Application No.:	A.19-04-014
Exhibit No.:	SCE-05
Witnesses:	B. Villadsen

SOUTHERN CALIFORNIA EDISON®

An *EDISON INTERNATIONAL®* Company

(U 338-E)

2020 Cost of Capital

Rebuttal Testimony on SCE's Base ROE

Before the
Public Utilities Commission of the State of California

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BEFORE THE
PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

REBUTTAL TESTIMONY OF DR. BENTE VILLADSEN

</div>

1 **I. INTRODUCTION, PURPOSE, AND SUMMARY**

2 **Q1. Please state your name, occupation and business address for the record.**

3 A1. My name is Bente Villadsen and I am a Principal of The Brattle Group, whose business
4 address is One Beacon Street, Suite 2600, Boston, Massachusetts, 02108.

5 **Q2. Are you the same Bente Villadsen, who filed Direct Testimony in this proceeding?**

6 A2. Yes. I am.

7 **Q3. Was this Rebuttal Testimony prepared by you or under your supervision?**

8 A3. Yes.

9 **Q4. What is the purpose of your rebuttal testimony in this proceeding?**

10 A4. I am sponsoring Exhibit SCE-05. Southern California Edison Company ("SCE" or the
11 "Company") has asked me to review and comment on the following submissions in this
12 docket:[1]

13 • Report on the Cost of Capital for Test Year 2020 by A. Rothschild on behalf of
14 the Public Advocates Office ("Rothschild Testimony")

15 • Direct Testimony of Michael P. Gorman on behalf of Energy Producers & Users
16 Coalition ("EPUC"), Indicated Shippers, and The Utility Reform Network
17 ("TURN") ("Gorman Testimony").

18 • Direct Testimony of Kevin W. O'Donnell on behalf of Federal Executive
19 Agencies ("O'Donnell Testimony")

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[1] I shall not address submissions that do not pertain to Southern California Edison nor shall I address
issues in the four testimonies below that do not pertain to cost of capital.

1   •   Prepared Direct Testimony of Richard McCann on behalf of the Environmental
2   Defense Fund ("McCann Testimony")

3   The testimony addresses the recommendations of the four intervener witnesses, who address

4   SCE's ROE focusing on the witnesses' applications of models and inputs. Specifically, I

5   address certain technical issues in the implementation of the CAPM, where it is necessary to

6   appropriately reflect the risk-free rate as of 2020 and to use a Market Risk Premium that take

7   the current market conditions into account. For the DCF models, I address the use of specific

8   models such as the sustainable growth model and models that rely on a specific number of

9   years. I also address the need to use the risk premium model and the merits of considering the

10   financial risk inherent in SCE's capital structure relative to that present in the models used to

11   estimate the ROE. Lastly, I address certain (but not all) criticism of my direct testimony

12   ("Villadsen Direct") and certain statements in individual witnesses' testimony.[2]

13   **Q5.**   **Please summarize your conclusions.**

14   A5.   Based on my review and analysis of the intervenor's testimonies, I conclude the
15   following:

16   a.   Intervenor recommendations for the ROE are too low.

17   b.   Mr. Gorman and Mr. Rothschild recommend a ROE below that granted to electric
18   utilities in 2018-19.[3]

19   c.   Intervenor witnesses downward bias the CAPM estimates by 0.2 to 2.3 percent
20   as they use too low a risk-free rate and, in the case of Mr. Gorman and Mr.
21   O'Donnell, too low a market risk premium.

22   d.   Failing to consider the ECAPM downward biases the ROE estimate.

23   e.   Use of the plowback method or sustainable growth downward biases the ROE
24   estimate.
25

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[2]   The fact that I do not address any and all issues raised in intervenors' testimonies does not necessarily mean I agree with the statements.

[3]   Only one of 45 integrated electric utilities had their ROE set at or below 9.0 percent.

1   f. It is a fallacy to consider a market-to-book ratio above one as indicative of too

2   high an allowed ROE

3   i. The Commission has in the past examined this claim and chose to not

4   pursue the issue.[4]

5   ii. As financial economics cannot explain absolute stock prices, neither can

6   it explain market-to-book ratios.

7   iii. Using the market-to-book ratio to determine the ROE leads to circularity

8   g. Intervenor witnesses downward bias the ROE by failing to consider financial

9   leverage.

10   h. Intervenor witnesses fail to recognize that the CAPM and DCF models based on

11   historic growth rates are backward looking and thus do not reflect the higher cost

12   of equity due to tax reform.

II. KEY OBSERVATIONS ON OTHER WITNESSES PROPOSED ROE AND CAPITAL STRUCTURE

15 **Q6.** **Please summarize the intervenors' recommendations on ROE and capital**

16   **structure for SCE.**

17 A6. Figure 1 below summarizes the recommendations for SCE. The table does not show

18   the recommended percentage of preferred for SCE: zero in the case of O'Donnell, five

19   percent in the case of Gorman and Rothschild.

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[4] See Order Instituting Rulemaking to Create a Consistent Regulatory Framework for the Guidance, Planning, and Evaluation of Integrated Distributed Energy Resources. R.14-10-003 (Filed October 2, 2014).

Figure 1: Summary of Recommendations for SCE

Witness		Recommended ROE	Recommended Equity Ratio
Gorman (EPUC/TURN)	[a]	9.0% + 0.65%	50%
Rothschild (PAO)	[b]	8.65%	48%
O'Donnell (FEA)	[c]	9.75%	52%
McCann (EDF)	[d]	No Increase	n/a
Villadsen (SCE)	[e]	10.60%	52%

Sources and Notes:

[a]: Gorman Testimony pp. VII-39 and VII-10, respectively. 0.65% is wildfire risk adder, see Gorman Testimony p. VII-1.

[b]: Rothschild Testimony p. 5.

[c]: O'Donnell Testimony p. 54.

[d]: McCann Testimony p. 1.

[e]: Villadsen Direct Testimony.

1 **Q7. What is your reaction to the recommendations above?**

2 A7. The Environmental Defense Fund's ("EDF') witness, Dr. McCann states that there is

3 not "sufficient evidence of changes in circumstances to justify an increase in the return

4 on equity (ROE)."[5]

5 None of the intervenor witnesses have presented convincing evidence that justifies a

6 decrease in the return on equity, and I find the recommendations too low for several

7 reasons. First, nationwide the allowed ROE for integrated electric utilities averaged

8 approximately 9.7 percent for 2018 and the first two quarters of 2019.[6] Notably, only

9 one integrated electric utility – Otter Tail Power Company in South Dakota - has been

10 awarded an ROE as low as that suggested by Mr. Gorman or Mr. Rothschild in 2018-

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[5] McCann Testimony, p. 1. As for Dr. McCann's statement that they have not "presented evidence that California's policy and regulatory initiatives, particularly those that promote enhancing the environment, have created an unfavorable investment situation compared to the rest of the industry " (p. 1), I refer to the direct and rebuttal testimony of Dr. Gary Stern; Exhibit SCE-04.

[6] Regulatory Research Associates, RRA Regulatory Focus "Major Rate Cases – January-June 2019," July 22, 2019 and underlying data.

1   19[7] and Otter Tail's South Dakota rate case was unique in that allowed return on rate

2   base was 7.09 percent as compared to an average of a bit over 6.9 percent for 2018-19,[8]

3   so the overall return allowed in that case was higher than the average overall return on

4   rate base. Therefore, a suggestion that SCE should be allowed an ROE of 9.0 percent

5   or lower as Mr. Gorman (excluding wildfire risk) and Mr. Rothschild suggest is out of

6   line with industry norms and particularly so because of SCE's higher than average risk

7   as discussed by Company witness Dr. Gary Stern and Brattle witnesses, Mr. Frank

8   Graves and Mr. Bob Mudge.[9]

9   **Q8. Has there been any recent developments in the U.S. or World economy that may**

10   **impact the cost of equity capital?**

11   A8.   Yes. Notably, the VIX, which is a measure of the stock market's expectations of

12   volatility as implied by S&P 500 index options,[10] increased dramatically in early

13   August as the U.S. stock market dropped on August 5. This is shown in Figure 2 below.

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[7]   SNL, Past Rate Cases: 2018-2019 (YTD).

[8]   SNL, "Otter Tail Power Company: SD: D-EL18-021 – Rate Case Profile" and SNL, Past Rate Cases for integrated electric utilities 2018-2019 (YTD).

[9]   Rebuttal Testimony of Dr. Gary Stern, Exhibit SCE-04, Rebuttal Testimony of Frank C. Graves and Robert S. Mudge, Exhibit SCE-06.

[10]   As noted in my direct testimony, p. 26, the index is traded on the Chicago Board Options Exchange.

Figure 2: VIX Index through 8/12/2019

Source: Bloomberg as of 8/12/2019
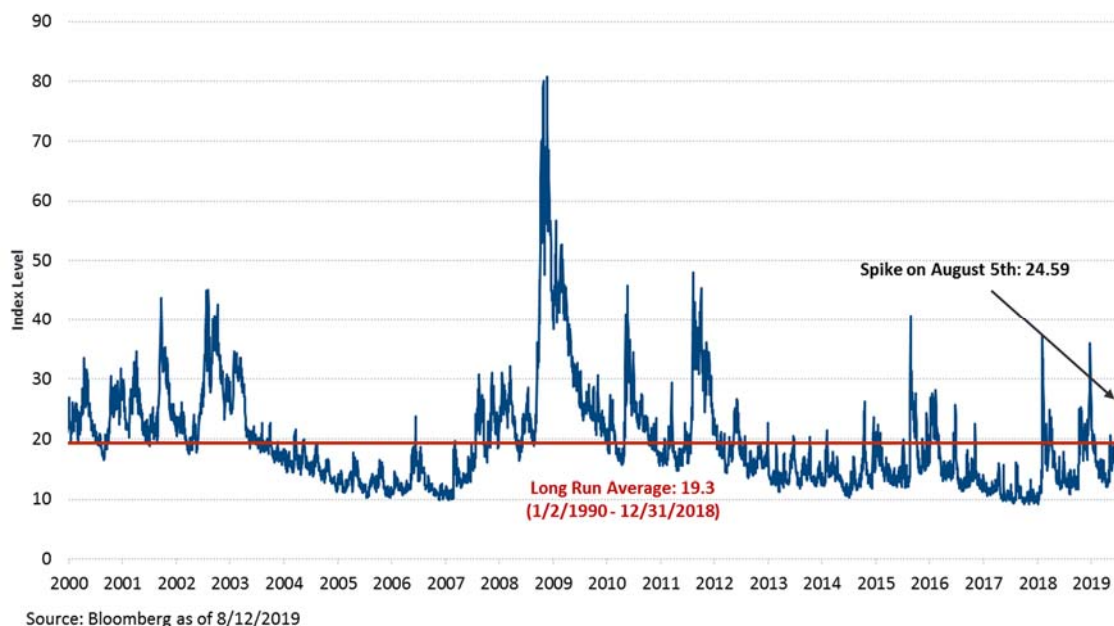
1   Among the other recent developments, the Federal Reserve reduced the Federal Funds

2   Rate on July 31, 2019[11] (I discuss this issue in Section III.B below) and financial

3   markets have exhibited some major swings in August causing Value Line to note that

4   financial markets have "come under pressure recently" citing trade conflicts as the

5   largest reason for the market uncertainty.[12] For example, the Dow Jones on August 14

6   lost 800 points for the worst losses in 2019.[13] These developments point to increased

7   volatility in capital markets and hence the need to ensure capital attraction.

8 **Q9.   Do   you   have   any   other   preliminary   comments   on   the   intervenors'**

9 **recommendations?**

10 A9.   Yes. Dr. McCann states that

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[11]   Federal Reserve Press Release, July 31, 2019.

[12]   Value Line, "The View," August 2019.

[13]   CNN Business, "Dow tumbles 800 points after bond market flashes a recession warning," August 15, 2019.

1	A higher equity share should lead to a lower ROE because the volatility of
2	equity income should decrease relative to total income, thus decreasing a
3	key risk parameter for valuing equity holdings.[14]

4   I wholeheartedly agree and that is exactly why I recommended an ROE of 10.6 percent

5   on 52 percent equity and in the alternative 10.9 percent on 48 percent equity.[15] I also

6   disagree with Mr. Gorman's suggestion that a lower common equity layer has no

7   bearing on the ROE.[16]

8   **Q10.**   **Do you agree with the comments from Mr. Gorman that the Tax Cut and Jobs**

9   **Act has not had a substantive impact[17]?**

10   A10.   No. Certainly the Tax Cut and Jobs Act ("TCJA") has a substantial impact on utilities

11   cash flow and as discussed in my direct testimony therefore negatively impacts credit

12   metrics, so that all else equal it is necessary to either increase the equity return or the

13   equity ratio.[18] This is exactly what some commissions have done. For example, the

14   Georgia Public Utilities Commission increased Atlanta Gas Light Company's common

15   equity ratio from 51 percent to 55 percent[19] and also increased the equity percentage

16   for Southern Company's Georgia operations, Georgia Power.[20] Similarly, Alabama

17   Power is expected to increase its equity percentage by an additional 3.76% by 2023.[21]

18   More broadly, Alabama, Georgia, and Texas have increased the regulatory equity

19   percentage for their jurisdictional utilities as an offset to the TCJA.[22] This is consistent

20   with Moody's cautioning of a decline in funds from operations ("FFO") coverage and

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[14]   McCann Testimony, p. 22.

[15]   Villadsen Direct Testimony pp. 4-5.

[16]   Gorman Testimony, p. VII-41.

[17]   Gorman Testimony, p. III-9.

[18]   *See* Villadsen Direct Testimony, Q/A 38-39 (pp. 29-30).

[19]   *See* GA PUC, Docket D-40828.

[20]   Southern Company, "Investor Presentation," Nov. 7, 2018.

[21]   Julien Dumoulin-Smith, "Southern Company: Reflecting the Latest: Earnings Sharing and Higher Equity Ratio," Bank of America / Merrill Lynch, December 7, 2018.

[22]   Moody's Investor Service, "Outlook 2019 – Regulated Utilities U.S.," November 8, 2018.

1   expectation of a substantial amount of equity issuances in 2019.[23] The equity issuance

2   is confirmed by Thomson Reuter's data, which show that utilities have been issuing a

3   larger volume of stocks than at any time since the financial crisis.[24]

4   For the purpose of estimating the cost of equity, it is important to acknowledge that the

5   reduction in the tax rate increases the volatility of earnings as discussed in my direct

6   testimony.[25] This will, all else equal, increase the cost of equity.

7   **Q11.** **How do you respond to Mr. O'Donnell's statement that the TCJA does not create**

8   **greater risk or at least no different risk from that of other utilities?[26]**

9   A11. The TCJA affects different utilities differently. However, the key point of my testimony

10   on this point was that it impacts earnings volatility and hence the cost of equity. A

11   model such as the CAPM relies on data for a five-year historical period, as does Mr.

12   O'Donnell's DCF models using historical data. The impact of the TCJA cannot

13   possibly be captured in the historical data. Consequently, even if the TCJA is fully

14   reflected in current "stock prices" it is not fully reflected in historical data used to

15   estimate beta or the historical data used by Mr. O'Donnell to calculate the plowback

16   ratio[27] or the historical growth in Earnings, Dividends, or Book Value per share.[28] In

17   other words, the increased risk has yet to show up in the estimated cost of equity when

18   relying on historical data in the calculation process.[29]

19   As shown in my direct testimony, the volatility in earnings increases with the reduction

20   in the corporate tax rate. Therefore, Mr. O'Donnell is incorrect in his assertion that

21   there is no need to adjust for the TCJA.

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[23] *Ibid*.

[24] Reuters Business News, "US tax reform reenergizes equity markets for utility companies," June 12, 2018.

[25] Villadsen Direct Testimony, Section IV.D.

[26] O'Donnell Testimony, p. 91. See also McCann Testimony, p. 22.

[27] O'Donnell Testimony, Exhibit KWO-6.

[28] O'Donnell Testimony, Exhibit KWO-5.

[29] *E.g.*, O'Donnell Testimony, Exhibits KWO-5 and KWO-6.

1   **Q12.** **What conclusion do you draw from the review of the submitted testimonies?**

2   A12. The submissions do not provide convincing evidence that SCE's allowed ROE should

3   be reduced – to the contrary, SCE today faces greater risks than in the past, so it is

4   reasonable that the return on equity and equity capitalization be increased.

5   **III. FINANCIAL LEVERAGE**

6   **Q13.** **What do you cover in this section of your rebuttal testimony?**

7   A13. I respond to the criticism and misunderstandings of my direct testimony regarding

8   financial leverage. Specifically, I address the concerns and misconceptions of Mr.

9   Gorman, and the failure of Mr. Rothschild and Mr. O'Donnell to consider financial risk

10   in their recommendations.

11   **Q14.** **What is your reaction to Mr. Gorman's statement that the Commission should**

12   **"reject Dr. Villadsen's ROE adder to the Base ROE if SCE's proposal to increase**

13   **its ratemaking capital structure common equity ratio is denied"?[30]**

14   A14. I disagree. The level of equity certainly does impact SCE's cost of debt as well as its

15   ability to withstand challenging times. A lower common equity ratio requires a higher

16   ROE.

17   **Q15.** **Please summarize the intervenors' testimonies regarding financial risk.**

18   A15. Mr. Gorman critiques my consideration of financial leverage.[31]

19   **Q16.** **What is your reaction to the intervenors' critique of your leverage considerations?**

20   A16. First, for the purpose of determining the ROE for SCE, the relevant financial risk or

21   leverage is that of equity holders, who compare their return to that available on

22   similarly situated companies – e.g., the proxy group. In evaluating the financial risk of

23   the proxy group, they look to the market (including the market value of debt and

---

[30] Gorman Testimony, p. VII-41.

[31] Gorman Testimony, pp. VII-45-49, VII-52-53, VII-58.

1   equity). Thus, the relevant measure of leverage from an equity perspective is market
2   value and not book value. Second, it is common practice in textbooks to consider the
3   impact of leverage on the cost of equity and not taking this effect into consideration
4   biases the cost of equity.

5   **Q17.   Elaborate on the relationship between leverage and the cost of equity?**

6   A17.   Yes. As indicated above, financial risk or capital structure is a large topic in financial
7   economics and it is commonly recognized in finance textbooks that financial leverage
8   impacts the cost of equity for a company. A replication of the text from a standard
9   MBA textbook is provided below:[32]

> **COMMON MISTAKE   Is Debt Better Than Equity?**
>
> Because debt has a lower cost of capital than equity, a common mistake is to assume that a firm can reduce its overall WACC by increasing the amount of debt financing. If this strategy works, shouldn't a firm take on as much debt as possible, at least as long as the debt is not risky?
>
> This argument ignores the fact that even if the debt is risk free and the firm will not default, adding leverage increases the risk of the equity. Given the increase in risk, equity holders will demand a higher risk premium and, therefore, a higher expected return. The increase in the cost of equity exactly offsets the benefit of a greater reliance on the cheaper debt capital, so that the firm's overall cost of capital remains unchanged.

