BEFORE THE WASHINGTON

UTILITIES & TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

Complainant,

v.

PUGET SOUND ENERGY

Respondent.

DOCKETS UE-190529 and UG-190530 (*Consolidated*)

RESPONSE TESTIMONY OF J. RANDALL WOOLRIDGE
ON BEHALF OF THE
WASHINGTON STATE OFFICE OF ATTORNEY GENERAL
PUBLIC COUNSEL

EXHIBIT JRW-1T

November 22, 2019

DOCKET NOS. UE-190529 and UG-190530 (*Consolidated*)

RESPONSE TESTIMONY OF J. RANDALLWOOLRIDGE

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RESPONSE TESTIMONY OF J. RANDALLWOOLRIDGE

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<u>EXHIBITS LIST</u>

I. INTRODUCTION

Q. Please state your full name, address, and occupation.

A. My name is J. Randall Woolridge, and my business address is 120 Haymaker Circle, State College, PA 16801. I am a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration at the University Park Campus of the Pennsylvania State University. I am also the Director of the Smeal College Trading Room and President of the Nittany Lion Fund, LLC. A summary of my educational background, research, and related business experience is provided in Exhibit JRW-2.

Q. On whose behalf are you testifying?

A. I have been asked by the Public Counsel Unit of the Washington State Attorney General's Office to provide an opinion as to the overall fair rate of return or cost of capital for the regulated electric and gas utility service of Puget Sound Energy (PSE or the "Company") and to evaluate PSE's rate of return testimony in this proceeding.[1]

Q. How is your testimony organized?

A. The following is an outline of my testimony:

- First, I summarize my cost of capital recommendation for the Company and review the primary areas of contention on the Company's position.
- Second, I provide an assessment of capital costs in today's capital markets.
- Third, I discuss the selection of proxy groups for estimating the cost of equity capital for

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

the Company.

- Fourth, I discuss the Company's recommended capital structure and debt cost rates.
- Fifth, I provide an overview of the concept of the cost of equity capital, and then estimate the equity cost rate for the Company.
- Finally, I critique PSE's rate of return analysis and testimony.

II. SUMMARY OF RECOMMENDATIONS

A. Overview

Q. What comprises a utility's "rate of return"?

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

Q. What is a utility's ROE intended to reflect?

A. An ROE is most simply described as the allowed rate of profit for a regulated company. In a competitive market, a company's profit level is determined by a variety of factors including: the state of the economy, the degree of competition a company faces, the ease of entry into its markets, the existence of substitute or complementary products/services, the company's cost structure, the impact of technological changes, and the supply and demand for its services and/or products. For a regulated monopoly, the regulator determines the level of profit available to the public utility. The United States Supreme Court established the guiding principles for determining an appropriate level of profitability for regulated public utilities in two cases: (1) *Hope* and (2) *Bluefield*.[2] In those cases, the Court recognized that the fair rate of return on equity should be: (1) comparable to returns investors expect to earn on other investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital.

Thus, the appropriate ROE for a regulated utility requires determining the market-based cost of capital. The market-based cost of capital for a regulated firm represents the return investors could expect from other investments, while assuming no more and no less risk. The purpose of the economic models and formulas in cost of capital testimony, such as the Discounted Cash Flow Model and the Capital Asset Pricing Model, which I have included in my testimony is to estimate, using market data of similar-risk firms, the rate of return on equity investors require for this specific risk-class of firms, in order to set an appropriate ROE for a regulated firm.

B. Summary of Positions

Q. Please review your proposed recommendations regarding the appropriate rate of return for the company.

A. The Company has proposed a capital structure consisting of 2.30 percent short-term debt, 49.20 percent long-term debt, and 48.50 percent common equity for PSE. The Company has proposed short-term and long-term debt cost rates of 4.18 percent and 5.51 percent. I have adopted this capital structure, as it is generally reflective of the capital structures of my proxy groups of electric, combination electric and gas, and gas distribution

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

companies. I have adjusted the short-term debt cost rate to reflect the lower short-term interest rates, but I have employed the Company's proposed long-term debt cost rates. Dr. Roger A. Morin has recommended a common equity cost rate of 9.80 percent for the Company. I have applied the Discounted Cash Flow Model (DCF) and the Capital Asset Pricing Model (CAPM) to a proxy group of publicly-held electric utility companies ("Electric Proxy Group"), the group developed by Dr. Morin ("Morin Proxy Group") and a group of gas distribution companies ("Gas Proxy Group"). My analysis indicates an appropriate equity cost rate of 8.75 percent for the Company. This figure is in the upper end of my equity cost rate range of 6.9 percent to 8.95 percent. With my proposed capital structure and senior capital cost rates for PSE, I am recommending an overall fair rate of return or cost of capital of 7.07 percent for PSE. This is summarized in Exhibit JRW-3.

C. Primary Rate of Return Issues in this Case

Q. Please describe the primary rate of return issues in this case.

A. The primary rate of return issues in this case are the appropriate capital structure and ROE for PSE.

<u>Capital Market Conditions</u> – Dr. Morin's analyses, ROE results, and recommendations are based on assumptions of higher interest rates and capital costs. However, I show that despite the Federal Reserve's moves to increase the federal funds rate over the 2015-18 time period, interest rates and capital costs remained at low levels. In 2019 interest rates have fallen with slow economic growth and low inflation, the Federal Reserve has cut the federal funds rate three times, and the 30-year yield has traded at all-time low levels.

<u>The Company's Short-Term Debt Cost Rate and ROE Analyses are Out-of-Date</u> – The Federal Reserve has cut the federal funds rate three times since the Company filed its testimony and so their proposed short-term debt cost rate is out of date. Also, the Company's ROE study was prepared in March of this year. Since that time, the 30-year Treasury rate has fallen about seventy basis points. In short, capital costs are lower now than when the Company's case was filed.

<u>DCF Approach</u> – Dr. Morin and I have both employed the traditional constant-growth DCF model. There are several errors in Dr. Morin's DCF analyses: (1) he adjusts the dividend yield by a full year of growth; (2) he has exclusively used the overly optimistic and upwardly biased earnings per share (EPS) growth rate forecasts of Wall Street analysts and *Value Line*. On the other hand, when developing the DCF growth rate that I have used in my analysis, I have reviewed thirteen growth rate measures including historical and projected growth rate measures and have evaluated growth in dividends, book value, and earnings per share.

<u>CAPM Approach</u> – The CAPM approach requires an estimate of the risk-free interest rate, beta, and the market or risk premium. There are three issues with Dr. Morin's CAPM approach: (1) he has used an ad hoc version of the CAPM – the empirical CAPM (ECAPM); (2) he has used a projected long-term Treasury rate of 4.20 percent that is more than 150 basis points above current yields; and (3) his market risk premium of 7.50 percent is based on two flawed studies: (a) a market risk premium using historical stock returns and bond income returns that even the source of his data, Duff &

Phelps,[3] an investment advisory firm, indicates it is an incorrect method to measure an expected market risk premium; and (b) a market risk premium based on an application of the DCF model to the S&P 500 that uses projected, upwardly-biased EPS growth rates that produce an unrealistically high expected stock return and market risk premium.

As I highlight in my testimony, there are three procedures for estimating a market risk premium – historic returns, surveys, and expected return models. I have used a market risk premium of 5.75 percent, which: (1) factors in all three approaches – historic returns, surveys, and expected return models – to estimate a market risk premium; and (2) employs the results of many studies of the market risk premium. As I note, the 5.75 percent figure reflects the market risk premiums: (1) determined in recent academic studies by leading finance scholars; (2) employed by leading investment banks and management consulting firms; and (3) found in surveys of companies, financial forecasters, financial analysts, and corporate CFOs.

<u>Risk Premium Approach</u> – There are three errors with Dr. Morin's risk premium analyses: (1) his projected risk-free interest rate of 4.2 percent is more than 150 basis points above current yields; (2) his historical risk premium study is based on the difference in the arithmetic mean historical returns over the 1931-2018 time period on the S&P Public Utility Index and U.S. Treasury bonds. As I discuss in my testimony, there are numerous empirical errors that result in historical returns providing inflated measure of expected future risk premiums; and (3) his other risk premium study establishes a risk premium by a regression of authorized ROEs for electric utilities and long-term Treasury

[3] Duff & Phelps, "U.S. Equity Risk Premium Recommendation," (Feb. 19, 2019), available at https://www.duffandphelps.com/insights/publications/valuation-insights/valuation-insights-first-quarter-2019/us-equity-risk-premium-recommendation.

yields over the 1986-2018 time period. As I note, this approach reflects commission behavior and not investor behavior.

III. CAPITAL MARKET CONDITIONS AND AUTHORIZED ROES

Q. Please review the Federal Reserve's decisions to raise the federal funds rate in recent years.

A. On December 16, 2015, the Federal Reserve increased its target rate for federal funds from 0.25 to 0.50 percent.[4] This increase came after the rate was kept in the 0.00 to 0.25 percent range for over five years in order to spur economic growth in the wake of the financial crisis associated with the Great Recession. As the economy has improved, with lower unemployment, steady but slow GDP growth, the Federal Reserve increased the target federal funds rate on eight additional occasions: December 2016; March, June, and December of 2017; and March, June, September, and December of 2018.

Q. How did long-term rates respond to the actions of the Federal Reserve?

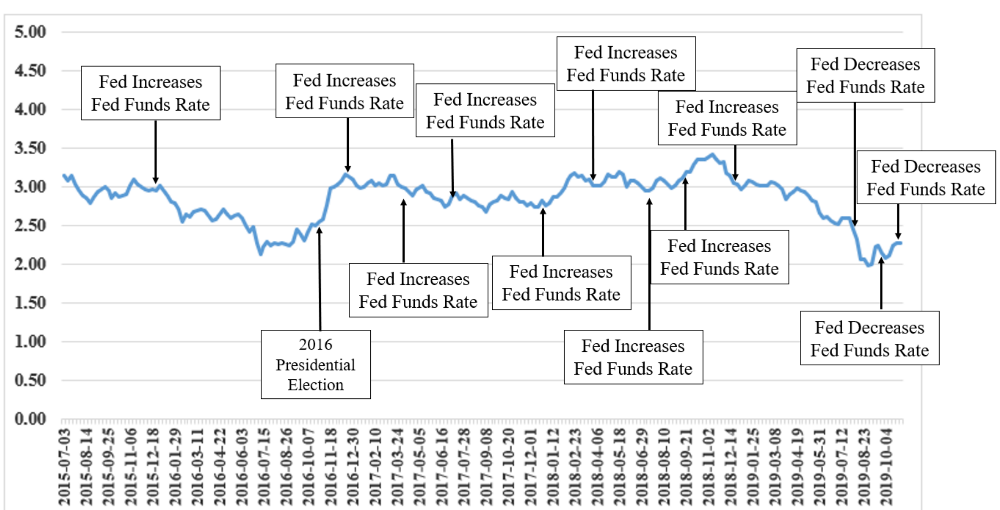
A. Figure 1, below, shows the yield on 30-year Treasury bonds over the period of 2015-2019. I have highlighted the dates when the Federal Reserve increased the federal funds rate. As the Fed increased the federal funds rate between 2015-2018, the 30-year Treasury yield remained primarily between 2.8 percent to 3.4 percent range. These yields peaked at 3.48 percent in November of 2018, shortly before the December 2018 rate increase by the Federal Reserve.

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

Q. Please review long-term treasury yields in 2019.

A. Despite the Fed's efforts to stimulate the economy, economic growth and inflation have remained low, even with record low unemployment levels. The rate increase in December of 2018 was seen by many as maybe too aggressive. Also, with the imposition of trade tariffs aimed at China, and with continued slow growth in Europe, concerns have grown that a recession is on the horizon in the U.S. This led the Federal Reserve to cut the federal fund rate to the 2.0 percent to 2.25 percent range in July of 2019. Thirty-year Treasury yields, which began the year in the 3.0 percent range, have fallen to almost 2.0 percent. In fact, in August of 2019, the 30-year Treasury yield fell to record lows and even traded below 2.0 percent. As a result, the Federal Reserve has cut the discount rate two more times since the July rate cut – in September and October. The irony is, despite the record low levels, the 30-year Treasury yield in the U.S. is still somewhat higher than the government bond rates in Japan, the U.K., Germany, and much of the rest of Europe.

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



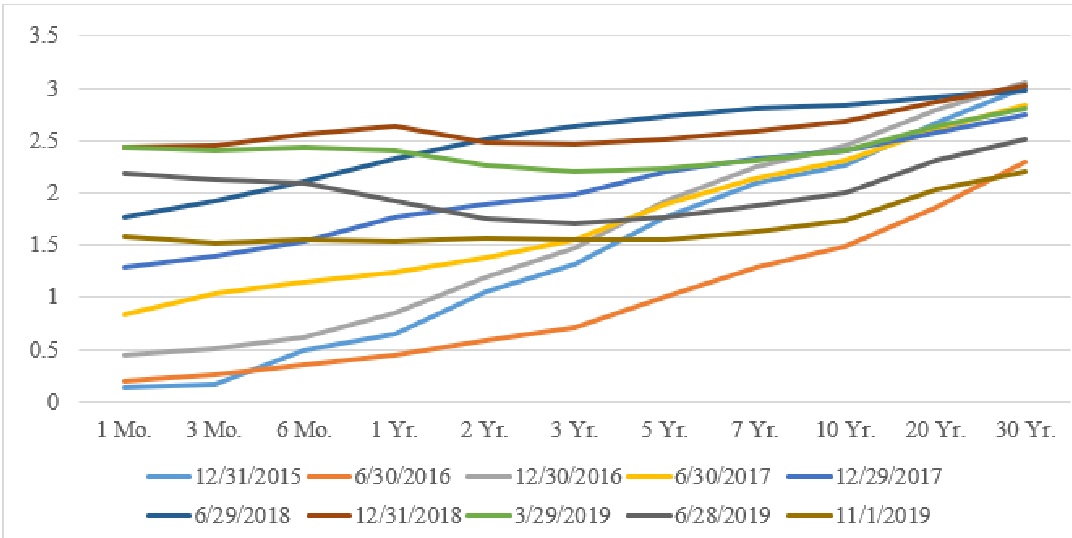
Q. Why have long-term treasury yields remained in the 2.0 percent to 3.0 percent range in recent years?

A. Whereas the Federal Reserve can directly affect short-term rates by adjustments to the federal funds rate, long-term rates are primarily driven by expected economic growth and inflation.[5] The relationship between short and long-term rates is normally evaluated using the yield curve. The yield curve depicts the relationship between the yield-to-maturity and the time-to-maturity for U.S. Treasury bills, notes, and bonds. Figure 2, below, shows the yield curve on a semi-annual basis since the Federal Reserve started increasing the federal funds rate at the end of 2015. It shows that, from the time the Federal Reserve began increasing the federal fund rate in 2015 and until 2018, with the exception of mid-year 2016, the 30-year Treasury yield has remained in the 2.8 percent to 3.4 percent range over this time frame despite the fact that short-term rates have increased from near 0.0 percent to about 2.50 percent. As such, long-term interest rates and capital costs did not increase in any meaningful way even with the Federal Reserve's actions and the increase in short-term rates.

