

STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION

In the matter of

Aquarion Water Company of New Hampshire, Inc.

Docket No. DW 20-184

Petition for Permanent Rate Increase

DIRECT TESTIMONY

OF

Josie A. M. Gage
Director of Economics and Finance
Office of the Consumer Advocate

March 2, 2022

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1 I. INTRODUCTION

2 **Q. Please state your name, business address and occupation.**

3 A. My name is Josie A. M. Gage. My business address is 21 South Fruit Street, Suite
4 18, Concord, New Hampshire. I am employed as the Director of Economics and
5 Finance with the New Hampshire Office of the Consumer Advocate (OCA).

6 **Q. Please summarize your education and professional experience.**

7 A. I have an M.B.A. concentrated in Economics and Investments from Simmons
8 Graduate School of Management, which I earned in 2003. I have a B.S. in Business
9 Administration, which I earned in 1998 from Lasell University. I have attended
10 both the New Mexico State University Center for Public Utilities, Practical
11 Regulatory Training in 2007, and the Institute of Public Utilities at Michigan State
12 University, Annual Utilities Studies Program in 2010.

13 During the past fifteen years I have developed utility ratemaking expertise while
14 at two utility commissions as an Analyst III and Economist III, as a Senior
15 Consultant, and currently as Director of Economics and Finance. I have
16 participated in utility proceedings with respect to the electric, natural gas,
17 telecommunications, water and transportation industries.

18 Since September 2021, I have been the Director of Economics and Finance for the
19 Office of the Consumer Advocate during which time I have been involved in five
20 requests for new permanent rates, among several other rate related dockets.

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1 Since November 2018, I have been an Independent Senior Consultant working
2 with Reno Energy Consulting Services, LLC, Derry, N.H. providing research for
3 several cases in New Mexico, Maryland, and Oklahoma. Prior to becoming a
4 consultant, I served seven and a half years (January 2010 – May 2017) as an
5 Economist III with the Commonwealth of Massachusetts, Department of Public
6 Utilities, Rates and Revenue Requirements Division. During my tenure there I
7 participated in over 50 cases related to utility ratemaking. Several of those were
8 requests for new permanent rates in which my primary assignment was the
9 company's capital structure, cost of debt, and return on equity.

10 Prior to working for the Commonwealth, I served three years (February 2007 –
11 January 2010) at New Hampshire Public Utilities Commission (PUC) as a Utilities
12 Analyst III in its Telecommunications Division. During those years I presented
13 Telecommunications-related testimony before the PUC.

14 **Q. Have you previously provided testimony before this Commission?**

15 A. Yes.

16 **II. PURPOSE AND RECOMMENDATIONS**

17 **Q. What is the purpose of your testimony?**

18 A. The purpose of my testimony is to provide the Commission with a recommended
19 alternative to the Company's proposed capital structure and rate of return. My
20 recommendation adheres to the standards in *Bluefield Water Works v. PSC*, 262 U.S.
21 679, 692-93 (1923) ("Bluefield") and *FPC v. Hope Natural Gas Co.*, 320 U.S. 591, 605
22 (1944) ("Hope"). In Bluefield and Hope, the U.S. Supreme Court established the

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principle that a public utility may be allowed to earn a return comparable to a return on investments in other enterprises having similar risks that allow the utility, under efficient management, the opportunity to attract capital on reasonable terms and to maintain a satisfactory credit rating.

Q. How does the Company's proposed return on equity ("ROE") compare with your recommendation?

A. The Company's witness, Mr. Dylan D'Ascendis, supports a weighted average cost of capital ("WACC") of 8.15 percent based on the Company's cost of long-term debt of 6.14 percent, a cost of short-term debt of 2.42 percent, a return on preferred stock of 6.00 percent, and an authorized ROE of 10.25 percent. The Company's capital structure is weighted 43.85 percent long-term debt, 3.79 percent short-term debt, 0.01 percent preferred stock, and equity representing 52.36 percent. Table 1 below depicts Mr. D'Ascendis' calculation of the Company's proposed capital structure and costs of capital.

| Table 1: Cost of Capital Summary | | | | | |
|----------------------------------|---------------------------|--------------------------|--------------|-------------|-------------------------|
| | [1] Capital Element | [2] Actual Amounts | [3] Ratio | [4] Rate | [5] Weighted Rate |
| 1 | Long-term Debt | \$13,900,000 | 43.85% | 6.14% | 2.69% |
| 2 | Short-term Debt | 1,200,000 | 3.79% | 2.42% | 0.09% |
| 3 | Preferred Stock | 2,300 | 0.01% | 6.00% | 0.00% |
| 4 | Equity | 16,598,323 | 52.36% | 10.25% | 5.37% |
| 5 | Total Capital | \$31,700,623 | 100.00% | WACC | 8.15% |

Source data: Testimony of Dylan W. D'Ascendis, Att. DWD-1 and Company Sch. 4A.

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I'm recommending that the PUC allow the Company a WACC of 7.41 percent and an authorized ROE of 8.84 percent. Table 2 below depicts my calculation of the Company's proposed capital structure and costs of capital.

| Table 2: Cost of Capital Summary | | | | | |
|----------------------------------|---------------------------|--------------------------|--------------|--------------|-------------------------|
| | [1] Capital Element | [2] Actual Amounts | [3] Ratio | [4] Rate | [5] Weighted Rate |
| 1 | Long-term Debt | \$13,900,000 | 43.85% | 6.14% | 2.69% |
| 2 | Short-term Debt | 1,200,000 | 3.79% | 2.42% | 0.09% |
| 3 | Preferred Stock | 2,300 | 0.01% | 6.00% | 0.00% |
| 4 | Equity | 16,598,323 | 52.36% | 8.84% | 4.58% |
| 5 | Total Capital | \$31,700,623 | 100.00% | WACC | 7.41% |

Source data: Exhibit JAMG-2, and Company Sch. 4A.

Q. Please give a brief overview of the Company's operations.

A. Aquarion provides public drinking water supply to approximately 226,000 customer accounts or more than 700,000 people throughout its various New England service territories.¹ The Company is the largest investor-owned water utility in New England and thereby, in New Hampshire. Aquarion Water Company of New Hampshire is a subsidiary of Aquarion Water Company which is a subsidiary of Eversource. The Company's Pro Forma Operating Revenues as of December 31, 2019, were \$7,616,793 (Company Schedule No. 1A). The Company proposes to increase that number to \$8,990,143 via this rate case (Company Schedule No. 1A). Ninety-seven percent of the Company's Operating

¹ <https://www.aquarionwater.com/about>

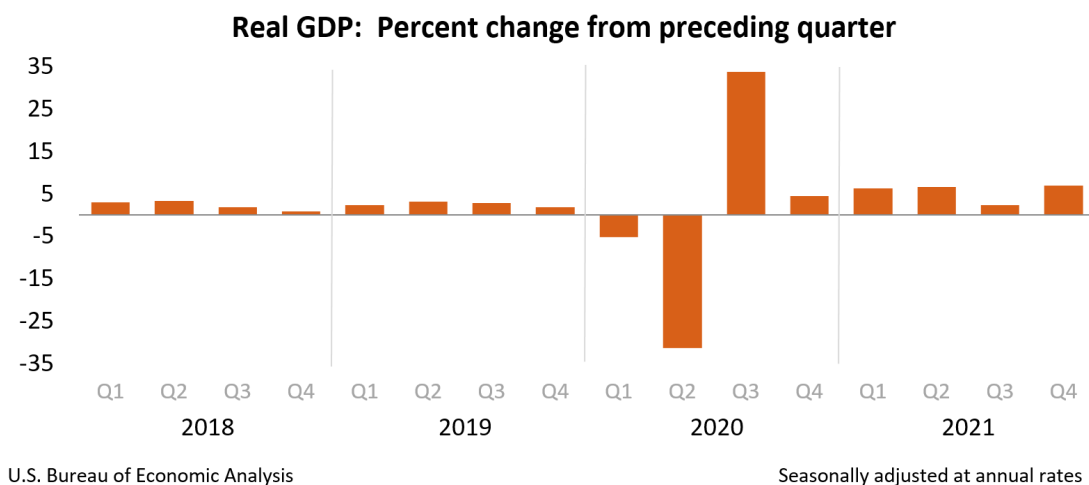
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Revenues come from water-related operations. Aquarion Water Company enjoys a Standard & Poor's ("S&P") corporate credit rating of A- (Stable) and a Moody's corporate rating of Baa2 (stable).²

III. COUNTRY AND COMPANY ECONOMIC ENVIRONMENT

Q. Please describe the current economic conditions under which this rate case contemplates a return on rate base.

A. In order to grasp a picture of what investors expect in terms of returns from individual investments, a review of the economy as a whole is necessary. Investors take the economy into account when making investment decisions and a snapshot of the investing environment is essential to any model of returns expectations. An initial measure of the economy in general is Real GDP, which the U.S. Bureau of Economics presents in the chart below.³

