Exhibit No. 3

Missouri-American Water Company – Exhibit 3
Testimony of Ann E. Bulkley
Rebuttal/Surrebuttal/Sur-Surrebuttal
File No. WR-2024-0320

Exhibit No.:	
Issues:	Cost of Capital; Capital Structure; Return on Equity
Witness:	Ann E. Bulkley
Exhibit Type:	Rebuttal / Surrebuttal / Sur-surrebuttal
Sponsoring Party:	Missouri-American Water Company
Case No.:	WR-2024-0320 SR-2024-0321

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WR-2024-0320
CASE NO. SR-2024-0321

REBUTTAL / SURREBUTTAL/ SUR-SURREBUTTAL TESTIMONY

OF

ANN E. BULKLEY

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

DENOTES CONFIDENTIAL

DENOTES HIGHLY CONFIDENTIAL

P

AFFIDAVIT

I, Ann E. Bulkley, under penalty of perjury, and pursuant to Section 509.030, RSMo, state that I am a Principal at The Brattle Group and that the accompanying testimony has been prepared by me or under my direction and supervision; that if inquiries were made as to the facts in said testimony, I would respond as therein set forth; and that the aforesaid testimony is true and correct to the best of my knowledge and belief.

Ann E. Bulkley

January 21, 2025
Dated

P

REBUTTAL/ SURREBUTTAL/ SUR-SURREBUTTAL TESTIMONY
ANN E. BULKLEY
MISSOURI-AMERICAN WATER COMPANY
CASE NO.: WR-2024-0320
CASE NO.: SR-2024-0321

TABLE OF CONTENTS

P

REBUTTAL / SURREBUTTAL/ SUR-SURREBUTTAL TESTIMONY

ANN E. BULKLEY

I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Ann E. Bulkley. I am a Principal at The Brattle Group ("Brattle"). My business address is One Beacon Street, Suite 2600, Boston, Massachusetts 02108.

Q. On whose behalf are you submitting this rebuttal / surrebuttal / sur-surrebuttal testimony?

A. I am submitting this Rebuttal / Surrebuttal / Sur-surrebuttal testimony before the Missouri Public Service Commission ("Commission") on behalf of Missouri-American Water Company ("MAWC" or the "Company"), a wholly-owned subsidiary of American Water Works Company, Inc. ("AWK").

Q. Did you previously provide Direct Testimony in this proceeding?

A. Yes. I filed Direct Testimony in this proceeding July 1, 2024.

Q. What is the purpose of your rebuttal / surrebuttal / sur-surrebuttal testimony?

A. The purpose of my Rebuttal / Surrebuttal/ Sur-surrebuttal testimony is to respond to the direct and rebuttal testimonies of Kelli Malki on behalf of the Missouri Public Service Commission Staff ("Staff")[1], Michael Abbott on behalf of the Staff[2], David Murray on

[1] Missouri Public Service Commission, Direct/Rebuttal Testimony of Kelli Malki, Case No. WR-2024-0320, December 6, 2024 ("Malki Direct/Rebuttal").

[2] Missouri Public Service Commission, Direct/Rebuttal Testimony of Michael J. Abbot, Case No. WR-2024-0320, December 6, 2024 ("Abbott Direct/Rebuttal").

P

behalf of the Missouri Office of the Public Counsel ("OPC"),[3] and Dr. Geoff Marke on behalf of the OPC[4] as well as the cross-rebuttal testimony of David Murray on behalf of the OPC[5] regarding their respective proposals for the capital structure and return on equity ("ROE") for MAWC in this proceeding.

Q. Are you sponsoring any schedules as part of your Rebuttal / Surrebuttal / Sur-surrebuttal testimony?

A. Yes, I am sponsoring Schedules AEB-R-1 through AEB-R-14, which have been prepared by me or under my direction.

Q. Have you prepared cost of equity analyses to support your Rebuttal / Surrebuttal / Sur-surrebuttal 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 November 30, 2024 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 as well as my recommended ROE of 10.75 percent. 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.

---

[3] Missouri Public Service Commission, Direct/Rebuttal Testimony of David Murray, Case No. WR-2024-0320, December 6, 2024 ("Murray Direct/Rebuttal").

[4] Missouri Public Service Commission, Direct/Rebuttal Testimony of Geoff Marke, Case No. WR-2024-0320, December 20, 2024 ("Marke Direct/Rebuttal").

[5] Missouri Public Service Commission, Cross Rebuttal Testimony of David Murray, Case No. WR-2024-0320, January 10, 2025 ("Murray Cross-Rebuttal").

P

Q. How is the remainder of your Rebuttal / Surrebuttal / Sur-surrebuttal testimony organized?

A. The remainder of my Rebuttal / Surrebuttal / Sur-surrebuttal testimony is organized as follows:

- Section II provides a summary and overview of my Rebuttal / Surrebuttal / Sur-surrebuttal testimony and the important factors to be considered in establishing the ROE for MAWC.
- Section III provides cost of equity analyses based on market data as of November 30, 2024.
- 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 Ms. Malki's and Mr. Murray's recommended capital structures for MAWC in this proceeding.
- Section VI provides my response to Ms. Malki's cost of equity analyses and recommendations.
- Section VII provides my response to Mr. Murray's cost of equity analyses and recommendations.
- Section VIII provides my response to Ms. Malki's, Mr. Murray's, Mr. Abbott's, and Dr. Marke's discussion of the Company's business and regulatory risks.
- Section IX provides my response to Mr. Murray's cross-rebuttal testimony regarding the appropriate capital structure for MAWC.

II. SUMMARY OF ANALYSES AND CONCLUSIONS

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 and capital structure recommendations of the other witnesses in this proceeding?

A. Figure 1 summarizes the results of the cost of equity analyses presented by Ms. Malki and Mr. Murray in this proceeding, as well as each of their final ROE recommendations. As shown, Ms. Malki conducts a Two-Step DCF analysis, a CAPM analysis and a Bond Yield Plus Risk Premium ("BYRP" or "Risk Premium") analysis. Ms. Malki determined her recommended range of 8.85 percent to 10.15 percent based on the results of her BYRP and set her recommended ROE of 9.50 percent at the midpoint of her recommended range.[6] It is unclear how Ms. Malki considered the results of her DCF and CAPM analyses, which she claims support a cost of equity range of 7.96 percent to 9.84 percent (*i.e.,* determined by averaging the range of the DCF and CAPM results), in determination of her recommended ROE.[7] Further, Ms. Malki opposes the Company's proposed capital structure consisting of 50.54 percent common equity and 49.46 percent long-term debt. Instead, Ms. Malki recommends that MAWC's capital structure be based on the capital structure of American Water Works Corporation ("AWWC") which is composed of 43.60 percent common equity, 0.01 percent preferred equity, and 56.38 percent long-term debt.[8]

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

---

6 Malki Direct/Rebuttal, at 52.

7 *Id.,* at 51-52.

8 *Id.,* at 31-32.

P

analyses. For his DCF and CAPM analyses, Mr. Murray relies on a proxy group of six comparable water utilities. Mr. Murray does not explain how he develops either his recommended ROE range of 9.00 percent to 9.50 percent or his recommended ROE of 9.25 percent, both of which are significantly greater any of the results of his cost of equity analyses shown in Figure 1. Mr. Murray also opposes the Company's proposed capital structure and instead recommends a capital structure consisting of 45 percent common equity and 55 percent long-term debt.[9]

Figure 1: Summary of Results of the Cost of Equity Analyses and ROE Recommendations of Ms. Malki and Mr. Murray

	Ms. Malki	**Mr. Murray**
DCF Analysis		
Two-Step DCF	7.85% - 9.05%	n/a
Multi-Stage DCF	n/a	7.25% - 7.50%
CAPM	8.07% - 10.63%	8.05% - 8.90%
ECAPM	n/a	n/a
Bond Yield Risk Premium	8.85% - 10.15%	8.50%
Recommended ROE Range	8.85% - 10.15%	9.00% - 9.50%
Recommended ROE	**9.50%**	**9.25%**

Q. What are your key conclusions and recommendations regarding the appropriate ROE and capital structure for MAWC in this proceeding?

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

Cost of Equity

[9] Murray Direct/Rebuttal, at 34.

P

- Updating the cost of equity estimation models that I relied upon in my Direct Testimony to reflect market data through November 30, 2024, demonstrates that my recommendation of 10.75 percent continues to fall well within the range of models results.

- While Ms. Malki contends that her DCF and CAPM analyses support a cost of equity range of 7.96 percent to 9.84 percent, it appears she acknowledges that the results of these two models are understated. Mr. Malki's recommendation of 9.50 percent is based on the average results of her BYRP analysis which is at the very high-end of the range that she indicated her DCF and CAPM analyses support.

- When Ms. Malki'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 cost of equity range resulting from those three updated analyses is 9.67 percent to 10.87 percent and the average is 10.19 percent. Therefore, my recommended ROE of 10.75 percent falls well within the adjusted cost of equity range while Ms. Malki's recommended ROE of 9.50 percent falls below the adjusted cost of equity range.

- Mr. Murray's ROE recommendation lacks analytical foundation and simply represents his own unsupported opinion as to the appropriate ROE for MAWC. 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 that is 28 basis points below what he states is the average authorized ROE nationally for water utilities in 2024.

- It is not credible for Mr. Murray to suggest that I should have relied on the assumptions used by his cost of equity estimation models when he does not directly rely on the results of those models to support his recommended ROE.

- While Ms. Malki and Mr. Murray dispute various assumptions that are used in my cost of equity estimation models, nothing in their direct/rebuttal testimonies has caused me to modify or adjust my analyses or ROE recommendation.

    - Neither Ms. Malki nor Mr. Murray have provided credible evidence to conclude that my inclusion of electric and natural gas utilities in my proxy group upwardly biases the results of my cost of equity estimates for MAWC. In fact, I demonstrate Ms. Malki's analysis of the results and the relative risk of the electric and gas proxy companies and the water proxy companies is flawed and does not validate her conclusion that the electric and gas utilities should not be included in the proxy group.

- Ms. Malki's and Mr. Murray's criticism regarding the use of projected earnings growth rates in the constant growth DCF model is unfounded.
    - While both Ms. Malki and Mr. Murray essentially suggest that I should have relied on either a two-stage or multi-stage DCF model using their assumptions, neither of them directly rely on the output of their respective DCF models.
    - Earnings are the fundamental driver of dividend growth rates, and there is significant academic research demonstrating that EPS growth rates are most relevant in stock price valuation.
- Ms. Malki's and Mr. Murray's allegation that the market return in my CAPM and ECAPM analyses is too high is contradicted by the fact that the methodology I have used to estimate the market return is consistent with (1) historical average returns; (2) the approach accepted by various regulators, and (3) the results of a study by the Federal Reserve Bank of New York that evaluated various market risk premium estimates.
    - There are several critical errors in Ms. Malki's "adjustment" to my CAPM and ECAPM analyses, that, when corrected, continues to support an ROE of 10.75 percent and fails to support Ms. Malki's conclusion. Thus, Ms. Malki's "adjustment" to my CAPM and ECAPM analyses cannot be relied upon.

- The recommendation of Mr. Abbott and Mr. Murray to reduce either the Company's ROE or equity ratio if the Company's proposed Revenue Stabilization Mechanism ("RSM") and production cost tracker are implemented is not supported by the analyses in this proceeding.
    - The conclusion reached by Mr. Abbott and Mr. Murray fail to consider the relative risks of the Company and the proxy group companies. When reviewing the relative risks of the Company, including these mechanisms and the proxy group operating companies, as shown in Schedule AEB-9 and discussed in my Direct Testimony, I concluded that the Company has moderately higher regulatory risk than the proxy group.
    - Mr. Abbott has not conducted any analysis to estimate the cost of equity for MAWC, nor has either he or Mr. Murray reviewed any of the proxy groups relied on in the current proceeding to determine which cost recovery mechanisms have been approved for the proxy group companies relative to the Company. Absent a comparison to the proxy group, there is no basis for either Mr. Abbott or Mr. Murray to comment on the relative risk of MAWC to the proxy group, let alone conclude that the either the ROE or equity ratio should be reduced.

Capital Structure

- The Company's proposed equity ratio of 50.54 percent is reasonable given that:

P

- it is below the mean three-year average equity ratio for the proxy group's operating companies by 352 basis points.
- it is at the low end of the range of authorized equity ratios for companies of comparable risk for the period of 2022-2024.
- when coupled with my recommended ROE of 10.75 percent results in a weighted ROE (ROE x equity ratio) that is well within the range of authorized weighted ROEs for the period of 2022-2024.

- I disagree with Ms. Malki and Mr. Murray that the Company's proposed capital structure should be compared to AWWC's consolidated capital structure given that:
  - the risk profiles of AWWC and MAWC are different. AWWC diversifies its risk across many water utility companies and regulatory jurisdictions while MAWC is a water utility with operations that are limited to one regulatory jurisdiction.
  - imposing AWWC's capital structure on MAWC would result in financial metrics that would limit MAWC's ability to seek non-AWCC debt financing.

- I maintain that the stand-alone principle for ratemaking applies to MAWC in this proceeding, which requires that the return provided to the operating company be consistent with the return available to investors on other investments of similar risk. As discussed previously, I disagree with Ms. Malki and Mr. Murray that AWCC's risk profile meets these criteria and instead request that this Commission recognize the difference in risk between an individual operating utility and a diversified financing entity.

III. UPDATED COST OF EQUITY RESULTS

Q. Have you updated your cost of equity analyses to support your Rebuttal / Surrebuttal / Sur-surrebuttal testimony?

A. Yes. As shown in Figure 2 below (see also Schedule AEB-R-1 through Schedule AEB-R-5), I have updated the results of the constant growth DCF, CAPM, and ECAPM analyses based on market data through November 29, 2024, 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 / Surrebuttal / Sur-surebuttal 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.

Q. Have you adjusted the proxy group that was relied upon in your Direct Testimony?

A. Yes, I have. I have included Southwest Gas Holdings, Inc. ("SWX") in the proxy group that I relied on to conduct the updated cost of equity analyses for my Rebuttal / Surrebuttal / Sur-surrebuttal testimony. On April 18, 2024, SWX completed its spinoff of Century Group, Inc. and therefore, is no longer involved in a transformative transaction and would meet the screening criteria that I relied on in my Direct Testimony.

Figure 2: Summary of Updated Cost of Equity Results

	Minimum Growth Rate	Average Growth Rate	Maximum Growth Rate
Constant Growth DCF			
Mean Results:			
30-Day Average	9.52%	10.18%	10.88%
90-Day Average	9.57%	10.23%	10.94%
180-Day Average	9.76%	10.42%	11.12%
Average	9.62%	10.28%	10.98%
Median Results:			
30-Day Average	9.46%	9.99%	10.54%
90-Day Average	9.57%	10.03%	10.49%
180-Day Average	9.68%	10.20%	10.67%
Average	9.57%	10.07%	10.57%

	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
CAPM:			
Current *Value Line* Beta	11.08%	11.07%	11.05%
Current Bloomberg Beta	10.23%	10.20%	10.17%
Long-term Avg. *Value Line* Beta	10.15%	10.12%	10.09%
ECAPM:			
Current *Value Line* Beta	11.32%	11.31%	11.30%
Current Bloomberg Beta	10.68%	10.67%	10.64%
Long-term Avg. *Value Line* Beta	10.62%	10.61%	10.58%

Q. Does your recommended ROE of 10.75 percent fall within the range of your updated model results?

A. Yes. Specifically, the results of my DCF analyses have increased when compared to the results included in my Direct Testimony, while the results of my CAPM and ECAPM results are moderately lower than the results filed in my Direct Testimony. As shown in Figure 2, my recommended ROE of 10.75 percent still falls well within the range of my updated cost of equity results.

IV. CAPITAL MARKET CONDITIONS AND COMPARABLE RETURN

Q. Do you generally agree with Ms. Malki'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 Ms. Malki's and Mr. Murray's respective characterizations of the capital market conditions over the past few years and the fact that Mr. Murray acknowledges the cost of equity for water utilities has increased since the Company's last rate proceeding as a result of the changes in capital market conditions.[10] Similarly, Ms. Malki concluded:

> [a]s shown in Figure 3 [since 2020], the average stock price for water utilities has underperformed compared to the S&P 500 Index. A lower stock price, all else remaining the same, implies a higher COE estimate in the DCF model.[11]

Further, both Ms. Malki and Mr. Murray recognize that short-term and long-term interest rates are significantly higher since the Company's 2022 rate proceeding due to the Federal Reserve's efforts to combat persistently high inflation. However, while Ms. Malki 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.

---

[10] *See, e.g.*, Murray Direct/Rebuttal, at 3, cost of equity range of 7.25 percent to 8.25 percent as compared to a cost of equity range of 6.0 percent to 6.50 percent in MAWC's 2022 rate case (Case No. WR-2022-0303, Direct Testimony of David Murray, November 22, 2022, at 5).

[11] Malki Direct/Rebuttal, at 14. (Clarification added)

P

Q. What conclusions have Ms. Malki and Mr. Murray drawn from the changes in market conditions?

A. Ms. Malki draws a few conclusions regarding capital market conditions and the results of her DCF and CAPM analyses that appear to be inconsistent. For example, in regard to the CAPM, Ms. Malki contends that the results are "overstated" due to: (1) high market risk and (2) high inflation which has led to elevated interest rates.[12] This would imply that the CAPM results cannot be relied on because they are being distorted by current market conditions. Conversely, when discussing the DCF model, Ms. Malki appears to conclude that the recent underperformance of utilities relative to the market results in increased estimates of the cost of equity produced by the DCF model. This conclusion implies that the cost of equity has increased and is not overstated as Ms. Malki concluded in regard to her CAPM results.

Mr. Murray also acknowledges that there has been an increase in the water utility industry's cost of equity in the past few years; however; he contends that his recommended ROE of 9.25 percent in this proceeding is reasonable because the cost of equity for water utilities is lower than electric utilities and, the price-to-earnings ("P/E") ratios for the water utility industry are trading above 2015 levels when the Commission separately authorized an ROE of 9.50 percent for Missouri's electric utilities.[13]

---

12 Malki Direct/Rebuttal, at 14 and 18.

13 Murray Direct/Rebuttal, at 2.

Q. Does the market data presented by Ms. Malki support your conclusion that capital market conditions have increased since the Company's 2022 rate proceeding?

A. Yes. Despite her conflicting interpretations of the changes in market conditions over the last few years, Ms. Malki has acknowledged that both the DCF and CAPM results indicate a higher cost of equity in the current proceeding than at the time of the Company's 2022 rate case. This is important because Ms. Malki's recommended ROE of 9.50 percent is inexcusably 23 basis points below Staff's recommended ROE of 9.73 percent in the Company's 2022 rate proceeding.[14]

Further, Ms. Malki's position that the results of her CAPM are "overstated" in the current capital market conditions is invalidated by the fact that her recommended ROE for the Company in this proceeding (i.e., 9.50 percent) is above the mean results of her CAPM of 9.35 percent.

Q. Is Mr. Murray's ROE recommendation of 9.25 percent in this proceeding consistent with the P/E ratio data that he references to support his recommendation?

A. No. The premise of Mr. Murray's discussion of the historical P/E ratios is that as P/E ratios for the water utility industry increase, the authorized ROE decreases, and vice versa. However, Mr. Murray's P/E benchmarking exercise is simplistic and fails to recognize other factors besides P/E ratios are used to estimate the cost of equity and for the Commission to establish an authorized ROE. To illustrate this point, the average P/E ratio for the companies that Mr. Murray indicates as representative of the water utility industry was 32.21 during the pendency of MAWC's 2020 rate proceeding in Case No. WR-2020-

[14] Case No. WR-2022-0303, Direct Testimony of Randall T. Jennings, November 22, 2022, at 5

P

0344, while the P/E ratio for those same companies is 23.90 for the period of July 1, 2024 (i.e., the filing date of MAWC's current rate proceeding) to September 30, 2024 (i.e., the end of the P/E ratio data provided by Mr. Murray).[15] Therefore, according to Mr. Murray's premise, his ROE recommendation in the current proceeding should be well above his ROE recommendation for MAWC in Case No. WR-2020-0344; however, that was not the case. Mr. Murray's ROE recommendation of 9.25 percent for MAWC in the current proceeding is equivalent to his ROE recommendation of 9.25 percent for MAWC in Case No. WR-2020-0344. Accordingly, Mr. Murray's attempt to benchmark P/E ratios for a group of water utilities as the basis for his ROE recommendation fails to support his recommendation and is not credible as he has held his recommendation in the current proceeding at a level that is consistent with his ROE recommendation at a time when P/E ratio were substantially higher.

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 3, long-term bond yields have increased substantially since the Commission adopted the settlement in the Company's last 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, in the most recent meeting, the FOMC

[15] Source: Murray workpaper titled: Charts and Graphs in Testimony-WR-2024-0320.xlsx.

P

indicated an expectation that there may be only two rate reductions before the end of 2025.[16]

Figure 3: Change in Market Conditions Since Missouri-American Water Company Last Rate Proceeding[17]

Docket	Date	Federal Funds Rate	30-Day Avg 30 Year Treasury Bond Yield	Core Inflation Rate
Settlement filed - WR-2022-0303	3/3/2023	4.57%	3.78%	5.56%
Order - WR-2022-0303	5/3/2023	4.83%	3.70%	5.33%
Direct Testimony	5/31/2024	5.33%	4.66%	3.41%
Current	12/31/2024	4.33%	4.56%	3.30%
Settlement to Current		-0.24%	0.79%	-2.26%
Order to Current		-0.50%	0.86%	-2.03%

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

A. The Federal Open Market Committee ("FOMC") recently reduced the federal funds rate range by a total of 100 basis points from 5.25 percent to 5.50 percent to 4.25 percent to 4.50 percent from the September 2024 meeting through the December 2024 meeting. However, at the December 2024 meeting, Chairman Powell's tone changed slightly, indicating any further reductions "now hinge on further progress in lowering stubbornly high inflation" and noted that from this point the FOMC will be "cautious about further cuts," forecasting just two rate cuts before the end of 2025.[18]

---

16 Schneider, Howard and Saphir, Ann, Reuters, Fed lowers rates but sees fewer cuts next year due to stubbornly high inflation, December 18, 2024.

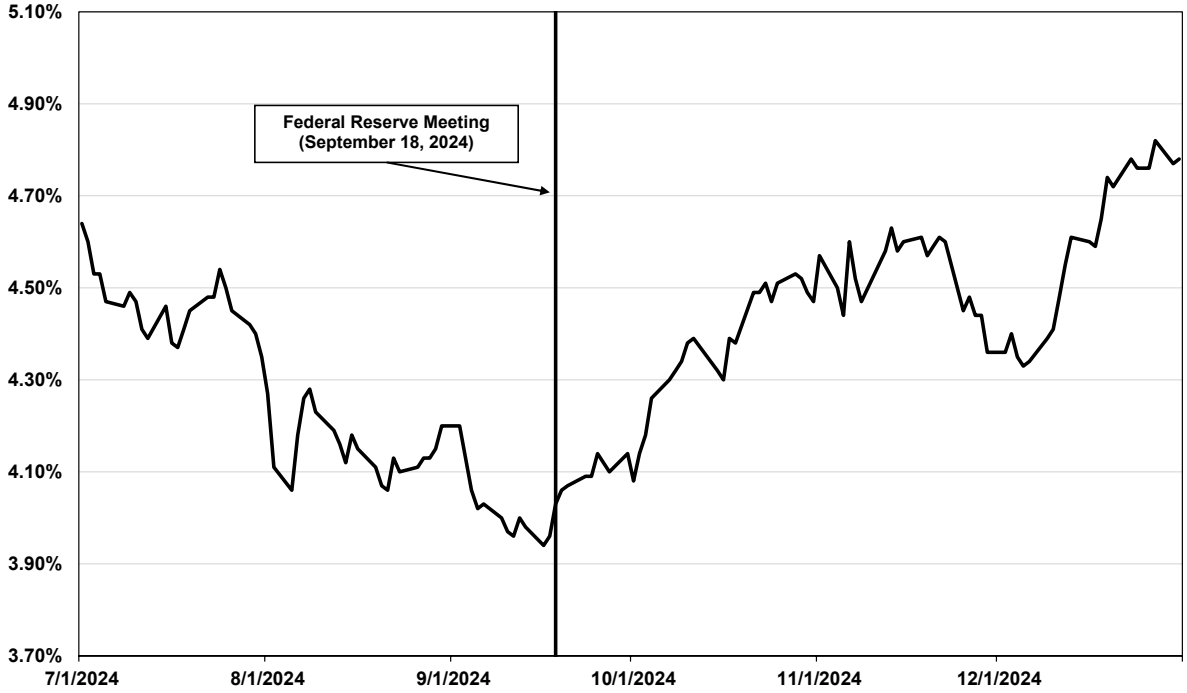
17 St. Louis Federal Reserve Bank; Bureau of Labor Statistics.

18 Howard Schneider and Ann Saphir, "Fed lowers rates but sees fewer cuts next year due to stubbornly high inflation," Reuters, December 18, 2024.

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 4, 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 December 31, 2024, the 30-year Treasury bond yield was 4.78 percent, which is consistent with levels seen in April 2024, several months prior to the reductions in the federal funds rate.

Figure 4: 30-year Treasury Bond Yield, July 1, 2024 – December 31, 2024[19]



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

A. According to a recent *Reuters* article, the increase in long-term government bond yields in the third quarter of 2024 was initially related to investors responding to an increasing

[19] S&P Capital IQ Pro.

P

probability of a Trump Administration in 2025 and has continued with the re-election of President Trump.[20] This is because investors view key elements of President Trump's economic plan such as tax cuts and tariffs as inflationary. The FOMC has indicated that the expectation of sustained inflation means that the Federal Reserve expects to lower the federal funds rate more gradually in 2025. For example, at the time the article was published in November 2024, *Reuters* noted that investors expected the federal funds rate to decline to 3.70 percent by the end of 2025 from the current range of 4.50 percent to 4.75 percent, which is 100 basis points above investors' expectations in September 2024.[21] Currently, as of January 2025, according to the CME Group, investors' expect the federal funds rate to decline by only 25 basis points by the end of 2025 to a range of 4.00 percent to 4.25 percent.[22]

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 estimates published in the *Blue Chip Financial Forecasts* for the average yield on the 30-year Treasury bond is 4.48 percent through 1Q/2026[23] and 4.30 percent over the longer term through 2030.[24] This is important because it means that long-term interest

---

20 Davide Barbuscia and Lewis Krauskopf, "Bond rebound uncertain as Trump plans overshadow Fed rate cuts," Reuters, November 8, 2024.

21 *Id.*

22 CME Group, as of 1/6/2025.

23 *Blue Chip Financial Forecasts*, Vol. 44, No. 1, December 30, 2024, at 2.

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

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 Ms. Malki'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 Ms. Malki or Mr. Murray agree that it is appropriate to consider previously authorized ROEs?

A. Ms. Malki appears to benchmark her recommended ROE of 9.50 percent to the average authorized return for water utilities in 2024, which she contends is 9.49 percent.[25] Similarly, Mr. Murray also considered the average authorized return for water utilities in 2024, which he calculated as 9.53 percent, when determining his recommended ROE of 9.25 percent.[26] 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

[25] Malki Direct/Rebuttal, at 55.

[26] Murray Direct/Rebuttal, at 5.

the period of 2010 through 2020, authorized returns did not decline by as much as they should have.[27]

Q. Do you have any concerns with the review of authorized returns conducted by Ms. Malki and Mr. Murray?

A. Yes. I have three primary concerns with the review of authorized returns conducted by Ms. Malki and Mr. Murray:

- Both Ms. Malki and Mr. Murray only include authorized returns for water utilities; however, the authorized returns for both transmission and distribution only ("T&D") electric and natural gas utilities should have been included in the sample of authorized returns reviewed. As I will discuss in more detail below, neither Ms. Malki nor Mr. Murray have provided credible evidence to conclude that the risks faced by T&D electric and natural gas utilities are sufficiently different than water utilities to warrant their exclusion. In fact, as I show in Figure 15 below, the average annual authorized returns for water utilities have been relatively consistent with the annual average for T&D electric and natural gas utilities. Further, reliance on only the authorized returns for water utilities results in a limited sample size. For example, as shown in Table 7 of Ms. Malki's direct/rebuttal testimony, her average annual authorized return for 2024 is only based on returns authorized in 9 rate cases.[28] The smaller the size of the sample of authorized returns, the greater the chance the average could be affected by the results of one rate case.

- Ms. Malki has not considered the effect of market conditions particularly the differences in the market conditions that existed when the returns were authorized relative to current market conditions. As noted, interest rates have increased substantially over the past few years and are expected to remain elevated over the near-term. Further, while Mr. Murray considered the recent increase in interest rates, he incorrectly concludes that returns should not increase because authorized returns did not decrease sufficiently to reflect the decline in interest rates over the period of 2010-2020.

- Both Ms. Malki and Mr. Murray rely primarily on annual average authorized returns instead of also considering the full range of authorized returns. For example, Ms. Malki relies on the average annual authorized returns for all water utilities to conclude that her recommendation is reasonable. However, it is important to

---

27 *Id.* at 19-20.

28 Malki Direct/Rebuttal Testimony, at 54.

consider the range of authorized returns due to the recent change in market conditions discussed, as well as to consider the business risk of the Company.

Q. Have you reviewed recently authorized ROES for utilities?

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

- I excluded rate cases for vertically integrated electric utilities because utilities that own generation have a different risk profile than water, natural gas, and T&D electric utilities.
- 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 5, since 2020, authorized ROEs for water, natural gas, and T&D electric utilities have increased. Further, both Ms. Malki's recommended ROE of 9.50 per cent and Mr. Murray's recommended ROE of 9.25 percent are below the average authorized ROE for water, natural gas, and electric utilities in the United States in 2024. It is therefore unreasonable to conclude that either Ms. Malki's or Mr. Murray's recommendation would reflect the investor-required return on equity for a water utility in current market conditions.

Figure 5: Range of Annual Authorized ROEs for Water, Natural Gas, and T&D Electric Utilities, 2020 –2024[29]

Year	Mean	Low	High
2020	9.42%	8.80%	10.00%
2021	9.54%	8.80%	10.24%
2022	9.53%	9.00%	10.20%
2023	9.51%	8.70%	10.25%
2024	9.66%	9.10%	11.88%

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 water, natural gas and T&D electric utilities since 2020 as shown in Figure 5 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 teams' abilities to raise capex budgets materially in the five-year window. Please see our additional work below highlighting the CoC crunch.[30]

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

[29] S&P Capital IQ Pro.

[30] Murray Direct/Rebuttal, at 20. Referencing: Nicholas Campanella, et. al., "U.S. Power & Utilities: Initiating Coverage: Down but Not Out," Barclays, August 22, 2023, p. 23.

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. In addition, to the examples provided in my Direct Testimony,[31] Connecticut, which is viewed by research analysts, equity analysts, and investors as among the least credit supportive jurisdictions in the United States for utilities, 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 has also indicated that it is exploring a sale of Aquarion Water due to the Connecticut regulatory environment.[32]

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

[31] Bulkley Direct, at 12-15.

[32] Luther Turmelle, "Aquarion is for sale, but who will buy it? Here's a look at what's next," CT Insider, March 23, 2024.

P

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.[33] Eversource executives stated that the company is unwilling to place capital at risk within Connecticut given that the state's regulatory policy discourages investment.[34] 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.[35] 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."[36] Eversource indicated that it will not reduce safety spending, but that it has made significant investments in reliability over the past decade but is unwilling to continue doing so without a secure and predictable cost recovery path.[37]

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

---

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

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

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

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

37 *Id*.

P

to the state's adverse regulatory environment.[38] 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.[39] In addition, Eversource and its subsidiaries, including CL&P, were downgraded one notch by S&P in December 2024, with S&P highlighting "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."[40]

Similarly, Avangrid, which owns United Illuminating ("UI"), CNG, and SCG in Connecticut, has also announced that its planned $191 million in capital investment in the state hinges on both regulatory decisions associated with the pending rate cases of CNG and SCG, and the resolution of Avangrid's ongoing legal appeal of PURA's August 2023 order whereby UI's rate request was reduced from $131 million to $23 million, which the utility says will require it to operate at a loss.

In addition, Avangrid has indicated that it experienced difficulties in attracting adequate subscription levels for debt issuances by its Connecticut utilities that closed in December

---

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

39 *Id*.

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

2023, and the bonds priced at a higher coupon rate than anticipated.[41] 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 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*.[42]

V. CAPITAL STRUCTURE

Q. What did Ms. Malki and Mr. Murray propose for the Company's capital structure in this proceeding?

A. Ms. Malki follows Staff's historical recommendations that the Commission use the consolidated capital structure of AWK for ratemaking purposes. As such, Ms. Malki recommends a capital structure that reflects the capital structure of AWK as of June 30, 2024, which is composed of 43.60 percent common equity, 0.01 percent preferred equity, and 56.38% long-term debt.[43]

---

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

42 *Id*.; emphasis added.

43 Malki Direct/Rebuttal, at 31-32.

Mr. Murray also recommends a capital structure that is based generally on American Water's capital structure on a consolidated basis, recommending a capital structure that is composed of 45 percent common equity and 55 percent long-term debt.[44]

Q. Do you agree with Ms. Malki that MAWC capital structure should be similar to American Water's capital structure?

A. No, I do not. A foundation to her conclusion is that the entities AWWC and MAWC bear similar risk. Consistent with the position of other staff members, Ms. Malki states that if "the business risks of the parent company are similar to those of the subsidiary, then each entity should be able to incur similar amounts of financial risk. Presumably, this should cause their capital structures to be fairly similar."[45] Malki supports this notion because MAWC receives debt financing from AWCC which issues debt that is rated based on the consolidated risk profile of AWWC and therefore suggests that the financial risks being evaluated by the market are AWWC's risks.[46] However, Ms. Malik has not provided any evidence that the business risks of the two entities are similar. AWWC has thirteen regulated water utility operating companies providing water and wastewater in jurisdictions across the U.S. MAWC is engaged in the provision of water and wastewater services to a defined population with a defined distribution system in a single regulated jurisdiction. The risk profiles of AWWC and MAWC are different because AWWC has the benefit of diversification of its subsidiaries' operations across more than a dozen

---

44 Murray Direct/Rebuttal, at 34.

45 Malki Direct/Rebuttal, at 29.

46 Malki Direct/Rebuttal, at 24-25.

regulatory jurisdictions across the U.S., whereas MAWC's operations are consolidated in a single jurisdiction, with the risks of its business operations also in that one jurisdiction.

Q. Does Ms. Malki agree that diversification reduces risk?

Yes, Ms. Malki agrees that diversification reduces risk, which in turn can help increase leverage, and she recognizes this risk difference between AWCC and MAWC; however, she ignores this important distinction when she proposes using AWWC capital structure for MAWC ratemaking capital structure. Specifically, Ms. Malki states:

> Further, due to diversified equity investments in subsidiaries, it is reasonable to assume that AWWC can take on greater leverage than MAWC because of its lesser financial and business risk. Staff notes that it is not always appropriate to use the parent company's cost of common equity if the parent company's risk profile is significantly different from that of its regulated subsidiaries.[47]

Ms. Malki's failure to address this difference in risk between AWCC and MAWC, through either her capital structure or recommended ROE for MAWC, is inconsistent with her own recognition of the fact that diversification reduces the risk of AWCC as compared with MAWC and makes her recommended capital structure inconsistent with the comparable return standard set forth in Hope and Bluefield that has been upheld by the Commission.[48]

Q. Does Ms. Malki recognize the benefits to MAWC's customers from its ability to obtain financing from AWCC?

No. Ms. Malki comes to the unsubstantiated conclusion that "[n]ot only would it be unreasonable and inappropriate to use MAWC's standalone capital structure to set

---

47 Malki Direct/Rebuttal, at 29-30.

48 Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944) ("Hope"); Bluefield Waterworks & Improvement Co., v. Public Service Commission of West Virginia, 262 U.S. 679 (1923) ("Bluefield").

MAWC's ROR, it would be more costly for ratepayers because of the higher equity ratio in MAWC's capital structure."[49] Ms. Malki has provided no evidence that MAWC's standalone capital structure is either "unreasonable" or "inappropriate." Ms. Malki simply concludes that since debt has a lower cost than equity, more debt in the capital structure will result in a lower cost. However, Ms. Malki fails to consider the financial risk associated with higher leverage: lower coverage ratios, lower credit ratings, and a higher cost of debt. In addition, higher leverage increases the risk to equity holders, who bear greater risk when an entity has higher leverage. Therefore, as leverage increases, the risk to equity holders increases, as does the investor-required cost of equity. Ms. Malki has provided no evidence to support her conclusion, and her proposal to simply substitute debt for equity will not necessarily reduce cost for customers.

As discussed in the Direct Testimony of Company witness Mr. Furia, the reliance on AWCC to issue debt has reduced the overall cost of debt for MAWC's utility customers as compared with MAWC acquiring debt on a stand-alone basis.[50] Therefore, it is unreasonable to adjust MAWC's capital structure to reflect the AWWC capital structure simply because MAWC primarily does not issue debt independently, when the use of a consolidated debt offering by AWWC has resulted in lower costs to customers.

Q. Has MAWC sought debt financing from sources other than AWCC?

A. Yes, as included in the Supplemental Direct Testimony of witness LaGrand, and authorized by the Commission MAWC intends to issue $150 million its own debt via State Revolving

[49] Malki Direct/Rebuttal, at 29.

[50] Furia Direct testimony, at 9-10.

Fund loans. MAWC is also exploring additional opportunities for State Revolving Fund loans that could be for as much as an additional $150 million of debt. [51]

Q. What are the options that are most often considered by utility regulatory commissions when setting a regulated utility's capital structure?

A. The three options that are most often considered for establishing a capital structure for ratemaking purposes are as follows:

- The utility operating company's actual (or projected) capital structure per the financial books and records of the company when this capital structure is reflective of the way the company is operated and it is generally consistent with industry norms.
- A hypothetical capital structure can be considered, especially if there are concerns that the actual per books capital structure is not reflective of the optimal capital structure for the utility operating company. The hypothetical capital structure can be based on comparable companies (*e.g.*, set within the range of the proxy group) or determined by the regulatory commission based on other risk factors.
- The parent company's consolidated capital structure has been applied when the utility operating company represents the vast majority of the parent holding company's operations, and therefore the financing for the operating company and the holding company are similar. This is not the case with American Water and any of its subsidiaries, including MAWC.

Q. Is the Company's proposed capital structure consistent with industry norms and therefore reasonable for ratemaking purposes?

A. Yes, it is for several reasons. First, pursuant to the stand-alone principle of ratemaking, regulated rates should be based solely on the risks and benefits of the regulated utility, not

[51] LaGrand Supp-DT, p. 6.

its investors, parent or affiliates. In the current proceeding, the Commission is estimating the cost of capital for MAWC's operations in Missouri, not a combination of MAWC and its affiliates across the United States that is encompassed by the capital structure of American Water. Second, as discussed in the Direct Testimony of Mr. Furia, the Company's capital structure is reflective of the way the Company has been operated.[52]

Furthermore, I have examined the capital structures of the operating companies of the proxy group as well as the capital structures that have recently been authorized for natural gas and water utilities. In each case, the Company's proposal is within the established range. As shown in Figure 6 below, the Company's proposed equity ratio is below the average of the actual equity ratios established by the utility operating companies held by the proxy group companies. In contrast, Staff's proposed equity ratio is approximately 275 basis points below the low end of the range set by the equity ratios of the proxy companies and OPC's recommended equity ratio is 134 basis points below the low end of the range.

[52] Furia Direct Testimony , at 7-8.

P

Figure 6 : Equity Ratios of Proxy Companies

Proxy Group Company	Ticker	2023	2022	2021	3-yr Avg.
American States Water Company	AWR	NA	54.16%	56.91%	55.54%
Atmos Energy Corporation	ATO	60.20%	60.01%	59.88%	60.03%
California Water Service Group	CWT	57.04%	50.07%	48.82%	51.97%
Essential Utilities, Inc.	WTRG	55.59%	57.04%	53.58%	55.41%
Eversource Energy	ES	55.48%	55.31%	53.25%	54.68%
Middlesex Water Company	MSEX	56.62%	57.46%	57.39%	57.16%
NiSource Inc.	NI	55.44%	54.17%	54.85%	54.82%
Northwest Natural Gas Company	NWN	46.96%	47.72%	44.08%	46.25%
ONE Gas, Inc.	OGS	60.41%	58.24%	61.09%	59.92%
SJW Group	SJW	53.11%	50.45%	50.85%	51.47%
Spire, Inc.	SR	46.34%	47.22%	48.62%	47.39%
MEAN		54.72%	53.81%	53.57%	54.06%
LOW		46.34%	47.22%	44.08%	46.25%
HIGH		60.41%	60.01%	61.09%	60.03%

As discussed in my Direct Testimony, the equity ratio is a measure of the financial risk of a company and the authorized ROE is the return to compensate investors for that risk.[53] In this case, the appropriate ROE for MAWC is based on a cost of equity analysis of a proxy group of publicly traded companies. To the extent that the capital structure that is authorized for MAWC has significantly higher leverage than the proxy group, then the Commission is imposing greater risk than the proxy group companies. Therefore, that incremental risk should be reflected in a relatively higher authorized ROE.

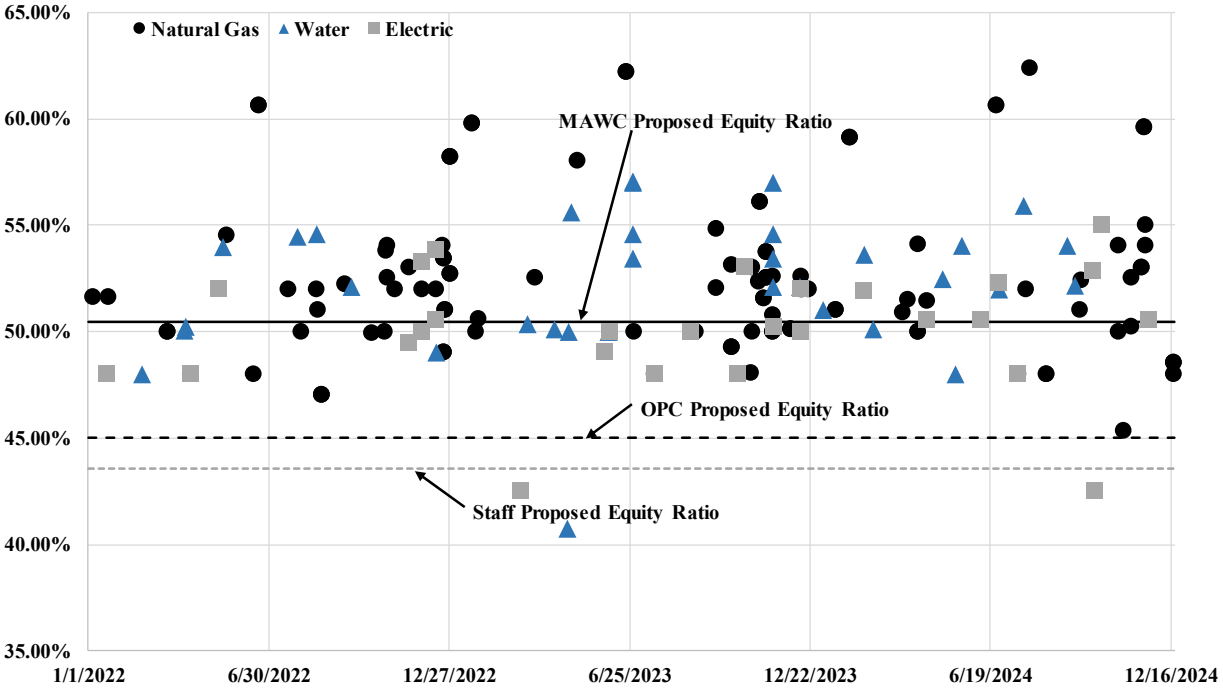
Q. How do the proposed equity ratios in this case compare with the equity ratios that have been recently authorized for water, natural gas and T&D electric utilities?

A. As shown in Figure 7 below, the majority of the recently authorized equity ratios for T&D electric, natural gas and water utilities are in the range of 50 percent to 55 percent. MAWC's proposed equity ratio of 50.54 percent is at the low end of the range of authorized

[53] Bulkley Direct, at 69.

equity ratios for companies of comparable risk. In contrast, the Staff's and OPC's proposed equity ratios is below nearly every authorized equity ratio over this same period.

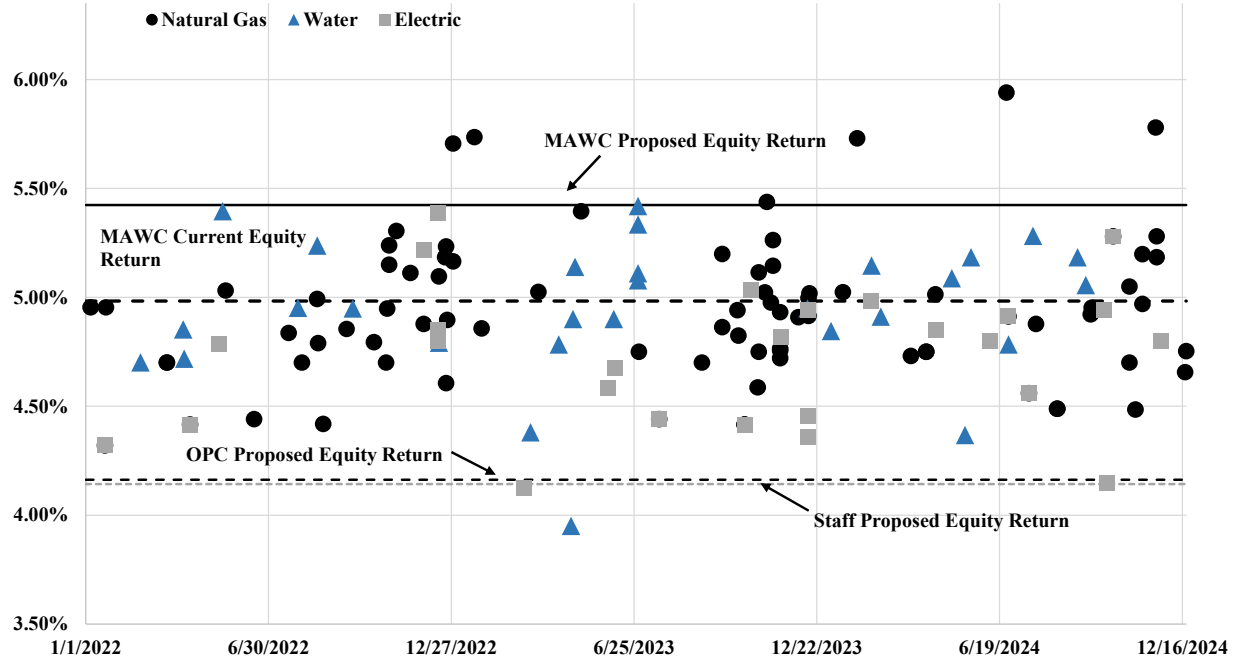
Figure 7: Average Authorized Equity Ratios for T&D Electric, Natural Gas and Water Utilities 2022-2024[54]



As shown in Figure 8, OPC and Staff's proposed equity returns (equity ratio x ROE) are at the very low-end of the range of authorized equity returns over the past three years.

[54] Chart excludes jurisdictions that include zero cost items in the capital structure: Arkansas, Indiana, Michigan and Florida.

Figure 8: Average Authorized Equity Returns for T&D Electric, Natural Gas and Water Utilities 2022-2024[55]



Q. Would the use of consolidated capital structure for ratemaking purposes affect investment in MAWC?

A. Yes, it could. As discussed in the Rebuttal/Surrebuttal/Sur-Surrebuttal Testimony of Company Witnesses Nick Furia, while the Company will always maintain a safe and reliable system, proactive investments in the MAWC system, as well as the acquisition of troubled water systems likely will not continue to occur at current levels if they are not supported by regulatory policy.[56]

[55] Chart excludes jurisdictions that include zero cost items in the capital structure: Arkansas, Indiana, Michigan and Florida. MAWC current equity return is based on an equity ratio of 50.00% and an ROE of 9.75%.

[56] Furia RT/ST/SST, at 5.

Q. Could the use of AWCC's consolidated capital structure affect MAWC's access to capital?

A. Yes, it could. Authorizing a more leveraged capital structure could make it difficult to access capital on reasonable terms. While MAWC receives financing from AWCC, I understand that MAWC has the option to seek financing elsewhere if it can obtain better terms than offered by AWCC. If MAWC needed to access capital from sources other than AWCC, imposing the consolidated capital structure on MAWC could result in weaker credit metrics that could limit MAWC's options for access to capital from sources other than AWCC.

Q. Why do you think that MAWC's credit metrics would be weaker if it were capitalized along the lines recommended by Ms. Malki and Mr. Murray?

A. As noted by Mr. Murray, MAWC's funds from operations ("FFO")-to-debt ratios have been in the range of ***_____*** [57] Mr. Murray also recognizes that: (i) AWK was downgraded in 2019 when it had an FFO-to-debt ratio of 16 percent; (ii) its FFO-to-debt ratio has been approximately 13 percent to 14 percent the past few years; and (iii) its FFO-to-debt ratio is expected to decline to 12 to 14 percent over the next few years.[58] Considering that AWK was downgraded in 2019 with an FFO-to-debt ratio of 16 percent, it is reasonable to assume that if AWK's capital structure is used for MAWC's ratemaking purposes, and thus MAWC's FFO-to-debt ratio were to match or be similar to

---

57 Murray Direct/Rebuttal, at 38.

58 Id., at 39. Mr. Murray acknowledges that his proposed capital structure will have the effect of weakening MAWC's FFO-to-debt ratio by reducing MAWC's FFO by $15.5 million, but justifies this effect by suggesting that the MAWC FFO-to-debt ratio will not fall below the target debt ratio for AWK. However, Mr. Murray also acknowledges that AWK was downgraded in April 2019 due to increased leverage and the weakening of credit metrics and that AWK's FFO-to-debt ratio is currently lower than when the downgrade occurred.