10   As Professors Berk and DeMarzo further note:

11   The levered equity return equals the unlevered equity return, plus and extra
12   "kick" due to leverage. … The amount of additional risk depends on the
13   amount of leverage, measured by the firm's market value debt-equity ratio,
14   D/E….[33]

15   Financial economics simply do not leave any doubt that the cost of equity increases
16   with financial leverage and that the relevant measure of financial leverage depends on
17   market value. I, like other witnesses, estimate the cost of equity using market data in

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[32]   Jonathan Berk and Peter DeMarzo, "Corporate Finance," Third Edition, 2013 (Berk & DeMarzo 2013), p. 492.
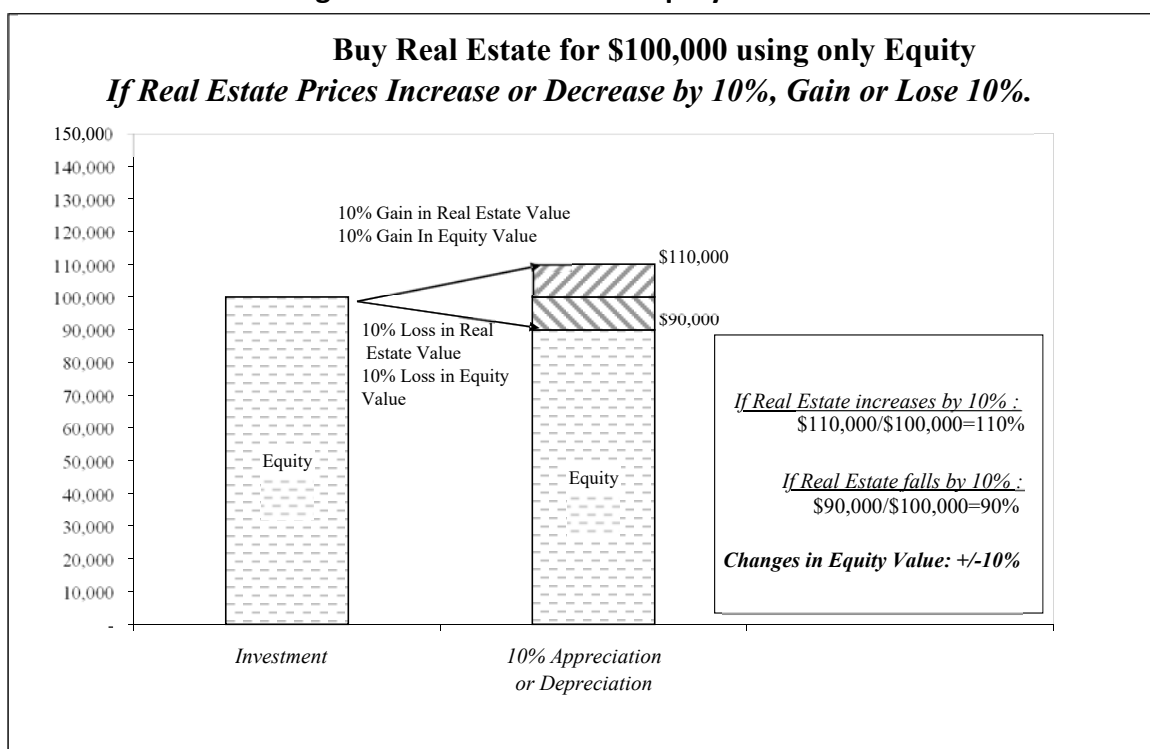
[33]   Berk & Peter DeMarzo 2013, p. 489. Similar comments appear in Richard A. Brealey, Stewart C. Myers, and Franklin Allen, 2014, Principles of Corporate Finance, 11th edition, McGraw-Hill Irwin (Brealey, Myers & Allen 2014), p. 433.

1   the CAPM-based and DCF-based models and therefore the estimation process uses
2   market data.[34]

3   **Q18. Could you provide a numerical example to illustrate the impact of financial**
4   **leverage on cost of equity?**

5   A18. As a simple example, think of an investor who takes money out of her savings and
6   invests $100,000 in real estate. The future value of the real estate is uncertain. If the
7   real estate market booms, she wins. If the real estate market declines, she loses. Figure
8   3 below illustrates this.

Figure 3: Return on an All-Equity Investment

Buy Real Estate for $100,000 using only Equity
If Real Estate Prices Increase or Decrease by 10%, Gain or Lose 10%.

10% Gain in Real Estate Value
10% Gain In Equity Value

$110,000

10% Loss in Real
Estate Value
10% Loss in Equity
Value

$90,000

Equity

Equity

If Real Estate increases by 10% :
$110,000/$100,000=110%

If Real Estate falls by 10% :
$90,000/$100,000=90%

Changes in Equity Value: +/-10%

Investment

*10% Appreciation
or Depreciation*

9   Compare this to the situation illustrated in Figure 4 below, where investor finances the
10   same real estate purchase using 50 percent cash from savings (equity) and 50 percent
11   funds from a mortgage (debt). In this case variability in the investor's expected equity
12   return is two times greater than that of debt. The entire fluctuation of 10 percent from

---

[34] Versions of the risk premium model that use allowed or realized ROEs (such as my implied risk
premium model) do rely on book value measures.

1   rising or falling real estate prices falls on the investor's equity investment, which is

2   smaller ($50,000) for the leveraged investment depicted in Figure 4 compared to the

3   all-equity $100,000 investment shown in Figure 3. The equity return for the leveraged

4   investment goes up or down by 20 percent in the latter scenario even though the actual

5   change in the value of the real estate (+/- 10%) is the same as depicted in Figure 3 for

6   the all-equity investment. The lesson from the example is obvious: debt adds risk.

Figure 4: Return on a Leveraged Equity Investment

Buy Real Estate for $100,000 with a $50,000 Mortgage
If Real Estate Increases or Falls by 10%, Gain or Lose 20%.

10% Gain in Real Estate Value
20% Gain In Equity Value

$110,000

$100,000

Equity

10% Loss in Real Estate Value
20% Loss in Equity Value

Equity

$90,000

If Real Estate increases by 10%:
$110,000 - $50,000 = $60,000
$60,000/$50,000=120%

If Real Estate falls by 10%:
$90,000 - $50,000 = $40,000
$40,000/$50,000=80%

Changes in Equity Value: +/-20%

$50,000

Mortgage

Mortgage

Initial Investment   *Change in Value*

7   **Q19. Do finance textbooks also address the question of how financial leverage affects**

8   **the cost of equity?**

9   A19. Yes. Textbooks on corporate finance provide examples like the one I present above to

10   illustrate how the introduction of debt financing amplifies the variability of equity

11   returns, thus increasing the risk to equity holders and causing them to demand higher

12   expected returns. For example, Professors Brealey, Myers, and Allen write

13   Our example shows how borrowing creates financial leverage or gearing.
14   Financial leverage does not affect the risk or the expected return on the

1 firm's assets, but it does push up the risk of the common stock. Shareholders
2 demand a correspondingly higher return because of this *financial risk*.[35]

3 Similarly, Professors Berk and DeMarzo summarize the effect of leverage on the cost
4 of capital as follows.

5 *…[L]everage increases the risk of equity even when there is no risk that the*
6 *firm will default.* Thus, while debt may be cheaper when considered on its
7 own, it raises the cost of capital for equity. Considering both sources of
8 capital together, the firm's average cost of capital with leverage is … the
9 same as for the unlevered firm.[36]

10 These statements by preeminent finance scholars in widely-used Corporate Finance
11 textbooks highlight two important points that can also be intuitively observed based on
12 the real estate investment example:

13 • The variability of returns on the asset itself (*e.g.*, the piece of real estate) is
14   unchanged by the introduction of financial leverage, therefore "leverage does not
15   affect the risk or the expected return on the firm's assets." Rather, it is the risk
16   and required returns of the equity and debt financing instruments that are changed
17   by the degree of financial leverage.

18 • The mechanism by which leverage adds variability to returns is independent of
19   any effect of increased leverage on the risk that the firm will be unable to fulfill
20   its fixed financial obligations, and thus (as Berk and DeMarzo put it) "leverage
21   increases the risk of equity even when there is no risk that the firm will default."

22 **Q20. What are the implications of these fundamental financial principles for**
23 **intervenors' ROE results?**

24 A20. Failing to recognize the impact of financial leverage on the cost of equity results in a
25   non-trivial downward bias in the cost of equity estimates. This can readily be seen by

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[35] Brealey, Myers and Allen (2017), *Principles of Corporate Finance, 12th Edition*, p. 446 [emphasis in original].

[36] Berk and DeMarzo (2014), *Corporate Finance, 3rd Ed.*, p. 482 [emphasis original].

1 looking to the difference in the sample betas[37] obtained at the proxy group's market
2 value and the same beta at 52.00 percent. This is shown in Figure 5 below, where I
3 calculate first the asset (or zero debt financing) beta using the betas provided by
4 intervenors along with the market value capital structure of the intervenor's proxy
5 group.[38] Next, in columns [2] and [3], I calculate the re-levered beta that is consistent
6 with an equity ratio of 52.00 percent (as requested by SCE). It is evident that relying
7 on a levered beta (column [1]) for the proxy group downward biases the ROE result.
8 Specifically, I find the downward bias for the CAPM to be in the range of 0.2 to 0.7
9 percent.

Figure 5: Downward Bias from Ignoring Financial Risk in the CAPM

Witness		Sample Equity Beta	Estimated Beta (without Taxes) Re-levered at (52%)	Estimated Beta (with Taxes) Re-levered at (52%)	Beta Downward Bias	Downward Bias on CAPM Estimate
		[1]	[2]	[3]	[4]	[5]
Gorman	[a]	0.70	0.80	0.78	**0.08 - 0.10**	**0.6% - 0.7%**
O'Donnell						
Sample	[b]	0.59	0.66	0.65	**0.06 - 0.07**	**0.4% - 0.5%**
Edison Int'l	[c]	0.60	0.65	0.63	**0.03 - 0.05**	**0.2% - 0.4%**
Rothschild						
Scenario 1	[d]	0.67	0.75	0.73	**0.06 - 0.08**	**0.4% - 0.6%**
Scenario 2	[e]	0.75	0.84	0.82	**0.07 - 0.09**	**0.5% - 0.6%**

Sources and Notes:
[1][a]: Gorman Testimony p. VII-39.
[1][b] & [c]: O'Donnell Testimony p. 52.
[1][d] & [e]: Rothschild Testimony p. 30.
[2] - [3]: See Table No. BV-R14. Estimated using standard textbook techniques as cited in direct testimony.
[4]: [2] & [3] - [1]
[5]: Result of multiplying [4] by a market risk premium estimate of 7.07%.

10 **Q21. What do you conclude from the discussion above?**

11 A21. Based on the discussion above, I find that intervenors' lack of consideration of financial
12 leverage result in too low an estimate for the ROE. I am concerned that Dr. McCann
13 appears to view capital attraction as the key element of the fair return standard, when

---

37 Mr. Gorman and Mr. O'Donnell report betas from Value Line, while Mr. Rothschild estimates his own betas.

38 *See* Exhibit SCE-05, Appendix Table No. BV-R12 and Table No. BV-R13.

1   he states that "[a] regulatory commission only need to allow the market return rate to
2   attract sufficient investment to cover the book value."[39]   Clearly, the *Hope and*
3   *Bluefield* decisions rely on two additional criteria: (i) that the return must be
4   comparable to that of similar risk enterprises and (ii) financial integrity. These two
5   criteria are equally important.

6   **IV. MODELS AND THEIR IMPLEMENTATION**

7   **Q22.   What do you cover in this section?**

8   A22. I first discuss the utilities in the proxy group (in short, samples) relied upon by various
9   intervenors and how they relate to my sample. I then summarize some key points
10   regarding the sample's risk versus that of SCE. I then discuss the relied upon models:
11   Capital Asset Pricing Model ("CAPM"), Risk Premium, Discounted Cash Flow
12   ("DCF") model, Comparable Earnings (used by Mr. O'Donnell), and other methods
13   relied upon by intervenors. I discuss their criticism of my approach within each
14   model's section.

15   **A. SAMPLE SELECTION**

16   **Q23.   What do you discuss in this section?**

17   A23. First, I discuss the differences between the sample presented in my direct testimony
18   and the samples presented by the intervening witnesses. Specifically, I will explain
19   why my sample selection is preferable to that of some of the intervenors' samples.
20   Second, I will show that my results at the time of estimation would not change
21   substantively by excluding companies that have reasons to be excluded as of today.

22   **Q24.   Can you compare your sample to that presented by the intervenor witnesses?**

23   A24. Yes. I compare the samples Figure 6. The samples are generally quite similar. Relative
24   to my proxy group, Mr. Gorman excludes four utilities: Avangrid, El Paso Electric,

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[39]   McCann Testimony p. 11.

1   Unitil, and Chesapeake Utilities.[40] Mr. O'Donnell used the same electric proxy group

2   as I, however he estimated results for Edison International as an individual data point

3   and he excluded Unitil from his main sample.[41] Mr. Rothschild used the same electric

4   proxy group as I, but also included Edison International.[42] Neither Mr. O'Donnell nor

5   Mr. Rothschild estimate the cost of capital for the natural gas or water utilities.

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[40]   Gorman Testimony p. VII-14.

[41]   O'Donnell Testimony p. 17.

[42]   Rothschild Testimony p. 9. I note that Mr. Rothschild claims to use the same sample as I, but upon
       review of his workpapers it became apparent he includes Edison International. *See,* Schedule ALR 3, p.
       1 for example.

Figure 6: Comparison of Proxy Groups

Sample / Company	Ticker	Villadsen (SCE)	Gorman (EPUC/TURN)	O'Donnell (FEA)	Rothschild (PAO)
		[1]	[2]	[3]	[4]
Electric					
ALLETE	ALE	X	X	X	X
Alliant Energy	LNT	X	X	X	X
Amer. Elec. Power	AEP	X	X	X	X
Ameren Corp.	AEE	X	X	X	X
CMS Energy Corp.	CMS	X	X	X	X
DTE Energy	DTE	X	X	X	X
Entergy Corp.	ETR	X	X	X	X
MGE Energy	MGEE	X	X	X	X
OGE Energy	OGE	X	X	X	X
Otter Tail Corp.	OTTR	X	X	X	X
WEC Energy Group	WEC	X	X	X	X
AVANGRID Inc.	AGR	X		X	X
Consol. Edison	ED	X	X	X	X
Duke Energy	DUK	X	X	X	X
Eversource Energy	ES	X	X	X	X
FirstEnergy Corp.	FE	X	X	X	X
NextEra Energy	NEE	X	X	X	X
PPL Corp.	PPL	X	X	X	X
Public Serv. Enterprise	PEG	X	X	X	X
Southern Co.	SO	X	X	X	X
Unitil Corp.	UTL	X			X
Edison Int'l	EIX				X
El Paso Electric	EE	X		X	X
IDACORP Inc.	IDA	X	X	X	X
NorthWestern Corp.	NWE	X	X	X	X
Pinnacle West Capital	PNW	X	X	X	X
PNM Resources	PNM	X	X	X	X
Portland General	POR	X	X	X	X
Xcel Energy Inc.	XEL	X	X	X	X
Natural Gas					
Atmos Energy	ATO	X	X		
Chesapeake Utilities	CPK	X			
NiSource Inc.	NI	X	X		
Northwest Natural	NWN	X	X		
ONE Gas Inc.	OGS	X	X		
Southwest Gas	SWX	X	X		
Spire Inc.	SR	X	X		
Water					
Amer. States Water	AWR	X	X		
Amer. Water Works	AWK	X	X		
Middlesex Water	MSEX	X	X		
York Water Co. (The)	YORW	X	X		

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Gorman Testimony p. VII-14.
[3]: O'Donnell Testimony p. 17. Mr. O'Donnell also estimates the cost of equity for EIX, but does so separately.
[4]: Rothschild Testimony p. 9.

1 **Q25.** **What is your reaction to Mr. Gorman's exclusion of Avangrid, El Paso Electric,**
2 **Unitil, and Chesapeake Utilities?**

3 A25. As of today, I do not disagree with the exclusion of El Paso Electric. Since the time I
4 selected my sample, El Paso has entered into an agreement to be acquired.[43] However,
5 I disagree with the exclusion of Avangrid, Unitil, Chesapeake Utilities.

6 Mr. Gorman's reason for excluding Avangrid is based on ownership structure—citing
7 that according to Value Line under 20 percent of their stock is publicly traded and thus
8 the control premium is likely to be reflected in its cost of equity estimate.[44]

9 Though Iberdrola may own over 80 percent of Avangrid's stock, the more important
10 feature of the stock that is publicly traded is that it is sufficiently liquid. According to
11 Yahoo finance, the average trading volume for Avangrid is approximately 425,000
12 shares per day, which is substantial. Importantly, the cost of capital depends on the risk
13 of the underlying assets and not on the owner of such assets. Because Avangrid has
14 sufficient trading for its stock price to be liquid, there is no reason to exclude the
15 company based on its ownership structure.[45]

16 The reason Mr. Gorman (among other intervenors) excludes Unitil is because "it is part
17 of the Value Line extended addition (*sic)*."[46] Despite this, I was able to procure the
18 necessary data from Value Line both at the time of my analysis and today to estimate
19 the cost of equity using my models. Thus, I do not have reason to exclude Unitil.[47]

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[43] El Paso Electric agreed on June 3, 2019 to be acquired by JP Morgan Investment Management Co.

[44] Gorman Testimony p. VII-14.

[45] Richard A. Brealey, Stewart C. Myers, and Franklin Allen, "Principles of Corporate Finance," 11th edition (2014), p. 219 states that "*The opportunity cost of capital depends on the use to which that capital is put*." Emphasis in original.

[46] Gorman Testimony, p. VII-14.

[47] I require a beta estimate and projected earnings per share estimates in order to use a company from Value Line. Unitil has both of these data points in addition to being listed as an electric utility in Value Line's database.

1   I disagree with the exclusion of Chesapeake Utilities for not having a credit rating.
2   Standard data providers such as CapitalIQ provide basic credit metrics for Chesapeake
3   that indicate the company is capable of paying back interest and other metrics that are
4   comparable to those of other gas LDCs.[48] There is therefore no reason to exclude the
5   company.

6   Mr. O'Donnell and Mr. Rothschild included Edison International ("EIX"), the parent
7   of SCE, in their samples with Mr. O'Donnell providing a separate estimate for SCE. I
8   find that excluding EIX is preferable as SCE is a very large component of the
9   consolidated company, EIX.[49]

10   **Q26.   Do your results change by excluding El Paso Electric from your proxy group?**

11   A26.   Not substantially. When rounding to one decimal point, the CAPM estimates do not
12   change. However, the DCF results I calculate actually increase slightly because El
13   Paso's DCF estimates are below the sample average.[50] The exclusion of El Paso does
14   not affect the risk premium results. Consequently, leaving El Paso in my sample is
15   conservative.