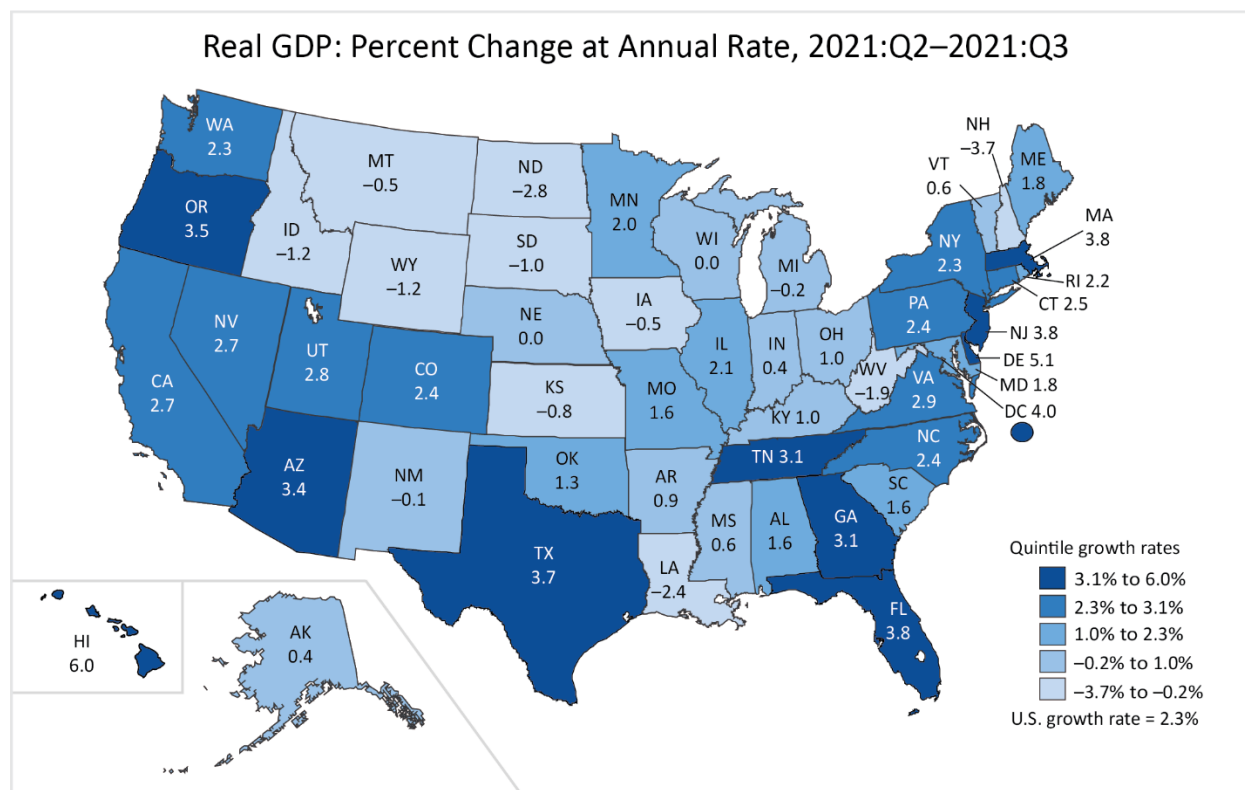


² <https://www.eversource.com/content/docs/default-source/investors/credit-ratings.pdf>.

³ <https://www.bea.gov/news/2022/gross-domestic-product-fourth-quarter-and-year-2021-advance-estimate>

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Analysts are generally lowering their GDP forecasts for 2022. S&P Global has reduced its GDP forecast from 4.1 percent to 3.9 percent,⁴ and Reuters reports that Goldman Sachs has also reduced its 2022 GDP forecast from 3.8 percent to 3.2 percent.⁵ Interestingly, and important to this case, is the fact that the Bureau of Economic Analysis at the U.S. Department of Commerce reports that New Hampshire, as of Q3 2021, is experiencing a *negative* 3.7 percent “growth” rate, the lowest in the nation.⁶



U.S. Bureau of Economic Analysis

⁴ <https://www.spglobal.com/ratings/en/research/articles/211129-economic-outlook-u-s-q1-2022-cruising-at-a-lower-altitude-12199021>

⁵ <https://www.reuters.com/world/us/goldman-sachs-cuts-2022-gdp-forecast-32-vs-38-consensus-2022-01-31/>

⁶ <https://www.bea.gov/news/2021/gross-domestic-product-state-3rd-quarter-2021>

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1 Inflationary pressures are at very high rates compared with pre-pandemic
2 conditions. The Consumer Price Index as reported by the U.S. Bureau of Labor
3 Statistics has risen considerably over the last year, considerably. According to the
4 Bureau of Labor Statistics, "[t]he all items index rose 7.5 percent for the 12 months
5 ending January, the largest 12-month increase since the period ending February
6 1982. The all items less food and energy index rose 6.0 percent, the largest 12-
7 month change since the period ending August 1982. The energy index rose 27.0
8 percent over the last year, and the food index increased 7.0 percent."⁷

9 While the Bureau of Labor Statistics reports that the unemployment rate has more-
10 or-less returned to near pre-pandemic levels,⁸ the number of people actively
11 participating in the labor force has declined dramatically.⁹

⁷ <https://www.bls.gov/news.release/cpi.nr0.htm>

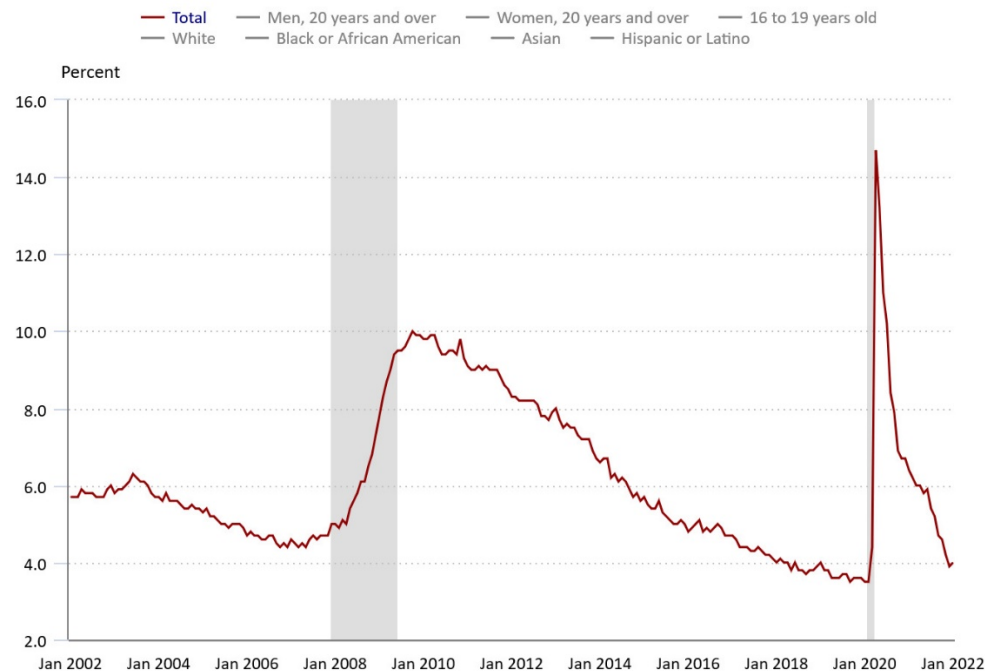
⁸ <https://www.bls.gov/charts/employment-situation/civilian-unemployment-rate.htm>

⁹ <https://www.bls.gov/charts/employment-situation/civilian-labor-force-participation-rate.htm>

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Civilian unemployment rate, seasonally adjusted

Click and drag within the chart to zoom in on time periods



Hover over chart to view data.

Note: Shaded area represents recession, as determined by the National Bureau of Economic Research.
Persons whose ethnicity is identified as Hispanic or Latino may be of any race.

Source: U.S. Bureau of Labor Statistics.



1

Civilian labor force participation rate, seasonally adjusted

Click and drag within the chart to zoom in on time periods



Hover over chart to view data.

Note: Shaded area represents recession, as determined by the National Bureau of Economic Research.
Persons whose ethnicity is identified as Hispanic or Latino may be of any race.

Source: U.S. Bureau of Labor Statistics.



2

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Combining these economic indicators one can see that 2022 and 2023 will not be easy years for residential ratepayers. The January 7, 2022 Value Line Investment Survey reports in its Water Utility Industry analysis that “[e]quities in this group¹⁰ are known for their earnings predictability, good dividend growth, and low volatility. COVID-19 has not had a material impact on these companies, as the demand for water is relatively inelastic.”¹¹ I understand this inelasticity to mean that ratepayers will demand the same amount of water regardless of the rate they are charged for it. Further, the Value Line analysis states, “[i]nvestors are willing to accept a growth rate in earnings that is less than the typical corporation in return for the clear-cut profit prospects. Also, demand for water may vary sometimes, but generally doesn’t change much. Indeed, the pandemic has not disrupted the water business in any meaningful way.”¹²

IV. CAPITAL STRUCTURE

Q. What factors affect the Company’s proposed capital structure?

A. Three components of the Company’s proposed capital structure are potentially problematic, among them an untimely cost of long-term debt, the inclusion of short-term debt in the Company’s proposed capital structure, and the inflation of the Company’s equity via last-minute contributions to capital.

Q. Please explain what you mean by an “untimely cost of long-term debt.”

¹⁰ The exact same seven companies that comprise the proxy group selected by myself and Mr. D’Ascendis.

¹¹ <https://www.valueline.com>

¹² <https://www.valueline.com>

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1 A. The Company's cost of long-term debt is a weighted average 6.14 percent as
2 presented by the Company in its initial filing at Schedule 4D. As of December 31,
3 2019, the Company had three issuances with interest (cost rates) of 7.71, 6.47, and
4 4.70 percent. I am recommending that the Commission order the Company to
5 refinance any of its long-term debt that has not already been refinanced since the
6 filing of this rate case. All of these rates do not reflect the current rate of debt for
7 a company with an S&P corporate credit rating of A- (Stable) and a Moody's
8 corporate rating of Baa2 (stable). Additionally, this water company in particular
9 is supported by the credit ratings and general access to credit of its parent
10 company, Eversource.

11 As a company's cost of debt is borne by its ratepayers, every effort should be made
12 on the part of Aquarion (and Eversource) to lower that cost to the lowest rate
13 available to the Company. If a company were to purposefully allow an
14 opportunity like those available in the current marketplace to pass without taking
15 every advantage, shareholders should bear the burden of such mismanagement,
16 not ratepayers.