AWK's current credit metrics, MAWC's financial strength would be weakened, thus limiting MAWC's options for access to capital financing outside of AWK.

In fact, S&P stated that, **[redacted]**

Thus, implementing Ms. Malki's and Mr. Murray's proposal in which MAWC's regulated capital structure would reflect AWK's consolidated capital structure would be inconsistent with the financial expectations of the credit rating agencies and could result in a downgrade the Company.

Q. Mr. Murray asserts that rating agencies, such as S&P Global Ratings, typically allow water utility companies to carry more leverage due to lower business risk associated

[59] S&P Global Ratings, Private Rating, Missouri-American Water Co., May 16, 2024, at 3.

[60] *Id.*

[61] *Id.,* at 2.

P

with water utility assets.[62] Is this a basis for applying AWK's consolidated capital structure to MAWC for ratemaking purposes?

A. No. While Mr. Murray claims that S&P "allows water utility companies to have funds from operations-to-debt (FFO/debt) ratios of as low 9% to 13% and still maintain an 'A' credit rating,"[63] he has disregarded or failed to acknowledge that Moody's, as just discussed, **_____ _____**

Q. Why is AWK still rated "investment grade" when it has a debt ratio similar to what Ms. Malki and Mr. Murray have proposed for MAWC?

A. As noted above, the rating agencies acknowledge that AWK benefits from the diversity of the utility operations in the large AWK system as part of their risk assessment. Specifically, Moody's has noted that AWK's credit profile is supported by: (1) its market position as the largest U.S. investor-owned water utility holding company, (2) strong regulatory and operational diversity across 14 states, and (3) reduced business risk after divesting its unregulated services business in 2021.[64] Consequently, the rating agencies recognize that the risk of AWK is lower than that of an entity operating in one jurisdiction or in one industry, and have reflected that lower risk in AWK's credit rating.

---

62 Murray Direct/Rebuttal, at 39.

63 *Id.,* at 40.

64 Moody's Investor Services, Credit Opinion, American Water Works Company, Inc., February 23, 2024, at 1.

Q. Please respond to Mr. Murray's position that it is not fair to ask ratepayers to pay for higher-cost capital than American Water considers appropriate for its consolidated capital structure.

A. Mr. Murray recognizes that American Water benefits from the diversification of utility operations across many jurisdictions, and that the benefits of this lower risk profile are transferred to MAWC customers through the relatively lower financing costs achieved by AWCC than could otherwise be obtained if MAWC were to seek financing on a stand-alone basis.[65] Therefore, since the American Water capital structure consolidates the risk of its many operating companies, MAWC's customers are benefiting from that consolidated (and thus lower) risk in the form of low-cost debt achieved by AWCC. If MAWC is allowed to maintain its requested stand-alone capital structure, then MAWC's customers will also benefit from the resulting financial flexibility of having a relatively higher equity component consistent with its actual operations, which is important in the event there is a benefit from or a need to attract capital from a source other than AWCC.

Q. What analysis has been conducted to demonstrate that MAWC's financing through AWCC is low-cost financing?

A. In his Direct Testimony, Mr. Furia provides an analysis that demonstrates that $29 million in savings have been passed on to MAWC customers as a result of the use of AWCC financing as compared with accessing the private placement bond market.[66] In addition, in Figure 9, I show the debt issuances made through AWCC since 2007, including the date of the issuance and the interest rate on the issuance. In addition, I have calculated the 30-day

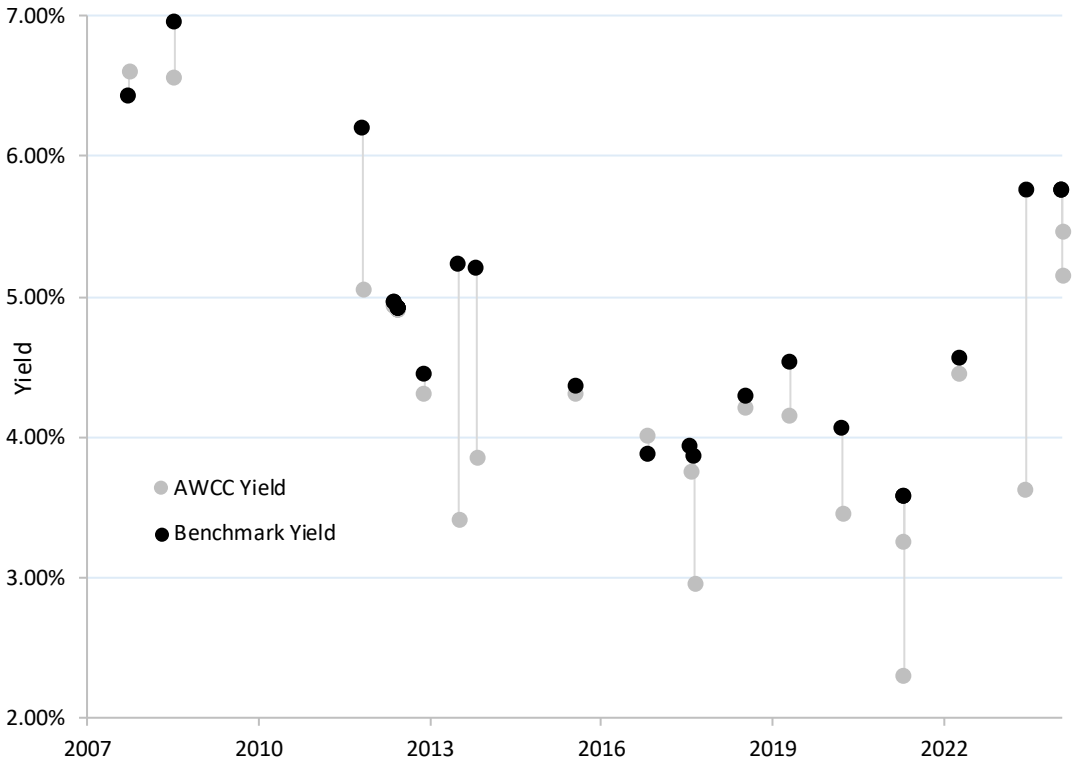
---

65 Direct Testimony of David Murray, at 41.

66 Furia Direct, at 9.

average yield on the Moody's A-rated Utility Bond Index and the Moody's Baa-rated Utility Bond index as of the date of each debt issuance. As shown in Figure 9, the interest rate obtained by AWCC has almost always been lower than the yield on the Moody's Utility Bond Index that corresponds to the AWCC rating at the time of issuance. This demonstrates that issuing debt through AWCC has consistently been the lowest cost resource available to American Water subsidiaries, including MAWC. Therefore, Missouri ratepayers have benefitted from the availability of the AWCC financing option, as opposed to MAWC obtaining financing on the open market.

Figure 9: Comparison of Interest Rates on AWCC Debt Issuances and Applicable Moody's Utility Bond Index at Time of Issuance



P

Q. Is there a mismatch between Ms. Malki and Mr. Murray's capital structure proposals and their respective proposals to rely on a proxy group to determine the authorized ROE?

A. Yes. While Ms. Malki and Mr. Murray propose that the equity ratio for MAWC match the consolidated capital structure of American Water, they also rely on market-based data for a proxy group of comparable companies to estimate the cost of equity. The market-based data for the proxy group includes the capitalization of those companies. Therefore, the cost of equity that is estimated using the proxy group companies is related to the equity ratios of the proxy companies, not AWCC.

As discussed in my Direct Testimony, the *Hope* and *Bluefield* decisions form the basis for determining whether a return is just and reasonable.[67] One of the standards established by the United States Supreme Court in those cases is that the authorized return must be consistent with the returns for other companies with similar or comparable risk. Unless the authorized equity ratio in this case is comparable to the equity ratio of the proxy group, the ROE will be out of sync, and the *Hope* test will be violated because it requires that the authorized ROE be based on "comparable risk."

The risk factors that are considered for purposes of establishing "comparable risk" are the business risk, financial risk (leverage), and regulatory risk of the subject company to the proxy group:

- The use of proxy group companies in similar businesses establishes comparable business risk.

[67] Bulkley Direct, at 9.

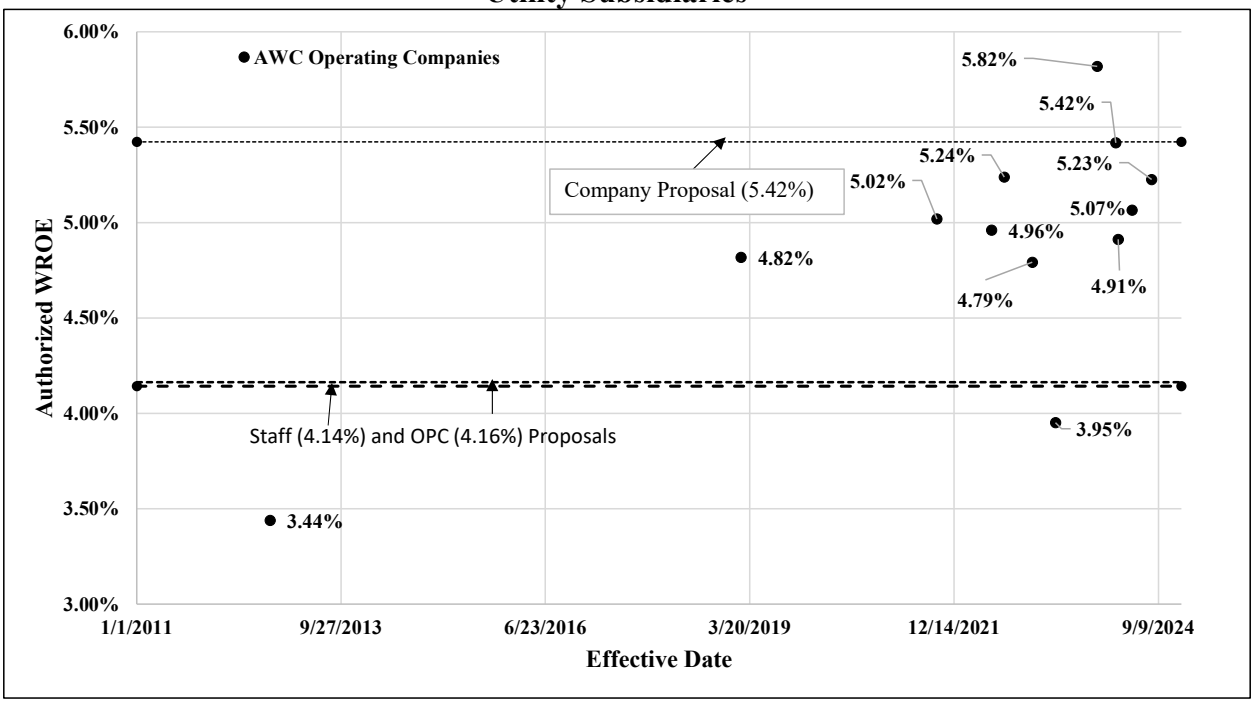
- The comparability of financial risk is evaluated by comparing the leverage of the subject company (*i.e.*, MAWC) to the proxy group. If the proxy group has lower financial risk (leverage) than the risk reflected by the equity ratio for the subject company, the cost of equity that results from the proxy group analysis must be adjusted to reflect the incremental risk of the subject company.
- Finally, regulatory risk is somewhat less certain across proxy companies. In this instance, the proxy group companies are more like American Water in that the regulatory risk is diversified across multiple jurisdictions.

Consequently, use of American Water's consolidated capital structure, which is more highly leveraged than the capital structures of the proxy companies, would result in increased financial risk for MAWC that would need to be accounted for through an authorized ROE that is higher than what is indicated by the proxy company analysis.

Q. How do Ms. Malki's or Mr. Murray's proposed equity ratios in combination with their proposed ROEs for MAWC compare to the other American Water utility operating subsidiaries?

A. Ms. Malki's proposed equity ratio of 43.60 percent and recommended ROE of 9.50 percent produces a weighted equity return ("WROE") of just 4.14 percent. Mr. Murray's proposed equity ratio of 45.00 percent and his recommended ROE of 9.25 percent produces a WROE of just 4.16 percent. The mean authorized ROE for the American Water operating subsidiaries is 9.78 percent and the mean equity ratio is 50.04 percent, which, as shown in Figure 10, produces a mean WROE of 4.89 percent. Thus, the weighted equity returns for MAWC proposed by Staff and OPC are substantially below the mean WROE of American Water's other operating companies.

Figure 10: Authorized Weighted Cost of Equity for American Water's Regulated Water Utility Subsidiaries[68]



Q. Does financial theory require aligning the equity ratio for ratemaking purposes to the equity ratio used to determine the authorized ROE?

A. Yes. If the Commission accepts Staff's or OPC's proposal to impute a capital structure consisting of more debt than the Company's test year capital structure, the higher common equity cost rate related to a changed common equity ratio must also be reflected in establishing the authorized ROE. It is a fundamental tenet of finance that the greater the amount of financial risk borne by common shareholders, the greater the return required by shareholders to be compensated for the added financial risk imparted by the greater use of senior debt financing. In other words, the greater the debt ratio, the greater the return required by equity investors. Thus, in that circumstance, the cost of equity must be adjusted

[68] Short term debt is included in the capital structure for KY, IL, TN, VA, WV. The capital structure for TN includes portion for company and parent. IN includes deferred taxes in the capital structure, which have been removed for comparison purposes. MAWC excluded from this analysis.

P

to reflect the additional risk associated with the more debt-heavy capital structure. In fact, Mr. Murray acknowledges this relationship considering that he has stated that if the Commission authorizes a higher equity ratio than his recommendation, then he recommends that MAWC be authorized an ROE at the lower end of his range.[69]

Q. If the equity ratios recommended by Ms. Malki and Mr. Murray were implemented, would the ROEs that they have recommended have to be significantly higher in order to achieve the equity return based MAWC's current equity ratio and ROE?

A. Yes. As shown in Figure 11, if Staff's and OPC's proposed equity ratios were implemented, their ROEs for MAWC would need to be 11.22 percent and 10.87 percent, respectively, in order to achieve the same average WROE as AWK's subsidiaries which is 4.89 percent based on an average equity ratio of 50.04 percent equity ratio and an average ROE of 9.78 percent. While Mr. Murray states that his recommended ROE should be lower if the Commission does not accept his proposed equity ratio proposal for MAWC, ironically, he fails to acknowledge that his recommended equity ratio in combination with his recommended ROE in this proceeding is well below the average for American Water's regulated water utility subsidiaries, highlighting a disconnect with Mr. Murray's and Ms. Malki's proposals.

[69] Direct Testimony of David Murray, at 6. Mr. Murray suggests that 9.00 to 9.50 percent is a reasonable range, with a point estimate of 9.25 percent based on his capital structure proposal.

Figure 11: Staff and OPC Proposed WROE v. Average AWK Subsidiary WROE

	AWK Average	Staff	OPC
Staff & OPC As Proposed			
Equity Ratio	50.04%	43.60%	45.00%
Equity Cost	9.78%	9.50%	9.25%
WROE	4.89%	4.14%	4.16%
Staff & OPC As Adjusted			
Equity Ratio		43.60%	45.00%
Equity Cost		11.22%	10.87%
WROE		4.89%	4.89%

Q. What is your conclusion regarding the capital structures recommended by Staff and OPC?

A. The use of the American Water consolidated capital structure recommended by Staff and OPC does not reflect the actual operations of MAWC, is contrary to the precedent of the United States Supreme Court and the Commission when considered in combination with their respective recommended ROEs and is incompatible with financial theory.

VI. RESPONSE TO MS. MALKI'S COST OF EQUITY ANALYSES

Q. What are your principal areas of disagreement with Ms. Malki's cost of equity analyses?

A. Specifically, Ms. Malki and I disagree on the following:

- the composition of the proxy group;
- the growth rate used in the constant growth DCF model;
- Ms. Malki's use of the two-step DCF model and the reasonableness of the results of Ms. Malki's two-step DCF analysis;
- the appropriate inputs to a forward-looking CAPM analysis and the reasonableness of the results of Ms. Malki's CAPM; and

- the specification of Ms. Malki's BRYP analysis.

Proxy Group

Q. What is the composition of Ms. Malki's proxy group for purposes of her cost of equity analyses?

A. Ms. Malki's proxy group is comprised of just six water utilities selected from the *Value Line* Water Utility industry, of which five are also in my larger proxy group.

Q. Why should AWK be excluded from the proxy group for MAWC?

A. As I discussed in my direct testimony, it is not appropriate to include AWK in the proxy group used to determine the authorized ROE for MAWC because of the circular logic that would occur.[70] For example, in the current proceeding, the ROE for MAWC is being determined, which in turn contributes to the ROE of its parent company, AWK. If AWK were included in the proxy group, AWK would be being used to determine its own subsidiary's ROE. Therefore, to avoid the circular logic, AWK should be excluded from the proxy group.

Q. If AWK were excluded how many companies would be included in Ms. Malki's proxy group?

A. The proper exclusion of AWK, as discussed above, results in only five companies being included in Ms. Malki's proxy group.

[70] Bulkley Direct Testimony, at 34.

Q. Why do you believe it is also appropriate to include natural and electric utilities in the proxy group for MAWC?

A. As discussed in my Direct Testimony, due to consolidation in the water industry, there are only a limited number of water utilities that can be included in the proxy group,[71] further reduced when AWK is appropriately excluded. The smaller the size of the proxy group, the greater the chance the proxy group average could be affected by the results of one company.

In addition, as also discussed in my Direct Testimony, similar to the water utilities, the electric and natural gas utilities included in my proxy group generate a substantial portion of their operating income from regulated distribution operations.[72] Therefore, there are significant similarities between the business and operating risks of water and gas distribution companies, and so these companies are properly included in my proxy group.

Q. Is there market evidence that it is appropriate to include electric and natural gas utilities in your proxy group?

A. Yes. While consolidation has occurred among water utilities, there have been a few acquisitions in recent years that have involved the merger of a natural gas utility with a water utility and an electric utility with a water utility. One of the reasons cited for the purpose of the merger of a natural gas utility and a water utility was the similarity in operating characteristics and risk profiles of water and natural gas utilities. For example, in 2017, Northwest Natural Gas Company ("NWN") acquired Salmon Valley Water

---

71 *Id.,* at 34-35.

72 *Id.,* at 35.

Company and Falls Water Company, two water utilities operating in the Pacific Northwest. In an interview regarding the transaction, the CEO of NWN noted that the water utility sector has a similar business model and risk profile as NWN's natural gas utilities.[73]

Similarly, Essential Utilities Inc. ("WTRG") recently completed the acquisition of PNG Companies, LLC, a natural gas utility operating in Pennsylvania, West Virginia and Kentucky. In discussing the acquisition, Essential's CEO noted:

> Franklin said both gas and water utilities are underground utilities, and that the systems share a common burden of being old and in need of replacement. However, he said rates will not go up for "a number of years," and that any increase would require approval from the PUC.[74]

Finally, in 2017, Eversource Energy, which has both electric and natural gas utility operations, completed its acquisition of Aquarion Water Company, a water utility with operations in Connecticut, Massachusetts and New Hampshire.

Thus, the similar operating characteristics and risk profiles of the industries have been a catalyst for consolidation.

Q. Have other regulatory commissions relied on proxy groups that include natural gas and electric distribution utilities?

A. Yes. Several regulatory commissions such as the Massachusetts Department of Public Utilities, the Florida Public Service Commission, the Illinois Commerce Commission and the Iowa Utilities Commission have considered the results of a proxy group that includes

---

[73] Northwest Natural Gas Company Press Release, "NW Natural Expands into Regulated Water Utility Sector with Acquisitions in Oregon and Idaho," December 21, 2017.

[74] Margaret J. Krauss, "Aqua America Will Buy Peoples Gas For $4.3 Billion," 90.5 WESA (NPR), January 16, 2020.

natural gas companies when determining the authorized ROE for water and wastewater utilities.[75]

Q. Have you reviewed the analyses conducted by Ms. Malki to determine that natural gas and electric utilities were not suitable proxy companies?

A. Yes, I have. Ms. Malki conducts a comparison of the credit ratings, betas and DCF results for the water companies included my proxy group and the electric and natural gas utilities in my proxy group using the data that I relied on in my Direct Testimony. Ms. Malki also developed a comparison of recently authorized ROEs for water utilities relative to those authorized for natural gas and electric utilities. According to Ms. Malki, the results of her analyses show that electric and natural gas utilities have greater risk than water utilities and therefore, should be excluded from the proxy group used to estimate the cost of equity for MAWC.

Q. What is your concern with Ms. Malki's comparison of the credit ratings for water utilities included in your proxy group relative to the credit ratings for the electric and natural gas utilities included in your proxy group?

A. Ms. Malki's conclusion that electric and natural gas utilities should be excluded from my proxy group because the average credit rating for the natural gas and electric utilities of A- is below the average for the water utilities of A is inconsistent with the proxy group

---

[75] Massachusetts Department of Public Utilities, Docket No. 17-90, Petition of Aquarion Water Company of Massachusetts, Inc., pursuant to G.L. c. 164, § 94, and G.L. c. 165, § 2, for Approval of a General Rate Increase as set forth in M.D.P.U. No. 3., October 31, 2018, p. 286-287. See also, Docket No. 20180006-WS, In re. Water and wastewater industry annual reestablishment of authorized range of return on common equity for water and wastewater utilities pursuant to Section 367.081(4)(f),F.S., Order No. PSC-2018-0327-PAA-WS, at 7. See also, Illinois Commerce Commission, Illinois-American Water Company Proposed Rate increases for Water and Sewer Service (tariffs filed February 10, 2022), Docket No. 22-0210, Order, December 15, 2022, at 102. See also, Iowa Utilities Commission, Iowa-American Water Company, Docket No. RPU-2020-0001, Final Decision and Order, June 28, 2021, at 24-27.

screening criteria that Ms. Malki relied on to develop her water utility proxy group. As Ms. Malki noted, to develop her proxy group, she required that all companies have at least an investment grade credit rating.[76] Therefore, as long as a utility had an individual credit rating either from S&P in the range of cred BBB- to AAA or Moody's in the range of Baa3 to Aaa, the company would meet Ms. Malki's credit rating screen. Ms. Malki did not require utilities to have an A rating to be included in the proxy group. Thus, her view that companies with an investment grade credit rating would be deemed generally comparable to MAWC conflicts with Ms. Malki's position that the electric and natural gas utilities included in my proxy group, each of which have an investment grade credit rating, should be excluded because the average credit rating for the group is A-. The Commission should disregard Ms. Malki's credit rating comparison as it is in direct conflict with the credit rating screening criterion that she relied on to develop her proxy group.

Q. Do you agree that Ms. Malki has conducted a comprehensive review of the beta coefficients that you relied on in your CAPM when comparing the average beta coefficients of the water utilities to the average beta coefficients of the electric and natural gas utilities?

A. No. Ms. Malki contends that the average beta coefficient for the natural gas and electric companies included in my proxy are consistently higher than the average beta coefficient for the water utilities included in my proxy group. However, Ms. Malki has misrepresented the beta coefficients that I relied on to conduct my CAPM analysis. Ms. Malki only conducted her comparison relying on the beta coefficients reported by *Value Line;*

[76] Malki Direct/Rebuttal, at 38.

however, I also relied on Bloomberg beta coefficients and a long-term average of the *Value Line* beta coefficients from 2013-2023. While I agree the average *Value Line* beta coefficient for electric and natural gas utilities is slightly higher than the average *Value Line* beta coefficient for the water utilities, the averages for the remaining two estimates of beta (*i.e.,* Bloomberg beta and long-term average *Value Line* beta) are generally consistent for the water utilities and the electric and natural gas utilities.

Figure 12: Comparison of Beta Coefficients for Water vs. Electric/Natural Gas Utilities in Bulkley Direct Testimony[77]

	Water Utilities Mean	Electric/ Natural Gas Utilities Mean
Value Line Beta	0.81	0.88
Bloomberg Beta	0.75	0.77
Long-term Average Beta	0.74	0.74

Furthermore, while the average *Value Line* beta for the water utilities was slightly lower than the average for the electric and natural gas utilities in my proxy group, there have been points in time in the past where the average *Value Line* beta for the water utilities was greater than the average *Value Line* beta for the electric and natural gas utilities. For example, as noted above, I relied on a long-term average beta coefficient calculated as an average of the *Value Line* beta coefficients for the companies in my proxy group from 2013 through 2023. As shown in Schedule AEB-R-6, while the betas for the water utilities are currently slightly lower than the betas for the electric and natural gas utilities in my proxy group, in other years such as 2016-2019, the opposite occurred and the water utilities had

[77] Source: Schedule AEB-4.

P

higher betas, and as noted above, on average over this historical period, the betas for these industry segments were essentially the same (i.e., 0.74).

Q. Is Ms. Malki's comparison of the *Value Line* beta coefficients for the water and electric and natural gas utilities in your proxy group tantamount to applying a beta screening criteria to develop the proxy group?

A. Yes, it is. It appears that Ms. Malki is applying a beta screen to an industry as opposed to an individual company when she suggests non-water utilities should be excluded from the proxy group. However, the *Value Line* beta coefficients that I have relied on would not only reflect the risk of operating in either the electric or natural gas industry, but they would also be reflective of the risk associated with the individual company. This can be seen by the fact that the electric and natural gas utilities in my proxy group do not have equivalent betas. In fact, as shown in Schedule AEB-4, the *Value Line* betas for the electric and natural gas utilities range from 0.85 to 0.95. The goal in developing a proxy group is to determine a set of companies that are generally comparable to the subject company, which, in this proceeding, is MAWC. By relying on a beta screen to exclude an entire industry, Ms. Malki is incorrectly assuming that each of those companies has the same set of risk factors that are greater than the risk associated with a water utility. However, Ms. Malki provides no evidence that is the case because the betas for each of the electric and natural gas utilities are different.

Furthermore, as shown in Schedule AEB-4, the *Value Line* betas for the water utilities range from 0.70 to 1.00, with the beta for Essential Utilities, Inc. ("WTRG") setting the high end of the range. WTRG's *Value Line* beta is clearly greater than the average beta

for the electric and natural gas utilities of 0.88. In fact, WTRG has the highest beta coefficient in my proxy group. According to the criteria applied by Ms. Malki, this means that WTRG would have greater risk than the electric and natural gas utilities included in my proxy group and should also be excluded from the proxy group. However, Ms. Malki has not proposed to exclude WTRG from my proxy group.

Finally, as shown in Schedule AEB-4, Eversource Energy ("ES") has a *Value Line* beta of 0.95, which is the highest of the electric and natural gas utilities in my proxy group. The application of a beta screen such as Ms. Malki's position would imply that ES be eliminated from the proxy group, which would also be consistent with Ms. Malki's recommendation to exclude all electric and natural gas utilities from my proxy group. However, as shown in Schedule AEB-4, ES has a 30-day average constant growth DCF result of 9.26 percent, which is below the mean for the water utilities of 9.65 percent. According to the result of the constant growth DCF model, ES would have less risk than the water utilities due to the lower DCF cost of equity estimate. This would contradict Ms. Malki's assessment of comparative risk based on beta. As a result, it is evident that Ms. Malki's application of a beta screen would result in the exclusion of companies that investors would consider comparable to MAWC.

Q. Why should the Commission reject Ms. Malki's comparison of your DCF model results for the water utilities and the electric and natural gas utilities shown in Table 4 of her direct/rebuttal testimony?

A. Ms. Malki's analysis is unreliable because she has calculated the average constant growth DCF results for the water utilities and natural gas and electric utilities incorrectly.

Specifically, Ms. Malki uses the constant growth DCF analyses that I present in Schedule AEB-3, and attempts to separate these results into water, natural gas and electric utility proxy groups to compare the results of these analyses however, her comparison is incorrect because she matches the individual constant growth DCF results with the incorrect proxy group company.

Figure 13 provides the individual 30-day average mean constant growth DCF results for each company in my proxy group shown in Schedule AEB-3 as well as the incorrect corresponding company reported by Ms. Malki and the correct corresponding company shown in Schedule AEB-3. For example, as shown in Figure 13, Atmos Energy Corporation had an individual DCF results of 10.03 percent; however, Ms. Malki incorrectly reported the 10.03 percent as the constant growth DCF result for of American States Water Company. Therefore, the average constant growth DCF result that Ms. Malki reports for both the water utilities included in my proxy group and the electric and gas utilities in my proxy group does not actually represent the average for those respective industry segments. As a result, Ms. Malki's analysis of my DCF results cannot be relied on to assess the relative risk of water utilities to electric and natural gas utilities.

Figure 13: Bulkley - 30-day Constant Growth DCF Results - Schedule KM-R3 vs. Schedule AEB-3

Incorrect Company List (Schedule KM-R3)	Cost of Equity: Mean Growth Rate	Correct Company List (Schedule AEB-3)
American States Water Company	10.03%	Atmos Energy Corporation
Atmos Energy Corporation	11.65%	NiSource Inc.
California Water Service Group	10.13%	Northwest Natural Gas Company
Essential Utilities, Inc.	8.93%	ONE Gas, Inc.
Eversource Energy	10.44%	Spire, Inc.
Middlesex Water Company	9.26%	Eversource Energy
NiSource Inc.	8.26%	American States Water Company
Northwest Natural Gas Company	12.96%	California Water Service Group
ONE Gas, Inc.	7.30%	Middlesex Water Company
SJW Group	10.20%	SJW Group
Spire, Inc.	9.52%	Essential Utilities, Inc.

Q. Have you corrected Ms. Malki's comparison of your DCF model results for the water utilities and the electric and natural gas utilities included in your proxy group?

A. Yes, I have. Specifically, I adjusted Ms. Malki's comparison to: (1) correctly match the individual companies in my proxy group with the corresponding DCF results; and (2) rely on my updated constant growth DCF results that reflect data through November 29, 2024. As shown in Figure 14, the average constant growth DCF results for the electric and natural gas utilities were less than the average constant growth DCF results for the water utilities. Therefore, it is reasonable to conclude that the constant growth DCF results presented in my Rebuttal / Surrebuttal /Sur-surrebuttal testimony are not upwardly biased by the inclusion of electric and natural gas utilities in my proxy group.

Figure 14: Comparison of Constant Growth DCF Results – Rebuttal Testimony – Water vs. Electric/Natural Gas

	Water Utilities Mean	Electric/Gas Utilities Mean
30-Day average	10.50%	9.95%
90-day average	10.50%	10.05%
180-Day average	10.63%	10.27%
Constant Growth DCF	10.54%	10.09%

Q. Ms. Malki also concludes that the national annual average authorized returns for electric transmission and distribution only ("T&D") utilities and natural gas utilities have generally been greater than the national average annual authorized returns for water utilities since 2017. How do you respond?

A. I have several concerns with Ms. Malki's review of authorized return for electric T&D, natural gas and water utilities. First, Ms. Malki's comparison of the authorized returns for electric T&D and natural gas utilities relative to the authorized returns for waters utilities is provided in Figure 5 of her direct/rebuttal testimony; however, the workpaper[78] that Ms. Malki provided does not appear to match the average annual authorized returns included in Figure 5. Moreover, the provided workpaper included the authorized returns for vertically integrated electric utilities which Ms. Malki contends she excluded from the comparison shown in Figure 5 of her direct/rebuttal testimony. Second, for 2020, Ms. Malki calculates an average annual return for water utilities of 8.90 percent, which appears to include the return authorized for Blue Granite Water Company of 7.46 percent by the South Carolina Public Service Commission. However, the authorized return for Blue

[78] Workpaper titled: Malki - Direct_Rebuttal Schedules.xlsx, tab: KM ROE Comparison.

P

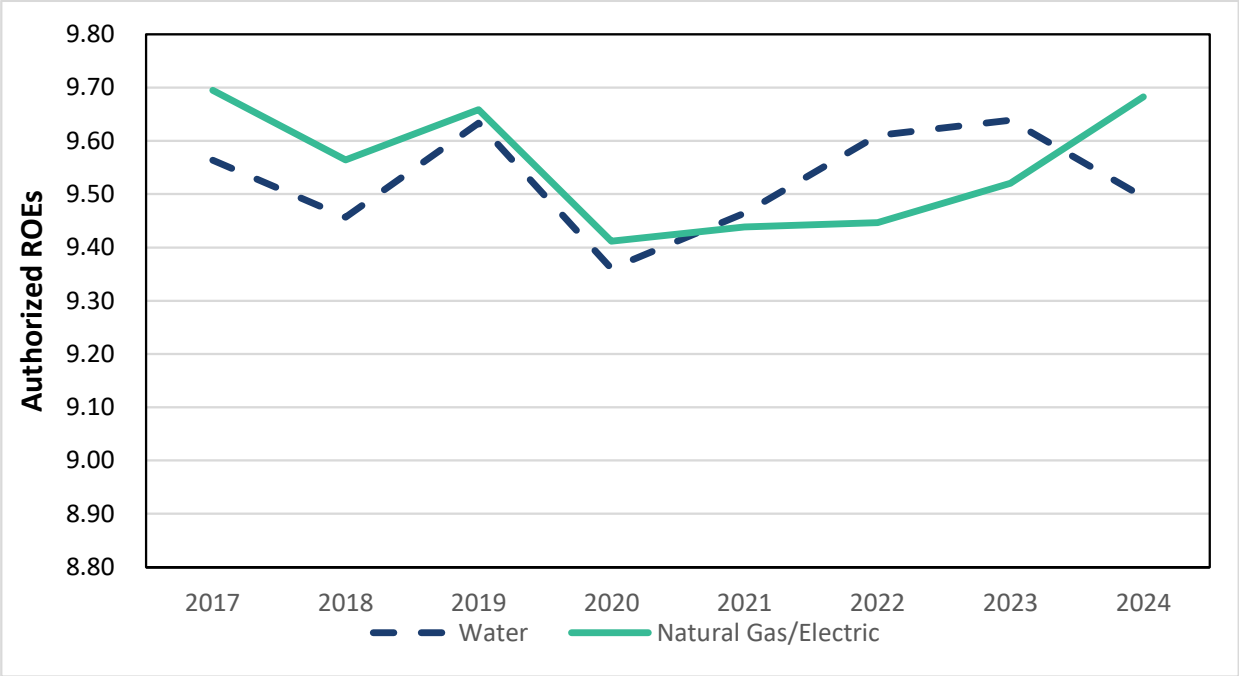
Granite Water Company should not have been included in the annual average because the return authorized reflected a penalty for service quality issues.[79] Ms. Malki's inclusion of the authorized return for Blue Granite Water Company has the effect of significantly biasing the annual average for 2020 downwards. Given the aforementioned issues associated with Ms. Malki's analysis, I recommended that the Commission disregard the comparison of authorized returns for electric T&D and natural gas utilities relative to water utilities shown in Figure 5 of Ms. Malki's direct/rebuttal testimony.

Q. Have you corrected Ms. Malki's comparison of authorized returns for electric T&D and natural gas utilities relative to the authorized returns for water utilities?

A. Yes. While I have not attempted to verify the authorized returns contained in Excel tabs: KM Electric & Gas ROE Data and KM Water ROE Data of Ms. Malki's workpaper titled: Malki - Direct_Rebuttal Schedules.xlsx, I relied on the data to calculate average annual returns for 2017 through 2024 for both water utilities and electric T&D and natural gas utilities. Further, I appropriately excluded the authorized return of 7.46 percent for Blue Granite Water Company in 2020, which included a penalty for service quality issues. As shown in Figure 15, the average annual authorized returns for electric T&D and natural gas utilities have varied over time. Further, this comparison does not provide support for Ms. Malki's conclusion that electric T&D and natural gas utilities have greater risk than water utilities. In fact, it shows that opposite, based on the comparison of authorized returns, the risk of the two industry segments is similar.

[79] South Carolina Public Service Commission, Docket No. 2019-290-WS, Order No. 2020-306, April 9, 2020, at 38.

Figure 15: Authorized ROEs: Water vs Electric T&D and Natural Gas Utilities, 2017 through October 2024[80]



DCF Analysis

Q. Please summarize Ms. Malki's specification of her DCF model.

A. Ms. Malki conducts a two-step DCF analysis where she relies on (1) the average of the monthly high and low stock prices for her proxy companies as of April 2024 through June 2024; and (2) a growth rate for each proxy company that is based on a short-term growth rate to which she applies an 80 percent weighting and a long-term growth rate to which she applies a 20 percent weighting.[81] Specifically, Ms. Malki'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 her proxy group companies published by *Value Line*.[82] Ms. Malki's long-term growth rate is a projected nominal gross domestic

---

80 Workpaper titled: Malki - Direct_Rebuttal Schedules.xlsx, tabs: KM Electric & Gas ROE Data and KM Water ROE Data. The average authorized ROE for waters utilities in 2020 has been adjusted to the authorized ROE for Blue Granite Water of 7.46 percent, which included an unspecified penalty for poor performance.

81 Schedule KM-d13

82 Schedule KM-d11

P

product ("GDP") growth rate of 3.80 percent as reported by the Congressional Budget Office in its Economic Outlook.[83] Ms. Malki calculates the cost of equity for each of her proxy group companies and narrows the range of results by eliminating the highest and lowest individual company results. The upper bound of this range is set by averaging the second and third highest results produced by her analyses. The lower bound is set by averaging the second and third lowest results produced by her analyses. Ms. Malki then averages her derived upper and lower bounds to estimate a cost of equity from her DCF analysis of 8.45 percent.[84]

Q. Are the results of Ms. Malki's DCF analyses reasonable?

A. No. The result of Ms. Malki's DCF analysis is well below any comparable authorized ROEs for electric T&D, natural gas, and water utilities since 2020, as shown in Figure 5, which is significant, since in 2020 interest rates were more than 300 basis points lower than they are as of the filing of my rebuttal testimony. While I disagree with Ms. Malki's application of the two-step DCF model and her measure of central tendency, it is important to note that it appears that Ms. Malki also recognizes that the results of her constant growth DCF analysis are not reasonable given that her ROE recommendation is 105 basis points greater than the result of her DCF analysis. As noted above, Ms. Malki appears to rely primarily on the results of her BYRP analysis since her recommended ROE of 9.50 percent is equivalent to the midpoint of her BYRP analysis. Thus, it appears that Ms. Malki does not rely on the result of her DCF analysis. The *Hope* and *Bluefield* decisions, which Ms. Malki acknowledges are standards to be followed in setting a just and reasonable return,

---

83 *Id.*

84 Malki Direct/Rebuttal, at 43.

require the authorized return to be comparable to other returns available to investors in companies with similar risk. Ms. Malki's DCF result of 8.45 percent does not meet this standard.

Q. Please explain why you disagree with Ms. Malki's specification of her two-step DCF analysis.

A. Ms. Malki references the FERC's ROE methodology set forth in Opinion No. 575 as support for her two-step DCF analysis; however, she fails to follow the FERC's methodology. Specifically, Ms. Malki's approach for both calculating the dividend yield and estimating the short-term growth rate in her two-step DCF analysis is inconsistent with the FERC's methodology.[85]

The FERC relies on a six-month average stock price for purposes of calculating the dividend yield; however, Ms. Malki uses a three-month average stock price. Furthermore, not only is Ms. Malki's stock price averaging inconsistent with the FERC's methodology, the stock prices that she relies on are outdated. Specifically, Ms. Malki relies on stock price data for the quarter ending June 30, 2024, even though her direct/rebuttal testimony was filed in December 2024. There is no reason that the data in her DCF should be this outdated. Given her direct/rebuttal testimony was filed in December 2024, Ms. Malki could have relied on stock price data for the quarter ending September 30, 2024.

[85] Schedule KM-d11, Schedule KM-d12, and Schedule KM-d13.

Q. Are the annual dividends for each proxy company that Ms. Malki relies on to estimate the dividend yield in her DCF analysis also outdated?

A. Yes. Ms. Malki relies on the annual 2023 dividends (stated in dollars) published by *Value Line* for each of her proxy group companies. However, given that Ms. Malki's testimony was filed in December 2024, it is more 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 her proxy group companies for 2024.

Q. Are Ms. Malki's short-term growth rates consistent with the FERC methodology?

A. No. As noted, Ms. Malki's short-term growth rates in her 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 on projected EPS growth rates as the short-term growth rate, not DPS or BVPS growth rates such as Ms. Malki has done.[86]

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

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 short-term growth rates in the DCF, and did not rely on either DPS or BVPS growth rates.[87] Similarly, in the Ameren Missouri 2021 rate proceeding, Staff witness Mr. Chari relied solely on projected

---

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

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

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.[88]

Q. Do you agree with Ms. Malki's GDP growth rate?

A. No. Ms. Malki's two-stage DCF model assumes a long-term growth rate in perpetuity. However, Ms. Malki's GDP growth forecast only reflects growth for the 30-year period of 2024 through 2054, even though her two-stage DCF model extends into perpetuity. 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, Ms. Malki's projected GDP growth rate may not be indicative of the expected growth in GDP over the long term.

Q. Does the academic research that Ms. Malki references to support the use of a GDP growth rate in the DCF model also support the GDP growth she selected for her two-stage DCF analysis?

A. No. Ms. Malki references Dr. Roger A. Morin's text *New Regulatory Finance*, in which Ms. Malki contends that Dr. Morin notes that all growth rates eventually converge to a level consistent with the growth in GDP.[89] However, it is first important to note that Ms. Malki's characterization of Dr. Morin's *New Regulatory Finance* is misleading. Dr. Morin stated that:

> ***[s]ome financial economists*** are uncomfortable with the assumption that the DCF growth rates are perpetual growth rates, and argue that above average growth can be expected to prevail for a fixed number of years and then the growth rate will settle down to a steady-state long-run level, consistent with that of the economy.[90]

---

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

89 Malki Direct/Rebuttal, at 40.

90 Roger Morin, New Regulatory Finance, 302 (2000).

Therefore, Dr. Morin did not note that it was "consensus" among analysts that long-term growth rates will converge to GDP. Furthermore, in Dr. Morin's most recent publication, in 2021, he addresses the shortcomings of using GDP growth like Ms. Malki has as the long-term growth rate estimate in the multi-stage DCF model:

> One central assumption in Multi-Stage DCF models, and a potential Achilles' heel, in my view, is that utility growth rates will eventually match the growth of the macroeconomy usually measured by the growth of the Gross Domestic Product (GDP). I am not aware of any financial literature supporting the notion that utility earnings per share are expected to grow at the average growth of the economy, or GDP growth.
>
> ***
>
> Multi-Stage DCF applications appear somewhat disconnected from the assumptions of the method and the consensus expectations of investors. The investment community does not look to GDP growth over the next several decades when evaluating an investment in utility stocks, nor does it anticipate a series of discrete multi-stage decennial stages. I am not aware of any evidence that investors evaluate the future based on the assumptions and data sources required to apply the two-stage or three stage DCF model.[91]

Additionally, Ms. Malki relies on the projected nominal GDP growth rate from CBO as opposed to relying on the methodology that Dr. Morin employs to estimate the long-term growth in GDP in her multi-stage DCF analysis. Dr. Morin estimates the long-term growth rate in nominal GDP by first calculating the growth in real GDP and then adding the expected inflation rate.[92] In his text, Dr. Morin indicates that the growth rate in real GDP is estimated by calculating the compound annual growth rate in real GDP from 1929 through the present, and the expected inflation rate is estimated as the difference between

---

[91] Roger Morin, Modern Regulatory Finance, 486 (2021).

[92] *Id.,* at 388

the yield on the 20-year Treasury bond and the yield on the 20-year Treasury Inflation Protected bond, resulting in a long-term GDP growth rate of 5.5 percent in 2020.[93]

Q. Have you reviewed any additional academic research that supports Dr. Morin's methodology for estimating the long-term nominal GDP growth rate?

A. Yes. Similar to Dr. Morin's methodology, *Morningstar* 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.[94]

Q. Did you develop an estimate of GDP growth consistent with the methodology outlined by *Morningstar*?

A. Yes. As shown in Schedule AEB-R-9, I estimated a long-term nominal GDP growth rate of 5.51 percent using the methodology outlined by Dr. Morin and *Morningstar*. The long-term nominal GDP growth rate is based on the real GDP growth rate of 3.18 percent from 1929 through 2023, and a projected inflation rate of 2.25 percent.

Q. Is the way in which Ms. Malki establishes the upper and lower bounds of the results of her DCF analysis also inconsistent with the FERC's methodology for excluding high-end and low-end outliers?

A. Yes. Ms. Malki's approach for establishing the upper and lower bounds of her results are arbitrary and inconsistent with the FERC methodology that she references as support for her two-step DCF approach. Specifically, as stated in the FERC's Opinion No. 575, which Ms. Malki references in her direct/rebuttal testimony, the FERC excludes low-end and

---

93 Id.

94 *Morningstar, Inc*., Ibbotson SBBI 2013 Valuation Yearbook, p. 52.

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-R-10, the DCF result for Middlesex Water Company ("MSEX") would be excluded pursuant to FERC's outlier methodology. If the DCF result for 6.57 percent for MSEX is excluded the average DCF result would be 8.80 percent which is 37 basis points higher than Ms. Malki's stated cost of equity from her DCF that is based on her arbitrary method of establishing a range of DCF results.

Q. How would the result of Ms. Malki's two-step DCF analysis change when current data is utilized, the FERC's two-step DCF approach is more accurately applied and your nominal GDP growth rate is relied on as the estimate of long-term growth?

A. Schedules AEB-R-7 through Schedule AEB-R-10 compare the growth rates, stock prices, and results of Ms. Malki's two-step DCF analysis as filed in her testimony to her two-step DCF analysis after it has been: (1) corrected to more accurately apply the FERC methodology that she references as support for her two-step DCF analysis; (2) updated to reflect data through September 2024; and (3) adjusted to rely on *Morningstar*'s method to estimate the GDP growth rate, which results in a long-term nominal GDP growth rate of 5.51 percent and is consistent with the approach relied on by Dr. Morin, who Ms. Malki references.

As shown on Schedule AEB-R-10, page 4, when Ms. Malki's analysis is corrected and adjusted with current data and inputs consistent with the sources Ms. Malki references,

the average resulting cost of equity for her proxy group is 9.67 percent, which approximately 120 basis points higher than her stated result of 8.45 percent.

Q. What are Ms. Malki's criticisms of your use of EPS growth rates in the DCF model?

A. Ms. Malki criticizes the use of projected earnings growth rates in the DCF model and suggest that the use of 3- to 5-year earnings growth rates in the constant growth DCF model overstates the cost of equity.[95] Ms. Malki suggests that it would be more appropriate to rely on a long-term growth rate that approximates the level of long-term gross GDP growth.[96]

Q. Why is it appropriate to rely on projected EPS growth rates in the constant growth DCF model?

A. There are numerous reasons why projected EPS growth rates are the more appropriate growth rates to be relied upon in the DCF analysis:

- 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. Therefore, EPS should be relied on in the DCF analysis.[97]

---

95 Malki Direct/Rebuttal, at 40.

96 *Id.,* at 40-41.

97 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).

- There is significant academic research demonstrating that EPS growth rates are most relevant in stock price valuation.[98] 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).[99]

- Projected EPS growth rates such as those available from S&P Capital IQ Pro and Zacks are based on consensus estimates from multiple sources 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 consensus basis attests to the importance of projected EPS growth rates to investors when developing long-term growth expectations.

Q. Have other regulatory commissions relied on projected EPS growth rates as the estimate of long-term growth in the constant growth DCF model?

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

---

[98] 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; Dr. 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.

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

> 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 performance. ***Thus, the best measure of growth for use in the DCF model are forecasted earnings growth rates***.[100]

Q. How do you respond to Ms. Malki's contention that the use of projected EPS growth rates is not consistent with the infinite time horizon the DCF model?

A. There are multiple reasons why there is no basis to Ms. Malki's claim:

- First, the utility industry is considered a mature industry due to its regulated status and relatively stable demand. Thus, financial projections such as earnings growth rate projections are also likely to be relatively stable over the long-term. The relative stability of the financial forecasts for utilities supports the use of a constant growth DCF model to estimate the cost of equity for a mature industry like utilities.

- Second, Ms. Malki appears to support her conclusion that it is not reasonable to assume that utilities can grow at a rate that is greater than the economy over the long term by comparing the projected growth rate in the constant growth DCF to her projected GDP growth rate. However, this comparison relies entirely on the accuracy of her estimate of the long-term GDP growth rate. As I discussed above, there are several concerns with her estimate of the long-term GDP growth rate.

- Finally, considering the empirical studies comparing the total factor productivity ("TFP") growth of the utility industry relative to the economy, it is not unreasonable to assume that earnings growth for utilities could exceed GDP growth over the long term. In a study filed as part of the Rate Regulation Initiative of the Alberta Utilities Commission, the authors calculated TFP growth[101] for 72 U.S. electric and combination electric and natural gas utilities and for the U.S. economy for the period of 1972 through 2009. For the U.S. utility group, TFP growth averaged 0.96 percent over the period of 1972 to 2009,[102] while TFP growth for the U.S. economy was 0.91 percent,[103] indicating that electric and combination electric and natural

---

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

101 TFP growth is a measure of productivity calculated as the difference between output growth and input growth. Higher TFP growth indicates that a company is converting inputs into higher levels of output growth (*i.e.*, increased productivity

102 Jeff Makholm, and Agustin Ros, "Update, Reply and PBR Plan Review for AUC Proceeding 566 – Rate Regulation Initiative", February 22, 2012, at 5.

103 *Id.,* at 19.

gas utilities were approximately 5 percent more productive than the U.S. economy over the study period. Therefore, the authors showed that utility growth exceeded growth for the U.S. economy for approximately 40 years.

