25	0.04%			7.07%	0.00%
Akamai Technologies Inc	AKAM	150.32	80.68	12,127.62					
Charles River Laboratories International Inc	CRL	51.14	165.31	8,454.22	0.02%			3.82%	0.00%
MarketAxess Holdings Inc	MKTX	37.69	192.79	7,266.88	0.02%	1.58%	0.00%	1.36%	0.00%
Devon Energy Corp	DVN	649.00	36.22	23,506.78		2.65%		-5.51%	
Bio-Techne Corp	TECH	158.09	61.75	9,761.91		0.52%			
Alphabet Inc	GOOGL	5,833.00	170.28	993,243.24	2.64%	0.47%	0.01%	12.25%	0.32%
Teleflex Inc	TFX	46.37	132.75	6,155.15	0.02%	1.02%	0.00%	7.34%	0.00%
Allegion plc	ALLE	86.29	128.71	11,106.43	0.03%	1.58%	0.00%	4.12%	0.00%
Netflix Inc	NFLX	427.76	980.56	419,441.50				22.93%	
Warner Bros Discovery Inc	WBD	2,454.76	11.46	28,131.60				43.06%	
Agilent Technologies Inc	A	285.29	127.92	36,494.24	0.10%	0.78%	0.00%	8.80%	0.01%
Trimble Inc	TRMB	245.79	71.98	17,692.11					
Elevance Health Inc	ELV	227.35	396.88	90,231.41	0.24%	1.72%	0.00%	8.18%	0.02%
CME Group Inc	CME	360.35	253.77	91,447.08	0.24%	1.97%	0.00%	3.60%	0.01%
Juniper Networks Inc	JNPR	333.19	35.98	11,988.17	0.03%	2.45%	0.00%	12.36%	0.00%
DTE Energy Co	DTE	206.93	133.70	27,665.88	0.07%	3.26%	0.00%	7.98%	0.01%
Celanese Corp	CE	109.33	50.94	5,569.39	0.01%	0.24%	0.00%	5.08%	0.00%
Nasdaq Inc	NDAQ	575.15	82.78	47,610.53	0.13%	1.16%	0.00%	13.47%	0.02%
Philip Morris International Inc	PM	1,554.86	155.28	241,438.23	0.64%	3.48%	0.02%	10.11%	0.06%
Ingersoll Rand Inc	IR	403.08	84.78	34,173.40		0.09%			
Salesforce Inc	CRM	957.00	297.85	285,042.45	0.76%	0.54%	0.00%	12.53%	0.10%
Roper Technologies Inc	ROP	107.39	584.50	62,766.66		0.56%			
Huntington Ingalls Industries Inc	HII	39.13	175.58	6,870.47	0.02%	3.08%	0.00%	13.85%	0.00%
MetLife Inc	MET	681.23	86.18	58,708.23	0.16%	2.53%	0.00%	12.81%	0.02%
Tapestry Inc	TPR	207.02	85.42	17,683.26	0.05%	1.64%	0.00%	9.55%	0.00%
CSX Corp	CSX	1,894.62	32.01	60,646.68	0.16%	1.62%	0.00%	8.23%	0.01%
Edwards Lifesciences Corp	EW	589.80	71.62	42,241.48					
Ameriprise Financial Inc	AMP	96.12	537.30	51,644.47	0.14%	1.10%	0.00%	11.93%	0.02%
Zebra Technologies Corp	ZBRA	51.38	315.05	16,187.02					
Zimmer Biomet Holdings Inc	ZBH	199.06	104.32	20,766.27		0.92%			
Camden Property Trust	CPT	106.76	124.06	13,244.30	0.04%	3.39%	0.00%	1.25%	0.00%
CBRE Group Inc	CBRE	300.04	141.94	42,587.32					
Mastercard Inc	MA	904.89	576.31	521,496.88	1.39%	0.53%	0.01%	13.27%	0.18%
CarMax Inc	KMX	153.80	82.97	12,760.78	0.03%			16.70%	0.01%
Intercontinental Exchange Inc	ICE	574.56	173.23	99,531.87	0.26%	1.11%	0.00%	16.02%	0.04%
Fidelity National Information Services Inc	FIS	529.69	71.12	37,671.67	0.10%	2.25%	0.00%	9.27%	0.01%
Smurfit WestRock PLC	SW	520.48	52.07	27,101.64		3.31%		63.58%	
Chipotle Mexican Grill Inc	CMG	1,355.34	53.97	73,147.54	0.19%			19.68%	0.04%
Wynn Resorts Ltd	WYNN	106.40	89.32	9,503.77	0.03%	1.12%	0.00%	8.30%	0.00%
Live Nation Entertainment Inc	LYV	233.40	143.36	33,460.39	0.09%			12.10%	0.01%
Assurant Inc	AIZ	50.79	207.89	10,559.13		1.54%			
NRG Energy Inc	NRG	198.07	105.71	20,937.83	0.06%	1.66%	0.00%	9.40%	0.01%
Monster Beverage Corp	MNST	972.52	54.65	53,148.20	0.14%			11.12%	0.02%
Regions Financial Corp	RF	905.47	23.46	21,242.21	0.06%	4.26%	0.00%	5.90%	0.00%
Baker Hughes Co	BKR	990.11	44.59	44,149.09		2.06%			
Mosaic Co/The	MOS	317.65	23.92	7,598.08		3.68%		-22.38%	
Expedia Group Inc	EXPE	123.33	197.96	24,415.12	0.06%	0.81%	0.00%	19.43%	0.01%
CF Industries Holdings Inc	CF	169.54	81.02	13,735.87		2.47%		-4.15%	
APA Corp	APA	369.95	20.70	7,657.91		4.83%		-13.72%	
Leidos Holdings Inc	LDOS	131.17	129.97	17,047.82	0.05%	1.23%	0.00%	11.70%	0.01%
Alphabet Inc	GOOG	5,497.00	172.22	946,693.34	2.52%	0.46%	0.01%	12.25%	0.31%
First Solar Inc	FSLR	107.06	136.18	14,579.72				35.43%	
Discover Financial Services	DFS	251.60	195.19	49,110.61	0.13%	1.43%	0.00%	1.37%	0.00%
Visa Inc	V	1,723.36	362.71	625,080.76	1.66%	0.65%	0.01%	12.19%	0.20%
Mid-America Apartment Communities Inc	MAA	116.90	168.12	19,653.53	0.05%	3.60%	0.00%	2.74%	0.00%
Xylem Inc/NY	XYL	242.94	130.89	31,799.03		1.22%			
Marathon Petroleum Corp	MPC	312.58	150.18	46,942.64		2.42%			
Tractor Supply Co	TSCO	531.55	55.35	29,421.20	0.08%	1.66%	0.00%	9.11%	0.01%
Advanced Micro Devices Inc	AMD	1,620.48	99.86	161,820.93				23.60%	