17 Additionally, there is the further issue of out-of-date debt costs buoying the
18 Company's overall WACC. For simplicity's sake I have left the 6.14 percent cost
19 of debt in my overall recommendation, however, this is quite high in today's
20 financial environment. I urge the Commission to consider this as it attempts to
21 maintain balance between ratepayers and shareholders' interests.

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1 **Q. How is the inclusion of short-term debt in the Company's calculation of its**
2 **WACC problematic?**

3 A. It is uncommon for a company's short-term debt to be included in its capital
4 structure for ratemaking purposes. In order for a debt issuance to be included in
5 short-term debt, it typically should have a maturity of one year or less. Because of
6 the temporary nature of short-term debt, the Company need not file a financing
7 with the Commission and therefore the interest rate is generally unregulated.
8 Traditionally, short term debt is not used to finance costs included in rate base.
9 Rather short-term debt is primarily used to finance construction and day-to-day
10 operations of the utility.

11 As the nature of short-term debt is temporary, and the Commission does not
12 review financing filings regarding short-term interest rates, a more typical
13 ratemaking treatment is to order utilities to include short-term debt in calculating
14 their allowance for funds used during construction ("AFUDC"). Interest costs
15 associated with short-term debt used for these purposes should be provided for
16 through the utility's AFUDC and working capital allowance, respectively.

17 For comparison purposes, I have left the Company's proposed short-term debt in
18 my recommended overall WACC calculations. However, I also recommend that
19 the Commission review its allowed practices where short-term debt is concerned.
20 Further, I recommend the Commission consider instructing utilities to include
21 short-term debt in their AFUDC calculations as a resolution to this fundamental
22 capital structure related issue.

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Q. Why do you think the Company has an inflated equity portion of its capital structure and why could it be problematic?

A. When asked in discovery about its practices regarding significant and noticeable increases to its equity the Company responded that “[t]he increase to retained earnings represents the portion of rates we are collecting and retaining in order to reinvestment them into the system and continue to provide safe and reliable water.” Company response to data request Joint Towns 1-3. It also responded to Joint Towns 1-2 that “[p]rior to the end of 2020, the Company had \$4,400,000 of short term inter company debt outstanding, *an increase of \$3,200,000, or 267%, over the prior year.* The Company’s parent elected to transfer \$1.6 million of the inter company debt to capital contribution to achieve a more reasonable level of inter company debt of \$2,800,000 at December 31, 2020.” (Emphasis added). (Joint Towns 1-2).

These practices are *only* acceptable if the Company is required to make good on its word to reinvest the funds into safe and reliable drinking water systems. Otherwise, they only serve to pad a company’s earnings from its allowed ROE. *If and only if* a company reinvests the funds should it receive the reward of a higher proportion of its WACC attributable to return on equity. It is because of these facts that I am not recommending an alteration to the Company’s equity portion of its proposed capital structure, rather I am recommending precise review of its capital reinvestments between rate cases to ensure ratepayers receive fair treatment.

V. PROXY GROUP SELECTION

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1 **Q. Please explain your proxy group selection process.**

2 A. Each of the selected companies included in the proxy group will have passed the
3 following five tests: (1) the company will have an S&P investment grade credit
4 rating; (2) the company will not have been involved in merger activity over the 12
5 months preceding the assembly of the group; (3) the company will earn at least 70
6 percent of its operating revenues from water utility operations; (4) the company
7 must be included in Value Line's water industry group; and (5) the company must
8 be covered by an analyst at Yahoo! Finance, Bloomberg, Zacks, or MSN Money.

9 These tests resulted in my choice to include the following seven companies in my
10 proxy group: American States Water Company (AWR), American Water Works
11 Company, Inc. (AWK), California Water Service Group (CWT), Essential Utilities,
12 Inc. (WTRG), Middlesex Water Company (MSEX), SJW Group (SJW), and The
13 York Water Company (YORW). Observations of the companies' credit ratings and
14 other basic financial data can be seen in Exhibit JAMG-1.

15 VI. RETURN ON EQUITY MODELING

16 **Q. Please explain your unique position regarding calculating a fair return on**
17 **equity.**

18 A. I now have the unique opportunity to both submit testimony as an expert witness
19 on return on equity, after having advised decision makers on a rate of return that
20 is fair, just and reasonable. While minor tweaks and adjustments were made over
21 the years by those decision makers, it was my recommendations that formed the
22 basis of the final ROE decisions in former iterations of my career.

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1 In my experience as a financial analyst and as a regulator who has reviewed and
2 examined the testimonies of many return on equity expert witnesses, I have
3 learned that the more the data is manipulated, the less it legitimately has to tell us
4 about expectations of investors. Alternatively stated, the more we shift the
5 methods we use to calculate a representative return to fit a given narrative, the
6 more difficult it is to make effective decisions regarding a truly reflective return
7 on equity.

8 It is with this experience in mind that I calculate a single stage Discounted Cash
9 Flow ("DCF") model and a traditional Capital Asset Pricing Model ("CAPM").

10 VII. RISK

11 **Q. Please discuss the risks that a regulated water utility may contend with.**

12 A. The expected return on an investment equates to a combined assessment of the
13 risk-free rate of return, inflation, business risk, financial risk, interest rate risk, and
14 regulatory risk.

15 Business risk, as perceived by investors, includes all the operating factors that
16 increase the probability that expected future cash flows accruing to investors may
17 not be realized. Business risk would include such factors as sales volatility and
18 operating leverage. A utility's business risk is a function of such factors as
19 customer base diversity, necessary capital expenditures, the regional and national
20 economy, the regulatory environment in which it operates, and inflation. The risks
21 associated with mixed economic signals, political uncertainty, and contentious

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1 international relations are shared by all businesses and, as a result, are reflected in
2 the proxy group's calculated costs of equity.

3 Other examples of business risk, particularly for water utilities, include an aging
4 infrastructure and water supply challenges. These challenges are not unique to
5 the Company as many water utilities face similar capital expenditures as they
6 upgrade and modernize existing facilities.

7 Financial risk relates to the capital structure of a company, including its fixed
8 contractual obligations and ability to pay interest on its debt and refinance that
9 debt when due. The proxy group tests control for financial risk by including only
10 those companies with an investment grade credit rating. Credit rating agencies
11 assess the financial health of a company through the use of key financial ratios that
12 measure the extent to which a company can pay its debt, including principal and
13 interest.

14 Interest rate risk is the risk that arises for bond owners from fluctuating interest
15 rates, which depends on how sensitive its price is to interest rate changes in the
16 market. Its sensitivity depends on the bond's time to maturity and the coupon rate
17 of the bond.

18 Regulatory risk is based on the investor's perceived understanding of the current
19 regulatory environment along with possible changes to that regulatory
20 environment. How regulators treat regulatory lag is one example of regulatory
21 risk. To the extent that companies face a time lag between incurring expenses and
22 cost recovery, such risk is best measured by choosing a proxy group of companies

that face similar regulatory oversight and earn the majority of their revenues from regulated operations.

VIII. DISCOUNTED CASH FLOW MODEL

Q. Which DCF model are you using to derive an ROE for Aquarion?

A. I am engaging the constant growth version of the DCF model for my recommendation of the Company's allowed cost of equity. In this version of the DCF model the price of a stock today represents the discounted expected future cash flows in the form of dividends. The price today is equal to the expected dividends indefinitely, divided by the cost of equity minus the expected rate of growth for the company.

$$P = D_1/(1+k)^1 + D_2/(1+k)^2 + \dots + D_n/(1+k)^n$$

Where P is the stock price, D₁, D₂, D_n are the dividends indefinitely, and k is the cost of equity. In order to simplify the model, expected future dividends are represented by applying a constant growth rate to the current observable dividend.

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

And solving for K or the cost of equity,

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

Where,

K = cost of equity

D₁ = dividends over the upcoming period

P = the price of the security

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1 g = the expected growth rate

2 Hence, the market rate for a given security is the expected dividend yield plus the
3 expected growth rate.

4 **Q. What is FERC's guidance on adjusting the dividend yield?**

5 A. In its Order 61,234, FERC has given the following guidance with regard to the DCF
6 model dividend yield. "For ratemaking purposes, the Commission rearranges the
7 DCF formula [by multiplying] ...the dividend yield by the expression $(1+.5g)$ to
8 account for the fact that dividends are paid on a quarterly basis. Multiplying the
9 dividend yield by $(1+.5g)$ increases the dividend yield by one half of the growth
10 rate and produces what the Commission refers to as the adjusted dividend yield.
11 The resulting formula is known as the constant growth DCF model and can be
12 expressed as $k=D/P(1+.5g)+g$."¹³ I have opted to follow this guidance with regard
13 to Aquarion.

14 **Q. What factors have you brought together in your Constant Growth DCF?**

15 A. A summary of my DCF model is provided in Exhibit JAMG-3. I have calculated a
16 dividend yield for the next 12-month period using the current dividend yield and
17 the expected growth rates. (Exhibits JAMG-4, JAMG-5, and JAMG-6). For the
18 dividend yield, I use the current annual dividend and both a 90-day average stock
19 price, and a 180-day average stock price. (Exhibits JAMG-5, and JAMG-6). I use
20 both analysts' five-year estimates of Earnings Per Share ("EPS") (which can be

¹³ https://www.ferc.gov/sites/default/files/2020-04/E-7_2.pdf

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found at JAMG-5), and a combination of EPS, Dividends per Share ("DPS"), and Book Value Per Share ("BVPS") projected 5 years forward. (Exhibits JAMG-5, and JAMG-6). Combining these estimates adds stability to the model by tempering earnings growth rates which are less stable than DPS, for example.