CAPM Analysis

Q. Please summarize Ms. Malki's application of the CAPM.

A. Ms. Malki'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 June 30, 2024; (2) betas for her proxy group published by *Value Line*; and, (3) an average of four measures of a market risk premium. Specifically, Ms. Malki'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 Ms. Malki'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 Ms. Malki's CAPM analyses range from 8.36 percent to 10.24 percent. Ms. Malki also applies an upper and lower bound to the results of her CAPM analysis similar to her DCF analysis and averages the upper and lower bounds to estimate a cost of equity of 9.35 percent.[104]

Q. Do you agree with Ms. Malki's specification of her CAPM analysis?

A. No. There are several flaws with Ms. Malki's CAPM analysis, including:

[104] Schedule KM-d14.

- 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 Ms. Malki'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. Ms. Malki has not provided any evidence that the historical average market return or the market risk premium that she relies on reflect the expected market conditions during 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 Ms. Malki for her 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.[105]

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

Given that the current and projected market conditions that both Ms. Malki 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."[106] As will be discussed in more detail, because the current long-term government bond yields are currently below those that Ms. Malki relies on in her historical average market risk premium estimates, the market risk premium based on long-term historical average data is certainly not 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 Ms. Malki relies on for her 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 16 illustrates the problem with relying on a historical market risk premium such as Ms. Malki has done. Specifically, the figure shows that from 2007-2009, the historical market risk premium decreased even as market volatility (the primary statistical

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

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 16: Historical Market Risk Premium and Market Volatility

	Market Volatility	Market Return	Annual Equity Risk Premium	Long-term Average Historical Market Risk Premium[107]
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

[107] 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.

market risk premium estimates used in my CAPM analyses specifically address this concern.

Q. Ms. Malki references the FERC's ROE methodology when discussing her DCF analysis. Does the FERC support the use of a historical market return and market risk premium when conducting the CAPM analysis?

A. No. Ms. Malki's approach to the CAPM is inconsistent with the FERC's methodology. The FERC has concluded that a forward-looking market return and market risk premium should be relied on for estimating a forward-looking estimate of the cost of equity when using the CAPM analysis.[108] Further, the methodology that was most recently endorsed by the FERC to estimate the market risk premium is generally consistent with the approach I have relied upon, which is to calculate the market risk premium based on the difference between the projected return on the market and the risk-free rate.

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

A. No. Ms. Malki has incorrectly used that historical data to estimate a market risk premium in all four of her CAPM scenarios.

Q. Please explain the errors in Ms. Malki's calculation of the historical market risk premia.

A. Ms. Malki's estimates of the historical market risk premia are incorrect and understated because, when calculating a historical market risk premium, the market return should be

[108] *See, e.g.*, *Entergy Arkansas, et al.*, Opinion No. 575, 175 FERC ¶ 61,136 (2021), at P 163-164.

P

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

- In two of her CAPM scenarios, Ms. Malki 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 her two other CAPM scenarios, Ms. Malki 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 her CAPM scenarios, Ms. Malki has incorrectly calculated the market risk premium by deducting the total return instead of the income-only return on the risk-free investment from the overall market return.

The market risk premium estimates the premium that is necessary for an investor to hold equity as compared to a risk-free investment. The problem with Ms. Malki's use of the total return on long-term government bonds is that it reflects the sum of both (i) the income-only 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; plus (ii) the capital appreciation of the bond, which is the return associated with the investor selling the bond at a higher price. However, the income-only return is the only portion of the total return on long-term government bonds that can be considered risk-free. The capital appreciation portion of the return is not without risk since the price of the bond could increase or decrease depending on the market. 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 Ms. Malki 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, Ms. Malki has understated the market risk premium. To illustrate this point, in one of her estimates of the historical market risk premium, Ms. Malki 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 5.94 percent.[109] However, when calculated correctly, the historical market risk premium is 7.17 percent – over more than 120 basis points higher than Ms. Malki's erroneous calculation.[110]

Q. Has the publisher of the historical data on which Ms. Malki relies noted that her approach to deriving an historical market risk premium is inappropriate?

A. Yes. *Morningstar*, the former publisher of the historical data on which Ms. Malki relies for purposes of her 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.[111]

---

109 Schedule KM-d14.

110 *Kroll*, Cost of Capital Navigator. Calculated correctly as the total return on the S&P 500 from 1926-2023 of 12.04 percent less the income-only return on long-term government bonds over this same period of 4.87 percent.

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

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

A. No. Ms. Malki'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. Ms. Malki 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 Ms. Malki'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).[112]

[112] *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 Ms. Malki acknowledge the historical relationship between interest rates and the market risk premium?

A. Yes. In her description of her BYRP analysis, Ms. Malki noted that she "relied on the negative relationship between the risk premium and interest rates" (*i.e.,* as interest rates increase, the equity risk premium decreases, and vice versa).[113] 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 Ms. Malki'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 Ms. Malki relies on?

A. As noted, one of Ms. Malki'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 7.17 percent.

This same CAPM scenario can be used to demonstrate the extent to which Ms. Malki 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 developing her CAPM analysis, Ms. Malki relies on a 3-month average risk-free rate on

[113] Malki Direct/Rebuttal, at 50.

long-term government bonds as of June 30, 2024 of 4.57 percent. However, this current risk-free rate is lower than the long-term historical average rate of 4.87 percent. Therefore, recognizing the inverse relationship between interest rates and the market risk premium, a relationship with which Ms. Malki agrees, the current market risk premium should be greater than the long-term historical average of 7.17 percent. However, Ms. Malki'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 Ms. Malki notes exists between these two assumptions.

Q. How does the understatement of the market risk premium affect Ms. Malki'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), Ms. Malki's CAPM results are also understated.

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.[114]

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.[115]

---

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

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

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

A. Schedule AEB-R-11 presents Ms. Malki's CAPM analysis corrected for the issues that I have identified with her CAPM analyses. Specifically, I have adjusted Ms. Malki's CAPM analysis to calculate the market risk premium as the historical arithmetic average market return from 1926 through 2023 minus her current estimate of the risk-free rate. 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. This adjusted market risk premium is more appropriate than the calculation performed by Ms. Malki that fails to reflect the inverse relationship between interest rates and the market risk premium. In addition, as previously discussed with respect to Ms. Malki's DCF analysis, Ms. Malki's corrected CAPM analysis presented in Schedule AEB-R-11 also updates the risk-free rate for the 3 months ending September 30, 2024.

As shown in Schedule AEB-R-11 when these corrections are reflected, the average cost of equity for Ms. Malki's CAPM analysis is 10.87 percent, which is an increase of 152 basis points from her as-filed position of 9.35 percent.

Q. Please summarize Ms. Malki's criticisms of your CAPM analyses.

A. Ms. Malki states that the results of my CAPM analyses are overstated due to: (1) the use of incorrect *Value Line* betas for my proxy group companies; and (2) reliance on unreasonably high market risk premia due to the market return on which I have relied.

Q. Do you agree with Ms. Malki statement that you did not rely on the correct beta coefficients reported by *Value Line* for the companies included in your proxy group?

A. No because her review of the beta coefficients that I rely on from *Value Line* contains the same error as Ms. Malki's review of my constant Growth DCF results. Specifically, while Ms. Malki references the correct *Value Line* beta coefficients shown in Schedule AEB-4, she matches the individual *Value Line* beta coefficients with the incorrect proxy group company. Figure 17 provides the *Value Line* betas for each company in my proxy group shown in Schedule AEB-4 as well as the incorrect corresponding company reported by Ms. Malki and the correct corresponding company shown in Schedule AEB-4. For example, as shown in Figure 17, Essential Utilities, Inc. had a *Value Line* beta of 1.00; however, Ms. Malki incorrectly reported this beta as the *Value Line* beta for Spire Inc. Therefore, I relied on the correct betas reported by Value Line for each of the companies included in my proxy and any conclusions that Ms. Malki drew based on her review of my beta coefficients should be disregarded by the Commission given her error.

Figure 17: Bulkley – *Value Line* Betas - Schedule KM-R4 vs. Schedule AEB-4

Incorrect Company List (Schedule KM-R4)	*Value Line* Beta	Correct Company List (Schedule AEB-4)
American States Water Company	0.85	Atmos Energy Corporation
Atmos Energy Corporation	0.90	NiSource Inc.
California Water Service Group	0.85	Northwest Natural Gas Company
Essential Utilities, Inc.	0.85	ONE Gas, Inc.
Eversource Energy	0.85	Spire, Inc.
Middlesex Water Company	0.95	Eversource Energy
NiSource Inc.	0.70	American States Water Company
Northwest Natural Gas Company	0.75	California Water Service Group
ONE Gas, Inc.	0.75	Middlesex Water Company
SJW Group	0.85	SJW Group
Spire, Inc.	1.00	Essential Utilities, Inc.

Q. Ms. Malki suggests that the market return used in your CAPM analysis is too high.[116] Is there any support for the methodology and resulting market return used in your CAPM analysis?

A. Yes. The market return shown in my analyses is within the range established by historical market return data and has been relied upon in other regulatory jurisdictions:

- The expected market return estimated in my analysis is reasonable and consistent with the range of annual equity returns that have been observed over the past century, whereby the realized equity return over this period was at least as high as my market return or greater.[117] The market return in my updated CAPM analysis is 12.05 percent, or below the 12.91 percent market return that I relied on in my Direct Testimony, and thus continues to be consistent with the frequency of historical market returns at or above my estimate, which demonstrates it is a reasonable expectation for the market.

- In a recent cost of capital proceeding for the electric utilities, the California Public Utilities Commission noted that all parties recognized that historical market returns and economically logical projections fall within the range of 12 percent.[118] This recognition is consistent with the market return utilized in my initial CAPM analysis in my Direct Testimony and herein in my updated CAPM analysis in my rebuttal testimony.

- As acknowledged by Ms. Malki and noted above, the FERC has supported the use of a constant growth DCF model to estimate the market return in the CAPM such as I have done. For example, in Opinion No. 569-A, the FERC continued to support the use of the constant growth DCF model to calculate the market return for the CAPM noting:

> We also continue to find that the CAPM should use a one-step DCF for its risk premium. This is because the rationale for using a two-step DCF methodology for a specific group of utilities does not apply when conducting a DCF study of the dividend-paying companies in the S&P 500, as the Commission found in Opinion Nos. 531-B and 569. A long-term component is unnecessary because of the regular updates to the S&P 500, which allows it to continue to grow at a short-term growth rate and because S&P 500

---

116 Malki Direct/Rebuttal, at 43-44.

117 Bulkley Direct Testimony, at 47-48.

118 California Public Utilities Commission, Application 22-04-008, *et al*., Decision 22-12-031, December 15, 2022, at 23.

companies include stocks that are both new and mature, the latter of which have a moderating effect on the short-term growth rates.[119]

- Various state utility regulatory commissions have also supported the use of a constant growth DCF model to estimate the market return in the CAPM. As shown in Figure 18, the Staff of the Illinois Commerce Commission ("ICC"), the I&E of the PAPUC, and the Staff of the Maine Public Utilities Commission ("Maine PUC") have each supported the forward-looking market risk premium, and the market return estimates using the constant growth DCF model. In each of these cases, the respective regulatory commission relied on the estimated CAPM results by these parties to determine the authorized ROE and did not dispute the use of the constant growth DCF model to calculate the market return.

Figure 18: Regulatory Commissions – Market Return Estimated Using the Constant Growth DCF Model

Intervening Party	Applicant	Docket No.	Approach of Intervening Party to Calculating the Market Return	Date of Order	Did the Commission Rely on the Party's CAPM?
Staff of the ICC	North Shore Gas Company	20-0810	CGDCF of the dividend-paying companies in the S&P 500 (11.95%)120	9/8/21	Yes[121]
I&E	Aqua Pennsylvania, Inc.	R-2021-3027385	CGDCF of the Value Line Universe and S&P 500 (12.14%)122	5/12/22	Yes, the PPUC placed primary weight on I&E's CAPM[123]
Staff of the MPUC	Northern Utilities, Inc.	2019-00092	CGDCF of the dividend-paying companies in the S&P 500 (11.33%-13.49%)[124]	4/1/20	Yes[125]

- The U.S. State Court of Appeals for the District of Columbia has addressed the concern regarding the use of projected EPS growth rates in a constant growth DCF model to estimate the market return in its review of FERC Opinion No. 569-B. In the decision, the Court acknowledged that FERC has relied on the use of EPS growth rates in the calculation of the forward-looking market return on the S&P

119 Ass'n. of Businesses Advocating Tariff Equity v. Midcontinent Indep. Sys. Operator, Inc., 171 FERC ¶ 61,154, ¶ 85 (2020).

120 Illinois Commerce Commission, Docket No. 20-0810, Order, September 8, 2021, at 71.

121 Id., at 86-87.

122 Pennsylvania Public Utility Commission, Docket No. R-2021-3027385, Opinion and Order, Public Meeting held May 12, 2022, at 147.

123 *Id*., at 178.

124 Maine Public Utilities Commission, Docket No. 2019-00092, Bench Analysis, October 29, 2019, at 21.

125 *Id*., Order Part II, April 1, 2020, at 58.

> 500 because the S&P 500 is regularly updated to include companies with high market capitalization and it includes companies at all stages of growth, including lower and higher growth potential. The Court determined that FERC's rationale for using projected EPS growth rates was sufficient and did not accept the challenge to this assumption.[126]

For all of these reasons, there is no basis to the contention made by Ms. Malki that the market return or market risk premia in my cost of equity analyses is too high.

Q. Do you agree with Ms. Malki's comparison of your market return to the geometric average historical market return?

A. No. For the reasons I discussed above, it is the arithmetic mean and not the geometric mean that is the appropriate calculation for estimating the market risk premium. Further, as just discussed, my expected market return is consistent with the range of annual equity returns that have been observed over the past century, whereby a majority of the realized equity return over this period were at least as high as my market return or greater.

Q. Ms. Malki contends that your calculation of the long-term growth rate for the S&P 500 in the estimation of your market return is "not consistent with FERC's assumption".[127] How do you respond?

A. Ms. Malki is incorrect in her characterization of calculation of the market return in my CAPM analysis. As shown in Schedule AEB-6 to my Direct Testimony and Schedule AEB-R-5 to my Rebuttal/Surrebuttal/Sur-surrebuttal testimony, I excluded companies in the S&P 500 that had a long-term EPS growth rate from Bloomberg that was either negative or greater than 20 percent which is consistent with the criteria applied by FERC. Therefore,

---

126 United States Court of Appeals, District of Columbia Circuit, Opinion, Docket No. 16-1325, August 9, 2022, at 19.

127 Malki Direct/Rebuttal, at 44.

I did not include "certain companies with extreme growth rate values" as contended by Ms. Malki. In fact, Ms. Malki is also inconsistent on this issue. In her testimony, Ms. Malki contends my calculation of the growth rate is inconsistent with the calculation relied on by FERC; however, in Schedule KM-R6, where Ms. Malki adjusts my calculation of the market return, she does not make an adjustment to exclude growth rates that are either negative or greater than 20 percent because they have already been excluded. This appears to another instance where Ms. Malki has developed an incorrect conclusion regarding the analysis that I presented in my Direct Testimony.

Q. Ms. Malki suggests that your market risk premium is an extreme outlier relative to other financial institutions' estimates of the market risk premium. Is Ms. Malki's comparison reasonable?

A. No. The decisions of other regulators contradict Ms. Malki's conclusion of my market return being an outlier. Further, the historical market risk premia estimates that Ms. Malki references have been addressed above, as they are used in her CAPM analysis. The additional estimates that she provides in her direct/rebuttal testimony are misleading, in that they were proposed by parties in a FERC proceeding, but not accepted by the FERC. Therefore, Ms. Malki has provided no evidence demonstrating that a regulator has relied on these estimates. Specifically, Ms. Malki presents forward-looking market risk premium estimates from *Value Line*, *Kroll* (formerly *Duff & Phelps*), and American Appraisal, and she cites the FERC's Opinion No. 569 as the source for those estimates.[128] However, Ms. Malki fails to acknowledge that the market risk premia that she cites from Opinion No. 569

[128] Malki Direct/Rebuttal Testimony, at 45, footnote 147.

were not agreed upon by the FERC in that proceeding. Rather, these estimates were raised by a specific intervenor group in that proceeding and summarized as such in Opinion No. 569 as part of the summary of the record.[129] However, the FERC did not agree with that intervenor's position in calculating the market return and thus market risk premium and it instead adopted an approach that is similar to the methodology I use to estimate the market risk premium.[130] Further, Ms. Malki fails to acknowledge that Opinion No. 569 was issued in November 2019, approximately five years ago, which means that the specific estimates of the market risk premia that she summarizes are outdated and not relevant for purposes of determining the cost of equity in the current proceeding.

Q. What is your response to Ms. Malki's reference to the market risk premium resulting from survey research published by Statista?

A. The drawbacks of using survey data include, among other things, biased responses, biased sampling, being affected by how the questions are asked and on recent stock price movements, and that surveys can suffer from low response rates. However, more importantly, the author of the IESE Business School survey, which appears to be the source of the data provided by Statista, states that the average of the distribution of the required equity premium from the survey "*cannot be interpreted as the REP [required equity premium] of the market nor as the REP of a representative investor*".[131]

---

129 Ass'n. of Businesses Advocating Tariff Equity, et. al. v. Midcontinent Indep. Sys. Operator, Inc., et. al., 169 FERC ¶ 61,129 (2019) ("Opinion No. 569"), at ¶ 249.

130 *Id.,* at ¶ 260-261.

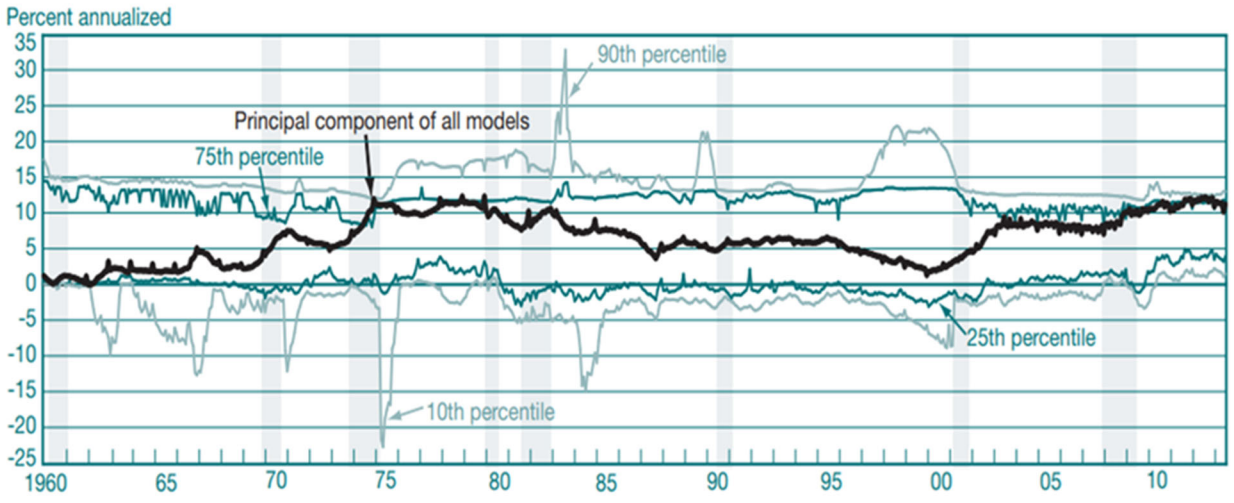
131 Pablo Fernandez, Diego Garcia de la Garza, and Lucia Fernandez Acin. "Survey: Market Risk Premium and Risk-Free Rate used for 96 countries in 2024," IESE Business School, at 11, March 11, 2024, (emphasis added).

Q. Have you reviewed any studies that have evaluated the reasonableness of market risk premium estimates?

A. Yes. 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.[132] The results of this study demonstrate that the market risk premium estimates that I relied on in my direct Testimony, which are in the range of 8.31 percent to 8.81 percent, are reasonable. 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 19, 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 19: The Federal Reserve Bank of New York, One-Year-Ahead Market Risk Premium[133]



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

[133] *Id.,* at 50.

P

Further, the Federal Reserve Bank of New York also 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.[134]

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 above inflation fears have once again increased as result of the campaign promises made by the incoming Trump administration. For example, the threat of increased tariffs on imported goods and cuts in taxes all are likely to put upward pressure on inflation. Given the results of the analysis conducted by the Federal Reserve Bank of New York, it is clear that my estimates of the market risk premium are reasonable.

Q. Does Ms. Malki adjust your CAPM analysis?

A. Yes. Ms. Malki contends that she has made the following adjustments to my CAPM analysis: (1) include only the water utilities that were contained in my proxy group; (2) rely

---

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

on the 3-month average yield on the 30-year Treasury bond of 4.57 percent; (3) correct the current *Value Line* betas; and (4) adjust my calculation of the market return to exclude non-dividend paying companies which produces a market return estimate of 11.93 percent.[135] According to Ms. Malki, applying her adjustments results in an updated CAPM range of 8.29 percent to 10.46 percent.

Q. Overall, do you agree with the changes that Ms. Malki suggests be made to your CAPM analyses?

A. No. Ms. Malki's re-calculation of my CAPM analysis contains four significant errors that renders her adjustments to my CAPM unreliable and unusable as estimates of the cost of equity. Specifically, Ms. Malki:

- incorrectly relies on a market return of 9.43 percent instead of her adjusted market return of 11.93 percent when adjusting my CAPM analysis that relied on the long-term average beta coefficients from *Value Line*. Ms. Malki did correctly rely on the market return of 11.93 percent when adjusting my CAPM analyses that relied on current *Value Line* and *Bloomberg* betas. This error is significant because it is the result of her adjustment to my CAPM analysis that relies on the long-term average beta from *Value Line* that sets the low-end of the range produced by her adjustments to my CAPM of 8.29 percent.

- incorrectly claimed that I did not rely on current *Value Line* betas in my CAPM analysis. However, as noted above, her contention was not correct as her review of my *Value Line* betas contained an error. The result of Ms. Malki's incorrect review of my *Value Line* betas was her correction to my analysis to rely on the most recent beta coefficients reported by *Value Line* as of the filing of my Direct Testimony for the water utilities in my proxy group. Although, instead of relying on the *Value Line* betas for the water utilities included in my proxy group as of Q2/2024 as she intended, Ms. Malki appears to incorrectly rely on an average of *Value Line* betas as of Q4/2022, Q4/2023, Q1/2024, and Q2/2024.

- pairs the *Bloomberg* and long-term average *Value Line* betas that I rely on with the incorrect proxy group company. This is the same error contained in Ms. Malki's review of the current *Value Line* betas that I discuss above. Therefore, the average cost of equity results presented for the CAPM scenarios that rely on the *Bloomberg*

[135] Malki Direct/Rebuttal, at 46.

and long-term average *Value Line* betas would not reflect the average for the water utilities contained in my proxy group.

- removes the growth rates for the non-dividend paying companies but fails to adjust the weight of the market capitalization for the remaining companies in the S&P 500 index when re-calculating my market return.

Q. Could you elaborate further on why Ms. Malki's re-calculation of your market return to exclude non-dividend paying companies is incorrect?

A. Yes. The market return calculation relied upon in my Direct Testimony, which Ms. Malki modifies for her "adjusted" CAPM and ECAPM analyses, is a market capitalization weighted return. However, as shown Schedule KM-r6, in the calculation of her "adjusted" market return of 11.93 percent, Ms. Malki removes the growth rates for the non-dividend paying companies, but she fails to adjust the weight of the market capitalization for the remaining companies in the index.

In order for this calculation to be performed correctly, it is necessary that the dividend yield and growth rate are weighted by the market capitalization of the companies that are included in the calculation. Therefore, when the non-dividend paying companies are removed from the calculation, the market capitalization of the non-dividend paying companies also must be removed from the weighting factor as it affects both the dividend yield and growth rate.

The consequence of Ms. Malki's error is that she calculates a lower "adjusted" weighted average growth rate, but her "adjusted" weighted average dividend yield remains the same as in my Direct Testimony (i.e., 1.72 percent) when it should have correctly increased with the removal of the non-dividend paying companies from the weighting in the index.

Q. Have you corrected Ms. Malki's calculation of the market return to properly reflect the exclusion of non-dividend paying companies?

A. Yes. As shown on Schedule AEB-R-12, the market return as filed in my Direct Testimony was 12.91 percent. Removing non-dividend paying companies from the calculation results in a market return of 12.89 percent. This estimate is generally consistent with the long-term historical market return from 1926 through 2023 is 12.04 percent,[136] as well as the market return of 12.05 percent reflected in my CAPM analysis based on the most recent market data. As discussed above, while I do not agree that the use of a historical market return is an appropriate proxy for the forward-looking market return, it nonetheless indicates that my projected market return, and resulting market risk premia, are not "unreasonably high" as suggested by Ms. Malki.[137]

Q. Have you corrected the errors contained in Ms. Malki's re-calculation of your CAPM analysis to apply her proposed adjustments?

A. Yes. Specifically, I corrected Ms. Malki's re-calculation of my CAPM to: (1) rely on the correct *Value Line*, *Bloomberg* and long-term average *Value Line* betas for the water utilities included in my proxy group; and (2) rely on the market return of 12.89 percent, which removes the non-dividend paying companies from the market return calculation presented in my Direct Testimony. As shown in Schedule AEB-R-13, correcting Ms. Malki's re-calculation of my CAPM analysis results in a cost of equity range of 10.71 percent to 11.31 percent, which continues to support an ROE of 10.75 percent.

---

136 *Kroll*, Cost of Capital Navigator.

137 Malki Direct/Rebuttal, at 43.

ECAPM Analysis

Q. What is Ms. Malki's position regarding your ECAPM analysis?

A. Ms. Malki states that each of her concerns regarding my CAPM analysis also apply to my ECAPM analysis. In addition, Ms. Malki disagrees with the adjustment made in the ECAPM to account for the tendency of the CAPM to underestimate the cost of equity for companies with betas less than 1.00.[138] Specifically, regarding the ECAPM adjustment, Ms. Malki states such adjustment is based on the findings of Dr. Morin who developed the model based on data between 1926 and 1984, and Ms. Malki asserts that there is no evidence that Dr. Morin's findings would still be relevant based on data after 1984.[139] Further, Ms. Malki contends that Dr. Morin presented other studies that produced returns between -9.61 percent to 13.56 percent, which Ms. Malki claims means that the CAPM overestimated the return in some instances and that such findings do not lend credibility to the use of the ECAPM.[140]

Q. Do you agree with Ms. Malki's conclusions on the ECAPM studies?

A. No, I do not. The concept of the ECAPM and the conclusion that the risk-return relationship is flatter than predicted by the CAPM is generally accepted in financial literature. In *Modern Regulatory Finance*, Dr. Morin provides a list of studies each of which concludes that the CAPM understates the returns for companies with betas less than 1.0 (which is typically utilities) and overstates the return for companies with betas greater than 1.0.[141] It is these empirical studies that formed the basis of the development of

---

138 Malki Direct/Rebuttal Testimony, at 48.

139 *Id*., at 49.

140 Id.

141 Roger A. Morin, *Modern Regulatory Finance*, Public Utilities Reports, Inc., 2021, at 206-208.

alternative models such as the ECAPM that would better predict the risk return-relationship observed when reviewing actual market data.

Academics and researchers use the equation shown below to determine the value of the constant term (α) or "alpha factor" using historical market data:

$$K_e = r_f + \alpha + \beta\left(\left(r_m - r_f\right) - \alpha\right) \quad [1]$$

Where:

K_e = the required market ROE;

α = a constant term;

β = beta coefficient of an individual security;

r_f = the risk-free ROR; and

r_m = the required return on the market as a whole.

There have been numerous additional studies published to estimate the value of the constant term or alpha factor in the ECAPM equation. Figure 20 provides the list of studies summarized by Dr. Morin and referenced by Ms. Malki as support for her conclusion that the ECAPM is not credible. However, Ms. Malki's conclusion improperly masks the fact that, as shown, six of the eight studies estimated positive values of the constant term, which indicates that the consensus among the studies is that the CAPM understates the observed return. Additionally, among the six studies that estimate only positive values of the constant term, the range of the constant term was 1.63 percent to 13.56 percent. Dr. Morin relied on a constant term in the range of 1 to 2 percent to develop the 0.25 and 0.75 factors included in the ECAPM and considering the range of the constant term provided in Figure 20, it would appear Dr. Morin's estimate is conservative.

Figure 20: Empirical Evidence on the Alpha Factor (Constant Term)[142]

Author	Range of Alpha
Fischer (1993)	-3.6% to 3.6%
Fischer, Jensen and Scholes (1972)	-9.61% to 12.24%
Fama and McBeth (1972)	4.08% to 9.36%
Fama and French (1992)	10.08% to 13.56%
Litzenberger and Ramaswamy (1979)	5.32% to 8.17%
Litzenberger, Ramaswamy and Sosin (1980)	1.63% to 5.04%
Pettengill, Sundaram and Mathur (1995)	4.6%
Morin (1989)	2.0%

Q. Do any of the studies cited by Dr. Morin examine the ability of the CAPM to estimate the return of utilities?

A. Yes. Litzenberger, Ramaswamy, and Howard (1980) studied the ability of the CAPM to estimate the returns for utilities.[143] The authors found that the CAPM tends to understate the return for stocks such as utilities, which have a beta less than 1.00. To develop their analysis, the authors used historical (*i.e.,* "raw") betas to estimate the "alpha" factor in the ECAPM. However, the authors also showed that an "alpha" factor can be derived for betas adjusted using the Blume procedure discussed above and the results of their analysis for raw betas. The Blume adjustment is shown in the following equation:

$$\beta_i = \omega\beta_{i(historical)} + (1 - \omega) \qquad [2]$$

Where:

β_i = adjusted beta

β_i [historical] = raw beta

ω = Blume Adjustment factor (*i.e.*, 0.67)

142 *Id*., at 222.

143 Robert Litzenberger, *et al*., "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *The Journal of Finance*, Vol. 35, No. 2, 1980, at 369-383.

The estimate of "alpha" using Blume-adjusted betas can be derived using the results presented in the "Raw Beta" section of Table 1 on page 380 and the equations on page 376:

$$a = a' - b' \left(\frac{1-\omega}{\omega}\right) = 0.326 - 0.330 \left(\frac{0.33}{0.67}\right) = 0.163 \qquad [3]$$

Where:

a = estimated alpha factor for Blume adjusted betas

a' = estimated alpha factor using raw betas

b' = estimated excess return over the risk-free rate using raw betas

Because the authors relied on monthly returns for stocks in the New York Stock Exchange, the estimated "alpha" factor using adjusted betas of 0.163 percent must be annualized.[144] When annualized, the estimated "alpha" factor is 1.97 percent using Blume-adjusted betas, which is consistent with the "alpha" factor relied on by Dr. Morin of 1 to 2 percent to develop the 0.25 and 0.75 factors included in the ECAPM that I rely on in both my direct and rebuttal testimonies.

Q. What is your response to Ms. Malki's contention that the ECAPM proposed by Dr. Morin may not be applicable if more recent market data is considered?

A. Ms. Malki's claim is incorrect as there has been a study published after the publication of Dr. Morin's book, *New Regulatory Finance*, that considered the use of the ECAPM based on more recent market data. Specifically, Chrétien and Coggins (2011) studied the CAPM and its ability to estimate the risk premium for the utility industry in particular subgroups of utilities for a data set that included market data through the end of 2006.[145] Chrétien

144 (1.00163)^12-1 = 1.97 percent

145 Stéphane Chrétien and Frank Coggins. "Cost Of Equity For Energy Utilities: Beyond The CAPM." *Energy Studies Review*, Vol. 18, No. 2, 2011.

and Coggins considered the CAPM, the Fama-French three-factor model and a model similar to the ECAPM used in my Direct Testimony. The study shows that the ECAPM significantly outperformed the traditional CAPM at predicting the observed risk premium for the various utility subgroups.

Q. Is Ms. Malki's recalculation of your ECAPM analyses reasonable?[146]

A. No. Similar to her adjustments to my CAPM analysis, Ms. Malki's recalculation of my ECAPM contains the same four significant errors that I discussed above: (1) Ms. Malki incorrectly relies on a market return of 9.43 percent instead of her adjusted market return of 11.93 percent when adjusting my ECAPM analysis that relies on the long-term average beta coefficients from *Value Line;* (2) Ms. Malki does not rely on *Value Line* betas as of Q2/2024 as she intended and instead appears to rely on an average of *Value Line* betas as of Q4/2022, Q4/2023, Q1/2024, and Q2/2024; (3) Ms. Malki pairs the *Bloomberg* and long-term average *Value Line* betas that I rely on with the incorrect proxy group company; and (4) Ms. Malki's market risk premium "adjustment" to exclude non-dividend paying companies was calculated incorrectly. These errors render the cost of equity estimates produced by Ms. Malki's adjustments to my ECAPM as unusable. Further, as summarized on Schedule AEB-R-13, when the errors in Ms. Malki's recalculation of my ECAPM analysis are corrected, the results of the ECAPM analysis support an ROE of 10.75 percent.

[146] Source: Schedule KM-r4.

BYRP Analysis

Q. Please summarize Ms. Malki's BYRP analysis.

A. Ms. Malki's BYRP analysis estimates the cost of equity as the average yield on utility bonds plus a utility risk premium. For the utility bond yield, Ms. Malki relies on the monthly average yields on the Moody's A-rated and Baa-rated utility bonds for April 2024 to June 2024. Ms. Malki's utility risk premia are based on a study referenced by Dr. Morin in his book, *New Regulatory Finance*, which resulted in a risk premium of 3.45 percent for A-rated electric utilities and a risk premium of 4.35 percent for Baa-rated electric utilities. However, because the referenced risk premia were for electric utilities, Ms. Malki reduced the risk premia by 21 basis point to reflect that the authorized returns for water utilities were lower than the authorized returns for vertically integrated electric utilities over the period of 2010-2024.[147] Ms. Malki's BYRP analysis produced an ROE range of 8.85 percent to 10.15 percent with a midpoint of 9.50 percent.[148]

Q. What is your primary concern with Ms. Malki's BYRP analysis?

A. My primary concern with Ms. Malki's BYRP analysis is that she relies on a historical estimate of the risk premium, which would not take into consideration the inverse relationship between interest rates and the risk premium. This is important because as I will discuss in more detail below, current interest rates are well below the historical interest rates that correspond to the historical risk premia that Ms. Malki relies on to conduct her BYRP analysis. Given the inverse relationship between interest rates and the risk premium, the current risk premium should be higher than the historical risk premium relied on by

147 Malki Direct/Rebuttal, at 51

148 Source: Schedule KM-d-14

Ms. Malki which means the cost of equity estimates produced by her BYRP analysis are significantly understated.

Q. Does Ms. Malki rely on historical estimates of the risk premia in her BYRP analysis?

A. Yes. Ms. Malki cites Dr. Morin's *New Regulatory Finance*, which references a study conducted in 1985 by Eugene Brigham, Dilip Shome and Steve Vinson titled "The Risk Premium Approach to measuring a Utility's Cost of Equity". Brigham, Shome and Vinson (1985) examined the relationship between risk premia and credit ratings and showed the risk premium increased as a company's credit rating decreased.[149] However, it is important to note that the estimated risk premia by credit rating were calculated for six-month period of January 1984 through June 1984. Therefore, the risk premia that Ms. Malki relies on for her BYRP analysis are based on market data from 40 years ago.

Q. Were the interest rates that existed in 1984 higher than current interest rates?

A. Yes. For example, as shown in Schedule KM-d4, the yield on the 30-year Treasury bond ranged from 11.75 percent to 13.44 percent for the period of January 1984 through June 1984, which is substantially greater than the 3-month average yield on the 30-year Treasury bond as of June 2024 of 4.57 percent that Ms. Malki relies on to conduct her CAPM analysis.

Q. Has Ms. Malki acknowledged the inverse relationship between interest rates and the risk premium?

A. Yes. In fact, Ms. Malki contends that she relied on the inverse relationship between interest rates and the risk premium to conduct her BYRP analysis. Specifically, Ms. Malki noted

[149] Brigham, Eugene F., et al. "The Risk Premium Approach to Measuring a Utility's Cost of Equity." Financial Management, vol. 14, no. 1, 1985, pp. 33–45.

"[t]o determine a risk premium for a given bond yield, Staff relied on the negative relationship between risk premiums and bond yields".[150] However, it is clear that she incorrectly did not consider the inverse relationship as her risk premia of 3.45 percent and 4.35 percent are based in interest rates levels that far exceed those that exist currently. It is reasonable to conclude that the historical risk premia relied by Ms. Malki substantially understate the current risk premium and should not have been added to current interest rates to produce an estimate of the cost of equity.

Q. Does Ms. Malki's reliance on historical risk premia from 1984 conflict with her critique of your ECAPM analysis?

A. Yes. Ms. Malki criticizes my ECAPM analysis because it is based on a study from Dr. Morin that relied on market data from 1926 through 1984 and there is no evidence that the results of the study would hold using data after 1984.[151] Therefore, she criticizes my ECAPM because it was based on historical data but then relies on risk premia estimated based on data from 1984. Ms. Malki's critique of my ECAPM analysis is clearly unreasonable given her use of data from 1984 to estimate her BYRP analysis.

Q. What is the appropriate approach for conducting a BYRP analysis?

A. The appropriate and more rigorous approach is to develop a regression equation that reflects the dynamic relationship between authorized returns and interest rates over an extended period of time and then input a current or projected interest rates into that equation. The benefit of conducting a regression equation is that it can be used to estimate

150 Malki Direct/Rebuttal, at 50.

151 *Id.*, at 49.

a forward-looking equity risk premium that corresponds to any interest rate that an analyst wishes to specify.

Q. Have you performed a BYRP analysis using a regression equation?

A. Yes, I have. I developed a regression analysis using authorized ROEs for natural gas and electric utilities as the historical measure of the ROE and the yield on Moody's Baa-rated utility bonds are the interest rate.

Q. Why did you conduct this analysis based on the natural gas and electric utility authorized ROEs?

A. The data set that is available for the water utilities begins in 2010, which is not a sufficient time period for a time series study such as the BYRP analysis. As I discussed in detail above, the data for natural gas and electric T&D companies is most appropriate since a large portion of their operating income is from regulated operations similar to MAWC, as well as the water utilities included in my proxy group. Moreover, as shown in Figure 15 above, the average annual authorized returns for electric T&D and natural gas utilities were generally consistent with the average annual returns for water utilities over the period of 2017 through 2024. As a result, it is reasonable and appropriate to rely on this time series analysis of the natural gas and electric T&D utility industry segment.

Q. What did your BYRP analysis reveal?

A. I developed my regression analysis using data on authorized returns for electric T&D and natural gas utilities as well as the yield on Moody's Baa-rated utility bonds for the period of Q1/1993 through Q3/2024 (*i.e.,* the most recent quarter prior to the filing of Ms. Malki's Direct/Rebuttal Testimony). As shown in Schedule AEB-R-14, when the regression results are applied to the monthly average of the Moody's Baa-rated utility bond yields for July

2024 through September 2024, Ms. Malki's BYRP analysis produces a cost of equity of 9.95 percent to 10.13 percent, with a midpoint of 10.04 percent. The average adjusted result of 10.04 percent represents a 54-basis point increase from the 9.50 percent ROE produced by Ms. Malki's BYRP analysis. This highlights how Ms. Malki's reliance on historical risk premia that do not consider the inverse relationship between the risk premium and interest rates understates the cost of equity for MAWC.

Cost of Equity Overview

Q. Based on the various issues that you have identified with Ms. Malki's DCF, CAPM, BYRP 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 21 presents the results of Ms. Malki's analyses when they are updated to use data for the most current quarter available prior to the filing of Ms. Malki's direct/rebuttal testimony and corrected for the issues that I have discussed. Specifically, the changes to Ms. Malki's two-step DCF, CAPM, and BYRP analyses are shown in Schedule AEB-R-10, Schedule AEB-R-11 and Schedule AEB-R-14, respectively. As shown in Figure 21, the resulting cost of equity range is 9.67 percent to 10.87 percent with an average of 10.19 percent. My recommended ROE of 10.75 percent is well within the adjusted cost of equity range while Ms. Malki's recommended ROE of 9.50 percent falls outside of the adjusted cost of equity range.

Figure 21: Resulting Cost of Equity from Ms. Malki's Adjusted Cost of Equity Analyses

	Analysis Results
Two-Step DCF Analysis	9.67%
CAPM Analysis	10.97%
BYRP Analysis	10.04%
Average	10.19%

VII. RESPONSE TO MR. MURRAY'S COST OF EQUITY ANALYSES

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 water companies. 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 7.39 percent to 8.90 percent,[152] he considers a reasonable range for the Company's ROE to be 9.00 percent to 9.50 percent and recommends an ROE of 9.25 percent.[153]

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

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

[152] Schedule DM-D-2 and Schedule DM-D-5.

[153] Murray Direct/Rebuttal, at 2.

develops multiple scenarios of a multi-stage dividend discount model that results in a cost of equity of between 7.25 percent and 7.50 percent,[154] and CAPM analyses that result in an estimated range of the cost of equity of 8.05 percent to 8.90 percent.[155] Finally, Mr. Murray considers a "rule of thumb" approach, which estimates a cost of equity of 8.50 percent. Mr. Murray then suggests that based on the current cost of equity, presumably established through the aforementioned analyses, a fair and reasonable ROE in this case would be between 9.00 percent and 9.50 percent, recommending the midpoint of that range for MAWC.[156]

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.[157] As a result, Mr. Murray states that he first estimates MAWC'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, in order to determine if there has been a fundamental change in the cost of capital.[158]

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.

---

154 Schedules DM-D-2 through DM-D-4.

155 Schedule DM-D-5.

156 Murray Direct/Rebuttal at 33.

157 *Id*., at 4-5.

158 *Id*., at 5.

Murray that: (1) there is a distinction between the cost of equity and the ROE authorized by regulatory commissions in setting just and 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.

Regulatory commissions are mandated to approve rates that balance the interests of customers and shareholders and that are just and reasonable. 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 substantially lower than any ROE that has been authorized by a regulatory commission in the past, 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. Given regulatory commissions' legal mandates for setting just and reasonable rates, it has to be concluded that the ROEs that these commissions authorized were deemed by those agencies to reflect the investor-required return and produced just and reasonable rates at that time based on the information presented in those proceedings.

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***.[159]

Q. How does Mr. Murray respond when you note that Ameren Illinois Co. received analyst credit and growth downgrades when the Illinois Commerce Commission

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

awarded an 8.72 percent ROE, a return that is 53 basis points lower than his recommended ROE for MAWC?

A. Mr. Murray implicitly acknowledges that in that circumstance, capital was allocated to its best use with the highest return but does not seem to consider that risk in setting his recommended ROE for MAWC in this proceeding. Mr. Murray agrees that equity analysts lowered their expectations for Ameren Corporation's EPS, and notes that Ameren Corporation renewed its guidance of 6.00% to 8.00% long-term CAGR in EPS, and notes that Ameren Corporation reallocated capital away from Illinois and towards Missouri.[160] According to Mr. Murray, low ROEs are fine for the parent as they will reallocate capital elsewhere and goes as far to say that "the Commission should be careful not to over-incentivize investment in Missouri."[161]

Q. What is your response to Mr. Murray's views on capital attraction?

A. Mr. Murray's suggestion, that it is the Commission's responsibility to reduce the incentive to invest in MAWC, particularly when the Company has projected significant capital investment over the next five years that will require financing is inconsistent with the *Hope* and *Bluefield* standards. As noted in my Direct Testimony, the Company projects $2.63 billion in capital expenditures over the period from 2024 through 2028. Mr. Murray has not suggested in his direct/rebuttal testimony that these investments are not necessary or appropriate. Therefore, it is unreasonable to suggest that the Commission set the ROE in this proceeding to reduce the investment in Missouri.

160 Murray Direct/Rebuttal, at 59.

161 Id., at 58.

Q. Do you agree with Mr. Murray's stated regarding the "zone of reasonableness" for the ROE to be established in this proceeding?

A. No. Mr. Murray's proposed zone of reasonableness is based on outdated authorized ROEs established for utilities that he has not established are of comparable risk to MAWC. The basis for 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. However, Mr. Murray contends that the zone of reasonableness in this proceeding should be 8.50 percent to 10.50 percent, based on the a 2015 Commission decision establishing the authorized ROE of 9.50 percent for electric utilities.[162] Mr. Murray makes no comparison of the market conditions at the time of those decisions, or the risk factors of the companies for which the Commission established the ROE at that time. Therefore, it is unreasonable to suggest that the ROE in the current proceeding should be set based on range around a decade-old rate decision that may not be representative of current market conditions, or the risks of the subject company.

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 22, generally, no.[163] 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. In practice, as noted previously, by setting his recommended ROE well above the

---

162 Id., at 2 and 5.

163 As shown in Figure 22, only the CAPM results using a 6.00% market risk premium, which Mr. Murray characterizes as "excessive," at page 30 of his Direct/Rebuttal testimony fall within the "zone of reasonableness".

range of his results, Mr. Murray has also disregarded his own analyses. The remainder of the results of his analyses are all below or well below the low end of the zone he suggests is relevant.

Figure 22: Comparison of the Results of Mr. Murray's Multi-Stage DCF Analyses and CAPM Relative to His Proposed Zone of Reasonableness[164]

	Cost of Equity	Mr. Murray Zone of Reasonableness	Within Zone?
Multi-Stage DCF			
Proxy Group with 6 month Avg. Stock Prices			
3.75% Perpetual Growth Rate	8.07%		No
4.00% Perpetual Growth Rate	8.15%		No
4.25% Perpetual Growth Rate	8.25%		No
CAPM			
20-Year Treas. Bond Yield. as Risk-Free Rate			
5% Market Risk Premium	8.13%	8.50% - 10.50%	No
6% market Risk Premium	8.90%		Yes
30-Year Treasury Bond Yield as Risk-Free Rate			
5% Market Risk Premium	8.05%		No
6% market Risk Premium	8.82%		Yes
Kroll Risk-Free Rate & Equity Risk Premium	8.30%		No

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

A. No. It is not surprising that Mr. Murray does not rely on his analytical results for purposes of developing his recommended ROE in this proceeding. All of the results of Mr. Murray's multi-stage DCF and CAPM analyses are *below the low end of the range* of comparable authorized ROEs that have been approved for water utilities since at least 1980, that were determined as market returns, without any penalties or other reductions. I recognize that Mr. Murray contends that the results of his cost of equity analyses are reasonable based on

[164] Id., at Schedule DM-D-2 and Schedule DM-D-5.

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 unsupported and unfounded given the mandate of regulatory commissions to authorize just and reasonable rates and that his position has been specifically rejected previously.

Q. In prior MAWC 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 23, Mr. Murray's model results have consistently been below his ROE recommendation.

Figure 23: Comparison of the Results of Mr. Murray's Cost of Equity Estimation Methodologies and Recommended ROE in Prior MAWC Rate Proceedings

Methodology	Case No. WR-2024-0320	Case No. WR-2022-0303	Case No. WR-2020-0344
Multi-Stage DCF ("lower" long-term growth rate) [165]	7.39% (3.75%)	6.09 (3.70%)	6.23% (3.50%)
Multi-Stage DCF (4.00% long-term growth rate) [166]	7.43%	6.22%	6.42%
Multi-Stage DCF ("higher" long-term growth rate) [167]	7.50% (4.25%)	6.35% (4.30%)	NA
CAPM (^5.00% MRP; *6.00% MRP)[168]	8.05%^ - 8.90%*	8.02%* - 8.26%*	5.77%* - 7.34%*

165 Murray Direct/Rebuttal, at DM-D-2; File No. WR-2022-0303, November 22, 2022, Direct Testimony of David Murray, at DM-D-2; File No. WR-2020-0344, November 24, 2020, Direct Testimony of David Murray, DM-D-3.

166 Murray Direct/Rebuttal, at DM-D-2; File No. WR-2022-0303, November 22, 2022, Direct Testimony of David Murray, at DM-D-2; File No. WR-2020-0344, November 24, 2020, Direct Testimony of David Murray, DM-D-2.

167 Murray Direct/Rebuttal, at DM-D-2; File No. WR-2022-0303, November 22, 2022, Direct Testimony of David Murray, at DM-D-2.

168 Murray Direct/Rebuttal, at DM-D-5; File No. WR-2022-0303, November 22, 2022, Direct Testimony of David Murray, at DM-D-4 through DM-D-7; File No. WR-2020-0344, November 24, 2020, Direct Testimony of David Murray, DM-D-4 through DM-D-7; Mr. Murray excludes American States Water Company and California Water Service Group in his 2020 CAPM results due to abnormally low betas.