In 2019, with the large decline in long-term Treasury rates, the concern has been an "inverted yield curve." An inverted yield curve occurs when short-term Treasury yields are above long-term Treasury yields and is commonly associated with a pending recession. Whereas the yield curve did invert in August, it is no longer inverted after the two additional rate cuts by the Federal Reserve in September and October of 2019.

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

Figure 2
Semi-Annual Yield Curves
2015-2019

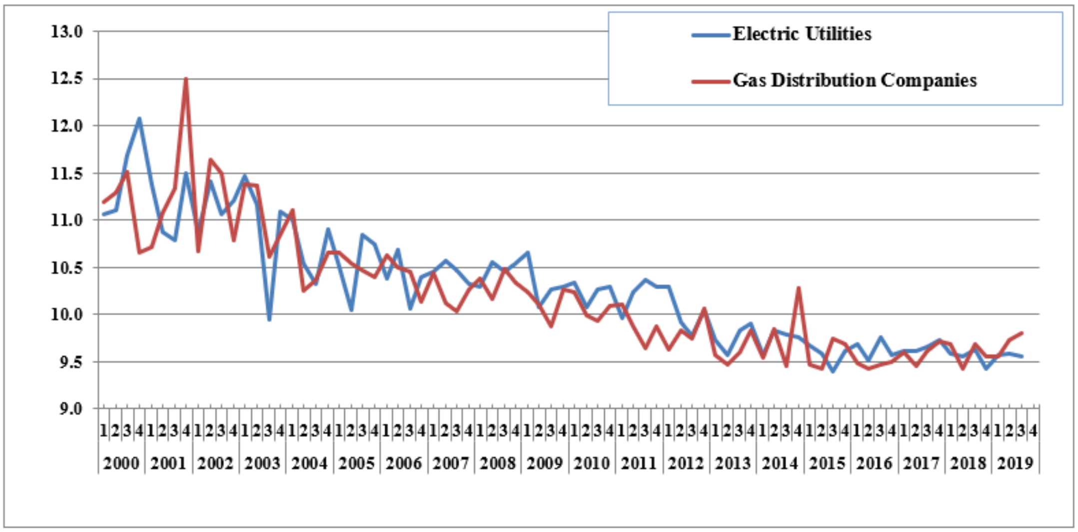


Date Source: https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2019

Q. Please discuss the trend in authorized returns on equity for electric and gas companies.

A. Over the past five years, with historically low interest rates and capital costs, authorized ROEs for electric utility and gas distribution companies have slowly declined to reflect the low capital cost environment. In Figure 3, below, I have graphed the quarterly authorized ROEs for electric and gas companies from 2000 to 2018. There is a clear downward trend in the data. On an annual basis, these authorized ROEs for electric utilities have declined from an average of 10.01 percent in 2012, 9.8 percent in 2013, 9.76 percent in 2014, 9.58 percent in 2015, 9.60 percent in 2016, 9.68 percent in 2017, 9.56 percent in 2018, and 9.57 percent in the first three quarters of 2019, according to S&P Global Market Intelligence, *RRA Regulatory Focus*, 2019.[6]

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



IV. PROXY GROUP SELECTION

Q. Please describe your approach to developing a fair rate of return recommendation for the company.

A. To develop a fair rate of return recommendation for the Company, I have evaluated the return requirements of investors on the common stock of a proxy group of publicly held electric utility companies ("Electric Proxy Group"). I have also employed the group developed by Dr. Morin ("Morin Proxy Group"), as well as a group of gas distribution companies ("Gas Proxy Group").

[6] S&P Global Market Intelligence, *RRA Regulatory Focus*, 2019. The electric utility authorized ROEs exclude the authorized ROEs in Virginia, which include generation adders.

Q. Please describe your proxy group of electric companies.

A. The selection criteria for the Electric Proxy Group include the following:

- At least 50 percent of revenues from regulated electric operations as reported by *AUS Utilities Report*;
- Listed as a U.S. Electric Utility by *Value Line Investment Survey*;
- An investment-grade corporate credit and bond rating;
- Has paid a cash dividend for the past six months, with no cuts or omissions;
- Not involved in an acquisition of another utility, and not the target of an acquisition; and
- Analysts' long-term earnings per share growth rate forecasts available from Yahoo or Zack's.

The Electric Proxy Group includes 30 companies. Summary financial statistics for the proxy group are listed in Exhibit JRW-4, page one.[7] The median operating revenues and net plant among members of the Electric Proxy Group are $6,582.0 million and $22,405.5 million, respectively. The group receives 81 percent of its revenues from regulated electric operations, has a BBB+ bond rating from Standard & Poor's and a Baa1 rating from Moody's, a common equity ratio of 45.5 percent, and an earned return on common equity of 9.7 percent.

Q. Please describe the Morin proxy group.

A. Dr. Morin's group is smaller (20 utilities) and includes combination electric and gas utility companies. Summary financial statistics for Dr. Morin's proxy group are provided

[7] In my testimony, I present financial results using both mean and medians as measures of central tendency. However, due to outliers among means, I have used the median as a measure of central tendency.

in Panel B of page one of Exhibit JRW-4. The median operating revenues and net plant for the Morin Proxy Group are $7,276.3 million and $21,825.5 million, respectively. The group receives 61 percent of its revenues from regulated electric operations and 27 percent from regulated gas operations, has a BBB+ bond rating from Standard & Poor's and a Baa1 rating from Moody's, a common equity ratio of 44.8 percent, and an earned return on common equity of 10.5 percent.

Q. Please describe your proxy group of gas distribution companies.

A. My Gas Proxy Group consists of nine natural gas distribution companies. The companies include Atmos Energy, Chesapeake Utilities, New Jersey Resources, NiSource, Inc. Northwest Natural Gas Company, ONE Gas, Inc., South Jersey Industries, Southwest Gas, and Spire.

Summary financial statistics for the Gas Proxy Group are listed on Panel C of page one of Exhibit JRW-4. The median operating revenues and net plant among members of the Gas Proxy Group are $1,740.7 million and $3,665.3 million, respectively. The group receives 68 percent of revenues from regulated gas operations, has an BBB+ average issuer credit rating from S&P, a median common equity ratio of 46.2 percent, and a median earned return on common equity of 8.9 percent.

Q. How does the investment risk of the company compare to that of your proxy groups?

A. I believe that bond ratings provide a good assessment of the investment risk of a company. PSE's issuer credit rating is BBB according to S&P and Baa1 according to Moody's. As shown in Table 1, PSE's Moody's credit rating is the same as the Electric and Morin Proxy Groups, and below the Gas Proxy Group. PSE's S&P issuer credit rating is one notch below the Electric, Morin, and Gas Proxy Groups (BBB vs. BBB+) and PSE's Moody's rating of Baa1 is equal to the three proxy groups. However, as highlighted by S&P and Moody's, PSE's credit ratings are constrained by the $1.8 billion of debt of its parent company, Puget Energy, Inc. Puget Energy's S&P and Moody's credit ratings are BBB- and Baa3.

Table 1
S&P and Moody's Credit Ratings

	S&P Issuer Credit	Moody's Long-Term Credit Rating
PSE	**BBB**	**Baa1**
Electric Proxy Group	**BBB+**	**Baa1**
Morin Proxy Group	**BBB+**	**Baa1**
Gas Proxy Group	**BBB+**	**Baa1**

Q. Please provide additional insights into how credit rating agencies view PSE?

A. In a recent credit report, Moody's noted that PSE maintains a credit supportive relationship with the WUTC that helps provide its stable and predictable cash flow. The Moody's report also addressed the passage of the Clean Energy Bill in May of this year. Specifically, Moody's made note of the following:[8]

> **Credit positive regulatory mechanisms provide good cost recovery and financial support**
> PSE has historically maintained a credit supportive relationship with the WUTC. Following the expiration of the utility's four-year rate plan in 2017, its regulatory process was characterized by some contention. However, we believe Washington's recently passed clean energy bill will provide more regulatory clarity and result in credit positive outcomes for the utility going forward.
>
> In May 2019, Washington passed a new clean energy bill, targeting 100% carbon-free electricity supply by 2045. The bill provides regulatory tools for utilities to recover carbon transition costs and clarifies the WUTC's

[8] Moody's Investor Service, *Puget Sound Energy: Update To Credit Analysis* (Aug. 29, 2019). Provided as Attachment D to Puget Sound Energy's response to WUTC Staff Data Request No. 40, at 4.

> authority to consider and implement performance and incentive-based regulation, multi-year rate plans, and other flexible regulatory mechanisms. It also allows for accelerated depreciation of coal plants and the ability to earn a return on certain PPAs.
>
> These credit positive attributes of the clean energy bill enhance existing credit supportive cost recovery mechanisms which include decoupling, expedited rate filings (ERF), an electric conservation rider, electric property tax tracker and purchased gas adjustment, among others. The decoupling mechanism in particular is credit supportive since it helps PSE to have greater fixed cost recovery in both its electric and gas segments, even in a declining sales volume environment, and includes electric fixed production energy costs.

In the credit analysis update, Moody's also provides its current and 12 to 18 month forward view of PSE's regulatory environment, ability to recover costs and earn returns, diversification, and financial strength. As shown in Table 2, PSE grades out primarily as an A rated utility in the analysis.

Table 2
Moody's Rating Methodology and Scorecard for PSE

Rating Factors
Puget Sound Energy, Inc.

Regulated Electric and Gas Utilities Industry Scorecard [1][2]	Current LTM 6/30/2019		Moody's 12-18 Month Forward View As of Date Published [3]	
Factor 1 : Regulatory Framework (25%)	**Measure**	**Score**	**Measure**	**Score**
a) Legislative and Judicial Underpinnings of the Regulatory Framework	A	A	A	A
b) Consistency and Predictability of Regulation	A	A	A	A
Factor 2 : Ability to Recover Costs and Earn Returns (25%)				
a) Timeliness of Recovery of Operating and Capital Costs	A	A	A	A
b) Sufficiency of Rates and Returns	Baa	Baa	Baa	Baa
Factor 3 : Diversification (10%)				
a) Market Position	Baa	Baa	Baa	Baa
b) Generation and Fuel Diversity	A	A	A	A
Factor 4 : Financial Strength (40%)				
a) CFO pre-WC + Interest / Interest (3 Year Avg)	5.0x	A	5.1x - 5.5x	A
b) CFO pre-WC / Debt (3 Year Avg)	22.4%	A	20% - 24%	A
c) CFO pre-WC – Dividends / Debt (3 Year Avg)	17.6%	A	15% - 19%	A
d) Debt / Capitalization (3 Year Avg)	46.6%	Baa	42% - 46%	A
Rating:				
Scorecard-Indicated Outcome Before Notching Adjustment		A3		A3
HoldCo Structural Subordination Notching				
a) Scorecard-Indicated Outcome		A3		A3
b) Actual Rating Assigned		Baa1		Baa1

[1] All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations
[2] As of 6/30/2019(L)
[3] This represents Moody's forward view; not the view of the issuer; and unless noted in the text, does not incorporate significant acquisitions and divestitures
Source: Moody's Financial Metrics

Moody's Investor Service, *Puget Sound Energy: Update to Credit Analysis*, (Aug. 29, 2019). Provided as Attachment D to Puget Sound Energy's response to WUTC Staff Data Request No. 40, at 7.

Q. What do you conclude about the riskiness of PSE relative to the proxy groups?

A. Based on the above discussion, I believe that the investment risk of PSE is in line with the proxy groups.

Q. Please discuss the risk analysis you preformed on page two of Exhibit JRW-4.

A. On page two of Exhibit JRW-4, I have assessed the riskiness of the three proxy groups using five different risk measures. These measures include Beta, Financial Strength, Safety, Earnings Predictability, and Stock Price Stability. These risk measures indicate that the two proxy groups are similar in risk. The comparisons of the risk measures include Beta (0.57 vs. 0.59 vs. 0.66), Financial Strength (A vs. A vs. A) Safety (1.8 vs. 1.8 vs. 1.9), Earnings Predictability (77 vs. 77 vs. 66), and Stock Price Stability (96 vs. 95 vs. 90). Overall, these measures suggest that the investment risk of the three groups (1) is very low and (2) is similar to each other.

V. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES

Q. What are PSE's recommended capital structure and senior capital cost rates for ratemaking purposes?

A. PSE witness Mr. Matthew McArthur provides PSE's capital structure and senior capital cost rates. Mr. McArthur has recommended a capital structure consisting of 2.30 percent short-term debt, 49.20 percent long-term debt, and 48.50 percent common equity for PSE. He has recommended short-term and long-term debt cost rates of 4.18 percent and 5.51 percent. His weighted short-term and long-term debt rate includes both include adjustments of 0.03 percent for commitment and amortization fees. This is summarized in Panel A of Exhibit JRW-5.

Q. Please discuss the capital structures of the companies in the proxy groups.

A. Panel B of Exhibit JRW-5 provides the average common equity ratios for the companies in the three proxy groups. The average common equity ratios for the Electric, Morin, and Gas Proxy Groups were 45.5 percent, 44.8 percent, and 46.20 percent as of December 31, 2018. These ratios indicate that PSE's proposed capital structure, with a common equity ratio of 48.50 percent, is above the averages of the proxy groups. That means the proposed capital structure include more common equity and less financial risk than the proxy groups. Nonetheless, I believe that PSE's proposed capital structure is reasonable, and I will employ it in my cost of capital recommendation.

Q. What senior capital cost rates are you using for PSE?

A. I am using the Company's proposed long-term debt cost rate of 5.51 percent and have included the .03 percent proposed adjustment in the weighted cost rate computation.

However, since the Company filed its testimony in May, the Federal Reserve has cut the federal fund rate three times. In developing its short-term debt cost rate, Mr. McArthur used the projected one-month London Interbank Offered Rate (LIBOR) rates from March 2020 to March 2021. These projected rates have declined significantly with the federal funds rate cuts. Mr. McArthur develops his short-term debt cost rate on page three of "NEW-PSE-Exh-MDM-05-6-20-19".[9] It is based on the projected LIBOR rates in May of this year, which are presented in line 9 of the Exhibit. I have included page three of "NEW-PSE-Exh-MDM-05-6-20-19" as page three of Exhibit JRW-5, but I have modified line 9 and inserted the current projected one-month LIBOR rates from March 2020 to March 2021. These updated projected rates are shown on page three of Exhibit

[9] Matthew D. McArthur, Exh. MDM-5, at 3.

JRW-5. The adjusted cost of short-term debt is 2.38 percent and is shown on line 20 of page two of Exhibit JRW-5. I have used this rate and have included the proposed .03 percent adjustment in the weighted cost rate computation.