I utilized the published growth-rate forecasts provided by Yahoo! Finance and Value Line. I would have like to also incorporate Zacks forecast data, but most of the companies in the proxy group are not covered by Zacks. I believe Zacks may have dropped coverage of some of the proxy group companies between this writing and Mr. D'Ascendis' filing his testimony.

Results of my DCF model can be summarized as follows:

| Constant Growth DCF Summary Results | | | | |
|-------------------------------------|------------------------------------|---|-------------------------------------|--|
| | [1] | [2] | [3] | [4] |
| | 90-Day Stock Price Avg. & Est. EPS | 90-Day Stock Price Avg. & Est. EPS, DPS, BVPS | 180-Day Stock Price Avg. & Est. EPS | 180-Day Stock Price Avg. & Est. EPS, DPS, BVPS |
| 1 | | | | |
| 2 | 9.76% | 8.74% | 9.88% | 8.79% |

From this table one can observe the stability derived from adding DPS and BVPS to the model.

IX. CAPITAL ASSET PRICING MODEL

Q. Please describe the CAPM are you utilizing to derive an ROE for Aquarion.

A. The CAPM assumes that investors require a premium for holding an equity security over that of a debt security. For bearing the extra burden of risk they expect an additional return. In this model the cost of equity is equal to the sum of

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a risk-free rate of return (aka a bond rate) and a risk premium for holding the equity (stock). One can envision the equation thusly:

$$K = R_f + RP$$

However, in order to include both the market risk and the risk specific to a given company, we add the company's beta to the equation and solve for the cost of equity:

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

Where,

K = the cost of equity

R_f = the risk free rate of return

β = the volatility of a security relative to the market, or the investment risk that cannot be eliminated by diversifying one's portfolio

R_m = the expected risk of the market as a whole

Typically, the yield on long-term U.S. Treasury Bonds is used to represent the risk-free rate of return.

The beta coefficient is a measure of non-diversifiable or systematic risk. It measures the movement of an asset's return in response to shifts in the market as a whole. The market as a whole is represented by a beta of 1.0. If a company's beta coefficient is more than 1.0 the stock is more volatile and therefore riskier than the market. If the beta is between 0.0 and 1.0 the company's stock is less volatile than the market and its returns will be proportional. For example, a company with a beta of .45 will earn a return of 45 percent of the return on the whole market.

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1 The expected return on the market or the market risk premium is more challenging
2 to represent, but several finance professionals and firms offer estimates of this
3 premium.

4 **Q. What inputs did you include in your CAPM?**

5 A. As of the date of this writing, the 30-day average of the 30-year Treasury Yield was
6 2.19. (Exhibit JAMG-8). Beta coefficients are available from Value Line and I have
7 utilized these as they are an industry standard. (Exhibit JAMG-9). As for the
8 expected return on the market, I have combined advice from A. Damodaran, Duff
9 and Phelps, now renamed Kroll, and KPMG Corporate Finance NL. (Exhibit
10 JAMG-10, Attachment-1, and Attachment-2). In Exhibit JAMG-10, I have provided
11 a visual chart of Damodaran's data, which reflects a 5.17 percent equity risk
12 premium. At the point in time of this writing, analysts are processing 2021 data
13 and Duff and Phelps has not yet updated their December 7, 2020, equity risk
14 premium estimate of 5.50 percent (Attachment-1). However, KPMG has released
15 its updated analysis as of December 31, 2021, with an equity market risk premium
16 of 5.0 percent (Attachment-2). Exhibit JAMG-7 summarizes my CAPM analysis,
17 which results in a 6.19 percent return on equity for the Company.

18 **Q. What value do you place on your model results?**

19 A. I place more weight on my DCF-derived results because it is widely used by both
20 the finance community and public utility commissions and yields more reliable
21 results. It is a forward-looking model that directly incorporates investors'
22 expectations of company dividend income through market pricing signals,

DW 20-184 Aquarion Water Company of New Hampshire, Inc.
Direct Testimony of Gage

1 particularly in the case of utility stocks where stock valuations are telling a
2 different story than the general market.

3 The CAPM model, in contrast, is largely reliant on financial market outcomes
4 complicated by monetary policy and near historically low interest rates. These
5 low interest rates have persisted many years longer than anticipated. Although
6 recent and planned activity by the Federal Reserve may result in increases in short-
7 term interest rates, such shifts in monetary policy may not lead to increases in
8 long-term interest rates. However, I rely on my CAPM results as a reasonableness
9 check.

10 **Q. What return on equity are you recommending for Aquarion?**

11 A. It is my recommendation that the Commission take into account the investing
12 environment in which Aquarion's ROE will be set. Therefore, I am choosing the
13 DCF model results for its stability, and I am choosing the version that includes the
14 largest data sets and collects the most information. In light of these, I recommend
15 a return on equity for Aquarion of 8.84 percent.

16 **Q. Does this conclude your testimony?**

17 A. Yes it does. However, I reserve the right to supplement my testimony as new
18 information becomes available.

Exhibits & Attachments

Exhibit JAMG-1
Page 1 of 1

| Water Utility Proxy Group | | | | | | | | |
|---------------------------|---|---------------|-------------------|--------------------------|---------------------------------|-----------------------------------|----------------------------|----------------------------------|
| Column /Line | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] |
| | Company Name | Ticker Symbol | Value Line Beta** | Value Line Safety Rank** | Value Line Financial Strength** | Standard & Poor's Rating Service* | Moody's Investors Service* | Value Line Common Equity Ratio** |
| 1 | American States Water Company | AWR | 0.65 | 2 | A | A+ | — | 54.5% |
| 2 | American Water Works Company, Inc. | AWK | 0.85 | 3 | B++ | A | Baa1 | 40.0% |
| 3 | California Water Service Group | CWT | 0.70 | 3 | B++ | A+ | — | 51.5% |
| 4 | Essential Utilities, Inc. | WTRG | 0.95 | 3 | B+ | A | Baa2 | 47.0% |
| 5 | Middlesex Water Company | MSEX | 0.70 | 2 | B++ | A | — | 57.5% |
| 6 | SJW Group | SJW | 0.80 | 3 | B+ | A- | — | 43.0% |
| 7 | The York Water Company | YORW | 0.85 | 3 | B+ | A- | — | 55.5% |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | * Sourced from each company's SEC filings and investor relations documents and webpages | | | | | | | |
| 11 | ** January 7, 2022 Value Line Company Sheets | | | | | | | |

Exhibit JAMG-2

Page 1 of 1

Aquarion's Capital Structure & Recommended Rate of ReturnColumn
/Line

| | [1] | [2] | [3] | [4] | [5] |
|---|------------------------|-------------------------|--------------|---------------|----------------------|
| | Capital Element | Actual Amounts* | Ratio | Rate** | Weighted Rate |
| 1 | | | | | |
| 2 | Long-term Debt | \$ 13,900,000.00 | 43.85% | 6.14% | 2.69% |
| 3 | Short-term Debt | \$ 1,200,000.00 | 3.79% | 2.42% | 0.09% |
| 4 | Preferred Stock | \$ 2,300.00 | 0.01% | 6.00% | 0.00% |
| 5 | Equity | \$ 16,598,323.00 | 52.36% | 8.84% | 4.63% |
| 6 | Total Capital | <u>\$ 31,700,623.00</u> | 100.00% | WACC*** | <u>7.41%</u> |

7

8 * Company's Schedules 2A, Page 1; Bates 561

9 ** Company's Schedules 4D, 4E, and 4F except ROE; Bates 581-583

10 ***Weighted Average Cost of Capital

11

12 **Aquarion's Equity Structure***

| | | |
|----|---------------------|-------------------------|
| 13 | Common Stock | \$ 2,187,075.00 |
| 14 | Paid in Capital | \$ 3,557,940.00 |
| 15 | Contributed Capital | \$ 2,480,250.00 |
| 16 | Ratained Earnings | \$ 8,373,058.00 |
| 17 | Total Equity | <u>\$ 16,598,323.00</u> |

18

19 * Company's Schedule 2A, Page 1; Bates 561

Exhibit JAMG-3

Page 1 of 1

| Discounted Cash Flow Model Results | | |
|------------------------------------|---------------------------------------|-------------------------|
| Column /Line | [1] | [2] |
| 1 | Discounted Cash Flow Elements | |
| 2 | Dividend Yield | 1.59% |
| 3 | FERC Recommended Growth Adjustment | 1.02625 |
| 4 | | 1.64% |
| 5 | Growth Rate | 7.20% |
| 6 | Return on Equity | 8.84% |
| 7 | | |
| 8 | Discounted Cash Flow Formulae | |
| 9 | | |
| 10 | Typical DCF Model | $k = D_1/P + g$ |
| 11 | | |
| 12 | DCF Model with FERC Growth Adjustment | $k = D_1/P (1+.5g) + g$ |