P

Methodology	Case No. WR-2024-0320	Case No. WR-2022-0303	Case No. WR-2020-0344
Rule of Thumb[169]	8.50%	8.75% - 9.00%	5.75%
Cost of Equity Range[170]	7.25% - 8.25%	6.00% - 6.50%	5.50% - 6.50%
ROE Recommendation[171]	9.25%	9.00%	9.25%
Amount by which Mr. Murray's ROE recommendation is greater than his highest cost of equity model result	**0.35%**	**0.74%**	**1.91%**

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

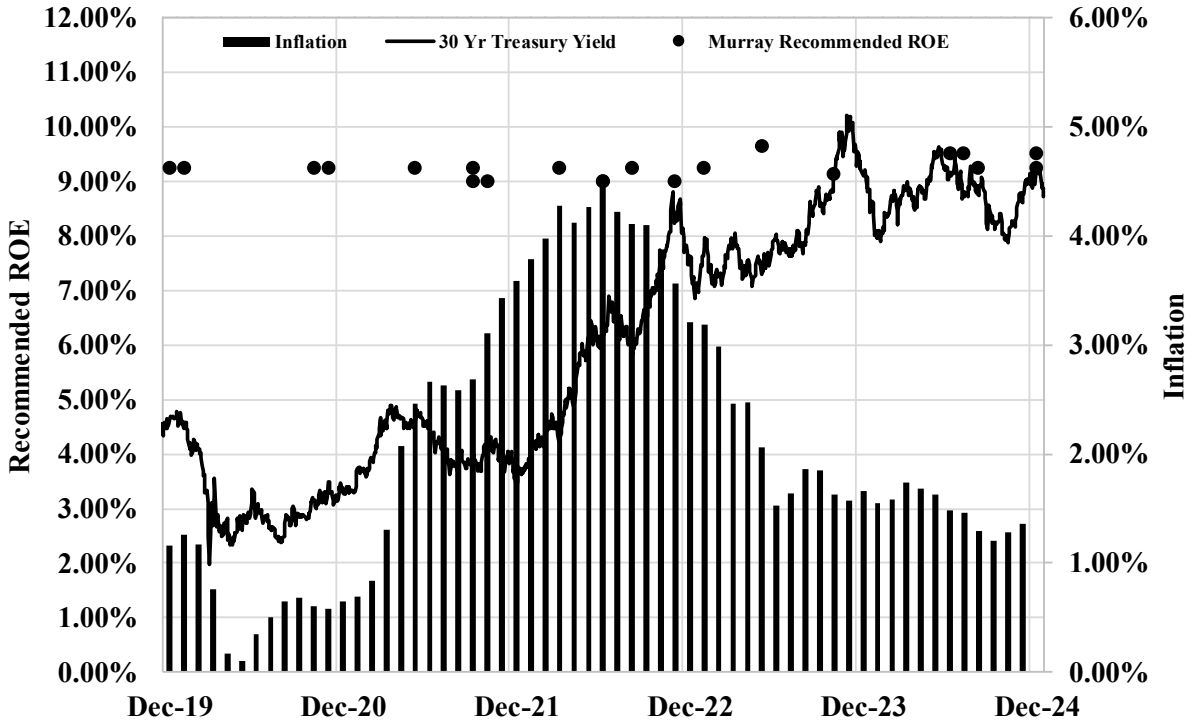
A. No. As shown in Figure 24, Mr. Murray's recommended ROEs have consistently been between 9.00 percent and 9.50 percent since 2019 – regardless of capital market conditions, with exception of recommending 9.65 percent for Confluence Rivers in Case No. WR-2023-0006. While long-term interest rates have 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 recognize how changes in market conditions affect the investor-required return on equity.

169 Murray Direct/Rebuttal, at 33; File No. WR-2022-0303, November 22, 2022, Direct Testimony of David Murray, at 38; File No. WR-2020-0344, November 24, 2020, Direct Testimony of David Murray, at 31.

170 Murray Direct/Rebuttal, at 5; File No. WR-2022-0303, November 22, 2022, Direct Testimony of David Murray, at 5; File No. WR-2020-0344, November 24, 2020, Direct Testimony of David Murray, 5.

171 Murray Direct/Rebuttal, at 2; File No. WR-2022-0303, November 22, 2022, Direct Testimony of David Murray, at 2; File No. WR-2020-0344, November 24, 2020, Direct Testimony of David Murray, at 3.

Figure 24: Mr. Murray's ROE Recommendations Compared to Changing Market Conditions



Proxy Group

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

A. Mr. Murray includes "most" "generally classified" domestic publicly traded water utilities by *Value Line*.[172] Mr. Murray's proxy group has six companies including MAWC's parent, AWK. Mr. Murray excludes Middlesex Water Company from his DCF, citing that "investment analysts do not provide financial metric estimates for Middlesex Water Company."[173]

172 Murray Direct/Rebuttal, at 26.

173 Id.

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

A. No. I disagree with several components of his proxy group including: (1) his limited and non-transparent screening criteria; (2) his small proxy group which could be improved by adding non-water utilities such as gas utilities; and (3) including the parent company AWK which introduces circular logic that occurs from using the parent company to determine the ROE for the subject company, which in turn contributes to the ROE of the parent company. However, given that 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 group further and I have limited my response to address those issues that cause the unreasonably low cost of equity results of Mr. Murray's multi-stage DCF and CAPM analyses.

Q. Please summarize Mr. Murray's criticism of your proxy group.

A. Mr. Murray suggests that natural gas utilities are not risk comparable to water companies and therefore should not be included in the proxy group for MAWC. However, Mr. Murray believes that it is useful to compare the water utility industry to other subsectors in the utility industry.[174]

Q. Do you agree with the analysis that Mr. Murray conducted to determine that natural gas and electric utilities were not suitable proxy companies?

A. No, I do not. Mr. Murray's analysis is limited to comparing betas of my water and non-water companies, and he claims that my *Value Line* (Bloomberg) betas are 0.76 (0.73) and

[174] Murray Direct/Rebuttal, at 62-64.

0.89 (0.78) for my water and non-water companies, respectively.[175] Mr. Murray also suggests that "water utility companies have higher growth expectations over a longer period of time than the regulated electric and natural gas utility subsectors,"[176] and observes that my water utility companies have had higher P/E ratios compared to my non-water utility companies.[177] These observations do not address screening criteria, and Mr. Murray inappropriately includes Essential Utilities, Inc. ("WTRG") as a non-water utility when calculating my average betas. Although WTRG displays similar risks to the non-water companies in my proxy group and provides natural gas, WTRG's business is primarily to provide drinking water and wastewater services.

Q. Have you corrected the beta summary calculation provided by Mr. Murray?

A. Yes. As discussed in response to Ms. Malki and shown in Figure 12, I have corrected the beta calculations by appropriately classifying WTRG as a water utility. As shown in Figure 12, the average beta coefficient for the water utilities is nearly identical to the average beta coefficient for the electric and natural gas utilities for two of the three estimates of beta that I rely on in my CAPM. Mr. Murray also acknowledges that the average Bloomberg betas for the water, electric and natural gas utilities included in my proxy group are "not nearly as consequential."[178]

Furthermore, as discussed in my response to Ms. Malki and shown in Schedule AEB-R-6, while the average *Value Line* beta for the water utilities was slightly lower than the average for the electric and natural gas utilities in my proxy group, there have been

---

175 *Id*., at 61.

176 Id., at 62.

177 Id., at 63.

178 Murray Direct/Rebuttal, at 61.

points in time in the past where the average *Value Line* beta for these waters utilities was greater than the average *Value Line* beta for these electric and natural gas utilities.

Q. Is Mr. Murray effectively applying a beta screen by comparing the beta coefficients for the water and electric and natural gas utilities in your proxy group?

A. Yes. Similar to Ms. Malki, Mr. Murray has essentially applied a beta screen to an industry as opposed to an individual company when suggesting that non-water utilities should be excluded from the proxy group.[179] However, this is inappropriate for all of the reasons that I discussed in my response to Ms. Malki.

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 calculates the projected dividends for each proxy company based on analysts' projected EPS growth rates through 2027 multiplied by their projected dividend payout ratios based on analysts' estimated annual DPS and EPS. For the second stage, which is 2028 through 2038, Mr. Murray relies 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 of 3.75 percent in 2038. Mr. Murray also conducts scenarios of his multi-stage DCF analysis by using long-term growth rates of 4.00 percent and 4.25 percent as well.[180] Mr. Murray performs his DCF with a six-month stock price

179 Id., 61-62.

180 *Id*., at DM-D-4.

period.[181] The results of Mr. Murray's multi-stage DCF analyses are shown previously in Figure 22.

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, does his multi-stage DCF analysis indicate that the cost of equity has increased for water utilities?

A. Yes. While I disagree with the specification of Mr. Murray's multi-stage DCF model, the results of his multi-stage DCF analysis in the current proceeding using the proxy group indicate an increase in the cost of equity since the Company's last rate proceeding. Specifically, as shown in Figure 25, the results of Mr. Murray's multi-stage DCF analysis are on average 122 basis points greater than the results of his multi-stage DCF analyses in the Company's last rate proceeding.[182]

---

181 *Id*., at 22.

182 Murray Direct/Rebuttal, at Schedule DM-D-2 through DM-D-4; Missouri Public Service Commission, Case No. WR-2022-0303, at Schedule DM-D-2 through DM-D-4.

Figure 25: Results of Mr. Murray's Multi-Stage DCF Analyses in the Current Proceeding as Compared to MAWC's Last Rate Proceeding[183]

	Current Case	Prior Case	Basis Point Increase
Multi-Stage DCF			
MAWC / 6 month Avg. Stock Prices			
3.70% Perpetual Growth Rate	-	6.09%	-
3.75% Perpetual Growth Rate	7.39%	-	-
4.00% Perpetual Growth Rate	7.43%	6.22%	121
4.25% Perpetual Growth Rate	7.50%	-	-
4.30% Perpetual Growth Rate	-	6.35%	-
Aveage	7.44%	6.22%	122

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

A. No. First, as discussed in my response to Ms. Malki, 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.[184] 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

183 *Id.*

184 Murray Direct, at 10.

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 multi-stage DCF models.
- Selection of the Growth Rates: Mr. Murray's multi-stage DCF model requires selecting both short-term and long-term growth rates.
- Duration of Each Stage of the Multi-Stage DCF Model: For his multi-stage DCF model, Mr. Murray assumes first stage growth from years 1-5 and 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 water 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 water 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 a 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***.[185]

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.[186]

Applying *Morningstar's* methodology, the long-term growth rate is 5.51 percent as shown in Schedule AEB-R-9, which is substantially higher than the long-term growth rate relied on by Mr. Murray.

---

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

186 *Id.* at 59.

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 the 2014/2015 Ameren Missouri Rate Case that the, "[c]ost of equity estimates using multi-stage DCF methodologies are **extremely sensitive** to the assumed perpetual growth rate."[187] As I have demonstrated, investors expect the long-term growth rate for utilities to exceed the long-term growth rate range of 3.75 percent to 4.25 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 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 the proxy group.

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 water 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. 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 water utility stock prices. Instead, if Mr.

---

187 Missouri Public Service Commission, Case No. ER-2014-0258, Staff Cost of Service Report, December 5, 2014, at 34.

Murray were to assume a long-term growth rate more consistent with current earnings growth projections, he would have obtained a much higher ROE estimate.

Q. Has Mr. Murray acknowledged that long-term EPS growth could be robust and significantly higher than his assumed long-term growth rate range of 3.75 percent to 4.25 percent?

A. Yes. In his discussion of the relative valuations of water utilities and electric utilities, Mr. Murray references that 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.[188]

Mr. Murray acknowledges that EPS growth can be sustained over a longer period of time. Therefore, if equity analysts were to expect the long-term EPS growth rate for water utilities to decline from current levels to 3.75 percent to 4.25 percent such as assumed by Mr. Murray, then they would undoubtedly have stock price targets for the proxy group much lower than the current stock prices upon which Mr. Murray relies for his DCF analysis.

Q. What does Mr. Murray say regarding your DCF analysis?

A. Mr. Murray states that that my DCF analysis overestimates the cost of equity by assuming that the dividends per share of the proxy group can grow in perpetuity at the same rate as equity analysts' projected five-year EPS growth rates.[189]

---

188 Murray Direct/Rebuttal, at 14.

189 Id., at 69.

Q. What is your response to Mr. Murray regarding the use of the constant growth DCF model and projected EPS growth rates?

A. First, while Mr. Murray criticizes the use of the constant growth DCF model and advocates instead for the use of a multi-stage DCF model, OPC's preferred specification of the DCF model produces cost of equity estimates that are substantially below any recently authorized ROE for a water utility and well below their own ROE recommendations in this proceeding. Specifically, Mr. Murray's multi-stage DCF model results in an average cost of equity estimate for the period ending October 31, 2024 of 7.44 percent, as shown in Figure 25. However, Mr. Murray recommends an ROE for MAWC in this proceeding of 9.25 percent, or 181 basis points higher than his multi-stage DCF result. Mr. Murray's DCF results clearly fail to meet the comparable return standard of *Hope* and *Bluefield*.[190] Considering Mr. Murray demonstrates no confidence in the results of his own multi-stage DCF models, it is unreasonable to suggest that the use of their multi-stage models is a more appropriate estimate of the cost of equity for MAWC than the results of the constant growth DCF model that I have conducted.

Q. What specification of the DCF model do you believe is most appropriate for estimating the cost of equity for MAWC?

A. A Constant Growth DCF model is appropriate for the utility industry because utilities are considered a mature industry as a result of their regulated status and relatively stable demand. Thus, financial projections such as earnings growth rates are also likely to be relatively stable over the long-term. This is consistent with the views of equity analysts,

[190] *Bluefield*, 262 U.S. at 692-93; *Hope*, 320 U.S., at 603.

as well as Mr. Murray, that project water utilities will be able to sustain earnings growth projections over the long-term. Thus, Mr. Murray should have considered the Constant Growth form of the DCF model, which would have reflected long-term growth rates that more closely support the share prices he relies on to calculate his multi-stage DCF analysis. However, the Constant Growth DCF model, which relies on current stock price valuations, still understates the forward-looking cost of equity during the period that MAWC's rates will be in effect because utility valuations are expected to decline over the near-term, but to a much lesser degree than the multi-stage DCF model as specified by Mr. Murray.

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 August 2024 through October 2024, four-year raw betas for his proxy group as published by S&P that Mr. Murray adjusts using the Blume adjustment, and market risk premia of 5.00 percent and 6.00 percent, which he contends are consistent with the investment 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 August 2024 through October 2024. Mr. Murray's third CAPM analysis relies on a risk-free rate and market risk premium published by *Kroll*, and the same betas as in his first two CAPM scenarios.[191] The results of Mr. Murray's CAPM analyses range

[191] *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.

from 8.05 percent to 8.90 percent, and ultimately, he states that his CAPM analyses indicate a cost of equity "in the 8% area."[192]

Q. Do you agree with Mr. Murry'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.

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

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.[193] However, the *Kroll* historical data referenced by Mr. Murray is the same data relied on by Ms. Malki, and Mr. Murray's reliance on that information also suffers from the same issues that I have previously discussed in my response to Ms. Malki (*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).

---

192 Murray Direct/Rebuttal, at 29-33 and Schedule DM-D-5.

193 *Id.*, at 30.

Q. Does Mr. Murray's projected market risk premium 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, the historical arithmetic mean market risk premium from 1926-2023 is 7.17 percent, and the historical income-only return on government bonds used to calculate the historical market risk premium over that same period is 4.87 percent;[194] however, Mr. Murray's assumed risk-free rate in this scenario is 4.44 percent.[195] Therefore, because current interest rates on long-term government bonds are *less 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 *greater than*, not less than, the long-term historical average of 7.17 percent. However, the projected market risk premium assumed by Mr. Murray of 5.00 percent in his CAPM scenario is materially *less than* the historical average market risk premium of 7.17 percent, instead of greater than the historical average as it should be. As a result, Mr. Murray has s understated the market risk premium in his CAPM analyses that rely on a projected market risk premium, which in turn, has caused the CAPM analysis result to be 8.30 percent,[196] or *substantially lower than any ROE authorized for a water utility over the period of time that this data has been compiled by S&P, which for water companies is 14 years*.[197]

---

194 *Kroll*, Cost of Capital Navigator.

195 Schedule DM-D-5, at 3.

196 *Id*.

197 Excluding cases where penalties were imposed through a reduction in the authorized ROE.

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 4.19 percent and 4.26 percent, respectively,[198] which imply a range for the overall market return of 9.26 percent and 10.26 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. Further this range is also significantly greater than the shorter-term projected market return that he references as support for his claim that his market risk premium range of 5.00 percent to 6.00 percent may actually be "excessive" for purposes of the CAPM.[199] Consequently, the implied market returns resulting from the market risk premia relied on by Mr. Murray are well below, and cannot be reconciled with, the long-term historical return on the market.

Q. What criticisms does Mr. Murray offer regarding your CAPM?

A. Mr. Murray has two concerns with my CAPM. First, he suggests that my non-water *Value Line* betas are too high.[200] I addressed this concern previously in my response to Mr. Murray regarding the development of the proxy group. Second, Mr. Murray indicates that he is unaware of any authoritative sources that calculate the market return such as I have done (*i.e.*, using a constant growth DCF model with projected earnings growth rates as the estimate of growth). Mr. Murray states that the sources he reviewed recommended using

198 *Id.*, at 1-2.

199 *Id.*, at 30.

200 Id., at 61.

a growth rate no higher than the growth rate of gross domestic product ("GDP") when estimating the long-term return for the market. Mr. Murray asserts that the Wilshire 5000, which is an index of the value of all American stocks traded in the United States, would be approximately 53 times the value of gross domestic product ("GDP") in 50 years if the index grew at the earnings growth rate that I relied on to calculate my market return.[201]

Q. How do you respond to Mr. Murray's comparison to the Wilshire 5000 Index to GDP?

A. The Wilshire 5000 had a ten-year annualized total return as of December 31, 2024 of 12.26 percent. Therefore, the Wilshire 5000 had a total return over the past 10 years that is generally consistent with my market return estimate.

Additionally, Mr. Murray's analysis is dependent on the selection of a US GDP growth rate, which he assumes is 4.00 percent. However, as shown in Schedule AEB-R-9 and discussed earlier, Mr. Murray's assumed growth rate is significantly below a long-term projected U.S. GDP growth rate of 5.51 percent, which is based on the real historical US GDP growth rate of 3.18 percent from 1929 through 2023,[202] plus a projected inflation rate of 2.25 percent.[203]

Q. Are there any articles that address the limitation that Mr. Murray suggests is appropriate on growth in the overall market?

A. Yes. A recent Morgan Stanley challenges the link between GDP and earnings in the context of the Buffett indicator. In a modern global economy, as "U.S. companies now get

---

201 Murray Direct/Rebuttal, at 69-71.

202 U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts Tables, Table 1.1.6, March 30, 2022.

203 The 5.51 percent equals (1 + 3.18 percent) x (1 + 2.25 percent) - 1.

more of their sales from outside the U.S. than they did in the past. GDP does not include those sales."[204] A recent Wellington Management article provides an intuitive example of this disconnect between GDP and EPS can be observed between the U.S. and China. "China EPS growth has stagnated while U.S. EPS growth has been exceptional, despite China's economy growing at twice the speed of the U.S….When EPS is diluted by additional company share issuance, it can further exacerbate this misalignment with GDP growth."[205] U.S. companies selling goods and services to China and other companies contribute to EPS but not GDP. Both earnings derived from international sales and share issuances/buybacks weaken the link between EPS growth and GDP growth

Furthermore, Economist Martin Feldstein observed that with the rise of services in the economy, GDP "official measures provide at best a lower bound on the true real growth rate with no indication of the size of the underestimation."[206] This calls into question using GDP as a reliable input for a multi-stage DCF.

Q. What benchmarks can you provide that demonstrate that the forward-looking market risk premium in your CAPM analysis is not overstated?

A. In addition to the academic article discussed previously, which concludes that the global economy and international trade break the direct link between US GDP and growth in the overall market, there are several benchmarks that demonstrate that the overall market return estimate used in my CAPM is reasonable. As I discussed in my response to Ms. Malki, my

---

204 Mauboussin, M. & Callahan, D. Charts from the Vault. Morgan Stanley Counterpoint Global Insights. December 5, 2024.

205 Samouihan, N. & King, A. Chart in focus: The need to differentiate market growth from macro growth. Wellington Management. September 2024.

206 Feldstien, M. (2017)., Underestimating the real growth of GDP, personal income, and productivity. Journal of Economic Perspectives. 31(2), 145-164.

expected market return is reasonable considering: (1) the range of annual equity returns that have been observed over the past century; and (2) a recent cost of capital proceeding for the electric utilities in California where the California Public Utilities Commission noted that all parties recognized that historical market returns and economically logical projections fall within the range of 12 percent.[207]

Q. What is your response to Mr. Murray's contention that he is not "aware of any authoritative sources" that use your approach to estimating the market return?[208]

A. I am aware of multiple authoritative sources that have relied on the constant growth DCF to estimate the market return in the CAPM. For example, as I discussed in my response to Ms. Malki, the FERC, the ICC, the PPUC, and the Maine PUC have also relied on the constant growth DCF model to estimate the market return. In addition, the U.S. State Court of Appeals for the District of Columbia addressed the concern regarding the use of projected EPS growth rates in a constant growth DCF model to estimate the market return, such as I have done in my CAPM analyses, in its review of FERC Opinion No. 569-B.[209]

ECAPM

Q. Does Mr. Murray discuss your ECAPM?

A. Not specifically. Mr. Murray discusses my ECAPM in the limited context of his concern regarding the market risk premium of my CAPM,[210] which I have already discussed; however, he does not specifically discuss the ECAPM.

---

207 California Public Utilities Commission. Decision 22-12-031. December 15, 2022, at 23.

208 Murray Direct/Rebuttal, at 70.

209 United States Court of Appeals, District of Columbia Circuit, Opinion, Docket No. 16-1325, August 9, 2022, at 19.

210 *Id*., at 71-72.

"Rule of Thumb" BYRP Analysis

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

A. Mr. Murray conducts a BYRP analysis that he characterizes a simple "rule of thumb" methodology as a check on the reasonableness of his DCF and CAPM results. Specifically, Mr. Murray's "rule of thumb" BYRP analysis is a form of a risk premium methodology that simply adds an estimated equity risk premium to an average utility bond yield in order to estimate the cost of equity. For his "rule of thumb" analysis, he states that the yield to maturity on MAWC's recent long-term bonds is around 5.50 percent, to which he then suggests adding 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 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 8.50 percent.[211] Mr. Murray does not comment on my BYRP analysis.

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 on the market risk premium of current market conditions. 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).[212] Therefore, given that current interest rates on long-term government bonds are below the historical average interest rate of those same bonds,

---

211 *Id.*, at 33.

212 *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.

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.

Lastly, Mr. Murray's overly simplistic "rule of thumb" produces material differences in the results that are inconsistent with his ROE recommendations over time. Specifically, as shown in Figure 26, while the result of Mr. Murray's "rule of thumb" approach has changed over the period from 2020 to 2024, his recommended ROE range for MAWC is effectively unchanged.

Figure 26: Comparison of Mr. Murray's "Rule of Thumb" Results

	Mr. Murray's "Rule of Thumb Results	Mr. Murray's ROE Range Recommendation	Mr. Murray's ROE Recommendation
Case No. WR-2020-0344	5.75%	8.25% to 9.25%	9.25%
Case No. WR-2022-0303	8.75% to 9.00%	8.40% to 9.25%	9.00%
Case No. WR-2024-0320	8.50%	9.00% to 9.50%	9.25%

In MAWC's 2022 proceeding, Mr. Murray testified that his "rule of thumb" analysis suggested a cost of equity between 8.75 to 9.00 percent and he recommended an ROE of 9.00 percent.[213] However, in this proceeding, Mr. Murray claims that this "rule of thumb" analysis indicates a cost of equity of 8.50 percent, while he is recommending an ROE of 9.20 percent.[214] In other words, Mr. Murray's "rule of thumb" reasonableness check yields a cost of equity result 25 to 50 basis points lower in the current proceeding than he indicated in MAWC's 2022 rate proceeding, yet his ROE recommendation is 25 basis points higher. Similarly, Mr. Murray's rule of thumb was 300 to 325 basis points higher than his "rule of thumb" analysis from MAWC's 2020 rate case, but his

213 File No. ER-2022-0303, November 22, 2022, Direct Testimony of David Murray, at 38.

214 Murray Direct, at 31.

P

recommended ROE was 25 basis points lower. Clearly, his "rule of thumb" analysis has no bearing on his recommended ROE.

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.

VIII. BUSINESS AND REGULATORY RISK

Revenue Stabilization Mechanism / Production Cost Tracker

Q. Please summarize Mr. Abbott's, Mr. Murray's and Mr. Marke's conclusions regarding the effect of the Company's proposed RSM, and production cost tracker on the Company's business risk and cost of equity.

A. Staff witness Abbott contends that the Company's proposed RSM provide no benefits to customers and rather would shift risk from the Company to its customers.[215] Accordingly, Mr. Abbott recommends that the Commission reject the Company's proposed RSM. However, Mr. Abbott concludes that if the Commission were to approve the Company's proposed RSM, the Commission should either reduce either the Company's ROE or equity ratio to account for the reduction in MAWC's business risk associated with the implementation of the RSM.[216]

Similarly, OPC witness Murray contends that the Company's proposed RSM and production cost tracker would decrease the Company's business risk. As a result, if the Commission were to approve the Company's proposed RSM and production cost tracker,

---

215 Abbot Direct/Rebuttal, at 8.

216 *Id.,* at 16.

Mr. Murray recommends that the Commission reduce either the Company's ROE or equity ratio to account for the reduction in risk.[217]

Finally, OPC witness Marke appears to generally conclude that if mechanisms (*i.e.*, future test year, revenue stabilization mechanism, cost recover mechanisms, etc.) that reduce regulatory lag are approved by the Commission then the allowed ROE must be reduced to account for the reduction in business risk.[218]

Q. What is your response?

A. Mr. Abbott and Mr. Murray each appear to conclude that either the authorized ROE or equity ratio for the Company should be reduced if the Company's proposed RSM and production cost tracker are approved because the proposals reduce MAWC's regulatory risk. Dr. Marke appears to agree as he contends that the allowed ROE should be reduced if mechanisms that reduce regulatory lag are approved by the Commission. However, it is not reasonable to recommend a reduction in the ROE simply because a utility has a cost recovery mechanism and/or revenue decoupling. The appropriate approach is to compare the adjustment mechanisms of MAWC to the adjustment mechanisms of the proxy group being used to develop the ROE to determine if MAWC has greater regulatory risk than the proxy group. As shown in Schedule AEB-9 and discussed in my Direct Testimony, I

[217] Murray Direct/Rebuttal, at 74

[218] Marke Direct/Rebuttal, at 13.

concluded that the Company has moderately higher regulatory risk than the proxy group given the lack of full fuel cost recovery[219] and limitations on capital cost recovery.[220]

Moreover, neither Mr. Abbott nor Dr. Marke have conducted any analysis to estimate the cost of equity for MAWC, nor has either Mr. Abbott, Dr. Marke or Mr. Murray reviewed any of the proxy groups relied on in the current proceeding to determine which cost recovery mechanisms have been approved for the proxy group companies relative to the Company. Absent a comparison to the proxy group, there is no basis for either Mr. Abbott, Mr. Murray or Dr. Marke to comment on the relative risk of MAWC to the proxy group, let alone conclude that either the ROE or equity ratio should be reduced.

Q. Are you aware of regulatory commissions that have concluded that rate mechanisms which provide more stable revenue do not reduce the risk of the company as compared to the proxy group?

A. Yes. I am aware that the Public Service Commission of Wyoming ("WY PSC"), the Public Service Commission of Maryland ("MD PSC"), and the Minnesota Public Utilities Commission ("MN PUC") have each rejected a proposed reduction to a utility's authorized ROE due to a revenue stabilization or revenue decoupling mechanism. For example, in Docket No. 30010-94-GR-08 for Quester Gas Company, the WY PSC noted the following:

> Regarding the OCA's suggestion about reducing ROE by 25 basis points if the Commission adopted the CET, the Commission agrees the CET [Conservation Enabling Tariff] may reduce its risk, but the OCA did not provided a logical basis on which to derive or apply the 25 basis point reduction in this docket. **This suggested reduction in ROE is not**

---

219 As discussed in my Direct Testimony, the Company proposed production cost tracker is not as comprehensive as purchased gas cost mechanisms available to the natural gas utilities in my proxy group which pass through the cost of gas directly to customers. Bulkley Direct, at 62.

220 Bulkley Direct, at 65.

> **appropriate because eight of the ten utilities in the proxy group Questar used in its DCF analysis have some sort of decoupling mechanism. If the decoupled utilities are part of the proxy group, the risk reduction is already accounted for when the proxy group financial parameters are used to determine a ROE for the Company**. The Commission agrees with Questar that financial analysts now tend to treat revenue stabilization measures as a norm, rather than an exception which requires adjustments. (Tr. Vol. II, p. 257.)[221]

Similarly, in Docket No. G-008/GR-08-1075 for CenterPoint Energy, the MN PUC rejected a proposal by the Office of the Attorney General to reduce CenterPoint Energy's ROE by 27 basis points if a revenue decoupling mechanism was approved due in part:

> Further, the Company argued persuasively that the comparison group used to determine that 8.09 percent was reasonable was composed of companies most of whom had significant revenue stabilization arrangements in place (including decoupling and including decoupling that adjusted for weather) so that adopting the limited decoupling plan for CenterPoint simply made CenterPoint more like the comparison group. In these circumstances, lowering the cost of equity in response to CenterPoint's limited decoupling would overemphasize the risk reduction resulting from the limited decoupling approved in this Order.[222]

Finally, in Case No. 9299 for Baltimore Gas and Electric Company, the MD PSC did not reduce the ROE for Baltimore Gas and Electric Company's natural gas operations due to its decoupling mechanism because revenue decoupling mechanisms were prevalent among natural gas distribution companies.[223]

---

221 In the Matter of the Application of Questar Gas Company for Approval to Implement an Increase in the Non-Gas Rates and Charges for A General Rate Increase of $482,980 and for Approval of a Conservation Enabling Tariff, Docket No. 30010-94-GR-08, Order, June 17, 2009, at 14-15. (emphasis added)

222 In the Matter of an Application by CenterPoint Energy for Authorized to Increase Natural Gas Rates in Minnesota, Docket No. G-008/GR-08-1075, Order, January 11, 2010, at 28.

223 In the Matter of an Application of Baltimore Gas and Electric Company for Adjustment in its Electric and Gas Case Rates, Order, February 22, 2013, at 78.

Flotation Cost

Q. What are Ms. Malki's and Mr. Murray's positions regarding flotation costs?

A. Ms. Malki contends that it is not appropriate to consider flotation costs when determining the authorized ROE in this proceeding because consideration of flotation costs "could distort the company's true earnings and performance" because flotation costs are one-time costs while "ROE measures ongoing profitability of equity."[224] As a result, Ms. Malki concludes that applying a flotation cost adjustment could lead to an "overstatement" of the ROE.[225]

Mr. Murray concludes that recovery of flotation costs for MAWC should only be allowed if the Commission adopts AWK's consolidated capital structure for MAWC since it is AWK that issued the common equity and not MAWC.[226] Further, he notes that the Commission has approved recovery of flotation costs through amortization over a "reasonable" period when the issuances costs could be reconciled to investments in Missouri and the common equity was issued within the test year.[227]

Q. Do you continue to believe that flotation costs should be considered by the Commission when establishing the ROE in this proceeding?

A. Yes. While I am not recommending a specific flotation cost adjustment, flotation costs are legitimate costs for equity holders that are not recovered through the rate of return on equity derived from the DCF or CAPM analysis. Just as rate base investments, flotation costs are

---

224 Malki Direct/Rebuttal, at 56.

225 *Id.*

226 Murray Direct/Rebuttal, at 73.

227 *Id.,* at 73-74.

also part of the invested costs of the utility, and the need to reimburse shareholders for the lost returns associated with equity issuance costs has been recognized by the academic and financial communities. Since the actual book equity of a stock issuance is calculated as the market value less flotation costs, the book equity of that issuance is always less than the market value of the stock. Therefore, all else equal, investors can earn their cost of equity in any year only if the company is allowed to earn a return on the common equity that is higher than the required return. This is because the total common equity base has been permanently reduced by the amount of the flotation cost. As noted in *Modern Regulatory Finance*: "[s]ince flotation costs of common stock issues cannot be amortized because they have no finite maturity, they must be recovered by way of an upward adjustment to the allowed return on equity."[228] The text goes on to state that a permanent adjustment is needed because:

> "…(a) even if no further stock issues are contemplated, the flotation cost adjustment is still permanently required to keep shareholders whole, and (b) flotation costs are only recovered if the rate of return is applied to total equity, including retained earnings, in all future years, even if no future financing is contemplated."[229]

Q. Is there academic support for the method you used to estimate flotation costs?

A. Yes. *Modern Regulatory Finance* identifies the "conventional approach" to calculating flotation costs in regulatory proceedings as dividing the expected dividend by 1 minus the flotation cost (e.g., for flotation costs of 5 percent, dividing the expected dividend by 0.95 will produce the adjusted cost of equity), and states regarding this approach that:

---

[228] Morin, Roger A. Modern Regulatory Finance. Public Utilities Reports, Inc., 2021, at 337.

[229] *Id.*, at 338.

Its use in regulatory proceedings by cost of capital witnesses is widespread. The formula is discussed in several college-level corporate finance textbooks, such as Brigham and Ehrhardt (2011).[230]

Q. Have regulatory commissions approved the inclusion of flotation costs in the authorization of a utility's ROE?

A. Yes. Various regulatory commissions across the United States have previously allowed the recovery of flotation costs in the authorization of a utility's ROE based on the circumstances in the case.[231]

IX. RESPONSE TO OPC WITNESS MR. MURRAY'S CROSS-REBUTTAL TESTIMONY

Q. Did Mr. Murray provide additional analysis and discussion of his cost of equity analysis in his cross-rebuttal testimony?

A. Yes.

Q. Is that discussion in response to testimony provided by any Intervenor, including Staff?

A It does not appear to be responsive to any other parties' testimony, however, I am providing a response to that analysis so the Commission has all relevant positions to analyze this issue.

---

230 *Id*., at 336.

231 *See, e.g.*, Indiana Utility Regulatory Commission, Cause No. 42359, Order, May 18, 2004, at 43; Connecticut Public Utilities Regulatory Authority, Docket No. 10-12-02, June 29, 2011, at 133–13. South Dakota Public Utilities Commission, Docket No. EL11-019, Final Decision and Order, July 2, 2012, at 6; South Dakota Public Utilities Commission, Docket No. EL18-021, Final Decision and Order, May 30, 2019, at 8; Maine Public Utilities Commission, Docket No. 2017-00198, Order, June 28, 2018; Maine Public Utilities Commission, Docket No. 2017-00065, Order, February 28, 2018.

Q. Why does Mr. Murray conclude that MAWC has earned a return that is greater than the Company's cost of equity?

A. Mr. Murray concludes that the Company has earned a return that is greater than MAWC's cost of equity because: (1) authorized returns for utilities have historically been set at levels that are greater than the cost of equity; and (2) AWK's equity ratio is below MAWC's actual equity ratio, therefore, the return on AWK's investment in MAWC is greater than MAWC's per books earned ROE.[232] According to Mr. Murray, the effect is captured in AWK's market-to-book ratio. He contends that if authorized ROEs were set equal to the cost of equity and the equity ratio of MAWC was consistent with the equity ratio of AWK, AWK's market-to-book ratio would equal 1.00 but instead he notes that it has consistently exceeded 1.00.[233]

Q. Do you agree with Mr. Murray that utility market-to-book ratios exceeding 1.00 demonstrates that previously authorized ROEs exceed the cost of equity?

A. No. There are several reasons why the market-to-book ratio for utilities may exceed 1.00 other than the ROE exceeding the cost of equity. First, Mr. Murray's position assumes that the Efficient Market Hypothesis ("EMH") holds true. The EMH theory contends that all information currently known by investors is already reflected in current stock prices.[234] For example, the theory of the DCF model is that the current share price is equal to the present value of all expected future dividends. Therefore, if markets were fully efficient as

---

232 Murray Cross-Rebuttal ,at 7.

233 *Id.*

234 R. J. Shiller, *Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?,* The American Economic Review, Vol. 71, No. 3, at 421-436 (1981).

suggested by Mr. Murray, changes in share prices could only be explained by new information that results in a change to the expected dividends.

However, as Dr. Lawrence Kolbe and Dr. Michael Vilbert outlined in their 2016 presentation to the California Public Utilities Commission, there is no consensus among economists regarding whether the theory of the efficient market hypothesis holds true and share prices are rationally priced, and even assuming for the sake of argument that the efficient market hypothesis does in fact hold true, there is also no consensus regarding which model produces reasonable estimates of the cost of equity.[235] In fact, Nobel Prize-winning economist Dr. Robert Shiller and others have provided compelling evidence against the efficient market hypothesis, concluding that share prices are not rationally priced and that the DCF model does not fully explain changes in share prices and thus will not accurately estimate the required return of investors.[236] There are numerous practical examples supporting this position (*e.g.*, large sudden declines in the market such as Black Monday in 1987, the Great Recession of 2008/09, the COVID-19 crash in March 2020, and the "tech bubble" of the late 1990s) that cannot be explained by new information regarding dividends).[237]

---

235 A. Lawrence Kolbe, Ph.D. and Michael J. Vilbert, Ph.D., *Moving Toward Value in Utility Compensation Shareholder Value Concept,*" Presented to the California Public Utilities Commission (June 13, 2016). https://www.brattle.com/insights-events/publications/moving-toward-value-in-utility-compensation-shareholder-value-concept/

236 R. J. Shiller, "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?," *The American Economic Review*, 1981, Vol. 71, No. 3, at 42-436.

237 *See, also*, R. J. Shiller, "From Efficient Markets Theory to Behavioral Finance," *Journal of Economic Perspectives,* 2003, Vol. 17, No. 1, at 83–104. Dr. Shiller contended that there were "asset bubbles" such as the "tech boom" from 1994 to 2000 that resulted in substantial increases in share prices that could not be explained by market fundamentals.

If share prices are not necessarily rationally priced and cannot be explained by the DCF model, then a market-to-book ratio greater than 1.00 cannot be attributed to the ROE exceeding the cost of equity as Mr. Murray suggests (*i.e.,* the DCF model will not necessarily produce an accurate estimate of the return required by investors given the level of prices and, as a result, the resulting cost of equity estimate produced by the DCF model, if set as the authorized ROE, would not produce a market-to-book ratio of 1.00).

Second, as Drs. Kolbe and Vilbert also noted, even if one assumes that the theory of the EMH holds, there are several important conditions that must hold before one can assume that the ROE equals the cost of equity at a market-to-book ratio of 1.00 for regulated utilities. Those conditions include:

- A utility has to be regulated on rate base identical to its GAAP book value.
- A utility has to have 100 percent regulated operations.
- The regulatory system has to be in full equilibrium (*i.e.,* there cannot be a lag in the adjustment of the authorized ROE to the market cost of equity); and
- The ROE expected, on average, has to equal the authorized ROE.[238]

As Drs. Kolbe and Vilbert concluded, it is very unlikely that all of these conditions will be satisfied. For example, changes in cost trends or regulatory lag can cause a utility to earn more or less than the allowed return, and if the expected return deviates from the allowed return, then the allowed return will not equal the cost of equity, and the market-to-book ratio will not equal 1.00.

---

[238] A. Lawrence Kolbe, Ph.D. and Michael J. Vilbert, Ph.D., *Moving Toward Value in Utility Compensation Shareholder Value Concept,*" Presented to the California Public Utilities Commission (June 13, 2016). https://www.brattle.com/insights-events/publications/moving-toward-value-in-utility-compensation-shareholder-value-concept/

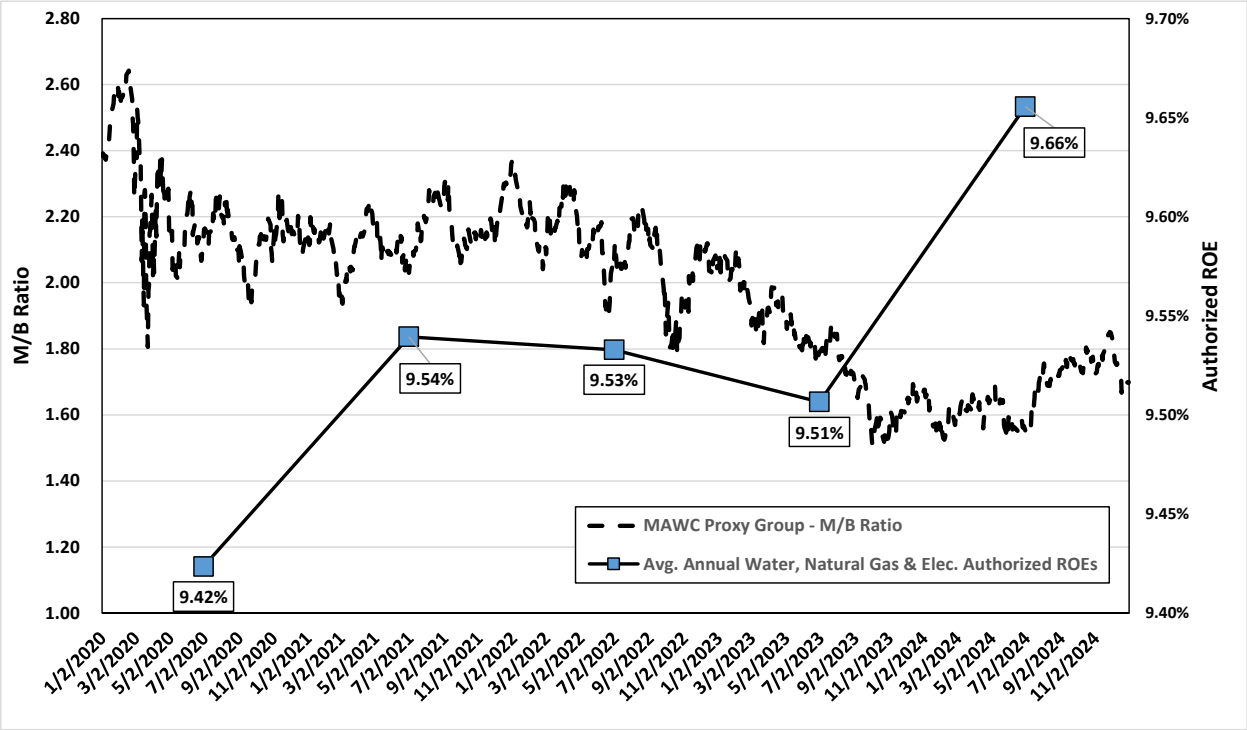
P

Q. Do recent trends in the authorized returns and market-to-book ratios support Mr. Murray's claim that authorized returns have exceed the cost of equity?

A. No, they do not. To test Mr. Murray's theory, I compared the average market-to-book ratio for the companies in my proxy group for the period of January 1, 2020 through December 31, 2024 to the average annual authorized ROEs for water, natural gas and T&D electric utilities for 2020 through 2024 shown in Figure 5 above. As shown in Figure 27, the market-to-book ratio for the companies in my proxy group declined since January 2020; however, the average annual authorized ROE for water, natural gas and T&D electric utilities increased.

Mr. Murray contends that authorized returns have been set higher than the cost of equity and given that authorized returns increased over the period of 2020-2024, it is reasonable to conclude that according to Mr. Murray's theory, the market-to-book ratios for utilities should have increased. However, the reverse occurred and the market-to-book ratio for the companies in my proxy group declined. Therefore, Mr. Murray's theory is not consistent with market evidence and should be disregarded by the Commission.

Figure 27: Comparison of the Market-to-Book Ratios for Ms. Bulkley's Proxy Group and Average Annual Authorized ROEs for Water, Natural Gas, and T&D Electric Utilities – 2020-2024 [239]



Q. Mr. Murray states that AWK has a market-to-book ratio greater than 1.00, does this imply that the market value of AWK's equity (*i.e.*, share price) is greater than the book value of AWK's equity?

A. Yes, it does.

Q. Because the market-to-book ratio is greater than 1.00, has Mr. Murray created a mismatch between the data he is relying on to develop his recommended capital structure for MAWC and the data he has relied on to estimate his cost of equity?

A. Yes. Mr. Murray recommends that MAWC's capital structure be set equal to AWK's capital structure based on the book value of debt and equity; however, Mr. Murray develops estimates of the cost of equity using his DCF and CAPM analyses which rely on the market

[239] S&P Capital IQ Pro.

P

value equity for his proxy group companies (*i.e.,* share prices in the Multi-Stage DCF and betas in the CAPM which reflect the returns of each of the proxy group companies based on their respective market value). Therefore, the cost of equity developed by Mr. Murray represents the return required by investors on the market value of equity not the book value.

Q. What is the effect of relying on the required return on the market value of equity for assessing the cost of equity, but then the book value of debt and equity for assessing the capital structure?

A. Because the market value of debt and equity are substantially different than the book value of debt and equity for AWK and the proxy group companies as shown in Figure 27 above (i.e., market-to-book ratio greater than 1.00), the resulting cost of equity estimate based on the market value would not reflect the financial risk of the book value capital structure.

This is illustrated in the following set of equations found readily in corporate finance textbooks including *Principles of Corporate Finance.*[240] As shown in Equation [1], the value of a company (or asset) is determined as follows:

$$V=D+E \qquad [1]$$

Where:

V = Market value of a company/asset
D = Market value of debt
E = Market value of equity

For simplicity, if it is assumed that there are no taxes, based on Equation [1], the total return on V can be estimated as follows:

[240] Brealey, Myers, and Allen, Principles of Corporate Finance, 12th Ed., 2017, at 437-446.

P

$$r_V = \frac{\mathrm{D}}{\mathrm{D}+\mathrm{E}} \times r_D + \frac{\mathrm{E}}{\mathrm{E}+\mathrm{D}} \times r_E \quad [2]$$

Where:

r_V = expected return on assets / weighted-average cost of capital

r_D = expected return on debt

r_E = expected return on equity

Then, Equation [2] can be rearranged into the following form to solve for the expected return on equity, r_E:

$$r_E = r_V + (r_V - r_D)\frac{D}{\mathrm{E}} \quad [3]$$

As shown in Equation [3], the expected return on the market value of equity is a function of the market debt-to-equity ratio. As the percentage of debt increases, the financial risk of the firm increases, and thus investors require a higher return to compensate for the additional financial risk.

Because the market-to-book ratios for utilities including AWK are greater than 1.00, this implies that the market value of equity is greater than the book value of equity. In other words, the capital structure based on book value of debt and equity will contain a higher percentage of debt than the capital structure based on the market value of debt and equity. As a result, the cost of equity based on the market value of equity would reflect the financial risk of the capital structure based on the market value of debt and equity. Since the capital structure based on the book value of debt and equity contains more leverage, the estimated cost of equity would not be sufficient to compensate investors for the increase financial risk associated with the book value capital structure. While Mr. Murray

acknowledges that financial risk increases as leverage increases[241] and the market-to-book ratios for utilities are greater than 1, he fails to consider the relationship these two factors. If the market-to-book ratio is different from 1.00 then the market value of debt and equity must be used in the determination of both the equity ratio and the cost of equity.

Q. Is Mr. Murray's proposal to use the book equity ratio of the parent company for MAWC's ratemaking equity ratio consistent with financial theory?

A. No. The basis for Mr. Murray's recommendation to use of AWK's book equity ratio for MAWC is that AWK uses double leverage. This logic is apparent in his statement that:

> American Water leveraged its awarded equity returns by using affiliate loans from AWCC at a cost of around 3.7% to infuse common equity into its subsidiaries. This further increased American Water's margin over its cost of capital, causing investors to be willing to pay even more for American Water's stock.[242]

However, Mr. Murray's double leverage argument runs counter to financial theory. While the capital structure and the cost of capital are intended to reflect the risks of the operations of the company, which in this case is MAWC, the double leverage argument suggests that the required return should be based on the source of funds, not the risk of the investment. The double leverage argument, therefore, suggests that the value of the equity in a company would differ based on the investor's source of funds, which is illogical.

---

241 Murray Direct/Rebuttal, at 41.

242 Murray Cross-Rebuttal, at 7.

Q. Can you provide an example to explain why Mr. Murray's proposal is flawed?

A. Yes. Consider the scenario where an investor borrows funds to invest in a stock, such as Apple Inc. ("AAPL"). The expected return to that investor on the AAPL stock is not the cost of the debt that the investor undertook to make the investment, but rather the return afforded all AAPL investors for that same period of investment. In contrast, Mr. Murray's position as applied to this example suggests that the required return to that investor would be a debt return because of the source of the funds, which is irrational, given that this investor would bear all the risk of repayment that is inherent in holding equity in AAPL. Consistent with financial theory, the proper return in this example is based on the risk associated with the use of funds, which is the equity return, not the source of the funds, which is the debt cost.

Q. Are there academic publication that support the view the cost of capital should be established for each investment on a stand-alone basis?

A. Yes. Several financial textbooks support this position. For example, in *Principles of Corporate Finance,* Brealey, Myers and Allen note:

> In principle, each project should be evaluated at its own opportunity cost of capital; the true cost of capital depends on the use to which the capital is put. If we wish to estimate the cost of capital for a particular project, it is project risk that counts.[243]

Similarly, *Modern Corporate Finance* indicates:

> Each project has its own required return, reflecting three basic elements: (1) the real or inflation-adjusted risk-free interest rate; (2) an inflation premium approximately equal to the amount of expected inflation; and (3) a premium for risk. The first two cost elements are shared by all projects and reflect the time value of money, whereas the third component varies according to the risks borne by investors in the different projects. For a project to be

[243] Richard A. Brealey, Stewart C. Myers, Franklin Allen, Principles of Corporate Finance, McGraw-Hill Irwin, 8th Ed., 2006, at 234.

> acceptable to the firm's shareholders, its return must be sufficient to compensate them for all three cost components. This minimum or required return is the project's cost of capital and is sometimes referred to as a hurdle rate. In discussing how to calculate the project's cost of capital, we begin by assuming the firm is all-equity financed and later relax that assumption.
>
> The preceding paragraph bears a crucial message: The cost of capital for a project depends on the riskiness of the assets being financed, not on the identity of the firm undertaking the project. … the risk-required return trade-off is set in the financial marketplace is based on the yields available to investors on other investments with similar risk characteristics. Consequently, the required return on a project (the project's cost of capital) is an opportunity cost, which depends on the alternative market investment that investors must forgo.[244]

Finally, the use of double leverage versus an independent capital structure was studied by Pettway and Jordan (1983)[245] and Lerner (1973).[246] Pettway and Jordan (1983) evaluated the use of these two capital structures in achieving three goals of rate of return regulation, which are that the allowed return must: (1) be sufficiently low as to eliminate monopoly rents or producer's surplus; (2) be sufficiently high to attract capital and guide the allocation of capital resources in a socially desired fashion; and (3) exactly compensate the investors of capital for the risk of their investment in the public utility. The conclusions reached by Pettway and Jordan (1983) were as follows:

> The "double leverage" approach to estimate the allowed rate of return would be incorrect and inappropriate when parents diversify into subsidiaries of unequal risk and/or use parent debt. The use of "double leverage" (1) does not eliminate "monopoly rents" or "producer's surplus" in the regulated operating company, (2) does not provide the proper rate of return to attract capital and to guide the allocation of capital resources in a socially desirable fashion, and (3) does not correctly compensate the investors of capital for the riskiness of their investments in the public utility. In the section, the

---

244 Alan C. Shapiro, Modern Corporate Finance, Wiley, 1st Ed., 1990, at 276.

245 Richard H. Pettway and Bradford D. Jordan, "Diversification, Double Leverage, and the Cost of Capital," *The Journal of Financial Research*, Vol VI, No. 4 Winter 1983.