VI. THE COST OF COMMON EQUITY CAPITAL

A. Overview

Q. Why must an overall cost of capital or fair rate of return be established for a public utility?

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

Q. Please provide an overview of the cost of capital in the context of the theory of the firm.

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

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

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

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

> Fundamentally, the value of a company is determined by the cash flow it generates over time for its owners, and the minimum acceptable rate of return required by capital investors. This "cost of equity capital" is used to discount the expected equity cash flow, converting it to a present value. The cash flow is, in turn, produced by the interaction of a company's return on equity and the annual rate of equity growth. High return on equity (ROE) companies in low-growth markets, such as Kellogg, are prodigious generators of cash flow, while low ROE companies in high-growth markets, such as Texas Instruments, barely generate enough cash flow to finance growth.
>
> A company's ROE over time, relative to its cost of equity, also determines whether it is worth more or less than its book value. If its ROE is consistently greater than the cost of equity capital (the investor's minimum acceptable return), the business is economically profitable and its market value will exceed book value. If, however, the business earns an ROE consistently less than its cost of equity, it is economically unprofitable, and its market value will be less than book value. [10]

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

Q. Please provide additional insights into the relationship between ROE and market-to-book ratios.

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

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

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

Profitability	*Value*
If ROE > K	*then Market/Book > 1*
If ROE = K	*then Market/Book =1*
If ROE < K	*then Market/Book < 1*[11]

To assess the relationship by industry, as suggested above, I performed a regression study between estimated ROE and market-to-book ratio ratios using natural gas distribution and electric utility companies. I used all companies in these two industries that are covered by *Value Line* and have estimated ROE and market-to-book ratio data. The results are presented in Exhibit JRW-6. The R-squares for the electric and gas companies is 0.50.[12] This demonstrates the strong positive relationship between ROEs and market-to-book ratios for public utilities.

Q. What economic factors have affected the cost of equity capital for public utilities?

A. Page one of Exhibit JRW-7 shows the yields on long-term A-rated public utility bonds. These yields decreased from 2000 until 2003, and then hovered in the 5.50 percent to 6.50 percent range from mid-2003 until mid-2008. These yields peaked in November 2008 at 7.75 percent during the Great Recession. These yields have generally declined since then, dropping below 4.0 percent on four occasions - in mid-2013, in early 2015, in the summer of 2016, and in late 2017. These yields increased in 2018 but have fallen back with the decline in interest rates in 2019 and now are in the 3.5 percent range.

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11 Benjamin Esty, *Note on Value Drivers*, Harvard Business School, Case No. 9-297-082 (April 7, 1997.

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

Page two of Exhibit JRW-7 provides the dividend yields for electric and gas groups over the past decade. The dividend yields for the electric group declined from 5.3 percent to 3.4 percent between the years 2001 to 2007, increased to over 5.0 percent in 2009, and have declined steadily since that time. The average dividend yield was 3.2 percent in 2018. The dividend yields for the gas group declined from 5.8 percent to 3.1 percent between the years 2000 to 2007, increased to about 4.0 percent in 2009, and have declined steadily since that time. The average dividend yield was 2.70 percent in both 2017 and 2018.

Average earned returns on common equity and market-to-book ratios for electric utilities are on page three of Exhibit JRW-7. For the electric group, earned returns on common equity have declined gradually over the years. In the past three years, the average earned ROE for the group has been in the 9.0 percent to 10.0 percent range. The average market-to-book ratios for this group declined to about 1.1X in 2009 during the financial crisis and have increased since that time. As of 2018, the average market-to-book for the group was 1.80X. For the gas group, earned returns on common equity have been in the range of 9.0 percent to 12.0 percent over these years. Over the past decade, the actual earned ROEs have declined from the 12.0 percent range to about 9.0 percent. The average market-to-book ratios for this group, which were about 1.25X in 2000 have increased to over 2.00X in both 2017 and 2018.

In summary, these data indicate that capital costs for utilities have declined over the past decade. In addition, electric utility and gas distribution companies have been earning ROEs in the 8.0 percent to 10.0 percent range and selling at market-to-book ratios in the 1.75 to 2.0 range. This means that, for at least the last decade, returns on common equity have been greater than the cost of capital, or more than necessary to meet investors' required returns. This also means that customers have been paying more than necessary to support an appropriate profit level for regulated utilities.

Q. What factors determine investors' expected or required rate of return on equity?

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

Q. How does the investment risk of utilities compare with that of other industries?

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

Page four of Exhibit JRW-7 provides an assessment of investment risk for 97 industries as measured by beta, which, according to modern capital market theory, is the only relevant measure of investment risk. These betas come from the *Value Line*

Investment Survey. The study shows that the investment risk of utilities is very low. The average betas for electric, gas, and water utility companies are 0.60, 0.67, and 0.70, respectively.[13] As such, the cost of equity for utilities is the lowest of all industries in the U.S., based on modern capital market theory.

Q. What is the cost of common equity capital?

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

According to valuation principles, the present value of an asset equals the discounted value of its expected future cash flows.[14] Investors discount these expected cash flows at their required rate of return that, as noted above, reflects the time value of money and the perceived riskiness of the expected future cash flows. As such, the cost of common equity is the rate at which investors' discount expected cash flows associate with common stock ownership.

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

[14] R. Brealey, S. Myers, and F. Allen, *Principles of Corporate Finance*, 9th Edition, 2008, Ch. 2.

Q. How can the expected or required rate of return on common equity capital be determined?

A. Models have been developed to ascertain the cost of common equity capital for a firm. Each model, however, has been developed using restrictive economic assumptions. Consequently, judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of common equity capital, in determining the data inputs for these models, and in interpreting the models' results. All of these decisions must take into consideration the firm involved, as well as current conditions in the economy and the financial markets.

Q. How do you plan to estimate the cost of equity capital for PSE?

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

B. Discounted Cash Flow Analysis

Q. Please describe the theory behind the traditional DCF model.

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

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

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

Q. Is the DCF model consistent with valuation techniques employed by investment firms?

A. Yes. Virtually all investment firms use some form of the DCF model as a valuation technique. One common application for investment firms is called the three-stage DCF or dividend discount model (DDM).[15] The stages in a three-stage DCF model are presented in Exhibit JRW-8. This model presumes that a company's dividend payout progresses initially through a growth stage, then proceeds through a transition stage, and finally assumes a maturity (or steady state) stage. The dividend-payment stage of a firm depends on the profitability of its internal investments which, in turn, is largely a function of the life cycle of the product or service.

1. Growth stage: Characterized by rapidly expanding sales, high profit margins, and an abnormally high growth in earnings per share. Because of highly

[15] R. Brealey, S. Myers, and F. Allen, *Principles of Corporate Finance*, 9th, Edition, 2008, Chapter 5.

profitable expected investment opportunities, the payout ratio is low. Competitors are attracted by the unusually high earnings, leading to a decline in the growth rate.

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

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

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

Q. How do you estimate stockholders' expected or required rate of return using the DCF model?

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

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

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

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

Q. In your opinion, is the constant-growth DCF model appropriate for public utilities?

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

Q. What factors should one consider when applying the DCF methodology?

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

Q. What dividend yields have you reviewed?

A. I have calculated the dividend yields for the companies in the proxy group using the current annual dividend and the 30-day, 90-day, and 180-day average stock prices. These dividend yields are provided in Panel A of page two in Exhibit JRW-9. For the Electric Proxy Group, the median dividend yields using the 30-day, 90-day, and 180-day average stock prices range from 3.00 percent to 3.20 percent. Given these results, I am using 3.10 percent as the dividend yield for the Electric Proxy Group. The dividend yields for the Morin Proxy Group are shown in Panel B of page two of Exhibit JRW-9. The median dividend yields range from 2.80 percent to 3.0 percent using the 30-day, 90-day, and 180-day average stock prices. Given these results, I am using 2.90 percent as the dividend yield for the Morin Proxy Group. The dividend yields for the Gas Proxy Group are shown in Panel C of page two of Exhibit JRW-9. The median dividend yields range from 2.5 percent to 2.7 percent using the 30-day, 90-day, and 180-day average stock prices. Given these results, I am using 2.60 percent as the dividend yield for the Gas Proxy Group.

Q. Please discuss the appropriate adjustment to the spot dividend yield.

A. According to the traditional DCF model, the dividend yield term relates the dividend paid over the coming period to the current stock price. As indicated by Professor Myron Gordon, who is commonly associated with the development of the DCF model for popular use, this is obtained by: (1) multiplying the expected dividend over the coming quarter by four, and

(2) dividing this dividend by the current stock price to determine the appropriate dividend yield for a firm that pays dividends on a quarterly basis.[16]

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

Q. Given this discussion, what adjustment factor do you use for your dividend yield?

A. I adjust the dividend yield by one-half (1/2) of the expected growth, so as to reflect growth over the coming year. This is the approach employed by the Federal Energy Regulatory Commission (FERC).[17] The DCF equity cost rate (K) is computed as:

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

Q. Please discuss the growth rate component of the DCF model.

A. There is debate as to the proper methodology to employ in estimating the growth component of the DCF model. By definition, this component is investors' expectation of the long-term dividend growth rate. Presumably, investors use some combination of

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

[17] *Transcontinental Gas Pipe Line Corp.*, Opinion No. 414-A, 84 FERC ¶ 61,084 (1998).

historical and/or projected growth rates for earnings and dividends per share and for internal or book-value growth to assess long-term potential.

Q. What growth data have you reviewed for the proxy groups?

A. I have analyzed a number of measures of growth for companies in the proxy groups. I reviewed *Value Line's* historical and projected growth rate estimates for earnings per share (EPS), dividends per share (DPS), and book value per share (BVPS). In addition, I utilized the average EPS growth rate forecasts of Wall Street analysts as provided by Yahoo and Zacks.[18] These services solicit five-year earnings growth rate projections from securities analysts, and compile and publish the means and medians of these forecasts. Finally, I also assessed prospective growth as measured by prospective earnings retention rates and earned returns on common equity.

Q. Please discuss historical growth in earnings and dividends, as well as internal growth.

A. Historical growth rates for EPS, DPS, and BVPS are readily available to investors and are presumably an important ingredient in forming expectations concerning future growth. However, one must use historical growth numbers as measures of investors' expectations with caution. In some cases, past growth may not reflect future growth potential. Additionally, employing a single growth rate number (for example, for five or 10 years) is unlikely to accurately measure investors' expectations, due to the sensitivity of a single growth rate figure to fluctuations in individual firm performance, as well as overall economic fluctuations (*i.e.*, business cycles). However, one must appraise the context in

[18] *Zacks*, available at www.zacks.com and *Yahoo Finance*, available at https://finance.yahoo.com/.

which the growth rate is being employed. According to the conventional DCF model, the expected return on a security is equal to the sum of the dividend yield and the expected long-term growth in dividends. Therefore, to best estimate the cost of common equity capital using the conventional DCF model, a look to long-term growth rate expectations is required.

Internally generated growth is a function of the percentage of earnings retained within the firm (the earnings retention rate) and the rate of return earned on those earnings (the return on equity). The internal growth rate is computed as the retention rate times the return on equity and is also significant in determining long-run earnings and, therefore, dividends. Investors recognize the importance of internally generated growth and pay premiums for stocks of companies that retain earnings and earn high returns on internal investments.

Q. Please discuss the services that provide analysts' EPS forecasts.

A. Analysts' EPS forecasts for companies are collected and published by a number of different investment information services, including Institutional Brokers Estimate System (I/B/E/S), Bloomberg, FactSet, Zacks, First Call and Reuters, among others. These services do not reveal the analysts who are solicited for forecasts or the identity of the analysts who actually provide the EPS forecasts, which are used in the compilations published by the services.

Q. Which of these EPS forecasts is used in developing a DCF growth rate?

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

Q. Why do you not rely exclusively on the EPS forecasts of Wall Street analysts in arriving at a DCF growth rate for the proxy group?

A. There are three issues with using the EPS growth rate forecasts of Wall Street analysts as DCF growth rates. First, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Nonetheless, over the very long term, dividend and earnings will have to grow at a similar growth rate. Therefore, consideration must be given to other indicators of growth, including prospective dividend growth, internal growth, as well as projected earnings growth.

Second, a study by Lacina, Lee, and Xu (2011) has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting future earnings than naïve random walk forecasts of future earnings.[19] Employing data over a twenty-year period, these authors demonstrate that using the most recent year's actual EPS figure to forecast EPS in the next three to five years proved to be just as accurate as using the EPS estimates from analysts' long-term earnings growth rate forecasts. In the authors' opinion, these results indicate that analysts' long-term earnings growth rate forecasts should be used with caution as inputs for valuation and cost of capital purposes.

Finally, and most significantly, it is well known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased. This has been demonstrated in a number of academic studies over the years.[20] Hence,

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

[20] The studies that demonstrate analysts' long-term EPS forecasts are overly-optimistic and upwardly biased include: R.D. Harris, *The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts*, Journal of Business Finance & Accounting, at 725-55 (June/July 1999); P. DeChow, A. Hutton, and R. Sloan, *The Relation Between Analysts' Forecasts of Long-Term Earnings Growth and Stock Price Performance Following Equity Offerings*, Contemporary Accounting Research (2000); K. Chan, L., Karceski, J., & Lakonishok, J., *The Level and Persistence of Growth Rates*, Journal of Finance at 643−684 (2003); M. Lacina,

using these growth rates as a DCF growth rate will provide an overstated equity cost rate. On this issue, a study by Easton and Sommers (2007) found that optimism in analysts' growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[21]

Q. Is it your opinion that stock prices reflect the upward bias in the EPS growth rate forecasts?

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

Q. Are the projected EPS growth rates of *Value Line* also overly optimistic and upwardly biased?

A. Yes. A study by Szakmary, Conover, and Lancaster (2008) evaluated the accuracy of *Value Line*'s three-to-five-year EPS growth rate forecasts using companies in the Dow Jones Industrial Average over a thirty-year time period and found these forecasted EPS growth rates to be significantly higher than the EPS growth rates that these companies subsequently achieved.[22]

Q. How does that affect the use of these forecasts in a DCF equity cost rate study?

A. According to the DCF model, the equity cost rate is a function of the dividend yield and expected growth rate. Because stock prices reflect the bias, it would affect the dividend

B. Lee and Z. Xu, *Advances in Business and Management Forecasting (Vol. 8),* Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, at 77-101; and Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, *Equity Analysts, Still Too Bullish*, McKinsey on Finance, at 14-17, (Spring 2010).

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

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

yield. In addition, the DCF growth rate needs to be adjusted downward from the projected EPS growth rate to reflect the upward bias.

Q. Please discuss the historical growth of the companies in the proxy groups, as provided by *Value Line.*

A. Page three of Exhibit JRW-9 provides the five and 10 year historical growth rates for EPS, DPS, and BVPS for the companies in the three proxy groups, as published in the *Value Line Investment Survey.* The median historical growth measures for EPS, DPS, and BVPS for the Electric Proxy Group, as provided in Panel A, range from 4.0 percent to 5.0 percent, with an average of the medians of 4.3 percent. For the Morin Proxy Group, as shown in Panel B of page three of Exhibit JRW-9, the historical growth measures in EPS, DPS, and BVPS, as measured by the medians, range from 4.5 percent to 6.0 percent, with an average of the medians of 5.1 percent. The median historical growth measures for EPS, DPS, and BVPS for the Gas Proxy Group, as provided in Panel C, range from 4.5 percent to 7.0 percent, with an average of the medians of 5.6 percent.