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Bloomberg Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
ResMed Inc	RMD	146.87	233.52	34,296.36	0.09%	0.91%	0.00%	14.08%	0.01%
Mettler-Toledo International Inc	MTD	20.92	1,272.72	26,620.80	0.07%			9.24%	0.01%
VICI Properties Inc	VICI	1,043.14	32.49	33,891.52	0.09%	5.32%	0.00%	2.59%	0.00%
Copart Inc	CPRT	966.09	54.80	52,941.89					
Jacobs Solutions Inc	J	122.54	128.11	15,699.07	0.04%	1.00%	0.00%	12.45%	0.01%
Albemarle Corp	ALB	117.57	77.03	9,056.68		2.10%		79.84%	
Fortinet Inc	FTNT	768.97	108.01	83,056.89	0.22%			9.01%	0.02%
Moderna Inc	MRNA	385.82	30.96	11,944.86				-15.80%	
Essex Property Trust Inc	ESS	64.33	311.57	20,041.77	0.05%	3.30%	0.00%	3.33%	0.00%
CoStar Group Inc	CSGP	410.13	76.25	31,272.08					
Realty Income Corp	O	891.52	56.76	50,604.24	0.13%	5.67%	0.01%	3.17%	0.00%
Westinghouse Air Brake Technologies Corp	WAB	170.85	185.36	31,668.41	0.08%	0.54%	0.00%	15.01%	0.01%
Palantir Technologies Inc	PLTR	2,248.95	84.92	190,980.90				31.39%	
Pool Corp	POOL	37.63	347.00	13,057.77	0.03%	1.38%	0.00%	8.77%	0.00%
Western Digital Corp	WDC	347.82	48.93	17,019.02					
PepsiCo Inc	PEP	1,371.50	153.47	210,484.08	0.56%	3.53%	0.02%	5.01%	0.03%
TE Connectivity PLC	TEL	298.35	154.03	45,955.34	0.12%	1.69%	0.00%	7.32%	0.01%
Diamondback Energy Inc	FANG	289.44	158.96	46,009.53		2.52%		-7.45%	
Palo Alto Networks Inc	PANW	662.10	190.43	126,083.70	0.34%			13.48%	0.05%
ServiceNow Inc	NOW	206.00	929.76	191,530.56					
Church & Dwight Co Inc	CHD	245.97	111.20	27,351.85		1.06%			
Federal Realty Investment Trust	FRT	85.68	105.42	9,032.45	0.02%	4.17%	0.00%	4.52%	0.00%
MGM Resorts International	MGM	285.55	34.76	9,925.74	0.03%			17.73%	0.00%
American Electric Power Co Inc	AEP	533.21	106.05	56,546.98	0.15%	3.51%	0.01%	5.40%	0.01%
Invitation Homes Inc	INVH	612.69	34.01	20,837.57	0.06%	3.41%	0.00%	3.76%	0.00%
PTC Inc	PTC	120.32	163.63	19,688.54	0.05%			17.83%	0.01%
JB Hunt Transport Services Inc	JBHT	100.01	161.19	16,120.32	0.04%	1.09%	0.00%	16.43%	0.01%
Lam Research Corp	LRCX	1,283.66	76.74	98,508.22	0.26%	1.20%	0.00%	16.74%	0.04%
Mohawk Industries Inc	MHK	62.59	117.59	7,359.63	0.02%			8.38%	0.00%
GE HealthCare Technologies Inc	GEHC	457.30	87.35	39,945.01	0.11%	0.16%	0.00%	9.53%	0.01%
Pentair PLC	PNR	164.82	94.20	15,525.78	0.04%	1.06%	0.00%	9.27%	0.00%
Vertex Pharmaceuticals Inc	VRTX	256.79	479.79	123,205.21					
Amcor PLC	AMCR	1,445.34	10.12	14,626.87	0.04%	5.04%	0.00%	7.10%	0.00%
Meta Platforms Inc	META	2,189.90	668.20	1,463,289.94	3.89%	0.31%	0.01%	13.81%	0.54%
T-Mobile US Inc	TMUS	1,141.74	269.69	307,917.20		1.31%			
United Rentals Inc	URI	65.31	642.32	41,948.06	0.11%	1.11%	0.00%	9.68%	0.01%
Alexandria Real Estate Equities Inc	ARE	173.09	102.26	17,700.36	0.05%	5.16%	0.00%	2.61%	0.00%
Honeywell International Inc	HON	649.92	212.89	138,361.16		2.12%			
Delta Air Lines Inc	DAL	645.96	60.12	38,835.24	0.10%	1.00%	0.00%	13.85%	0.01%
United Airlines Holdings Inc	UAL	328.80	93.81	30,845.02	0.08%			14.48%	0.01%
Seagate Technology Holdings PLC	STX	211.71	101.91	21,575.10		2.83%			
News Corp	NWS	189.34	32.28	6,111.92		0.62%			
Centene Corp	CNC	496.04	58.16	28,849.92	0.08%			7.97%	0.01%
Apollo Global Management Inc	APO	570.48	149.27	85,155.62	0.23%	1.24%	0.00%	14.51%	0.03%
Martin Marietta Materials Inc	MLM	60.97	482.35	29,410.88		0.66%			
Teradyne Inc	TER	161.72	109.86	17,766.42	0.05%	0.44%	0.00%	10.80%	0.01%
PayPal Holdings Inc	PYPL	989.24	71.05	70,285.68	0.19%			12.44%	0.02%
Tesla Inc	TSLA	3,216.52	292.98	942,375.16	2.51%			1.00%	0.03%
Blackrock Inc	BLK	155.25	977.78	151,803.71		2.13%			
KKR & Co Inc	KKR	888.23	135.59	120,434.96		0.52%			
Arch Capital Group Ltd	ACGL	375.36	92.91	34,874.44	0.09%			2.77%	0.00%
Dow Inc	DOW	700.09	38.11	26,680.49		7.35%		32.49%	
Everest Group Ltd	EG	42.93	353.22	15,165.18		2.26%		28.81%	
Teledyne Technologies Inc	TDY	46.83	515.02	24,120.86					
Domino's Pizza Inc	DPZ	34.30	489.71	16,795.44	0.04%	1.42%	0.00%	9.24%	0.00%
GE Vernova Inc	GEV	275.90	335.18	92,476.41		0.30%		97.07%	
News Corp	NWSA	378.06	28.62	10,819.94		0.70%			
Exelon Corp	EXC	1,004.83	44.20	44,413.65	0.12%	3.62%	0.00%	6.81%	0.01%
Global Payments Inc	GPN	247.62	105.28	26,069.03	0.07%	0.95%	0.00%	9.75%	0.01%
Crown Castle Inc	CCI	434.60	94.10	40,895.69	0.11%	6.65%	0.01%	2.12%	0.00%
Align Technology Inc	ALGN	73.60	187.03	13,764.97	0.04%			10.64%	0.00%
Kenvue Inc	KVUE	1,911.24	23.60	45,105.28		3.47%		34.17%	
Targa Resources Corp	TRGP	218.11	201.72	43,996.50		1.49%		27.68%	
Bunge Global SA	BG	133.97	74.19	9,939.09	0.03%	3.67%	0.00%	3.46%	0.00%
LKQ Corp	LKQ	259.15	42.19	10,933.74		2.84%			
Deckers Outdoor Corp	DECK	151.77	139.36	21,151.17	0.06%			15.15%	0.01%
Workday Inc	WDAY	214.00	263.34	56,354.76					
Zoetis Inc	ZTS	447.79	167.24	74,888.72	0.20%	1.20%	0.00%	7.96%	0.02%
Equinix Inc	EQIX	97.33	904.62	88,048.48	0.23%	2.07%	0.00%	15.85%	0.04%
Digital Realty Trust Inc	DLR	336.64	156.32	52,624.23	0.14%	3.12%	0.00%	4.05%	0.01%
Molina Healthcare Inc	MOH	55.50	301.12	16,712.16	0.04%			9.45%	0.00%
Las Vegas Sands Corp	LVS	715.93	44.71	32,009.44	0.09%	2.24%	0.00%	7.60%	0.01%