246 Eugene M. Lerner, "What are the Real Double Leverage Problems," Public Utilities Reports, Inc., June 7, 1973.

> two approaches are compared in a theoretical framework with tax effects specifically considered. The "independent company" approach is found to be universally correct, whereas the "double leverage" approach is only correct in specific areas. When a public utility holding company has a diversified group of subsidiaries of unequal risk and/or parent debt, a "double leverage" approach which uses the parent's WACC as an estimate of the cost of equity capital of the regulated subsidiary is incorrect and should not be employed. The results of this paper, using both a series of examples and a theoretical framework analysis, reaffirm the "independent company" approach as satisfying the three standards of rate of return regulation. The analysis finds no valid support for the "double leverage" approach; the "independent company" approach is shown to be universally correct.[247]

Lerner (1973) concluded that the double leverage adjustment should be rejected because it discriminates among classes of security holders, is contrary to the basic principles of financial theory and, if applied, would lead to consequences that are not in the public interest. The author, who was a finance professor at Northwestern University at the time the report was published, noted that it is well-established in financial theory that the cost of equity capital is the risk-adjusted opportunity cost to the investor and that the sources of shareholder funds do not enter into the cost of equity calculation. Further, Lerner (1973) recognized that it is:

> illogical to equate a corporation's cost of equity with its shareholders' sources or costs of funds. The relevant considerations are the alternatives available to the shareholders and the returns and risks associated with those alternatives. Where or how the shareholder obtained the funds used to purchase the shares, or the cost of those funds to the shareholder, are totally irrelevant to the calculation of the cost of equity to the corporation.
>
> This is also true whether the corporation has one or many shareholders and whether the shareholders are individuals or corporations. There is no basis in financial theory for estimating the cost of equity by one procedure for corporations whose shares are owned by individuals and by a different procedure - e.g., using the double leverage adjustment - for corporations whose shares are owned by a holding company. To do so is discriminatory.

---

247 *Id.*

> The mere transfer of ownership of an operating company from the public to a holding company or the reverse should not logically in and of itself result in a change in the operating company's allowable rate of return. Nor should the cost of capital of a parent holding company determine the cost of equity of the subsidiary.[248]

Q. Do you agree with Mr. Murray's comparison of MAWC to SJW Group to support his conclusion that a company of similar size and geographic diversity to MAWC could maintain a more highly leveraged capital structure than the capital structure proposed by MAWC and not have a "much lower credit rating"?[249]

A. No, I do not. While SJW Group may be similar in size to MAWC, I do not agree with Mr. Murray that SJW Group and MAWC have similar geographic diversity. Mr. Murray incorrectly only appears to reference SJW Group's operations in California; however, as shown in Figure 28 below, SJW Group also has operations in Connecticut, Maine and Texas. It is clear that SJW Group has much greater geographic diversity than MAWC which only has operations in Missouri. Given the geographic diversity of SJW Group, which Mr. Murray acknowledges diversifies risk, it is not reasonable to assume as Mr. Murray has that MAWC would be able to maintain a more highly leverage capital structure consistent with SJW Group and also have a similar credit rating.

---

248 Eugene M. Lerner, "What are the Real Double Leverage Problems," Public Utilities Reports, Inc., June 7, 1973, at 22.

249 Murray Cross-Rebuttal ,at 7.

Figure 28: SJW Group – Customers by State

State	Water Customers	Wastewater Customers
California[250]	232,400	N/A
Connecticut[251]	107,000	3,000
Maine[252]	32,000	N/A
Texas[253]	28,000	950

Q. Does this conclude your Rebuttal / Surrebuttal / Sur-surrebuttal testimony?

A. Yes, it does.

250 Source: SJW Group, 2023 Form 10-K, at 8.

251 Source: Connecticut Water website: https://www.ctwater.com/about-us/

252 Source: Maine Water website: https://www.mainewater.com/about-us/

253 Source: SJW Group, 2023 Form 10-K, at 8.

P

COST OF EQUITY ANALYSES
SUMMARY OF RESULTS

	Minimum Growth Rate	Average Growth Rate	Maximum Growth Rate
Constant Growth DCF			
Mean Results:			
30-Day Average	9.52%	10.18%	10.88%
90-Day Average	9.57%	10.23%	10.94%
180-Day Average	9.76%	10.42%	11.12%
Average	9.62%	10.28%	10.98%
Median Results:			
30-Day Average	9.46%	9.99%	10.54%
90-Day Average	9.57%	10.03%	10.49%
180-Day Average	9.68%	10.20%	10.67%
Average	9.57%	10.07%	10.57%

	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
CAPM:			
Current *Value Line* Beta	11.08%	11.07%	11.05%
Current Bloomberg Beta	10.23%	10.20%	10.17%
Long-term Avg. *Value Line* Beta	10.15%	10.12%	10.09%
ECAPM:			
Current *Value Line* Beta	11.32%	11.31%	11.30%
Current Bloomberg Beta	10.68%	10.67%	10.64%
Long-term Avg. *Value Line* Beta	10.62%	10.61%	10.58%

P

30-DAY CONSTANT GROWTH DCF

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Projected EPS Growth Rate	[6] S&P Projected EPS Growth Rate	[7] Zacks 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	$143.48	2.43%	2.51%	7.00%	n/a	7.00%	7.00%	9.51%	9.51%	9.51%
NiSource Inc.	NI	$1.06	$35.95	2.95%	3.07%	9.50%	7.78%	7.00%	8.09%	10.05%	11.16%	12.59%
Northwest Natural Gas Company	NWN	$1.96	$40.95	4.79%	4.92%	6.50%	4.83%	n/a	5.66%	9.73%	10.58%	11.44%
ONE Gas, Inc.	OGS	$2.64	$74.00	3.57%	3.62%	3.50%	2.00%	n/a	2.75%	5.60%	6.37%	7.13%
Southwest Gas Corporation	SWX	$2.48	$75.07	3.30%	3.44%	10.00%	8.80%	6.00%	8.27%	9.40%	11.71%	13.47%
Spire, Inc.	SR	$3.02	$66.80	4.52%	4.64%	4.50%	6.45%	5.00%	5.32%	9.12%	9.96%	11.12%
Eversource Energy	ES	$2.86	$63.55	4.50%	4.63%	6.00%	5.61%	5.50%	5.70%	10.12%	10.33%	10.64%
American States Water Company	AWR	$1.86	$84.08	2.21%	2.29%	6.50%	8.00%	6.30%	6.93%	8.58%	9.22%	10.30%
California Water Service Group	CWT	$1.12	$51.36	2.18%	2.32%	13.00%	n/a	n/a	13.00%	15.32%	15.32%	15.32%
Middlesex Water Company	MSEX	$1.36	$65.54	2.08%	2.15%	7.00%	n/a	n/a	7.00%	9.15%	9.15%	9.15%
SJW Group	SJW	$1.60	$55.83	2.87%	2.95%	6.50%	4.98%	6.10%	5.86%	7.91%	8.81%	9.46%
Essential Utilities, Inc.	WTRG	$1.30	$39.20	3.32%	3.43%	7.00%	6.44%	6.30%	6.58%	9.73%	10.01%	10.44%
Mean				3.23%	3.33%	7.25%	6.10%	6.15%	6.85%	9.52%	10.18%	10.88%
Median				3.13%	3.25%	6.75%	6.44%	6.20%	6.76%	9.46%	9.99%	10.54%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 30-day average as of November 29, 2024
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

P

90-DAY CONSTANT GROWTH DCF

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Projected EPS Growth Rate	[6] S&P Projected EPS Growth Rate	[7] Zacks 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	$136.05	2.56%	2.65%	7.00%	n/a	7.00%	7.00%	9.65%	9.65%	9.65%
NiSource Inc.	NI	$1.06	$33.86	3.13%	3.26%	9.50%	7.78%	7.00%	8.09%	10.24%	11.35%	12.78%
Northwest Natural Gas Company	NWN	$1.96	$39.71	4.94%	5.08%	6.50%	4.83%	n/a	5.66%	9.88%	10.74%	11.60%
ONE Gas, Inc.	OGS	$2.64	$71.12	3.71%	3.76%	3.50%	2.00%	n/a	2.75%	5.75%	6.51%	7.28%
Southwest Gas Corporation	SWX	$2.48	$72.94	3.40%	3.54%	10.00%	8.80%	6.00%	8.27%	9.50%	11.81%	13.57%
Spire, Inc.	SR	$3.02	$65.73	4.59%	4.72%	4.50%	6.45%	5.00%	5.32%	9.20%	10.03%	11.20%
Eversource Energy	ES	$2.86	$64.99	4.40%	4.53%	6.00%	5.61%	5.50%	5.70%	10.02%	10.23%	10.53%
American States Water Company	AWR	$1.86	$82.72	2.25%	2.33%	6.50%	8.00%	6.30%	6.93%	8.62%	9.26%	10.34%
California Water Service Group	CWT	$1.12	$52.69	2.13%	2.26%	13.00%	n/a	n/a	13.00%	15.26%	15.26%	15.26%
Middlesex Water Company	MSEX	$1.36	$63.95	2.13%	2.20%	7.00%	n/a	n/a	7.00%	9.20%	9.20%	9.20%
SJW Group	SJW	$1.60	$57.53	2.78%	2.86%	6.50%	4.98%	6.10%	5.86%	7.83%	8.72%	9.37%
Essential Utilities, Inc.	WTRG	$1.30	$38.99	3.34%	3.45%	7.00%	6.44%	6.30%	6.58%	9.74%	10.03%	10.46%
Mean				3.28%	3.39%	7.25%	6.10%	6.15%	6.85%	9.57%	10.23%	10.94%
Median				3.23%	3.35%	6.75%	6.44%	6.20%	6.76%	9.57%	10.03%	10.49%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 90-day average as of November 29, 2024
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

P

180-DAY CONSTANT GROWTH DCF

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Projected EPS Growth Rate	[6] S&P Projected EPS Growth Rate	[7] Zacks 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	$125.67	2.77%	2.87%	7.00%	n/a	7.00%	7.00%	9.87%	9.87%	9.87%
NiSource Inc.	NI	$1.06	$30.84	3.44%	3.58%	9.50%	7.78%	7.00%	8.09%	10.56%	11.67%	13.10%
Northwest Natural Gas Company	NWN	$1.96	$37.85	5.18%	5.33%	6.50%	4.83%	n/a	5.66%	10.13%	10.99%	11.85%
ONE Gas, Inc.	OGS	$2.64	$66.47	3.97%	4.03%	3.50%	2.00%	n/a	2.75%	6.01%	6.78%	7.54%
Southwest Gas Corporation	SWX	$2.48	$72.77	3.41%	3.55%	10.00%	8.80%	6.00%	8.27%	9.51%	11.82%	13.58%
Spire, Inc.	SR	$3.02	$62.66	4.82%	4.95%	4.50%	6.45%	5.00%	5.32%	9.43%	10.27%	11.43%
Eversource Energy	ES	$2.86	$61.62	4.64%	4.77%	6.00%	5.61%	5.50%	5.70%	10.27%	10.48%	10.78%
American States Water Company	AWR	$1.86	$77.28	2.41%	2.49%	6.50%	8.00%	6.30%	6.93%	8.79%	9.43%	10.51%
California Water Service Group	CWT	$1.12	$50.38	2.22%	2.37%	13.00%	n/a	n/a	13.00%	15.37%	15.37%	15.37%
Middlesex Water Company	MSEX	$1.36	$58.14	2.34%	2.42%	7.00%	n/a	n/a	7.00%	9.42%	9.42%	9.42%
SJW Group	SJW	$1.60	$55.96	2.86%	2.94%	6.50%	4.98%	6.10%	5.86%	7.91%	8.80%	9.45%
Essential Utilities, Inc.	WTRG	$1.30	$37.83	3.44%	3.55%	7.00%	6.44%	6.30%	6.58%	9.85%	10.14%	10.56%
Mean				3.46%	3.57%	7.25%	6.10%	6.15%	6.85%	9.76%	10.42%	11.12%
Median				3.42%	3.55%	6.75%	6.44%	6.20%	6.76%	9.68%	10.20%	10.67%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 180-day average as of November 29, 2024
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

P

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VL BETA

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

Company	Ticker	[1] Current 30-day average of 30-year U.S. Treasury bond yield	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE
Atmos Energy Corporation	ATO	4.52%	0.90	12.05%	7.54%	11.30%	11.49%
NiSource Inc.	NI	4.52%	0.95	12.05%	7.54%	11.68%	11.77%
Northwest Natural Gas Company	NWN	4.52%	0.85	12.05%	7.54%	10.92%	11.20%
ONE Gas, Inc.	OGS	4.52%	0.85	12.05%	7.54%	10.92%	11.20%
Southwest Gas Corporation	SWX	4.52%	0.95	12.05%	7.54%	11.68%	11.77%
Spire, Inc.	SR	4.52%	0.90	12.05%	7.54%	11.30%	11.49%
Eversource Energy	ES	4.52%	0.95	12.05%	7.54%	11.68%	11.77%
American States Water Company	AWR	4.52%	0.75	12.05%	7.54%	10.17%	10.64%
California Water Service Group	CWT	4.52%	0.75	12.05%	7.54%	10.17%	10.64%
Middlesex Water Company	MSEX	4.52%	0.75	12.05%	7.54%	10.17%	10.64%
SJW Group	SJW	4.52%	0.85	12.05%	7.54%	10.92%	11.20%
Essential Utilities, Inc.	WTRG	4.52%	1.00	12.05%	7.54%	12.05%	12.05%
Mean			0.87			11.08%	11.32%

Notes:
[1] Source: Bloomberg Professional, 30-day average as of November 29, 2024
[2] Source: Value Line
[3] Source: Schedule AEB-R-5
[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 & VL BETA

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

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q1 2025 - Q1 2026)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE
Atmos Energy Corporation	ATO	4.42%	0.90	12.05%	7.63%	11.29%	11.48%
NiSource Inc.	NI	4.42%	0.95	12.05%	7.63%	11.67%	11.77%
Northwest Natural Gas Company	NWN	4.42%	0.85	12.05%	7.63%	10.91%	11.19%
ONE Gas, Inc.	OGS	4.42%	0.85	12.05%	7.63%	10.91%	11.19%
Southwest Gas Corporation	SWX	4.42%	0.95	12.05%	7.63%	11.67%	11.77%
Spire, Inc.	SR	4.42%	0.90	12.05%	7.63%	11.29%	11.48%
Eversource Energy	ES	4.42%	0.95	12.05%	7.63%	11.67%	11.77%
American States Water Company	AWR	4.42%	0.75	12.05%	7.63%	10.14%	10.62%
California Water Service Group	CWT	4.42%	0.75	12.05%	7.63%	10.14%	10.62%
Middlesex Water Company	MSEX	4.42%	0.75	12.05%	7.63%	10.14%	10.62%
SJW Group	SJW	4.42%	0.85	12.05%	7.63%	10.91%	11.19%
Essential Utilities, Inc.	WTRG	4.42%	1.00	12.05%	7.63%	12.05%	12.05%
Mean			0.87			11.07%	11.31%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 43, No. 12, November 27, 2024, at 2
[2] Source: Value Line
[3] Source: Schedule AEB-R-5
[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 & VL BETA

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

Company	Ticker	[1] Projected 30-year U.S. Treasury bond yield (2026-2030)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE
Atmos Energy Corporation	ATO	4.30%	0.90	12.05%	7.75%	11.28%	11.47%
NiSource Inc.	NI	4.30%	0.95	12.05%	7.75%	11.66%	11.76%
Northwest Natural Gas Company	NWN	4.30%	0.85	12.05%	7.75%	10.89%	11.18%
ONE Gas, Inc.	OGS	4.30%	0.85	12.05%	7.75%	10.89%	11.18%
Southwest Gas Corporation	SWX	4.30%	0.95	12.05%	7.75%	11.66%	11.76%
Spire, Inc.	SR	4.30%	0.90	12.05%	7.75%	11.28%	11.47%
Eversource Energy	ES	4.30%	0.95	12.05%	7.75%	11.66%	11.76%
American States Water Company	AWR	4.30%	0.75	12.05%	7.75%	10.11%	10.60%
California Water Service Group	CWT	4.30%	0.75	12.05%	7.75%	10.11%	10.60%
Middlesex Water Company	MSEX	4.30%	0.75	12.05%	7.75%	10.11%	10.60%
SJW Group	SJW	4.30%	0.85	12.05%	7.75%	10.89%	11.18%
Essential Utilities, Inc.	WTRG	4.30%	1.00	12.05%	7.75%	12.05%	12.05%
Mean			0.87			11.05%	11.30%

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

P

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & BLOOMBERG BETA

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

Company	Ticker	[1] Current 30-day average of 30-year U.S. Treasury bond yield	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE
Atmos Energy Corporation	ATO	4.52%	0.74	12.05%	7.54%	10.11%	10.60%
NiSource Inc.	NI	4.52%	0.79	12.05%	7.54%	10.44%	10.84%
Northwest Natural Gas Company	NWN	4.52%	0.70	12.05%	7.54%	9.76%	10.34%
ONE Gas, Inc.	OGS	4.52%	0.76	12.05%	7.54%	10.28%	10.72%
Southwest Gas Corporation	SWX	4.52%	0.82	12.05%	7.54%	10.69%	11.03%
Spire, Inc.	SR	4.52%	0.76	12.05%	7.54%	10.24%	10.69%
Eversource Energy	ES	4.52%	0.79	12.05%	7.54%	10.43%	10.84%
American States Water Company	AWR	4.52%	0.65	12.05%	7.54%	9.39%	10.06%
California Water Service Group	CWT	4.52%	0.69	12.05%	7.54%	9.70%	10.29%
Middlesex Water Company	MSEX	4.52%	0.77	12.05%	7.54%	10.32%	10.75%
SJW Group	SJW	4.52%	0.79	12.05%	7.54%	10.48%	10.87%
Essential Utilities, Inc.	WTRG	4.52%	0.84	12.05%	7.54%	10.88%	11.17%
Mean			0.76			10.23%	10.68%

Notes:
[1] Source: Bloomberg Professional, 30-day average as of November 29, 2024
[2] Source: Bloomberg Professional, as of November 29, 2024
[3] Source: Schedule AEB-R-5
[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 & BLOOMBERG BETA

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

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q1 2025 - Q1 2026)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE
Atmos Energy Corporation	ATO	4.42%	0.74	12.05%	7.63%	10.09%	10.58%
NiSource Inc.	NI	4.42%	0.79	12.05%	7.63%	10.42%	10.83%
Northwest Natural Gas Company	NWN	4.42%	0.70	12.05%	7.63%	9.73%	10.31%
ONE Gas, Inc.	OGS	4.42%	0.76	12.05%	7.63%	10.26%	10.70%
Southwest Gas Corporation	SWX	4.42%	0.82	12.05%	7.63%	10.68%	11.02%
Spire, Inc.	SR	4.42%	0.76	12.05%	7.63%	10.21%	10.67%
Eversource Energy	ES	4.42%	0.79	12.05%	7.63%	10.41%	10.82%
American States Water Company	AWR	4.42%	0.65	12.05%	7.63%	9.36%	10.03%
California Water Service Group	CWT	4.42%	0.69	12.05%	7.63%	9.67%	10.27%
Middlesex Water Company	MSEX	4.42%	0.77	12.05%	7.63%	10.30%	10.73%
SJW Group	SJW	4.42%	0.79	12.05%	7.63%	10.46%	10.85%
Essential Utilities, Inc.	WTRG	4.42%	0.84	12.05%	7.63%	10.86%	11.16%
Mean			0.76			10.20%	10.67%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 43, No. 12, November 27, 2024, at 2
[2] Source: Bloomberg Professional, as of November 29, 2024
[3] Source: Schedule AEB-R-5
[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 & BLOOMBERG BETA

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

Company	Ticker	[1] Projected 30-year U.S. Treasury bond yield (2026-2030)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE
Atmos Energy Corporation	ATO	4.30%	0.74	12.05%	7.75%	10.06%	10.55%
NiSource Inc.	NI	4.30%	0.79	12.05%	7.75%	10.39%	10.81%
Northwest Natural Gas Company	NWN	4.30%	0.70	12.05%	7.75%	9.70%	10.29%
ONE Gas, Inc.	OGS	4.30%	0.76	12.05%	7.75%	10.23%	10.68%
Southwest Gas Corporation	SWX	4.30%	0.82	12.05%	7.75%	10.65%	11.00%
Spire, Inc.	SR	4.30%	0.76	12.05%	7.75%	10.18%	10.65%
Eversource Energy	ES	4.30%	0.79	12.05%	7.75%	10.39%	10.80%
American States Water Company	AWR	4.30%	0.65	12.05%	7.75%	9.32%	10.00%
California Water Service Group	CWT	4.30%	0.69	12.05%	7.75%	9.64%	10.24%
Middlesex Water Company	MSEX	4.30%	0.77	12.05%	7.75%	10.27%	10.71%
SJW Group	SJW	4.30%	0.79	12.05%	7.75%	10.43%	10.84%
Essential Utilities, Inc.	WTRG	4.30%	0.84	12.05%	7.75%	10.84%	11.14%
Mean			0.76			10.17%	10.64%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 43, No. 12, November 27, 2024, at 14
[2] Source: Bloomberg Professional, as of November 29, 2024
[3] Source: Schedule AEB-R-5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

P

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

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

Company	Ticker	[1] Current 30-day average of 30-year U.S. Treasury bond yield	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE
Atmos Energy Corporation	ATO	4.52%	0.75	12.05%	7.54%	10.17%	10.64%
NiSource Inc.	NI	4.52%	0.76	12.05%	7.54%	10.21%	10.67%
Northwest Natural Gas Company	NWN	4.52%	0.71	12.05%	7.54%	9.86%	10.41%
ONE Gas, Inc.	OGS	4.52%	0.74	12.05%	7.54%	10.07%	10.57%
Southwest Gas Corporation	SWX	4.52%	0.83	12.05%	7.54%	10.75%	11.08%
Spire, Inc.	SR	4.52%	0.74	12.05%	7.54%	10.10%	10.59%
Eversource Energy	ES	4.52%	0.76	12.05%	7.54%	10.25%	10.70%
American States Water Company	AWR	4.52%	0.69	12.05%	7.54%	9.72%	10.31%
California Water Service Group	CWT	4.52%	0.70	12.05%	7.54%	9.83%	10.38%
Middlesex Water Company	MSEX	4.52%	0.74	12.05%	7.54%	10.07%	10.56%
SJW Group	SJW	4.52%	0.76	12.05%	7.54%	10.27%	10.72%
Essential Utilities, Inc.	WTRG	4.52%	0.79	12.05%	7.54%	10.48%	10.87%
Mean			0.75			10.15%	10.62%

Notes:
[1] Source: Bloomberg Professional, 30-day average as of November 29, 2024
[2] Source: Schedule AEB-R-4
[3] Source: Schedule AEB-R-5
[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 & VALUE LINE LT AVERAGE BETA

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

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q1 2025 - Q1 2026)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE
Atmos Energy Corporation	ATO	4.42%	0.75	12.05%	7.63%	10.14%	10.62%
NiSource Inc.	NI	4.42%	0.76	12.05%	7.63%	10.19%	10.65%
Northwest Natural Gas Company	NWN	4.42%	0.71	12.05%	7.63%	9.83%	10.39%
ONE Gas, Inc.	OGS	4.42%	0.74	12.05%	7.63%	10.05%	10.55%
Southwest Gas Corporation	SWX	4.42%	0.83	12.05%	7.63%	10.73%	11.06%
Spire, Inc.	SR	4.42%	0.74	12.05%	7.63%	10.07%	10.57%
Eversource Energy	ES	4.42%	0.76	12.05%	7.63%	10.23%	10.68%
American States Water Company	AWR	4.42%	0.69	12.05%	7.63%	9.69%	10.28%
California Water Service Group	CWT	4.42%	0.70	12.05%	7.63%	9.80%	10.36%
Middlesex Water Company	MSEX	4.42%	0.74	12.05%	7.63%	10.04%	10.54%
SJW Group	SJW	4.42%	0.76	12.05%	7.63%	10.25%	10.70%
Essential Utilities, Inc.	WTRG	4.42%	0.79	12.05%	7.63%	10.46%	10.86%
Mean			0.75			10.12%	10.61%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 43, No. 12, November 27, 2024, at 2
[2] Source: Schedule AEB-R-4
[3] Source: Schedule AEB-R-5
[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 & VALUE LINE LT AVERAGE BETA

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

Company	Ticker	[1] Projected 30-year U.S. Treasury bond yield (2026-2030)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] ROE (K)	[6] ECAPM ROE
Atmos Energy Corporation	ATO	4.30%	0.75	12.05%	7.75%	10.11%	10.60%
NiSource Inc.	NI	4.30%	0.76	12.05%	7.75%	10.16%	10.63%
Northwest Natural Gas Company	NWN	4.30%	0.71	12.05%	7.75%	9.80%	10.36%
ONE Gas, Inc.	OGS	4.30%	0.74	12.05%	7.75%	10.02%	10.53%
Southwest Gas Corporation	SWX	4.30%	0.83	12.05%	7.75%	10.71%	11.05%
Spire, Inc.	SR	4.30%	0.74	12.05%	7.75%	10.04%	10.55%
Eversource Energy	ES	4.30%	0.76	12.05%	7.75%	10.20%	10.66%
American States Water Company	AWR	4.30%	0.69	12.05%	7.75%	9.66%	10.26%
California Water Service Group	CWT	4.30%	0.70	12.05%	7.75%	9.76%	10.33%
Middlesex Water Company	MSEX	4.30%	0.74	12.05%	7.75%	10.01%	10.52%
SJW Group	SJW	4.30%	0.76	12.05%	7.75%	10.22%	10.68%
Essential Utilities, Inc.	WTRG	4.30%	0.79	12.05%	7.75%	10.43%	10.84%
Mean			0.75			10.09%	10.58%

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

P

HISTORICAL BETA - 2013 - 2023

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] 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	0.75
NiSource Inc.	NI	0.85	0.85	NMF	NMF	0.60	0.50	0.55	0.85	0.85	0.85	0.90	0.76
Northwest Natural Gas Company	NWN	0.65	0.70	0.65	0.65	0.70	0.60	0.60	0.80	0.85	0.80	0.80	0.71
ONE Gas, Inc.	OGS				0.70	0.70	0.65	0.65	0.80	0.80	0.80	0.80	0.74
Southwest Gas Corporation	SWX	0.80	0.85	0.80	0.75	0.80	0.70	0.70	0.95	0.95	0.90	0.90	0.83
Spire, Inc.	SR	0.65	0.70	0.70	0.70	0.70	0.65	0.65	0.85	0.85	0.85	0.85	0.74
Eversource Energy	ES			0.75	0.70	0.65	0.60	0.55	0.90	0.90	0.90	0.90	0.76
American States Water Company	AWR	0.65	0.70	0.70	0.75	0.80	0.70	0.65	0.65	0.65	0.65	0.70	0.69
California Water Service Group	CWT	0.60	0.70	0.75	0.75	0.80	0.70	0.70	0.65	0.70	0.70	0.70	0.70
Middlesex Water Company	MSEX	0.75	0.70	0.70	0.75	0.80	0.75	0.75	0.75	0.70	0.70	0.75	0.74
SJW Group	SJW	0.85	0.85	0.75	0.75	0.70	0.60	0.60	0.85	0.80	0.80	0.85	0.76
Essential Utilities, Inc.	WTRG	0.60	0.70	0.75	0.70	0.75	0.70	0.65	0.95	0.95	0.95	1.00	0.79
Mean		0.72	0.76	0.74	0.72	0.73	0.65	0.64	0.82	0.82	0.81	0.83	0.75

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.
[10] Value Line, dated December 30, 2022.
[11] Value Line, dated December 29, 2023.
[12] Average ([1] - [11])

P

MARKET RISK PREMIUM DERIVED FROM S&P 500 INDEX

[1] Estimated Weighted Average Dividend Yiel	1.46%
[2] Estimated Weighted Average Long-Term Growth Rat	10.51%
[3] S&P 500 Estimated Required Market Returr	12.05%

		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
LyondellBasell Industries NV	LYB	324.76	82.00	26,630		6.54%		-11.21%	
American Express Co	AXP	704.44	304.68	214,630	0.56%	0.92%	0.01%	15.55%	0.09%
Verizon Communications In	VZ	4,209.63	44.34	186,655	0.49%	6.11%	0.03%	2.98%	0.01%
Texas Pacific Land Corp	TPL	22.97	1,598.49	36,725		0.40%			
Broadcom Inc	AVGO	4,670.58	162.08	757,007	1.98%	1.31%	0.03%	17.05%	0.34%
Boeing Co/The	BA	747.17	155.44	116,140				34.61%	
Solventum Corp	SOLV	172.75	71.51	12,354				-6.78%	
Caterpillar Inc	CAT	482.80	406.11	196,071	0.51%	1.39%	0.01%	7.02%	0.04%
JPMorgan Chase & Co	JPM	2,815.34	249.72	703,047	1.84%	2.00%	0.04%	2.80%	0.05%
Chevron Corp	CVX	1,797.09	161.93	291,003	0.76%	4.03%	0.03%	3.60%	0.03%
Coca-Cola Co/The	KO	4,307.80	64.08	276,044	0.72%	3.03%	0.02%	5.98%	0.04%
AbbVie Inc	ABBV	1,767.14	182.93	323,263	0.84%	3.59%	0.03%	11.26%	0.10%
Walt Disney Co/The	DIS	1,810.94	117.47	212,731	0.56%	0.77%	0.00%	15.80%	0.09%
Corpay Inc	CPAY	69.71	381.18	26,572	0.07%			14.54%	0.01%
Extra Space Storage Inc	EXR	211.98	170.96	36,241	0.09%	3.79%	0.00%	1.62%	0.00%
Exxon Mobil Corp	XOM	4,395.09	117.96	518,445		3.36%		-1.82%	
Phillips 66	PSX	412.99	133.98	55,332		3.43%		-8.20%	
General Electric Co	GE	1,082.29	182.16	197,151		0.61%		30.30%	
HP Inc	HPQ	963.72	35.43	34,145	0.09%	3.27%	0.00%	3.80%	0.00%
Home Depot Inc/The	HD	993.36	429.13	426,282	1.11%	2.10%	0.02%	3.56%	0.04%
Monolithic Power Systems In	MPWR	48.78	567.64	27,689		0.88%		22.00%	
International Business Machines Corp	IBM	924.65	227.41	210,274	0.55%	2.94%	0.02%	3.80%	0.02%
Johnson & Johnson	JNJ	2,407.62	155.01	373,206	0.97%	3.20%	0.03%	3.00%	0.03%
Lululemon Athletica In	LULU	117.66	320.66	37,729	0.10%			7.00%	0.01%
McDonald's Corp	MCD	716.62	294.24	210,858	0.55%	2.41%	0.01%	4.77%	0.03%
Merck & Co Inc	MRK	2,529.64	101.64	257,112	0.67%	3.19%	0.02%	13.00%	0.09%
3M Co	MMM	544.56	133.53	72,715	0.19%	2.10%	0.00%	1.81%	0.00%
American Water Works Co Inc	AWK	194.89	136.94	26,689	0.07%	2.23%	0.00%	7.83%	0.01%
Bank of America Corp	BAC	7,672.88	47.51	364,539	0.95%	2.19%	0.02%	5.00%	0.05%
Pfizer Inc	PFE	5,666.99	26.21	148,532	0.39%	6.41%	0.02%	10.02%	0.04%
Procter & Gamble Co/The	PG	2,355.04	179.26	422,165	1.10%	2.25%	0.02%	7.37%	0.08%
AT&T Inc	T	7,175.29	23.16	166,180	0.43%	4.79%	0.02%	1.16%	0.01%
Travelers Cos Inc/The	TRV	227.02	266.04	60,396	0.16%	1.58%	0.00%	18.71%	0.03%
RTX Corp	RTX	1,331.02	121.83	162,158	0.42%	2.07%	0.01%	10.62%	0.04%
Analog Devices Inc	ADI	496.30	218.05	108,218	0.28%	1.69%	0.00%	14.05%	0.04%
Walmart Inc	WMT	8,038.25	92.50	743,538	1.94%	0.90%	0.02%	9.24%	0.18%
Cisco Systems Inc	CSCO	3,982.76	59.21	235,819	0.62%	2.70%	0.02%	4.04%	0.02%
Intel Corp	INTC	4,313.00	24.05	103,728	0.27%			2.86%	0.01%
General Motors Co	GM	1,099.60	55.59	61,127	0.16%	0.86%	0.00%	18.41%	0.03%
Microsoft Corp	MSFT	7,434.88	423.46	3,148,375	8.22%	0.78%	0.06%	15.35%	1.26%
Dollar General Corp	DG	219.92	77.27	16,993		3.05%		-7.74%	
Cigna Group/The	CI	278.15	337.80	93,960	0.25%	1.66%	0.00%	11.65%	0.03%
Kinder Morgan Inc	KMI	2,221.64	28.27	62,806	0.16%	4.07%	0.01%	6.39%	0.01%
Citigroup Inc	C	1,891.26	70.87	134,034		3.16%		26.39%	
American International Group In	AIG	623.77	76.88	47,955	0.13%	2.08%	0.00%	10.49%	0.01%
Altria Group Inc	MO	1,694.81	57.74	97,859	0.26%	7.07%	0.02%	4.20%	0.01%
HCA Healthcare Inc	HCA	253.30	327.22	82,884	0.22%	0.81%	0.00%	10.84%	0.02%
International Paper Co	IP	347.41	58.83	20,438		3.14%		-2.00%	
Hewlett Packard Enterprise Co	HPE	1,298.67	21.22	27,558	0.07%	2.45%	0.00%	4.73%	0.00%
Abbott Laboratories	ABT	1,734.46	118.77	206,001	0.54%	1.85%	0.01%	8.15%	0.04%
Aflac Inc	AFL	555.53	114.00	63,330	0.17%	1.75%	0.00%	9.37%	0.02%
Air Products and Chemicals In	APD	222.38	334.33	74,348	0.19%	2.12%	0.00%	10.24%	0.02%
Super Micro Computer In	SMCI	585.57	32.64	19,113					
Royal Caribbean Cruises Ltd	RCL	268.88	244.06	65,622		0.66%		32.53%	
Hess Corp	HES	308.12	147.18	45,349		1.36%			
Archer-Daniels-Midland Co	ADM	478.53	54.60	26,128		3.66%		-4.65%	
Automatic Data Processing In	ADP	407.46	306.93	125,061	0.33%	2.01%	0.01%	9.10%	0.03%
Verisk Analytics Inc	VRSK	141.21	294.21	41,546	0.11%	0.53%	0.00%	12.00%	0.01%
AutoZone Inc	AZO	16.90	3,169.54	53,579	0.14%			13.50%	0.02%
Linde PLC	LIN	476.16	460.99	219,504	0.57%	1.21%	0.01%	11.47%	0.07%
Avery Dennison Corp	AVY	80.35	205.95	16,547	0.04%	1.71%	0.00%	13.82%	0.01%
Enphase Energy Inc	ENPH	135.11	71.35	9,640	0.03%			4.56%	0.00%
MSCI Inc	MSCI	78.37	609.63	47,777	0.12%	1.05%	0.00%	12.00%	0.01%
Ball Corp	BALL	298.43	61.96	18,490	0.05%	1.29%	0.00%	12.66%	0.01%
Axon Enterprise Inc	AXON	76.25	646.96	49,334				24.64%	
Dayforce Inc	DAY	157.70	79.99	12,614					
Carrier Global Corp	CARR	897.23	77.37	69,418	0.18%	0.98%	0.00%	12.25%	0.02%
Bank of New York Mellon Corp/The	BK	727.08	81.87	59,526	0.16%	2.30%	0.00%	12.10%	0.02%
Otis Worldwide Corp	OTIS	399.46	102.98	41,136	0.11%	1.51%	0.00%	10.00%	0.01%
Baxter International Inc	BAX	510.59	33.71	17,212	0.04%	2.02%	0.00%	1.27%	0.00%
Becton Dickinson & Co	BDX	289.12	221.90	64,156	0.17%	1.87%	0.00%	9.00%	0.02%
Berkshire Hathaway Inc	BRK/B	1,328.45	483.02	641,666					
Best Buy Co Inc	BBY	214.73	90.00	19,325	0.05%	4.18%	0.00%	4.89%	0.00%
Boston Scientific Corp	BSX	1,473.83	90.66	133,617	0.35%			12.64%	0.04%
Bristol-Myers Squibb Co	BMY	2,028.18	59.22	120,109		4.05%		-0.11%	
Brown-Forman Corp	BF/B	303.54	42.08	12,773		2.15%		-3.20%	
Coterra Energy Inc	CTRA	736.61	26.72	19,682		3.14%			
Hilton Worldwide Holdings In	HLT	243.78	253.44	61,784	0.16%	0.24%	0.00%	12.62%	0.02%
Carnival Corp	CCL	1,154.16	25.43	29,350					
Qorvo Inc	QRVO	94.53	69.05	6,527	0.02%			3.70%	0.00%
Builders FirstSource Inc	BLDR	115.08	186.47	21,460	0.06%			0.15%	0.00%
UDR Inc	UDR	329.96	45.86	15,132	0.04%	3.71%	0.00%	1.46%	0.00%
Clorox Co/The	CLX	123.78	167.17	20,693	0.05%	2.92%	0.00%	10.56%	0.01%
Paycom Software Inc	PAYC	57.66	231.92	13,373	0.03%	0.65%	0.00%	10.23%	0.00%
CMS Energy Corp	CMS	298.78	69.71	20,828	0.05%	2.96%	0.00%	7.43%	0.00%
Colgate-Palmolive Co	CL	817.01	96.63	78,948	0.21%	2.07%	0.00%	8.23%	0.02%
EPAM Systems Inc	EPAM	56.72	243.92	13,835	0.04%			6.44%	0.00%
Conagra Brands Inc	CAG	477.27	27.55	13,149	0.03%	5.08%	0.00%	0.62%	0.00%

P

		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Airbnb Inc	ABNB	440.00	136.11	59,889	0.16%			19.27%	0.03%
Consolidated Edison Inc	ED	346.41	100.59	34,846	0.09%	3.30%	0.00%	5.79%	0.01%
Corning Inc	GLW	856.21	48.67	41,672	0.11%	2.30%	0.00%	16.38%	0.02%
GoDaddy Inc	GDDY	140.39	197.57	27,737					
Cummins Inc	CMI	137.18	375.04	51,449	0.13%	1.94%	0.00%	11.78%	0.02%
Caesars Entertainment Inc	CZR	212.48	38.49	8,178					
Danaher Corp	DHR	722.28	239.69	173,122	0.45%	0.45%	0.00%	0.85%	0.00%
Target Corp	TGT	458.21	132.31	60,626	0.16%	3.39%	0.01%	11.09%	0.02%
Deere & Co	DE	273.60	465.90	127,470	0.33%	1.26%	0.00%	1.13%	0.00%
Dominion Energy Inc	D	840.01	58.75	49,351	0.13%	4.54%	0.01%	16.29%	0.02%
Dover Corp	DOV	137.19	205.90	28,248	0.07%	1.00%	0.00%	9.23%	0.01%
Alliant Energy Corp	LNT	256.60	63.20	16,217	0.04%	3.04%	0.00%	7.27%	0.00%
Steel Dynamics Inc	STLD	152.24	145.27	22,117		1.27%		-4.40%	
Duke Energy Corp	DUK	771.00	117.05	90,246	0.24%	3.57%	0.01%	6.70%	0.02%
Regency Centers Corp	REG	181.51	75.59	13,720	0.04%	3.73%	0.00%	4.24%	0.00%
Eaton Corp PLC	ETN	395.20	375.42	148,366	0.39%	1.00%	0.00%	15.29%	0.06%
Ecolab Inc	ECL	283.16	248.77	70,442	0.18%	0.92%	0.00%	18.46%	0.03%
Revvity Inc	RVTY	121.70	116.14	14,134	0.04%	0.24%	0.00%	7.86%	0.00%
Dell Technologies Inc	DELL	333.87	127.59	42,599	0.11%	1.40%	0.00%	9.51%	0.01%
Emerson Electric Co	EMR	569.53	132.60	75,520	0.20%	1.59%	0.00%	13.14%	0.03%
EOG Resources Inc	EOG	562.45	133.26	74,952		2.93%		-1.24%	
Aon PLC	AON	216.27	391.54	84,677	0.22%	0.69%	0.00%	11.18%	0.02%
Entergy Corp	ETR	214.41	156.17	33,484	0.09%	3.07%	0.00%	7.36%	0.01%
Equifax Inc	EFX	123.95	261.56	32,421		0.60%		22.00%	
EQT Corp	EQT	596.68	45.44	27,113		1.39%		-6.00%	
IQVIA Holdings Inc	IQV	181.50	200.84	36,452	0.10%			9.02%	0.01%
Gartner Inc	IT	77.13	517.93	39,950	0.10%			9.00%	0.01%
FedEx Corp	FDX	244.32	302.67	73,949	0.19%	1.82%	0.00%	12.33%	0.02%
FMC Corp	FMC	124.84	59.09	7,377		3.93%		-3.67%	
Brown & Brown Inc	BRO	285.96	113.10	32,342	0.08%	0.53%	0.00%	11.31%	0.01%
Ford Motor Co	F	3,903.44	11.13	43,445	0.11%	5.39%	0.01%	3.06%	0.00%
NextEra Energy Inc	NEE	2,056.40	78.67	161,777	0.42%	2.62%	0.01%	7.65%	0.03%
Franklin Resources Inc	BEN	523.67	22.76	11,919	0.03%	5.45%	0.00%	5.00%	0.00%
Garmin Ltd	GRMN	192.02	212.60	40,825		1.41%		21.60%	
Freeport-McMoRan Inc	FCX	1,436.93	44.20	63,512	0.17%	1.36%	0.00%	15.37%	0.03%
Dexcom Inc	DXCM	390.60	77.99	30,463				20.11%	
General Dynamics Corp	GD	274.97	284.01	78,094	0.20%	2.00%	0.00%	14.58%	0.03%
General Mills Inc	GIS	555.16	66.26	36,785	0.10%	3.62%	0.00%	2.45%	0.00%
Genuine Parts Co	GPC	139.04	126.73	17,620		3.16%			
Atmos Energy Corp	ATO	155.40	151.32	23,515		2.30%			
WW Grainger Inc	GWW	48.70	1,205.34	58,700	0.15%	0.68%	0.00%	5.61%	0.01%
Halliburton Co	HAL	878.50	31.86	27,989	0.07%	2.13%	0.00%	2.85%	0.00%
L3Harris Technologies Inc	LHX	189.67	246.25	46,706	0.12%	1.88%	0.00%	9.00%	0.01%
Healthpeak Properties Inc	DOC	699.44	21.99	15,381	0.04%	5.46%	0.00%	4.99%	0.00%
Insulet Corp	PODD	70.14	266.78	18,713				31.17%	
Catalent Inc	CTLT	181.51	61.11	11,092					
Fortive Corp	FTV	346.95	79.33	27,523	0.07%	0.40%	0.00%	10.74%	0.01%
Hershey Co/The	HSY	147.74	176.13	26,022		3.11%		-4.55%	
Synchrony Financial	SYF	389.34	67.52	26,289		1.48%		39.62%	
Hormel Foods Corp	HRL	548.36	32.43	17,783	0.05%	3.58%	0.00%	6.23%	0.00%
Arthur J Gallagher & Co	AJG	219.40	312.24	68,505	0.18%	0.77%	0.00%	12.81%	0.02%
Mondelez International Inc	MDLZ	1,337.19	64.95	86,851	0.23%	2.89%	0.01%	5.07%	0.01%
CenterPoint Energy Inc	CNP	651.73	32.62	21,259	0.06%	2.58%	0.00%	8.01%	0.00%
Humana Inc	HUM	120.41	296.38	35,688		1.19%		-8.82%	
Willis Towers Watson PLC	WTW	100.73	322.00	32,434	0.08%	1.09%	0.00%	10.81%	0.01%
Illinois Tool Works Inc	ITW	295.30	277.52	81,952	0.21%	2.16%	0.00%	7.08%	0.02%
CDW Corp/DE	CDW	133.26	175.93	23,445	0.06%	1.42%	0.00%	3.96%	0.00%
Trane Technologies PLC	TT	225.02	416.22	93,659	0.24%	0.81%	0.00%	16.94%	0.04%
Interpublic Group of Cos Inc/The	IPG	372.51	30.48	11,354	0.03%	4.33%	0.00%	0.91%	0.00%
International Flavors & Fragrances Inc	IFF	255.68	91.36	23,359	0.06%	1.75%	0.00%	3.39%	0.00%
Generac Holdings Inc	GNRC	59.50	188.20	11,197					
NXP Semiconductors NV	NXPI	254.16	229.37	58,296	0.15%	1.77%	0.00%	2.29%	0.00%
Kellanova	K	344.70	80.72	27,824	0.07%	2.82%	0.00%	9.41%	0.01%
Broadridge Financial Solutions Inc	BR	116.89	236.02	27,588		1.49%			
Kimberly-Clark Corp	KMB	333.49	139.35	46,471	0.12%	3.50%	0.00%	8.06%	0.01%
Kimco Realty Corp	KIM	674.12	25.57	17,237	0.05%	3.91%	0.00%	4.66%	0.00%
Oracle Corp	ORCL	2,771.06	184.84	512,203	1.34%	0.87%	0.01%	11.95%	0.16%
Kroger Co/The	KR	723.49	61.08	44,191	0.12%	2.10%	0.00%	3.11%	0.00%
Lennar Corp	LEN	238.81	174.39	41,646	0.11%	1.15%	0.00%	9.07%	0.01%
Eli Lilly & Co	LLY	949.32	795.35	755,038		0.65%		28.50%	
Charter Communications Inc	CHTR	142.20	396.97	56,447	0.15%			7.71%	0.01%
Loews Corp	L	217.78	86.73	18,888		0.29%			
Lowe's Cos Inc	LOW	564.65	272.43	153,828		1.69%		-0.44%	
Hubbell Inc	HUBB	53.67	460.09	24,693	0.06%	1.15%	0.00%	18.00%	0.01%
IDEX Corp	IEX	75.72	230.63	17,464		1.20%			
Marsh & McLennan Cos Inc	MMC	491.12	233.23	114,544	0.30%	1.40%	0.00%	8.79%	0.03%
Masco Corp	MAS	215.75	80.56	17,381	0.05%	1.44%	0.00%	7.54%	0.00%
S&P Global Inc	SPGI	317.50	522.51	165,897	0.43%	0.70%	0.00%	14.00%	0.06%
Medtronic PLC	MDT	1,282.29	86.54	110,969	0.29%	3.24%	0.01%	6.49%	0.02%
Viatris Inc	VTRS	1,193.59	13.09	15,624		3.67%		-3.41%	
CVS Health Corp	CVS	1,258.41	59.85	75,316		4.44%		-2.27%	
DuPont de Nemours Inc	DD	417.96	83.59	34,937	0.09%	1.82%	0.00%	4.01%	0.00%
Micron Technology Inc	MU	1,110.48	97.95	108,772		0.47%		53.55%	
Motorola Solutions Inc	MSI	167.12	499.70	83,510	0.22%	0.87%	0.00%	9.48%	0.02%
Cboe Global Markets Inc	CBOE	104.69	215.85	22,596	0.06%	1.17%	0.00%	13.68%	0.01%
Newmont Corp	NEM	1,138.45	41.94	47,747		2.38%		37.81%	
NIKE Inc	NKE	1,190.60	78.37	93,307		2.04%		-1.83%	
NiSource Inc	NI	466.78	38.09	17,780	0.05%	2.78%	0.00%	8.00%	0.00%
Norfolk Southern Corp	NSC	226.24	275.85	62,408	0.16%	1.96%	0.00%	8.84%	0.01%
Principal Financial Group Inc	PFG	228.73	86.36	19,753	0.05%	3.38%	0.00%	12.60%	0.01%
Eversource Energy	ES	366.40	64.49	23,629	0.06%	4.43%	0.00%	5.09%	0.00%
Northrop Grumman Corp	NOC	145.70	487.59	71,040	0.19%	1.69%	0.00%	19.22%	0.04%
Wells Fargo & Co	WFC	3,329.49	76.17	253,607	0.66%	2.10%	0.01%	10.67%	0.07%
Nucor Corp	NUE	234.81	154.69	36,323		1.40%		-8.72%	
Occidental Petroleum Corp	OXY	938.34	50.58	47,461	0.12%	1.74%	0.00%	12.00%	0.01%
Omnicom Group Inc	OMC	195.09	104.82	20,450	0.05%	2.67%	0.00%	5.61%	0.00%
ONEOK Inc	OKE	584.18	113.60	66,363	0.17%	3.49%	0.01%	7.39%	0.01%