Q. Please summarize *Value Line's* projected growth rates for the companies in the proxy groups.

A. *Value Line's* projections of EPS, DPS, and BVPS growth for the companies in the proxy groups are shown on page four of Exhibit JRW-9. As stated above, due to the presence of outliers, the medians are used in the analysis. For the Electric Proxy Group, as shown in Panel A of page four of Exhibit JRW-9, the medians range from 4.0 percent to 6.00 percent, with an average of the medians of 5.2 percent. The range of the medians for the Morin Proxy Group, shown in Panel B of page four of Exhibit JRW-9, is from 5.0 percent to 6.0 percent, with an average of the medians of 5.5 percent. The range of the medians for the Gas Proxy Group, shown in Panel C of page four of Exhibit JRW-9, is from 5.0 percent to 9.0 percent, with an average of the medians of 6.8 percent.

Also provided on page four of Exhibit JRW-9 are the prospective sustainable growth rates for the companies in the proxy groups as measured by *Value Line*'s average projected retention rate and return on shareholders' equity. As noted above, sustainable growth is a significant and a primary driver of long-run earnings growth. For the Electric, Morin and Gas Proxy Groups, the median prospective sustainable growth rates are 3.5 percent, 3.9 percent, and 4.8 percent, respectively.

Q. Please assess growth for the proxy groups as measured by analysts' forecasts of expected five-year EPS growth.

A. Yahoo and Zacks collect, summarize, and publish Wall Street analysts' long-term EPS growth rate forecasts for the companies in the proxy groups. These forecasts are provided for the companies in the proxy groups on page five of Exhibit JRW-9. I have reported both the mean and median growth rates for the groups. Since there is considerable overlap in analyst coverage between the three services, and not all of the companies have forecasts from the different services, I have averaged the expected five-year EPS growth rates from the three services for each company to arrive at an expected EPS growth rate for each company. The mean/median of analysts' projected EPS growth rates for the Electric, Morin, and Gas Proxy Groups are 5.0%/5.3%, 5.0%/5.3%, and 6.0%/6.5%, respectively.[23]

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

Q. Please summarize your analysis of the historical and prospective growth of the proxy groups.

A. Page six of Exhibit JRW-9 shows the summary DCF growth rate indicators for the proxy groups.

The historical growth rate indicators for my Electric Proxy Group imply a baseline growth rate of 4.3 percent. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 5.20 percent, and *Value Line*'s projected sustainable growth rate is 3.5 percent. The projected EPS growth rates of Wall Street analysts for the Electric Proxy Group are 5.0 percent and 5.3 percent as measured by the mean and median growth rates. The overall range for the projected growth rate indicators (ignoring historical growth) is 3.9 percent to 5.3 percent. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate projected growth rate is 5.25 percent. This growth rate figure is in the upper end of the range of historic and projected growth rates for the Electric Proxy Group.

For the Morin Proxy Group, the historical growth rate indicators indicate a growth rate of 5.1 percent. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 5.5 percent, and *Value Line*'s projected sustainable growth rate is 3.9 percent. The projected EPS growth rates of Wall Street analysts are 5.0 percent and 5.3 percent as measured by the mean and median growth rates. The overall range for the projected growth rate indicators is 3.9 percent to 5.5 percent. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate projected growth rate is in the range of 5.25 percent to 5.50 percent for the Morin Group. I will use the midpoint of this range, 5.375 percent, as the DCF growth rate for the Morin

Proxy Group. This growth rate figure is in the upper end of the range of historic and projected growth rates for the Morin Proxy Group.

The historical growth rate indicators for my Gas Proxy Group indicate a baseline growth rate of 5.6 percent. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 6.8 percent, and *Value Line*'s projected sustainable growth rate is 4.8 percent. The projected EPS growth rates of Wall Street analysts for the Gas Proxy Group are 6.0 percent and 6.5 percent as measured by the mean and median growth rates. The overall range for the projected growth rate indicators (ignoring historical growth) is 4.8 percent to 6.5 percent. Giving primary weight to the projected EPS growth rate of Wall Street analysts, I believe that the appropriate projected growth rate is 6.25 percent for the Gas Proxy Group. This growth rate figure is in the upper end of the range of historic and projected growth rates for the group.

Q. Based on the above analysis, what are your indicated common equity cost rates from the DCF model for the proxy groups?

A. My DCF-derived equity cost rates for the groups are summarized on page one of Exhibit JRW-9 and in Table 3 below.

Table 3
DCF-derived Equity Cost Rate/ROE

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Electric Proxy Group	**3.10%**	**1.02625**	**5.25%**	**8.45%**
Morin Proxy Group	**2.90%**	**1.02687**	**5.38%**	**8.35%**
Gas Proxy Group	**2.60%**	**1.03125**	**6.25%**	**8.95%**

The DCF result for the Electric Proxy Group is the 3.10 percent dividend yield, times the one and one-half growth adjustment of 1.02625, plus the DCF growth rate of

5.25 percent, which results in an equity cost rate of 8.45 percent. The result for the Morin Proxy Group is 8.35 percent, which includes a dividend yield of 2.90 percent, an adjustment factor of 1.026875, and a DCF growth rate of 5.375 percent. For the Gas Proxy Group, the DCF result Group is the 2.60 percent dividend yield, times the one and one-half growth adjustment of 1.03125, plus the DCF growth rate of 6.25 percent, which results in an equity cost rate of 8.95 percent.

C. Capital Asset Pricing Model

Q. Please discuss the capital asset pricing model (CAPM).

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

$$k = R_f + RP$$

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

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

$$\boldsymbol{K = (R_f) + \beta * [E(R_m) - (R_f)]}$$

Where:

- *K* represents the estimated rate of return on the stock;
- *E(R* $E(R_m)$ represents the expected return on the overall stock market. Frequently, the

S&P 500 is used as a proxy for the "market";

- (R_f) represents the risk-free rate of interest;
- *[E(R_m) - (R_f)]* represents the expected equity or market risk premium—the excess return that an investor expects to receive above the risk-free rate for investing in risky stocks; and
- *Beta*—(ß) is a measure of the systematic risk of an asset.

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

Q. Please discuss Exhibit JRW-10.

A. Exhibit JRW-10 provides the summary results for my CAPM study. Page one shows the results, and the following pages contain the supporting data.

Q. Please discuss the risk-free interest rate.

A. The yield on long-term U.S. Treasury bonds has usually been viewed as the risk-free rate of interest in the CAPM. The yield on long-term U.S. Treasury bonds, in turn, has been considered to be the yield on U.S. Treasury bonds with 30-year maturities.

Q. What risk-free interest rate are you using in your CAPM?

A. As shown on page two of Exhibit JRW-10, the yield on 30-year U.S. Treasury bonds has been in the 2.0 percent to 4.0 percent range over the 2013–2019 time period. The current 30-year Treasury yield is near the bottom of this range. Given the recent range of yields, I have chosen to use the top end of the range as my risk-free interest rate. Therefore, I am using 3.75 percent as the risk-free rate, or R_f, in my CAPM. This is similar to the normalized risk-free interest rate used by the investment advisory firm Duff & Phelps.[24]

Q. Does the 3.75 percent risk-free interest rates take into consideration of forecasts of higher interest rates?

A. No, it does not. Forecasts of higher interest rates have been notoriously wrong for a decade. [25] My 3.75 percent risk-free interest rate considers the range of interest rates in the past and effectively synchronizes the risk-free rate with the market risk premium. The risk-free rate and the market risk premium are interrelated in that the market risk premium is developed in relation to the risk-free rate. As discussed below, my market risk premium is based on the results of many studies and surveys that have been published over time. Therefore, my risk-free interest rate of 3.75 percent is effectively a normalized risk-free rate of interest.

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24 Duff & Phelps, "U.S. Equity Risk Premium Recommendation," (Feb. 19, 2019), available at https://www.duffandphelps.com/insights/publications/valuation-insights/valuation-insights-first-quarter-2019/us-equity-risk-premium-recommendation.

25 Ben Eisen, *Yes, 100% of economists were dead wrong about yields*, Market Watch (Oct. 22, 2014). Perhaps reflecting this fact, *Bloomberg* reported that the Federal Reserve Bank of New York has stopped using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those interest rate forecasts. *See* Susanne Walker and Liz Capo McCormick, *Unstoppable $100 Trillion Bond Market Renders Models Useless*, Bloomberg.com (June 2, 2014), available at http://www.bloomberg.com/news/2014-06-01/the-unstoppable-100-trillion-bond-market-renders-models-useless.html. Joe Weisenthal, *How Interest Rates Keep Making People on Wall Street Look Like Fools*, Bloomberg.com, March 16, 2015, available at http://www.bloomberg.com/news/articles/2015-03-16/how-interest-rates-keep-making-people-on-wall-street-look-like-fools. Akin Oyedele, *Interest Rate Forecasters are Shockingly Wrong Almost All of the Time*, Business Insider (July 18, 2015), available at http://www.businessinsider.com/interest rate-forecasts-are-wrong-most-of-the-time-2015-7.

Q. What betas are you employing in your CAPM?

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

As shown on page three of Exhibit JRW-10, the slope of the regression line is the stock's ß. A steeper line indicates that the stock is more sensitive to the return on the overall market. This means that the stock has a higher ß and greater-than-average market risk. A less steep line indicates a lower ß and less market risk. Several online investment information services, such as Yahoo and Reuters, provide estimates of stock betas. Usually these services report different betas for the same stock. The differences are usually due to: (1) the time period over which ß is measured; and (2) any adjustments that are made to reflect the fact that betas tend to regress to 1.0 over time. In estimating an equity cost rate for the proxy group, I am using the betas for the companies as provided in the *Value Line Investment Survey*. As shown on page three of Exhibit JRW-10, the median betas for the companies in the Electric, Morin, and Gas Proxy Groups are 0.55, 0.55, and 0.65, respectively.

Q. Please discuss the market risk premium.

A. The market risk premium is equal to the expected return on the stock market (e.g., the expected return on the S&P 500, $E(R_m)$ minus the risk-free rate of interest (R_f)). The market risk premium is the difference in the expected total return between investing in equities and investing in "safe" fixed-income assets, such as long-term government bonds. However, while the market risk premium is easy to define conceptually, it is difficult to measure because it requires an estimate of the expected return on the market - $E(R_m)$. As is discussed below, there are different ways to measure $E(R_m)$, and studies have come up with significantly different magnitudes for $E(R_m)$. As Merton Miller, the 1990 Nobel Prize winner in economics indicated, $E(R_m)$ is very difficult to measure and is one of the great mysteries in finance.[26]

Q. Please discuss the alternative approaches to estimating the market risk premium.

A. Page four of Exhibit JRW-10 highlights the primary approaches to, and issues in, estimating the expected market risk premium. The traditional way to measure the market risk premium was to use the difference between historical average stock and bond returns. In this case, historical stock and bond returns, also called *ex post* returns, were used as the measures of the market's expected return (known as the *ex ante* or forward-looking expected return). This type of historical evaluation of stock and bond returns is often called the "Ibbotson approach" after Professor Roger Ibbotson, who popularized this method of using historical financial market returns as measures of expected returns. However, this historical evaluation of returns can be a problem because: (1) *ex post* returns are not the same as *ex ante* expectations; (2) market risk premiums can change over time, increasing when investors become more risk-averse and decreasing when

[26] Merton Miller, *The History of Finance: An Eyewitness Account*, Journal of Applied Corporate Finance (2000) at 3.

investors become less risk-averse; and (3) market conditions can change such that *ex post* historical returns are poor estimates of *ex ante* expectations.

The use of historical returns as market expectations has been criticized in numerous academic studies as discussed later in my testimony. The general theme of these studies is that the large equity risk premium discovered in historical stock and bond returns cannot be justified by the fundamental data. These studies, which fall under the category "*Ex Ante* Models and Market Data," compute *ex ante* expected returns using market data to arrive at an expected equity risk premium. These studies have also been called "Puzzle Research" after the famous study by Mehra and Prescott in which the authors first questioned the magnitude of historical equity risk premiums relative to fundamentals.[27]

In addition, there are a number of surveys of financial professionals regarding the market risk premium. There have also been several published surveys of academics on the equity risk premium. *CFO Magazine* conducts a quarterly survey of CFOs, which includes questions regarding their views on the current expected returns on stocks and bonds. Usually, over 200 CFOs participate in the survey.[28] Questions regarding expected stock and bond returns are also included in the Federal Reserve Bank of Philadelphia's annual survey of financial forecasters, which is published as the *Survey of Professional Forecasters*.[29] This survey of professional economists has been published for almost fifty

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

[28] DUKE/CFO Magazine Global Business Outlook Survey at 61, (Sept. 2019), available at https://www.cfosurvey.org/wp-content/uploads/2019/06/Q2-2019-US-Toplines-1.pdf.

[29] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters* (Mar. 22, 2019), available at https://www.philadelphiafed.org/-/media/research-and-data/real-time-center/survey-of-professional-forecasters/2019/spfq119.pdf?la=en. The Survey of Professional Forecasters was formerly conducted by the

years. In addition, Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums they use in their investment and financial decision-making.[30]

Q. Please provide a summary of the market risk premium studies.

A. Derrig and Orr (2003), Fernandez (2007), and Song (2007) completed the most comprehensive review of the research on the market risk premium.[31] Derrig and Orr's study evaluated the various approaches to estimating market risk premiums, as well as the issues with the alternative approaches and summarized the findings of the published research on the market risk premium. Fernandez examined four alternative measures of the market risk premium – historical, expected, required, and implied. He also reviewed the major studies of the market risk premium and presented the summary market risk premium results. Song provides an annotated bibliography and highlights the alternative approaches to estimating the market risk premium.

Page five of Exhibit JRW-10 provides a summary of the results of the primary risk premium studies reviewed by Derrig and Orr, Fernandez, and Song, as well as other more recent studies of the market risk premium. In developing page five of Exhibit JRW-10, I have categorized the studies as discussed on page four of Exhibit JRW-10. I have

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American Statistical Association (ASA) and the National Bureau of Economic Research (NBER) and was known as the ASA/NBER survey. The survey, which began in 1968, is conducted each quarter. The Federal Reserve Bank of Philadelphia, in cooperation with the NBER, assumed responsibility for the survey in June 1990.

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

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

also included the results of studies of the "Building Blocks" approach to estimating the equity risk premium. The Building Blocks approach is a hybrid approach employing elements of both historical and *ex ante* models.

Q. Please discuss page five of Exhibit JRW-10.

A. Page five of JRW-10 provides a summary of the results of the market risk premium studies that I have reviewed. These include the results of: (1) the various studies of the historical risk premium, (2) *ex ante* market risk premium studies, (3) market risk premium surveys of CFOs, financial forecasters, analysts, companies and academics, and (4) the Building Blocks approach to the market risk premium. There are results reported for over thirty studies, and the median market risk premium is 4.83 percent.

Q. Please highlight the results of the more recent risk premium studies and surveys.

A. The studies cited on page five of Exhibit JRW-10 include every market risk premium study and survey I could identify that was published over the past decade and that provided an market risk premium estimate. Most of these studies were published prior to the financial crisis that began in 2008. In addition, some of these studies were published in the early 2000s at the market peak. It should be noted that many of these studies (as indicated) used data over long periods of time (as long as fifty years of data) and so were not estimating an market risk premium as of a specific point in time (e.g., the year 2001). To assess the effect of the earlier studies on the market risk premium, I have reconstructed page five of Exhibit JRW-10 on page six of Exhibit JRW-10; however, I have eliminated all studies dated before January 2, 2010. The median for this subset of studies is 5.24 percent.