16   **Q27.   Do you agree with Mr. Rothschild's and Mr. O'Donnell's decision to not estimate**
17   **the cost of equity for the gas and water utilities?**

18   A27.   No. The group of natural gas and water utilities I included in my sample are highly
19   regulated and provide insights into the cost of equity for state-regulated utilities.[51]
20   Neither Mr. Rothschild nor Mr. O'Donnell provided an estimate although Mr. Gorman
21   did include such an estimate.

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[48]   *See* Appendix Table No. BV-R21.

[49]   The McCann Testimony did not discuss sample selection.

[50]   See Appendix BV-C pp. 64-65.

[51]   Villadsen Direct Testimony p. 37 shows the percentage of regulated activities for each company included in the sample.

1   **B. CAPM AND ECAPM**

2 **Q28. What do you address in this section?**

3 A28. First, I will briefly reprise my explanation of the CAPM as introduced in my direct

4   testimony. Next, I will discuss the various inputs required and the issues I take with the

5   intervenor witnesses input choices. Finally, I show the downward bias introduced in

6   the intervenor witnesses' implementation of the CAPM through input choices and

7   ignorance of the importance of financial risk.

8 **Q29. Please briefly outline the CAPM and ECAPM**

9 A29. As I explain more thoroughly in my direct testimony, the CAPM is a risk positioning

10   model defined through the following equation:[52]

11 $$r = RFR + \beta \times MRP$$

12   Where:

13   - r is the estimated cost of equity

14   - RFR is the risk free rate

15   - B is the estimated equity beta

16   - and MRP is the market risk premium

17   The intervenor witnesses use largely the same representation but differ in regards to the

18   inputs they select and the interpretation they give to their results.

19   **1. Risk-Free Rate**

20 **Q30. Please summarize the risk-free rate inputs presented by the intervenor witnesses.**

21 A30. The risk free rate inputs are summarized in Figure 7 below.

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[52] Villadsen Direct Testimony p. 39.

Figure 7: Comparison of Risk Free Rate Inputs

	Villadsen (SCE)	Intervenors		
		Gorman (EPUC/TURN)	O'Donnell (FEA)	Rothschild (PAO)
	[1]	[2]	[3]	[4]
Scenario 1	4.40%	2.80%	2.53%	2.12%
Scenario 2	4.15%	-	3.46%	2.20%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Gorman Testimony p. VII-35.
[3]: O'Donnell Testimony p. 52.
[4]: Rothschild Testimony p. 30.

1   Mr. Gorman presents a risk free-rate input of 2.80 percent, which represents Blue Chip
2   Financial Forecasts' projected 30-year Treasury bond yield.[53]

3   Mr. O'Donnell presents two risk-free rate inputs, 2.53 percent and 3.46 percent. These
4   represent the minimum and maximum of the U.S. 30 year Treasury yield over the year
5   leading up to June 30, 2019.[54]

6   Mr. Rothschild uses a risk-free rate input of 2.12 percent, which is the 3-month U.S.
7   Treasury Bond yield as of June 30, 2019.[55] Mr. Rothschild also uses a risk-free rate of
8   2.20 percent, though he does not appear to explain this value.[56]

9   While Dr. McCann does not implement a CAPM, he suggests using a risk-free rate of
10   2.25 percent (grossed up for income tax, which is about 3.1 percent). This risk-free
11   rate is based on the interest rate of the Metropolitan Water District of Southern

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[53] Gorman Testimony p. VII-35. Mr. Gorman does not specify the year this projection represents.

[54] O'Donnell Testimony p. 52.

[55] Rothschild Testimony p. 25. Though Mr. Rothschild does not specify this to be the 3-month, 2.12 is reported as the 3-month yield on June 28th, the last trading day prior to Mr. Rothschild's quoted date. See Daily Treasury Yield Curve Rates, U.S. Department of the Treasury. Accessible at: https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2019

[56] Rothschild Testimony p. 30.

1   California, which, according to Dr. McCann, is the "bellwether utility west of the
2   Mississippi River."[57]

3 **Q31. Do you agree with the intervening witnesses risk free rate inputs?**

4 A31. No. While Mr. Gorman does present a forecasted risk free rate input, he does not take
5   into account the current elevation in yield spreads and thus understates what the risk
6   free rate will likely be going forward. Relative to the yield spread prior to the financial
7   crisis, utility bond yield spreads over U.S. Treasuries of analogous maturities are
8   elevated by between 36 and 46 basis points.[58] As I explain in my direct testimony, this
9   spread can either by attributed to downward pressure on the risk free rate or an elevated
10   market risk premium.[59] By ignoring this, Mr. Gorman has underestimated his risk free
11   rate estimate by at least 20 basis points.[60]

12   While Mr. Gorman at least is using a forecasted risk free rate input, Mr. O'Donnell and
13   Mr. Rothschild present historical values. Since this proceeding concerns rates to be in
14   effect starting in 2020, it is inappropriate to utilize a historical risk free rate estimate.

15   Moreover, Mr. Rothschild's use of the current 3-month U.S. Treasury yield is not only
16   inappropriate because it is not a forecast of what the prevailing risk free rate will be in
17   the time rates will be in effect, but it also is not consistent with a reasonable estimate
18   of the time horizon typically associated with investment in a utility. Mr. Rothschild
19   claims that his choice of a short-term treasury bond is because these "bonds have
20   negligible risk of default, and because their value has a relevantly low exposure to

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[57] McCann Testimony p. 21.

[58] The elevated spread calculated by comparing 15-day average spread through 7/31/2019 to average spread from April 1991 through December 2007. Spreads calculated as difference between 20 year A-rated utility bond and 20 year U.S. Treasury and 20 year BBB-rated utility bond and 20 year U.S. Treasury. Appendix BV-B-8 submitted with my direct testimony shows a similar spread calculation using the 15-day average spread through 12/31/2018 to average spread from April 1991 through December 2007.

[59] Villadsen Direct Testimony pp. 40-41.

[60] The Gorman Testimony p. VII-31 states that the yield spread is lower today than the 39-year average spread, but that fails to consider the before and after the financial crisis spread.

1   swings in the overall market."[61] The first portion of this statement does not differentiate

2   the short-term U.S. government bond from a long-term one and thus is not a sufficient

3   explanation for using the 3-month yield. The latter portion of Mr. Rothschild's

4   explanation for his choice of risk-free rate is simply not relevant in this case. Long-

5   term Treasury bonds are only subject to interest risk, not default risk. Investors are

6   exposed to changes in interest rate only if the investor's horizon does not match the

7   tenor of the bond. Thus, if an investor holds a long-term Treasury bond to maturity,

8   fluctuations in the market in the interim are irrelevant. Since equity has a perpetual life

9   and utilities invest in and operate infrastructure over long horizons, for purposes of

10   deriving a CAPM estimate of the cost of equity in this proceeding, it is appropriate to

11   treat long-term government bond yields as an unbiased estimate of the risk-free rate of

12   return that an investor could achieve (by holding the bond to maturity) over that

13   horizon. The Commission has in past energy decisions stated that "the risk-free rate is

14   based on long-term Treasuries."[62]

15   Lastly, Dr. McCann's suggestion to use a risk-free rate based on a specific "bellwether"

16   entity is misguided because the risk-free rate is that representing the yield on a riskless

17   asset in the U.S. and is not location specific.

18   Notably, the choice of current or historical risk-free rates will downward bias the cost

19   of equity estimates as will Mr. Gorman's choice because he fails to acknowledge the

20   current downward pressure on government bond yields.

21   **Q32. In your opinion, what characterizes a reasonable risk-free interest rate to use in**

22   **the CAPM?**

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[61] Rothschild Testimony p. 25.

[62] Decision 07-12-049, December 20, 2007, p. 16. See also Decision 12-12-034, p .24, where the Commission characterizes the CAPM result as being the sum of a **risk-free bond** and a risk premium. See also An Introduction to Utility Cost of Capital, p. 10 (April 18, 2017) ("The yields on long-term US Treasury yields are used as a proxy for risk-free rate of interest."), available at http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Divis ions/Policy_and_Planning/PPD_Work/PPD_Work_Products_(2014_forward)/PPD-An-Introduction- to-Utility-Cost-of-Capital.pdf

1 A32. I find that a forecasted yield on 20- or 30-year government bonds adjusted for any
2   unusual downward pressure is the most appropriate.

3 **Q33. How has the recent reduction in the Federal Funds Rate by the Federal Reserve**
4   **impacted government long-term bond yields?**

5 A33. The July 31, 2019 reduction in the Federal Funds rate did not appear to have any
6   substantial impact on long-term government bond yields – possibly because the action
7   was already incorporated in bond pricing. As of the time of this rebuttal, I do not have
8   access to an August forecast of the 10-year government bond yield from Blue Chip, but
9   the July forecast was reduced relative to the forecast available at the time of my direct
10   testimony in April. However, there are many uncertainties that could cause the actual
11   and forecasted yield to move up or down before rates go into effect, so I do not update
12   my analysis.

13   **2. Beta**

14 **Q34. Please summarize the betas implemented by the intervening witnesses in this**
15   **proceeding.**

16 A34. Mr. Gorman uses a beta input of 0.70 in his implementation of the CAPM.[63] This
17   estimate represents the "long-term" average of Value Line betas for the companies in
18   his proxy group.[64] Mr. Gorman states that he arrived at this estimate by first considering
19   the average betas of his electric proxy group and his water and gas proxy group.[65] He
20   additionally notes that the betas over the time period for which he has retrieved data
21   from Value Line have generally ranged from 0.60 to 0.75.

22   Mr. O'Donnell presents two betas for estimation of the CAPM for SCE, both the
23   average of his proxy group and the current beta estimate for Edison International (EIX).
24   Like Dr. Vilbert, Dr. Morin, Mr. Gorman, and me, Mr. O'Donnell retrieves these beta

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[63] Gorman Testimony, p. VII-36 (Gorman Exhibit MPG-14, p. 2).
[64] Mr. Gorman calculates this estimate using quarterly reported betas from Q3 2014 – Q2 2019.
[65] Mr. Gorman reports these as being 0.59 and 0.66, respectively.

1   estimates from Value Line. Mr. O'Donnell reports the proxy group average beta as 0.59

2   and the estimate for Edison International as 0.60.[66]

3   Mr. Rothschild calculates his own betas using a weighting of multiple estimation

4   methodologies. Through these methodologies, he arrives at two estimates of beta, his

5   "Hybrid Beta" and his "Forward Beta". He reports these estimates as 0.67 and 0.75

6   respectively.[67] I present a summary of the intervening witnesses' beta estimates in

7   Figure 8 below.

Figure 8: Comparison of Beta Inputs

	Villadsen (SCE)	Intervenors		
		Gorman (EPUC/TURN)	O'Donnell (FEA)	Rothschild (PAO)
	[1]	[2]	[3]	[4]
Beta Estimate / Range	Varies	0.70	0.59 - 0.60	0.67 - 0.75

Sources and Notes:
[1]: Villadsen Direct Testimony. Unlike the intervenors, I estimate for each sample company rather than using a sample average beta.
[2]: Gorman Testimony pp. VII-36-37.
[3]: O'Donnell Testimony p. 52.
[4]: Rothschild Testimony pp. 30.

8   **Q35. Do you agree with the beta estimates used by the intervening witnesses?**

9   A35. I agree with using Value Line betas as a reputable source for estimates of levered beta

10   estimates.[68] However, the three intervenor witnesses all fail to recognize that the Value

11   Line betas (as well as Mr. Rothschild's calculated betas) are levered equity betas that

12   reflect the market value capital structures of the companies for which they are

13   estimated. [69]

14   I also believe Mr. O'Donnell's estimates are downwardly biased relative to what is

15   representative for a utility comparable to SCE. Mr. Gorman, Mr. Rothschild, and I all

16   find an average beta above Mr. O'Donnell's range.

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[66] O'Donnell Testimony, p. 52.

[67] Rothschild Testimony, pp. 28-30.

[68] Mr. Rothschild calculates his own betas but obtain similar results to those from Value Line.

[69] I discuss this issue in Section IV below.

1   **3. Market Risk Premium**

2   **Q36. Please summarize the market risk premia used by the intervening witnesses in this**
3   **proceeding.**

4   A36.   The relied upon estimates for the MRP are presented in Figure 9 below.

Figure 9: Comparison of Market Risk Premium Inputs

	Villadsen (SCE)	Intervenors		
		Gorman (EPUC/TURN)	O'Donnell (FEA)	Rothschild (PAO)
	[1]	[2]	[3]	[4]
Scenario 1	7.07%	6.00%	4.00%	6.99%
Scenario 2	8.07%	8.20%	6.00%	9.47%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Gorman Testimony pp. VII-37-39.
[3]: O'Donnell Testimony p. 52.
[4]: Rothschild Testimony pp. 30.

5   Mr. Gorman presents two estimates for the MRP, 6 percent and 8.2 percent.[70]   The
6   former estimate he bases on Duff and Phelps data and a long run historical average,
7   while the latter he estimates using a combination of Duff and Phelps data and consensus
8   inflation projections. To calculate the historical value (6 percent), Mr. Gorman takes
9   the difference between Duff and Phelps arithmetic average achieved total return on the
10   S&P 500 between 1926 and 2018 (11.9 percent) and the total return on long-term
11   Treasury bonds (5.9 percent). Mr. Gorman's calculates his "forward-looking" estimate
12   using the arithmetic average real market return from 1926 to 2018 (8.8 percent), the
13   Blue Chip Financial Forecasts consensus consumer price index (CPI) projection (2
14   percent), and his estimate of risk free rate (2.8 percent). By applying the consensus
15   inflation projection to the long run average real return estimate, he calculates his
16   expected market return of approximately 11 percent. Last, he subtracts his risk free rate
17   estimate to arrive at a MRP estimate of 8.2 percent.[71]

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[70]   Gorman Testimony, p. VII-37.

[71]   Gorman Testimony p. VII-37. Estimate calculated as follows: $[(1 + 8.8\%) \times (1 + 2\%) - 1] = 10.98\%$;
10.98% - 2.8% = 8.2%

1   Mr. O'Donnell presents various sources to arrive at his MRP estimates of 4 and 6
2   percent. He first shows the geometric and arithmetic mean returns from 1926 to 2016
3   using Ibbotson SBBI data. To calculate this estimate point, he reports the large
4   company stocks return (10 percent and 12 percent for geometric and arithmetic means,
5   respectively), the total return on long-term government bonds (6.0 and 6.3 percent),
6   and purports to calculated the difference between the two. Mr. O'Donnell reports the
7   result of these calculations as a 6 percent estimate using geometric means and 5.7
8   percent using arithmetic means. It is not clear to me how Mr. O'Donnell arrived at his
9   reported value of 6 percent using geometric means when calculating the difference
10   between 10 percent and 6 percent.[72]

11   In addition to presenting long-term historical averages, Mr. O'Donnell lists a variety of
12   numbers sourced from a Morningstar article published in January of 2019. These
13   market return estimates are from a variety of firms and vary greatly. Citing that
14   Vanguard, John Bogle, JP Morgan, and BlackRock forecast returns between 3 percent
15   and 7 percent, Mr. O'Donnell declares that 4 percent to 6 percent is a mid-range
16   estimate.[73] Mr. O'Donnell also cites a survey of CFOs published by Duke University
17   finance professors, reporting 4.42 percent as the current premium. Though all of these
18   values, Mr. O'Donnell ultimately uses MRP inputs of 4 and 6 percent.[74]

19   Finally, Mr. Rothschild uses MRP estimates of 6.99 percent and 9.47 percent. To
20   calculate these values, Mr. Rothschild claims to have used a DCF analysis to estimate
21   the expected return on the S&P 500. He reports having used stock options to estimate
22   growth then arrives at his two estimates by using two growth distribution scenarios.[75]
23   After estimating the expected return on the S&P 500, Mr. Rothschild subtracts his
24   estimate of the current risk free rate (2.12 percent) to arrive at his market risk
25   premiums.[76]

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[72]   O'Donnell Testimony p. 37.
[73]   O'Donnell Testimony p. 38.
[74]   O'Donnell Testimony pp. 38-39.
[75]   Rothschild Testimony pp. 29-30.
[76]   Rothschild workpapers, Schedule ALR 5, page 3.

1   **Q37.**   **Do you agree with the intervenor's estimates of the market risk premium?**

2   A37.   No. I take particular issue with Mr. Gorman and Mr. O'Donnell's estimates of MRP.
3   First, both Mr. Gorman and Mr. O'Donnell arrive at the historical arithmetic MRP
4   using total returns rather than income returns, which is the only part of the return that
5   is truly risk-free. Second, Mr. O'Donnell refers to the geometric MRP, which is simply
6   not a good measure of the forward-looking MRP (which is what is needed in the
7   CAPM).

8   **Q38.**   **Please elaborate on your comment regarding the use of a total return as opposed**
9   **to the income return.**

10   A38.   As Duff & Phelps explains, only the cash payments associated with government bonds
11   are truly risk free on an annual return basis, and therefore these income returns are
12   appropriate for calculating the annual premium received by risky equity investments in
13   excess of the risk-free rate.[77] In contrast, total returns on long-term government bonds
14   include capital appreciation returns resulting from interest rate and currency
15   fluctuations. These returns are uncertain at the time of the investment and can only be
16   realized by selling the bond before maturity. Consequently, only historical income
17   returns accurately reflect the risk free rate of interest expected by investors upon
18   purchasing long term government bonds. In sum, ex-post realized income returns
19   correctly correspond to the ex-ante yields on government bonds that reflect the risk-
20   free rate of return available to market participants.

21   **Q39.**   **Why is the historical geometric MRP not a good measure of the MRP that is**
22   **needed in the CAPM?**

23   A39.   While geometric means are useful for measuring historical performance (in the form of
24   compound annual returns), they are downward biased as estimates of expected future
25   returns. This is because they represent the average of a single ex-post realization of the

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[77]   *Duff & Phelps 2016 Valuation Handbook*, at p. 3-28 to 3-32. See also Leonardo Giacchino and Jonathan Lesser, *Principles of Utility Corporate Finance*, 1st Edition (2011), pp. 234-235.

1   distribution of possible ex-ante expected returns, and as such do not account for year-

2   to-year variation around the expected value. Empirical evidence and academic opinion

3   supports the use of arithmetic averages (when using historical data) or expectations (for

4   forward-looking models) as the most appropriate forecasts of expected returns.[78] The

5   arithmetic mean is the appropriate parameter because it is a better measure of

6   expectations about the future in the statistical sense of a probability-weighted average

7   over possible future returns. As noted by Drs. Brealey, Myers and Allen,

8   If the cost of capital is estimated from historical return or risk premiums,
9   use arithmetic averages, not the compound [geometric] annual rates of
10   return.[79]

11   Other academic texts agree that the geometric average MRP is inappropriate for the

12   purpose of estimating the cost of capital, which is inherently a forward looking

13   measure.[80]   For example, Giacchino & Lesser show that the reliance on a geometric

14   average MRP downward biases the expected MRP.[81]

15   Since the geometric average looks at the compounded growth that has been achieved

16   over a specific time period, it is appropriate when reporting the historical performance

17   of, for example, an investor's 401(k) stocks over the last year. However, for the

18   purpose of determining the cost of equity for SCE, a forward-looking measure is

19   required as it is the expected growth over the next many years, not the performance

20   over the last year or last decade that is of interest. For those reasons, the geometric

21   measure of the MRP considered by Mr. O'Donnell should be ignored.