P

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.
Raymond James Financial Inc	RJF	204.04	169.28	34,541	0.09%	1.06%	0.00%	10.00%	0.01%
PG&E Corp	PCG	2,137.54	21.63	46,235	0.12%	0.46%	0.00%	9.84%	0.01%
Parker-Hannifin Corp	PH	128.72	702.90	90,478	0.24%	0.93%	0.00%	7.90%	0.02%
Rollins Inc	ROL	484.31	50.33	24,375	0.06%	1.31%	0.00%	14.00%	0.01%
PPL Corp	PPL	737.97	34.93	25,777	0.07%	2.95%	0.00%	6.93%	0.00%
ConocoPhillips	COP	1,293.56	108.34	140,145	0.37%	2.88%	0.01%	4.50%	0.02%
PulteGroup Inc	PHM	205.08	135.27	27,741	0.07%	0.65%	0.00%	7.98%	0.01%
Pinnacle West Capital Corp	PNW	113.70	93.70	10,654	0.03%	3.82%	0.00%	7.26%	0.00%
PNC Financial Services Group Inc/The	PNC	396.78	214.72	85,197	0.22%	2.98%	0.01%	18.19%	0.04%
PPG Industries Inc	PPG	232.00	124.37	28,854	0.08%	2.19%	0.00%	6.89%	0.01%
Progressive Corp/The	PGR	585.81	268.88	157,513		0.15%		39.87%	
Veralto Corp	VLTO	247.31	108.19	26,756		0.33%			
Public Service Enterprise Group Inc	PEG	498.23	94.30	46,983	0.12%	2.55%	0.00%	6.29%	0.01%
Cooper Cos Inc/The	COO	199.16	104.46	20,804	0.05%			12.43%	0.01%
Edison International	EIX	387.15	87.75	33,972	0.09%	3.56%	0.00%	7.58%	0.01%
Schlumberger NV	SLB	1,412.15	43.94	62,050	0.16%	2.50%	0.00%	9.17%	0.01%
Charles Schwab Corp/The	SCHW	1,779.66	82.76	147,285	0.38%	1.21%	0.00%	8.94%	0.03%
Sherwin-Williams Co/The	SHW	251.85	397.40	100,086	0.26%	0.72%	0.00%	10.29%	0.03%
West Pharmaceutical Services Inc	WST	72.42	325.68	23,587	0.06%	0.26%	0.00%	2.49%	0.00%
J M Smucker Co/The	SJM	106.42	117.79	12,535	0.03%	3.67%	0.00%	5.49%	0.00%
Snap-on Inc	SNA	52.51	369.69	19,411	0.05%	2.32%	0.00%	4.81%	0.00%
AMETEK Inc	AME	231.31	194.38	44,962	0.12%	0.58%	0.00%	7.34%	0.01%
Uber Technologies Inc	UBER	2,105.71	71.96	151,527				61.51%	
Southern Co/The	SO	1,094.63	89.13	97,565	0.25%	3.23%	0.01%	7.94%	0.02%
Truist Financial Corp	TFC	1,327.52	47.68	63,296	0.17%	4.36%	0.01%	7.01%	0.01%
Southwest Airlines Co	LUV	599.74	32.36	19,407	0.05%	2.22%	0.00%	7.97%	0.00%
W R Berkley Corp	WRB	381.07	64.55	24,598	0.06%	0.50%	0.00%	13.07%	0.01%
Stanley Black & Decker Inc	SWK	154.16	89.45	13,790		3.67%			
Public Storage	PSA	175.70	348.05	61,154	0.16%	3.45%	0.01%	2.10%	0.00%
Arista Networks Inc	ANET	314.94	405.82	127,809	0.33%			17.80%	0.06%
Sysco Corp	SYY	491.23	77.11	37,878	0.10%	2.65%	0.00%	7.00%	0.01%
Corteva Inc	CTVA	692.25	62.07	42,968	0.11%	1.10%	0.00%	9.10%	0.01%
Texas Instruments Inc	TXN	912.22	201.03	183,383	0.48%	2.71%	0.01%	0.10%	0.00%
Textron Inc	TXT	185.51	85.63	15,885		0.09%			
Thermo Fisher Scientific Inc	TMO	382.50	529.63	202,584	0.53%	0.29%	0.00%	8.37%	0.04%
TJX Cos Inc/The	TJX	1,127.87	125.69	141,762	0.37%	1.19%	0.00%	8.42%	0.03%
Globe Life Inc	GL	83.95	111.24	9,338	0.02%	0.86%	0.00%	6.00%	0.00%
Johnson Controls International plc	JCI	662.19	83.86	55,531	0.14%	1.76%	0.00%	9.59%	0.01%
Ulta Beauty Inc	ULTA	47.11	386.64	18,216				-0.55%	
Union Pacific Corp	UNP	606.26	244.66	148,327	0.39%	2.19%	0.01%	9.24%	0.04%
Keysight Technologies Inc	KEYS	173.54	170.84	29,648	0.08%			13.10%	0.01%
UnitedHealth Group Inc	UNH	920.28	610.20	561,557	1.47%	1.38%	0.02%	10.52%	0.15%
Blackstone Inc	BX	722.00	191.09	137,967		1.80%		22.49%	
Ventas Inc	VTR	419.35	64.07	26,868	0.07%	2.81%	0.00%	7.65%	0.01%
Labcorp Holdings Inc	LH	83.64	241.16	20,170	0.05%	1.19%	0.00%	9.21%	0.00%
Vulcan Materials Co	VMC	132.06	288.13	38,051	0.10%	0.64%	0.00%	14.45%	0.01%
Weyerhaeuser Co	WY	726.58	32.26	23,440		2.48%		-13.66%	
Williams Cos Inc/The	WMB	1,219.01	58.52	71,337	0.19%	3.25%	0.01%	5.57%	0.01%
Constellation Energy Corp	CEG	315.12	256.56	80,847	0.21%	0.55%	0.00%	18.94%	0.04%
WEC Energy Group Inc	WEC	316.35	101.05	31,968	0.08%	3.31%	0.00%	7.09%	0.01%
Adobe Inc	ADBE	440.20	515.93	227,112	0.59%			16.34%	0.10%
Vistra Corp	VST	340.23	159.84	54,382		0.55%			
AES Corp/The	AES	711.03	13.04	9,272		5.29%			
Expeditors International of Washington Inc	EXPD	139.98	120.91	16,924	0.04%	1.21%	0.00%	6.49%	0.00%
Amgen Inc	AMGN	537.53	282.87	152,052	0.40%	3.18%	0.01%	4.81%	0.02%
Apple Inc	AAPL	15,115.82	237.33	3,587,438	9.37%	0.42%	0.04%	14.22%	1.33%
Autodesk Inc	ADSK	215.00	291.90	62,759	0.16%			12.84%	0.02%
Cintas Corp	CTAS	403.30	225.79	91,061	0.24%	0.69%	0.00%	12.00%	0.03%
Comcast Corp	CMCSA	3,817.10	43.19	164,860	0.43%	2.87%	0.01%	8.63%	0.04%
Molson Coors Beverage Co	TAP	193.57	62.06	12,013	0.03%	2.84%	0.00%	4.90%	0.00%
KLA Corp	KLAC	133.76	647.03	86,547	0.23%	1.05%	0.00%	12.54%	0.03%
Marriott International Inc/MD	MAR	277.89	289.09	80,336	0.21%	0.87%	0.00%	5.20%	0.01%
Fiserv Inc	FI	568.92	220.96	125,708	0.33%			11.99%	0.04%
McCormick & Co Inc/MD	MKC	252.19	78.41	19,774	0.05%	2.30%	0.00%	6.92%	0.00%
PACCAR Inc	PCAR	524.30	117.00	61,343	0.16%	1.03%	0.00%	0.48%	0.00%
Costco Wholesale Corp	COST	443.07	971.88	430,614	1.12%	0.48%	0.01%	9.88%	0.11%
Stryker Corp	SYK	381.22	392.15	149,494	0.39%	0.82%	0.00%	12.22%	0.05%
Tyson Foods Inc	TSN	285.86	64.50	18,438	0.05%	3.10%	0.00%	18.97%	0.01%
Lamb Weston Holdings Inc	LW	142.60	77.24	11,014	0.03%	1.86%	0.00%	0.57%	0.00%
Applied Materials Inc	AMAT	824.40	174.71	144,032	0.38%	0.92%	0.00%	11.58%	0.04%
Cardinal Health Inc	CAH	242.01	122.24	29,583	0.08%	1.65%	0.00%	7.60%	0.01%
Cincinnati Financial Corp	CINF	156.32	159.83	24,984	0.07%	2.03%	0.00%	8.30%	0.01%
Paramount Global	PARA	626.27	10.85	6,795		1.84%		45.00%	
DR Horton Inc	DHI	321.17	168.78	54,207	0.14%	0.95%	0.00%	9.24%	0.01%
Electronic Arts Inc	EA	262.27	163.67	42,926	0.11%	0.46%	0.00%	12.85%	0.01%
Erie Indemnity Co	ERIE	46.19	440.56	20,349		1.16%			
Fair Isaac Corp	FICO	24.35	2,375.03	57,827				30.00%	
Fastenal Co	FAST	572.89	83.56	47,870	0.12%	1.87%	0.00%	7.79%	0.01%
M&T Bank Corp	MTB	165.92	218.64	36,277	0.09%	2.47%	0.00%	5.10%	0.00%
Xcel Energy Inc	XEL	595.31	72.56	43,196	0.11%	3.02%	0.00%	7.36%	0.01%
Fifth Third Bancorp	FITB	670.54	48.06	32,226		3.08%		25.00%	
Gilead Sciences Inc	GILD	1,246.27	92.58	115,379	0.30%	3.33%	0.01%	16.28%	0.05%
Hasbro Inc	HAS	139.50	65.15	9,089		4.30%		27.48%	
Huntington Bancshares Inc/OH	HBAN	1,452.81	18.01	26,165	0.07%	3.44%	0.00%	3.45%	0.00%
Welltower Inc	WELL	622.69	138.18	86,043	0.22%	1.94%	0.00%	15.72%	0.04%
Biogen Inc	BIIB	145.72	160.63	23,407	0.06%			4.43%	0.00%
Northern Trust Corp	NTRS	198.22	111.16	22,034	0.06%	2.70%	0.00%	12.04%	0.01%
Packaging Corp of America	PKG	89.80	248.85	22,348	0.06%	2.01%	0.00%	7.85%	0.00%
Paychex Inc	PAYX	359.90	146.27	52,642	0.14%	2.68%	0.00%	6.99%	0.01%
QUALCOMM Inc	QCOM	1,111.00	158.53	176,127	0.46%	2.14%	0.01%	7.73%	0.04%
Ross Stores Inc	ROST	331.76	154.87	51,380		0.95%		98.30%	
IDEXX Laboratories Inc	IDXX	81.88	421.75	34,535	0.09%			9.75%	0.01%
Starbucks Corp	SBUX	1,133.80	102.46	116,169		2.38%			
KeyCorp	KEY	991.28	19.48	19,310	0.05%	4.21%	0.00%	20.00%	0.01%
Fox Corp	FOXA	221.16	47.12	10,421	0.03%	1.15%	0.00%	9.54%	0.00%
Fox Corp	FOX	235.58	44.73	10,538	0.03%	1.21%	0.00%	9.54%	0.00%
State Street Corp	STT	293.15	98.51	28,878	0.08%	3.09%	0.00%	10.37%	0.01%

P

		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Norwegian Cruise Line Holdings Lt	NCLH	439.71	26.89	11,824				58.74%	
US Bancorp	USB	1,560.03	53.29	83,134	0.22%	3.75%	0.01%	8.51%	0.02%
A O Smith Corp	AOS	119.11	74.49	8,873		1.83%			
Gen Digital Inc	GEN	616.20	30.85	19,010	0.05%	1.62%	0.00%	6.77%	0.00%
T Rowe Price Group In	TROW	222.16	123.84	27,512	0.07%	4.01%	0.00%	8.17%	0.01%
Waste Management Inc	WM	401.37	228.22	91,600	0.24%	1.31%	0.00%	14.57%	0.03%
Constellation Brands In	STZ	181.54	240.95	43,741	0.11%	1.68%	0.00%	10.88%	0.01%
Invesco Ltd	IVZ	449.44	18.09	8,130	0.02%	4.53%	0.00%	12.44%	0.00%
Intuit Inc	INTU	279.92	641.73	179,631	0.47%	0.65%	0.00%	18.41%	0.09%
Morgan Stanley	MS	1,611.04	131.61	212,028	0.55%	2.81%	0.02%	10.16%	0.06%
Microchip Technology In	MCHP	537.01	68.17	36,608		2.67%		-19.88%	
Crowdstrike Holdings Inc	CRWD	233.85	345.97	80,906				54.97%	
Chubb Ltd	CB	403.10	288.73	116,386	0.30%	1.26%	0.00%	1.99%	0.01%
Hologic Inc	HOLX	226.94	79.50	18,042	0.05%			7.42%	0.00%
Citizens Financial Group In	CFG	440.70	48.14	21,215		3.49%			
Jabil Inc	JBL	112.84	135.83	15,327	0.04%	0.24%	0.00%	10.82%	0.00%
O'Reilly Automotive In	ORLY	57.73	1,243.22	71,772	0.19%			9.11%	0.02%
Allstate Corp/The	ALL	264.80	207.39	54,918		1.77%		175.00%	
Equity Residential	EQR	379.43	76.66	29,087	0.08%	3.52%	0.00%	3.08%	0.00%
BorgWarner Inc	BWA	218.70	34.21	7,482		1.29%		-1.00%	
Keurig Dr Pepper Inc	KDP	1,356.45	32.65	44,288	0.12%	2.82%	0.00%	6.73%	0.01%
Host Hotels & Resorts Inc	HST	699.03	18.42	12,876		4.34%		-1.49%	
Incyte Corp	INCY	192.65	74.59	14,370				39.79%	
Simon Property Group In	SPG	326.27	183.60	59,903	0.16%	4.58%	0.01%	1.34%	0.00%
Eastman Chemical Cc	EMN	115.91	104.72	12,138	0.03%	3.09%	0.00%	5.72%	0.00%
AvalonBay Communities In	AVB	142.24	235.35	33,476	0.09%	2.89%	0.00%	5.41%	0.00%
Prudential Financial Inc	PRU	356.00	129.41	46,070	0.12%	4.02%	0.00%	3.22%	0.00%
United Parcel Service In	UPS	731.37	135.72	99,261	0.26%	4.80%	0.01%	1.72%	0.00%
Walgreens Boots Alliance In	WBA	864.62	9.02	7,799		11.09%		-21.19%	
STERIS PLC	STE	98.71	219.06	21,623		1.04%			
McKesson Corp	MCK	126.94	627.79	79,692	0.21%	0.45%	0.00%	13.43%	0.03%
Lockheed Martin Corp	LMT	237.04	526.11	124,707	0.33%	2.51%	0.01%	2.61%	0.01%
Cencora Inc	COR	193.28	251.55	48,620	0.13%	0.87%	0.00%	8.78%	0.01%
Capital One Financial Corp	COF	381.51	192.01	73,254	0.19%	1.25%	0.00%	14.13%	0.03%
The Campbell's Company	CPB	297.62	46.20	13,750	0.04%	3.20%	0.00%	5.71%	0.00%
Waters Corp	WAT	59.38	384.72	22,843	0.06%			6.20%	0.00%
Palantir Technologies In	PLTR	2,180.65	67.08	146,278				36.08%	
Nordson Corp	NDSN	57.18	260.99	14,924		1.20%			
Dollar Tree Inc	DLTR	214.99	71.27	15,322	0.04%			6.86%	0.00%
Darden Restaurants Inc	DRI	117.50	176.27	20,712	0.05%	3.18%	0.00%	9.75%	0.01%
Evergy Inc	EVRG	229.75	64.63	14,848	0.04%	4.13%	0.00%	5.35%	0.00%
Match Group Inc	MTCH	251.09	32.74	8,221				34.93%	
Domino's Pizza Inc	DPZ	34.53	476.19	16,444	0.04%	1.27%	0.00%	11.05%	0.00%
NVR Inc	NVR	3.06	9,235.58	28,297	0.07%			9.43%	0.01%
NetApp Inc	NTAP	203.31	122.64	24,933	0.07%	1.70%	0.00%	7.66%	0.00%
Old Dominion Freight Line In	ODFL	213.50	225.14	48,067	0.13%	0.46%	0.00%	8.80%	0.01%
DaVita Inc	DVA	82.00	166.17	13,626	0.04%			17.90%	0.01%
Hartford Financial Services Group Inc/Th	HIG	289.89	122.79	35,596	0.09%	1.69%	0.00%	12.07%	0.01%
Iron Mountain Inc	IRM	293.46	123.67	36,292	0.09%	2.31%	0.00%	4.00%	0.00%
Estee Lauder Cos Inc/Th	EL	233.44	72.12	16,835	0.04%	1.94%	0.00%	10.56%	0.00%
Cadence Design Systems In	CDNS	274.26	306.81	84,147	0.22%			15.76%	0.03%
Tyler Technologies In	TYL	42.80	629.17	26,928					
Universal Health Services Inc	UHS	58.71	205.00	12,037		0.39%		23.30%	
Skyworks Solutions In	SWKS	159.92	87.59	14,007	0.04%	3.20%	0.00%	15.09%	0.01%
Quest Diagnostics Inc	DGX	111.62	162.66	18,155	0.05%	1.84%	0.00%	6.28%	0.00%
Rockwell Automation In	ROK	112.90	295.14	33,320		1.78%			
Kraft Heinz Co/The	KHC	1,209.17	31.97	38,657	0.10%	5.00%	0.01%	1.87%	0.00%
American Tower Corp	AMT	467.29	209.00	97,663	0.25%	3.10%	0.01%	13.39%	0.03%
Regeneron Pharmaceuticals In	REGN	108.07	750.22	81,078				29.39%	
Amazon.com In	AMZN	10,515.01	207.89	2,185,966				35.35%	
Jack Henry & Associates Inc	JKHY	72.96	175.63	12,814	0.03%	1.25%	0.00%	9.30%	0.00%
Ralph Lauren Corp	RL	40.22	231.40	9,306	0.02%	1.43%	0.00%	11.25%	0.00%
BXP Inc	BXP	158.11	81.99	12,963	0.03%	4.78%	0.00%	0.65%	0.00%
Amphenol Corp	APH	1,205.61	72.65	87,588	0.23%	0.91%	0.00%	18.77%	0.04%
Howmet Aerospace Inc	HWM	406.26	118.38	48,093		0.27%		27.36%	
Valero Energy Corp	VLO	316.59	139.08	44,031		3.08%		-19.65%	
Synopsys Inc	SNPS	153.61	558.49	85,792	0.22%			12.82%	0.03%
CH Robinson Worldwide In	CHRW	118.21	105.58	12,480	0.03%	2.35%	0.00%	19.90%	0.01%
Accenture PLC	ACN	626.38	362.37	226,983	0.59%	1.63%	0.01%	8.18%	0.05%
TransDigm Group In	TDG	56.23	1,252.97	70,455	0.18%			16.05%	0.03%
Yum! Brands In	YUM	279.07	138.27	38,587	0.10%	1.94%	0.00%	9.89%	0.01%
Prologis Inc	PLD	925.91	116.78	108,128	0.28%	3.29%	0.01%	3.56%	0.01%
FirstEnergy Corp	FE	576.32	42.55	24,522	0.06%	4.00%	0.00%	6.31%	0.00%
VeriSign Inc	VRSN	96.10	187.18	17,988					
Quanta Services Inc	PWR	147.61	344.52	50,855		0.12%			
Henry Schein In	HSIC	124.68	77.05	9,607	0.03%			8.39%	0.00%
Ameren Corp	AEE	266.51	94.39	25,156	0.07%	2.84%	0.00%	6.25%	0.00%
ANSYS Inc	ANSS	87.45	351.10	30,704	0.08%			11.53%	0.01%
FactSet Research Systems In	FDS	37.99	490.67	18,640	0.05%	0.85%	0.00%	9.00%	0.00%
NVIDIA Corp	NVDA	24,490.00	138.25	3,385,743		0.03%		49.81%	
Cognizant Technology Solutions Cor	CTSH	495.82	80.49	39,909	0.10%	1.49%	0.00%	6.40%	0.01%
Intuitive Surgical Inc	ISRG	356.18	542.00	193,049	0.50%			18.85%	0.09%
Take-Two Interactive Software In	TTWO	175.63	188.38	33,085				60.59%	
Republic Services Inc	RSG	313.15	218.30	68,361	0.18%	1.06%	0.00%	11.44%	0.02%
eBay Inc	EBAY	479.00	63.29	30,316	0.08%	1.71%	0.00%	9.93%	0.01%
Goldman Sachs Group Inc/Th	GS	313.91	605.57	190,094	0.50%	1.98%	0.01%	14.95%	0.07%
SBA Communications Cor	SBAC	107.52	226.25	24,327	0.06%	1.73%	0.00%	17.77%	0.01%
Sempra	SRE	633.40	93.67	59,331	0.15%	2.65%	0.00%	6.46%	0.01%
Moody's Corp	MCO	181.20	499.98	90,596		0.68%			
ON Semiconductor Cor	ON	425.80	71.12	30,283				-1.44%	
Booking Holdings In	BKNG	33.10	5,201.98	172,168	0.45%	0.67%	0.00%	15.98%	0.07%
F5 Inc	FFIV	58.61	250.35	14,674	0.04%			6.72%	0.00%
Akamai Technologies In	AKAM	150.23	94.02	14,124	0.04%			7.09%	0.00%
Charles River Laboratories International In	CRL	51.14	199.06	10,179	0.03%			4.06%	0.00%
MarketAxess Holdings In	MKTX	37.70	258.69	9,754	0.03%	1.14%	0.00%	3.02%	0.00%
Devon Energy Corp	DVN	656.90	37.95	24,929		2.32%			
Bio-Techne Corp	TECH	158.89	75.36	11,974		0.42%			

P

		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Alphabet Inc	GOOGL	5,843.00	168.95	987,175	2.58%	0.47%	0.01%	16.07%	0.41%
Teleflex Inc	TFX	46.44	192.85	8,957	0.02%	0.71%	0.00%	7.50%	0.00%
Netflix Inc	NFLX	427.46	886.81	379,074				35.22%	
Allegion plc	ALLE	86.93	140.84	12,243	0.03%	1.36%	0.00%	8.33%	0.00%
Agilent Technologies Inc	A	287.33	137.97	39,643	0.10%	0.72%	0.00%	6.83%	0.01%
Warner Bros Discovery Inc	WBD	2,453.17	10.48	25,709				29.09%	
Elevance Health Inc	ELV	231.92	406.96	94,383	0.25%	1.60%	0.00%	11.90%	0.03%
Trimble Inc	TRMB	244.21	72.97	17,820					
CME Group Inc	CME	360.36	238.00	85,765	0.22%	1.93%	0.00%	3.55%	0.01%
Juniper Networks Inc	JNPR	331.09	35.70	11,820	0.03%	2.46%	0.00%	3.56%	0.00%
DTE Energy Co	DTE	206.93	125.78	26,027	0.07%	3.24%	0.00%	10.06%	0.01%
Nasdaq Inc	NDAQ	574.76	82.99	47,699	0.12%	1.16%	0.00%	9.60%	0.01%
Celanese Corp	CE	109.31	73.21	8,003	0.02%	3.82%	0.00%	9.15%	0.00%
Philip Morris International Inc	PM	1,554.83	133.06	206,886	0.54%	4.06%	0.02%	10.00%	0.05%
Salesforce Inc	CRM	956.00	329.99	315,470	0.82%	0.48%	0.00%	17.52%	0.14%
Ingersoll Rand Inc	IR	403.01	104.17	41,982	0.11%	0.08%	0.00%	17.00%	0.02%
Huntington Ingalls Industries Inc	HII	39.13	197.92	7,744	0.02%	2.73%	0.00%	7.36%	0.00%
Roper Technologies Inc	ROP	107.23	566.44	60,739		0.58%			
MetLife Inc	MET	692.42	88.23	61,092	0.16%	2.47%	0.00%	13.14%	0.02%
Tapestry Inc	TPR	233.04	62.28	14,513	0.04%	2.25%	0.00%	7.34%	0.00%
CSX Corp	CSX	1,928.42	36.55	70,484	0.18%	1.31%	0.00%	7.56%	0.01%
Edwards Lifesciences Corp	EW	589.80	71.35	42,082	0.11%			6.86%	0.01%
Ameriprise Financial Inc	AMP	97.01	573.97	55,683	0.15%	1.03%	0.00%	16.72%	0.02%
Zebra Technologies Corp	ZBRA	51.58	407.00	20,993					
Zimmer Biomet Holdings In	ZBH	199.07	112.10	22,316	0.06%	0.86%	0.00%	6.50%	0.00%
CBRE Group Inc	CBRE	306.02	139.99	42,839					
Camden Property Trus	CPT	106.68	125.80	13,421	0.04%	3.28%	0.00%	2.11%	0.00%
Mastercard Inc	MA	910.77	532.94	485,384	1.27%	0.50%	0.01%	14.68%	0.19%
CarMax Inc	KMX	154.92	83.97	13,009	0.03%			17.91%	0.01%
Intercontinental Exchange Inc	ICE	574.18	160.96	92,419	0.24%	1.12%	0.00%	11.26%	0.03%
Smurfit WestRock PLC	SW	520.16	55.02	28,619		2.20%		-1.71%	
Fidelity National Information Services In	FIS	538.35	85.30	45,922		1.69%		22.90%	
Chipotle Mexican Grill Inc	CMG	1,362.59	61.52	83,827				22.88%	
Wynn Resorts Ltd	WYNN	109.81	94.38	10,364		1.06%		-13.11%	
Live Nation Entertainment Inc	LYV	232.35	138.25	32,123				32.27%	
Assurant Inc	AIZ	51.29	227.10	11,647		1.41%			
NRG Energy Inc	NRG	202.57	101.61	20,583	0.05%	1.60%	0.00%	9.40%	0.01%
Regions Financial Corp	RF	908.86	27.01	24,548	0.06%	3.70%	0.00%	5.52%	0.00%
Monster Beverage Corp	MNST	972.52	55.13	53,615	0.14%			9.94%	0.01%
Mosaic Co/The	MOS	317.65	26.46	8,405		3.17%		-22.38%	
Baker Hughes Co	BKR	989.53	43.95	43,490		1.91%		25.86%	
Expedia Group Inc	EXPE	122.82	184.62	22,676				22.64%	
CF Industries Holdings Inc	CF	174.02	89.66	15,603		2.23%		-6.90%	
Leidos Holdings Inc	LDOS	133.43	165.40	22,070	0.06%	0.97%	0.00%	15.41%	0.01%
APA Corp	APA	369.95	22.65	8,379		4.42%		-10.77%	
Alphabet Inc	GOOG	5,534.00	170.49	943,492	2.46%	0.47%	0.01%	16.07%	0.40%
First Solar Inc	FSLR	107.06	199.27	21,333				41.38%	
Discover Financial Services	DFS	251.07	182.43	45,803	0.12%	1.53%	0.00%	11.74%	0.01%
Visa Inc	V	1,728.11	315.08	544,491	1.42%	0.75%	0.01%	12.50%	0.18%
Mid-America Apartment Communities In	MAA	116.88	164.16	19,187	0.05%	3.58%	0.00%	0.79%	0.00%
Xylem Inc/NY	XYL	242.94	126.75	30,793		1.14%			
Marathon Petroleum Corp	MPC	321.39	156.15	50,185		2.33%		-13.05%	
Advanced Micro Devices Inc	AMD	1,622.81	137.18	222,609				41.66%	
Tractor Supply Co	TSCO	106.84	283.67	30,307	0.08%	1.55%	0.00%	6.20%	0.00%
ResMed Inc	RMD	146.80	249.02	36,555	0.10%	0.85%	0.00%	12.61%	0.01%
Mettler-Toledo International Inc	MTD	21.10	1,251.20	26,404	0.07%			8.25%	0.01%
Jacobs Solutions Inc	J	123.97	141.23	17,508		0.82%			
Copart Inc	CPRT	963.53	63.39	61,078					
VICI Properties Inc	VICI	1,043.14	32.61	34,017	0.09%	5.31%	0.00%	2.72%	0.00%
Fortinet Inc	FTNT	766.45	95.05	72,851	0.19%			17.59%	0.03%
Albemarle Corp	ALB	117.54	107.70	12,659		1.50%		23.74%	
Moderna Inc	MRNA	384.82	43.06	16,570	0.04%			17.67%	0.01%
Essex Property Trust Inc	ESS	64.27	310.46	19,952	0.05%	3.16%	0.00%	2.91%	0.00%
CoStar Group Inc	CSGP	409.96	81.34	33,346					
Realty Income Corp	O	875.21	57.63	50,435	0.13%	5.49%	0.01%	3.78%	0.00%
Westinghouse Air Brake Technologies Corp	WAB	171.89	200.62	34,484	0.09%	0.40%	0.00%	18.16%	0.02%
Pool Corp	POOL	38.06	377.09	14,350	0.04%	1.27%	0.00%	0.20%	0.00%
Western Digital Corp	WDC	345.71	72.99	25,233				-10.00%	
PepsiCo Inc	PEP	1,371.99	163.45	224,252	0.59%	3.32%	0.02%	6.26%	0.04%
TE Connectivity PLC	TEL	299.16	151.12	45,209	0.12%	1.72%	0.00%	4.55%	0.01%
Diamondback Energy Inc	FANG	291.99	177.59	51,854		2.03%			
Palo Alto Networks Inc	PANW	328.10	387.82	127,244	0.33%			13.41%	0.04%
ServiceNow Inc	NOW	206.00	1,049.44	216,185				25.00%	
Church & Dwight Co Inc	CHD	245.00	110.13	26,982	0.07%	1.03%	0.00%	7.39%	0.01%
Federal Realty Investment Trus	FRT	84.96	116.65	9,911	0.03%	3.77%	0.00%	4.26%	0.00%
Amentum Holdings In	AMTM	243.29	24.35	5,924					
MGM Resorts International	MGM	297.74	38.34	11,415	0.03%			5.61%	0.00%
American Electric Power Co Inc	AEP	532.57	99.86	53,182	0.14%	3.73%	0.01%	6.40%	0.01%
Invitation Homes Inc	INVH	612.61	34.25	20,982	0.05%	3.27%	0.00%	3.63%	0.00%
PTC Inc	PTC	120.13	200.06	24,033	0.06%			16.59%	0.01%
JB Hunt Transport Services Inc	JBHT	100.83	189.11	19,068	0.05%	0.91%	0.00%	11.01%	0.01%
Lam Research Corp	LRCX	1,286.69	73.88	95,060	0.25%	1.25%	0.00%	15.78%	0.04%
Mohawk Industries Inc	MHK	63.12	138.83	8,763	0.02%			2.71%	0.00%
Pentair PLC	PNR	165.23	108.99	18,009	0.05%	0.84%	0.00%	12.71%	0.01%
GE HealthCare Technologies Inc	GEHC	456.87	83.22	38,021	0.10%	0.17%	0.00%	10.24%	0.01%
Vertex Pharmaceuticals Inc	VRTX	257.53	468.13	120,557	0.31%			12.20%	0.04%
Amcor PLC	AMCR	1,445.34	10.64	15,378	0.04%	4.79%	0.00%	7.52%	0.00%
Meta Platforms Inc	META	2,180.00	574.32	1,252,018		0.35%		21.60%	
T-Mobile US Inc	TMUS	1,160.49	246.94	286,571	0.75%	1.43%	0.01%	5.00%	0.04%
United Rentals Inc	URI	65.62	866.00	56,829	0.15%	0.75%	0.00%	7.62%	0.01%
Honeywell International Inc	HON	650.25	232.93	151,462	0.40%	1.94%	0.01%	7.58%	0.03%
Alexandria Real Estate Equities Inc	ARE	174.76	110.23	19,264	0.05%	4.72%	0.00%	2.82%	0.00%
Delta Air Lines Inc	DAL	645.28	63.82	41,182	0.11%	0.94%	0.00%	8.76%	0.01%
Seagate Technology Holdings PLC	STX	211.53	101.33	21,434		2.84%		-11.00%	
United Airlines Holdings Inc	UAL	328.80	96.83	31,838	0.08%			9.00%	0.01%
News Corp	NWS	190.00	32.09	6,097		0.62%			
Centene Corp	CNC	504.87	60.00	30,292	0.08%			6.35%	0.01%

P

		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Martin Marietta Materials Inc	MLM	61.12	599.21	36,623	0.10%	0.53%	0.00%	8.39%	0.01%
Teradyne Inc	TER	162.86	110.00	17,915	0.05%	0.44%	0.00%	14.60%	0.01%
PayPal Holdings Inc	PYPL	1,002.54	86.77	86,990	0.23%			14.76%	0.03%
Tesla Inc	TSLA	3,210.06	345.16	1,107,984	2.89%			1.00%	0.03%
Blackrock Inc	BLK	148.13	1,022.80	151,506	0.40%	1.99%	0.01%	12.51%	0.05%
Arch Capital Group Ltd	ACGL	376.24	100.72	37,895	0.10%			4.00%	0.00%
KKR & Co Inc	KKR	888.23	162.87	144,666		0.43%		29.00%	
Dow Inc	DOW	700.09	44.21	30,951		6.33%		-4.83%	
Everest Group Ltd	EG	42.98	387.56	16,657	0.04%	2.06%	0.00%	0.81%	0.00%
Teledyne Technologies In	TDY	46.60	485.26	22,614	0.06%			7.41%	0.00%
GE Vernova Inc	GEV	275.65	334.12	92,101				81.12%	
News Corp	NWSA	378.91	29.35	11,121		0.68%			
Exelon Corp	EXC	1,004.83	39.56	39,751	0.10%	3.84%	0.00%	5.48%	0.01%
Global Payments Inc	GPN	254.49	118.96	30,275	0.08%	0.84%	0.00%	9.02%	0.01%
Crown Castle Inc	CCI	434.60	106.25	46,176	0.12%	5.89%	0.01%	2.12%	0.00%
Aptiv PLC	APTV	235.04	55.53	13,052	0.03%			13.28%	0.00%
Align Technology In	ALGN	74.65	232.77	17,377	0.05%			5.19%	0.00%
Kenvue Inc	KVUE	1,917.26	24.08	46,168	0.12%	3.41%	0.00%	13.58%	0.02%
Targa Resources Corp	TRGP	218.06	204.30	44,550		1.47%		27.23%	
Bunge Global SA	BG	139.63	89.74	12,530		3.03%		-8.88%	
Deckers Outdoor Corp	DECK	151.92	195.96	29,771	0.08%			10.50%	0.01%
LKQ Corp	LKQ	259.96	39.29	10,214		3.05%			
Zoetis Inc	ZTS	451.17	175.25	79,067	0.21%	0.99%	0.00%	9.58%	0.02%
Digital Realty Trust Inc	DLR	331.71	195.69	64,913	0.17%	2.49%	0.00%	4.12%	0.01%
Equinix Inc	EQIX	96.49	981.48	94,701	0.25%	1.74%	0.00%	16.07%	0.04%
Las Vegas Sands Corp	LVS	725.03	53.06	38,470		1.51%			
Molina Healthcare Inc	MOH	57.20	297.90	17,040	0.04%			11.73%	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] Source: Bloomberg Professional as of November 29, 202
[5] Source: Bloomberg Professional as of November 29, 202
[6] Equals [4] x [5]
[7] Equals weight in the S&P 500
[8] Source: Bloomberg Professional as of November 29, 202
[9] Equals [7] x [8]
[10] Source: Bloomberg Professional, as of November 29, 202
[11] Equals [7] x [10]

P

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] 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	0.75
NiSource Inc.	NI	0.85	0.85	NMF	NMF	0.60	0.50	0.55	0.85	0.85	0.85	0.90	0.76
Northwest Natural Gas Company	NWN	0.65	0.70	0.65	0.65	0.70	0.60	0.60	0.80	0.85	0.80	0.80	0.71
ONE Gas, Inc.	OGS				0.70	0.70	0.65	0.65	0.80	0.80	0.80	0.80	0.74
Spire, Inc.	SR	0.65	0.70	0.70	0.70	0.70	0.65	0.65	0.85	0.85	0.85	0.85	0.74
Eversource Energy	ES			0.75	0.70	0.65	0.60	0.55	0.90	0.90	0.90	0.90	0.76
American States Water Company	AWR	0.65	0.70	0.70	0.75	0.80	0.70	0.65	0.65	0.65	0.65	0.70	0.69
California Water Service Group	CWT	0.60	0.70	0.75	0.75	0.80	0.70	0.70	0.65	0.70	0.70	0.70	0.70
Middlesex Water Company	MSEX	0.75	0.70	0.70	0.75	0.80	0.75	0.75	0.75	0.70	0.70	0.75	0.74
SJW Group	SJW	0.85	0.85	0.75	0.75	0.70	0.60	0.60	0.85	0.80	0.80	0.85	0.76
Essential Utilities, Inc.	WTRG	0.60	0.70	0.75	0.70	0.75	0.70	0.65	0.95	0.95	0.95	1.00	0.79
Mean (Natural Gas/Electric)		0.74	0.76	0.73	0.69	0.68	0.60	0.60	0.83	0.84	0.83	0.85	0.74
Mean (Water)		0.69	0.73	0.73	0.74	0.77	0.69	0.67	0.77	0.76	0.76	0.80	0.74
Mean		0.71	0.74	0.73	0.72	0.72	0.64	0.63	0.80	0.80	0.80	0.83	0.74

Notes:
[1] Value Line, December 26, 2013
[2] Value Line, December 31, 2014
[3] Value Line, December 30, 2015
[4] Value Line, December 29, 2016
[5] Value Line, December 28, 2017
[6] Value Line, December 27, 2018
[7] Value Line, December 26, 2019
[8] Value Line, December 30, 2020
[9] Value Line, December 29, 2021
[10] Value Line, December 30, 2022
[11] Value Line, December 29, 2023
[11] Average ([1] - [11])

P

Ms. Malki Growth Rate Estimates

As Filed

Company	Ticker	[1] EPS	[2] DPS	[3] BVPS	[4] Average	[5] Projected GDP Growth	[6] DCF Growth
		Projected					
				Weight:	80%	20%	
Data through June 30, 2024							
American States Water Co	AWR	6.50%	8.50%	11.50%	8.83%	3.80%	7.83%
American Water Works Company Inc.	AWK	4.50%	8.50%	6.50%	6.50%	3.80%	5.96%
California Water Service Group	CWT	11.50%	6.00%	4.50%	7.33%	3.80%	6.63%
Essential Utilities Inc.	WTRG	7.00%	8.00%	4.50%	6.50%	3.80%	5.96%
Middlesex Water Company	MSEX	6.50%	5.00%	1.00%	4.17%	3.80%	4.09%
SJW Group	SJW	6.50%	4.50%	3.50%	4.83%	3.80%	4.63%
Average		**7.08%**	**6.75%**	**5.25%**	**6.36%**	**3.80%**	**5.85%**

Notes:
[1] The Value Line Investment Survey, dated: July 5, 2024
[2] The Value Line Investment Survey, dated: July 5, 2024
[3] The Value Line Investment Survey, dated: July 5, 2024
[4] Average of [1], [2], [3]
[5] Congress Budget Office, Budget Economic Outlook
[6] Equals ([5] x 20%) + ([4] x 80%)

P

Ms. Malki Growth Rate Estimates

Updated to Reflect Most Current Data as of the Filing of Ms. Malki's Testimony

Company	Ticker	[1] Projected EPS	[2] Projected DPS	[3] Projected BVPS	[4] Average	[5] Projected GDP Growth	[6] DCF Growth
				Weight:	80%	20%	
Data through September 30, 2024							
American States Water Co	AWR	6.50%	8.50%	11.50%	8.83%	3.80%	7.83%
American Water Works Company Inc.	AWK	4.50%	8.50%	6.50%	6.50%	3.80%	5.96%
California Water Service Group	CWT	13.00%	6.00%	6.50%	8.50%	3.80%	7.56%
Essential Utilities Inc.	WTRG	7.00%	8.00%	4.50%	6.50%	3.80%	5.96%
Middlesex Water Company	MSEX	7.00%	5.00%	1.00%	4.33%	3.80%	4.23%
SJW Group	SJW	6.50%	4.50%	3.50%	4.83%	3.80%	4.63%
Average		**7.42%**	**6.75%**	**5.58%**	**6.58%**	**3.80%**	**6.03%**

Notes:
[1] The Value Line Investment Survey, dated October 4, 2024.
[2] The Value Line Investment Survey, dated October 4, 2024.
[3] The Value Line Investment Survey, dated October 4, 2024.
[4] Average of [1], [2], [3]
[5] Congress Budget Office, Budget Economic Outlook
[6] Equals ([5] x 20%) + ([4] x 80%)

P

Ms. Malki Growth Rate Estimates

Updated to Reflect Most Current Data as of the Filing of Ms. Malki's Testimony & Value Line Projected EPS Growth Rates

Company	Ticker	[1] Projected EPS	[2] Projected GDP Growth	[3] DCF Growth
	Weight:	80%	20%	
Data through September 30, 2024				
American States Water Co	AWR	6.50%	3.80%	5.96%
American Water Works Company Inc.	AWK	4.50%	3.80%	4.36%
California Water Service Group	CWT	13.00%	3.80%	11.16%
Essential Utilities Inc.	WTRG	7.00%	3.80%	6.36%
Middlesex Water Company	MSEX	7.00%	3.80%	6.36%
SJW Group	SJW	6.50%	3.80%	5.96%
Average		**7.42%**	**3.80%**	**6.69%**

Notes:
[1] The Value Line Investment Survey, dated October 4, 2024.
[2] Congress Budget Office, Budget Economic Outlook
[3] Equals ([5] x 20%) + ([4] x 80%)

P

Ms. Malki Growth Rate Estimates

Updated to Reflect Most Current Data as of the Filing of Ms. Malki's Testimony, Value Line Projected EPS Growth Rates & Morningstar GDP Growth Rate

Company	Ticker	[1] Projected EPS	[2] Projected GDP Growth	[3] DCF Growth
	Weight:	80%	20%	
Data through September 30, 2024				
American States Water Co	AWR	6.50%	5.51%	6.30%
American Water Works Company Inc.	AWK	4.50%	5.51%	4.70%
California Water Service Group	CWT	13.00%	5.51%	11.50%
Essential Utilities Inc.	WTRG	7.00%	5.51%	6.70%
Middlesex Water Company	MSEX	7.00%	5.51%	6.70%
SJW Group	SJW	6.50%	5.51%	6.30%
Average		**7.42%**	**5.51%**	**7.04%**

Notes:
[1] The Value Line Investment Survey, dated October 4, 2024.
[2] Schedule AEB-R-9
[3] Equals ([5] x 20%) + ([4] x 80%)

P

Ms. Malki's DCF Analysis
Stock Prices

As Filed

		[1]	[2]	[3]	[4]	[5]	[6]	[7]
		April 2024		May 2024		June 2024		
Company	Ticker	Max Stock Price	Min Stock Price	Max Stock Price	Min Stock Price	Max Stock Price	Min Stock Price	Aveage Stock Price
American States Water Co	AWR	$ 69.97	$ 68.76	$ 76.11	$ 74.74	$ 72.14	$ 70.95	$ 72.11
American Water Works Company Inc.	AWK	$120.09	$117.97	$131.72	$129.46	$130.85	$128.71	$ 126.47
California Water Service Group	CWT	$ 46.41	$ 45.40	$ 51.92	$ 50.86	$ 48.79	$ 47.83	$ 48.54
Essential Utilities Inc.	WTRG	$ 36.08	$ 35.39	$ 38.59	$ 37.89	$ 37.59	$ 37.01	$ 37.09
Middlesex Water Company	MSEX	$ 49.16	$ 47.84	$ 55.72	$ 54.04	$ 53.03	$ 51.73	$ 51.92
SJW Group	SJW	$ 54.62	$ 53.52	$ 57.36	$ 56.29	$ 53.52	$ 52.49	$ 54.63

[1] Schedule KM-d12
[2] Schedule KM-d12
[3] Schedule KM-d12
[4] Schedule KM-d12
[5] Schedule KM-d12
[6] Schedule KM-d12
[7] Average of [1] through [6]

P

Ms. Malki's DCF Analysis
Stock Prices

Updated to Reflect Most Current Data as of the Filing of Ms. Malki's Testimony

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
		April 2024		May 2024		June 2024		July 2024		August 2024		September 2024		
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
American States Water Co	AWR	$ 69.97	$ 68.76	$ 76.11	$ 74.74	$ 72.14	$ 70.95	$ 78.39	$ 76.89	$ 82.46	$ 81.08	$ 83.41	$ 82.03	$ 76.41
American Water Works Company Inc.	AWK	$120.09	$117.97	$131.72	$129.46	$130.85	$128.71	$138.36	$135.74	$143.70	$141.13	$147.43	$145.17	$ 134.19
California Water Service Group	CWT	$ 46.41	$ 45.40	$ 51.92	$ 50.86	$ 48.79	$ 47.83	$ 51.70	$ 50.62	$ 54.28	$ 53.26	$ 54.69	$ 53.76	$ 50.79
Essential Utilities Inc.	WTRG	$ 36.08	$ 35.39	$ 38.59	$ 37.89	$ 37.59	$ 37.01	$ 39.87	$ 39.13	$ 39.93	$ 39.30	$ 39.11	$ 38.48	$ 38.20
Middlesex Water Company	MSEX	$ 49.16	$ 47.84	$ 55.72	$ 54.04	$ 53.03	$ 51.73	$ 60.64	$ 58.60	$ 62.79	$ 61.13	$ 65.22	$ 63.55	$ 56.95
SJW Group	SJW	$ 54.62	$ 53.52	$ 57.36	$ 56.29	$ 53.52	$ 52.49	$ 58.47	$ 57.16	$ 59.38	$ 58.27	$ 59.52	$ 58.54	$ 56.59

[1] - [12] S&P Capital IQ Pro.
[13] Average of [1] through [12]

P

CALCULATION OF LONG-TERM GDP GROWTH RATE

Step 1	
Real GDP ($ Billions) [1]	
1929	$ 1,191.1
2023	$ 22,671.1
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	**5.51%**

Notes:
[1] Bureau of Economic Analysis, November 27, 2024
[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

P

Ms. Malki'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 GDP Gwth Rate	[7] Wgtd. Average Gwth Rate	[8] Cost of Equity
					Weight:	80%	20%		
Data through June 30, 2024									
American States Water Co	AWR	$ 1.66	$ 72.11	2.30%	2.39%	8.83%	3.80%	7.83%	10.22%
American Water Works Company Inc.	AWK	$ 2.78	$ 126.47	2.20%	2.26%	6.50%	3.80%	5.96%	8.22%
California Water Service Group	CWT	$ 1.04	$ 48.54	2.14%	2.21%	7.33%	3.80%	6.63%	8.84%
Essential Utilities Inc.	WTRG	$ 1.19	$ 37.09	3.21%	3.30%	6.50%	3.80%	5.96%	9.26%
Middlesex Water Company	MSEX	$ 1.26	$ 51.92	2.43%	2.48%	4.17%	3.80%	4.09%	6.57%
SJW Group	SJW	$ 1.52	$ 54.63	2.78%	2.85%	4.83%	3.80%	4.63%	7.47%
								Average:	**8.43%**

Ms. Malki Outlier Methodology

Lower Bound:	7.85%
Upper Bound:	9.05%
Cost of Equity / Avg. of Lower & Upper Bound:	8.45%

FERC Outlier Methodology (Lower Bound):

30-Day Average Yield on Moody's Baa-rated Corporate Bonds:	5.46%
Avg. of Ms. Malki'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:	6.58%

FERC Outlier Methodology (Upper Bound):

Median DCF Result:	8.53%
Upper Bound Threshold (200% of Median DCF Result):	17.06%

Averger Excl. FERC Outliers: **8.80%**

Notes:
[1] - [8] Schedule KM-d13

P

Ms. Malki's Two-Step DCF Analysis

Updated to Reflect Data through September 2024

Company	Ticker	[1] 2024 Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected *Value Line* EPS, DPS & BVPS Gwth Rate	[6] Projected GDP Gwth Rate	[7] Wgtd. Average Gwth Rate	[8] Cost of Equity
					Weight:	80%	20%		
Data through September 30, 2024									
American States Water Co	AWR	$ 1.79	$ 76.41	2.34%	2.43%	8.83%	3.80%	7.83%	10.26%
American Water Works Company Inc.	AWK	$ 3.00	$ 134.19	2.24%	2.30%	6.50%	3.80%	5.96%	8.26%
California Water Service Group	CWT	$ 1.12	$ 50.79	2.20%	2.29%	8.50%	3.80%	7.56%	9.85%
Essential Utilities Inc.	WTRG	$ 1.27	$ 38.20	3.32%	3.42%	6.50%	3.80%	5.96%	9.38%
Middlesex Water Company	MSEX	$ 1.32	$ 56.95	2.32%	2.37%	4.33%	3.80%	4.23%	6.59%
SJW Group	SJW	$ 1.60	$ 56.59	2.83%	2.89%	4.83%	3.80%	4.63%	7.52%
								Average:	**8.64%**

Ms. Malki Outlier Methodology

Lower Bound:	7.89%
Upper Bound:	9.62%
Cost of Equity (Avg. of Lower & Upper Bound):	8.75%

FERC Outlier Methodology (Lower Bound):

30-Day Average Yield on Moody's Baa-rated Corporate Bonds:	5.46%
Avg. of Ms. Malki'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:	6.58%

FERC Outlier Methodology (Upper Bound):

Median DCF Result:	8.82%
Upper Bound Threshold (200% of Median DCF Result):	17.65%

Averger Excl. FERC Outliers: **8.64%**

Notes:
[1] *The Value Line Investment Survey, dated October 4, 2024*
[2] Schedule AEB-R-8
[3] Equals [1] / [2]
[4] Equals [3] x (1+[7]x50%)
[5] *The Value Line Investment Survey, dated October 4, 2024*
[6] Congress Budget Office, Budget Economic Outlook
[7] Equals ([5] x 80%) + ([6] x 20%)
[8] Equals [4] + [7]

P

Ms. Malki's Two-Step DCF Analysis

Updated to Reflect Data through September 2024 & Value Line Projected EPS Growth Rates