Q. Please summarize the market risk premium studies and surveys.

A. As noted above, there are three approaches to estimating the market risk premium – historic stock and bond returns, ex ante or expected returns models, and surveys. The studies on page six of Exhibit JRW-10 can be summarized in the following manner:

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

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

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

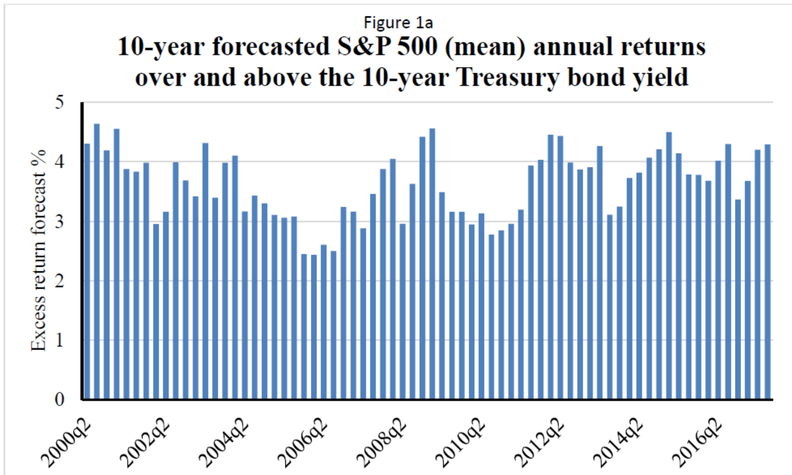
Q. Please highlight the ex ante market risk premium studies and surveys that you believe are most timely and relevant.

A. I will highlight several studies/surveys.

CFO Magazine conducts a quarterly survey of CFOs, which includes questions regarding their views on the current expected returns on stocks and bonds. In the September 2019 CFO survey conducted by *CFO Magazine* and Duke University, which included approximately 200 responses, the expected 10-year market risk premium was 4.62 percent.[32] Figure 4, below, shows the market risk premium associated with the CFO Survey, which has been in the 4.0 percent range in recent years.

[32] DUKE/CFO Magazine Global Business Outlook Survey at 61 (Sept. 2019), available at https://www.cfosurvey.org/wp-content/uploads/2019/06/Q2-2019-US-Toplines-1.pdf.

Figure 4
Market Risk Premium CFO Survey



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

Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums they use in their investment and financial decision-making.[33] His survey results are included on pages 5 and 6 of Exhibit JRW-10. The results of his 2019 survey of academics, financial analysts, and companies, which included 4,000 responses, indicated a mean market risk premium employed by U.S. analysts and companies of 5.6 percent.[34] His estimated market risk premium for the U.S. has been in the 5.00 percent to 5.50 percent range in recent years.

Professor Aswath Damodaran of NYU, a leading expert on valuation and the market risk premium, provides a monthly updated market risk premium which is based on projected S&P 500 EPS and stock price level and long-term interest rates. His

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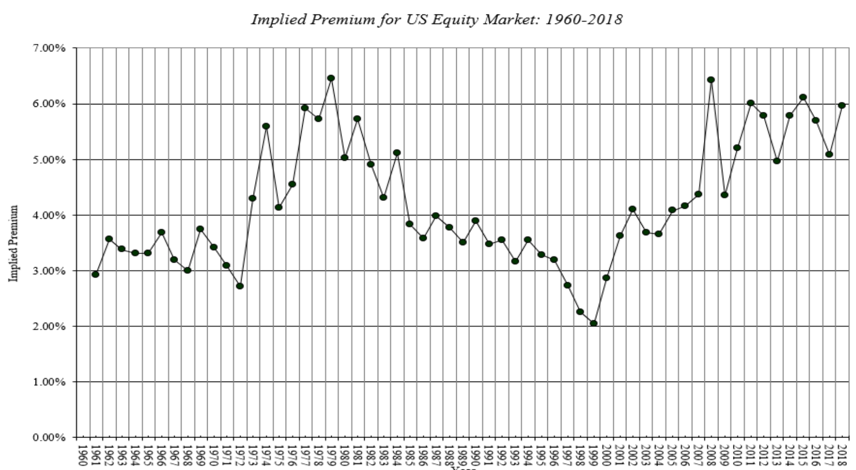
[33] Pablo Fernandez, Vitaly Pershin, and Isabel Fernandez Acín, *Market Risk Premium and Risk-Free Rate used for 59 countries in 2019: a survey*, IESE Business School, (Apr. 2019), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3358901.

[34] *Id.* at 3.

estimated market risk premium, shown graphically in Figure 5, below, for the past 20 years, has primarily been in the range of 5.0 percent to 6.0 percent since 2010.

Figure 5
Damodaran Market Risk Premium



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

Duff & Phelps, an investment advisory firm, provides recommendations for the risk-free interest rate and market risk premiums to be used in calculating the cost of capital data. Their recommendations over the 2008-2019 time periods are shown on page seven of Exhibit JRW-10. Duff & Phelps' recommended market risk premium has been in the 5.0 percent to 6.0 percent range over the past decade. Most recently, in the first quarter of 2019, Duff & Phelps increased its recommended market risk premium from 5.0 percent to 5.50 percent.[35]

KPMG is one of the largest public accounting firms in the world. Its recommended market risk premium over the 2013-2019 time period is shown in Panel A of page eight of Exhibit JRW-10. KPMG's recommended market risk premium has been

[35] Duff & Phelps, "U.S. Equity Risk Premium Recommendation," (Feb. 19, 2019), https://www.duffandphelps.com/insights/publications/valuation-insights/valuation-insights-first-quarter-2019/us-equity-risk-premium-recommendation.

in the 5.50 percent to 6.50 percent range over this time period. In the first quarter of 2019, KPMG increased its estimated market risk premium from 5.50 percent to 5.75 percent.[36]

Finally, the website *market-risk-premia.com* provides risk-free interest rates, implied market risk premiums, and overall cost of capital for thirty-six countries around the world. These parameters for the U.S. over the 2002-2019 time period are shown in Panel B of page eight of Exhibit JRW-10. As of July 31, 2019, *market-risk-premia.com* estimated an implied cost of capital for the U.S. of 6.12 percent consisting of a risk-free rate of 2.02 percent and an implied market risk premium of 4.10.[37]

Q. Given these results, what market risk premium are you using in your CAPM?

A. The studies on page six of Exhibit JRW-10, and more importantly the more timely and relevant studies just cited, suggest that the appropriate market risk premium in the U.S. is in the 4.0 percent to 6.0 percent range. I will use an expected market risk premium of 5.75 percent, which is in the upper end of the range, as the market risk premium. I gave most weight to the market risk premium estimates of the CFO Survey, Duff & Phelps, KPMG, the Fernandez survey, and Damodaran. This is a conservatively high estimate of the market risk premium considering the many studies and surveys of the market risk premium.

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

[37] Market-Risk-Premia.com, *Implied Market-risk-premia (market risk premium): USA*, available at http://www.market-risk-premia.com/us.html.

Q. What equity cost rate is indicated by your CAPM analysis?

A. The results of my CAPM study for the proxy groups are summarized on page one of Exhibit JRW-10 and in Table 4 below.

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

	Risk-Free Rate	Beta	Equity Risk Premium	Equity Cost Rate
Electric Proxy Group	3.75%	0.55	5.75%	6.9%
Morin Proxy Group	3.75%	0.55	5.75%	6.9%
Gas Proxy Group	3.75%	0.65	5.75%	7.5%

For the Electric and Morin Proxy Groups, the risk-free rate of 3.75 percent plus the product of the beta of 0.55 times the equity risk premium of 5.75 percent results in a 6.9 percent equity cost rate. For the Gas Proxy Group, the risk-free rate of 3.75 percent plus the product of the beta of 0.65 times the equity risk premium of 5.75 percent results in a 7.5 percent equity cost rate.

D. Equity Cost Rate Summary

Q. Please summarize the results of your equity cost rate studies.

A. My DCF analyses for the Electric, Morin and Gas Proxy Groups indicate equity cost rates are 8.45 percent, 8.35 percent, and 8.95 percent, respectively. The CAPM equity cost rates for the Electric, Morin and Gas Proxy Groups are 6.9 percent, 6.9 percent, and 7.5 percent.

Table 5
ROEs Derived from DCF and CAPM Models

	DCF	CAPM
Electric Proxy Group	8.45%	6.90%
Morin Proxy Group	8.35%	6.90%
Gas Proxy Group	8.95%	7.50%

Q. Given these results, what is your estimated equity cost rate for the groups?

A. Given these results, I conclude that the appropriate equity cost rate for companies in the Electric and Morin Proxy Groups is in the 6.90 percent to 8.95 percent range. Because I give primary weight to the DCF results, I will use an equity cost rate of 8.75 percent for PSE.

Q. Please indicate why an equity cost rate of 8.75 percent is appropriate for the electric operations of PSE.

A. There are a number of reasons why an equity cost rate of 8.75 percent is appropriate and fair for the Company in this case:

1. I have employed PSE's recommended capital structure which has a little more equity and less financial risk than the average of the proxy groups;

2. As shown in Exhibits JRW-4 and JRW-5, capital costs for utilities, as indicated by long-term bond yields, are at historically low levels. In addition, given low inflationary expectations and slow global economic growth, interest rates are likely to remain at low levels for some time.

3. As shown in Exhibit JRW-7, the electric utility and gas distribution industries are among the lowest risk industries in the U.S. as measured by beta. As such, the cost of equity capital for this industry is among the lowest in the U.S., according to the CAPM.

4. On an annual basis, these authorized ROEs for electric utilities have declined from an average of 10.01 percent in 2012, 9.8 percent in 2013, 9.76 percent in 2014, 9.58 percent in 2015, 9.60 percent in 2016, 9.68 percent in 2017, 9.56 percent in 2018, and 9.56 percent in the first three-quarters of 2019,

according to Regulatory Research Associates.[38] The authorized ROEs for gas distribution companies have declined from 9.94 percent in 2012, to 9.68 percent in 2013, 9.78 percent in 2014, 9.60 percent in 2015, 9.50 percent in 2016, 9.72 percent in 2017, 9.59 percent in 2018, and 9.68 percent in the first three quarters of 2019.[39] In my opinion, authorized ROEs have lagged behind capital market cost rates, or in other words, authorized ROEs have been slow to reflect low capital market cost rates. However, the <u>trend</u> has been towards lower ROEs and the <u>norm</u> now is below 10 percent. Hence, I believe that my recommended ROE reflects our present historically low capital cost rates, and these low capital cost rates are finally being recognized as the norm by state utility regulatory commissions.

Q. Do you believe that your 8.75 percent ROE recommendations meet the *Hope* and *Bluefield* standards?

A. Yes, I do. As previously noted, according to the *Hope* and *Bluefield* decisions, returns on capital should be: (1) comparable to returns investors expect to earn on other investments of similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain and support the company's credit and to attract capital. As shown in Exhibit JRW-7, electric utility and gas distribution companies have been earning in the 8.0 percent to 10.0 percent range in recent years. While my recommendation is below the average authorized ROEs for electric utility and gas

38 S&P Global Market Intelligence, RRA *Regulatory Focus*, 2019. The electric utility authorized ROEs exclude the authorized ROEs in Virginia, which include generation adders.

39 *Ib.*

distribution companies, it reflects the downward trend in authorized and earned ROEs of utilities.

Q. Please discuss your recommendation in light of a Moody's publication.

A. Moody's published an article on utility ROEs and credit quality. In the article, Moody's recognizes that authorized ROEs for electric and gas companies are declining due to lower interest rates. [40]

> The credit profiles of US regulated utilities will remain intact over the next few years despite our expectation that regulators will continue to trim the sector's profitability by lowering its authorized returns on equity (ROE). Persistently low interest rates and a comprehensive suite of cost recovery mechanisms ensure a low business risk profile for utilities, prompting regulators to scrutinize their profitability, which is defined as the ratio of net income to book equity. We view cash flow measures as a more important rating driver than authorized ROEs, and we note that regulators can lower authorized ROEs without hurting cash flow, for instance by targeting depreciation, or through special rate structures.

Moody's indicates that with the lower authorized ROEs, electric and gas companies are earning ROEs of 9.0 percent to 10.0 percent, but this is not impairing their credit profiles and is not deterring them from raising record amounts of capital. With respect to authorized ROEs, Moody's recognizes that utilities and regulatory commissions are having trouble justifying higher ROEs in the face of lower interest rates and cost recovery mechanisms.[41]

> Robust cost recovery mechanisms will help ensure that US regulated utilities' credit quality remains intact over the next few years. As a result, falling authorized ROEs are not a material credit driver at this time, but rather reflect regulators' struggle to justify the cost of capital gap between the industry's authorized ROEs and persistently low interest rates. We also see utilities struggling to defend this gap, while at the same time recovering

[40] Moody's Investors Service, *Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles* (Mar. 10, 2015).

[41] *Id*. at 2.

> the vast majority of their costs and investments through a variety of rate mechanisms.

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

Q. Are utilities able to attract capital with the lower ROEs?

A. Moody's also highlights in the article that utilities are raising about $50 billion a year in debt capital, despite the lower ROEs.

Q. Have the lower roes hurt the stock performance of utility stocks?

A. No. Figure 6 shows the Dow Jones Utility Index (DJU) versus the S&P 500 since January 1, 2019.[42] Both the DJU and the S&P 500 are near or have achieved record levels, and the DJU has performed right along with the S&P 500 over this time period. As a result, with high stock prices, utility dividend yields and DCF equity cost rates are low.

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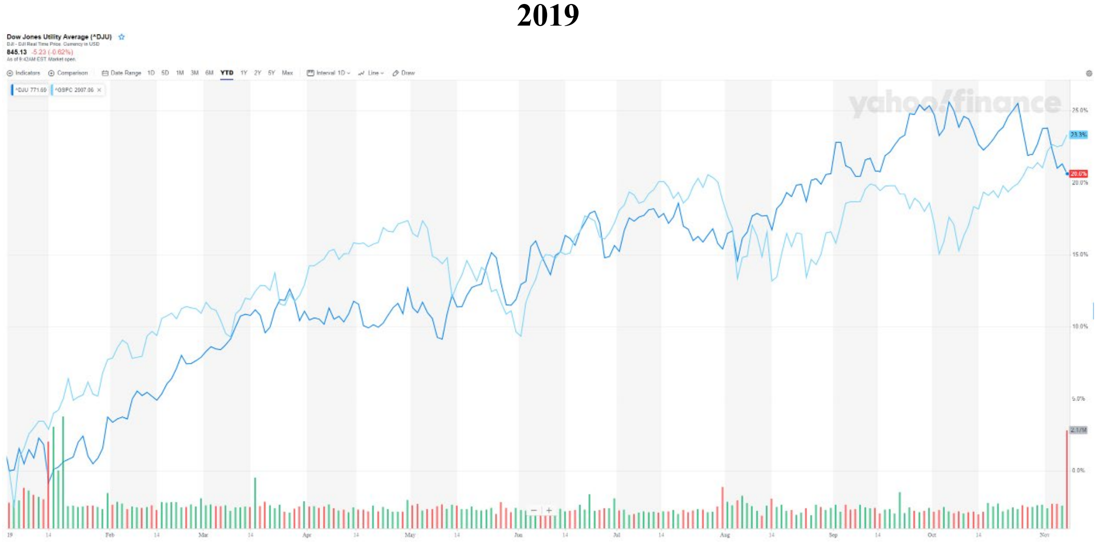
[42] *Yahoo Finance,* available at https://finance.yahoo.com/.