Proxy Group Dividend Yield Analysis

| Column/Line | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] |
|-------------|--|---------------|----------------|--------------------|--------------------|---------------------|------------|-------------|
| | Company Name | Ticker Symbol | Dividend Yield | Dividend Yield 30- | Dividend Yield 90- | Dividend Yield 180- | Median | |
| 1 | American States Water Company | AWR | 1.64% | 1.55% | 1.47% | 1.51% | 1.53% | |
| 2 | American Water Works Company, | AWK | 1.59% | 1.50% | 1.39% | 1.36% | 1.44% | |
| 3 | California Water Service Group | CWT | 1.57% | 1.52% | 1.41% | 1.45% | 1.49% | |
| 4 | Essential Utilities, Inc. | WTRG | 2.30% | 2.19% | 2.10% | 2.14% | 2.16% | |
| 5 | Middlesex Water Company | MSEX | 1.15% | 1.15% | 1.06% | 1.05% | 1.10% | |
| 6 | SJW Group | SJW | 2.11% | 2.03% | 1.97% | 1.98% | 2.00% | |
| 7 | The York Water Company | YORW | 1.78% | 1.72% | 1.63% | 1.61% | 1.68% | |
| 8 | | | | | | Mean | 1.63% | |
| 9 | | | | | | Median | 1.53% | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | Dividend Yield = Annual Dividends Per Share / Price Per Share | | | | | | | |
| 13 | Company | AWR | AWK | CWT | WTRG | MSEX | SJW | YORW |
| 14 | Most Recent Annualized Dividend: | 1.40 | 2.36 | 0.92 | 1.04 | 1.11 | 1.36 | 0.76 |
| 15 | 2/14/2022 Closing Stock Price** | \$85.56 | \$148.03 | \$58.47 | \$45.12 | \$96.51 | \$64.35 | \$42.59 |
| 16 | 30-Day Average Closing Stock Price | \$90.03 | \$157.38 | \$60.57 | \$47.59 | \$98.66 | \$67.14 | \$44.18 |
| 17 | 90-Day Average Closing Stock Price | \$95.42 | \$170.18 | \$65.23 | \$49.58 | \$105.16 | \$69.01 | \$46.57 |
| 18 | 180-Day Average Closing Stock Price | \$92.69 | \$173.13 | \$63.30 | \$48.56 | \$105.90 | \$68.74 | \$47.20 |
| 19 | | | | | | | | |
| 20 | * January 7, 2022 Value Line Company Sheets | | | | | | | |
| 21 | ** Yahoo! Finance reported closing stock price as of the date listed | | | | | | | |

Exhibit JAMG-5
Page 1 of 1

| Column /Line | Constant Growth DCF, Expected EPS Growth Method | | | | | | | | | | | |
|-----------------|--|---------------|--------------|----------|---------------|----------------|----------------|---------------|------------|-------------|------------------|-----------|
| | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] |
| | | | 90-Day Stock | | DPS 2022 | Dividend Yield | Expected | Yahoo! | Value Line | Avg. Exp. | | |
| 1 | Company Name | Ticker Symbol | Price Avg. | DPS 2021 | =[4]*(1+[10]) | =[4]/[3] | Dividend Yield | Projected EPS | Projected | Earnings | DCF | |
| 2 | American States Water Company | AWR | \$95.42 | 1.40 | 1.49 | 1.47 | 1.56 | 6.70% | 6.50% | 6.60% | =[7]+[10] | |
| 3 | American Water Works Company, Inc. | AWK | \$170.18 | 2.36 | 2.56 | 1.39 | 1.50 | 8.20% | 8.50% | 8.35% | | 9.85% |
| 4 | California Water Service Group | CWT | \$65.23 | 0.92 | 1.01 | 1.41 | 1.55 | 11.70% | 8.50% | 10.10% | | 11.65% |
| 5 | Essential Utilities, Inc. | WTRG | \$49.58 | 1.04 | 1.13 | 2.10 | 2.27 | 6.40% | 10.00% | 8.20% | | 10.47% |
| 6 | Middlesex Water Company | MSEX | \$105.16 | 1.11 | 1.15 | 1.06 | 1.10 | 2.70% | 5.00% | 3.85% | | 4.95% |
| 7 | SJW Group | SJW | \$69.01 | 1.36 | 1.50 | 1.97 | 2.17 | 5.70% | 15.00% | 10.35% | | 12.52% |
| 8 | The York Water Company | YORW | \$46.57 | 0.76 | 0.80 | 1.63 | 1.73 | 4.90% | 6.50% | 5.70% | | 7.43% |
| 9 | | Mean | \$85.88 | 1.28 | 1.38 | 1.57 | 1.70 | 6.61% | 8.57% | 7.59% | | 9.29% |
| 10 | | Median | \$69.01 | 1.11 | 1.15 | 1.47 | 1.56 | 6.40% | 8.50% | 8.20% | | 9.76% |
| 11 | | | | | | | | | | | | |
| 12 | Constant Growth DCF, Expected EPS, DPS, and BVPS Growth Method | | | | | | | | | | | |
| | | | 90-Day Stock | | DPS 2022 | Dividend Yield | Expected | Avg. Exp. | Value Line | Value Line | Avg. Exp. | |
| | | | Price Avg. | DPS 2021 | =[4]*(1+[10]) | =[4]/[3] | Dividend Yield | Earnings | Expected | Expected | Growth Rate | DCF |
| 13 | Company Name | Ticker Symbol | | | | | | Growth Rate | DPS Growth | BVPS Growth | (EPS, DPS, BVPS) | =[7]+[11] |
| 14 | American States Water Company | AWR | \$95.42 | 1.40 | 1.48 | 1.47 | 1.55 | 6.60% | 9.50% | 5.50% | 7.20% | 8.75% |
| 15 | American Water Works Company, Inc. | AWK | \$170.18 | 2.36 | 2.48 | 1.39 | 1.46 | 8.35% | 8.50% | 5.00% | 7.28% | 8.74% |
| 16 | California Water Service Group | CWT | \$65.23 | 0.92 | 0.97 | 1.41 | 1.49 | 10.10% | 6.50% | 5.50% | 7.37% | 8.85% |
| 17 | Essential Utilities, Inc. | WTRG | \$49.58 | 1.04 | 1.11 | 2.10 | 2.23 | 8.20% | 7.50% | 6.50% | 7.40% | 9.63% |
| 18 | Middlesex Water Company | MSEX | \$105.16 | 1.11 | 1.15 | 1.06 | 1.09 | 3.85% | 5.50% | 3.50% | 4.28% | 5.38% |
| 19 | SJW Group | SJW | \$69.01 | 1.36 | 1.42 | 1.97 | 2.06 | 10.35% | 6.00% | 4.50% | 6.95% | 9.01% |
| 20 | The York Water Company | YORW | \$46.57 | 0.76 | 0.79 | 1.63 | 1.70 | 5.70% | 6.00% | 4.00% | 5.23% | 6.93% |
| 21 | | Mean | \$85.88 | 1.28 | 1.34 | 1.57 | 1.65 | 7.59% | 7.07% | 4.93% | 6.53% | 8.18% |
| 22 | | Median | \$77.44 | 1.19 | 1.25 | 1.52 | 1.60 | 7.90% | 6.79% | 4.96% | 7.08% | 8.74% |

| Constant Growth DCF, Expected EPS Growth Method | | | | | | | | | | | | |
|--|------------------------------------|---------------|---------------|----------|------------------|----------------|-------------------------|----------------------|----------------------|-----------------------|-----------------------|-------|
| Column /Line | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] |
| | | | 180-Day Stock | | DPS 2022 | Dividend Yield | Expected Dividend Yield | Yahoo! Projected EPS | Value Line Projected | Avg. Exp. Earnings | DCF | |
| 1 | Company Name | Ticker Symbol | Price Avg. | DPS 2021 | = [4]* (1+ [10]) | = [4]/ [3] | = [5]/ [3] | (5 Years) | EPS (5 Years) | Growth Rate | = [7]+ [10] | |
| 2 | American States Water Company | AWR | \$92.69 | 1.40 | 1.49 | 1.51 | 1.61 | 6.70% | 6.50% | 6.60% | 8.21% | |
| 3 | American Water Works Company, Inc. | AWK | \$173.13 | 2.36 | 2.56 | 1.36 | 1.48 | 8.20% | 8.50% | 8.35% | 9.83% | |
| 4 | California Water Service Group | CWT | \$63.30 | 0.92 | 1.01 | 1.45 | 1.60 | 11.70% | 8.50% | 10.10% | 11.70% | |
| 5 | Essential Utilities, Inc. | WTRG | \$48.56 | 1.04 | 1.13 | 2.14 | 2.32 | 6.40% | 10.00% | 8.20% | 10.52% | |
| 6 | Middlesex Water Company | MSEX | \$105.90 | 1.11 | 1.15 | 1.05 | 1.09 | 2.70% | 5.00% | 3.85% | 4.94% | |
| 7 | SJW Group | SJW | \$68.74 | 1.36 | 1.50 | 1.98 | 2.18 | 5.70% | 15.00% | 10.35% | 12.53% | |
| 8 | The York Water Company | YORW | \$47.20 | 0.76 | 0.80 | 1.61 | 1.70 | 4.90% | 6.50% | 5.70% | 7.40% | |
| 9 | | Mean | \$85.64 | 1.28 | 1.38 | 1.59 | 1.71 | 6.61% | 8.57% | 7.59% | 9.30% | |
| 10 | | Median | \$80.71 | 1.24 | 1.32 | 1.48 | 1.61 | 6.55% | 8.50% | 8.28% | 9.88% | |
| 11 | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | |
| Constant Growth DCF, Expected EPS, DPS, and BVPS Growth Method | | | | | | | | | | | | |
| | | | 180-Day Stock | | DPS 2022 | Dividend Yield | Expected Dividend Yield | Avg. Exp. Earnings | Value Line Expected | Value Line Expected | Avg. Exp. Growth Rate | |
| | Company Name | Ticker Symbol | Price Avg. | DPS 2021 | = [4]* (1+ [10]) | = [4]/ [3] | = [5]/ [3] | Growth Rate | DPS Growth (5 Years) | BVPS Growth (5 Years) | (EPS, DPS, BVPS) | DCF |
| 13 | American States Water Company | AWR | \$92.69 | 1.40 | 1.48 | 1.51 | 1.59 | 6.60% | 9.50% | 5.50% | 7.20% | 8.79% |
| 14 | American Water Works Company, Inc. | AWK | \$173.13 | 2.36 | 2.48 | 1.36 | 1.43 | 8.35% | 8.50% | 5.00% | 7.28% | 8.71% |
| 15 | California Water Service Group | CWT | \$63.30 | 0.92 | 0.97 | 1.45 | 1.53 | 10.10% | 6.50% | 5.50% | 7.37% | 8.90% |
| 16 | Essential Utilities, Inc. | WTRG | \$48.56 | 1.04 | 1.11 | 2.14 | 2.28 | 8.20% | 7.50% | 6.50% | 7.40% | 9.68% |
| 17 | Middlesex Water Company | MSEX | \$105.90 | 1.11 | 1.15 | 1.05 | 1.08 | 3.85% | 5.50% | 3.50% | 4.28% | 5.37% |
| 18 | SJW Group | SJW | \$68.74 | 1.36 | 1.42 | 1.98 | 2.07 | 10.35% | 6.00% | 4.50% | 6.95% | 9.02% |
| 19 | The York Water Company | YORW | \$47.20 | 0.76 | 0.79 | 1.61 | 1.67 | 5.70% | 6.00% | 4.00% | 5.23% | 6.91% |
| 20 | | Mean | \$85.64 | 1.28 | 1.34 | 1.59 | 1.67 | 7.59% | 7.07% | 4.93% | 6.53% | 8.20% |
| 21 | | Median | \$68.74 | 1.11 | 1.15 | 1.51 | 1.59 | 8.20% | 6.50% | 5.00% | 7.20% | 8.79% |
| 22 | | | | | | | | | | | | |