Notes:
[1] Equals sum of Col. [9]
[2] Equals sum of Col. [11]
[3] Equals ([1] x (1 + (0.5 x [2]))) + [2]
[4] Bloomberg Professional 30-day average as of February 28 2025
[5] Bloomberg Professional 30-day average as of February 28 2025
[6] Equals [4] x [5]
[7] Equals weight in S&P 500 based on market capitalization [6] if Growth Rate >0% and ≤20%
[8] Bloomberg Professional 30-day average as of February 28 2025
[9] Equals [7] x [8]
[10] Bloomberg Professional 30-day average as of February 28 2025
[11] Equals [7] x [10]



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9237735
R Square	0.8533575
Adjusted R Square	0.8525196
Standard Error	0.0054678
Observations	177

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.03045	0.03045	1,018.37859	0.00000
Residual	175	0.00523	0.00003		
Total	176	0.03568			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.0788	0.00	86.74	0.0000	0.0770	0.0806	0.0770	0.0806
U.S. Govt. 30-year Treasury	(0.4282)	0.01	(31.91)	0.0000	(0.4547)	(0.4017)	(0.4547)	(0.4017)

	[7] U.S. Govt. 30-year Treasury	[8] Risk Premium	[9] ROE
Current 30-day average of 30-year U.S. Treasury bond yield [4]	4.73%	5.85%	10.58%
Blue Chip Near-Term Projected Forecast (Q2 2025 - Q2 2026) [5]	4.64%	5.89%	10.53%
Blue Chip Long-Term Projected Forecast (2026-2030) [6]	4.30%	6.04%	10.34%
AVERAGE			10.48%

Notes:
[1] Source: Regulatory Research Associates, rate cases through February 28, 2025
[2] Source: S&P Capital IQ Pro, quarterly bond yields are the average of each trading day in the quarter
[3] Equals Column [1] − Column [2]
[4] Source: S&P Capital IQ Pro, 30-day average as of February 28, 2025
[5] Source: Blue Chip Financial Forecasts, Vol. 44, No. 3, February 28, 2025, at 2
[6] Source: Blue Chip Financial Forecasts, Vol. 43, No. 12, November 27, 2024, at 14
[7] See notes [4], [5] & [6]
[8] Equals 0.079019 + (-0.431192 x Column [7])
[9] Equals Column [7] + Column [8]

BOND YIELD PLUS RISK PREMIUM

Quarter	[1] Average Authorized Natural Gas ROE	[2] U.S. Govt. 30-year Treasury	[3] Risk Premium
1980.1	13.45%	11.66%	1.79%
1980.2	14.38%	10.52%	3.85%
1980.3	13.87%	10.85%	3.02%
1980.4	14.35%	12.10%	2.25%
1981.1	14.71%	12.53%	2.18%
1981.2	14.61%	13.24%	1.36%
1981.3	14.86%	14.13%	0.72%
1981.4	15.70%	13.85%	1.86%
1982.1	15.55%	13.96%	1.59%
1982.2	15.62%	13.52%	2.10%
1982.3	15.77%	12.79%	2.97%
1982.4	15.63%	10.75%	4.89%
1983.1	15.41%	10.71%	4.71%
1983.2	14.84%	10.65%	4.19%
1983.3	15.24%	11.62%	3.62%
1983.4	15.40%	11.74%	3.66%
1984.1	15.39%	12.04%	3.35%
1984.2	15.07%	13.18%	1.89%
1984.3	15.46%	12.69%	2.77%
1984.4	15.33%	11.70%	3.63%
1985.1	15.03%	11.58%	3.45%
1985.2	15.44%	11.00%	4.45%
1985.3	14.64%	10.55%	4.08%
1985.4	14.37%	10.04%	4.33%
1986.1	14.05%	8.77%	5.28%
1986.2	13.28%	7.49%	5.79%
1986.3	13.09%	7.40%	5.69%
1986.4	13.62%	7.53%	6.09%
1987.1	12.61%	7.49%	5.11%
1987.2	13.04%	8.53%	4.51%
1987.3	12.70%	9.06%	3.64%
1987.4	12.69%	9.23%	3.46%
1988.1	12.94%	8.63%	4.31%
1988.2	12.48%	9.06%	3.41%
1988.3	12.79%	9.18%	3.61%
1988.4	12.98%	8.97%	4.00%
1989.1	12.99%	9.04%	3.96%
1989.2	13.25%	8.70%	4.55%
1989.3	12.56%	8.12%	4.44%
1989.4	12.94%	7.93%	5.00%
1990.1	12.68%	8.44%	4.24%
1990.2	12.81%	8.65%	4.16%
1990.3	12.36%	8.79%	3.57%
1990.4	12.78%	8.56%	4.22%
1991.1	12.69%	8.20%	4.49%
1991.2	12.53%	8.31%	4.22%
1991.3	12.43%	8.19%	4.24%
1991.4	12.33%	7.85%	4.48%
1992.1	12.42%	7.81%	4.61%
1992.2	11.98%	7.90%	4.09%
1992.3	11.87%	7.45%	4.42%
1992.4	11.94%	7.52%	4.42%
1993.1	11.75%	7.07%	4.68%
1993.2	11.71%	6.86%	4.85%
1993.3	11.39%	6.32%	5.07%
1993.4	11.16%	6.14%	5.02%
1994.1	11.12%	6.58%	4.54%
1994.2	10.84%	7.36%	3.47%
1994.3	10.87%	7.59%	3.28%
1994.4	11.53%	7.96%	3.56%
1995.2	11.00%	6.94%	4.06%
1995.3	11.07%	6.72%	4.35%
1995.4	11.61%	6.24%	5.37%