Figure 6
Dow Jones Utilities vs. S&P 500
2019



VII. CRITIQUE OF PSE'S RATE OF RETURN TESTIMONY

Q. Please summarize the company's cost of capital recommendation.

A. The Company has proposed a capital structure consisting of 2.30 percent short-term debt, 49.20 percent long-term debt, and 48.50 percent common equity for PSE. The Company has proposed short-term and long-term debt cost rates of 4.18 percent and 5.51 percent. Dr. Morin has recommended a ROE of 9.8 percent for the Company. The overall rate of return recommendation is 7.62 percent. This is summarized on page one of Exhibit JRW-11.

Q. What issues do you have with the company's cost of capital position?

1. <u>Capital Market Conditions</u> – Dr. Morin's analyses, ROE results, and recommendations are based on assumptions of higher interest rates and capital costs. However, I show that despite the Federal Reserve's moves to increase the federal funds rate over the 2015-18 time period, interest rates and capital costs remained at low levels. In 2019 interest rates have fallen dramatically with slow economic growth and low

inflation, the Federal Reserve has cut the federal funds rate three times, and the 30-year yield has traded at all-time low levels.

2. <u>The Company's Short-Term Debt Cost Rate and ROE Analyses are Out-of-Date</u> – The Federal Reserve has cut the federal funds rate three times since the Company filed its testimony and so their proposed short-term debt cost rate is out of date. Also, the Company's ROE study was prepared in March of this year. Since that time, the 30-year Treasury rate has fallen about seventy basis points. In short, capital costs are lower now than when the Company's case was filed.

3. <u>DCF Approach</u> – Dr. Morin and I have both employed the traditional constant-growth DCF model. There are two errors in Dr. Morin's DCF analysis: (1) he adjusts the dividend yield by a full year of growth; and (2) he has exclusively used the overly optimistic and upwardly biased EPS growth rate forecasts of Wall Street analysts and *Value Line*.

4. <u>CAPM Approach</u> – The CAPM approach requires an estimate of the risk-free interest rate, beta, and the market or risk premium. There are three issues with Dr. Morin's CAPM approach: (1) he has used an ad hoc version of the CAPM – the empirical CAPM (ECAPM); (2) he has employed a projected long-term Treasury rate of 4.20 percent that is more than 150 basis points above current yields; and (3) his market risk premium of 7.50 percent is based on two flawed studies: (a) a market risk premium using historical stock returns and bond income returns that even the source of his data, Duff & Phelps, indicates is an incorrect method to measure an expected market risk premium; and (b) a market risk premium based on an application of the DCF model to the

S&P 500 that uses projected, upwardly-biased EPS growth rates that produce an unrealistically high expected stock return and market risk premium.,

5. Risk Premium Approach – There are three errors with Dr. Morin's risk premium analyses: (1) his projected risk-free interest rate of 4.2 percent that is more than 150 basis points above current yields; (2) his historical risk premium study is based on the difference in the arithmetic mean historical returns over the 1931-2018 time period on the S&P Public Utility Index and U.S. Treasury bonds. As I discuss in my testimony, there are numerous empirical errors that result in historical returns providing inflated measure of expected future risk premiums; and (3) his other risk premium study establishes a risk premium by a regression of authorized ROEs for electric utilities and long-term Treasury yields over the 1986-2018 time period. As I note, this approach reflects commission behavior and not investor behavior.

The first two issues were addressed above. The other three are discussed below.

A. PSE's Approach Number One: DCF Approach

Q. Please summarize Dr. Morin's DCF estimates.

A. Dr. Morin develops an equity cost rate by applying the DCF model to the companies in his proxy group. Dr. Morin's DCF results are summarized on page two of Exhibit JRW-11. He uses the current dividend yields for companies in his group as reported by *Value Line* and adjusts these yields by a full-year growth rate (1+G). As a DCF growth rate, Dr. Morin has employed the forecasted EPS growth rates of Zacks and *Value Line*. His DCF equity cost rates estimated are 9.7 percent using *Value Line* growth and 8.5 percent using Zacks' growth.

Q. What are the errors in Dr. Morin's DCF analyses?

A. The primary issues in Dr. Morin's DCF analyses are: (1) the full year growth adjustment to dividend yields; and (2) the exclusive use of the overly optimistic and upwardly biased EPS growth rate forecasts of Wall Street analysts and *Value Line*. Each will be discussed in a separate section below.

1. Dividend Yield Adjustment

Q. Please discuss the appropriate adjustment to the dividend yield in the DCF model.

A. As indicated previously, the appropriate dividend yield adjustment for growth in the DCF model is the expected dividend for the next quarter multiplied by four. In applying the DCF model, the appropriate growth rate adjustment to the dividend yield is complicated because companies change their quarterly dividend payments at different times during the year. This means that it is not appropriate to make a full-year adjustment to the dividend yield. Therefore, I have adjusted the dividend yields for the two groups by half the expected growth rate. This is consistent with the approach used by FERC.[43]

Also, Dr. Morin argues that investors require additional compensation during the coming year because their dividends are paid out quarterly instead of being paid all in a lump sum. The error in this logic and approach is that the investor receives the money from each quarterly dividend and has the option to reinvest it as he or she chooses. This reinvestment generates its own compounding growth, but it is outside of the dividend payments of the issuing company.

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[43] *Transcontinental Gas PipeLine Corp.*, Opinion No. 414-A, 84 FERC ¶ 61,084 (1998).

2. Analysts' and *Value Lin*e's EPS Growth Rates

Q. Please review Dr. Morin's DCF growth rate.

A. In his DCF model, Dr. Morin employs the EPS growth rate forecasts of Zacks and *Value Line*.

Q. Please discuss Dr. Morin's reliance on the projected growth rates of Wall Street analysts and *Value Line.*

A. It is highly unlikely that investors today would rely exclusively on the EPS growth rate forecasts of Wall Street analysts and ignore other growth rate measures in arriving at their expected growth rates for equity investments. As I discussed in my cost of capital report, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Hence, consideration must be given to other indicators of growth, including historical prospective dividend growth, internal growth, as well as projected earnings growth. Also, a study by Lacina, Lee, and Xu (2011) has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting future earnings than naïve random walk forecasts of future earnings.[44] And finally, and most significantly, it is well-known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.[45] Hence, using these growth rates as a DCF constant growth rate produces an overstated equity cost rate. A study by Easton and Sommers (2007) found that optimism in analysts' earnings growth

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

[45] See references in footnote No. 18 of this testimony.

rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[46]

In addition, as noted above, a study by Szakmary, Conover, and Lancaster (2008) evaluated the accuracy of *Value Line*'s three-to-five-year EPS growth rate forecasts using companies in the Dow Jones Industrial Average over a thirty-year time period and found these forecasted EPS growth rates to be significantly higher than the EPS growth rates that these companies subsequently achieved.[47]

Q. Please provide more details the *Value Line*'s EPS growth rates.

A. Page three of Exhibit JRW-11 shows Dr. Morin's projected EPS growth rates from Zacks and *Value Line.* The Zack's EPS growth rates are the average of analysts' three-to-five-year projected growth rates. *Value Line* uses a different approach in estimating projected growth. *Value Line* projects growth from a three-year base period – 2016-2018 – to a projected three-year period for the period 2022-2024. Using this approach, the three-year based period can have a significant impact on the *Value L*ine growth rate if this base period includes years with abnormally high or low earnings. For 16 of the 20 proxy companies, the *Value* Line projected growth rates are larger than the Zack's growth rates and the average *Value Line* growth rate (6.4 percent) is 110 basis points above his Zack's

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46 Easton, P., & Sommers, G., *Effect of analysts' optimism on estimates of the expected rate of return implied by earnings forecasts*. Journal of Accounting Research, 45(5), 983–1015 (2007).

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

DCF results (5.3 percent). This is why Dr. Morin's *Value Line* DCF results (9.7 percent) is over 100 basis points above his Zack's DCF results (8.5 percent).[48]

B. PSE's Approach Number Two: CAPM Approach

Q. Please discuss Dr. Morin's CAPM.

A. On pages 30-49 of his testimony and in Exhibit Nos. RAM-7 and RAM-8, Dr. Morin develops an equity cost rate by applying the CAPM model to the companies in his proxy group. Dr. Morin has used a traditional CAPM, as well as a variant, the Empirical CAPM (ECAPM). The CAPM approach requires an estimate of the risk-free interest rate, beta, and the market risk premium. Dr. Morin calculates a CAPM equity cost rate using a projected long-term Treasury bond yield of 4.2 percent, an average beta of 0.62 and a combination of market risk premiums. The ECAPM variant of the CAPM generates adjustments to the risk-free rate and the market risk premium in calculating an equity cost rate. Dr. Morin reports CAPM and ECAPM equity cost rates of 8.9 percent and 9.6 percent.

Q. What are the errors in Dr. Morin's CAPM/ECAPM analyses?

A. The primary errors, which will be reviewed below, with Dr. Morin's CAPM/ECAPM analyses are: (1) the use of the ECAPM version of the CAPM; (2) the projected risk-free interest rate of 4.2 percent; (3) the various historical and projected market risk premiums developed by Dr. Morin.

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

1. ECAPM Approach

Q. What issues do you have with Dr. Morin's ECAPM?

A. The ECAPM, as promoted by Dr. Morin, attempts to model the well-known findings of tests employing the CAPM, which have indicated the Security Market Line (SML) is not as steep as predicted by the CAPM. As such, the ECAPM is nothing more than an ad hoc version of the CAPM. Moreover, the ECAPM has not been theoretically or empirically validated in any refereed journals. The ECAPM provides for weights, which are used to adjust the risk-free rate and market risk premium in applying the ECAPM. Dr. Morin uses 0.25 and 0.75 factors to boost the equity risk premium measure.

Beyond the lack of any theoretical or empirical validation of the ECAPM, there is an error in Dr. Morin's ECAPM. I am not aware of any tests of the CAPM that use adjusted betas such as those used by Dr. Morin. Adjusted betas effectively address the empirical issue with the CAPM by increasing the expected returns for low beta stocks and decreasing the returns for high beta stocks.

2. The Projected Risk-Free Interest Rate

Q. Please discuss the base yield of Dr. Morin's CAPM/ECAPM analyses.

A. Dr. Morin uses a projected risk-free interest rate 4.2 percent in his CAPM/ECAPM analyses. This figure is almost 150 basis points above the current yield on long-term Treasury bonds. This is excessive for two reasons. First, as discussed below, economists are always predicting that interest rates will increase, and yet they are almost always wrong. Obviously, investors are well aware of the consistently wrong forecasts of higher interest rates, and therefore place little weight on such forecasts. Second, investors would not be buying long-term Treasury bonds at their current yields if they expected interest rates to suddenly increase. If interest rates do increase, the prices of the bonds investors bought at today's yields go down, producing a negative return.

Q. Do you recommend the commission accept Dr. Morin's use of forecasts of higher interest rates and capital costs?

A. No. I suggest that the Commission set an equity cost rate based on current indicators of market-cost rates and not speculate on the future direction of interest rates.

Economists have been predicting that interest rates would be going up for a decade, and they consistently have been wrong. For example, after the announcement of the end of the Quantitative Easing III (QE III) program in 2014, all the economists in Bloomberg's interest rate survey forecast that interest rates would increase in 2014, and <u>100 percent of the economists were wrong</u>. According to the *Market Watch* article:[49]

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

Two other financial publications produced studies on how economists consistently predict higher interest rates, and yet they too, have been wrong. The first publication, entitled "How Interest Rates Keep Making People on Wall Street Look Like

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[49] Ben Eisen, *Yes, 100% of economists were dead wrong about yields*, Market Watch, (Oct. 22, 2014), available at https://www.marketwatch.com/story/yes-100-of-economists-were-dead-wrong-about-yields-2014-10-21. Perhaps reflecting this fact, *Bloomberg* reported that the Federal Reserve Bank of New York has stopped using the interest rate estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those interest rate forecasts. *See* Susanne Walker and Liz Capo McCormick, *Unstoppable $100 Trillion Bond Market Renders Models Useless*, Bloomberg.com (June 2, 2014), available at http://www.bloomberg.com/news/2014-06-01/the-unstoppable-100-trillion-bond-market-renders-models-useless.html.

Fools," evaluated economists' forecasts for the yield on 10-year Treasury bonds at the beginning of the year for the last 10 years.[50] The results demonstrated that economists consistently predict that interest rates will go higher, and interest rates have not fulfilled those predictions.

The second study tracked economists' forecasts for the yield on 10-year Treasury bonds on an ongoing basis from 2010 until 2015.[51] The study, entitled "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," indicates that economists are continually forecasting that interest rates are going up, yet they do not. Indeed, as Bloomberg has reported, economists' continued failure in forecasting increasing interest rates has caused the Federal Reserve Bank of New York to stop using the interest-rate estimates of professional forecasters in the Bank's interest-rate model due to the unreliability of those interest-rate forecasts.[52]

Obviously, investors are aware of the consistently wrong forecasts of higher interest rates, and therefore place little weight on such forecasts. Investors would not be buying long-term Treasury bonds or utility stocks at their current yields if they expected interest rates to suddenly increase, thereby producing higher yields and negative returns. For example, consider a utility that pays a dividend of $2.00 with a stock price of $50.00. The current dividend yield in that example is 4.0 percent. If, as Dr. Morin suggests,

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

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

[52] Ben Eisen, *Yes, 100% of economists were dead wrong about yields*, Market Watch (Oct. 22, 2014), available at https://www.marketwatch.com/story/yes-100-of-economists-were-dead-wrong-about-yields-2014-10-21.

interest rates and required utility yields increase, the price of the utility stock would decline. In the example above, if higher return requirements led the dividend yield to increase from 3.0 percent to 4.0 percent in the next year, the stock price would have to decline to $40, which would be a -20 percent return on the stock. Obviously, investors would not buy the utility stock with an expected return of -20 percent due to higher dividend yield requirements.

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

3. The Market Risk Premium

Q. Please assess Dr. Morin's market risk premium of 7.5 percent.

A. Dr. Morin's develops his market risk premium of 7.5 percent based on two studies: (1) a historical market risk premium of 6.9 percent computed as the difference in the arithmetic mean stock and Treasury bond income returns over the 1925-2018 time period as published by Duff & Phelps; and (2) a prospective market risk premium of 8.0 percent computed by applying the DCF model to the S&P 500 and using *Value Line*'s projected ESP growth rates as the DCF growth rate.