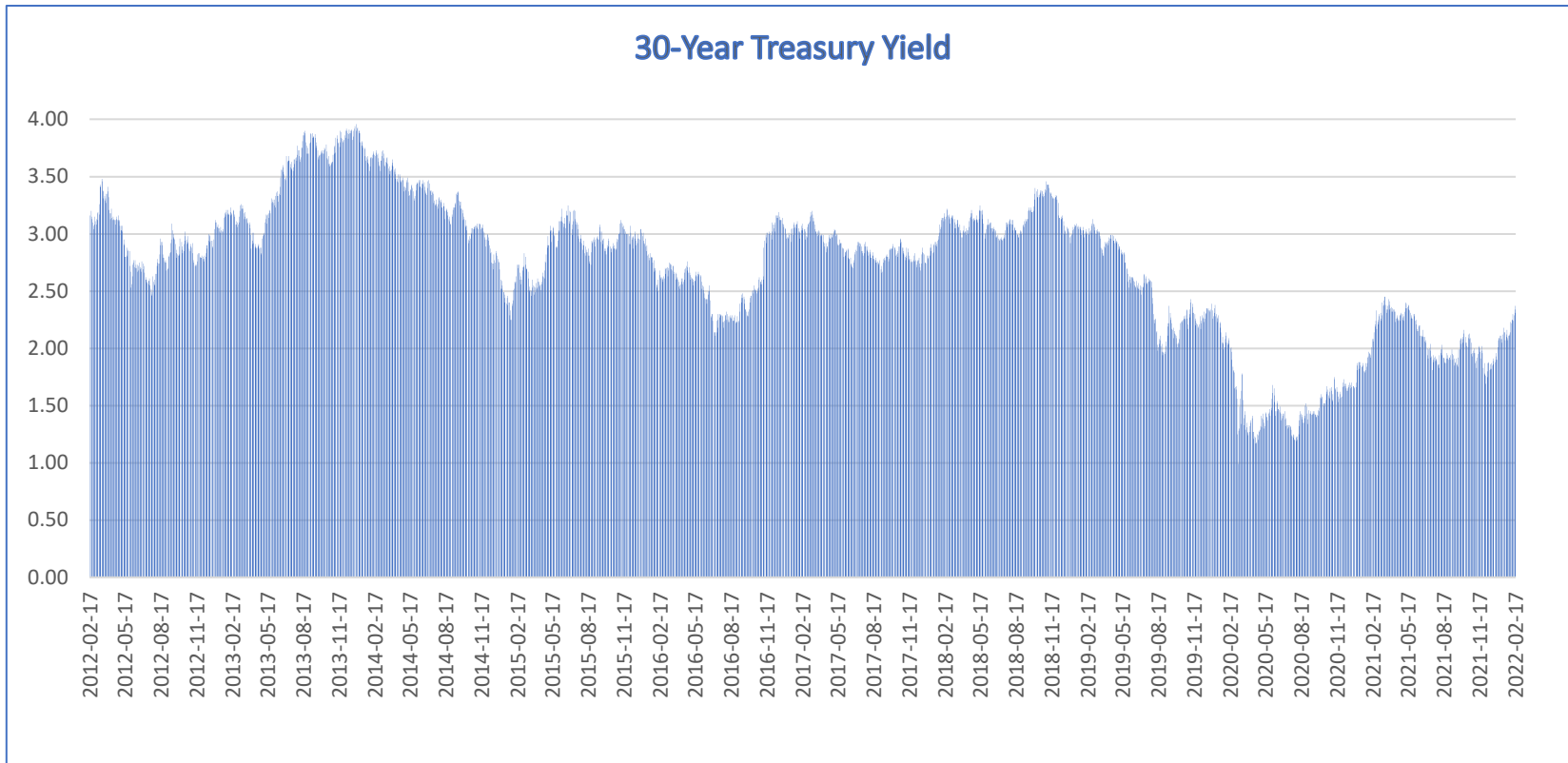
Exhibit JAMG-7

Page 1 of 1

| Capital Asset Pricing Model | | |
|-----------------------------|---|---|
| Column /Line | [1] | [2] |
| 1 | CAPM Elements | |
| 2 | Risk Free Rate of Return | 2.19 % |
| 3 | Beta | 0.80 |
| 4 | Equity Market Risk Premium | 5.00 % |
| 5 | | <hr/> 4.00 |
| 6 | | |
| 7 | Return on Equity | <hr/> 6.19 % |
| 8 | | |
| 9 | Capital Asset Pricing Model Formulae | |
| 10 | | |
| 11 | Basis of the CAPM | $k = R_f + RP$ |
| 12 | | |
| 13 | Complete CAPM Formula | $k = (R_f) + \beta \times [E(R_m) - (R_f)]$ |

Exhibit JAMG-8
Page 1 of 1

Risk Free Rate of Return



Source: <https://fred.stlouisfed.org/series/DGS30>

30-Day Average Yield: 2.19

Exhibit JAMG-9

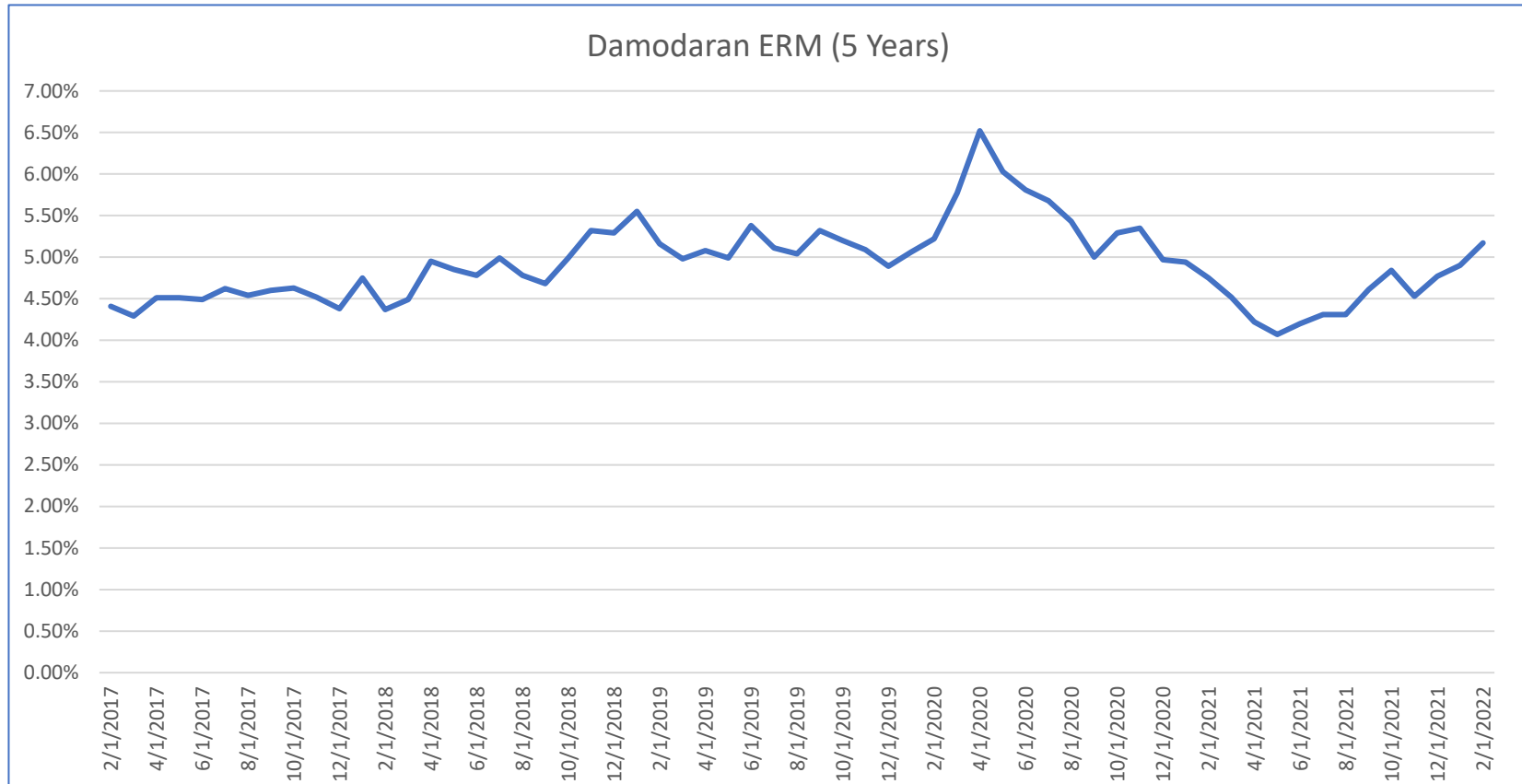
Page 1 of 1

| Proxy Group Betas | | | |
|-------------------|---|----------------------|-------------------|
| Column/L ine | [1] | [2] | [3] Value Line |
| 1 | Company Name | Ticker Symbol | Beta* |
| 2 | American States Water Company | AWR | 0.65 |
| 3 | American Water Works Company, Inc. | AWK | 0.85 |
| 4 | California Water Service Group | CWT | 0.70 |
| 5 | Essential Utilities, Inc. | WTRG | 0.95 |
| 6 | Middlesex Water Company | MSEX | 0.70 |
| 7 | SJW Group | SJW | 0.80 |
| 8 | The York Water Company | YORW | 0.85 |
| 9 | | Median | 0.80 |
| 10 | | | |
| 11 | * January 7, 2022 Value Line Company Sheets | | |