BOND YIELD PLUS RISK PREMIUM

	[1]	[2]	[3]
Quarter	Average Authorized Natural Gas ROE	U.S. Govt. 30-year Treasury	Risk Premium
1996.1	11.45%	6.29%	5.16%
1996.2	10.88%	6.92%	3.95%
1996.3	11.25%	6.97%	4.28%
1996.4	11.19%	6.62%	4.57%
1997.1	11.31%	6.82%	4.49%
1997.2	11.70%	6.94%	4.76%
1997.3	12.00%	6.53%	5.47%
1997.4	10.92%	6.15%	4.77%
1998.2	11.37%	5.85%	5.52%
1998.3	11.41%	5.48%	5.93%
1998.4	11.69%	5.11%	6.58%
1999.1	10.82%	5.37%	5.44%
1999.2	11.25%	5.80%	5.45%
1999.4	10.38%	6.26%	4.12%
2000.1	10.66%	6.30%	4.36%
2000.2	11.03%	5.98%	5.05%
2000.3	11.33%	5.79%	5.54%
2000.4	12.10%	5.69%	6.41%
2001.1	11.38%	5.45%	5.93%
2001.2	10.75%	5.70%	5.05%
2001.4	10.65%	5.30%	5.35%
2002.1	10.67%	5.52%	5.15%
2002.2	11.64%	5.62%	6.03%
2002.3	11.50%	5.09%	6.41%
2002.4	11.01%	4.93%	6.08%
2003.1	11.38%	4.85%	6.53%
2003.2	11.36%	4.60%	6.76%
2003.3	10.61%	5.11%	5.50%
2003.4	10.84%	5.11%	5.73%
2004.1	11.06%	4.88%	6.18%
2004.2	10.57%	5.34%	5.24%
2004.3	10.37%	5.11%	5.26%
2004.4	10.66%	4.93%	5.73%
2005.1	10.65%	4.71%	5.94%
2005.2	10.54%	4.47%	6.07%
2005.3	10.47%	4.42%	6.05%
2005.4	10.32%	4.65%	5.66%
2006.1	10.68%	4.63%	6.05%
2006.2	10.60%	5.14%	5.46%
2006.3	10.34%	5.00%	5.34%
2006.4	10.14%	4.74%	5.40%
2007.1	10.52%	4.80%	5.72%
2007.2	10.13%	4.99%	5.14%
2007.3	10.03%	4.95%	5.08%
2007.4	10.12%	4.61%	5.50%
2008.1	10.38%	4.41%	5.97%
2008.2	10.17%	4.57%	5.59%
2008.3	10.55%	4.45%	6.10%
2008.4	10.34%	3.64%	6.69%
2009.1	10.24%	3.44%	6.80%
2009.2	10.11%	4.17%	5.94%
2009.3	9.88%	4.32%	5.56%
2009.4	10.31%	4.34%	5.97%
2010.1	10.24%	4.62%	5.61%
2010.2	9.99%	4.37%	5.62%
2010.3	10.43%	3.86%	6.57%
2010.4	10.09%	4.17%	5.92%
2011.1	10.10%	4.56%	5.54%
2011.2	9.85%	4.34%	5.51%
2011.3	9.65%	3.70%	5.95%
2011.4	9.88%	3.04%	6.84%
2012.1	9.63%	3.14%	6.50%
2012.2	9.83%	2.94%	6.89%

BOND YIELD PLUS RISK PREMIUM

	[1]	[2]	[3]
Quarter	Average Authorized Natural Gas ROE	U.S. Govt. 30-year Treasury	Risk Premium
2012.3	9.75%	2.74%	7.01%
2012.4	10.06%	2.86%	7.19%
2013.1	9.57%	3.13%	6.44%
2013.2	9.47%	3.14%	6.33%
2013.3	9.60%	3.71%	5.89%
2013.4	9.83%	3.79%	6.04%
2014.1	9.54%	3.69%	5.85%
2014.2	9.84%	3.44%	6.39%
2014.3	9.45%	3.27%	6.18%
2014.4	10.28%	2.96%	7.32%
2015.1	9.47%	2.55%	6.91%
2015.2	9.43%	2.88%	6.55%
2015.3	9.75%	2.96%	6.79%
2015.4	9.68%	2.96%	6.71%
2016.1	9.48%	2.72%	6.76%
2016.2	9.42%	2.57%	6.85%
2016.3	9.47%	2.28%	7.19%
2016.4	9.67%	2.83%	6.84%
2017.1	9.60%	3.05%	6.55%
2017.2	9.47%	2.90%	6.57%
2017.3	10.14%	2.82%	7.32%
2017.4	9.70%	2.82%	6.88%
2018.1	9.68%	3.02%	6.66%
2018.2	9.43%	3.09%	6.34%
2018.3	9.71%	3.06%	6.65%
2018.4	9.53%	3.27%	6.26%
2019.1	9.55%	3.01%	6.54%
2019.2	9.73%	2.78%	6.94%
2019.3	9.95%	2.29%	7.67%
2019.4	9.74%	2.26%	7.48%
2020.1	9.35%	1.89%	7.46%
2020.2	9.55%	1.38%	8.17%
2020.3	9.52%	1.37%	8.15%
2020.4	9.50%	1.62%	7.87%
2021.1	9.71%	2.07%	7.63%
2021.2	9.48%	2.26%	7.22%
2021.3	9.43%	1.93%	7.50%
2021.4	9.59%	1.95%	7.65%
2022.1	9.38%	2.25%	7.12%
2022.2	9.23%	3.05%	6.18%
2022.3	9.52%	3.26%	6.26%
2022.4	9.65%	3.89%	5.75%
2023.1	9.64%	3.75%	5.89%
2023.2	9.40%	3.81%	5.59%
2023.3	9.53%	4.23%	5.30%
2023.4	9.62%	4.58%	5.04%
2024.1	9.62%	4.32%	5.29%
2024.2	9.97%	4.58%	5.40%
2024.3	9.58%	4.23%	5.35%
2024.4	9.70%	4.50%	5.21%
2025.1	9.70%	4.77%	4.93%
AVERAGE	11.33%	6.03%	5.29%
MEDIAN	10.68%	5.11%	5.46%

Dr. Won Growth Rate Estimates

As Filed

Company	Ticker	[1] Projected EPS	[2] Projected DPS	[3] Projected BVPS	[4] Average	[5] Projected GDP Growth	[6] DCF Growth
				Weight:	20%	80%	
Data through December 31, 2024							
Atmos Energy Corporation	ATO	7.00%	7.50%	5.00%	6.50%	3.90%	4.42%
Northwest Natural Holding Company	NWN	6.50%	0.50%	4.00%	3.67%	3.90%	3.85%
ONE Gas, Inc.	OGS	3.50%	2.50%	4.50%	3.50%	3.90%	3.82%
Southwest Gas Holdings, Inc.	SWX	10.00%	5.50%	7.50%	7.67%	3.90%	4.65%
Spire Inc.	SR	4.50%	4.50%	5.50%	4.83%	3.90%	4.09%
Average		**6.30%**	**4.10%**	**5.30%**	**5.23%**	**3.90%**	**4.17%**

Notes:
[1] The Value Line Investment Survey
[2] The Value Line Investment Survey
[3] The Value Line Investment Survey
[4] Average of [1], [2], [3]
[5] Congress Budget Office, Budget Economic Outlook
[6] Equals ([5] x 80%) + ([4] x 20%)

Dr. Won Growth Rate Estimates

Updated to Reflect Most Current Data as of the Filing of Dr. Won's Testimony and to Include NiSource in Proxy Group