Q. What are the issues with Dr. Morin's historical market risk premium?

A. There are a number of issues with this approach. First, Dr. Morin is using annual stock returns, which include the annual dividend and the annual change in the stock price; however, he is not using the annual bond return. Instead, he uses the annual bond income return. This measure includes the annual interest income but excludes the annual price change. This is an apples to oranges comparison and results in an overstatement of the market risk premium. Second, there are a number of empirical issues with using historical stock and bond returns to estimate an expected market risk premium, which is discussed below.

Q. Please address the issues involved in using historical stock and bond returns to compute a forward-looking or *ex ante* risk premium.

A. As previously discussed, one way to measure a market risk premium is to compute the difference between historic stock and bond returns. However, this approach can produce differing results depending on several factors, including: the measure of central tendency used (arithmetic versus geometric means), the time period evaluated, and the stock and bond market index employed. Furthermore, there are a myriad of empirical problems in this approach, which result in historical market returns producing poor estimates of expected risk premiums. Among the errors are: the U.S. stock market survivorship bias (the "Peso Problem"), the company survivorship bias (only successful companies survive – poor companies do not survive), the measurement of central tendency (the arithmetic versus geometric mean), the historical time horizon used, and the unattainable return bias (the procedure presumes monthly portfolio rebalancing).[53] The bottom line is that there

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[53] These issues are addressed in a number of studies, including: Aswath. Damodaran, *Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition* NYU Working Paper (2015) at 32-5; *See*

are a number of empirical problems in using historical stock and bond returns to measure an expected equity risk premium.

Q. Please discuss the arithmetic versus geometric mean issue?

A. The measure of investment return has a significant effect on the interpretation of the risk premium results. When analyzing a single security price series over time (i.e., a time series), the best measure of investment performance is the geometric mean return. Using the arithmetic mean overstates the return experienced by investors. In a study entitled "Risk and Return on Equity: The Use and Misuse of Historical Estimates," Carleton and Lakonishok make the following observation: "The geometric mean measures the changes in wealth over more than one period on a buy and hold (with dividends invested) strategy."[54] When a historic stock and bond return study covers more than one period (and he assumes that dividends are reinvested), Dr. Morin should employ the geometric mean and not the arithmetic mean.

To demonstrate the upward bias of the arithmetic mean, consider the following example. Assume that you have a stock (that pays no dividend) that is selling for $100 today, increases to $200 in one year, and then falls back to $100 in two years. The table below shows the prices and returns.

Richard Roll, *On Computing Mean Returns and the Small Firm Premium*, Journal of Financial Economics (1983) at 371-86; Jay Ritter, *The Biggest Mistakes We Teach*, Journal of Financial Research (Summer 2002); Bradford Cornell, *The Equity Risk Premium*, New York, John Wiley & Sons (1999) at 36-78; and J. P. Morgan, *The Most Important Number in Finance* (May 2008) at 6, available at https://www.jpmorgan.com/jpmpdf/1320675769380.pdf.

[54] Willard T. Carleton and Josef Lakonishok, *Risk and Return on Equity: The Use and Misuse of Historical Estimates*, Financial Analysts Journal at 38-47, (Jan.-Feb. 1985).

Table 6
Geometric versus Arithmetic Mean Return

Time Period	Stock Price	Annual Return
0	$100	
1	$200	100%
2	$100	-50%

The arithmetic mean return is simply (100 percent + (-50 percent))/2 = 25 percent per year. The geometric mean return is $((2 * .50)^{(1/2)}) - 1 = 0$ percent per year. Therefore, the arithmetic mean return suggests that your stock has appreciated at an annual rate of 25 percent, while the geometric mean return indicates an annual return of 0 percent. Since after two years, your stock is still only worth $100, the geometric mean return is the appropriate return measure.

For this reason, when stock returns and earnings growth rates are reported in the financial press, they are generally reported using the geometric mean. This is because of the upward bias of the arithmetic mean. As further evidence of the appropriate mean return measure, the Securities and Exchange Commission (SEC) requires equity mutual funds to report historic return performance using geometric mean and not arithmetic mean returns.[55] Therefore, the historic arithmetic mean return measures are biased and should be disregarded.

Nonetheless, in measuring historic returns to develop an expected equity risk premium, finance texts will often recommend the use of an arithmetic mean return as a measure of central tendency. A common justification for using the arithmetic mean return is that since annual stock returns are not serially correlated, the best measure of a return

[55] SEC, Form N-1A.

for next year is the arithmetic mean of past returns. On the other hand, Damodaran suggests that such an estimate is not appropriate in estimating an equity risk premium:[56]

> The arithmetic average return measures the simple mean of the series of annual returns, whereas the geometric average looks at the compounded return. Many estimation services and academics argue for the arithmetic average as the best estimate of the equity risk premium. In fact, if annual returns are uncorrelated over time, and our objective was to estimate the risk premium for the next year, the arithmetic average is the best and most unbiased estimate of the premium. There are, however, strong arguments that can be made for the use of geometric averages. First, empirical studies seem to indicate that returns on stocks are negatively correlated over long periods of time. Consequently, the arithmetic average return is likely to overstate the premium. Second, while asset pricing models may be single period models, the use of these models to get expected returns over long periods (such as five or ten years) suggests that the estimation period may be much longer than a year. In this context, the argument for geometric average premiums becomes stronger. Indro and Lee (1997) compare arithmetic and geometric premiums, find them both wanting, and argue for a weighted average, with the weight on the geometric premium increasing with the time horizon.

Q. What is the source of Dr. Morin's 6.9 percent historical market risk premium?

A. He uses the historical returns annual yearbook which is now published by Duff & Phelps.

Q. What is Duff & Phelps opinion regarding the use of historical stock market returns to estimate an MPR?

A. In its Client Update on the market risk premium, dated March 16, 2016, Duff & Phelps made the following statements regarding using historical returns to compute an market risk premium:[57]

> In estimating the conditional ERP, <u>valuation analysts cannot simply use the long-term historical ERP, without further analysis.</u> A better alternative would be to examine approaches that are sensitive to the current economic

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[56] Aswath. Damodaran, *Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2017 Edition*, NYU Working Paper (2017) at 34.

[57] Duff & Phelps, Client Alert, March 16, 2016, p. 37 (emphasis supplied). This document is attached as Exhibit JRW-18. Duff & Phelps uses the term equity risk premium or ERP to refer to the market risk premium.

> conditions. As previously discussed, Duff & Phelps employs a multi-faceted analysis to estimate the conditional ERP that takes into account a broad range of economic information and multiple ERP estimation methodologies to arrive at its recommendation.

Q. Does Duff & Phelps use a historic stock market return figure as its recommended equity or market risk premium?

A. No.

Q. What does Duff & Phelps say about the expected ERP and historical returns?

A. Duff & Phelps provides details about its perspective on historical returns versus its estimation of the ERP (emphasis added):[58]

> ERP is a forward-looking concept. It is an expectation as of the valuation date for which no market quotes are directly observable. <u>While an analyst can observe premiums realized over time by referring to historical data (i.e., realized return approach or ex post approach), such realized premium data do not represent the ERP expected in prior periods, nor do they represent the current ERP estimate.</u> Rather, realized premiums represent, at best, only a sample from prior periods of what may have then been the expected ERP. To the extent that realized premiums on the average equate to expected premiums in prior periods, such samples may be representative of current expectations. But to the extent that prior events that are not expected to recur caused realized returns to differ from prior expectations, such samples should be adjusted to remove the effects of these nonrecurring events. Such adjustments are needed to improve the predictive power of the sample.

Q. Does Duff & Phelps publish its recommended market risk premium?

A. Yes. In fact, on the same internet page on which they sell their annual valuation handbook used by Dr. Morin, Duff & Phelps publishes its estimate of the equity or market risk premium.[59] On this page, Duff & Phelps notes that the firm increased its U.S. equity risk premium to 5.50 percent as of January 31, 2016. I find it puzzling that Dr.

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[58] Duff & Phelps, *Client Alert* (Mar. 16, 2016) at 35 (emphasis supplied).

[59] Duff & Phelps, *Cost of Capital*, available at https://www.duffandphelps.com/insights/publications/cost-of-capital/ (last visited Nov. 19, 2019).

Morin would use the historical average annual stock return from the Duff & Phelps book and then totally ignore Duff & Phelps' recommendation as to the appropriate ERP.

Q. Do you agree that the U.S. equity risk premium of 5.50 percent is a reasonable and well-supported number in the current capitalization climate?

A. Yes. I have considered this figure is arriving at my 5.75 percent market risk premium.

Q. How does Dr. Morin develop his projected market risk premium of 8.0 percent?

A. Dr. Morin also develops a prospective market risk premium of 8.0 percent by applying the DCF model to the S&P 500 and using *Value Line*'s projected EPS growth rates as the DCF growth rate. He uses a dividend yield of 2.20 percent and an expected EPS growth rate of 10.0 percent to get an expected stock market return of 12.2 percent. He then subtracts his projected risk-free interest rate of 4.2 percent to arrive at an expected market risk premium of 8.0 percent.

Q. Is Dr. Morin's projected market risk premium of 8.0 percent reflective of the market risk premiums found in published studies and surveys?

A. No. It is well in excess of the market risk premiums: (1) found in studies of the market risk premiums by leading academic scholars; (2) produced by analyses of historic stock and bond returns; and (3) found in surveys of financial professionals. Page five of Exhibit JRW-10 provides the results of over 30 market risk premiums studies from the past 15 years. Historic stock and bond returns suggest a market risk premium in the 4.5 percent to 7.0 percent range, depending on whether one uses arithmetic or geometric mean returns. There have been many studies using expected return (also called *ex ante*) models, and their market risk premiums results vary from as low as 2.0 percent to as high as 7.31 percent. Finally, the market risk premiums developed from surveys of analysts, companies, financial professionals, and academics suggest lower market risk premiums, in a range of from 1.91 percent to 5.70 percent. The bottom line is that there is no support in historic return data, surveys, academic studies, or reports for investment firms for a market risk premium as high as those used by Dr. Morin.

Q. Please once again address the issues with *Value Line*'s EPS growth rate forecasts.

A. The key point is that Dr. Morin's CAPM market risk premium methodology is based entirely on the concept that *Value Line*'s projections of companies' EPS growth rates reflect investors' expected *long-term* EPS growth for those companies. However, this seems highly unrealistic given the research on these projections. As noted above, the EPS growth rate forecasts of *Value Line*, such as those used by Dr. Morin, have been to be significantly higher than the EPS growth rates that these companies subsequently achieve.[60]

Q. Is there other evidence that indicates that Dr. Morin's market risk premium developed using *Value Line*'s EPS growth rates is excessive?

A. Yes. The fact is that long-term EPS growth rate of 10.0 percent is inconsistent with both historic and projected economic and earnings growth in the U.S for several reasons: (1) long-term EPS and economic growth is about one-half of Dr. Morin's projected EPS growth rate of 10.0 percent; (2) long-term EPS and GDP growth are directly linked; and (3) more recent trends in GDP growth, as well as projections of GDP growth, suggest slower economic and earnings growth in the future.

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

Long-Term Historic EPS And GDP Growth Have Been In The Six Percent To Seven Percent Range – In Exhibit JRW-12, I performed a study of the growth in nominal GDP, S&P 500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960. The results are provided on page one of Exhibit JRW-12, and a summary is shown in Table 7, below.

Table 7
GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

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

The results show that the historical long-run growth rates for GDP, S&P EPS, and S&P DPS are in the six percent to seven percent range. By comparison, Dr. Morin's long-run growth rate projection of 10.0 percent is at best overstated. This estimate suggests that companies in the U.S. would be expected to: (1) increase their growth rate of EPS by 50 percent in the future, and (2) maintain that growth indefinitely in an economy that is expected to grow at a rate of less than one-half of his projected growth rates.

There is a Direct Link Between Long-Term EPS and GDP Growth – The results in Exhibit JRW-12 and Table 7 show that historically there has been a close link between long-term EPS and GDP growth rates. Brad Cornell of the California Institute of Technology published a study on GDP growth, earnings growth, and equity returns. He finds that long-term EPS growth in the U.S. is directly related to GDP growth, with

GDP growth providing an upward limit on EPS growth. In addition, he finds that long-term stock returns are determined by long-term earnings growth. He concludes with the following observations:[61]

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

<u>The Trend Indicates GDP Growth in the U.S. has Slowed</u> – The components of nominal GDP growth are real GDP growth and inflation. On page one of Exhibit JRW-12 of my testimony, I provide an analysis of GDP growth since 1960. Since 1960, nominal GDP has grown at a compounded rate of 6.46 percent. Whereas GDP has grown at a compounded rate of 6.46 percent since 1960, economic growth in the U.S. has slowed considerably in recent decades. Page two of Exhibit JRW-12 provides the nominal annual GDP growth rates over the 1961 to 2018 time period. Nominal GDP growth grew from 6.0 percent to over 12 percent from the 1960s to the early 1980s due in large part to inflation and higher prices. Despite an uptick during the mid-2000s, annual nominal GDP growth rates have declined to the 2.0 percent to 4.0 percent range over the past decade.[62]

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[61] Bradford Cornell, *Economic Growth and Equity Investing*, Financial Analysts Journal (Jan.-Feb. 2010) at 63.

[62] Nominal GDP did increase to 5.0% in 2018. However, this is a one-time boost associated with the 2017 decrease in taxes.

The components of nominal GDP growth are real GDP growth and inflation. Page three of Exhibit JRW-12 shows annual real GDP growth rate over the 1961 to 2015 time period. Real GDP growth has gradually declined from the 5.0 percent to 6.0 percent range in the 1960s to the 2.0 percent to 3.0 percent during the most recent five-year period. The second component of nominal GDP growth is inflation. Page four of Exhibit JRW-12 shows inflation as measured by the annual growth rate in the Consumer Price Index (CPI) over the 1961 to 2018 time period. The large increase in prices from the late 1960s to the early 1980s is readily evident. Equally evident is the rapid decline in inflation during the 1980s as inflation declined from above 10 percent to about four percent. Since that time inflation has gradually declined and has been in the 2.0 percent range or below over the past five years.

The graphs on pages 2, 3, and 4 of Exhibit JRW-12 provide very clear evidence of the decline in nominal GDP as well as its components, real GDP and inflation, in recent decades. To gauge the magnitude of the decline in nominal GDP growth, Table 8 and page five of Exhibit JRW-12 provide the compounded GDP growth rates for 10-, 20-, 30-, 40- and 50- years. Whereas the 50-year compounded GDP growth rate is 6.36 percent, there has been a monotonic and significant decline in nominal GDP growth over subsequent 10-year intervals, especially in the most recent 10-year interval. These figures clearly suggest that nominal GDP growth in recent decades has slowed and that a growth rate in the range of 4.0 percent to 5.0 percent is more appropriate today for the U.S. economy. Dr. Morin's long-term GDP growth rate of 5.40 percent is clearly inflated.