Exhibit JAMG-10

Page 1 of 1

Charted Expected Return on the Market



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

Table: Equity Risk Premium & Risk-free Rates

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

For additional information, please visit
<https://www.duffandphelps.com/insights/publications/cost-of-capital>

| Date | Risk-free Rate (R_f) | R_f (%) | Duff & Phelps Recommended ERP (%) | What Changed |
|---|--|----------------------|-----------------------------------|--------------|
| Current Guidance: | | | | |
| December 7, 2020 – UNTIL FURTHER NOTICE | Normalized 20-year U.S. Treasury yield | 2.50 | 5.50 | ERP |
| June 30, 2020 – December 6, 2020 | Normalized 20-year U.S. Treasury yield | 2.50 | 6.00 | R_f |
| March 25, 2020 – June 29, 2020 | Normalized 20-year U.S. Treasury yield | 3.00 | 6.00 | ERP |
| December 19, 2019 – March 24, 2020 | Normalized 20-year U.S. Treasury yield | 3.00 | 5.00 | ERP |
| September 30, 2019 – December 18, 2019 | Normalized 20-year U.S. Treasury yield | 3.00 | 5.50 | R_f |
| December 31, 2018 – September 29, 2019 | Normalized 20-year U.S. Treasury yield | 3.50 | 5.50 | ERP |
| September 5, 2017 – December 30, 2018 | Normalized 20-year U.S. Treasury yield | 3.50 | 5.00 | ERP |
| November 15, 2016 – September 4, 2017 | Normalized 20-year U.S. Treasury yield | 3.50 | 5.50 | R_f |
| January 31, 2016 – November 14, 2016 | Normalized 20-year U.S. Treasury yield | 4.00 | 5.50 | ERP |
| December 31, 2015 | Normalized 20-year U.S. Treasury yield | 4.00 | 5.00 | |
| December 31, 2014 | Normalized 20-year U.S. Treasury yield | 4.00 | 5.00 | |
| December 31, 2013 | Normalized 20-year U.S. Treasury yield | 4.00 | 5.00 | |
| February 28, 2013 – January 30, 2016 | Normalized 20-year U.S. Treasury yield | 4.00 | 5.00 | ERP |
| December 31, 2012 | Normalized 20-year U.S. Treasury yield | 4.00 | 5.50 | |
| January 15, 2012 – February 27, 2013 | Normalized 20-year U.S. Treasury yield | 4.00 | 5.50 | ERP |
| December 31, 2011 | Normalized 20-year U.S. Treasury yield | 4.00 | 6.00 | |
| September 30, 2011 – January 14, 2012 | Normalized 20-year U.S. Treasury yield | 4.00 | 6.00 | ERP |
| July 1 2011 – September 29, 2011 | Normalized 20-year U.S. Treasury yield | 4.00 | 5.50 | R_f |
| June 1, 2011 – June 30, 2011 | Spot 20-year U.S. Treasury yield | Spot | 5.50 | R_f |
| May 1, 2011 – May 31, 2011 | Normalized 20-year U.S. Treasury yield | 4.00 | 5.50 | R_f |
| December 31, 2010 | Spot 20-year U.S. Treasury yield | Spot | 5.50 | |
| December 1, 2010 – April 30, 2011 | Spot 20-year U.S. Treasury yield | Spot | 5.50 | R_f |
| June 1, 2010 – November 30, 2010 | Normalized 20-year U.S. Treasury yield | 4.00 | 5.50 | R_f |
| December 31, 2009 | Spot 20-year U.S. Treasury yield | Spot | 5.50 | |
| December 1, 2009 – May 31, 2010 | Spot 20-year U.S. Treasury yield | Spot | 5.50 | ERP |
| June 1, 2009 – November 30, 2009 | Spot 20-year U.S. Treasury yield | Spot | 6.00 | R_f |
| December 31, 2008 | Normalized 20-year U.S. Treasury yield | 4.50 | 6.00 | |
| November 1, 2008 – May 31, 2009 | Normalized 20-year U.S. Treasury yield | 4.50 | 6.00 | R_f |
| October 27, 2008 – October 31, 2008 | Spot 20-year U.S. Treasury yield | Spot | 6.00 | ERP |
| January 1, 2008 – October 26, 2008 | Spot 20-year U.S. Treasury yield | Spot | 5.00 | Initialized |

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

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

This and other related resources can also be found in the online Cost of Capital Navigator platform. To learn more about the Cost of Capital Navigator and other Duff & Phelps valuation and industry data products, visit www.DPCostofCapital.com.

Equity Market Risk Premium – Research Summary

31 December 2021



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We recommend a MRP of 5.0% as per 31 December 2021

If you are reading this, it is likely that you are in regular contact with KPMG Corporate Finance & Valuations ("KPMG Corporate Finance NL") on the topic of valuations. The goal of this document is to provide a summary to our business partners about our recent observations and conclusions regarding one of the key valuation parameters, the equity market risk premium.

We recommend the use of an equity market risk premium ("MRP") of 5.0% as per 31 December 2021. Between the third and fourth quarter of 2021 we have observed higher stock prices, albeit combined with increased volatility. Over the same period, both the forecasted growth outlooks and risk-free rates have remained relatively constant when compared to 30 September 2021. As a result of these developments, we maintain our MRP at 5.0%, in line with the MRP as per the third quarter of 2021.

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Introduction – valuation and discount rates

Introduction

The discount rate is an important input parameter to any valuation based on the discounted cash flow methodology (“DCF”). All else equal, a higher discount rate will lead to a lower asset value and vice versa.

In this document, we will specifically focus on the derivation of the cost of equity for company valuations. This discount rate can either be directly applied to equity cash flow forecasts of a company or it can be used in conjunction with the cost of debt and a certain financing structure to derive the weighted average cost of capital (“WACC”).

Discount rate derivation

While there are several ways to derive discount rates, the most commonly applied methodology is the ‘build-up methodology’ based on the Capital Asset Pricing Model (“CAPM”). This methodology builds up the discount rate by summation of several asset-related risk components in order to derive a return at which investors are willing to invest in this asset (e.g. a company).

A general DCF model can be expressed by the following formula:

$$\text{Present value} = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \dots = \sum_{t=1}^{\infty} \frac{CF_t}{(1+k)^t}$$

| | | |
|---------------|---|--|
| Present value | = | value of the analysed asset (e.g. a company) |
| CF_t | = | cash flow that the asset will generate in period t |
| k | = | asset-specific discount rate |

The build-up of the cost of equity (“k”) of a company can be expressed as:

$$k = r_{fr} + \beta \times MRP + \alpha$$

| | | |
|----------|---|-------------------------------|
| k | = | required return on equity |
| r_{fr} | = | risk-free rate |
| β | = | a company’s systematic risk |
| MRP | = | market or equity risk premium |
| α | = | asset-specific risk factors |

The function and derivation of the individual discount rate parameters are briefly discussed on the following slide.

Introduction – discount rate parameters

Risk-free rate

The risk-free rate forms the basis for any discount rate estimation using the build-up methodology. As the name implies, this rate should not take into account any risk factors and should only include two general components:

- The time value of money; and
- Inflation.

Since there are no investments that are truly risk-free, the risk-free rate is commonly approximated by reference to the yield on long-term debt instruments issued by presumably financially healthy governments (e.g. AAA-rated government bonds with a maturity of 30 years).

Beta

Beta measures how the returns of a certain company behave in relation to the returns of the relevant market benchmark.

A beta greater/smaller than 1.0 means that the share price of a company is more/less volatile than the general market and therefore investors will require a higher/lower return to compensate for this volatility.

Alpha

Alpha is an asset-specific adjustment factor that may need to be applied for a number of different reasons. If a financial forecast does not account for certain operational risks, it may be appropriate to include a forecast risk premium. Other examples of alpha adjustments are size premia and illiquidity premia.

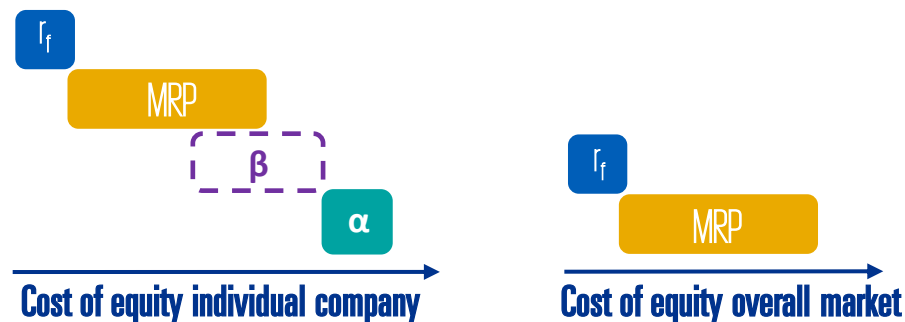


Equity market risk premium (MRP)

The MRP is the average return that investors require over the risk-free rate for accepting the higher variability in returns that are common for equity investments (i.e. the MRP reflects a minimum threshold on top of the risk-free rate for investors in order to be willing to invest).