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[78]   *See* for example, Morin, R.A., *New Regulatory Finance*, Public Utilities Report, Inc., 2006 (Morin 2006), Appendix 4A, which summarizes the theoretical, empirical, practical, and academic evidence on this issue. *See also* 2016 Valuation Handbook, p. 3-29 and footnotes 3.56 and 3.57.

[79]   Richard A. Brealey, Stewart C. Myers, and Franklin Allen, "*Principles of Corporate Finance*," 11th edition, 2014, p. 163.

[80]   See, for example, Morningstar, *Ibbotson SBBI Valuation Yearbook*, 2014, pp. 56-58, Roger A. Morin, *New Regulatory Finance*, Public Utilities Reports 2006, pp. 116-117; Alex Kane, and Alan J. Marcus, *Investments*, 6th Edition, 2005, McGraw-Hill, p. 865, and Stephen A. Ross, Randolph W. Westerfield & Jeffrey Jaffe, Corporate Finance, 10th edition 2013, pp. 158-159.

[81]   Leonardo R. Giacchino and Jonathan A. Lesser, "Principles of Utility Corporate Finance," 2011, pp. 133-134.

1   **Q40.   How about the use of survey data as those Mr. O'Donnell cites[82]?**

2   A40.   As a study by Professor Ibbotson noted:

3   when using this [survey] method, one attempts to obtain the estimates from
4   the market participants themselves. But there are a number of problems with
5   this approach. Most of these investors have no clear opinion about the long-
6   run outlook. Many of them have only very short-term horizons. Individual
7   investors often exhibit extreme optimism or pessimism and make pro-
8   cyclical forecast …(notes omitted) [83]

9   Professor Ibbotson goes on to note the problems with replicability, the determination

10   of the horizon over which the forecast is made, and the very large variation in forecasts

11   among participants. I concur and find for these reasons that surveys lack reliability.

12   Hence, I recommend survey data on the MRP be ignored.

13   **Q41.   Do you have any other comments on the MRP?**

14   A41.   Yes. As noted above in Section II and in my direct testimony,[84] the MRP is not constant

15   over time, so the macroeconomic evidence needs to be examined for me to accurately

16   assess the reasonableness of any given MRP and indications are that the MRP is at least

17   as high as the historical arithmetic average and likely higher.

18   Also, looking to a forecasted MRP, as mentioned in my direct testimony,[85] the

19   forecasted MRP is higher at approximately 9.5 percent[86] as of today.[87]

20   **Q42.   Based on your discussion above, what do you conclude regarding the CAPM**
21   **results obtained by intervenors?**

---

[82]   O'Donnell Testimony, pp. 37-38.

[83]   Roger G. Ibbotson, "The Equity Risk Premium," published in *Rethinking the Equity Risk Premium*, Research Foundation of CFA Institute, December 2011, pp. 18-26.

[84]   Villadsen Direct Testimony, pp. 41-43.

[85]   Villadsen Direct Testimony, p. 23.

[86]   The 9.5 percent was calculated using the method used in FERC's NETO Briefing Order using data as of June 30, 2019 (*See* Exhibit SCE-05, Appendix Table No. BV-R22).

[87]   This is comparable to Mr. Rothschild's second estimate of 9.47 percent (Rothschild Testimony, Table 8, p. 30).

1   A42.   The intervenors' inputs to the model are such that the CAPM results are downward
2   biased. Most notably, a historical risk-free rate or one that fails to take into account the
3   downward pressure the Federal Reserve has put on government bond yields will be too
4   low—hence causing the CAPM-based ROE to be too low. Similarly, Mr. O'Donnell's
5   use of a geometric MRP or survey results will downward bias the CAPM-based ROE
6   results.   Similarly, using total returns rather than income returns in the arithmetic
7   average MRP downward biases the results. To illustrate the impact, I correct Mr.
8   Gorman's risk free rate and market risk premium input estimates and find that Mr.
9   Gorman has downwardly biased his CAPM cost of equity estimates by nearly 1 percent.
10   Specifically, I correct for Mr. Gorman excluding adjustment for downward pressure on
11   the risk free rate and use of total rather than income returns in calculating his low-end
12   estimate of the market risk premium.

Figure 10: Gorman CAPM with Corrected Inputs

		Beta	Risk Free Rate	Market Risk Premium	CAPM Estimate
		[1]	[2]	[3]	[4]
Gorman Estimate	[a]	0.70	2.8%	6.0%	7.0%
Villadsen Input Corrected	[b]	0.70	3.0%	7.1%	7.9%
Downward Bias	**[c] = [a] - [b]**				**-0.9%**

Sources and Notes:
[1] - [4][a]: Gorman Testiomy p. VII-39.
[1][b] = [1][a]
[2][b]: Villadsen Rebuttal Testimony.
[3][b]: Villadsen Direct Testimony.
[4] = [2] + [1] x [3]

13   Like Mr. Gorman, Mr. O'Donnell relies, in part, on the long-term historical difference
14   between arithmetic returns and total rather than income returns for purposes of
15   calculating the MRP. By correcting for this error, I estimate that Mr. O'Donnell has
16   understated his CAPM cost of equity estimates by approximately 0.2 to 2.3%.

Figure 11: O'Donnell CAPM with Corrected Inputs

		Beta	Risk Free Rate	Market Risk Premium	CAPM Estimate
		[1]	[2]	[3]	[4]
O'Donnell					
Scenario 1 (Sample)	[a]	0.59	2.53%	4.00%	4.9%
Scenario 2 (Sample)	[b]	0.59	3.46%	6.00%	7.0%
Scenario 1 (EIX)	[c]	0.60	2.53%	4.00%	4.9%
Scenario 2 (EIX)	[d]	0.60	3.46%	6.00%	7.1%
Villadsen Input Corrected					
Sample	[e]	0.59	3.0%	7.1%	7.2%
EIX	[f]	0.60	3.0%	7.1%	7.2%
Downward Bias					
Scenario 1 (Sample)	[g] = [a] - [e]				**-2.3%**
Scenario 2 (Sample)	[h] = [b] - [e]				**-0.2%**
Scenario 1 (EIX)	[i] = [c] - [f]				**-2.3%**
Scenario 2 (EIX)	[j] = [d] - [f]				**-0.2%**

Sources and Notes:
[1] - [4][a] - [d]: O'Donnell Testimony p. 52.
[1][e] = [1][a] and [1][b]
[1][f] = [1][c] and [1][d]
[2][e] & [f]: Villadsen Rebuttal Testimony.
[3][e] & [f]: Villadsen Direct Testimony.
[4] = [2] + [1] x [3]

1   **4. ECAPM**

2   **Q43. What is the ECAPM?**

3   A43. As I discussed in my direct testimony, the empirical CAPM is a modification to the
4   base CAPM model that take into account the empirical fact that the CAPM tends to
5   underestimate the return on equity for stocks with betas below one and tends to
6   overestimate the return on equity for stocks with betas above one.[88]

7    $$r = (RFR + \alpha) + \beta \times (MRP - \alpha)$$

---

[88]   Villadsen Direct Testimony p. 45.

1   The parameters as same as specified above, with the addition of the "alpha factor",

2   which serves to adjust the model to account for the aforementioned adjustment.

3   **Q44.   Did any of the intervenors implement this model in this proceeding?**

4   A44.   None of the intervenors commenting on the cost of equity for SCE relied on the

5   ECAPM in this proceeding and therefore failed to recognize the empirical fact that the

6   theoretical CAPM results in a security market line that is too steep and an intercept that

7   is too low.[89] That means that the CAPM discussed above determines a cost of equity

8   that is too low for low beta companies and a cost of equity that is too high for high beta

9   companies.

10   **Q45.   What are the implications of not implementing the ECAPM?**

11   A45.   Since the beta estimates for the utilities used as proxies in this proceeding are below

12   one, the failure to consider the ECAPM will downward bias the ROE estimates. I have

13   quantified this downward bias in Figure 12. The figure shows that by ignoring the

14   ECAPM, even with their other flawed input choices the intervenors have

15   underestimated their ROE estimates by around half a percent.

---

[89]   Mr. Knecht implements an ECAPM. However, Mr. Knecht does not comment on SCE's ROE.

Figure 12: ECAPM Model Applied to Intervenor Inputs

Witness		Risk Free Rate	Beta	Market Risk Premium	CAPM Estimate	ECAPM Estimate (alpha = 1.5%)	Downward Bias (alpha = 1.50%)
		[1]	[2]	[3]	[4]	[5]	[6]
Gorman							
Scenario 1	[a]	2.80%	0.70	6.00%	7.0%	7.5%	**-0.4%**
Scenario 2	[b]	2.80%	0.70	8.20%	8.5%	9.0%	**-0.4%**
O'Donnell							
Scenario 1 (Sample)	[c]	2.53%	0.59	4.00%	4.9%	5.5%	**-0.6%**
Scenario 2 (Sample)	[d]	3.46%	0.59	6.00%	7.0%	7.6%	**-0.6%**
Scenario 1 (EIX)	[e]	2.53%	0.60	4.00%	4.9%	5.5%	**-0.6%**
Scenario 2 (EIX)	[f]	3.46%	0.60	6.00%	7.1%	7.7%	**-0.6%**
Rothschild							
Scenario 1	[g]	2.12%	0.67	6.99%	6.8%	7.3%	**-0.5%**
Scenario 2	[h]	2.20%	0.75	9.47%	9.3%	9.7%	**-0.4%**

Sources and Notes:
[1] - [4][a] & [b]: Gorman Testiomy p. VII-39.
[1] - [4][c] - [f]: O'Donnell Testimony p. 52.
[1] - [4][g] & [h]: Rothschild Testimony p. 30.
[5] = ([1] + 1.50%) + [2] x ([3] - 1.50%)
[6] = [4] - [5]

Q46. **How do you respond to Mr. Gorman's statement that it is inappropriate to use the ECAPM in combination with adjusted betas?[90]**

A46. Mr. Gorman is not correct. These are two fundamentally different and complementary adjustments. This can be shown by reference to Figure 13, which illustrates the empirical security market line ("SML"). The adjustment to beta corrects the estimate of the relative risk of the company, which is measured along the horizontal axis of the SML. The ECAPM adjusts the risk-return tradeoff (i.e., the slope) in the SML, which is on the vertical axis. In other words, the expected return (measured on the vertical axis) for a given level of risk (measured on the horizontal axis) is different from the predictions of the theoretical CAPM. Getting the relative risk of the investment correct does not adjust for the slope of the SML, nor does adjusting the slope correct for errors in the estimation of relative risk.

---

[90] Gorman Testimony p. VII-45.

Figure 13: The Empirical Security Market Line
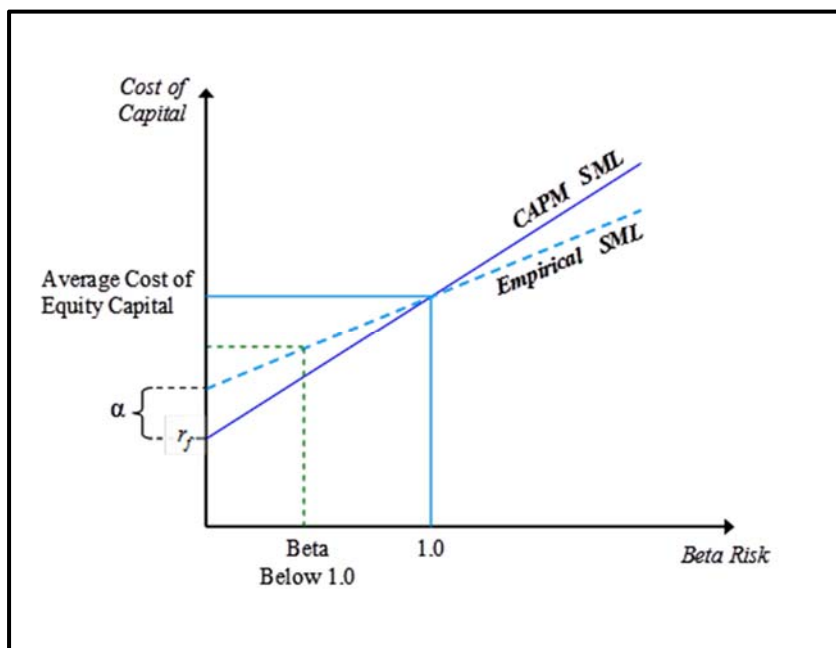
1   Importantly, the Blume adjustment, which has the effect of tilting the Security Market

2   Line as shown in Figure 13, is used to calculate the Value Line's betas that Mr. Gorman,

3   Mr. O'Donnell and I use. The method was developed by Professor Blume.[91] As shown

4   in Professor Blume's paper, it is possible to apply a consistent adjustment procedure to

5   historical betas that increased the accuracy in forecasting realized betas. Essentially,

6   Professor Blume's adjustment transforms a historical beta into a better estimate of

7   expected future beta. It is this expected "true" beta that drives investors' expected

8   returns according to the CAPM.

9   The backward-looking empirical tests of the CAPM that gave rise to the ECAPM did

10   not suffer from bias in the measurement of betas. Researchers plotted realized stock

11   portfolio returns against betas measured *over the same time period* to produce plots

12   such as Figure 14 below, which comes from the 2004 paper by Professors Eugene Fama

13   and Kenneth French.[92] The fact that betas and returns were measured

14   contemporaneously means that the betas used in the tests were *already the best possible*

---

[91]   Blume, Marshall E. (1971), "On the Assessment of Risk," *The Journal of Finance*, 26, p. 1-10.

[92]   Fama, Eugene F. & French, Kenneth R, (2004), "The Capital Asset Pricing Model: Theory and Evidence," *Journal of Economic Perspectives, 18(3),* p. 25-46.

1   *measure* of the "true" systematic risk over the relevant time period. In other words, no

2   adjustments were needed for these betas. Despite this, researchers observed that the

3   risk-return trade-off predicted by the CAPM was too steep to accurately explain the

4   realized returns. As explained above the ECAPM explicitly corrects for this empirical

5   observation.

Figure 14
Evidence from Empirical Tests of the CAPM[93]
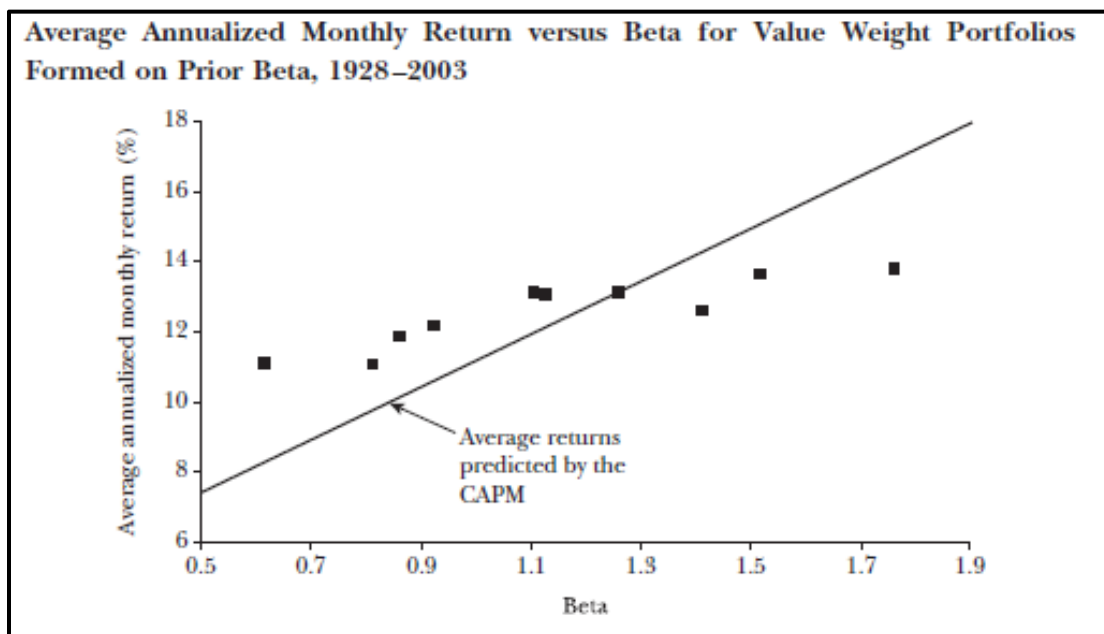
6   **Q47.   Did the empirical tests that gave rise to the ECAPM use raw betas in their**

7   **analyses?**

8   A47.   They did. However, this is simply because the researchers were able to measure raw

9   betas and realized returns from the same historical period. In other words, no

10   adjustment to the raw beta was necessary to evaluate the market return realized for the

11   same historical period – that is different from using betas to determine the cost of equity

12   for future periods. Hence, the raw betas they measured accurately captured the

13   systematic risk that impacted the returns they measured. In a sense, the measured betas

---

[93]   *Ibid.,* p. 33.

1   and realized returns were already contemporaneous in the tests of the CAPM that

2   identified the effect shown in Figures 13 and 14.

3   **Q48. What do you conclude regarding the ECAPM?**

4   A48. For the reasons discussed above, the ECAPM has merit and there is no double-counting

5   in using adjusted betas in the ECAPM. Not only is the ECAPM of merit, but failing to

6   consider the results will downward bias the results by approximately half a percent.

7   **C. RISK PREMIUM**

8   **Q49. Why did you use a risk premium model to estimate SCE's cost of equity?**

9   A49. I believe that investors consider the information that is available to them and certainly

10   allowed ROEs are publicly available. As SCE (and its parent, EIX) needs to compete

11   for capital, it is important that the Company can do so on equal term with other "similar

12   risk" companies. Principally, the risk premium method determines the risk premium

13   over and above a risk-free rate (or a bond yield) that investors in other regulated

14   companies have access to and use the information to derive a cost of equity using the

15   expected / forecasted risk-free rate (or bond yield) at the time rates go into effect. The

16   risk premium model provides information about available returns and I believe such

17   information is considered by investors. Importantly, it is the only model that directly

18   compares the allowed return for regulated utilities to that calculated for SCE.

19   **Q50. Mr. Gorman critiques your regression analysis as "simplistic."[94] How do you**

20   **react?**

21   A50. The criticism focused on my risk premium analysis relying on an inverse relationship

22   between the historically allowed risk premium and interest rates. Mr. Gorman found

23   this "simplistic." While there certainly are more sophisticated methods, the regression

24   analysis is distinctly less "simplistic" than Mr. Gorman's suggestion to use a risk

25   premium of 6.0% and add a forecasted yield of 2.8 percent.[95] It is also worth noting

---

[94] Gorman Testimony, pp. VII-56 to 57.

[95] Gorman Testimony, p. VII-34.