Table 8
Historic GDP Growth Rates

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

Long-Term GDP Projections also Indicate Slower GDP Growth in the Future

There are several forecasts of annual GDP growth that are available from economists and government agencies. These are listed in Panel B of on page five of Exhibit JRW-12. The mean 10-year nominal GDP growth forecast (as of March 2019) by economists in the recent *Survey of Financial Forecasters* is 4.25 percent.[63] The Energy Information Administration (EIA), in its projections used in preparing *Annual Energy Outlook,* forecasts long-term GDP growth of 4.20 percent for the period 2018-2050.[64] The Congressional Budget Office (CBO), in its forecasts for the period 2018 to 2048, projects a nominal GDP growth rate of 4.40 percent.[65] Finally, the Social Security Administration (SSA), in its Annual OASDI Report, provides a projection of nominal GDP from 2018-2095.[66] SSA's projected growth GDP growth rate over this period is 4.35 percent. Overall, these forecasts suggest long-term GDP growth rate in the 4.0

[63] Federal Reserve Bank of Philadelphia, *Survey of Financial Forecasters*, available at https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/ (last accessed Nov. 19, 2019).

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

[65] Congressional Budget Office, *The 2019 Long-Term Budget Outlook* (June 15, 2019), available at https://www.eia.gov/outlooks/aeo/pdf/appa.pdf.

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

percent - 4.4 percent range. Given this range, Dr. Morin's market risk premium presumes a projected EPS growth rate of 10.0 percent that is almost three times projected GDP growth. Given the connection between EPS and GDP growth rates, this defies economic logic.

Q. What fundamental factors have led to the decline if prospective GDP growth?

A. As addressed in a study by the consulting firm McKinsey & Co., two factors drive real GDP growth over time: (a) the number of workers in the economy (employment); and (2) the productivity of those workers (usually defined as output per hour).[67] According to McKinsey, real GDP growth over the past 50 years was driven by population and productivity growth which grew at compound annual rates of 1.7 percent and 1.8 percent, respectively.

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

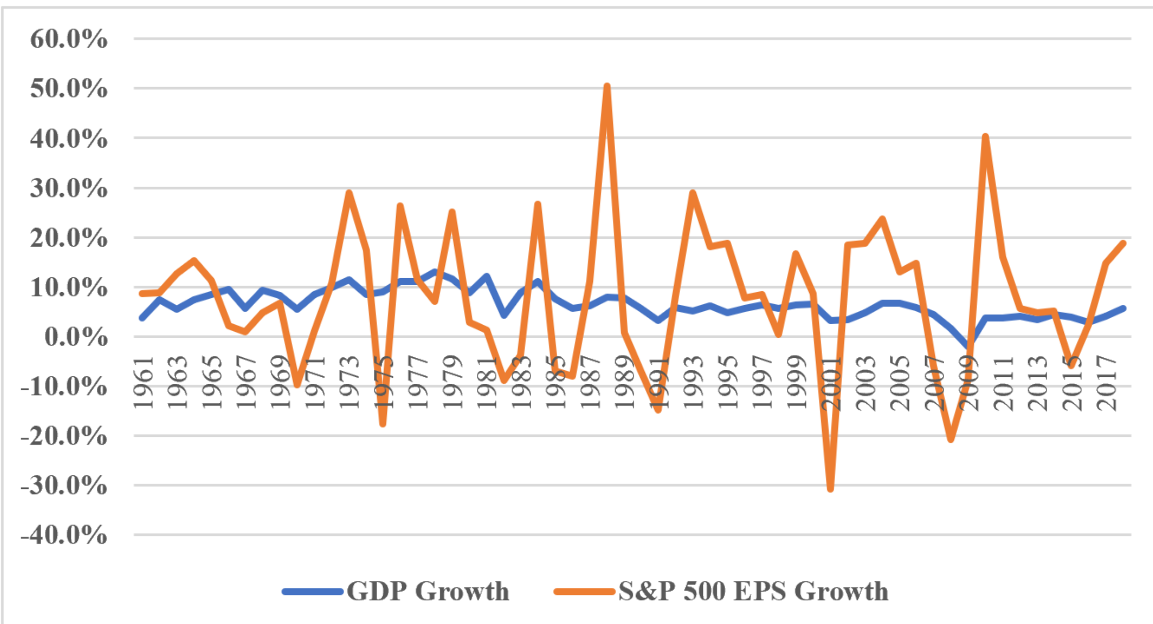
Q. Please provide more insights into the relationship between S&P 500 EPS and GDP growth.

A. Figure 7 shows the average annual growth rates for GDP and the S&P 500 EPS since 1960. The one very apparent difference between the two is that the S&P 500 EPS growth

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

rates are much more volatile than the GDP growth rates, when compared using the relatively short, and somewhat arbitrary, annual conventions used in these data.[68] Volatility aside, however, it is clear that over the medium to long run, S&P 500 EPS growth does not outpace GDP growth.

Figure 7
Average Annual Growth Rates
GDP and S&P 500 EPS
1960-2018



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

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

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

Corporate Profits are Constrained by GDP – Milton Friedman, the noted economist, warned investors and others not to expect corporate profit growth to sustainably exceed GDP growth, stating, "Beware of predictions that earnings can grow faster than the economy for long periods. When earnings are exceptionally high, they don't just keep booming."[69] Friedman also noted in the *Fortune* interview that profits must move back down to their traditional share of GDP. In Table 9, below, I show that currently the aggregate net income levels for the S&P 500 companies, using 2018 figures, represent 6.73 percent of nominal GDP.

Table 9
S&P 500 Aggregate Net Income as a Percent of GDP

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

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

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

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

The Differences Between the S&P 500 EPS and GDP – In the last three years, as the EPS for the S&P 500 has grown at a faster rate than U.S. nominal GDP, some have pointed to the differences between the S&P 500 and GDP.[70] These differences include: (a) corporate profits are about 2/3 manufacturing driven, while GDP is 2/3 services driven; (b) consumer discretionary spending accounts for a smaller share of S&P 500 profits (15 percent) than of GDP (23 percent); (c) corporate profits are more international-trade driven, while exports minus imports tend to drag on GDP; and (d) S&P 500 EPS is impacted not just by corporate profits but also by share buybacks on the positive side (fewer shares boost EPS) and by share dilution on the negative side (new shares dilute EPS). While these differences may seem significant, it must be remembered that the Income Approach to measure GDP includes corporate profits (in addition to employee compensation and taxes on production and imports) and therefore effectively accounts for the first three factors.[71]

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

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

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

Q. Please provide addition evidence on how unrealistic Dr. Morin's S&P 500 EPS growth rate of 10.0 percent is?

A. Beyond my previous discussion, I have also performed the following analysis of S&P 500 EPS and GDP growth in Table 10 below. Specifically, I started with the 2018 aggregate net income for the S&P 500 companies and 2018 nominal GDP for the U.S. As shown in Table 9, the aggregate profit for the S&P 500 companies represented 6.73 percent of nominal GDP in 2018. In Table 10, I then project the aggregate net income level for the S&P 500 companies and GDP as of the year 2050. For the growth rate for the S&P 500 companies, I used Dr. Morin's *Value Line* projected EPS growth rate of 10.0 percent. As a growth rate for nominal GDP, I used the average of the long-term projected GDP growth rates from CBO, SSA, and EIA (4.0 percent, 4.4 percent, and 4.3 percent), which is 4.23 percent. The projected 2050 level for the aggregate net income level for the S&P 500 companies is $29.7 trillion. Over the same period GDP grows to $78.7 trillion. As such, if the aggregate net income for the S&P 500 grows in accordance with the growth rates used by Dr. Morin, and if nominal GDP grows at rates projected by major government agencies, the net income of the S&P 500 companies will represent growth from 6.73 percent of GDP in 2018 to 36.76 percent of GDP in 2050. Obviously, given the tie between EPS and GDP growth, such a scenario is implausible.

Table 10
Projected S&P 500 Earnings and Nominal GDP
2018-2050
S&P 500 Aggregate Net Income as a Percent of GDP

	2018 Value	Growth Rate	No. of Years	2050 Value
Aggregate Net Income for S&P 500	1,406,400.0	10.00%	32	29,694,415.6
2018 Nominal U.S. GDP	20,891,000.0	4.32%	32	80,775,130.2
Net Income/GDP (%)	6.73%			36.76%

Data Sources: 2018 Aggregate Net Income for S&P 500 companies – *Value Line* (March 12, 2019).
2018 Nominal GDP – Moody's - https://www.economy.com/united-states/nominal-gross-domestic-product.
S&P 500 EPS Growth Rate – Dr. Morin's *Value Line* projected EPS growth rate - 10.0 percent;
Nominal GDP Growth Rate – The average of the long-term projected GDP growth rates from CBO, SSA, and EIA (4.0 percent, 4.4 percent, and 4.3 percent).

Q. Please provide a summary assessment of GDP and S&P 500 EPS growth rates.

A. As noted above, the long-term link between corporate profits and GDP is inevitable. The short-term differences in growth between the two has been highlighted by some notable market observers, including Warren Buffet, who indicated that corporate profits as a share of GDP tend to go far higher after periods where they are depressed, and then drop sharply after they have been hovering at historically high levels. In a famous 1999 *Fortune* article, Mr. Buffet made the following observation:[72]

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

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

In sum, Dr. Morin's long-term S&P 500 EPS growth rate of 10.0 percent is overstated and has no basis in economic reality. In the end, the big question remains as to whether corporate profits can grow faster than GDP. Jeremy Siegel, the renowned finance professor at the Wharton School of the University of Pennsylvania, believes that going forward, earnings per share can grow about half a point faster than nominal GDP, or about 5.0 percent, due to the big gains in the technology sector. But he also believes that sustained EPS growth matching analysts' near-term projections is absurd: "The idea of 8 percent or 10 percent or 12 percent growth is ridiculous. It will not happen."[73]

Q. Finally, please an overall evaluation of Dr. Morin's expected stock market return that is used to develop his market risk premium.

A. The are several additional issues with the *Value Line* results. The 12.2 percent expected stock market return is high by historic standard. The compounded annual return in the U.S. stock market is about 10 percent (9.49 percent according to Damodaran between 1928-2018). The high expected stock market return, and the resulting MRP and equity cost rate results, are directly related to the 10.0 percent expected EPS growth rate. There are numerous fallacies with this growth rate. First, the expected growth rate is not from today going forward, but instead it is computed from a three-year base period in the past (2016-2018) to a projected three-year period in the future (2022-2024). The problem here is that it incorporates historic growth in the base period, which can inflate projected growth for the future if the base period includes poor earnings. Second, and most significantly, a projected growth rate of 10.0 percent does not reflect economic reality.

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

As noted above, it assumes that S&P 500 companies can grow their earnings in the future at a rate that is more than double the expected GDP growth rate.

Q. What cost of equity capital would Dr. Morin be recommending if he had used Duff & Phelps risk-free interest rate of 3.5 percent and its equity or market risk premium of 5.50 percent?

A. He would be at a much lower level.

$$K = (R_f) + ß * [E(R_m) - (R_f)]$$
$$K = 3.5\% + 0.62 * 5.5\%$$
$$K = 6.9\%$$

C. PSE Approach Number Three: Risk Premium Approach

Q. Please discuss Dr. Morin's risk premium approach.

A. Dr. Morin develops an equity cost rate for PSE with historical and allowed ROE risk premium studies.

The historical study computes a risk premium established as the difference in the arithmetic mean historical returns over the 1931-2015 time period on the S&P Public Utility Index and U.S. Treasury bonds. He adds this risk premium to a projected 4.40 percent yield on long-term U.S. Treasury bonds.

Dr. Morin's second risk premium study establishes a risk premium by a regression of authorized ROEs for electric utilities and long-term Treasury yields over the 1986-2015 time period. He then adds the resulting risk premium to a projected yield on 30-year Treasury yield of 4.40 percent. Dr. Morin's analyses produced equity cost rates of 10.5 percent and 10.7 percent for PSE.

Q. What are the errors in Dr. Morin's risk premium analyses?

A. The primary errors with Dr. Morin's risk premium analyses are: (1) the projected risk-free interest rate of 4.0 percent in both the historical and allowed risk premium approaches; (2) the use of historical stock and bond returns in the historical risk premium approach; and (3) the risk premium in the allowed risk premium approach.

1. The Projected Risk-Free Interest Rate

Q. Please discuss the base yield of Dr. Morin's risk premium analyses.

A. Dr. Morin uses a projected long-term Treasury yield of 4.40 percent in both of his risk premium approaches. This figure is almost 150 basis points above the current yield on long-term Treasury bonds. As discussed above, this figure is excessive because: (1) economists are always predicting that interest rates will rise , and yet they are almost always wrong; and (2) investors would not be buying long-term Treasury bonds at their current yields if they expected interest rates to suddenly increase.

2. The Historical Risk Premium

Q. Please discuss the errors in Dr. Morin's historical risk premium analysis.

A. There are two primary errors in Dr. Morin historical risk premium analysis. First, he computed the historical risk premium as the difference in the arithmetic mean stock and bond returns and then added the risk premium to a forecasted long-term Treasury yield. The error occurs in comingling historical returns with a projected expected return. Second, and most significantly, the risk premium is based on historical stock and bond returns. As discussed at length above, there are a myriad of empirical problems in using historical market returns to estimate an expected risk premium. Among the errors are the

U.S. stock market survivorship bias (the "Peso Problem"), the company survivorship bias (only successful companies survive – poor companies do not survive), the measurement of central tendency (the arithmetic versus geometric mean), the historical time horizon used, and the unattainable return bias (the procedure presumes monthly portfolio rebalancing).

3. The Authorized ROE Risk Premium

Q. What are the issues with Dr. Morin's authorized risk premium?

A. There are several problems with this approach. First, the methodology produces an inflated measure of the risk premium because the approach uses historic authorized ROEs and Treasury yields, and the resulting risk premium is applied to projected Treasury Yields. Since Treasury yields are always forecasted to increase, the resulting risk premium would be minor if done correctly and would employ projected Treasury yields in the analysis rather than historic Treasury yields.

Second, Dr. Morin's used the average annual allowed ROEs from the Regulatory Research Associates (RRA) that include a number of cases for Virginia that include ROE adders of 100 to 200 basis points for specific generation projects. For example, RRA reports an average allowed ROE for electric utilities of 9.85 percent including the Virginia cases, and 9.60 percent excluding the Virginia cases with ROE adders.

Dr. Morin's risk premium approach is a gauge of *commission* behavior and not *investor* behavior. Capital costs are determined in the marketplace through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also consider other utility and rate case-specific information in setting ROEs. As such, Dr. Morin's approach and results reflect other factors such as capital structure, credit ratings and other risk measures, service territory, capital expenditures, energy supply issues, rate design, investment and expense trackers, and other factors used by utility commissions in determining an appropriate ROE, in addition to capital costs. This may especially be true when the authorized ROE data includes the results of rate cases that are settled and not fully litigated.

Finally, Dr. Morin's methodology produces an inflated required rate of return since utilities have been selling at market-to-book ratios in excess of 1.0 for many years. This indicates that the authorized rates of return have been greater than the return that investors require. As discussed earlier in my testimony, a market-to-book ratio above 1.0 indicates a company's ROE is above its equity cost rate. Therefore, the risk premium produced from the study is overstated as a measure of investor return requirements and produced an inflated equity cost rate.

Q. Does this conclude your testimony?

A. Yes, it does.