Company	Ticker	[1] Projected EPS	[2] Projected DPS	[3] Projected BVPS	[4] Average	[5] Projected GDP Growth	[6] DCF Growth
				Weight:	20%	80%	
Data through February 28, 2025							
Atmos Energy Corporation	ATO	6.00%	7.00%	5.00%	6.00%	3.90%	4.32%
NiSource	NI	9.50%	4.50%	5.00%	6.33%	3.90%	4.39%
Northwest Natural Holding Company	NWN	6.50%	0.50%	4.00%	3.67%	3.90%	3.85%
ONE Gas, Inc.	OGS	4.00%	2.50%	6.00%	4.17%	3.90%	3.95%
Southwest Gas Holdings, Inc.	SWX	10.00%	5.50%	7.50%	7.67%	3.90%	4.65%
Spire Inc.	SR	4.50%	4.00%	2.50%	3.67%	3.90%	3.85%
Average		**6.75%**	**4.00%**	**5.00%**	**5.25%**	**3.90%**	**4.17%**

Notes:
[1] The Value Line Investment Survey
[2] The Value Line Investment Survey
[3] The Value Line Investment Survey
[4] Average of [1], [2], [3]
[5] Congress Budget Office, Budget Economic Outlook
[6] Equals ([4] x 20%) + ([5] x 80%)

Dr. Won Growth Rate Estimates

Updated to Reflect Most Current Data as of the Filing of Dr. Won's Testimony, Updated to include NiSource in Proxy Group, and Corrected to use Projected EPS Growth Rates and FERC Weighting

Company	Ticker	[1] Projected EPS	[2] Projected GDP Growth	[3] DCF Growth
Corrected FERC Weight:		80%	20%	
Data through February 28, 2025				
Atmos Energy Corporation	ATO	6.00%	3.90%	5.58%
NiSource	NI	9.50%	3.90%	8.38%
Northwest Natural Holding Company	NWN	6.50%	3.90%	5.98%
ONE Gas, Inc.	OGS	4.00%	3.90%	3.98%
Southwest Gas Holdings, Inc.	SWX	10.00%	3.90%	8.78%
Spire Inc.	SR	4.50%	3.90%	4.38%
Average		**6.75%**	**3.90%**	**6.18%**

Notes:
[1] The Value Line Investment Survey
[2] Congress Budget Office, Budget Economic Outlook
[3] Equals ([4] x 80%) + ([5] x 20%)

Dr. Won's DCF Analysis
Stock Prices

As Filed

		[1]	[2]	[3]	[4]	[5]	[6]	[7]
		October 2024		November 2024		December 2024		
Company	Ticker	Max Stock Price	Min Stock Price	Max Stock Price	Min Stock Price	Max Stock Price	Min Stock Price	Aveage Stock Price
Atmos Energy Corporation	ATO	$ 141.41	$ 139.69	$ 146.59	$ 144.42	$ 142.41	$ 140.03	$ 142.42
Northwest Natural Holding Company	NWN	$ 40.35	$ 39.65	$ 41.97	$ 41.08	$ 41.43	$ 40.70	$ 40.86
ONE Gas, Inc.	OGS	$ 73.55	$ 72.50	$ 75.75	$ 74.18	$ 71.99	$ 70.49	$ 73.08
Southwest Gas Holdings, Inc.	SWX	$ 74.65	$ 73.42	$ 77.43	$ 75.38	$ 73.68	$ 72.26	$ 74.47
Spire Inc.	SR	$ 65.74	$ 64.64	$ 68.12	$ 66.77	$ 69.27	$ 67.89	$ 67.07

[1] Schedule SJW-d11

Dr. Won's DCF Analysis
Stock Prices

Updated to Reflect Most Current Data as of the Filing of Dr. Won's Testimony

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
		September 2024		October 2024		November 2024		December 2024		January 2025		February 2025		
Company	Ticker	Max Stock Price	Min Stock Price	Max Stock Price	Min Stock Price	Max Stock Price	Min Stock Price	Max Stock Price	Min Stock Price	Max Stock Price	Min Stock Price	Max Stock Price	Min Stock Price	6 Month Average Stock Price
Atmos Energy Corporation	ATO	$ 136.48	$ 134.47	$ 141.41	$ 139.69	$ 146.59	$ 144.42	$ 142.41	$ 140.03	$ 141.96	$ 139.50	$ 147.48	$ 144.99	$ 141.62
NiSource	NI	$ 34.05	$ 33.62	$ 34.90	$ 34.45	$ 36.79	$ 36.21	$ 36.95	$ 36.40	$ 37.35	$ 36.61	$ 39.30	$ 38.65	$ 36.27
Northwest Natural Holding Company	NWN	$ 40.24	$ 39.59	$ 40.35	$ 39.65	$ 41.97	$ 41.08	$ 41.43	$ 40.70	$ 40.10	$ 39.32	$ 41.09	$ 40.47	$ 40.50
ONE Gas, Inc.	OGS	$ 72.68	$ 71.60	$ 73.55	$ 72.50	$ 75.75	$ 74.18	$ 71.99	$ 70.49	$ 70.45	$ 68.96	$ 72.69	$ 71.13	$ 72.16
Southwest Gas Holdings, Inc.	SWX	$ 72.95	$ 71.57	$ 74.65	$ 73.42	$ 77.43	$ 75.38	$ 73.68	$ 72.26	$ 72.40	$ 70.75	$ 77.22	$ 75.75	$ 73.95
Spire Inc.	SR	$ 66.84	$ 65.95	$ 65.74	$ 64.64	$ 68.12	$ 66.77	$ 69.27	$ 67.89	$ 69.45	$ 67.99	$ 74.02	$ 72.62	$ 68.27

[1] - [12] S&P Capital IQ Pro.

CALCULATION OF LONG-TERM GDP GROWTH RATE

Step 1	
Real GDP ($ Billions) [1]	
1929	$ 1,191.1
2024	$ 23,303.5
Compound Annual Growth Rate	**3.18%**
Step 2	
Consumer Price Index (YoY % Change) [2]	
2031-2035	2.20%
Average	2.20%
Consumer Price Index (All-Urban) [3]	
2035	3.96
2050	5.54
Compound Annual Growth Rate	2.26%
GDP Chain-type Price Index (2012=1.000) [3]	
2035	1.73
2050	2.43
Compound Annual Growth Rate	2.30%
Average Inflation Forecast	**2.25%**
Long-Term GDP Growth Rate	**5.50%**

Notes:
[1] Bureau of Economic Analysis, February 27, 2025
[2] Blue Chip Financial Forecasts, Vol. 43, No. 12, November 27, 2024, at 14
[3] Energy Information Administration, Annual Energy Outlook 2023 at Table 20, March 16, 2023