1 that the "simplistic" risk premium model, I used to determine the risk premium, is the
2 same as that used by the Federal Energy Regulatory Commission ("FERC") pursuant
3 to its NETO Briefing Order,[96] which is the most recent FERC order on cost of equity
4 estimation techniques.

5 **Q51. Would any modifications to Mr. Gorman's risk premium model be needed?**

6 A51. Yes. For the reasons discussed above, (i) the risk premium increases as the risk-free
7 rate decrease and (ii) the risk-free rate relied upon by Mr. Gorman is too low.

8 **D. DCF-BASED MODELS**

9 **Q52. What does this section of your rebuttal testimony address?**

10 A52. In this section, I address the discounted cash flow (DCF) model used by the intervenors
11 and respond to criticisms of my implementation of the model. There are three
12 parameters in the DCF model as shown in the constant growth form of the model below.

13
$$r = \frac{D_1}{P_0} + g = \frac{D_0}{P_0} \times (1 + g) + g \qquad\qquad (3)$$

14 Where r = the cost of equity,

15 P_0 = the current market price,

16 D_1 = the next expected dividend, and

17 g = the growth rate of dividends.

18 I first address the estimation of the parameters and whether to implement an annual or
19 quarterly version of the model. Next I address various issues with the alternate versions
20 of the model that are used by intervenors.

---

[96] *Coakley v. Bangor Hydro-Elec. Co.*, 165 FERC ¶ 61,030 (2018) ("NETO Briefing Order").

1 **Q53.** **What are the issues associated with selecting the appropriate period over which**
2 **to determine the current stock price for the model?**

3 A53. Relying upon a single day is not appropriate because market prices can change
4 dramatically in one day as is clear from the recent volatility in the stock market. For
5 example, the S&P 500 Index reached an all-time high on July 26, 2019 and then
6 experienced the largest one-day decline of 2019 on August 14, 2019. Given the recent
7 volatility, using stock prices from a single day may not be representative of investors'
8 expectations necessary to estimate the cost of equity capital.

9 Mr. Gorman uses a very long estimation period, the average stock price over a 13-week
10 period ending June 28, 2019, while Mr. Rothschild uses a single day, June 30, 2019.[97]
11 Too long an estimation period weakens the forward-looking nature of the DCF model,
12 while too short a period fails to eliminate the impact of a single unusual day.

13 Mr. Rothschild recognizes the potential problem of relying upon a single day so he also
14 uses the average of the highest and lowest price per company over the past year.[98]
15 These are two highly questionable choices. The first suffers from being a single day,
16 and the second suffers from being over too long a historical period. The sample
17 companies will pay at least three quarterly dividends over the course of a year, perhaps
18 four. The DCF model is forward looking so averaging prices over a much shorter
19 period is recommended.

20 Mr. O'Donnell states that he uses 12-month ahead dividend yield forecasts from *Value*
21 *Line*.[99] However, his cited dividend yields do not match the yields provided by *Value*
22 *Line.* Moreover, it is not clear how *Value Line* calculates the dividend yield forecast,
23 so this method is not transparent.

24 **Q54.** **Do you agree with using an annual DCF model?**

---

[97] Rothschild Testimony, p. 16. I note that Mr. Rothschild's market data is as of Friday June 28, 2019.
[98] Rothschild Testimony, p. 16.
[99] O'Donnell Testimony, p. 26.

1   A54.   No. The sample companies pay dividends quarterly. As I noted in my direct testimony,
2   there is no reason not to match the estimation period of the DCF model with the actual
3   period that dividends are paid. Mr. Gorman, Mr. Rothschild, and Mr. O'Donnell all
4   use the annual version of the model. There is simply no reason to use an approximation
5   which can be avoided by using a quarterly version of the DCF model.

6   Mr. O'Donnell objects to my calculation of the dividend yield using $(1 + g)$ instead of
7          $(1 + 0.5g)$[100] presumably because he does not recognize that I am using a quarterly DCF
8   model for which the 0.5 approximation is not required.

9   **Q55.**   **Is Mr. Rothschild correct that using a quarterly version of the DCF model would**
10   **lower the model's estimates?[101]**

11   A55.   No. He notes that there are two changes. One is that the forecast annual growth must
12   be converted to a quarterly compound rate which is lower. The second is that dividends
13   are paid earlier in the model. He is correct on both points, but he is incorrect that the
14   result is lower. The quarterly model actually produces a higher ROE estimate for two
15   reasons. First, the need for the approximation is removed. Second, the time value of
16   money benefit from the dividend earlier in time results in a more accurate as well as
17   higher estimate. To be clear, I use the quarterly DCF model because it matches more
18   accurately the actual payment of dividends and removes the need for an approximation
19   as compared to the annual DCF model.

20   **Q56.**   **Do you agree with the growth rate estimates selected by the intervenors?**

21   A56.   No. I disagree with the growth rates used by Mr. O'Donnell and Mr. Rothschild. Mr.
22   O'Donnell determines the growth rate using four different methods, the first method
23   relies on the plowback ratio, the second method relies on historical rates of change and
24   the remaining two methods rely on surveys of forecasted growth rates by Value Line

---

[100]   O'Donnell Testimony, p. 82.
[101]   Rothschild Testimony, pp. 20-21.

1   and CFRA Equity Research.[102] I disagree with and focus my critique on his first two

2   methods. Mr. Gorman relies upon EPS forecasts from financial analysts.[103]

3   **Q57.   Please review the methods to estimate the growth rate of dividends.**

4   A57. Estimating the growth rate of dividends is one of the most challenging and most

5   controversial aspect of implementing the DCF model. There are three ways to estimate

6   the growth rate of dividends per share (DPS): 1) use average historical growth rates, 2)

7   rely on forecasts of earnings per share (EPS) growth rates by financial analysts, and 3)

8   calculate the sustainable growth rate.

9   In the constant growth DCF model, DPS, EPS, and the stock price are all assumed to

10   grow at the same constant rate which also means that the price/earnings and payout

11   ratios are constant. Analysts note that historical or forecast growth rates for these

12   variables are not constant, but all DCF models require an assumption of constant

13   growth at some point in the future.[104]

14   Although the model requires the growth of dividends, financial analysts generally

15   provide only long-term EPS forecasts, but generally for a maximum of five years into

16   the future.

17   The use of historical growth rate is not recommended because historical growth rates

18   would only be applicable if the analyst believed that the future will be exactly like the

19   past. Moreover, financial analysts are well aware of historical data when they provide

20   their forecasts, so the impact of historical data is already included in their forecasts.

21   The third method, sustainable growth is theoretically consistent with the DCF model,

---

[102] O'Donnell Testimony, pp. 48-50.

[103] Gorman Testimony, p. VII-18.

[104] If DPS and EPS are expected to growth at different rates for an extended period, it appropriate to use a multistage model to capture the variability until an assumption of constant growth is warranted.

1   but has a number of weaknesses which means that it is not the resolution to growth rate

2   estimation that Mr. Rothschild seems to think it is.[105]

3   **Q58.   What are the weaknesses with the sustainable growth rate estimate?**

4   A58.   Mr. Rothschild uses the following constant DCF model:[106]

5    $$k = D/P + (br + sv)$$

6   He refers to *(br + sv)* as the "constant sustainable growth" rate where

7   *k* = market cost of equity;

8   *b* = the earnings retention rate;

9   *r* = return on book value of common equity;

10   *s* = the rate of continuous new stock financing; and

11   *v* = the fraction of funds raised by the sale of stock that increases the existing
12   book value of common equity.[107]

13   Mr. Rothschild uses historical information and forecasts from *Value Line* for dividends

14   and book value of equity (also referred to as book value per share, or "BPS") to

15   calculate the market-to-book ratio and dividend yield for each company in the proxy

16   group as of 6/30/2019. These values are used in the calculation of the earnings retention

17   rate *(b)*, which Mr. Rothschild estimates by applying the assumed rate of return on book

18   value of common equity *(r)* to 2018 BPS and comparing to the most recent quarter's

19   dividend level. For his estimates, he bases the return on equity, *r,* on *Value Line* forward

20   looking estimates of expected returns on BPS for 2022-2024. He bases the implied

21   book return on Zacks analyst implied book returns and recent historical earned book

22   returns.[108] Mr. Rothschild sets the return on book value of equity *(r)* equal to 10.50

23   percent,[109] which assumes investors expect the electric sample to be able to earn a

24   return of 10.50 percent on the book value of equity into perpetuity. Yet, he only

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[105]   Rothschild Testimony, p. 19.
[106]   Rothschild Testimony, p. 12.
[107]   Rothschild Testimony, p. 12.
[108]   Rothschild Testimony, p. 18.
[109]   *Ibid.*

1   recommends SCE to be authorized an allowed market ROE of 8.65 percent. I note that

2   the 10.5 percent return on book equity relied upon by Mr. Rothschild is close to the

3   10.6 percent return on equity that I recommend for SCE (at 52 percent equity).

4   **Q59. Must the market cost of equity and return on book value of equity be the same?**

5   A59. No. I am simply pointing out the failure of logic in Mr. Rothschild's analysis. If a

6   utility holding company's assets consisted only of regulated assets[110] and was

7   authorized an allowed ROE of 8.65 percent on its original cost (i.e., book value) rate

8   base, it is not logical to expect the utility to earn a 10.50 percent book return on its

9   equity which Mr. Rothschild used to estimate the sustainable growth rate. Under fair

10   regulation, companies do not expect to earn 201 bps (i.e., 10.50% minus 8.65%) more

11   than their authorized ROE. Mr. Rothschild's "sustainable growth" DCF model reflects

12   a fundamental inconsistency between its assumptions and the application to regulated

13   utilities. Additionally, Mr. Rothschild is relying upon the views of a single *Value Line*

14   analyst for his growth rate estimates. This is unnecessary when there are generally

15   multiple long-term forecasts available from financial analysts.

16   **Q60. Why are forecasts from security analysts the best source of growth rates?**

17   A60. As explained in my direct testimony, Appendix BV-B, pp. BV-B-4 to BV-B-5 along

18   with the references herein, analyst forecasts are attempting to capture the market

19   sentiment of investors and recent studies have not found any bias for stable, regulated

20   companies.

21   Use of historical growth rates is not appropriate because the DCF is a forward-looking

22   model, and the future can be different from the past. Financial analysts are aware of

23   the historical information and consider that information when formulating their

24   forecasts, so including information is redundant and unnecessary.

---

[110] It is not necessary for all of the utility's assets to be regulated, but it is easier to see the point using a
company with 100 percent regulated assets.

1   **Q61.** **Do any other intervenor witnesses use the sustainable growth method to estimate**

2   **dividend growth?**

3   A61. Yes. Mr. O'Donnell uses the sustainable growth method, but he calls it the plowback

4   ratio growth method.[111] Mr. Gorman also references the sustainable growth rate. For

5   the same reasons as above that is not appropriate.

6   **Q62.** **Do you have any other comments on the intervenors' DCF models?**

7   A62. Yes. Mr. Rothschild and Mr. O'Donnell both state that analysts' growth rates are

8   optimistic. I addressed this issue in my direct testimony and shall not repeat the reasons

9   why more recent research finds that this is not the case for stable entities such as

10   regulated utilities.[112]

11   **E. MARKET-TO-BOOK CONSIDERATIONS**

12   **Q63.** **What is the issue with market-to-book ratios?**

13   A63. Several of the intervenors' testimonies claim or imply that a market-to-book (MB) ratio

14   greater than 1.0 is prima facie evidence that regulators have allowed ROEs greater than

15   the cost of capital.[113] The market-to-book ratio is the ratio of the market price of a share

16   of stock to its book value.

17   **Q64.** **What is the basis for an inference that the MB ratio provides evidence regarding**

18   **the relationship between allowed ROEs and the cost of equity?**

19   A64. The inference is based on the concept of present value (PV) for investment decisions.

20   The present value of a stream is payments is calculated as the sum of the discounted

21   values of the payments where the appropriate discount rate is the cost of capital of the

22   payments. An investment is determined to be valuable if the PV of the cash flows from

23   the investment exceed the cost of the investment, resulting in a positive PV.

24   Investments for which the PV of the cash flows exactly equal the required investment

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[111] O'Donnell Testimony, p. 50.

[112] Villadsen Direct, Appendix B, pp. B-4 to B-5.

[113] McCann Testimony, p. 12, Rothschild Testimony, pp. 99-100.

1   are considered to have a net PV (NPV) of zero. An NPV of zero is the minimum for

2   an acceptable investment.

Q65. How does the NPV concept relate to the MB ratio?

A65.   Regulators attempt to set the allowed ROR for regulated companies equal to the cost

of capital so that regulated company investments are expected to have a zero NPV.[114]

The implication is that the value of a regulated company should be equal to the book

value of its investments. If that is not true, i.e., if the market price of equity is greater

than the book value of equity, the intervenors' views are that the explanation is that the

regulators have set the allowed ROE higher than the cost of capital.

Q66. Why is MB ratio not an indication that the allowed ROEs have been set higher than the cost of capital?

A66.   There are many reasons. First, the hypothesis could only be true for a pure play holding

company regulated in such a way as to avoid regulatory lag. A pure play company is

required because the theory only applies to a company whose assets are 100 percent

regulated. Even if all assets are regulated, the allowed ROE could depart from the cost

of capital when rates were set with the passage of time. Second, MB ratios for regulated

companies have exceeded 1.0 for a long time. If the hypothesis were true, regulators

have systematically overestimated the cost of capital for an equally long time, but

regulators say that they are trying to set the allowed ROE equal to the cost of capital.[115]

This means that there must be some other reason why the MB ratios exceed one.

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[114] For example, Professor Stewart C. Myers's paper, "The Application of Finance Theory to Public Utility Rate Cases," *Journal of Economics and Management Science* 3, 1972 pp. 58-97 emphasize that regulation is usually regarded as a substitute for competition. If the definition of "fair return" is based on the theory of competitive markets, then regulation should assure that the average expected rate of return on new utility investment is equal to the utility's cost of capital. That is the ultimate justification for basing rate of return regulation on finance theory and not book values.

[115] The issue of whether the allowed ROE has consistently exceeded the cost of capital was the subject of a "hearing" in June, 2016 under the rubric of "r minus k". See Order Instituting Rulemaking to Create a Consistent Regulatory Framework for the Guidance, Planning, and Evaluation of Integrated Distributed Energy Resources. R.14-10-003 (Filed October 2, 2014).

1   **Q67.   Why do the MB ratios of regulated companies exceed 1.0?**

2   A67.   Unfortunately, the short answer is that no one knows for sure. Economists currently

3   do not have a good model that can explain the "level" of stock prices even though

4   markets are exceptionally good at getting relative prices correct. We know that relative

5   prices are correct because arbitrage prevents them from diverging too far. Arbitrage

6   profits stem from mispricing in which identical assets have different prices. In that

7   situation, the investor can sell the higher price asset and replace it with the lower priced

8   asset and have a riskless profit. The concept extends to similar assets with different

9   prices. As a result, relative mispricing in liquid capital markets is quickly corrected.

10   The level of the stock market, i.e., how high or low prices are can change very quickly

11   as anyone observing the market knows. The present value model of stock prices has a

12   difficult time explaining the sudden changes in the level of prices observed in the past.

13   It is much more likely that prices of all companies in the market rise and fall more or

14   less together. Of course, some companies change quite differently than the rest of the

15   market, but in general the prices of most companies change similarly. In a rising

16   market, prices of most stocks are increasing, including utilities irrespective of the book

17   value of the utility companies.

18   **Q68.   Do any of the intervenors rely upon MB ratio information to inform their estimate**

19   **of the cost of capital?**

20   A68.   Yes. Dr. McCann makes an incorrect assertion in this regard. He says that the

21   "Commission generally is targeting to set the ROE so that the book and market values

22   of the utility company are roughly comparable."[116] This is not true. The Commission

23   attempts to set the allowed ROE equal to the cost of capital, as do all regulators, so as

24   to meet the standards specified by the Supreme Court.[117] Moreover, it is well known

25   that any attempt at targeting the MB ratio is circular. If investors believed that the

26   Commission was attempting to target a MB ratio of 1.0, the ratio would not deviate

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[116]   McCann Testimony, p. 5.

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

1   from 1.0 because investors would know that the Commission would alter the allowed

2   ROE if it did deviate. Under that policy, the MB would provide no information about

3   the relationship between the allowed ROE and the cost of capital.

4 **Q69. Is Dr. McCann's implied market return on equity a relevant measure of the cost**

5   **of capital?**

6 A69. No. Dr. McCann calculates what he calls the "implied market return on equity" which

7   is the ratio of the book value of equity to the market value of equity times the allowed

8   ROE.[118] From an investor's point of view, this is a meaningless calculation because an

9   investor's market return is the sum of dividends received plus capital gain on the stock

10   not the implied market ROE. When the MB ratio exceeds 1.0, the implied market

11   return on equity will always be less than the allowed ROE. As an example of how

12   unhelpful Dr. McCann's implied market return is, consider Figure 2 (p. 10) in which

13   he shows that PG&E implied market return is more than 14 percent upon bankruptcy.

14   Investors certainly did not receive a positive 14 percent return upon PG&E's

15   bankruptcy.

16 **Q70. What implication does Dr. McCann draw from his calculations of the implied**

17   **market ROE?**

18 A70. Dr. McCann then claims that "When the (implied) market ROE is below the authorized

19   ROE that means that investors are willing to pay a premium relative to the book value

20   of the utility-that the company is attractive to investors and its market value is greater

21   than its book value. A regulatory commission only needs to allow the market return

22   rate to attract sufficient investment to cover the book value."[119] This is not correct and

23   is really another way of saying that if the MB ratio is greater than 1.0, the allowed ROE

24   exceeds the market cost of capital.

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[118] McCann Testimony, p. 9. See also McCann-Cost of Capital dataset.xlsx on the summary tab.

[119] McCann Testimony, p. 11.

1 The implication of Dr. McCann's claim is that "[U]sing this data, the average ROE

2 from the basket of comparison utilities should be adjusted downward from 9.9% to

3 5.0%. This would bring the ROE to the same market par value that was used to set the

4 cost of capital in 2012."[120] The uselessness of these calculations is demonstrated by

5 the assertion that 5.0 percent is the appropriate, risk adjusted return for electric utilities.

6 A 5 percent allowed ROE is only marginally greater than the cost of BBB-rated utility

7 debt and well below the average of allowed ROEs in other jurisdictions. Such a return

8 would fail to meet the comparable earnings, capital attraction, and financial integrity

9 standards of the Supreme Court.

10 In summary, Dr. McCann's implied market ROE is meaningless in setting the allowed

11 ROE. Analysts use market data to estimate the cost of capital for the companies. Use

12 of a MB ratio to calculate an implied market ROE has no place in cost of capital

13 calculations. Dr. McCann's testimony on this point should be disregarded.

14 **Q71. How about Mr. Rothschild's claim that if the market-to-book is above one, the**

15 **utility is earning more than its cost of equity[121]?**

16 A71. For the same reasons as discussed above in relation to Dr. McCann's testimony this is

17 an incorrect statement.