Since alpha only relates to company-specific adjustments, it can be omitted if considering the overall market (alpha = 0). Furthermore it is important to note that for the overall market, beta will by definition always be 1.0, since the sum of all returns of individual stocks equals the overall return of the market, and therefore, the two are perfectly correlated.

As the figure below shows, the required return for the overall market is defined entirely by the risk-free rate and the MRP.



Measurement of the equity market risk premium – methodologies

Implied equity market risk premium

The general DCF formula discussed earlier can be used to solve for the implied discount rate that reconciles these parameters.

Deducting the risk-free rate from this implied discount rate will yield an implied MRP.

The implied MRP methodology is to some extent sensitive to input assumptions and careful consideration must be given to:

- The selection of income proxies (e.g. dividends, buy-backs, cash flow);
- The basis of expected growth rates (e.g. macroeconomic considerations, analyst forecasts); and
- The trade-off between outcome stability and current relevance with regards to certain historical inputs (e.g. dividend yield normalisations, pay-out ratios).

KPMG Corporate Finance, a division of KPMG Advisory N.V. (“KPMG Corporate Finance”), continuously inspects if enhancements in applying the above input assumptions are necessary for the current MRP method in order to accurately reflect the current market dynamics.

We deem the implied MRP methodology the most appropriate methodology in order to derive changes in the MRP as a result of the financial crisis, because it incorporates recent market developments, expectations, and it can be logically deduced from observable market data.

Historical observation methodology

This methodology assumes that the expected MRP can be derived by studying historical equity returns.

While this methodology is well established and theoretically sound, it does not allow for the incorporation of the most recent market developments.

Other methodologies

There are a number of other prominent methodologies which may lead to additional insights, the most common being:

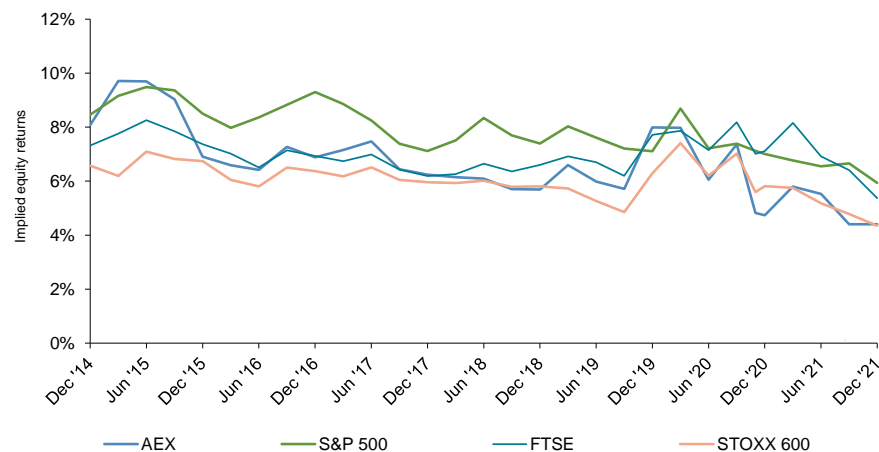
- The multi-factor model;
- The yield spread build-up; and
- The survey approach.

While each of these methodologies offers some unique advantages, the application of these methodologies involves similar trade-offs as the ones between the historical and the implied MRP methodology.

Development of discount rates

Implied equity return

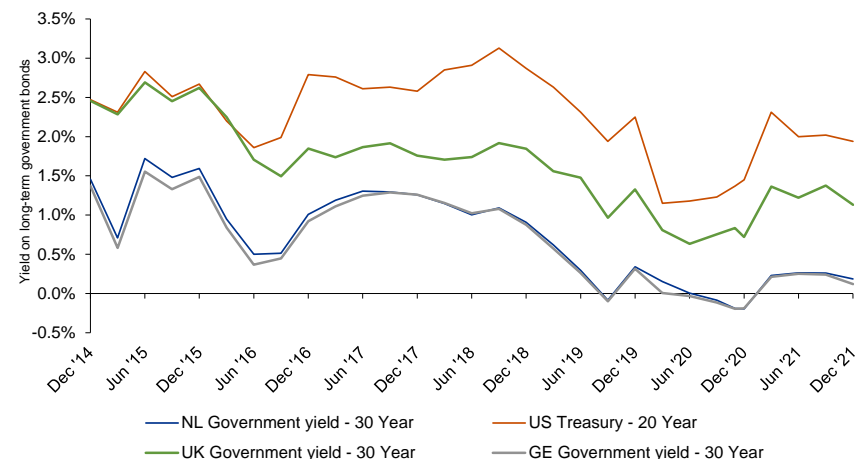
The graph below illustrates the movement in the implied equity returns for a number of major equity markets over time. From this graph it can be observed that the implied equity returns of the markets included have either remained relatively stable (i.e. AEX and STOXX 600) or have experienced a (slight) decrease (i.e. FTSE and S&P500) since 30 September 2021.



Yield on long-term bonds

In the graph below, the interest rate movements for a number of highly developed markets (Netherlands, UK, Germany and US) are displayed.

From this graph it can be observed that the long term yields of the German and Dutch government bonds, and the US Treasury bond have remained relatively constant and that the yields of the UK government bond have decreased slightly compared to 30 September 2021.



Equity market risk premium as per 30 September 2021: 5.0%

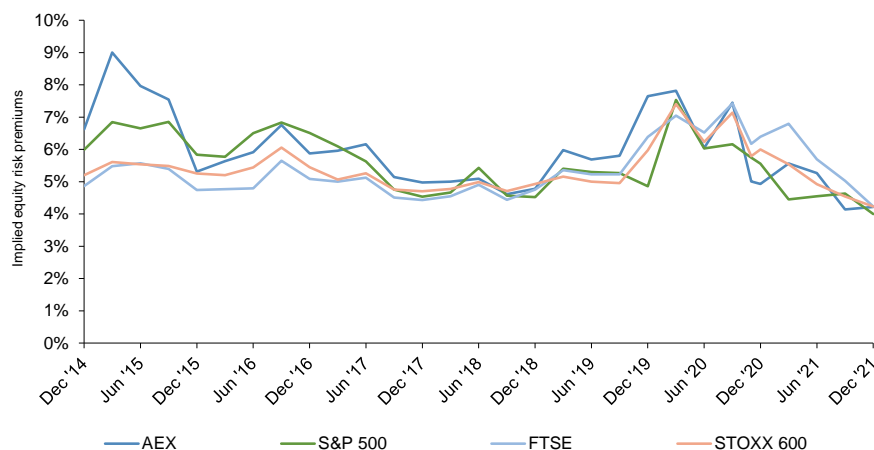


In our current update we observe relatively constant or slight decreases in MRP estimates compared to 30 September 2021. This is driven by slightly lower implied equity returns, but relatively constant risk-free rates.

Equity market risk premium KPMG Corporate Finance

Based on the analyses set out in this report we conclude that the markets included in our study (with more weight given to the S&P 500, FTSE and STOXX 600), show relatively constant or slightly lower implied premiums compared to 30 September 2021. Therefore, KPMG Corporate Finance NL recommends the use of a **MRP of 5.0%** as per 31 December 2021.

We note that our estimation is based on information available as at 31 December 2021. Developments in the market after 31 December 2021 are not reflected in the MRP estimate as at 31 December 2021.



Considerations

In order to assess the reasonableness of the outcomes of our implied MRP study, we have considered various other methodologies as previously described. To the extent that these methodologies are valid to derive insights about the current level of the MRP, these methodologies have confirmed our findings.

Based on our research and professional judgement we consider the outcome of our study to represent a global MRP. However, when calculating a discount rate for a specific valuation purpose, consideration must be given to (amongst others):

- The basis for the applied risk-free rate;
- The applicable country risk premium; and
- Expected differences in inflationary outlook.

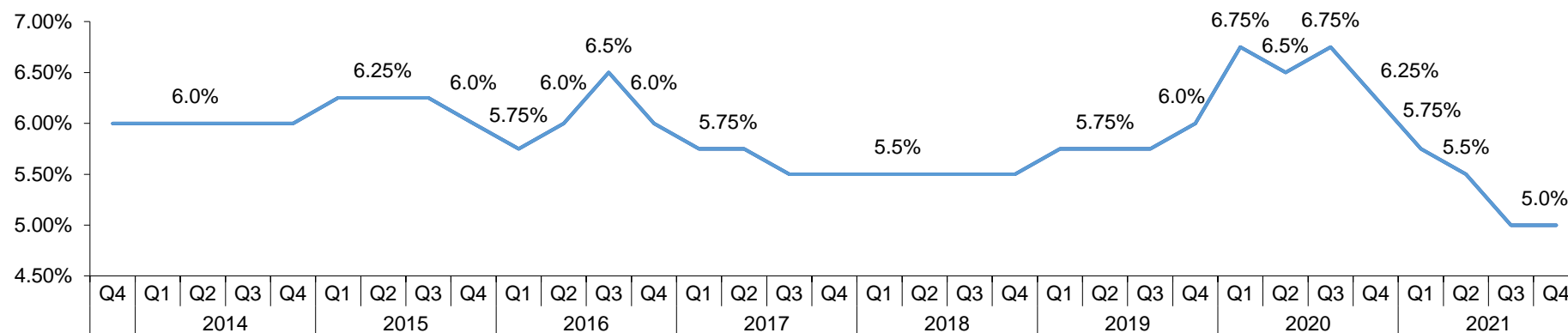
We highlight that the individual input parameters used in the determination of the discount rate should never be viewed in isolation.

Appendix



Historic MRP estimates

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





KPMG on social media



KPMG app

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