Dr. Won's Two-Step DCF Analysis

As Filed

Company	Ticker	[1] 2023 Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected *Value Line* EPS, DPS & BVPS Gwth Rate	[6] Projected Long Term Gwth Rate	[7] Wgtd. Average Gwth Rate	[8] Cost of Equity
					Weight:	80%	20%		
Data through December 30, 2024									
Atmos Energy Corporation	ATO	$ 2.96	$ 142.42	2.08%	2.14%	6.50%	3.90%	5.98%	8.12%
Northwest Natural Holding Company	NWN	$ 1.94	$ 40.86	4.75%	4.84%	3.67%	3.90%	3.71%	8.55%
ONE Gas, Inc.	OGS	$ 2.60	$ 73.08	3.56%	3.62%	3.50%	3.90%	3.58%	7.20%
Southwest Gas Holdings, Inc.	SWX	$ 2.48	$ 74.47	3.33%	3.45%	7.67%	3.90%	6.91%	10.36%
Spire Inc.	SR	$ 2.88	$ 67.07	4.29%	4.39%	4.83%	3.90%	4.65%	9.04%
				3.60%	3.69%	5.23%	3.90%	4.97%	
								Average:	8.65%

Dr. Won Outlier Methodology

Lower Bound:	7.66%
Upper Bound:	9.70%
Cost of Equity / Avg. of Lower & Upper Bound:	**8.68%**

FERC Outlier Methodology (Lower Bound):

30-Day Average Yield on Moody's Baa-rated Corporate Bonds:	5.67%
Avg. of Dr. Won's Market Risk Premia in the CAPM:	5.63%
FERC Percent of Market Risk Premium in CAPM for Outlier Test:	20.00%
Lower Bound Threshold:	6.80%

FERC Outlier Methodology (Upper Bound):

Median DCF Result:	8.55%
Upper Bound Threshold (200% of Median DCF Result):	17.10%

Notes:
[1] - [8] Schedule SJW-d12

Dr. Won's Two-Step DCF Analysis

Corrected Short Term Growth Rates and Updated to Reflect Data through February 2025

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Company	Ticker	2025 Dividend per Share	Stock Price	Dividend Yield	Expected Dividend Yield	*Value Line* Projected EPS Gwth Rate	Projected Long Term Gwth Rate	Wgtd. Average Gwth Rate	Cost of Equity
					Weight:	80%	20%		
Data through February 28, 2025									
Atmos Energy Corporation	ATO	$ 3.48	$ 141.62	2.46%	2.53%	6.00%	3.90%	5.58%	8.11%
Northwest Natural Holding Company	NWN	$ 1.96	$ 40.50	4.84%	4.98%	6.50%	3.90%	5.98%	10.96%
ONE Gas, Inc.	OGS	$ 2.68	$ 72.16	3.71%	3.79%	4.00%	3.90%	3.98%	7.77%
Southwest Gas Holdings, Inc.	SWX	$ 2.48	$ 73.95	3.35%	3.50%	10.00%	3.90%	8.78%	12.28%
Spire Inc.	SR	$ 3.14	$ 68.27	4.60%	4.70%	4.50%	3.90%	4.38%	9.08%
								Average:	9.64%

Dr. Won Outlier Methodology

Lower Bound:	7.94%
Upper Bound:	11.62%
Cost of Equity (Avg. of Lower & Upper Bound):	**9.78%**

FERC Outlier Methodology (Lower Bound):

30-Day Average Yield on Moody's Baa-rated Corporate Bonds:	5.67%
Avg. of Dr. Won's Market Risk Premia in the CAPM:	5.63%
FERC Percent of Market Risk Premium in CAPM for Outlier Test:	20.00%
Lower Bound Threshold:	6.80%

FERC Outlier Methodology (Upper Bound):

Median DCF Result:	9.08%
Upper Bound Threshold (200% of Median DCF Result):	18.16%

FERC Outlier Methodology

Average Cost of Equity: 9.64%

Notes:
[1] *Value Line* ; projected 2025 as of 2/28/25
[2] Schedule AEB-1R, Attachment 8, p. 2
[3] Equals [1] / [2]
[4] Equals [3] x (1+[7]x50%)
[5] *Value Line* ; most current as of 2/28/25
[6] Schedule SJW-d15
[7] Equals ([5] x 80%) + ([6] x 20%)
[8] Equals [4] + [7]

Dr. Won's Two-Step DCF Analysis

Corrected Short Term and Long Term Growth Rates, and Updated to Reflect Data through February 2025

Company	Ticker	[1] 2025 Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] *Value Line* Projected EPS Gwth Rate	[6] *Morningstar* Projected GDP Gwth Rate	[7] Wgtd. Average Gwth Rate	[8] Cost of Equity
					Weight:	80%	20%		
Data through February 28, 2025									
Atmos Energy Corporation	ATO	$ 3.48	$ 141.62	2.46%	2.53%	6.00%	5.50%	5.90%	8.43%
Northwest Natural Holding Company	NWN	$ 1.96	$ 40.50	4.84%	4.99%	6.50%	5.50%	6.30%	11.29%
ONE Gas, Inc.	OGS	$ 2.68	$ 72.16	3.71%	3.79%	4.00%	5.50%	4.30%	8.09%
Southwest Gas Holdings, Inc.	SWX	$ 2.48	$ 73.95	3.35%	3.51%	10.00%	5.50%	9.10%	12.61%
Spire Inc.	SR	$ 3.14	$ 68.27	4.60%	4.71%	4.50%	5.50%	4.70%	9.41%
								Average:	9.97%

Dr. Won Outlier Methodology

Lower Bound:	8.26%
Upper Bound:	11.95%
Cost of Equity (Avg. of Lower & Upper Bound):	**10.11%**

FERC Outlier Methodology (Lower Bound):

30-Day Average Yield on Moody's Baa-rated Corporate Bonds:	5.67%
Avg. of Dr. Won's Market Risk Premia in the CAPM:	5.63%
FERC Percent of Market Risk Premium in CAPM for Outlier Test:	20.00%
Lower Bound Threshold:	6.80%

FERC Outlier Methodology (Upper Bound):

Median DCF Result:	9.41%
Upper Bound Threshold (200% of Median DCF Result):	18.82%

FERC Outlier Methodology

Average Cost of Equity:	**9.97%**

Notes:
[1] Value Line; projected 2025 as of 2/28/25
[2] Schedule AEB-1R, Attachment 8, p. 2
[3] Equals [1] / [2]
[4] Equals [3] x (1+[7]x50%)
[5] Value Line; most current as of 2/28/25
[6] Schedule AEB-1R, Attachment 9
[7] Equals ([5] x 80%) + ([6] x 20%)
[8] Equals [4] + [7]

Dr. Won's Two-Step DCF Analysis

Corrected Short Term and Long Term Growth Rates, Updated to Reflect Data through February 2025 and Included NiSource

Company	Ticker	[1] 2025 Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] *Value Line* Projected EPS Gwth Rate	[6] *Morningstar* Projected GDP Gwth Rate	[7] Wgtd. Average Gwth Rate	[8] Cost of Equity
					Weight:	80%	20%		
Data through February 28, 2025									
Atmos Energy Corporation	ATO	$ 3.48	$ 141.62	2.46%	2.53%	6.00%	5.50%	5.90%	8.43%
NiSource	NI	$ 1.12	$ 36.27	3.09%	3.22%	9.50%	5.50%	8.70%	11.92%
Northwest Natural Holding Company	NWN	$ 1.96	$ 40.50	4.84%	4.99%	6.50%	5.50%	6.30%	11.29%
ONE Gas, Inc.	OGS	$ 2.68	$ 72.16	3.71%	3.79%	4.00%	5.50%	4.30%	8.09%
Southwest Gas Holdings, Inc.	SWX	$ 2.48	$ 73.95	3.35%	3.51%	10.00%	5.50%	9.10%	12.61%
Spire Inc.	SR	$ 3.14	$ 68.27	4.60%	4.71%	4.50%	5.50%	4.70%	9.41%
								Average:	10.29%