18 **V. OTHER COMMENTS**

19 **Q72. What do you address in this section?**

20 A72. I discuss issues in the intervenor testimonies directed at my direct testimony and not

21 discussed above. The fact that I do not necessarily address any and all comments, does

22 not mean that I agree.

---

[120] McCann Testimony, p. 14.

[121] Rothschild Testimony, pp. 99-100.

1   **Q73.**   **Mr. O'Donnell says that you do "not offer any specific reasons for relying solely**
2   **on forecasted growth rates."[122] How do you respond?**

3   A73.   With due respect, I refer Mr. O'Donnell to Appendix B, Section C of my Direct
4   Testimony, where I discuss the literature on forecasted growth rates and conclude that
5   literature suggests the growth rate bias tends to exist on stocks that have characteristics
6   not applicable to utilities.[123]

7   **Q74.**   **Mr. Gorman says that the Michigan PSC has rejected your ATWACC.[124] Would**
8   **you like to comment?**

9   A74.   Yes. First, the Michigan PSC cannot have rejected "Dr. Villadsen's application of the
10   ATWACC"[125] as the only cost of capital testimony, I have filed before the Michigan
11   PSC, was filed on July 8, 2019.[126] The Michigan PSC has yet to consider that evidence.
12   Second, a careful read or search of my Direct Testimony would reveal that the upper
13   end of my recommendation for SCE in this matter was based on the results that are
14   calculated using the Hamada approach to take financial leverage into account (not an
15   ATWACC).[127]

16   **Q75.**   **Mr. O'Donnell refers to your testimony in Oregon and states that your "interest**
17   **rate forecast for 2019 has been well in excess of actual 20-year US Treasury yields.**
18   **A Commission that followed Dr. Villadsen's recommendation last year would**
19   **have grossly overestimated the ROE …"[128] Do you have a response?**

20   A75.   Yes. First, one observation is far from sufficient to draw the conclusion that forecasts
21   have no merit. The issue of interest rate forecasts is discussed at length in Section III.C

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[122] O'Donnell Testimony, p. 82.

[123] Villadsen Direct, Appendix BV-B, p. BV-B-4.

[124] Gorman Testimony, p. VII-49.

[125] *Ibid.*

[126] Villadsen Direct, Appendix A contains a full list of testimonies as of April 2019. Dr. Villadsen filed testimony in Michigan PSC Docket U-20561 on July 8, 2019.

[127] Compare Villadsen Direct Testimony Figures 15 and 20.

[128] O'Donnell Testimony, p. 85.

1   above. More importantly, however, I consistently rely on a forecasted interest rate for

2   the period rates will be in effect (if available). Second, California has an annual

3   adjustment mechanism that adjust the ROE upward or downward depending on interest

4   rates. Consequently, any large over or under estimation of the ROE due to interest rates

5   will be short-lived.

6   **Q76.** **Mr. Gorman reference Regulatory Research Associates ("RRA") ratings of**

7   **regulatory jurisdictions and states that California is "one of the most cost**

8   **supportive regulatory environments for a utility to operate in across the**

9   **country."[129] Do you agree?**

10 A76. No. Mr. Gorman is referencing RRA regulatory ratings of state commissions.[130] The

11 cited RRA publications, as Mr. Gorman states, rates California Average / 1; which was

12 established with a downgrade in January 2019.[131] While the publication concludes that

13 "California regulation of energy utilities is *relatively constructive* from an investor

14 viewpoint in recent years" based on its past decisions, RRA also notes that

15 While the wildfire legislation mitigates some of the future wildfire risk, the
16 failure to address the inverse condemnation doctrine and move away from
17 a strict liability standard continues to *pose higher-than-average risks for*
18 *investors* in all of the state' utilities.[132] [emphasis added]

19 Thus, California may be relatively constructive from an investor perspective, but I do

20 not see these comments as indicating it being "one of the most cost supportive

21 regulatory environments for a utility to operate in across the country."

22 **Q77.** **Are the benchmarks cited by Mr. Rothschild regarding the expected return in the**

23 **U.S. stock market[133] relevant for the determination of SCE's cost of equity?**

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[129] Gorman Testimony, p. IV-11.

[130] S&P Global Market Intelligence: "RRA Regulatory Focus: State Regulatory Evaluations – Energy," May 9, 2019.

[131] SNL: Commission Profiles – assessed August 10, 2019.

[132] *Ibid*.

[133] Rothschild Testimony, p. 7.

1 A77. No. Mr. Rothschild quotes long-term market returns from Charles Schwab (and J.P.
2   Morgan) and use that as one reason SCE's requested ROE is above expectations.[134]
3   Based on the report from Charles Schwab it is not clear what is being reported: (i) the
4   equity return and if so at what capitals structure? (ii) the overall rate of return for a
5   weighted average of debt and equity? Or (iii) something else.

6 **Q78. Do you have any comments on Mr. Gorman's statement that electric utilities**
7   **credit quality has improved since 2008?**

8 A78. Yes. Two comments. I agree that credit quality has improved over the last decade, but
9   not over the past year. First, it appears that Mr. Gorman leaves out PG&E in his Table
10   7 as there are no companies below BBB- (as of year-end 2018, PG&E was rated by
11   S&P). Second, looking closely at Gorman's Table 7, the percentage of electric utilities
12   at in the A range or higher has declined from 40 to 35 percent, while those one notch
13   away from non-investment grade or below investment grade has increased slightly.
14   Thus, more recently the electric utility industry has not seen an improvement in credit
15   ratings.[135]

16 **Q79. Does the fact that you have not responded to any and all criticism imply that you**
17   **agree?**

18 A79. No.

19 **Q80. Does the complete your rebuttal testimony?**

20 A80. Yes.

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[134] *Ibid.*

[135] Additionally, I note that NW Natural and Vectren were downgraded during the past year.

Appendix A

Tables BV-R1 through BV-R23

Table No. BV-R1

Index to Rebuttal Tables of Dr. Villadsen

Table No.	Table Name
Table No. BV-R1	Index to Rebuttal Tables of Dr. Villadsen
Table No. BV-R2	Summary and Comparison of Recommendations
Table No. BV-R3	Proxy Group Comparison
Table No. BV-R4	Market Value Capital Structure
Table No. BV-R5	Risk Free Rate Comparison
Table No. BV-R6	Beta Comparison
Table No. BV-R7	Market Risk Premium Comparison
Table No. BV-R8	Calculation of Projected Risk Free Rate
Table No. BV-R9	Gorman CAPM with Corrected Inputs
Table No. BV-R10	O'Donnell CAPM with Corrected Inputs
Table No. BV-R11	ECAPM Model Applied to Intervenor Inputs
Table No. BV-R12	Market Value Equity Ratio Summary - Intervenor Samples
Table No. BV-R13	Hamada Adjustment to Obtain Unlevered Asset Beta
Table No. BV-R14	Relevered Beta at SCE's Proposed Capital Structure
Table No. BV-R15	Intervenor Downward CAPM Bias due to Failure to Consider Financial Leverage
Table No. BV-R16	Utility Yield Mapping
Table No. BV-R17	Utility Bond Yields
Table No. BV-R18	Financial Risk Adjustment to Intervenor DCF Estimates (1)
Table No. BV-R19	Financial Risk Adjustment to Intervenor DCF Estimates (2)
Table No. BV-R20	Intervenor Downward DCF Bias due to Failure to Consider Financial Leverage
Table No. BV-R21	Natural Gas Sample Credit Metrics
Table No. BV-R22	NETO MRP Summary
Table No. BV-R23	Estimation of S&P 500 Cost of Equity - DDM

Table No. BV-R2

Summary and Comparison of Recommendations

Witness		Recommended ROE	Recommended Equity Ratio
Gorman (EPUC/TURN)	[a]	9.0% + 0.65%	50%
Rothschild (PAO)	[b]	8.65%	48%
O'Donnell (FEA)	[c]	9.75%	52%
McCann (EDF)	[d]	No Increase	n/a
Villadsen (SCE)	[e]	10.60%	52%

Sources and Notes:

[a]: Gorman Testimony pp. VII-39 and VII-10, respectively. 0.65% is wildfire risk adder, see Gorman Testimony p. VII-1.

[b]: Rothschild Testimony p. 5.

[c]: O'Donnell Testimony p. 54.

[d]: McCann Testimony p. 1.

[e]: Villadsen Direct Testimony.

| Sample / Company | Ticker | Villadsen (SCE) | Intervenors | | |
			Gorman (EPUC/TURN)	O'Donnell (FEA)	Rothschild (PAO)
		[1]	[2]	[3]	[4]
Electric					
ALLETE	ALE	X	X	X	X
Alliant Energy	LNT	X	X	X	X
Amer. Elec. Power	AEP	X	X	X	X
Ameren Corp.	AEE	X	X	X	X
CMS Energy Corp.	CMS	X	X	X	X
DTE Energy	DTE	X	X	X	X
Entergy Corp.	ETR	X	X	X	X
MGE Energy	MGEE	X	X	X	X
OGE Energy	OGE	X	X	X	X
Otter Tail Corp.	OTTR	X	X	X	X
WEC Energy Group	WEC	X	X	X	X
AVANGRID Inc.	AGR	X		X	X
Consol. Edison	ED	X	X	X	X
Duke Energy	DUK	X	X	X	X
Eversource Energy	ES	X	X	X	X
FirstEnergy Corp.	FE	X	X	X	X
NextEra Energy	NEE	X	X	X	X
PPL Corp.	PPL	X	X	X	X
Public Serv. Enterprise	PEG	X	X	X	X
Southern Co.	SO	X	X	X	X
Unitil Corp.	UTL	X			X
Edison Int'l	EIX				X
El Paso Electric	EE	X		X	X
IDACORP Inc.	IDA	X	X	X	X
NorthWestern Corp.	NWE	X	X	X	X
Pinnacle West Capital	PNW	X	X	X	X
PNM Resources	PNM	X	X	X	X
Portland General	POR	X	X	X	X

Table No. BV-R3

Proxy Group Comparison

Sample / Company	Ticker	Villadsen (SCE)	Intervenors		
			Gorman (EPUC/TURN)	O'Donnell (FEA)	Rothschild (PAO)
		[1]	[2]	[3]	[4]
Xcel Energy Inc.	XEL	X	X	X	X
Natural Gas					
Atmos Energy	ATO	X	X		
Chesapeake Utilities	CPK	X			
NiSource Inc.	NI	X	X		
Northwest Natural	NWN	X	X		
ONE Gas Inc.	OGS	X	X		
Southwest Gas	SWX	X	X		
Spire Inc.	SR	X	X		
Water					
Amer. States Water	AWR	X	X		
Amer. Water Works	AWK	X	X		
Middlesex Water	MSEX	X	X		
York Water Co. (The)	YORW	X	X		

Sources and Notes:

[1]: Villadsen Direct Testimony.

[2]: Gorman Testimony p. VII-14.

[3]: O'Donnell Testimony p. 17. Mr. O'Donnell also estimates the cost of equity for EIX, but does so separately.

[4]: Rothschild Testimony p. 9.

Table No. BV-R4

Market Value Capital Structure

Sample / Company	Ticker	Equity (%)	Preferred Equity (%)	Debt (%)	S&P Credit Rating
		[1]	[2]	[3]	[4]
Electric					
ALLETE	ALE	64.0%	0.0%	36.0%	BBB+
Alliant Energy	LNT	60.9%	1.7%	37.3%	A-
Amer. Elec. Power	AEP	56.8%	0.0%	43.2%	A-
Ameren Corp.	AEE	59.6%	0.0%	40.4%	BBB+
CMS Energy Corp.	CMS	50.9%	0.0%	49.1%	BBB+
DTE Energy	DTE	60.0%	0.0%	40.0%	BBB+
Entergy Corp.	ETR	47.8%	0.9%	51.4%	BBB+
MGE Energy	MGEE	78.8%	0.0%	21.2%	AA-
OGE Energy	OGE	69.6%	0.0%	30.4%	BBB+
Otter Tail Corp.	OTTR	68.5%	0.0%	31.5%	BBB
WEC Energy Group	WEC	64.7%	0.2%	35.1%	A-
AVANGRID Inc.	AGR	70.2%	0.0%	29.8%	BBB+
Consol. Edison	ED	58.0%	0.0%	42.0%	A-
Duke Energy	DUK	52.6%	0.0%	47.4%	A-
Eversource Energy	ES	60.6%	0.6%	38.8%	A+
FirstEnergy Corp.	FE	39.5%	0.0%	60.5%	BBB
NextEra Energy	NEE	61.6%	0.0%	38.4%	A-
PPL Corp.	PPL	48.9%	0.0%	51.1%	A-
Public Serv. Enterprise	PEG	64.9%	0.0%	35.1%	BBB+
Southern Co.	SO	54.9%	1.1%	44.0%	A-
Unitil Corp.	UTL	56.9%	0.0%	43.1%	BBB+
Edison Int'l	EIX	57.3%	5.7%	37.0%	BBB
El Paso Electric	EE	57.3%	0.0%	42.7%	BBB
IDACORP Inc.	IDA	65.4%	0.0%	34.6%	BBB
NorthWestern Corp.	NWE	57.6%	0.0%	42.4%	BBB
Pinnacle West Capital	PNW	63.5%	0.0%	36.5%	A-
PNM Resources	PNM	50.8%	0.2%	49.0%	BBB+

Table No. BV-R4

Market Value Capital Structure

Sample / Company	Ticker	Equity (%)	Preferred Equity (%)	Debt (%)	S&P Credit Rating
		[1]	[2]	[3]	[4]
Portland General	POR	56.2%	0.0%	43.8%	BBB+
Xcel Energy Inc.	XEL	56.6%	0.0%	43.4%	A-
Natural Gas					
Atmos Energy	ATO	65.5%	0.0%	34.5%	A
Chesapeake Utilities	CPK	72.9%	0.0%	27.1%	-
NiSource Inc.	NI	42.2%	0.2%	57.6%	BBB+
Northwest Natural	NWN	63.1%	0.0%	36.9%	-
ONE Gas Inc.	OGS	69.6%	0.0%	30.4%	A
Southwest Gas	SWX	62.9%	0.0%	37.1%	BBB+
Spire Inc.	SR	54.5%	0.0%	45.5%	A-
Water					
Amer. States Water	AWR	77.3%	0.0%	22.7%	A+
Amer. Water Works	AWK	60.0%	0.0%	40.0%	A
Middlesex Water	MSEX	74.2%	0.4%	25.4%	A
York Water Co. (The)	YORW	76.3%	0.0%	23.7%	A-

Sources and Notes:

[1] - [3]: Schedule No. BV-4, Villadsen Direct Testimony.

[4]: Bloomberg as of 6/30/2019. Bloomberg does not report a credit rating for CPK or NWN. For CPK explanation, see Villadsen Rebuttal. NWN was recently downgraded to Baa1 by Moodys.

Table No. BV-R5

Risk Free Rate Comparison

	Villadsen (SCE)	Intervenors		
		Gorman (EPUC/TURN)	O'Donnell (FEA)	Rothschild (PAO)
	[1]	[2]	[3]	[4]
Scenario 1	4.40%	2.80%	2.53%	2.12%
Scenario 2	4.15%	-	3.46%	2.20%

Sources and Notes:

[1]: Villadsen Direct Testimony.

[2]: Gorman Testimony p. VII-35.

[3]: O'Donnell Testimony p. 52.

[4]: Rothschild Testimony p. 30.

Table No. BV-R6

Beta Comparison

	Villadsen (SCE)	Intervenors		
		Gorman (EPUC/TURN)	O'Donnell (FEA)	Rothschild (PAO)
	[1]	[2]	[3]	[4]
Beta Estimate / Range	Varies	0.70	0.59 - 0.60	0.67 - 0.75

Sources and Notes:

[1]: Villadsen Direct Testimony. Unlike the intervenors, I estimate for each sample company rather than using a sample average beta.

[2]: Gorman Testimony pp. VII-36-37.

[3]: O'Donnell Testimony p. 52.

[4]: Rothschild Testimony pp. 30.

Table No. BV-R7

Market Risk Premium Comparison

	Villadsen (SCE)	Intervenors		
		Gorman (EPUC/TURN)	O'Donnell (FEA)	Rothschild (PAO)
	[1]	[2]	[3]	[4]
Scenario 1	7.07%	6.00%	4.00%	6.99%
Scenario 2	8.07%	8.20%	6.00%	9.47%

Sources and Notes:

[1]: Villadsen Direct Testimony.

[2]: Gorman Testimony pp. VII-37-39.

[3]: O'Donnell Testimony p. 52.

[4]: Rothschild Testimony pp. 30.

Table No. BV-R8

Calculation of Projected Risk Free Rate

Projection for 10 year U.S. Gov't Bond	[a]	2.3%
Maturity Premium	[b]	0.5%
Utility Bond Yield Spread Adjustment	[c]	0.2%
Risk Free Rate (20 year maturity)	[d] = SUM([a]:[c])	3.0%

Sources and Notes:

[a]: Blue Chip Economic Indicators July 2019 forecast for 2020, 10-year U.S. Treasury.

[b]: Long-run average maturity premium of 20 over 10 year U.S. Treasuries.

[c]: Estimated utility bond yield spread adjustment.

Table No. BV-R9

Gorman CAPM with Corrected Inputs

		Beta	Risk Free Rate	Market Risk Premium	CAPM Estimate
		[1]	[2]	[3]	[4]
Gorman Estimate	[a]	0.70	2.8%	6.0%	7.0%
Villadsen Input Corrected	[b]	0.70	3.0%	7.1%	7.9%
Downward Bias	**[c] = [a] - [b]**				**-0.9%**

Sources and Notes:

[1] - [4][a]: Gorman Testiomy p. VII-39.

[1][b] = [1][a]

[2][b]: Villadsen Rebuttal Testimony.

[3][b]: Villadsen Direct Testimony.

[4] = [2] + [1] x [3]

Table No. BV-R10

O'Donnell CAPM with Corrected Inputs

		Beta	Risk Free Rate	Market Risk Premium	CAPM Estimate
		[1]	[2]	[3]	[4]
O'Donnell					
Scenario 1 (Sample)	[a]	0.59	2.53%	4.00%	4.9%
Scenario 2 (Sample)	[b]	0.59	3.46%	6.00%	7.0%
Scenario 1 (EIX)	[c]	0.60	2.53%	4.00%	4.9%
Scenario 2 (EIX)	[d]	0.60	3.46%	6.00%	7.1%
Villadsen Input Corrected					
Sample	[e]	0.59	3.0%	7.1%	7.2%
EIX	[f]	0.60	3.0%	7.1%	7.2%
Downward Bias					
Scenario 1 (Sample)	[g] = [a] - [e]				**-2.3%**
Scenario 2 (Sample)	[h] = [b] - [e]				**-0.2%**
Scenario 1 (EIX)	[i] = [c] - [f]				**-2.3%**
Scenario 2 (EIX)	[j] = [d] - [f]				**-0.2%**

Sources and Notes:

[1] - [4][a] - [d]: O'Donnell Testimony p. 52.

[1][e] = [1][a] and [1][b]

[1][f] = [1][c] and [1][d]

[2][e] & [f]: Villadsen Rebuttal Testimony.