Company	Ticker	[1] 2024 Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected *Value Line* EPS Gwth Rate	[6] Projected GDP Gwth Rate	[7] Wgtd. Average Gwth Rate	[8] Cost of Equity
					Weight:	80%	20%		
Data through September 30, 2024									
American States Water Co	AWR	$ 1.79	$ 76.41	2.34%	2.41%	6.50%	3.80%	5.96%	8.37%
American Water Works Company Inc.	AWK	$ 3.00	$ 134.19	2.24%	2.28%	4.50%	3.80%	4.36%	6.64%
California Water Service Group	CWT	$ 1.12	$ 50.79	2.20%	2.33%	13.00%	3.80%	11.16%	13.49%
Essential Utilities Inc.	WTRG	$ 1.27	$ 38.20	3.32%	3.43%	7.00%	3.80%	6.36%	9.79%
Middlesex Water Company	MSEX	$ 1.32	$ 56.95	2.32%	2.39%	7.00%	3.80%	6.36%	8.75%
SJW Group	SJW	$ 1.60	$ 56.59	2.83%	2.91%	6.50%	3.80%	5.96%	8.87%
								Average:	**9.32%**

Ms. Malki Outlier Methodology

Lower Bound:	8.56%
Upper Bound:	9.33%
Cost of Equity (Avg. of Lower & Upper Bound):	8.95%

FERC Outlier Methodology (Lower Bound):

30-Day Average Yield on Moody's Baa-rated Corporate Bonds:	5.46%
Avg. of Ms. Malki'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:	6.58%

FERC Outlier Methodology (Upper Bound):

Median DCF Result:	8.81%
Upper Bound Threshold (200% of Median DCF Result):	17.62%

Averger Excl. FERC Outliers: **9.32%**

Notes:
[1] *The Value Line Investment Survey, dated October 4, 2024*
[2] Schedule AEB-R-8
[3] Equals [1] / [2]
[4] Equals [3] x (1+[7]x50%)
[5] *The Value Line Investment Survey, dated October 4, 2024*
[6] Congress Budget Office, Budget Economic Outlook
[7] Equals ([5] x 80%) + ([6] x 20%)
[8] Equals [4] + [7]

P

Ms. Malki's Two-Step DCF Analysis

Updated to Reflect Data through September 2024,
Value Line Projected EPS Growth Rates,
Morningstar GDP Growth Rate

Company	Ticker	[1] 2024 Dividend per Share	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Projected *Value Line* EPS Gwth Rate	[6] *Morningstar* Projected GDP Gwth Rate	[7] Wgtd. Average Gwth Rate	[8] Cost of Equity
					Weight:	80%	20%		
Data through September 30, 2024									
American States Water Co	AWR	$ 1.79	$ 76.41	2.34%	2.42%	6.50%	5.51%	6.30%	8.72%
American Water Works Company Inc.	AWK	$ 3.00	$ 134.19	2.24%	2.29%	4.50%	5.51%	4.70%	6.99%
California Water Service Group	CWT	$ 1.12	$ 50.79	2.20%	2.33%	13.00%	5.51%	11.50%	13.83%
Essential Utilities Inc.	WTRG	$ 1.27	$ 38.20	3.32%	3.44%	7.00%	5.51%	6.70%	10.14%
Middlesex Water Company	MSEX	$ 1.32	$ 56.95	2.32%	2.40%	7.00%	5.51%	6.70%	9.10%
SJW Group	SJW	$ 1.60	$ 56.59	2.83%	2.92%	6.50%	5.51%	6.30%	9.22%
								Average:	**9.67%**

Ms. Malki Outlier Methodology

Lower Bound:	8.91%
Upper Bound:	9.68%
Cost of Equity (Avg. of Lower & Upper Bound):	9.29%

FERC Outlier Methodology (Lower Bound):

30-Day Average Yield on Moody's Baa-rated Corporate Bonds:	5.46%
Avg. of Ms. Malki'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:	6.58%

FERC Outlier Methodology (Upper Bound):

Median DCF Result:	9.16%
Upper Bound Threshold (200% of Median DCF Result):	18.32%

Averger Excl. FERC Outliers: **9.67%**

Notes:
[1] *The Value Line Investment Survey, dated October 4, 2024*
[2] Schedule AEB-R-8
[3] Equals [1] / [2]
[4] Equals [3] x (1+[7]x50%)
[5] *The Value Line Investment Survey, dated October 4, 2024*
[6] Congress Budget Office, Budget Economic Outlook
[7] Equals ([5] x 80%) + ([6] x 20%)
[8] Equals [4] + [7]

P

Ms. Malki's Adjusted CAPM Analysis

Company	Ticker	[1] Risk-Free Rate	[2] Historical Arithmetic Avg. Return on S&P 500 (1926-2023)	[3] Market Risk Premium	[4] *Value Line* Beta	[5] Cost of Equity
American States Water Co	AWR	4.23%	12.04%	7.81%	0.75	10.09%
American Water Works Company Inc.	AWK	4.23%	12.04%	7.81%	1.00	12.04%
California Water Service Group	CWT	4.23%	12.04%	7.81%	0.75	10.09%
Essential Utilities Inc.	WTRG	4.23%	12.04%	7.81%	1.00	12.04%
Middlesex Water Company	MSEX	4.23%	12.04%	7.81%	0.75	10.09%
SJW Group	SJW	4.23%	12.04%	7.81%	0.85	10.87%
					Average:	**10.87%**

[1] 3-month average 30-year Treasury bond yield ending September 30, 2024
[2] Kroll, Cost of Capital Navigator
[3] Equals [2] - [1]
[4] *The Value Line Investment Survey,* dated October 4, 2024.
[5] Equals [1] + ([3] x [4])

P

MARKET RISK PREMIUM DERIVED FROM ANALYSTS' LONG-TERM GROWTH ESTIMATES

Bulkley As-Filed Direct Testimony

Estimated Weighted Average Dividend Yield: 1.72% [1]

Estimated Weighted Average Long-Term Growth Rate: 11.09% [2]

Estimated S&P 500 Required Market Return: **12.91%** [3]

Ms. Bulkley "Adjustments" Corrected

Estimated Weighted Average Dividend Yield: 1.86% [12]

Estimated Weighted Average Long-Term Growth Rate: 10.93% [13]

Estimated S&P 500 Required Market Return: **12.89%** [14]

					Bulkley Direct Testimony As-Filed					Bulkley Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[15]	[16]	[17]	[18]	[19]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
LyondellBasell Industries NV	LYB	325.62	99.97	32,552	0.10%	5.00%	0.01%	8.00%	0.01%	0.11%	5.00%	0.01%	8.00%	0.01%
American Express Co	AXP	719.30	234.03	168,338	0.53%	1.20%	0.01%	15.22%	0.08%	0.57%	1.20%	0.01%	15.22%	0.09%
Verizon Communications Inc	VZ	4,209.26	39.49	166,223	0.52%	6.74%	0.04%	1.22%	0.01%	0.56%	6.74%	0.04%	1.22%	0.01%
Broadcom Inc	AVGO	463.42	1,300.27	602,572	1.89%	1.62%	0.03%	14.20%	0.27%	2.04%	1.62%	0.03%	14.20%	0.29%
Boeing Co/The	BA	613.88	167.84	103,034				74.41%					74.41%	
Solventum Corp	SOLV	172.71	65.01	11,228				-4.00%					-4.00%	
Caterpillar Inc	CAT	489.05	334.57	163,622	0.51%	1.55%	0.01%	15.00%	0.08%	0.55%	1.55%	0.01%	15.00%	0.08%
JPMorgan Chase & Co	JPM	2,872.09	191.74	550,695	1.73%	2.40%	0.04%	3.50%	0.06%	1.87%	2.40%	0.04%	3.50%	0.07%
Chevron Corp	CVX	1,847.32	161.27	297,917	0.93%	4.04%	0.04%	7.00%	0.07%	1.01%	4.04%	0.04%	7.00%	0.07%
Coca-Cola Co/The	KO	4,311.19	61.77	266,302	0.84%	3.14%	0.03%	6.36%	0.05%	0.90%	3.14%	0.03%	6.36%	0.06%
AbbVie Inc	ABBV	1,770.65	162.64	287,978	0.90%	3.81%	0.03%	8.62%	0.08%	0.98%	3.81%	0.04%	8.62%	0.08%
Walt Disney Co/The	DIS	1,834.33	111.10	203,794		0.81%		21.90%			0.81%		21.90%	
Corpay Inc	CPAY	71.85	302.14	21,710	0.07%			13.65%	0.01%				13.65%	
Extra Space Storage Inc	EXR	211.62	134.28	28,416	0.09%	4.83%	0.00%	1.62%	0.00%	0.10%	4.83%	0.00%	1.62%	0.00%
Exxon Mobil Corp	XOM	3,943.01	118.27	466,339		3.21%		-12.00%			3.21%		-12.00%	
Phillips 66	PSX	423.95	143.21	60,714		3.21%					3.21%			
General Electric Co	GE	1,094.61	161.82	177,129		0.69%		23.50%			0.69%		23.50%	
HP Inc	HPQ	978.48	28.09	27,486	0.09%	3.92%	0.00%	0.50%	0.00%	0.09%	3.92%	0.00%	0.50%	0.00%
Home Depot Inc/The	HD	991.03	334.22	331,222	1.04%	2.69%	0.03%	4.31%	0.04%	1.12%	2.69%	0.03%	4.31%	0.05%
Monolithic Power Systems Inc	MPWR	48.66	669.33	32,570	0.10%	0.75%	0.00%	16.00%	0.02%	0.11%	0.75%	0.00%	16.00%	0.02%
International Business Machines Corp	IBM	918.60	166.20	152,672	0.48%	4.02%	0.02%	3.19%	0.02%	0.52%	4.02%	0.02%	3.19%	0.02%
Johnson & Johnson	JNJ	2,409.78	144.59	348,431	1.09%	3.43%	0.04%	5.05%	0.06%	1.18%	3.43%	0.04%	5.05%	0.06%
Lululemon Athletica Inc	LULU	120.89	360.60	43,594										
McDonald's Corp	MCD	721.01	273.04	196,863	0.62%	2.45%	0.02%	7.79%	0.05%	0.67%	2.45%	0.02%	7.79%	0.05%
Merck & Co Inc	MRK	2,533.03	129.22	327,318		2.38%		39.45%			2.38%		39.45%	
3M Co	MMM	553.36	96.51	53,405		6.26%		0.00%			6.26%		0.00%	
American Water Works Co Inc	AWK	194.76	122.32	23,822	0.07%	2.31%	0.00%	7.70%	0.01%	0.08%	2.31%	0.00%	7.70%	0.01%
Bank of America Corp	BAC	7,820.37	37.01	289,432		2.59%					2.59%			
Pfizer Inc	PFE	5,646.78	25.62	144,670	0.45%	6.56%	0.03%	9.59%	0.04%	0.49%	6.56%	0.03%	9.59%	0.05%
Procter & Gamble Co/The	PG	2,360.14	163.20	385,174	1.21%	2.47%	0.03%	8.09%	0.10%	1.31%	2.47%	0.03%	8.09%	0.11%
AT&T Inc	T	7,170.00	16.89	121,101	0.38%	6.57%	0.02%	2.78%	0.01%	0.41%	6.57%	0.03%	2.78%	0.01%
Travelers Cos Inc/The	TRV	228.99	212.16	48,583	0.15%	1.98%	0.00%	18.24%	0.03%	0.16%	1.98%	0.00%	18.24%	0.03%
RTX Corp	RTX	1,329.51	101.52	134,971	0.42%	2.32%	0.01%	10.21%	0.04%	0.46%	2.32%	0.01%	10.21%	0.05%
Analog Devices Inc	ADI	495.91	200.61	99,484	0.31%	1.83%	0.01%	4.50%	0.01%	0.34%	1.83%	0.01%	4.50%	0.02%
Walmart Inc	WMT	8,058.05	59.35	478,245	1.50%	1.40%	0.02%	7.00%	0.11%	1.62%	1.40%	0.02%	7.00%	0.11%
Cisco Systems Inc	CSCO	4,049.19	46.98	190,231	0.60%	3.41%	0.02%	7.50%	0.04%	0.64%	3.41%	0.02%	7.50%	0.05%
Intel Corp	INTC	4,256.87	30.47	129,707	0.41%	1.64%	0.01%	0.41%	0.00%	0.44%	1.64%	0.01%	0.41%	0.00%
General Motors Co	GM	1,140.40	44.53	50,782	0.16%	1.08%	0.00%	15.71%	0.03%	0.17%	1.08%	0.00%	15.71%	0.03%
Microsoft Corp	MSFT	7,432.31	389.33	2,893,620	9.08%	0.77%	0.07%	16.54%	1.50%	9.80%	0.77%	0.08%	16.54%	1.62%
Dollar General Corp	DG	219.67	139.19	30,576		1.70%		-1.47%			1.70%		-1.47%	
Cigna Group/The	CI	283.65	357.04	101,273	0.32%	1.57%	0.00%	11.62%	0.04%	0.34%	1.57%	0.01%	11.62%	0.04%
Kinder Morgan Inc	KMI	2,219.38	18.28	40,570	0.13%	6.29%	0.01%	4.00%	0.01%	0.14%	6.29%	0.01%	4.00%	0.01%
Citigroup Inc	C	1,911.37	61.33	117,224	0.37%	3.46%	0.01%	17.34%	0.06%	0.40%	3.46%	0.01%	17.34%	0.07%
American International Group Inc	AIG	674.03	75.31	50,761	0.16%	1.91%	0.00%	9.50%	0.02%	0.17%	1.91%	0.00%	9.50%	0.02%
Altria Group Inc	MO	1,717.63	43.81	75,249	0.24%	8.95%	0.02%	4.00%	0.01%	0.25%	8.95%	0.02%	4.00%	0.01%
HCA Healthcare Inc	HCA	264.49	309.82	81,943	0.26%	0.85%	0.00%	9.57%	0.02%	0.28%	0.85%	0.00%	9.57%	0.03%
International Paper Co	IP	347.33	34.94	12,136		5.29%		-2.00%			5.29%		-2.00%	
Hewlett Packard Enterprise Co	HPE	1,300.00	17.00	22,100	0.07%	3.06%	0.00%	2.86%	0.00%	0.07%	3.06%	0.00%	2.86%	0.00%
Abbott Laboratories	ABT	1,735.18	105.97	183,877	0.58%	2.08%	0.01%	4.19%	0.02%	0.62%	2.08%	0.01%	4.19%	0.03%
Aflac Inc	AFL	575.41	83.65	48,133	0.15%	2.39%	0.00%	6.69%	0.01%	0.16%	2.39%	0.00%	6.69%	0.01%
Air Products and Chemicals Inc	APD	222.31	236.34	52,540	0.16%	3.00%	0.00%	9.40%	0.02%	0.18%	3.00%	0.01%	9.40%	0.02%
Super Micro Computer Inc	SMCI	58.55	858.80	50,283				54.91%					54.91%	
Royal Caribbean Cruises Ltd	RCL	257.35	139.63	35,934				27.45%					27.45%	
Hess Corp	HES	308.11	157.49	48,524	0.15%	1.11%	0.00%	18.00%	0.03%	0.16%	1.11%	0.00%	18.00%	0.03%
Archer-Daniels-Midland Co	ADM	494.44	58.66	29,004		3.41%		-2.35%			3.41%		-2.35%	
Automatic Data Processing Inc	ADP	410.79	241.89	99,366	0.31%	2.32%	0.01%	16.00%	0.05%	0.34%	2.32%	0.01%	16.00%	0.05%
Verisk Analytics Inc	VRSK	143.39	217.96	31,253	0.10%	0.72%	0.00%	11.97%	0.01%	0.11%	0.72%	0.00%	11.97%	0.01%
AutoZone Inc	AZO	17.30	2,956.40	51,155	0.16%			14.75%	0.02%				14.75%	
Linde PLC	LIN	481.58	440.96	212,356	0.67%	1.26%	0.01%	11.00%	0.07%	0.72%	1.26%	0.01%	11.00%	0.08%
Avery Dennison Corp	AVY	80.55	217.28	17,503	0.05%	1.62%	0.00%	7.00%	0.00%	0.06%	1.62%	0.00%	7.00%	0.00%
Enphase Energy Inc	ENPH	136.06	108.76	14,798	0.05%			19.27%	0.01%				19.27%	
MSCI Inc	MSCI	79.22	465.79	36,902	0.12%	1.37%	0.00%	11.45%	0.01%	0.13%	1.37%	0.00%	11.45%	0.01%
Ball Corp	BALL	315.64	69.57	21,959	0.07%	1.15%	0.00%	9.50%	0.01%	0.07%	1.15%	0.00%	9.50%	0.01%
Axon Enterprise Inc	AXON	75.46	313.66	23,670										
Dayforce Inc	DAY	156.60	61.37	9,611										
Carrier Global Corp	CARR	901.01	61.49	55,403	0.17%	1.24%	0.00%	7.87%	0.01%	0.19%	1.24%	0.00%	7.87%	0.01%
Bank of New York Mellon Corp/The	BK	747.82	56.49	42,244	0.13%	2.97%	0.00%	10.00%	0.01%	0.14%	2.97%	0.00%	10.00%	0.01%
Otis Worldwide Corp	OTIS	404.32	91.20	36,874	0.12%	1.71%	0.00%	9.00%	0.01%	0.12%	1.71%	0.00%	9.00%	0.01%
Baxter International Inc	BAX	508.00	40.37	20,508	0.06%	2.87%	0.00%	2.73%	0.00%	0.07%	2.87%	0.00%	2.73%	0.00%
Becton Dickinson & Co	BDX	288.90	234.60	67,776	0.21%	1.62%	0.00%	8.36%	0.02%	0.23%	1.62%	0.00%	8.36%	0.02%
Berkshire Hathaway Inc	BRK/B	1,311.00	396.73	520,111										
Best Buy Co Inc	BBY	215.38	73.64	15,861	0.05%	5.11%	0.00%	3.36%	0.00%	0.05%	5.11%	0.00%	3.36%	0.00%
Boston Scientific Corp	BSX	1,469.90	71.87	105,641	0.33%			12.08%	0.04%				12.08%	
Bristol-Myers Squibb Co	BMY	2,027.10	43.94	89,071		5.46%		-4.12%			5.46%		-4.12%	
Brown-Forman Corp	BF/B	303.42	47.85	14,518	0.05%	1.82%	0.00%	2.73%	0.00%	0.05%	1.82%	0.00%	2.73%	0.00%
Coterra Energy Inc	CTRA	751.85	27.36	20,571		3.07%					3.07%			
Campbell Soup Co	CPB	298.10	45.71	13,626	0.04%	3.24%	0.00%	4.87%	0.00%	0.05%	3.24%	0.00%	4.87%	0.00%
Hilton Worldwide Holdings Inc	HLT	250.05	197.28	49,329	0.15%	0.30%	0.00%	15.52%	0.02%	0.17%	0.30%	0.00%	15.52%	0.03%
Carnival Corp	CCL	1,119.45	14.82	16,590										
Qorvo Inc	QRVO	96.55	116.84	11,281	0.04%			17.72%	0.01%				17.72%	
Builders FirstSource Inc	BLDR	121.94	182.82	22,293	0.07%			11.65%	0.01%				11.65%	
UDR Inc	UDR	329.33	38.08	12,541	0.04%	4.46%	0.00%	6.06%	0.00%	0.04%	4.46%	0.00%	6.06%	0.00%
Clorox Co/The	CLX	124.19	147.87	18,364	0.06%	3.25%	0.00%	13.23%	0.01%	0.06%	3.25%	0.00%	13.23%	0.01%
Paycom Software Inc	PAYC	58.15	187.98	10,931	0.03%	0.80%	0.00%	5.50%	0.00%	0.04%	0.80%	0.00%	5.50%	0.00%
CMS Energy Corp	CMS	291.76	60.61	17,684	0.06%	3.40%	0.00%	7.36%	0.00%	0.06%	3.40%	0.00%	7.36%	0.00%
Colgate-Palmolive Co	CL	820.44	91.92	75,415	0.24%	2.18%	0.01%	8.18%	0.02%	0.26%	2.18%	0.01%	8.18%	0.02%
EPAM Systems Inc	EPAM	58.00	235.26	13,644	0.04%			2.97%	0.00%				2.97%	
Comerica Inc	CMA	132.59	50.17	6,652		5.66%					5.66%			
Conagra Brands Inc	CAG	478.06	30.78	14,715	0.05%	4.55%	0.00%	1.82%	0.00%	0.05%	4.55%	0.00%	1.82%	0.00%
Airbnb Inc	ABNB	438.09	158.57	69,467	0.22%			19.82%	0.04%				19.82%	
Consolidated Edison Inc	ED	344.92	94.40	32,561	0.10%	3.52%	0.00%	5.70%	0.01%	0.11%	3.52%	0.00%	5.70%	0.01%
Corning Inc	GLW	855.35	33.38	28,552	0.09%	3.36%	0.00%	10.78%	0.01%	0.10%	3.36%	0.00%	10.78%	0.01%
Cummins Inc	CMI	141.86	282.49	40,073	0.13%	2.38%	0.00%	6.07%	0.01%	0.14%	2.38%	0.00%	6.07%	0.01%
Caesars Entertainment Inc	CZR	216.42	35.82	7,752				-28.24%					-28.24%	
Danaher Corp	DHR	740.69	246.62	182,668		0.44%		-7.56%			0.44%		-7.56%	
Target Corp	TGT	461.69	160.98	74,323		2.73%		-2.13%			2.73%		-2.13%	
Deere & Co	DE	278.36	391.41	108,952		1.50%		-4.67%			1.50%		-4.67%	
Dominion Energy Inc	D	837.59	50.98	42,700	0.13%	5.24%	0.01%	10.65%	0.01%	0.14%	5.24%	0.01%	10.65%	0.02%
Dover Corp	DOV	137.43	179.30	24,641	0.08%	1.14%	0.00%	9.50%	0.01%	0.08%	1.14%	0.00%	9.50%	0.01%
Alliant Energy Corp	LNT	252.72	49.80	12,585	0.04%	3.86%	0.00%	7.00%	0.00%	0.04%	3.86%	0.00%	7.00%	0.00%
Steel Dynamics Inc	STLD	160.02	130.12	20,822		1.41%		-1.63%			1.41%		-1.63%	
Duke Energy Corp	DUK	771.00	98.26	75,758	0.24%	4.17%	0.01%	6.65%	0.02%	0.26%	4.17%	0.01%	6.65%	0.02%
Regency Centers Corp	REG	184.58	59.22	10,931	0.03%	4.53%	0.00%	3.63%	0.00%	0.04%	4.53%	0.00%	3.63%	0.00%
Eaton Corp PLC	ETN	399.89	318.26	127,270	0.40%	1.18%	0.00%	15.00%	0.06%	0.43%	1.18%	0.01%	15.00%	0.06%

P

MARKET RISK PREMIUM DERIVED FROM ANALYSTS' LONG-TERM GROWTH ESTIMATES

Bulkley As-Filed Direct Testimony

Estimated Weighted Average Dividend Yield:	1.72%	[1]
Estimated Weighted Average Long-Term Growth Rate:	11.09%	[2]
Estimated S&P 500 Required Market Return:	**12.91%**	[3]

Ms. Bulkley "Adjustments" Corrected

Estimated Weighted Average Dividend Yield:	1.86%	[12]
Estimated Weighted Average Long-Term Growth Rate:	10.93%	[13]
Estimated S&P 500 Required Market Return:	**12.89%**	[14]

					Bulkley Direct Testimony As-Filed					Bulkley Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[15]	[16]	[17]	[18]	[19]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Ecolab Inc	ECL	285.91	226.15	64,659	0.20%	1.01%	0.00%	12.50%	0.03%	0.22%	1.01%	0.00%	12.50%	0.03%
Revvity Inc	RVTY	123.53	102.47	12,658	0.04%	0.27%	0.00%	8.26%	0.00%	0.04%	0.27%	0.00%	8.26%	0.00%
Emerson Electric Co	EMR	571.70	107.78	61,618	0.19%	1.95%	0.00%	14.13%	0.03%	0.21%	1.95%	0.00%	14.13%	0.03%
EOG Resources Inc	EOG	580.00	132.13	76,636	0.24%	2.75%	0.01%	5.00%	0.01%	0.26%	2.75%	0.01%	5.00%	0.01%
Aon PLC	AON	217.43	282.01	61,318	0.19%	0.96%	0.00%	10.59%	0.02%	0.21%	0.96%	0.00%	10.59%	0.02%
Entergy Corp	ETR	213.27	105.54	22,509	0.07%	4.28%	0.00%	7.02%	0.00%	0.08%	4.28%	0.00%	7.02%	0.01%
Equifax Inc	EFX	123.61	220.19	27,218	0.09%	0.71%	0.00%	11.56%	0.01%	0.09%	0.71%	0.00%	11.56%	0.01%
EQT Corp	EQT	441.59	40.09	17,703		1.57%		31.59%			1.57%		31.59%	
IQVIA Holdings Inc	IQV	182.01	231.77	42,185	0.13%			8.92%	0.01%				8.92%	
Gartner Inc	IT	77.63	412.59	32,029	0.10%			10.78%	0.01%				10.78%	
FedEx Corp	FDX	246.08	261.78	64,419	0.20%	1.93%	0.00%	13.00%	0.03%	0.22%	1.93%	0.00%	13.00%	0.03%
FMC Corp	FMC	124.82	59.01	7,365	0.02%	3.93%	0.00%	8.00%	0.00%	0.02%	3.93%	0.00%	8.00%	0.00%
Brown & Brown Inc	BRO	285.25	81.54	23,259	0.07%	0.64%	0.00%	9.56%	0.01%	0.08%	0.64%	0.00%	9.56%	0.01%
Ford Motor Co	F	3,921.49	12.15	47,646	0.15%	4.94%	0.01%	1.67%	0.00%	0.16%	4.94%	0.01%	1.67%	0.00%
NextEra Energy Inc	NEE	2,023.71	66.97	135,528	0.43%	3.08%	0.01%	8.10%	0.03%	0.46%	3.08%	0.01%	8.10%	0.04%
Franklin Resources Inc	BEN	526.09	22.84	12,016		5.43%					5.43%			
Garmin Ltd	GRMN	192.08	144.47	27,750	0.09%	2.08%	0.00%	5.60%	0.00%	0.09%	2.08%	0.00%	5.60%	0.01%
Freeport-McMoRan Inc	FCX	1,434.41	49.94	71,634	0.22%	1.20%	0.00%	1.14%	0.00%	0.24%	1.20%	0.00%	1.14%	0.00%
Dexcom Inc	DXCM	397.68	127.39	50,661				30.31%					30.31%	
General Dynamics Corp	GD	274.36	287.09	78,767	0.25%	1.98%	0.00%	12.64%	0.03%	0.27%	1.98%	0.01%	12.64%	0.03%
General Mills Inc	GIS	564.55	70.46	39,778	0.12%	3.35%	0.00%	4.00%	0.00%	0.13%	3.35%	0.00%	4.00%	0.01%
Genuine Parts Co	GPC	139.30	157.21	21,899		2.54%					2.54%			
Atmos Energy Corp	ATO	150.84	117.90	17,784	0.06%	2.73%	0.00%	7.00%	0.00%	0.06%	2.73%	0.00%	7.00%	0.00%
WW Grainger Inc	GWW	49.07	921.35	45,210		0.89%					0.89%			
Halliburton Co	HAL	885.30	37.47	33,172	0.10%	1.81%	0.00%	11.60%	0.01%	0.11%	1.81%	0.00%	11.60%	0.01%
Healthpeak Properties Inc	DOC	703.78	18.61	13,097	0.04%	6.45%	0.00%	2.24%	0.00%	0.04%	6.45%	0.00%	2.24%	0.00%
L3Harris Technologies Inc	LHX	189.68	214.05	40,601	0.13%	2.17%	0.00%	7.29%	0.01%	0.14%	2.17%	0.00%	7.29%	0.01%
Insulet Corp	PODD	70.02	171.94	12,040				33.03%					33.03%	
Catalent Inc	CTLT	180.97	55.85	10,107				35.27%					35.27%	
Fortive Corp	FTV	352.03	75.27	26,497	0.08%	0.43%	0.00%	8.98%	0.01%	0.09%	0.43%	0.00%	8.98%	0.01%
Hershey Co/The	HSY	149.60	193.92	29,010	0.09%	2.83%	0.00%	5.50%	0.01%	0.10%	2.83%	0.00%	5.50%	0.01%
Synchrony Financial	SYF	401.54	43.98	17,660		2.27%					2.27%			
Hormel Foods Corp	HRL	547.69	35.56	19,476	0.06%	3.18%	0.00%	6.59%	0.00%	0.07%	3.18%	0.00%	6.59%	0.00%
Arthur J Gallagher & Co	AJG	216.80	234.69	50,881	0.16%	1.02%	0.00%	12.32%	0.02%	0.17%	1.02%	0.00%	12.32%	0.02%
Mondelez International Inc	MDLZ	1,341.36	71.94	96,497	0.30%	2.36%	0.01%	8.55%	0.03%	0.33%	2.36%	0.01%	8.55%	0.03%
CenterPoint Energy Inc	CNP	633.03	29.14	18,447	0.06%	2.75%	0.00%	7.95%	0.00%	0.06%	2.75%	0.00%	7.95%	0.00%
Humana Inc	HUM	120.50	302.09	36,402		1.17%		-6.15%			1.17%		-6.15%	
Willis Towers Watson PLC	WTW	102.24	251.14	25,676	0.08%	1.40%	0.00%	12.37%	0.01%	0.09%	1.40%	0.00%	12.37%	0.01%
Illinois Tool Works Inc	ITW	298.75	244.11	72,927	0.23%	2.29%	0.01%	7.27%	0.02%	0.25%	2.29%	0.01%	7.27%	0.02%
CDW Corp/DE	CDW	134.37	241.86	32,498	0.10%	1.03%	0.00%	8.93%	0.01%	0.11%	1.03%	0.00%	8.93%	0.01%
Trane Technologies PLC	TT	226.35	317.34	71,831	0.23%	1.06%	0.00%	13.47%	0.03%	0.24%	1.06%	0.00%	13.47%	0.03%
Interpublic Group of Cos Inc/The	IPG	377.42	30.44	11,489	0.04%	4.34%	0.00%	4.94%	0.00%	0.04%	4.34%	0.00%	4.94%	0.00%
International Flavors & Fragrances Inc	IFF	255.32	84.65	21,613		1.89%		-1.97%			1.89%		-1.97%	
Generac Holdings Inc	GNRC	60.27	135.96	8,194	0.03%			6.00%	0.00%				6.00%	
NXP Semiconductors NV	NXPI	255.68	256.19	65,504	0.21%	1.58%	0.00%	20.00%	0.04%	0.22%	1.58%	0.00%	20.00%	0.04%
Kellanova	K	340.68	57.86	19,712	0.06%	3.87%	0.00%	8.42%	0.01%	0.07%	3.87%	0.00%	8.42%	0.01%
Broadridge Financial Solutions Inc	BR	117.77	193.41	22,778		1.65%					1.65%			
Kimberly-Clark Corp	KMB	336.71	136.53	45,971	0.14%	3.57%	0.01%	7.72%	0.01%	0.16%	3.57%	0.01%	7.72%	0.01%
Kimco Realty Corp	KIM	674.13	18.63	12,559	0.04%	5.15%	0.00%	2.80%	0.00%	0.04%	5.15%	0.00%	2.80%	0.00%
Oracle Corp	ORCL	2,748.51	113.75	312,643	0.98%	1.41%	0.01%	14.30%	0.14%	1.06%	1.41%	0.01%	14.30%	0.15%
Kroger Co/The	KR	721.69	55.38	39,967	0.13%	2.09%	0.00%	4.76%	0.01%	0.14%	2.09%	0.00%	4.76%	0.01%
Lennar Corp	LEN	245.04	151.62	37,152	0.12%	1.32%	0.00%	8.82%	0.01%	0.13%	1.32%	0.00%	8.82%	0.01%
Eli Lilly & Co	LLY	950.41	781.10	742,361		0.67%		40.63%			0.67%		40.63%	
Bath & Body Works Inc	BBWI	224.90	45.42	10,215	0.03%	1.76%	0.00%	13.65%	0.00%	0.03%	1.76%	0.00%	13.65%	0.00%
Charter Communications Inc	CHTR	144.39	255.94	36,954	0.12%			5.89%	0.01%				5.89%	
Loews Corp	L	222.07	75.15	16,689		0.33%					0.33%			
Lowe's Cos Inc	LOW	572.19	227.99	130,454	0.41%	1.93%	0.01%	2.12%	0.01%	0.44%	1.93%	0.01%	2.12%	0.01%
Hubbell Inc	HUBB	53.68	370.52	19,891	0.06%	1.32%	0.00%	18.00%	0.01%	0.07%	1.32%	0.00%	18.00%	0.01%
IDEX Corp	IEX	75.70	220.46	16,688		1.16%					1.16%			
Marsh & McLennan Cos Inc	MMC	492.72	199.43	98,264	0.31%	1.42%	0.00%	6.90%	0.02%	0.33%	1.42%	0.00%	6.90%	0.02%
Masco Corp	MAS	220.24	68.45	15,076	0.05%	1.69%	0.00%	8.64%	0.00%	0.05%	1.69%	0.00%	8.64%	0.00%
S&P Global Inc	SPGI	320.26	415.83	133,172	0.42%	0.88%	0.00%	12.93%	0.05%	0.45%	0.88%	0.00%	12.93%	0.06%
Medtronic PLC	MDT	1,327.82	80.24	106,545	0.33%	3.44%	0.01%	3.83%	0.01%	0.36%	3.44%	0.01%	3.83%	0.01%
Viatris Inc	VTRS	1,187.57	11.57	13,740		4.15%		-1.69%			4.15%		-1.69%	
CVS Health Corp	CVS	1,260.48	67.71	85,347	0.27%	3.93%	0.01%	7.62%	0.02%	0.29%	3.93%	0.01%	7.62%	0.02%
DuPont de Nemours Inc	DD	417.58	72.50	30,275	0.09%	2.10%	0.00%	6.72%	0.01%	0.10%	2.10%	0.00%	6.72%	0.01%
Micron Technology Inc	MU	1,107.37	112.96	125,088		0.41%		-4.00%			0.41%		-4.00%	
Motorola Solutions Inc	MSI	166.12	339.15	56,341	0.18%	1.16%	0.00%	8.85%	0.02%	0.19%	1.16%	0.00%	8.85%	0.02%
Cboe Global Markets Inc	CBOE	105.58	181.15	19,126	0.06%	1.21%	0.00%	14.28%	0.01%	0.06%	1.21%	0.00%	14.28%	0.01%
Laboratory Corp of America Holdings	LH	84.29	201.37	16,974	0.05%	1.43%	0.00%	9.46%	0.01%	0.06%	1.43%	0.00%	9.46%	0.01%
Newmont Corp	NEM	1,153.14	40.64	46,864	0.15%	2.46%	0.00%	18.15%	0.03%	0.16%	2.46%	0.00%	18.15%	0.03%
NIKE Inc	NKE	1,211.46	92.26	111,769	0.35%	1.60%	0.01%	10.85%	0.04%	0.38%	1.60%	0.01%	10.85%	0.04%
NiSource Inc	NI	448.19	27.86	12,487	0.04%	3.80%	0.00%	7.00%	0.00%	0.04%	3.80%	0.00%	7.00%	0.00%
Norfolk Southern Corp	NSC	225.91	230.32	52,033		2.34%					2.34%			
Principal Financial Group Inc	PFG	235.15	79.14	18,610	0.06%	3.59%	0.00%	11.79%	0.01%	0.06%	3.59%	0.00%	11.79%	0.01%
Eversource Energy	ES	350.73	60.62	21,261		4.72%					4.72%			
Northrop Grumman Corp	NOC	147.99	485.03	71,780	0.23%	1.54%	0.00%	18.93%	0.04%	0.24%	1.54%	0.00%	18.93%	0.05%
Wells Fargo & Co	WFC	3,501.70	59.32	207,721	0.65%	2.36%	0.02%	13.41%	0.09%	0.70%	2.36%	0.02%	13.41%	0.09%
Nucor Corp	NUE	239.98	168.53	40,444	0.13%	1.28%	0.00%	0.83%	0.00%	0.14%	1.28%	0.00%	0.83%	0.00%
Occidental Petroleum Corp	OXY	879.50	66.14	58,170	0.18%	1.33%	0.00%	20.00%	0.04%	0.20%	1.33%	0.00%	20.00%	0.04%
Omnicom Group Inc	OMC	195.83	92.84	18,181	0.06%	3.02%	0.00%	7.46%	0.00%	0.06%	3.02%	0.00%	7.46%	0.00%
ONEOK Inc	OKE	583.64	79.12	46,178	0.14%	5.01%	0.01%	1.56%	0.00%	0.16%	5.01%	0.01%	1.56%	0.00%
Raymond James Financial Inc	RJF	207.30	122.00	25,291	0.08%	1.48%	0.00%	15.38%	0.01%	0.09%	1.48%	0.00%	15.38%	0.01%
PG&E Corp	PCG	2,133.51	17.11	36,504	0.11%	0.23%	0.00%	10.10%	0.01%	0.12%	0.23%	0.00%	10.10%	0.01%
Parker-Hannifin Corp	PH	128.41	544.91	69,972	0.22%	1.20%	0.00%	16.28%	0.04%	0.24%	1.20%	0.00%	16.28%	0.04%
Rollins Inc	ROL	484.23	44.56	21,577	0.07%	1.35%	0.00%	13.02%	0.01%	0.07%	1.35%	0.00%	13.02%	0.01%
PPL Corp	PPL	737.12	27.46	20,241	0.06%	3.75%	0.00%	7.22%	0.00%	0.07%	3.75%	0.00%	7.22%	0.00%
ConocoPhillips	COP	1,171.10	125.62	147,114		2.48%					2.48%			
PulteGroup Inc	PHM	210.34	111.42	23,436	0.07%	0.72%	0.00%	7.65%	0.01%	0.08%	0.72%	0.00%	7.65%	0.01%
Pinnacle West Capital Corp	PNW	113.56	73.65	8,363	0.03%	4.78%	0.00%	7.28%	0.00%	0.03%	4.78%	0.00%	7.28%	0.00%
PNC Financial Services Group Inc/The	PNC	397.85	153.26	60,974	0.19%	4.05%	0.01%	15.32%	0.03%	0.21%	4.05%	0.01%	15.32%	0.03%
PPG Industries Inc	PPG	235.36	129.00	30,362	0.10%	2.02%	0.00%	7.82%	0.01%	0.10%	2.02%	0.00%	7.82%	0.01%
Progressive Corp/The	PGR	585.70	208.25	121,972		0.19%		32.49%			0.19%		32.49%	
Veralto Corp	VLTO	246.85	93.68	23,125		0.38%					0.38%			
Public Service Enterprise Group Inc	PEG	498.59	69.08	34,442	0.11%	3.47%	0.00%	6.28%	0.01%	0.12%	3.47%	0.00%	6.28%	0.01%
Robert Half Inc	RHI	105.12	69.14	7,268	0.02%	3.07%	0.00%	7.15%	0.00%	0.02%	3.07%	0.00%	7.15%	0.00%
Cooper Cos Inc/The	COO	198.76	89.06	17,701	0.06%			11.77%	0.01%				11.77%	
Edison International	EIX	383.93	71.06	27,282	0.09%	4.39%	0.00%	7.80%	0.01%	0.09%	4.39%	0.00%	7.80%	0.01%
Schlumberger NV	SLB	1,429.34	47.48	67,865	0.21%	2.32%	0.00%	14.81%	0.03%	0.23%	2.32%	0.01%	14.81%	0.03%
Charles Schwab Corp/The	SCHW	1,773.48	73.95	131,148	0.41%	1.35%	0.01%	14.20%	0.06%	0.44%	1.35%	0.01%	14.20%	0.06%
Sherwin-Williams Co/The	SHW	253.55	299.61	75,966	0.24%	0.95%	0.00%	9.56%	0.02%	0.26%	0.95%	0.00%	9.56%	0.02%
West Pharmaceutical Services Inc	WST	72.84	357.48	26,040	0.08%	0.22%	0.00%	7.72%	0.01%	0.09%	0.22%	0.00%	7.72%	0.01%
J M Smucker Co/The	SJM	106.18	114.85	12,194	0.04%	3.69%	0.00%	7.04%	0.00%	0.04%	3.69%	0.00%	7.04%	0.00%
Snap-on Inc	SNA	52.72	267.96	14,127	0.04%	2.78%	0.00%	3.83%	0.00%	0.05%	2.78%	0.00%	3.83%	0.00%

P

MARKET RISK PREMIUM DERIVED FROM ANALYSTS' LONG-TERM GROWTH ESTIMATES

Bulkley As-Filed Direct Testimony

Estimated Weighted Average Dividend Yield: 1.72% [1]

Estimated Weighted Average Long-Term Growth Rate: 11.09% [2]

Estimated S&P 500 Required Market Return: **12.91%** [3]

Ms. Bulkley "Adjustments" Corrected

Estimated Weighted Average Dividend Yield: 1.86% [12]

Estimated Weighted Average Long-Term Growth Rate: 10.93% [13]

Estimated S&P 500 Required Market Return: **12.89%** [14]

					Bulkley Direct Testimony As-Filed					Bulkley Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[15]	[16]	[17]	[18]	[19]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
AMETEK Inc	AME	231.21	174.66	40,383	0.13%	0.64%	0.00%	7.56%	0.01%	0.14%	0.64%	0.00%	7.56%	0.01%
Uber Technologies Inc	UBER	2,081.54	66.27	137,944				51.75%					51.75%	
Southern Co/The	SO	1,094.63	73.50	80,456	0.25%	3.92%	0.01%	7.10%	0.02%	0.27%	3.92%	0.01%	7.10%	0.02%
Truist Financial Corp	TFC	1,338.10	37.55	50,246	0.16%	5.54%	0.01%	10.30%	0.02%	0.17%	5.54%	0.01%	10.30%	0.02%
Southwest Airlines Co	LUV	598.46	25.94	15,524		2.78%		21.33%			2.78%		21.33%	
W R Berkley Corp	WRB	256.55	76.97	19,747	0.06%	0.57%	0.00%	11.50%	0.01%	0.07%	0.57%	0.00%	11.50%	0.01%
Stanley Black & Decker Inc	SWK	153.80	91.40	14,058	0.04%	3.54%	0.00%	10.00%	0.00%	0.05%	3.54%	0.00%	10.00%	0.00%
Public Storage	PSA	175.83	259.45	45,619	0.14%	4.63%	0.01%	3.51%	0.01%	0.15%	4.63%	0.01%	3.51%	0.01%
Arista Networks Inc	ANET	312.63	256.56	80,209	0.25%			15.67%	0.04%				15.67%	
Sysco Corp	SYY	497.83	74.32	36,999	0.12%	2.74%	0.00%	14.00%	0.02%	0.13%	2.74%	0.00%	14.00%	0.02%
Corteva Inc	CTVA	687.80	54.13	37,230	0.12%	1.18%	0.00%	13.66%	0.02%	0.13%	1.18%	0.00%	13.66%	0.02%
Texas Instruments Inc	TXN	910.48	176.42	160,627	0.50%	2.95%	0.01%	10.00%	0.05%	0.54%	2.95%	0.02%	10.00%	0.05%
Textron Inc	TXT	190.70	84.59	16,131	0.05%	0.09%	0.00%	10.12%	0.01%	0.05%	0.09%	0.00%	10.12%	0.01%
Thermo Fisher Scientific Inc	TMO	381.31	568.72	216,860		0.27%					0.27%			
TJX Cos Inc/The	TJX	1,132.97	94.09	106,602	0.33%	1.59%	0.01%	10.00%	0.03%	0.36%	1.59%	0.01%	10.00%	0.04%
Globe Life Inc	GL	94.04	76.17	7,163	0.02%	1.26%	0.00%	7.00%	0.00%	0.02%	1.26%	0.00%	7.00%	0.00%
Johnson Controls International plc	JCI	681.48	65.07	44,344	0.14%	2.27%	0.00%	9.77%	0.01%	0.15%	2.27%	0.00%	9.77%	0.01%
Ulta Beauty Inc	ULTA	47.94	404.84	19,406	0.06%			6.90%	0.00%				6.90%	
Union Pacific Corp	UNP	610.12	237.16	144,697	0.45%	2.19%	0.01%	11.00%	0.05%	0.49%	2.19%	0.01%	11.00%	0.05%
Keysight Technologies Inc	KEYS	174.56	147.94	25,824				-0.99%					-0.99%	
UnitedHealth Group Inc	UNH	920.08	483.70	445,043	1.40%	1.55%	0.02%	11.58%	0.16%	1.51%	1.55%	0.02%	11.58%	0.17%
Blackstone Inc	BX	722.26	116.61	84,223		2.85%		23.93%			2.85%		23.93%	
Marathon Oil Corp	MRO	571.48	26.85	15,344	0.05%	1.64%	0.00%	7.00%	0.00%	0.05%	1.64%	0.00%	7.00%	0.00%
Bio-Rad Laboratories Inc	BIO	23.42	269.75	6,318										
Ventas Inc	VTR	404.05	44.28	17,891	0.06%	4.07%	0.00%	5.78%	0.00%	0.06%	4.07%	0.00%	5.78%	0.00%
Vulcan Materials Co	VMC	132.27	257.63	34,077	0.11%	0.71%	0.00%	15.78%	0.02%	0.12%	0.71%	0.00%	15.78%	0.02%
Weyerhaeuser Co	WY	729.62	30.17	22,013		2.65%					2.65%			
Williams Cos Inc/The	WMB	1,218.43	38.36	46,739	0.15%	4.95%	0.01%	2.50%	0.00%	0.16%	4.95%	0.01%	2.50%	0.00%
Constellation Energy Corp	CEG	315.12	185.94	58,594	0.18%	0.76%	0.00%	9.00%	0.02%	0.20%	0.76%	0.00%	9.00%	0.02%
WEC Energy Group Inc	WEC	315.56	82.64	26,078	0.08%	4.04%	0.00%	6.85%	0.01%	0.09%	4.04%	0.00%	6.85%	0.01%
Adobe Inc	ADBE	448.00	462.83	207,348	0.65%			16.73%	0.11%				16.73%	
AES Corp/The	AES	710.29	17.90	12,714	0.04%	3.85%	0.00%	7.85%	0.00%	0.04%	3.85%	0.00%	7.85%	0.00%
Expeditors International of Washington Inc	EXPD	143.90	111.31	16,017	0.05%	1.24%	0.00%	2.85%	0.00%	0.05%	1.24%	0.00%	2.85%	0.00%
Amgen Inc	AMGN	536.38	273.94	146,935	0.46%	3.29%	0.02%	4.49%	0.02%	0.50%	3.29%	0.02%	4.49%	0.02%
Apple Inc	AAPL	15,441.88	170.33	2,630,216	8.25%	0.56%	0.05%	13.00%	1.07%	8.91%	0.56%	0.05%	13.00%	1.16%
Autodesk Inc	ADSK	213.92	212.85	45,532	0.14%			12.76%	0.02%				12.76%	
Cintas Corp	CTAS	101.46	658.34	66,797	0.21%	0.82%	0.00%	10.83%	0.02%	0.23%	0.82%	0.00%	10.83%	0.02%
Comcast Corp	CMCSA	3,914.18	38.11	149,169	0.47%	3.25%	0.02%	8.67%	0.04%	0.51%	3.25%	0.02%	8.67%	0.04%
Molson Coors Beverage Co	TAP	197.55	57.26	11,312	0.04%	3.07%	0.00%	4.67%	0.00%	0.04%	3.07%	0.00%	4.67%	0.00%
KLA Corp	KLAC	134.64	689.29	92,806	0.29%	0.84%	0.00%	9.54%	0.03%	0.31%	0.84%	0.00%	9.54%	0.03%
Marriott International Inc/MD	MAR	288.26	236.13	68,067	0.21%	0.88%	0.00%	4.74%	0.01%	0.23%	0.88%	0.00%	4.74%	0.01%
Fiserv Inc	FI	585.10	152.67	89,328	0.28%			15.47%	0.04%				15.47%	
McCormick & Co Inc/MD	MKC	251.75	76.06	19,148	0.06%	2.21%	0.00%	5.96%	0.00%	0.06%	2.21%	0.00%	5.96%	0.00%
PACCAR Inc	PCAR	524.01	106.11	55,603	0.17%	1.13%	0.00%	12.00%	0.02%	0.19%	1.13%	0.00%	12.00%	0.02%
Costco Wholesale Corp	COST	443.50	722.90	320,609	1.01%	0.64%	0.01%	10.16%	0.10%	1.09%	0.64%	0.01%	10.16%	0.11%
Stryker Corp	SYK	380.47	336.50	128,028	0.40%	0.95%	0.00%	8.45%	0.03%	0.43%	0.95%	0.00%	8.45%	0.04%
Tyson Foods Inc	TSN	286.34	60.65	17,366		3.23%		53.81%			3.23%		53.81%	
Lamb Weston Holdings Inc	LW	144.39	83.34	12,034	0.04%	1.73%	0.00%	11.56%	0.00%	0.04%	1.73%	0.00%	11.56%	0.00%
Applied Materials Inc	AMAT	830.90	198.65	165,058	0.52%	0.81%	0.00%	14.23%	0.07%	0.56%	0.81%	0.00%	14.23%	0.08%
American Airlines Group Inc	AAL	653.54	13.51	8,829				-1.53%					-1.53%	
Cardinal Health Inc	CAH	243.23	103.04	25,063	0.08%	1.94%	0.00%	11.91%	0.01%	0.08%	1.94%	0.00%	11.91%	0.01%
Cincinnati Financial Corp	CINF	156.56	115.69	18,112	0.06%	2.80%	0.00%	7.35%	0.00%	0.06%	2.80%	0.00%	7.35%	0.00%
Paramount Global	PARA	625.78	11.39	7,128		1.76%		48.12%			1.76%		48.12%	
DR Horton Inc	DHI	329.31	142.19	46,825	0.15%	0.84%	0.00%	4.37%	0.01%	0.16%	0.84%	0.00%	4.37%	0.01%
Electronic Arts Inc	EA	267.35	126.82	33,905	0.11%	0.60%	0.00%	12.50%	0.01%	0.11%	0.60%	0.00%	12.50%	0.01%
Fair Isaac Corp	FICO	24.71	1,133.33	28,006										
Fastenal Co	FAST	572.55	67.94	38,899		2.30%					2.30%			
M&T Bank Corp	MTB	166.72	144.39	24,073	0.08%	3.60%	0.00%	8.00%	0.01%	0.08%	3.60%	0.00%	8.00%	0.01%
Xcel Energy Inc	XEL	555.64	53.73	29,854	0.09%	4.08%	0.00%	6.71%	0.01%	0.10%	4.08%	0.00%	6.71%	0.01%
Fifth Third Bancorp	FITB	683.81	36.46	24,932		3.84%		25.00%			3.84%		25.00%	
Gilead Sciences Inc	GILD	1,246.97	65.20	81,302	0.26%	4.72%	0.01%	13.35%	0.03%	0.28%	4.72%	0.01%	13.35%	0.04%
Hasbro Inc	HAS	138.79	61.30	8,508	0.03%	4.57%	0.00%	17.10%	0.00%	0.03%	4.57%	0.00%	17.10%	0.00%
Huntington Bancshares Inc/OH	HBAN	1,449.25	13.47	19,521	0.06%	4.60%	0.00%	4.46%	0.00%	0.07%	4.60%	0.00%	4.46%	0.00%
Welltower Inc	WELL	597.92	95.28	56,969	0.18%	2.56%	0.00%	14.52%	0.03%	0.19%	2.56%	0.00%	14.52%	0.03%
Biogen Inc	BIIB	145.60	214.82	31,277	0.10%			4.62%	0.00%				4.62%	
Northern Trust Corp	NTRS	204.59	82.39	16,856	0.05%	3.64%	0.00%	10.80%	0.01%	0.06%	3.64%	0.00%	10.80%	0.01%
Packaging Corp of America	PKG	89.76	172.98	15,526	0.05%	2.89%	0.00%	3.00%	0.00%	0.05%	2.89%	0.00%	3.00%	0.00%
Paychex Inc	PAYX	359.96	118.81	42,767	0.13%	3.00%	0.00%	7.00%	0.01%	0.14%	3.00%	0.00%	7.00%	0.01%
QUALCOMM Inc	QCOM	1,116.00	165.85	185,089	0.58%	2.05%	0.01%	10.65%	0.06%	0.63%	2.05%	0.01%	10.65%	0.07%
Ross Stores Inc	ROST	335.17	129.55	43,422	0.14%	1.13%	0.00%	10.00%	0.01%	0.15%	1.13%	0.00%	10.00%	0.01%
IDEXX Laboratories Inc	IDXX	83.09	492.76	40,943	0.13%			11.51%	0.01%				11.51%	
Starbucks Corp	SBUX	1,132.20	88.49	100,188	0.31%	2.58%	0.01%	13.62%	0.04%	0.34%	2.58%	0.01%	13.62%	0.05%
KeyCorp	KEY	942.78	14.49	13,661	0.04%	5.66%	0.00%	9.83%	0.00%	0.05%	5.66%	0.00%	9.83%	0.00%
Fox Corp	FOXA	239.30	31.01	7,421	0.02%	1.68%	0.00%	6.24%	0.00%	0.03%	1.68%	0.00%	6.24%	0.00%
Fox Corp	FOX	235.58	28.68	6,756	0.02%	1.81%	0.00%	6.24%	0.00%	0.02%	1.81%	0.00%	6.24%	0.00%
State Street Corp	STT	301.50	72.49	21,856	0.07%	3.81%	0.00%	8.06%	0.01%	0.07%	3.81%	0.00%	8.06%	0.01%
Norwegian Cruise Line Holdings Ltd	NCLH	425.66	18.92	8,053				48.23%					48.23%	
US Bancorp	USB	1,558.00	40.63	63,302	0.20%	4.82%	0.01%	5.00%	0.01%	0.21%	4.82%	0.01%	5.00%	0.01%
A O Smith Corp	AOS	120.78	82.84	10,006		1.55%					1.55%			
Gen Digital Inc	GEN	636.91	20.14	12,827	0.04%	2.48%	0.00%	11.51%	0.00%	0.04%	2.48%	0.00%	11.51%	0.01%
T Rowe Price Group Inc	TROW	223.30	109.57	24,467	0.08%	4.53%	0.00%	5.88%	0.00%	0.08%	4.53%	0.00%	5.88%	0.00%
Waste Management Inc	WM	401.08	208.02	83,433	0.26%	1.44%	0.00%	11.11%	0.03%	0.28%	1.44%	0.00%	11.11%	0.03%
Constellation Brands Inc	STZ	182.95	253.46	46,371	0.15%	1.59%	0.00%	11.01%	0.02%	0.16%	1.59%	0.00%	11.01%	0.02%
Invesco Ltd	IVZ	449.80	14.17	6,374	0.02%	5.79%	0.00%	8.71%	0.00%	0.02%	5.79%	0.00%	8.71%	0.00%
Intuit Inc	INTU	279.98	625.62	175,160	0.55%	0.58%	0.00%	18.76%	0.10%	0.59%	0.58%	0.00%	18.76%	0.11%
Morgan Stanley	MS	1,627.00	90.84	147,797	0.46%	3.74%	0.02%	5.29%	0.02%	0.50%	3.74%	0.02%	5.29%	0.03%
Microchip Technology Inc	MCHP	540.39	91.98	49,705	0.16%	1.96%	0.00%	2.30%	0.00%	0.17%	1.96%	0.00%	2.30%	0.00%
Chubb Ltd	CB	406.06	248.64	100,963	0.32%	1.38%	0.00%	6.00%	0.02%	0.34%	1.38%	0.00%	6.00%	0.02%
Hologic Inc	HOLX	234.73	75.77	17,786	0.06%			8.68%	0.00%				8.68%	
Citizens Financial Group Inc	CFG	458.49	34.11	15,639		4.93%		-5.79%			4.93%		-5.79%	
Jabil Inc	JBL	120.60	117.36	14,153	0.04%	0.27%	0.00%	12.00%	0.01%	0.05%	0.27%	0.00%	12.00%	0.01%
O'Reilly Automotive Inc	ORLY	58.98	1,013.26	59,764	0.19%			10.51%	0.02%				10.51%	
Allstate Corp/The	ALL	263.76	170.06	44,855		2.16%		53.70%			2.16%		53.70%	
Equity Residential	EQR	378.94	64.40	24,404	0.08%	4.19%	0.00%	4.75%	0.00%	0.08%	4.19%	0.00%	4.75%	0.00%
BorgWarner Inc	BWA	230.96	32.77	7,568	0.02%	1.34%	0.00%	5.67%	0.00%	0.03%	1.34%	0.00%	5.67%	0.00%
Keurig Dr Pepper Inc	KDP	1,355.57	33.70	45,683	0.14%	2.55%	0.00%	7.12%	0.01%	0.15%	2.55%	0.00%	7.12%	0.01%
Host Hotels & Resorts Inc	HST	703.60	18.87	13,277		4.24%					4.24%			
Incyte Corp	INCY	224.54	52.05	11,687				25.33%					25.33%	
Simon Property Group Inc	SPG	325.77	140.53	45,780	0.14%	5.55%	0.01%	1.58%	0.00%	0.16%	5.55%	0.01%	1.58%	0.00%
Eastman Chemical Co	EMN	117.65	94.44	11,111	0.03%	3.43%	0.00%	6.19%	0.00%	0.04%	3.43%	0.00%	6.19%	0.00%
AvalonBay Communities Inc	AVB	142.03	189.57	26,924	0.08%	3.59%	0.00%	5.81%	0.00%	0.09%	3.59%	0.00%	5.81%	0.01%
Prudential Financial Inc	PRU	359.38	110.48	39,704	0.12%	4.71%	0.01%	10.08%	0.01%	0.13%	4.71%	0.01%	10.08%	0.01%
United Parcel Service Inc	UPS	727.84	147.48	107,342	0.34%	4.42%	0.01%	8.77%	0.03%	0.36%	4.42%	0.02%	8.77%	0.03%
Walgreens Boots Alliance Inc	WBA	862.71	17.73	15,296		5.64%		-1.67%			5.64%		-1.67%	