Dr. Won Outlier Methodology

Lower Bound:	8.26%
Upper Bound:	12.26%
Cost of Equity (Avg. of Lower & Upper Bound):	**10.26%**

FERC Outlier Methodology (Lower Bound):

30-Day Average Yield on Moody's Baa-rated Corporate Bonds:	5.67%
Avg. of Dr. Won's Market Risk Premia in the CAPM:	5.63%
FERC Percent of Market Risk Premium in CAPM for Outlier Test:	20.00%
Lower Bound Threshold:	6.80%

FERC Outlier Methodology (Upper Bound):

Median DCF Result:	10.35%
Upper Bound Threshold (200% of Median DCF Result):	20.70%

FERC Outlier Methodology

Average Cost of Equity: 10.29%

Notes:
[1] Value Line; projected 2025 as of 2/28/25
[2] Schedule AEB-1R, Attachment 8, p. 2
[3] Equals [1] / [2]
[4] Equals [3] x (1+[7]x50%)
[5] Value Line; most current as of 2/28/25
[6] Schedule AEB-1R, Attachment 9
[7] Equals ([5] x 80%) + ([6] x 20%)
[8] Equals [4] + [7]

Dr. Won's Adjusted CAPM Analysis

Company	Ticker	[1] Risk-Free Rate	[2] Historical Arithmetic Avg. Return on Lg. Cap Stocks (1926-2024)	[3] Market Risk Premium	[4] *Value Line* Beta	[5] Cost of Equity
Atmos Energy Corporation	ATO	4.71%	12.30%	7.59%	0.90	11.54%
NiSource	NI	4.71%	12.30%	7.59%	0.95	11.92%
Northwest Natural Holding Company	NWN	4.71%	12.30%	7.59%	0.90	11.54%
ONE Gas, Inc.	OGS	4.71%	12.30%	7.59%	0.85	11.16%
Southwest Gas Holdings, Inc.	SWX	4.71%	12.30%	7.59%	0.95	11.92%
Spire Inc.	SR	4.71%	12.30%	7.59%	0.90	11.54%
					Average (incl. NI):	**11.60%**
					Average (excl. NI):	**11.54%**

[1] 3-month average 30-year Treasury bond yield ending February 28, 2025
[2] Kroll, Cost of Capital Navigator
[3] Equals [2] - [1]
[5] *Value Line*
[5] Equals [1] + ([3] x [4])

BOND YIELD PLUS RISK PREMIUM

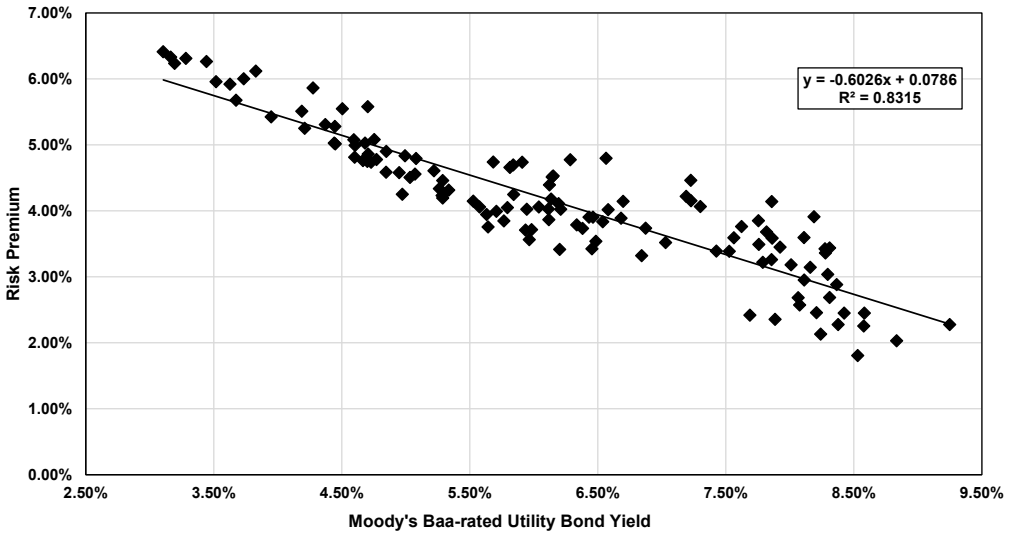
Quarter	[1] Average Authorized Natural Gas ROE	[2] Avg. Baa-Rated Utiliity Bond Yield	[3] Risk Premium
1993.1	11.75%	8.31%	3.44%
1993.2	11.71%	8.11%	3.60%
1993.3	11.39%	7.62%	3.77%
1993.4	11.16%	7.56%	3.59%
1994.1	11.12%	7.86%	3.26%
1994.2	10.84%	8.58%	2.26%
1994.3	10.87%	8.83%	2.03%
1994.4	11.53%	9.25%	2.28%
1995.2	11.00%	8.31%	2.69%
1995.3	11.07%	8.11%	2.95%
1995.4	11.61%	7.76%	3.85%
1996.1	11.45%	7.86%	3.59%
1996.2	10.88%	8.42%	2.45%
1996.3	11.25%	8.37%	2.88%
1996.4	11.19%	8.01%	3.18%
1997.1	11.31%	8.16%	3.15%
1997.2	11.70%	8.27%	3.43%
1997.3	12.00%	7.86%	4.14%
1997.4	10.92%	7.53%	3.39%
1998.2	11.37%	7.30%	4.07%
1998.3	11.41%	7.19%	4.22%
1998.4	11.69%	7.23%	4.46%
1999.1	10.82%	7.43%	3.39%
1999.2	11.25%	7.76%	3.49%
1999.4	10.38%	8.24%	2.13%
2000.1	10.66%	8.38%	2.28%
2000.2	11.03%	8.58%	2.45%
2000.3	11.33%	8.30%	3.04%
2000.4	12.10%	8.19%	3.91%
2001.1	11.38%	7.92%	3.45%
2001.2	10.75%	8.06%	2.69%
2001.4	10.65%	8.08%	2.57%
2002.1	10.67%	8.21%	2.46%
2002.2	11.64%	8.28%	3.36%
2002.3	11.50%	7.82%	3.68%
2002.4	11.01%	7.79%	3.22%
2003.1	11.38%	7.23%	4.15%
2003.2	11.36%	6.57%	4.80%
2003.3	10.61%	6.87%	3.74%
2003.4	10.84%	6.70%	4.14%
2004.1	11.06%	6.28%	4.78%
2004.2	10.57%	6.68%	3.89%
2004.3	10.37%	6.46%	3.91%
2004.4	10.66%	6.14%	4.52%
2005.1	10.65%	5.91%	4.74%
2005.2	10.54%	5.84%	4.70%
2005.3	10.47%	5.81%	4.66%
2005.4	10.32%	6.14%	4.18%
2006.1	10.68%	6.15%	4.53%
2006.2	10.60%	6.58%	4.02%
2006.3	10.34%	6.43%	3.91%
2006.4	10.14%	6.11%	4.03%
2007.1	10.52%	6.12%	4.40%
2007.2	10.13%	6.34%	3.79%
2007.3	10.03%	6.49%	3.54%
2007.4	10.12%	6.38%	3.74%
2008.1	10.38%	6.54%	3.84%
2008.2	10.17%	6.84%	3.32%
2008.3	10.55%	7.03%	3.52%
2008.4	10.34%	8.53%	1.81%
2009.1	10.24%	7.88%	2.36%