[3][e] & [f]: Villadsen Direct Testimony.

[4] = [2] + [1] x [3]

Table No. BV-R11

ECAPM Model Applied to Intervenor Inputs

Witness		Risk Free Rate	Beta	Market Risk Premium	CAPM Estimate	ECAPM Estimate (alpha = 1.5%)	Downward Bias (alpha = 1.50%)
		[1]	[2]	[3]	[4]	[5]	[6]
Gorman							
Scenario 1	[a]	2.80%	0.70	6.00%	7.0%	7.5%	**-0.4%**
Scenario 2	[b]	2.80%	0.70	8.20%	8.5%	9.0%	**-0.4%**
O'Donnell							
Scenario 1 (Sample)	[c]	2.53%	0.59	4.00%	4.9%	5.5%	**-0.6%**
Scenario 2 (Sample)	[d]	3.46%	0.59	6.00%	7.0%	7.6%	**-0.6%**
Scenario 1 (EIX)	[e]	2.53%	0.60	4.00%	4.9%	5.5%	**-0.6%**
Scenario 2 (EIX)	[f]	3.46%	0.60	6.00%	7.1%	7.7%	**-0.6%**
Rothschild							
Scenario 1	[g]	2.12%	0.67	6.99%	6.8%	7.3%	**-0.5%**
Scenario 2	[h]	2.20%	0.75	9.47%	9.3%	9.7%	**-0.4%**

Sources and Notes:

[1] - [4][a] & [b]: Gorman Testiomy p. VII-39.

[1] - [4][c] - [f]: O'Donnell Testimony p. 52.

[1] - [4][g] & [h]: Rothschild Testimony p. 30.

[5] = ([1] + 1.50%) + [2] x ([3] - 1.50%)

[6] = [4] - [5]

Table No. BV-R12

Market Value Equity Ratio Summary - Intervenor Samples

Witness		Equity (%)	Preferred Equity (%)	Debt (%)
		[1]	[2]	[3]
Gorman				
Overall	[a]	60.5%	0.2%	39.3%
Electric	[b]	58.9%	0.2%	40.9%
Water/Gas	[c]	64.6%	0.1%	35.4%
O'Donnell				
Sample	[d]	59.3%	0.2%	40.6%
Edison Int'l	[e]	57.3%	5.7%	37.0%
Rothschild	[f]	59.1%	0.4%	40.5%

Sources and Notes:

* Calculated as average market value capital structures based on samples presented by the respective intervenors. See Table No. BV-R3: Proxy Group Comparison and Table No. BV-R4: Market Value Capital Structure, respectively.

Table No. BV-R13

Hamada Adjustment to Obtain Unlevered Asset Beta

Witness		Sample Equity Beta	S&P Rating	Debt Beta	Equity Ratio (%)	Preferred Equity Ratio (%)	Debt Ratio (%)	Tax Rate (%)	Asset Beta (without Taxes)	Asset Beta (with Taxes)
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Gorman	[a]	0.70	BBB	0.10	60.5%	0.2%	39.3%	28.0%	0.46	0.51
O'Donnell										
Sample	[b]	0.59	BBB	0.10	59.3%	0.2%	40.6%	28.0%	0.39	0.43
Edison Int'l	[c]	0.60	BBB	0.10	57.3%	5.7%	37.0%	28.0%	0.39	0.42
Rothschild										
Scenario 1	[d]	0.67	BBB	0.10	59.1%	0.4%	40.5%	28.0%	0.44	0.48
Scenario 2	[e]	0.75	BBB	0.10	59.1%	0.4%	40.5%	28.0%	0.48	0.53

Sources and Notes:

[1]: See Table No. BV-R6: Beta Comparison.

[2]: Approximate median S&P Credit Rating of the respective intervenor samples as of 6/30/2019.

[3]: Villadsen Direct Testimony.

[4] - [6]: See Table No. BV-R12: Market Value Equity Ratio Summary - Intervenor Samples.

[7]: Combined state and federal tax rate.

[8] = [1] x [4] + [3] x ([5] + [6])

[9] = [[1] x [4] + [3] x ([5] + [6] x (1 - [7])] / [[4] + [5] + [6] x (1 - [7])]

Table No. BV-R14

Relevered Beta at SCE's Proposed Capital Structure

Witness		Asset Beta (without Taxes)	Asset Beta (with Taxes)	SCE S&P Rating	Assumed Debt Beta	SCE Regulatory Equity Ratio (%)	Tax Rate (%)	Estimated Equity Beta (without Taxes)	Estimated Equity Beta (with Taxes)
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Gorman	[a]	0.46	0.51	BBB	0.10	52.0%	28.0%	0.80	0.78
O'Donnell									
Sample	[b]	0.39	0.43	BBB	0.10	52.0%	28.0%	0.66	0.65
Edison Int'l	[c]	0.39	0.42	BBB	0.10	52.0%	28.0%	0.65	0.63
Rothschild									
Scenario 1	[d]	0.44	0.48	BBB	0.10	52.0%	28.0%	0.75	0.73
Scenario 2	[e]	0.48	0.53	BBB	0.10	52.0%	28.0%	0.84	0.82

Sources and Notes:

[1] - [2]: Table No. BV-R13: Hamada Adjustment to Obtain Unlevered Asset Beta.

[3]: Assumed credit rating of SCE.

[4]: Villadsen Direct.

[5]: Provided by SCE.

[6]: Combined state and federal tax rate.

[7] = [1] + (1 - [5]) / [5] x ([1] - [4])

[8] = [2] + (1 - [5]) x (1 - [6]) / [5] x ([2] - [4])

Table No. BV-R15

Intervenor Downward CAPM Bias due to Failure to Consider Financial Leverage

Witness		Sample Equity Beta	Estimated Beta (without Taxes) Re-levered at (52%)	Estimated Beta (with Taxes) Re-levered at (52%)	Beta Downward Bias	Downward Bias on CAPM Estimate
		[1]	[2]	[3]	[4]	[5]
Gorman	[a]	0.70	0.80	0.78	**0.08 - 0.10**	**0.6% - 0.7%**
O'Donnell						
Sample	[b]	0.59	0.66	0.65	**0.06 - 0.07**	**0.4% - 0.5%**
Edison Int'l	[c]	0.60	0.65	0.63	**0.03 - 0.05**	**0.2% - 0.4%**
Rothschild						
Scenario 1	[d]	0.67	0.75	0.73	**0.06 - 0.08**	**0.4% - 0.6%**
Scenario 2	[e]	0.75	0.84	0.82	**0.07 - 0.09**	**0.5% - 0.6%**

Sources and Notes:

[1][a]: Gorman Testimony p. VII-39.

[1][b] & [c]: O'Donnell Testimony p. 52.

[1][d] & [e]: Rothschild Testimony p. 30.

[2] - [3]: See Table No. BV-R14. Estimated using standard textbook techniques as cited in direct testimony.

[4]: [2] & [3] - [1]

[5]: Result of multiplying [4] by a market risk premium estimate of 7.07%.

Table No. BV-R16

Utility Yield Mapping

Rating		Bond Yield
A	[a]	3.76%
BBB	[b]	4.16%

[a] - [b]: Bloomberg LP as of 6/30/2019. 15-day average yield.

Table No. BV-R17

Utility Bond Yields

Data Point	Date	A Rated Utility	BBB Rated Utility
1	6/10/2019	3.86	4.26
2	6/11/2019	3.86	4.27
3	6/12/2019	3.84	4.25
4	6/13/2019	3.83	4.22
5	6/14/2019	3.81	4.22
6	6/17/2019	3.81	4.21
7	6/18/2019	3.77	4.18
8	6/19/2019	3.74	4.15
9	6/20/2019	3.70	4.09
10	6/21/2019	3.74	4.12
11	6/24/2019	3.70	4.07
12	6/25/2019	3.68	4.06
13	6/26/2019	3.73	4.10
14	6/27/2019	3.68	4.06
15	6/28/2019	3.68	4.05
15-day average:		**3.76%**	**4.16%**

Source: Bloomberg LP as of 8/12/2019.

Table No. BV-R18

Financial Risk Adjustment to Intervenor DCF Estimates (1)

		Reported Cost of Equity Estimate	S&P Bond Rating	Cost of Debt Estimate	Equity Ratio (%)	Preferred Equity Ratio (%)	Debt Ratio (%)	Tax Rate (%)	Overall After-Tax Cost of Capital
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Gorman									
Electric Proxy Group									
Constant Growth DCF Model (Analyst Growth)	[a]	8.58%	BBB	4.2%	58.9%	0.2%	40.9%	28%	6.3%
Constant Growth DCF Model (Sustainable Growth)	[b]	8.68%	BBB	4.2%	58.9%	0.2%	40.9%	28%	6.3%
Multi-Stage DCF Model	[c]	7.64%	BBB	4.2%	58.9%	0.2%	40.9%	28%	5.7%
Water/Gas Proxy Group									
Constant Growth DCF Model (Analyst Growth)	[d]	7.82%	A	3.8%	64.6%	0.1%	35.4%	28%	6.0%
Constant Growth DCF Model (Sustainable Growth)	[e]	9.62%	A	3.8%	64.6%	0.1%	35.4%	28%	7.2%
Multi-Stage DCF Model	[f]	6.59%	A	3.8%	64.6%	0.1%	35.4%	28%	5.2%
O'Donnell									
Sample Low	[g]	6.9%	BBB	4.2%	59.3%	0.2%	40.6%	28%	5.3%
Sample High	[h]	9.0%	BBB	4.2%	59.3%	0.2%	40.6%	28%	6.6%
Edison Int'l Low	[i]	7.3%	BBB	4.2%	57.3%	5.7%	37.0%	28%	5.5%
Edison Int'l High	[j]	9.5%	BBB	4.2%	57.3%	5.7%	37.0%	28%	6.8%
Rothschild									
Constant Growth DCF									
Estimate 1	[k]	7.57%	BBB	4.2%	59.1%	0.4%	40.5%	28%	5.7%
Estimate 2	[l]	8.63%	BBB	4.2%	59.1%	0.4%	40.5%	28%	6.3%
Estimate 3	[m]	7.51%	BBB	4.2%	59.1%	0.4%	40.5%	28%	5.7%
Estimate 4	[n]	8.72%	BBB	4.2%	59.1%	0.4%	40.5%	28%	6.4%
Non-Constant Growth DCF									
Estimate 1	[o]	8.45%	BBB	4.2%	59.1%	0.4%	40.5%	28%	6.2%
Estimate 2	[p]	9.41%	BBB	4.2%	59.1%	0.4%	40.5%	28%	6.8%

Sources and Notes:

[1][a] - [f]: Gorman Testimony p. VII-28.

[1][g] - [j]: O'Donnell Testimony p. 50.

[1][k] - [n]: Rothschild Testimony p. 17.

[1][o] - [p]: Rothschild Testimony p. 20.

[2]: S&P Bond Rating average of sample / actual as of 6/30/2019.

[3]: 15 day average utility bond yield associated with [2] as of 6/30/2019. See Table No. BV-R16: Utility Yield Mapping and Table No. BV-R17: Utility Bond Yields.

[4] - [6]: See Table No. BV-R12: Market Value Equity Ratio Summary - Intervenor Samples.

[7]: Combined State and Federal Tax Rate.

[8] = [1] x [4] + [3] x [5] + [3] x [6] x (1 - [7])

Financial Risk Adjustment to Intervenor DCF Estimates (2)

		Overall After-Tax Cost of Capital	SCE S&P Bond Rating	Cost of Debt Estimate	SCE Representative Regulatory Equity Ratio (%)	SCE Representative Regulatory Debt Ratio (%)	Tax Rate (%)	Cost of Equity Estimate
		[1]	[2]	[3]	[4]	[5]	[6]	[7]
Gorman								
Electric Proxy Group								
Constant Growth DCF Model (Analyst Growth)	[a]	6.3%	BBB	4.2%	52.0%	48.0%	28%	9.3%
Constant Growth DCF Model (Sustainable Growth)	[b]	6.3%	BBB	4.2%	52.0%	48.0%	28%	9.4%
Multi-Stage DCF Model	[c]	5.7%	BBB	4.2%	52.0%	48.0%	28%	8.3%
Water/Gas Proxy Group								
Constant Growth DCF Model (Analyst Growth)	[d]	6.0%	BBB	4.2%	52.0%	48.0%	28%	8.8%
Constant Growth DCF Model (Sustainable Growth)	[e]	7.2%	BBB	4.2%	52.0%	48.0%	28%	11.0%
Multi-Stage DCF Model	[f]	5.2%	BBB	4.2%	52.0%	48.0%	28%	7.3%
O'Donnell								
Sample Low	[g]	5.3%	BBB	4.2%	52.0%	48.0%	28%	7.5%
Sample High	[h]	6.6%	BBB	4.2%	52.0%	48.0%	28%	9.8%
Edison Int'l Low	[i]	5.5%	BBB	4.2%	52.0%	48.0%	28%	7.9%
Edison Int'l High	[j]	6.8%	BBB	4.2%	52.0%	48.0%	28%	10.3%
Rothschild								
Constant Growth DCF								
Estimate 1	[k]	5.7%	BBB	4.2%	52.0%	48.0%	28%	8.2%
Estimate 2	[l]	6.3%	BBB	4.2%	52.0%	48.0%	28%	9.4%
Estimate 3	[m]	5.7%	BBB	4.2%	52.0%	48.0%	28%	8.1%
Estimate 4	[n]	6.4%	BBB	4.2%	52.0%	48.0%	28%	9.5%
Non-Constant Growth DCF								
Estimate 1	[o]	6.2%	BBB	4.2%	52.0%	48.0%	28%	9.2%
Estimate 2	[p]	6.8%	BBB	4.2%	52.0%	48.0%	28%	10.3%

Sources and Notes:

[1]: See Table No. BV-R18: Financial Risk Adjustment to Intervenor DCF Estimates (1).

[2]: SCE assumed debt rating.

[3]: 15 day average utility bond yield associated with [2] as of 6/30/2019. See Table No. BV-R16: Utility Yield Mapping and Table No. BV-R17: Utility Bond Yields.

[4] - [5]: Provided by SCE.

[6]: Combined State and Federal Tax Rate.

[7] = [[1] - [3] x [5] x (1 - [6])] / [4]

Table No. BV-R20

Intervenor Downward DCF Bias due to Failure to Consider Financial Leverage

	Original Estimate Range	Financial Risk Adjusted Range	Downward Bias
	[1]	[2]	[3]
Gorman			
Electric Proxy Group	7.6% - 8.7%	8.3% - 9.4%	**0.6% - 0.8%**
Water/Gas Proxy Group	6.6% - 9.6%	7.3% - 11.0%	**0.7% - 1.4%**
O'Donnell			
Sample	6.9% - 9.0%	7.5% - 9.8%	**0.6% - 0.8%**
Edison Int'l	7.3% - 9.5%	7.9% - 10.3%	**0.6% - 0.8%**
Rothschild			
Constant Growth DCF	7.5% - 8.7%	8.1% - 9.5%	**0.6% - 0.8%**
Non-Constant Growth DCF	8.4% - 9.4%	9.2% - 10.3%	**0.8% - 0.9%**

Sources and Notes:

[1]: Estimates originally sourced from intervenor testimonies, see also Table No. BV-R18: Financial Risk Adjustment to Intervenor DCF Estimates (1).

[2]: Calculated by accounting for financial risk differences between sample companies and SCE. See Table No. BV-R18: Financial Risk Adjustment to Intervenor DCF Estimates (1) and Table No. BV-R19: Financial Risk Adjustment to Intervenor DCF Estimates (2).

[3] = [2] - [1]

Table No. BV-R21

Natural Gas Sample Credit Metrics

Metric		1st Half 2019	3 Year Average
[1]		[2]	[3]
Total Debt/Equity			
Chesapeake Utilities	[a]	122%	112%
Atmos Energy	[b]	66%	79%
ONE Gas Inc.	[c]	77%	78%
NiSource Inc.	[d]	156%	175%
Northwest Natural	[e]	107%	115%
Southwest Gas	[f]	96%	102%
Spire Inc.	[g]	101%	115%
EBIT / Interest Exp.			
Chesapeake Utilities	[h]	5.2x	5.9x
Atmos Energy	[i]	7.6x	6.8x
ONE Gas Inc.	[j]	4.9x	5.6x
NiSource Inc.	[k]	NM	1.4x
Northwest Natural	[l]	3.5x	3.6x
Southwest Gas	[m]	3.5x	3.7x
Spire Inc.	[n]	3.0x	3.2x

Sources and Notes:

[1] - [3]: Data from S&P Capital IQ, Retrieved 8/13/2019.

[3]: Average of 2017, 2018, and 1st Half of 2019 values.

Table No. BV-R22

NETO MRP Summary

NETO Proposed Methodology (Avera)

Dividend Yield	[a]	2.42%
Growth Rate	[b]	9.97%
Estimated Cost of Equity	[c] = [a] + [b]	12.40%
Risk Free Rate	[d]	2.89%
Market Risk Premium	**[e] = [c] - [d]**	**9.50%**

Sources and Notes:

[a]: Market Cap weighted average dividend yield of all dividend paying stocks on the S&P 500 using data reported by Value Line Investment Analyzer as of 6/27/2019.

[b]: Market Cap weighted average IBES LTG Consensus Growth Rate of all dividend paying stocks on the S&P 500 using data reported by Thomson Reuters as of 6/30/2019.

[d]: 6-month average of 30-year U.S. Treasury Constant Maturity Rate series up to 6/30/2019, St. Louis FRED.