P

MARKET RISK PREMIUM DERIVED FROM ANALYSTS' LONG-TERM GROWTH ESTIMATES

Bulkley As-Filed Direct Testimony			Ms. Bulkley "Adjustments" Corrected		
Estimated Weighted Average Dividend Yield:	1.72%	[1]	Estimated Weighted Average Dividend Yield:	1.86%	[12]
Estimated Weighted Average Long-Term Growth Rate:	11.09%	[2]	Estimated Weighted Average Long-Term Growth Rate:	10.93%	[13]
Estimated S&P 500 Required Market Return:	**12.91%**	[3]	Estimated S&P 500 Required Market Return:	**12.89%**	[14]

						Bulkley Direct Testimony As-Filed						Bulkley Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]		[15]	[16]	[17]	[18]	[19]	
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.		Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.	
STERIS PLC	STE	98.81	204.56	20,213		1.02%						1.02%				
McKesson Corp	MCK	131.41	537.21	70,594	0.22%	0.46%	0.00%	12.22%	0.03%		0.24%	0.46%	0.00%	12.22%	0.03%	
Lockheed Martin Corp	LMT	239.94	464.93	111,554	0.35%	2.71%	0.01%	2.39%	0.01%		0.38%	2.71%	0.01%	2.39%	0.01%	
Cencora Inc	COR	199.48	239.05	47,686	0.15%	0.85%	0.00%	10.10%	0.02%		0.16%	0.85%	0.00%	10.10%	0.02%	
Capital One Financial Corp	COF	382.10	143.43	54,805		1.67%		50.10%				1.67%		50.10%		
Waters Corp	WAT	59.31	309.04	18,329	0.06%			7.23%	0.00%					7.23%		
Nordson Corp	NDSN	57.19	258.19	14,766		1.05%						1.05%				
Dollar Tree Inc	DLTR	217.98	118.25	25,776	0.08%			14.10%	0.01%					14.10%		
Darden Restaurants Inc	DRI	119.36	153.41	18,311	0.06%	3.42%	0.00%	10.97%	0.01%		0.06%	3.42%	0.00%	10.97%	0.01%	
Evergy Inc	EVRG	229.75	52.45	12,050	0.04%	4.90%	0.00%	5.00%	0.00%		0.04%	4.90%	0.00%	5.00%	0.00%	
Match Group Inc	MTCH	268.01	30.82	8,260				36.66%						36.66%		
Domino's Pizza Inc	DPZ	34.88	529.27	18,461	0.06%	1.14%	0.00%	12.99%	0.01%		0.06%	1.14%	0.00%	12.99%	0.01%	
NVR Inc	NVR	3.17	7,438.85	23,566	0.07%			4.87%	0.00%					4.87%		
NetApp Inc	NTAP	206.38	102.21	21,094	0.07%	1.96%	0.00%	7.40%	0.00%		0.07%	1.96%	0.00%	7.40%	0.01%	
Old Dominion Freight Line Inc	ODFL	217.67	181.71	39,554	0.12%	0.57%	0.00%	13.12%	0.02%		0.13%	0.57%	0.00%	13.12%	0.02%	
DaVita Inc	DVA	87.70	139.01	12,191	0.04%			14.97%	0.01%					14.97%		
Hartford Financial Services Group Inc/The	HIG	295.76	96.89	28,656	0.09%	1.94%	0.00%	7.00%	0.01%		0.10%	1.94%	0.00%	7.00%	0.01%	
Iron Mountain Inc	IRM	293.10	77.52	22,721		3.35%						3.35%				
Estee Lauder Cos Inc/The	EL	232.93	146.71	34,173	0.11%	1.80%	0.00%	17.63%	0.02%		0.12%	1.80%	0.00%	17.63%	0.02%	
Cadence Design Systems Inc	CDNS	272.13	275.63	75,008	0.24%			16.32%	0.04%					16.32%		
Tyler Technologies Inc	TYL	42.46	461.55	19,595												
Universal Health Services Inc	UHS	60.08	170.43	10,240	0.03%	0.47%	0.00%	12.42%	0.00%		0.03%	0.47%	0.00%	12.42%	0.00%	
Skyworks Solutions Inc	SWKS	160.44	106.59	17,102	0.05%	2.55%	0.00%	5.08%	0.00%		0.06%	2.55%	0.00%	5.08%	0.00%	
Quest Diagnostics Inc	DGX	111.09	138.18	15,351		2.17%		-0.82%				2.17%		-0.82%		
Rockwell Automation Inc	ROK	114.59	270.96	31,050	0.10%	1.85%	0.00%	10.87%	0.01%		0.11%	1.85%	0.00%	10.87%	0.01%	
Kraft Heinz Co/The	KHC	1,215.64	38.61	46,936	0.15%	4.14%	0.01%	3.87%	0.01%		0.16%	4.14%	0.01%	3.87%	0.01%	
American Tower Corp	AMT	466.98	171.56	80,114	0.25%	3.78%	0.01%	10.24%	0.03%		0.27%	3.78%	0.01%	10.24%	0.03%	
Regeneron Pharmaceuticals Inc	REGN	107.94	890.66	96,141	0.30%			13.00%	0.04%					13.00%		
Amazon.com Inc	AMZN	10,387.38	175.00	1,817,792				24.94%						24.94%		
Jack Henry & Associates Inc	JKHY	72.87	162.69	11,855	0.04%	1.35%	0.00%	7.69%	0.00%		0.04%	1.35%	0.00%	7.69%	0.00%	
Ralph Lauren Corp	RL	39.04	163.64	6,389	0.02%	1.83%	0.00%	12.64%	0.00%		0.02%	1.83%	0.00%	12.64%	0.00%	
Boston Properties Inc	BXP	157.05	61.89	9,720	0.03%	6.33%	0.00%	0.37%	0.00%		0.03%	6.33%	0.00%	0.37%	0.00%	
Amphenol Corp	APH	600.60	120.77	72,535	0.23%	0.73%	0.00%	11.57%	0.03%		0.25%	0.73%	0.00%	11.57%	0.03%	
Howmet Aerospace Inc	HWM	410.30	66.75	27,388	0.09%	0.30%	0.00%	14.19%	0.01%		0.09%	0.30%	0.00%	14.19%	0.01%	
Pioneer Natural Resources Co	PXD	233.62	269.32	62,919		3.80%		-13.00%				3.80%		-13.00%		
Valero Energy Corp	VLO	327.00	159.87	52,277		2.68%		-24.00%				2.68%		-24.00%		
Synopsys Inc	SNPS	152.54	530.59	80,938	0.25%			18.70%	0.05%					18.70%		
Etsy Inc	ETSY	117.06	68.67	8,039	0.03%			4.48%	0.00%					4.48%		
CH Robinson Worldwide Inc	CHRW	115.71	71.00	8,216	0.03%	3.44%	0.00%	5.00%	0.00%		0.03%	3.44%	0.00%	5.00%	0.00%	
Accenture PLC	ACN	670.42	300.91	201,737	0.63%	1.71%	0.01%	10.00%	0.06%		0.68%	1.71%	0.01%	10.00%	0.07%	
TransDigm Group Inc	TDG	55.61	1,248.03	69,398	0.22%			14.52%	0.03%					14.52%		
Yum! Brands Inc	YUM	281.50	141.25	39,762	0.12%	1.90%	0.00%	8.59%	0.01%		0.13%	1.90%	0.00%	8.59%	0.01%	
Prologis Inc	PLD	925.84	102.05	94,482	0.30%	3.76%	0.01%	8.70%	0.03%		0.32%	3.76%	0.01%	8.70%	0.03%	
FirstEnergy Corp	FE	575.52	38.34	22,065	0.07%	4.43%	0.00%	6.65%	0.00%		0.07%	4.43%	0.00%	6.65%	0.00%	
VeriSign Inc	VRSN	100.14	169.48	16,972												
Quanta Services Inc	PWR	145.75	258.56	37,685	0.12%	0.14%	0.00%	10.00%	0.01%		0.13%	0.14%	0.00%	10.00%	0.01%	
Henry Schein Inc	HSIC	128.48	69.28	8,901	0.03%			9.38%	0.00%					9.38%		
Ameren Corp	AEE	266.51	73.87	19,687	0.06%	3.63%	0.00%	6.00%	0.00%		0.07%	3.63%	0.00%	6.00%	0.00%	
ANSYS Inc	ANSS	87.30	324.88	28,362	0.09%			8.63%	0.01%					8.63%		
FactSet Research Systems Inc	FDS	38.12	416.89	15,890	0.05%	0.94%	0.00%	10.32%	0.01%		0.05%	0.94%	0.00%	10.32%	0.01%	
NVIDIA Corp	NVDA	2,500.00	864.02	2,160,050		0.02%		37.63%				0.02%		37.63%		
Cognizant Technology Solutions Corp	CTSH	497.20	65.68	32,656	0.10%	1.83%	0.00%	12.00%	0.01%		0.11%	1.83%	0.00%	12.00%	0.01%	
Intuitive Surgical Inc	ISRG	354.71	370.62	131,461	0.41%			16.21%	0.07%					16.21%		
Take-Two Interactive Software Inc	TTWO	170.75	142.81	24,384				22.73%						22.73%		
Republic Services Inc	RSG	314.98	191.70	60,381	0.19%	1.12%	0.00%	9.04%	0.02%		0.20%	1.12%	0.00%	9.04%	0.02%	
eBay Inc	EBAY	518.00	51.54	26,698	0.08%	2.10%	0.00%	1.99%	0.00%		0.09%	2.10%	0.00%	1.99%	0.00%	
Goldman Sachs Group Inc/The	GS	324.53	426.71	138,479	0.43%	2.58%	0.01%	9.31%	0.04%		0.47%	2.58%	0.01%	9.31%	0.04%	
SBA Communications Corp	SBAC	108.02	186.12	20,105	0.06%	2.11%	0.00%	8.00%	0.01%		0.07%	2.11%	0.00%	8.00%	0.01%	
Sempra	SRE	632.15	71.63	45,281	0.14%	3.46%	0.00%	3.85%	0.01%		0.15%	3.46%	0.01%	3.85%	0.01%	
Moody's Corp	MCO	182.50	370.33	67,585	0.21%	0.92%	0.00%	9.45%	0.02%		0.23%	0.92%	0.00%	9.45%	0.02%	
ON Semiconductor Corp	ON	430.23	70.16	30,185	0.09%			3.32%	0.00%					3.32%		
Booking Holdings Inc	BKNG	34.17	3,452.03	117,959		1.01%		22.55%				1.01%		22.55%		
F5 Inc	FFIV	58.81	165.31	9,721	0.03%			7.81%	0.00%					7.81%		
Akamai Technologies Inc	AKAM	153.21	100.93	15,464	0.05%			8.33%	0.00%					8.33%		
Charles River Laboratories International Inc	CRL	51.35	229.00	11,759	0.04%			14.00%	0.01%					14.00%		
MarketAxess Holdings Inc	MKTX	37.87	200.09	7,577	0.02%	1.48%	0.00%	5.09%	0.00%		0.03%	1.48%	0.00%	5.09%	0.00%	
Devon Energy Corp	DVN	635.00	51.18	32,499		3.44%						3.44%				
Bio-Techne Corp	TECH	157.19	63.21	9,936	0.03%	0.51%	0.00%	2.00%	0.00%		0.03%	0.51%	0.00%	2.00%	0.00%	
Alphabet Inc	GOOGL	5,874.00	162.78	956,170	3.00%	0.49%	0.01%	15.01%	0.45%		3.24%	0.49%	0.02%	15.01%	0.49%	
Teleflex Inc	TFX	47.10	208.75	9,832	0.03%	0.65%	0.00%	7.21%	0.00%		0.03%	0.65%	0.00%	7.21%	0.00%	
Allegion plc	ALLE	87.44	121.56	10,629	0.03%	1.58%	0.00%	7.25%	0.00%		0.04%	1.58%	0.00%	7.25%	0.00%	
Netflix Inc	NFLX	430.97	550.64	237,307				35.61%						35.61%		
Warner Bros Discovery Inc	WBD	2,450.13	7.36	18,033				35.28%						35.28%		
Agilent Technologies Inc	A	293.06	137.04	40,160		0.69%						0.69%				
Trimble Inc	TRMB	244.21	60.07	14,670												
Elevance Health Inc	ELV	232.42	528.58	122,852	0.39%	1.23%	0.00%	10.02%	0.04%		0.42%	1.23%	0.01%	10.02%	0.04%	
CME Group Inc	CME	360.03	209.64	75,476	0.24%	2.19%	0.01%	4.90%	0.01%		0.26%	2.19%	0.01%	4.90%	0.01%	
Juniper Networks Inc	JNPR	324.99	34.82	11,316	0.04%	2.53%	0.00%	4.78%	0.00%		0.04%	2.53%	0.00%	4.78%	0.00%	
BlackRock Inc	BLK	148.76	754.64	112,260	0.35%	2.70%	0.01%	11.89%	0.04%		0.38%	2.70%	0.01%	11.89%	0.05%	
DTE Energy Co	DTE	206.93	110.32	22,828	0.07%	3.70%	0.00%	6.50%	0.00%		0.08%	3.70%	0.00%	6.50%	0.01%	
Celanese Corp	CE	108.91	153.61	16,729	0.05%	1.82%	0.00%	4.32%	0.00%		0.06%	1.82%	0.00%	4.32%	0.00%	
Nasdaq Inc	NDAQ	575.21	59.85	34,426	0.11%	1.60%	0.00%	5.72%	0.01%		0.12%	1.60%	0.00%	5.72%	0.01%	
Philip Morris International Inc	PM	1,554.56	94.94	147,590	0.46%	5.48%	0.03%	8.23%	0.04%		0.50%	5.48%	0.03%	8.23%	0.04%	
Ingersoll Rand Inc	IR	403.44	93.32	37,649		0.09%						0.09%				
Salesforce Inc	CRM	970.00	268.94	260,872		0.59%		22.50%				0.59%		22.50%		
Roper Technologies Inc	ROP	107.02	511.46	54,737		0.59%						0.59%				
Huntington Ingalls Industries Inc	HII	39.61	276.93	10,969		1.88%		40.00%				1.88%		40.00%		
MetLife Inc	MET	723.02	71.08	51,392	0.16%	3.07%	0.00%	14.63%	0.02%		0.17%	3.07%	0.01%	14.63%	0.03%	
Tapestry Inc	TPR	229.37	39.92	9,156	0.03%	3.51%	0.00%	11.00%	0.00%		0.03%	3.51%	0.00%	11.00%	0.00%	
CSX Corp	CSX	1,954.93	33.22	64,943	0.20%	1.44%	0.00%	10.76%	0.02%		0.22%	1.44%	0.00%	10.76%	0.02%	
Edwards Lifesciences Corp	EW	601.30	84.67	50,912	0.16%			10.03%	0.02%					10.03%		
Ameriprise Financial Inc	AMP	100.19	411.79	41,258		1.44%						1.44%				
Zebra Technologies Corp	ZBRA	51.42	314.56	16,174												
Zimmer Biomet Holdings Inc	ZBH	205.08	120.28	24,668	0.08%	0.80%	0.00%	6.89%	0.01%		0.08%	0.80%	0.00%	6.89%	0.01%	
Camden Property Trust	CPT	106.97	99.68	10,663	0.03%	4.13%	0.00%	5.93%	0.00%		0.04%	4.13%	0.00%	5.93%	0.00%	
CBRE Group Inc	CBRE	305.70	86.89	26,562												
Mastercard Inc	MA	925.72	451.20	417,686	1.31%	0.59%	0.01%	16.78%	0.22%		1.42%	0.59%	0.01%	16.78%	0.24%	
CarMax Inc	KMX	157.39	67.97	10,698				25.76%						25.76%		
Intercontinental Exchange Inc	ICE	572.62	128.76	73,730	0.23%	1.40%	0.00%	10.83%	0.03%		0.25%	1.40%	0.00%	10.83%	0.03%	
Fidelity National Information Services Inc	FIS	576.47	67.92	39,154	0.12%	2.12%	0.00%	16.00%	0.02%		0.13%	2.12%	0.00%	16.00%	0.02%	
Chipotle Mexican Grill Inc	CMG	27.47	3,159.60	86,785				22.81%						22.81%		
Wynn Resorts Ltd	WYNN	112.07	91.65	10,271		1.09%						1.09%				
Live Nation Entertainment Inc	LYV	230.80	88.91	20,520												
Assurant Inc	AIZ	51.98	174.40	9,065	0.03%	1.65%	0.00%	5.04%	0.00%		0.03%	1.65%	0.00%	5.04%	0.00%	

P

MARKET RISK PREMIUM DERIVED FROM ANALYSTS' LONG-TERM GROWTH ESTIMATES

Bulkley As-Filed Direct Testimony

Estimated Weighted Average Dividend Yield: 1.72% [1]

Estimated Weighted Average Long-Term Growth Rate: 11.09% [2]

Estimated S&P 500 Required Market Return: **12.91%** [3]

Ms. Bulkley "Adjustments" Corrected

Estimated Weighted Average Dividend Yield: 1.86% [12]

Estimated Weighted Average Long-Term Growth Rate: 10.93% [13]

Estimated S&P 500 Required Market Return: **12.89%** [14]

					Bulkley Direct Testimony As-Filed					Bulkley Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[15]	[16]	[17]	[18]	[19]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
NRG Energy Inc	NRG	208.02	72.67	15,117	0.05%	2.24%	0.00%	3.00%	0.00%	0.05%	2.24%	0.00%	3.00%	0.00%
Monster Beverage Corp	MNST	1,040.64	53.45	55,622	0.17%			12.45%	0.02%				12.45%	
Regions Financial Corp	RF	918.86	19.27	17,707	0.06%	4.98%	0.00%	1.71%	0.00%	0.06%	4.98%	0.00%	1.71%	0.00%
Baker Hughes Co	BKR	998.00	32.62	32,555		2.58%		27.93%			2.58%		27.93%	
Mosaic Co/The	MOS	321.69	31.39	10,098	0.03%	2.68%	0.00%	16.00%	0.01%	0.03%	2.68%	0.00%	16.00%	0.01%
Expedia Group Inc	EXPE	130.77	134.63	17,605	0.06%			19.47%	0.01%				19.47%	
CF Industries Holdings Inc	CF	188.34	78.97	14,873	0.05%	2.53%	0.00%	2.50%	0.00%	0.05%	2.53%	0.00%	2.50%	0.00%
APA Corp	APA	370.89	31.44	11,661		3.18%		-2.00%			3.18%		-2.00%	
Leidos Holdings Inc	LDOS	135.21	140.22	18,959	0.06%	1.08%	0.00%	9.66%	0.01%	0.06%	1.08%	0.00%	9.66%	0.01%
Alphabet Inc	GOOG	5,617.00	164.64	924,783	2.90%	0.49%	0.01%	15.01%	0.44%	3.13%	0.49%	0.02%	15.01%	0.47%
First Solar Inc	FSLR	107.03	176.30	18,869				29.52%					29.52%	
TE Connectivity Ltd	TEL	306.23	141.48	43,325	0.14%	1.84%	0.00%	5.04%	0.01%	0.15%	1.84%	0.00%	5.04%	0.01%
Discover Financial Services	DFS	251.00	126.73	31,809		2.21%		61.27%			2.21%		61.27%	
Visa Inc	V	1,574.15	268.61	422,833	1.33%	0.77%	0.01%	13.53%	0.18%	1.43%	0.77%	0.01%	13.53%	0.19%
Mid-America Apartment Communities Inc	MAA	116.69	130.00	15,169	0.05%	4.52%	0.00%	2.99%	0.00%	0.05%	4.52%	0.00%	2.99%	0.00%
Xylem Inc/NY	XYL	241.77	130.70	31,599		1.10%					1.10%			
Marathon Petroleum Corp	MPC	352.33	181.72	64,025		1.82%		-12.00%			1.82%		-12.00%	
Tractor Supply Co	TSCO	107.93	273.08	29,474	0.09%	1.61%	0.00%	5.54%	0.01%	0.10%	1.61%	0.00%	5.54%	0.01%
Advanced Micro Devices Inc	AMD	1,615.79	158.38	255,908				33.38%					33.38%	
ResMed Inc	RMD	146.91	213.99	31,437	0.10%	0.90%	0.00%	8.30%	0.01%	0.11%	0.90%	0.00%	8.30%	0.01%
Mettler-Toledo International Inc	MTD	21.39	1,229.70	26,301	0.08%			9.18%	0.01%				9.18%	
VICI Properties Inc	VICI	1,043.14	28.55	29,782	0.09%	5.81%	0.01%	1.98%	0.00%	0.10%	5.81%	0.01%	1.98%	0.00%
Copart Inc	CPRT	961.46	54.31	52,217										
Jacobs Solutions Inc	J	125.65	143.53	18,035	0.06%	0.81%	0.00%	12.41%	0.01%	0.06%	0.81%	0.00%	12.41%	0.01%
Albemarle Corp	ALB	117.53	120.31	14,139		1.33%		-19.50%			1.33%		-19.50%	
Fortinet Inc	FTNT	763.03	63.18	48,208	0.15%			18.05%	0.03%				18.05%	
Moderna Inc	MRNA	382.88	110.31	42,235	0.13%			17.62%	0.02%				17.62%	
Essex Property Trust Inc	ESS	64.21	246.25	15,811	0.05%	3.98%	0.00%	4.48%	0.00%	0.05%	3.98%	0.00%	4.48%	0.00%
CoStar Group Inc	CSGP	408.34	91.53	37,376	0.12%			20.00%	0.02%				20.00%	
Realty Income Corp	O	861.15	53.54	46,106	0.14%	5.76%	0.01%	4.82%	0.01%	0.16%	5.76%	0.01%	4.82%	0.01%
Westrock Co	WRK	258.15	47.96	12,381	0.04%	2.52%	0.00%	5.28%	0.00%	0.04%	2.52%	0.00%	5.28%	0.00%
Westinghouse Air Brake Technologies Corp	WAB	176.39	161.08	28,412	0.09%	0.50%	0.00%	15.49%	0.01%	0.10%	0.50%	0.00%	15.49%	0.01%
Pool Corp	POOL	38.33	362.53	13,895	0.04%	1.21%	0.00%	4.73%	0.00%	0.05%	1.21%	0.00%	4.73%	0.00%
Western Digital Corp	WDC	326.53	70.83	23,128				-11.96%					-11.96%	
PepsiCo Inc	PEP	1,374.79	175.91	241,839	0.76%	3.08%	0.02%	7.91%	0.06%	0.82%	3.08%	0.03%	7.91%	0.06%
Diamondback Energy Inc	FANG	178.34	201.13	35,870	0.11%	6.13%	0.01%	2.00%	0.00%	0.12%	6.13%	0.01%	2.00%	0.00%
Palo Alto Networks Inc	PANW	323.10	290.89	93,987				20.50%					20.50%	
ServiceNow Inc	NOW	205.38	693.33	142,398				25.00%					25.00%	
Church & Dwight Co Inc	CHD	243.91	107.89	26,315	0.08%	1.05%	0.00%	7.35%	0.01%	0.09%	1.05%	0.00%	7.35%	0.01%
Federal Realty Investment Trust	FRT	82.78	104.17	8,623	0.03%	4.19%	0.00%	5.18%	0.00%	0.03%	4.19%	0.00%	5.18%	0.00%
MGM Resorts International	MGM	317.02	39.44	12,503	0.04%			9.87%	0.00%				9.87%	
American Electric Power Co Inc	AEP	526.59	86.03	45,303	0.14%	4.09%	0.01%	5.93%	0.01%	0.15%	4.09%	0.01%	5.93%	0.01%
Invitation Homes Inc	INVH	611.96	34.20	20,929	0.07%	3.27%	0.00%	6.43%	0.00%	0.07%	3.27%	0.00%	6.43%	0.00%
PTC Inc	PTC	119.55	177.44	21,213				21.10%					21.10%	
JB Hunt Transport Services Inc	JBHT	103.20	162.57	16,777	0.05%	1.06%	0.00%	12.00%	0.01%	0.06%	1.06%	0.00%	12.00%	0.01%
Lam Research Corp	LRCX	130.74	894.41	116,932	0.37%	0.89%	0.00%	11.92%	0.04%	0.40%	0.89%	0.00%	11.92%	0.05%
Mohawk Industries Inc	MHK	63.86	115.32	7,365	0.02%			2.74%	0.00%				2.74%	
GE HealthCare Technologies Inc	GEHC	456.47	76.24	34,801	0.11%	0.16%	0.00%	11.53%	0.01%	0.12%	0.16%	0.00%	11.53%	0.01%
Pentair PLC	PNR	166.03	79.09	13,131	0.04%	1.16%	0.00%	13.13%	0.01%	0.04%	1.16%	0.00%	13.13%	0.01%
Vertex Pharmaceuticals Inc	VRTX	258.46	392.81	101,525	0.32%			16.71%	0.05%				16.71%	
Amcor PLC	AMCR	1,445.34	8.94	12,921	0.04%	5.59%	0.00%	2.63%	0.00%	0.04%	5.59%	0.00%	2.63%	0.00%
Meta Platforms Inc	META	2,191.45	430.17	942,694	2.96%	0.46%	0.01%	18.58%	0.55%	3.19%	0.46%	0.01%	18.58%	0.59%
T-Mobile US Inc	TMUS	1,171.85	164.17	192,383	0.60%	1.58%	0.01%	5.00%	0.03%	0.65%	1.58%	0.01%	5.00%	0.03%
United Rentals Inc	URI	66.59	667.99	44,481	0.14%	0.98%	0.00%	5.27%	0.01%	0.15%	0.98%	0.00%	5.27%	0.01%
Alexandria Real Estate Equities Inc	ARE	174.88	115.87	20,264	0.06%	4.38%	0.00%	5.49%	0.00%	0.07%	4.38%	0.00%	5.49%	0.00%
Honeywell International Inc	HON	651.19	192.73	125,503	0.39%	2.24%	0.01%	8.50%	0.03%	0.43%	2.24%	0.01%	8.50%	0.04%
Delta Air Lines Inc	DAL	645.31	50.07	32,311	0.10%	0.80%	0.00%	12.00%	0.01%	0.11%	0.80%	0.00%	12.00%	0.01%
United Airlines Holdings Inc	UAL	328.80	51.46	16,920	0.05%			12.79%	0.01%				12.79%	
Seagate Technology Holdings PLC	STX	209.99	85.91	18,040	0.06%	3.26%	0.00%	1.21%	0.00%	0.06%	3.26%	0.00%	1.21%	0.00%
News Corp	NWS	191.10	24.54	4,689		0.81%					0.81%			
Centene Corp	CNC	534.91	73.06	39,080	0.12%			5.16%	0.01%				5.16%	
Martin Marietta Materials Inc	MLM	61.64	587.07	36,187	0.11%	0.50%	0.00%	9.71%	0.01%	0.12%	0.50%	0.00%	9.71%	0.01%
Teradyne Inc	TER	152.97	116.32	17,794		0.41%		-1.44%			0.41%		-1.44%	
PayPal Holdings Inc	PYPL	1,046.05	67.92	71,047	0.22%			6.02%	0.01%				6.02%	
Tesla Inc	TSLA	3,189.20	183.28	584,516				-11.00%					-11.00%	
Arch Capital Group Ltd	ACGL	374.15	93.54	34,998	0.11%			6.00%	0.01%				6.00%	
Dow Inc	DOW	703.27	56.90	40,016	0.13%	4.92%	0.01%	2.46%	0.00%	0.14%	4.92%	0.01%	2.46%	0.00%
Everest Group Ltd	EG	43.38	366.41	15,896	0.05%	1.91%	0.00%	3.93%	0.00%	0.05%	1.91%	0.00%	3.93%	0.00%
Teledyne Technologies Inc	TDY	47.42	381.48	18,091	0.06%			7.49%	0.00%				7.49%	
GE Vernova Inc	GEV	274.09	153.71	42,130										
News Corp	NWSA	380.02	23.80	9,045		0.84%					0.84%			
Exelon Corp	EXC	999.74	37.58	37,570	0.12%	4.04%	0.00%	5.25%	0.01%	0.13%	4.04%	0.01%	5.25%	0.01%
Global Payments Inc	GPN	257.99	122.77	31,673	0.10%	0.81%	0.00%	11.98%	0.01%	0.11%	0.81%	0.00%	11.98%	0.01%
Crown Castle Inc	CCI	435.00	93.78	40,794	0.13%	6.68%	0.01%	7.00%	0.01%	0.14%	6.68%	0.01%	7.00%	0.01%
Aptiv PLC	APTV	272.68	71.00	19,360	0.06%			11.44%	0.01%				11.44%	
Align Technology Inc	ALGN	75.28	282.38	21,257	0.07%			6.87%	0.00%				6.87%	
Illumina Inc	ILMN	158.90	123.05	19,553	0.06%			3.00%	0.00%				3.00%	
Kenvue Inc	KVUE	1,914.65	18.82	36,034	0.11%	4.25%	0.00%	15.35%	0.02%	0.12%	4.25%	0.01%	15.35%	0.02%
Targa Resources Corp	TRGP	223.16	114.06	25,453	0.08%	2.63%	0.00%	9.00%	0.01%	0.09%	2.63%	0.00%	9.00%	0.01%
Bunge Global SA	BG	141.60	101.76	14,409		2.60%		-8.30%			2.60%		-8.30%	
LKQ Corp	LKQ	266.78	43.13	11,506		2.78%					2.78%			
Deckers Outdoor Corp	DECK	25.67	818.47	21,008	0.07%			19.98%	0.01%				19.98%	
Zoetis Inc	ZTS	456.95	159.24	72,764	0.23%	1.09%	0.00%	10.10%	0.02%	0.25%	1.09%	0.00%	10.10%	0.02%
Equinix Inc	EQIX	94.91	711.11	67,488	0.21%	2.40%	0.01%	12.49%	0.03%	0.23%	2.40%	0.01%	12.49%	0.03%
Digital Realty Trust Inc	DLR	311.61	138.78	43,245	0.14%	3.52%	0.00%	4.80%	0.01%	0.15%	3.52%	0.01%	4.80%	0.01%
Molina Healthcare Inc	MOH	59.00	342.10	20,184	0.06%			11.72%	0.01%				11.72%	
Las Vegas Sands Corp	LVS	745.05	44.36	33,050	0.10%	1.80%	0.00%	11.24%	0.01%	0.11%	1.80%	0.00%	11.24%	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] Source: Bloomberg Professional as of April 30, 2024
[5] Source: Bloomberg Professional as of April 30, 2024
[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, as of April 30, 2024
[9] Equals [7] x [8]
[10] Bloomberg Professional, as of April 30, 2024
[11] Equals [7] x [10]
[12] Equals sum of Col. [17]

P

MARKET RISK PREMIUM DERIVED FROM ANALYSTS' LONG-TERM GROWTH ESTIMATES

Bulkley As-Filed Direct Testimony

Estimated Weighted Average Dividend Yield:	1.72%	[1]
Estimated Weighted Average Long-Term Growth Rate:	11.09%	[2]
Estimated S&P 500 Required Market Return:	**12.91%**	[3]

Ms. Bulkley "Adjustments" Corrected

Estimated Weighted Average Dividend Yield:	1.86%	[12]
Estimated Weighted Average Long-Term Growth Rate:	10.93%	[13]
Estimated S&P 500 Required Market Return:	**12.89%**	[14]

					Bulkley Direct Testimony As-Filed					Bulkley Direct Testimony *Excluding* Non-Dividend Paying Companies				
		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[15]	[16]	[17]	[18]	[19]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Bloomberg Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.

[13] Equals sum of Col. [19]
[14] Equals ([12] x (1 + (0.5 x [13]))) + [13]
[15] Equals weight in S&P 500 based on market capitalization [6] if Dividend Yield >0% & Growth Rate >0% and 0%
[16] Bloomberg Professional, as of April 30, 2024
[17] Equals [15] x [16]
[18] Bloomberg Professional, as of April 30, 2024
[19] Equals [15] x [18]

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & VL BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	3-month average of 30-year U.S. Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE (K)	ECAPM ROE (K)
American States Water Company	AWR	4.57%	0.70	12.89%	8.32%	10.39%	11.02%
California Water Service Group	CWT	4.57%	0.75	12.89%	8.32%	10.81%	11.33%
Middlesex Water Company	MSEX	4.57%	0.75	12.89%	8.32%	10.81%	11.33%
SJW Group	SJW	4.57%	0.85	12.89%	8.32%	11.64%	11.96%
Essential Utilities, Inc.	WTRG	4.57%	1.00	12.89%	8.32%	12.89%	12.89%
Mean						11.31%	11.71%

Notes:
[1] Schedule KM-r4, 3-month average as of June 30, 2024
[2] Value Line
[3] Schedule AEB-R-12
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & BLOOMBERG BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	3-month average of 30-year U.S. Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE (K)	ECAPM ROE (K)
American States Water Company	AWR	4.57%	0.65	12.89%	8.32%	9.95%	10.68%
California Water Service Group	CWT	4.57%	0.69	12.89%	8.32%	10.31%	10.95%
Middlesex Water Company	MSEX	4.57%	0.77	12.89%	8.32%	10.97%	11.45%
SJW Group	SJW	4.57%	0.80	12.89%	8.32%	11.22%	11.64%
Essential Utilities, Inc.	WTRG	4.57%	0.85	12.89%	8.32%	11.62%	11.93%
Mean						10.81%	11.33%

Notes:
[1] Schedule KM-r4, 3-month average as of June 30, 2024
[2] Bloomberg Professional
[3] Schedule AEB-R-12
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPM / ECAPM MODELS

CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA
BULKLEY AS-FILED MARKET RETURN, EXCLUDING NON-DIVIDEND PAYING COMPANIES

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

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	3-month average of 30-year U.S. Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE (K)	ECAPM ROE (K)
American States Water Company	AWR	4.57%	0.69	12.89%	8.32%	10.32%	10.96%
California Water Service Group	CWT	4.57%	0.70	12.89%	8.32%	10.43%	11.05%
Middlesex Water Company	MSEX	4.57%	0.74	12.89%	8.32%	10.70%	11.25%
SJW Group	SJW	4.57%	0.76	12.89%	8.32%	10.92%	11.42%
Essential Utilities, Inc.	WTRG	4.57%	0.79	12.89%	8.32%	11.15%	11.59%
Mean						10.71%	11.25%

Notes:
[1] Schedule KM-r4, 3-month average as of June 30, 2024
[2] Schedule AEB-5
[3] Schedule AEB-R-12
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

P

BOND YIELD PLUS RISK PREMIUM

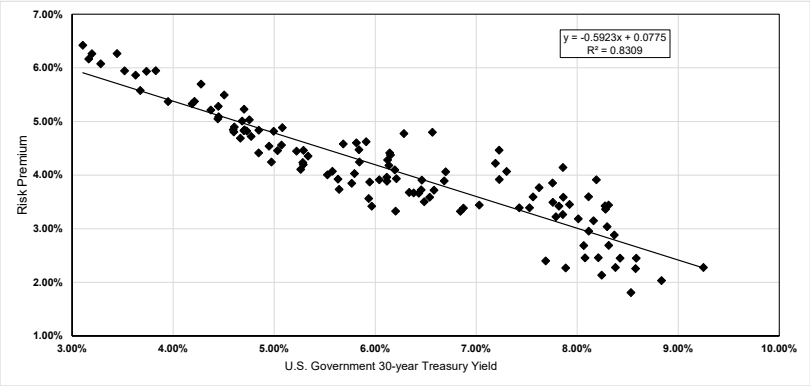
	[1]	[2]	[3]
Quarter	Average Authorized Electric T&D & Natual Gas ROE	Moody's Baa-rated Utility Bond Yield	Risk Premium
1993.1	11.75%	8.31%	3.44%
1993.2	11.71%	8.11%	3.60%
1993.3	11.39%	7.62%	3.77%
1993.4	11.16%	7.56%	3.59%
1994.1	11.12%	7.86%	3.26%
1994.2	10.84%	8.58%	2.26%
1994.3	10.87%	8.83%	2.03%
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	10.53%	8.08%	2.46%
2002.1	10.67%	8.21%	2.46%
2002.2	11.64%	8.28%	3.36%
2002.3	11.24%	7.82%	3.42%
2002.4	11.01%	7.79%	3.22%
2003.1	11.15%	7.23%	3.92%
2003.2	11.36%	6.57%	4.80%
2003.3	10.26%	6.87%	3.38%
2003.4	10.76%	6.70%	4.06%
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	10.56%	6.14%	4.41%
2005.1	10.53%	5.91%	4.62%
2005.2	10.31%	5.84%	4.47%
2005.3	10.42%	5.81%	4.60%
2005.4	10.31%	6.14%	4.18%
2006.1	10.53%	6.15%	4.37%
2006.2	10.30%	6.58%	3.72%
2006.3	10.09%	6.43%	3.66%
2006.4	10.07%	6.11%	3.96%
2007.1	10.40%	6.12%	4.28%
2007.2	10.01%	6.34%	3.68%
2007.3	9.99%	6.49%	3.50%
2007.4	10.05%	6.38%	3.67%
2008.1	10.13%	6.54%	3.59%
2008.2	10.17%	6.84%	3.32%
2008.3	10.47%	7.03%	3.44%
2008.4	10.34%	8.53%	1.81%
2009.1	10.15%	7.88%	2.27%
2009.2	10.09%	7.69%	2.40%
2009.3	10.18%	6.45%	3.72%
2009.4	10.29%	6.19%	4.10%
2010.1	10.14%	6.21%	3.93%
2010.2	10.00%	6.12%	3.88%
2010.3	10.26%	5.68%	4.58%
2010.4	10.09%	5.84%	4.24%
2011.1	9.95%	6.04%	3.91%
2011.2	9.82%	5.79%	4.03%
2011.3	9.69%	5.34%	4.35%
2011.4	9.97%	5.08%	4.89%
2012.1	9.63%	5.07%	4.56%

P

BOND YIELD PLUS RISK PREMIUM

	[1]	[2]	[3]
Quarter	Average Authorized Electric T&D & Natual Gas ROE	Moody's Baa-rated Utility Bond Yield	Risk Premium
2012.2	9.81%	4.99%	4.82%
2012.3	9.68%	4.85%	4.84%
2012.4	10.00%	4.51%	5.49%
2013.1	9.55%	4.71%	4.84%
2013.2	9.55%	4.73%	4.82%
2013.3	9.37%	5.26%	4.11%
2013.4	9.67%	5.22%	4.44%
2014.1	9.49%	5.03%	4.46%
2014.2	9.79%	4.75%	5.03%
2014.3	9.53%	4.70%	4.83%
2014.4	9.93%	4.70%	5.23%
2015.1	9.54%	4.45%	5.09%
2015.2	9.26%	4.85%	4.41%
2015.3	9.75%	5.29%	4.46%
2015.4	9.53%	5.53%	4.00%
2016.1	9.48%	5.29%	4.20%
2016.2	9.40%	4.60%	4.80%
2016.3	9.59%	4.21%	5.37%
2016.4	9.44%	4.59%	4.84%
2017.1	9.50%	4.60%	4.90%
2017.2	9.49%	4.44%	5.05%
2017.3	9.97%	4.28%	5.70%
2017.4	9.52%	4.19%	5.33%
2018.1	9.58%	4.37%	5.21%
2018.2	9.35%	4.67%	4.69%
2018.3	9.69%	4.68%	5.01%
2018.4	9.49%	4.95%	4.54%
2019.1	9.49%	4.77%	4.72%
2019.2	9.73%	4.45%	5.28%
2019.3	9.78%	3.83%	5.95%
2019.4	9.67%	3.74%	5.94%
2020.1	9.25%	3.67%	5.58%
2020.2	9.49%	3.63%	5.86%
2020.3	9.53%	3.11%	6.42%
2020.4	9.33%	3.16%	6.16%
2021.1	9.71%	3.44%	6.26%
2021.2	9.46%	3.52%	5.94%
2021.3	9.46%	3.20%	6.26%
2021.4	9.36%	3.28%	6.08%
2022.1	9.32%	3.95%	5.37%
2022.2	9.22%	4.97%	4.24%
2022.3	9.52%	5.28%	4.23%
2022.4	9.50%	5.93%	3.56%
2023.1	9.65%	5.58%	4.07%
2023.2	9.38%	5.64%	3.73%
2023.3	9.38%	5.97%	3.42%
2023.4	9.53%	6.20%	3.33%
2024.1	9.61%	5.77%	3.85%
2024.2	9.81%	5.94%	3.87%
2024.3	9.55%	5.63%	3.92%
AVERAGE	10.26%	6.16%	4.10%
MEDIAN	10.09%	6.12%	4.06%

P



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.91156
R Square	0.83093
Adjusted R Square	0.82954
Standard Error	0.00418
Observations	123

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.01041	0.01041	594.70	0.00000
Residual	121	0.00212	0.00002		
Total	122	0.01252			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.0775	0.0015	50.18	0.00000	0.07442	0.08053	0.07442	0.08053
Moody's Baa-rated Utility Bond Yield	(0.5923)	0.0243	(24.39)	0.00000	(0.64037)	(0.54420)	(0.64037)	(0.54420)

	[7] Moody's Baa-rated Utility Bond [7]	[8] Risk Premium [8]	[9] ROE [9]
Moody's Baa-rated Utility Bond Yield - July 2024 [4]	5.85%	4.28%	10.13%
Moody's Baa-rated Utility Bond Yield - August 2024 [5]	5.61%	4.42%	10.03%
Moody's Baa-rated Utility Bond Yield - September 2024 [6]	5.41%	4.54%	9.95%
AVERAGE			10.04%

Notes:
[1] Source: Regulatory Research Associates, rate cases through September 30, 2024
[2] Source: Bloomberg Professional, quarterly bond yields are the average of each trading day in the quarter
[3] Equals Column [1] − Column [2]
[4] Source: Bloomberg Professional
[5] Source: Bloomberg Professional
[6] Source: Bloomberg Professional
[7] See notes [4], [5] & [6]
[8] Equals 0.077476 + (-0.592283 x Column [7])
[9] Equals Column [7] + Column [8]

P