BOND YIELD PLUS RISK PREMIUM

Quarter	[1] Average Authorized Natural Gas ROE	[2] Avg. Baa-Rated Utiliity Bond Yield	[3] Risk Premium
2009.2	10.11%	7.69%	2.42%
2009.3	9.88%	6.45%	3.43%
2009.4	10.31%	6.19%	4.11%
2010.1	10.24%	6.21%	4.03%
2010.2	9.99%	6.12%	3.87%
2010.3	10.43%	5.68%	4.74%
2010.4	10.09%	5.84%	4.25%
2011.1	10.10%	6.04%	4.06%
2011.2	9.85%	5.79%	4.05%
2011.3	9.65%	5.34%	4.31%
2011.4	9.88%	5.08%	4.79%
2012.1	9.63%	5.07%	4.56%
2012.2	9.83%	4.99%	4.84%
2012.3	9.75%	4.85%	4.90%
2012.4	10.06%	4.51%	5.55%
2013.1	9.57%	4.71%	4.86%
2013.2	9.47%	4.73%	4.74%
2013.3	9.60%	5.26%	4.34%
2013.4	9.83%	5.22%	4.61%
2014.1	9.54%	5.03%	4.51%
2014.2	9.84%	4.75%	5.08%
2014.3	9.45%	4.70%	4.75%
2014.4	10.28%	4.70%	5.58%
2015.1	9.47%	4.45%	5.02%
2015.2	9.43%	4.85%	4.59%
2015.3	9.75%	5.29%	4.46%
2015.4	9.68%	5.53%	4.15%
2016.1	9.48%	5.29%	4.20%
2016.2	9.42%	4.60%	4.81%
2016.3	9.47%	4.21%	5.25%
2016.4	9.67%	4.59%	5.08%
2017.1	9.60%	4.60%	5.00%
2017.2	9.47%	4.44%	5.03%
2017.3	10.14%	4.28%	5.86%
2017.4	9.70%	4.19%	5.51%
2018.1	9.68%	4.37%	5.31%
2018.2	9.43%	4.67%	4.76%
2018.3	9.71%	4.68%	5.03%
2018.4	9.53%	4.95%	4.58%
2019.1	9.55%	4.77%	4.78%
2019.2	9.73%	4.45%	5.28%
2019.3	9.95%	3.83%	6.12%
2019.4	9.74%	3.74%	6.00%
2020.1	9.35%	3.67%	5.68%
2020.2	9.55%	3.63%	5.92%
2020.3	9.52%	3.11%	6.41%
2020.4	9.50%	3.16%	6.33%
2021.1	9.71%	3.44%	6.26%
2021.2	9.48%	3.52%	5.96%
2021.3	9.43%	3.20%	6.24%
2021.4	9.59%	3.28%	6.31%
2022.1	9.38%	3.95%	5.43%
2022.2	9.23%	4.97%	4.25%
2022.3	9.52%	5.28%	4.23%
2022.4	9.65%	5.93%	3.71%
2023.1	9.64%	5.58%	4.06%
2023.2	9.40%	5.64%	3.76%
2023.3	9.53%	5.97%	3.57%
2023.4	9.62%	6.20%	3.42%

BOND YIELD PLUS RISK PREMIUM

	[1]	[2]	[3]
Quarter	Average Authorized Natural Gas ROE	Avg. Baa-Rated Utiliity Bond Yield	Risk Premium
2024.1	9.62%	5.77%	3.85%
2024.2	9.97%	5.94%	4.03%
2024.3	9.58%	5.63%	3.95%
2024.4	9.70%	5.71%	3.99%
2025.1	9.70%	5.98%	3.72%
AVERAGE	10.30%	6.16%	4.14%
MEDIAN	10.14%	6.12%	4.07%



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9118641
R Square	0.8314961
Adjusted R Square	0.8301261
Standard Error	0.0042146
Observations	125

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.01078	0.01078	606.95329	0.00000
Residual	123	0.00218	0.00002		
Total	124	0.01297			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.0786	0.00	50.59	0.0000	0.0755	0.0816	0.0755	0.0816
Avg. Baa-Rated Utiliity Bond Yield	(0.6026)	0.02	(24.64)	0.0000	(0.6511)	(0.5542)	(0.6511)	(0.5542)

	Moody's Baa-Rated Utility Bond Yld [5]	Risk Premium [6]	ROE [7]
Current 30-day average of Baa-rated utility bond yield [4]	5.94%	4.27%	10.22%

Notes:
[1] Regulatory Research Associates, rate cases through February 2025
[2] Bloomberg Professional, quarterly bond yields are the average of each trading day in the quarter
[3] Equals Column [1] − Column [2]
[4] Bloomberg, 30-day average as of February 2025
[5] See note [4]
[6] Equals 0.078565 + (-0.602648 x Column [5])
[7] Equals Column [5] + Column [6]

BUSINESS SEGMENT DATA FOR NEW JERSEY RESOURCES CORPORATION

New Jersey Resource Corporation - Operating Income ($000)

Year	Total	Natural Gas Distribution	Clean Energy Ventures	Energy Services	Storage and Transportation	Home Services and Other & Eliminations	Notes	Percent Reg / Total
2023	407,000	207,528	58,722	113,112	32,425	(4,787)	[1]	58.96%
2022	406,475	218,973	66,178	95,639	22,163	3,522	[1]	59.32%
2021	288,350	148,993	37,993	79,163	10,659	11,542	[1]	55.37%
3 yr. average								**57.88%**

Notes:
[1] Source: NJR - 2023 Form 10-K, pp. 43, 47, 49, 52, and 67

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Adjust Its Revenues for its Natural Gas Service.	**)** **)** **)**	Case No. GR-2024-0369

AFFIDAVIT OF ANN E. BULKLEY

COMMOMWEALTH OF MASSACHUSETTS	**)**
	) ss
CITY OF BOSTON	**)**

Ann E. Bulkley, being first duly sworn states:

My name is Ann E. Bulkley, and on my oath declare that I am of sound mind and lawful age; that I have prepared the foregoing *Rebuttal Testimony*; and further, under the penalty of perjury, that the same is true and correct to the best of my knowledge and belief.

/s/ Ann E. Bulkley
Ann E. Bulkley

Sworn to me this 1st day of April, 2025.