Table No. BV-R23

Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
3M Company	$98,857	$5.76	$173.34	3.32%	3.7%
Abbott Labs.	$147,644	$1.28	$84.10	1.52%	11.6%
AbbVie Inc.	$110,477	$4.28	$72.72	5.89%	5.9%
ABIOMED Inc.	$11,503	$0.00	$260.49	n/a	n/a
Accenture Plc	$116,857	$3.06	$184.77	1.66%	9.1%
Activision Blizzard	$36,213	$0.37	$47.20	0.78%	5.9%
Adobe Systems	$143,244	$0.00	$294.65	n/a	n/a
Advance Auto Parts	$10,883	$0.24	$154.14	0.16%	17.2%
Advanced Micro Dev.	$33,261	$0.00	$30.37	n/a	n/a
AES Corp.	$10,978	$0.55	$16.76	3.28%	9.0%
Affiliated Managers	$5,348	$1.31	$92.14	1.42%	0.9%
Aflac Inc.	$40,721	$1.10	$54.81	2.01%	6.2%
Agilent Technologies	$23,221	$0.66	$74.67	0.88%	10.6%
Air Products & Chem.	$49,200	$4.64	$226.37	2.05%	12.0%
Akamai Technologies	$12,985	$0.00	$80.14	n/a	n/a
Alaska Air Group	$7,794	$1.40	$63.91	2.19%	19.1%
Albemarle Corp.	$7,366	$1.47	$70.41	2.09%	13.7%
Alexandria Real Estate	$15,548	$4.00	$141.09	2.84%	0.1%
Alexion Pharmac.	$28,274	$0.00	$130.98	n/a	n/a
Align Techn.	$21,596	$0.00	$273.70	n/a	n/a
Allegion plc	$10,234	$1.08	$110.55	0.98%	8.8%
Allergan plc	$54,418	$2.96	$167.43	1.77%	3.0%
Alliance Data Sys.	$7,181	$2.52	$140.13	1.80%	5.2%

Table No. BV-R23

Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Alliant Energy	$11,616	$1.42	$49.08	2.89%	5.0%
Allstate Corp.	$33,347	$2.00	$101.69	1.97%	11.2%
Alphabet Inc.	$747,592	$0.00	$1,080.91	n/a	n/a
Alphabet Inc. 'A'	$748,023	$0.00	$1,082.80	n/a	n/a
Altria Group	$89,657	$3.20	$47.35	6.76%	7.2%
Amazon.com	$936,906	$0.00	$1,893.63	n/a	n/a
Amer. Airlines	$14,282	$0.40	$32.61	1.23%	14.5%
Amer. Elec. Power	$43,372	$2.80	$88.01	3.18%	5.9%
Amer. Express	$103,738	$1.71	$123.44	1.39%	10.7%
Amer. Int'l Group	$46,140	$1.28	$53.28	2.40%	49.5%
Amer. Tower 'A'	$90,979	$4.08	$204.45	2.00%	21.8%
Amer. Water Works	$20,806	$2.00	$116.00	1.72%	8.2%
Ameren Corp.	$18,334	$1.99	$75.11	2.65%	4.9%
Ameriprise Fin'l	$19,327	$3.88	$145.16	2.67%	18.8%
AmerisourceBergen	$17,997	$1.64	$85.26	1.92%	7.1%
AMETEK Inc.	$20,109	$0.56	$90.84	0.62%	8.6%
Amgen	$113,062	$5.90	$184.28	3.20%	1.9%
Amphenol Corp.	$28,504	$0.92	$95.94	0.96%	6.3%
Anadarko Petroleum	$34,581	$1.20	$70.56	1.70%	31.6%
Analog Devices	$41,724	$2.16	$112.87	1.91%	9.3%
ANSYS Inc.	$16,849	$0.00	$204.82	n/a	n/a
Anthem Inc.	$72,682	$3.20	$282.21	1.13%	17.5%
Aon plc	$46,390	$1.76	$192.98	0.91%	11.7%

Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Apache Corp.	$10,766	$1.00	$28.97	3.45%	28.3%
Apartment Investment	$7,589	$1.56	$50.12	3.11%	7.1%
Apple Inc.	$920,259	$3.13	$197.92	1.58%	12.0%
Applied Materials	$41,830	$0.85	$44.91	1.89%	8.5%
Aptiv PLC	$20,901	$0.88	$80.83	1.09%	9.4%
Archer Daniels Midl'd	$22,719	$1.40	$40.80	3.43%	-8.8%
Arconic Inc.	$11,391	$0.08	$25.82	0.31%	11.2%
Arista Networks	$19,724	$0.00	$259.62	n/a	n/a
Assurant Inc.	$6,437	$2.40	$106.38	2.26%	19.4%
AT&T Inc.	$240,663	$2.06	$33.51	6.15%	1.8%
Atmos Energy	$12,263	$2.21	$105.56	2.09%	6.5%
Autodesk Inc.	$36,292	$0.00	$162.90	n/a	n/a
Automatic Data Proc.	$71,426	$3.46	$165.33	2.09%	16.9%
AutoZone Inc.	$26,680	$0.00	$1,099.47	n/a	n/a
AvalonBay Communities	$27,901	$6.26	$203.18	3.08%	2.5%
Avery Dennison	$9,540	$2.38	$115.68	2.06%	10.7%
Baker Hughes a GE co.	$12,715	$0.72	$24.63	2.92%	46.3%
Ball Corp.	$22,777	$0.60	$69.99	0.86%	14.4%
Bank of America	$269,924	$0.66	$29.00	2.28%	14.7%
Bank of New York Mellon	$41,547	$1.12	$44.15	2.54%	9.4%
Baxter Int'l Inc.	$41,656	$0.88	$81.90	1.07%	10.7%
BB&T Corp.	$36,902	$1.76	$49.13	3.58%	10.8%
Becton Dickinson	$67,204	$3.12	$252.01	1.24%	10.6%

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Berkshire Hathaway 'B'	$0	$0.00	$213.17	n/a	n/a
Best Buy Co.	$18,282	$2.00	$69.73	2.87%	8.2%
Biogen	$46,490	$0.00	$233.87	n/a	n/a
BlackRock Inc.	$71,762	$13.20	$469.30	2.81%	6.4%
Block (H&R)	$5,948	$1.04	$29.30	3.55%	10.0%
Boeing	$205,093	$8.72	$364.01	2.40%	18.8%
Booking Holdings	$81,531	$0.00	$1,874.71	n/a	n/a
BorgWarner	$8,732	$0.68	$41.98	1.62%	3.5%
Boston Properties	$19,775	$3.90	$129.00	3.02%	7.0%
Boston Scientific	$58,307	$0.00	$42.98	n/a	n/a
Bristol-Myers Squibb	$73,770	$1.64	$45.35	3.62%	5.6%
Broadcom Inc.	$113,998	$10.60	$287.86	3.68%	16.1%
Broadridge Fin'l	$14,904	$2.15	$127.68	1.68%	10.0%
Brown-Forman 'B'	$26,378	$0.67	$55.43	1.21%	8.1%
C.H. Robinson	$11,522	$2.00	$84.35	2.37%	6.8%
Cabot Oil & Gas 'A'	$9,594	$0.36	$22.96	1.57%	39.3%
Cadence Design Sys.	$19,720	$0.00	$70.81	n/a	n/a
Campbell Soup	$11,965	$1.40	$40.07	3.49%	-3.3%
Capital One Fin'l	$41,949	$1.60	$90.74	1.76%	6.1%
Capri Holdings Ltd.	$5,132	$0.00	$34.68	n/a	n/a
Cardinal Health	$13,890	$1.92	$47.10	4.08%	4.3%
CarMax Inc.	$14,921	$0.00	$86.83	n/a	n/a
Carnival Corp.	$24,200	$2.00	$46.55	4.30%	9.0%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Caterpillar Inc.	$77,466	$4.12	$136.29	3.02%	19.1%
Cboe Global Markets	$11,840	$1.24	$103.63	1.20%	3.1%
CBRE Group	$17,092	$0.00	$51.30	n/a	n/a
CBS Corp. 'B'	$18,259	$0.72	$49.90	1.44%	15.2%
Celanese Corp.	$13,439	$2.48	$107.80	2.30%	10.9%
Celgene Corp.	$65,088	$0.00	$92.44	n/a	n/a
Centene Corp.	$21,674	$0.00	$52.44	n/a	n/a
CenterPoint Energy	$14,317	$1.17	$28.63	4.09%	6.0%
CenturyLink Inc.	$12,693	$1.00	$11.76	8.50%	8.5%
Cerner Corp.	$23,333	$0.72	$73.30	0.98%	12.3%
CF Industries	$10,443	$1.25	$46.71	2.68%	58.4%
Charter Communic.	$87,444	$0.00	$395.18	n/a	n/a
Chevron Corp.	$234,491	$4.76	$124.44	3.83%	27.0%
Chipotle Mex. Grill	$20,074	$0.00	$732.88	n/a	n/a
Chubb Ltd.	$67,426	$3.00	$147.29	2.04%	10.6%
Church & Dwight	$17,997	$0.91	$73.06	1.25%	8.0%
Cigna Corp.	$59,913	$0.04	$157.55	0.03%	12.9%
Cimarex Energy	$5,857	$0.80	$59.33	1.35%	16.3%
Cincinnati Financial	$16,784	$2.24	$103.67	2.16%	5.9%
Cintas Corp.	$24,730	$2.25	$237.29	0.95%	14.7%
Cisco Systems	$240,364	$1.40	$54.73	2.56%	9.9%
Citigroup Inc.	$157,595	$1.98	$70.03	2.83%	14.8%
Citizens Fin'l Group	$16,033	$1.30	$35.36	3.68%	8.6%

Table No. BV-R23

Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Citrix Sys.	$12,889	$1.40	$98.14	1.43%	9.0%
Clorox Co.	$19,474	$4.24	$153.11	2.77%	3.3%
CME Group	$69,225	$3.00	$194.11	1.55%	5.3%
CMS Energy Corp.	$16,316	$1.59	$57.91	2.75%	7.1%
Coca-Cola	$218,010	$1.60	$50.92	3.14%	5.0%
Cognizant Technology	$35,881	$0.80	$63.39	1.26%	6.0%
Colgate-Palmolive	$61,933	$1.72	$71.67	2.40%	2.2%
Comcast Corp.	$190,618	$0.84	$42.28	1.99%	11.2%
Comerica Inc.	$11,092	$2.68	$72.64	3.69%	4.0%
Conagra Brands	$12,357	$0.88	$26.52	3.32%	9.2%
Concho Resources	$20,429	$0.50	$103.18	0.48%	17.0%
ConocoPhillips	$69,246	$1.22	$61.00	2.00%	0.1%
Consol. Edison	$28,534	$3.01	$87.68	3.43%	3.4%
Constellation Brands	$36,000	$3.05	$196.94	1.55%	6.2%
Cooper Cos.	$16,413	$0.06	$336.89	0.02%	10.0%
Copart Inc.	$16,786	$0.00	$74.74	n/a	n/a
Corning Inc.	$25,986	$0.80	$33.23	2.41%	14.0%
Costco Wholesale	$116,805	$2.60	$264.26	0.98%	10.1%
Coty Inc.	$9,881	$0.50	$13.40	3.73%	5.5%
Crown Castle Int'l	$54,276	$4.80	$130.35	3.68%	19.2%
CSX Corp.	$66,921	$0.96	$77.37	1.24%	11.3%
Cummins Inc.	$26,499	$4.56	$171.34	2.66%	6.2%
CVS Health	$71,053	$2.00	$54.49	3.67%	5.4%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Danaher Corp.	$101,629	$0.68	$142.92	0.48%	8.6%
Darden Restaurants	$14,947	$3.52	$121.73	2.89%	10.5%
DaVita Inc.	$9,220	$0.00	$56.26	n/a	n/a
Deere & Co.	$52,247	$3.04	$165.71	1.83%	16.4%
Delta Air Lines	$37,217	$1.54	$56.75	2.71%	12.6%
Dentsply Sirona	$12,898	$0.35	$58.36	0.60%	9.2%
Devon Energy	$11,759	$0.36	$28.52	1.26%	42.8%
Diamondback Energy	$17,695	$0.75	$108.97	0.69%	36.2%
Digital Realty Trust	$24,276	$4.48	$117.79	3.80%	16.7%
Discover Fin'l Svcs.	$25,247	$1.60	$77.59	2.06%	12.0%
Discovery Communic. 'C'	$14,333	$0.00	$28.45	n/a	n/a
Discovery Inc.	$15,611	$0.00	$30.70	n/a	n/a
Dish Network 'A'	$17,867	$0.00	$38.41	n/a	n/a
Disney (Walt)	$247,815	$1.76	$139.64	1.26%	1.9%
Dollar General	$35,251	$1.28	$135.16	0.95%	9.8%
Dollar Tree Inc.	$25,694	$0.00	$107.39	n/a	n/a
Dominion Energy	$61,529	$3.72	$77.32	4.81%	4.6%
Dover Corp.	$14,321	$1.92	$100.20	1.92%	10.9%
Dow Inc.	$38,123	$2.85	$49.31	5.78%	7.5%
DTE Energy	$23,371	$3.96	$127.88	3.10%	4.0%
Duke Energy	$64,464	$3.79	$88.24	4.30%	7.1%
Duke Realty Corp.	$11,200	$0.91	$31.61	2.88%	6.0%
DXC Technology	$14,519	$0.84	$55.15	1.52%	8.6%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
E*Trade Fin'l	$11,007	$0.56	$44.60	1.26%	7.5%
Eastman Chemical	$10,672	$2.48	$77.83	3.19%	7.2%
Eaton Corp. plc	$34,999	$2.84	$83.28	3.41%	8.1%
eBay Inc.	$34,418	$0.57	$39.50	1.44%	12.3%
Ecolab Inc.	$55,392	$1.84	$197.44	0.93%	13.4%
Edison Int'l	$21,217	$2.45	$67.41	3.63%	6.2%
Edwards Lifesciences	$38,644	$0.00	$184.74	n/a	n/a
Electronic Arts	$29,554	$0.00	$101.26	n/a	n/a
Emerson Electric	$41,590	$1.97	$66.72	2.95%	8.1%
Entergy Corp.	$19,307	$3.70	$102.93	3.59%	-4.7%
EOG Resources	$53,453	$1.15	$93.16	1.23%	16.0%
Equifax Inc.	$15,998	$1.56	$135.24	1.15%	3.0%
Equinix Inc.	$41,883	$10.22	$504.29	2.03%	22.5%
Equity Residential	$27,931	$2.31	$75.92	3.04%	2.7%
Essex Property Trust	$19,001	$7.98	$291.93	2.73%	7.9%
Everest Re Group Ltd.	$9,963	$5.80	$247.18	2.35%	58.1%
Evergy Inc.	$14,708	$2.01	$60.15	3.34%	6.2%
Eversource Energy	$23,931	$2.17	$75.76	2.86%	5.6%
Exelon Corp.	$46,181	$1.47	$47.94	3.07%	0.8%
Expedia Group	$19,357	$1.28	$133.03	0.96%	13.5%
Expeditors Int'l	$12,829	$1.00	$75.86	1.32%	4.1%
Extra Space Storage	$13,424	$3.64	$106.10	3.43%	6.0%
Exxon Mobil Corp.	$320,802	$3.48	$76.63	4.54%	12.3%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
F5 Networks	$8,539	$0.00	$145.63	n/a	n/a
Facebook Inc.	$540,926	$0.00	$193.00	n/a	n/a
Fastenal Co.	$18,441	$0.86	$32.59	2.64%	19.0%
Federal Rlty. Inv. Trust	$9,543	$4.14	$128.76	3.22%	5.0%
FedEx Corp.	$42,555	$2.85	$164.19	1.74%	8.8%
Fidelity Nat'l Info.	$39,193	$1.40	$122.68	1.14%	9.7%
Fifth Third Bancorp	$20,178	$0.96	$27.90	3.44%	13.1%
First Republic Bank	$16,046	$0.76	$97.65	0.78%	11.3%
FirstEnergy Corp.	$22,592	$1.56	$42.81	3.64%	-6.6%
Fiserv Inc.	$35,633	$0.00	$91.16	n/a	n/a
FleetCor Technologies	$24,065	$0.00	$280.85	n/a	n/a
FLIR Systems	$7,229	$0.70	$54.10	1.29%	21.9%
Flowserve Corp.	$6,743	$0.76	$52.69	1.44%	19.0%
Fluor Corp.	$4,618	$0.84	$33.69	2.49%	32.2%
FMC Corp.	$10,940	$1.70	$82.95	2.05%	21.8%
Foot Locker	$4,621	$1.52	$41.92	3.63%	11.0%
Ford Motor	$39,971	$0.60	$10.23	5.87%	-1.4%
Fortinet Inc.	$13,101	$0.00	$76.83	n/a	n/a
Fortive Corp.	$26,931	$0.28	$81.52	0.34%	13.1%
Fortune Brands Home	$7,828	$0.88	$57.13	1.54%	8.4%
Fox Corp. 'A'	$22,332	$0.00	$36.64	n/a	n/a
Fox Corp. 'B'	$0	$0.00	$36.53	n/a	n/a
Franklin Resources	$17,628	$1.10	$34.80	3.16%	-2.3%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Freep't-McMoRan Inc.	$16,774	$0.20	$11.61	1.72%	9.8%
Gallagher (Arthur J.)	$15,925	$1.72	$87.59	1.96%	13.2%
Gap (The) Inc.	$6,698	$0.97	$17.97	5.40%	3.9%
Garmin Ltd.	$15,239	$2.28	$79.80	2.86%	5.2%
Gartner Inc.	$14,321	$0.00	$160.94	n/a	n/a
Gen'l Dynamics	$51,338	$4.08	$181.82	2.24%	8.4%
Gen'l Electric	$90,696	$0.04	$10.50	0.38%	8.2%
Gen'l Mills	$31,259	$1.98	$52.52	3.77%	6.5%
Gen'l Motors	$54,353	$1.56	$38.53	4.05%	15.4%
Genuine Parts	$15,021	$3.05	$103.58	2.94%	4.3%
Gilead Sciences	$85,460	$2.52	$67.56	3.73%	2.4%
Global Payments	$25,098	$0.04	$160.13	0.02%	16.0%
Goldman Sachs	$73,105	$3.40	$204.60	1.66%	3.6%
Grainger (W.W.)	$14,755	$5.76	$268.23	2.15%	10.3%
Halliburton Co.	$19,821	$0.72	$22.74	3.17%	18.7%
Hanesbrands Inc.	$6,141	$0.60	$17.22	3.48%	2.6%
Harley-Davidson	$5,661	$1.50	$35.83	4.19%	8.5%
Harris Corp.	$22,370	$2.77	$189.13	1.46%	
Hartford Fin'l Svcs.	$19,992	$1.20	$55.72	2.15%	9.9%
Hasbro Inc.	$13,332	$2.72	$105.68	2.57%	11.2%
HCA Healthcare	$46,001	$1.60	$135.17	1.18%	11.4%
HCP Inc.	$15,184	$1.48	$31.98	4.63%	2.5%
Helmerich & Payne	$5,442	$2.84	$50.62	5.61%	57.7%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Henry (Jack) & Assoc.	$10,362	$1.60	$133.92	1.19%	11.0%
Hershey Co.	$28,140	$2.89	$134.03	2.16%	7.7%
Hess Corp.	$19,562	$1.00	$63.57	1.57%	-23.4%
Hewlett Packard Ent.	$20,153	$0.49	$14.95	3.28%	7.4%
Hilton Worldwide Hldgs.	$28,160	$0.60	$97.74	0.61%	17.0%
HollyFrontier Corp.	$7,725	$1.37	$46.28	2.96%	-6.2%
Hologic Inc.	$12,788	$0.00	$48.02	n/a	n/a
Home Depot	$227,929	$5.44	$207.97	2.62%	8.8%
Honeywell Int'l	$126,511	$3.28	$174.59	1.88%	6.9%
Hormel Foods	$21,589	$0.86	$40.54	2.12%	6.4%
Horton D.R.	$16,127	$0.61	$43.13	1.41%	7.4%
Host Hotels & Resorts	$13,335	$0.81	$18.22	4.45%	28.4%
HP Inc.	$31,234	$0.67	$20.79	3.22%	5.5%
Humana Inc.	$35,730	$2.20	$265.30	0.83%	13.9%
Hunt (J.B.)	$9,753	$1.06	$91.41	1.16%	11.6%
Huntington Bancshs.	$14,284	$0.60	$13.82	4.34%	8.0%
Huntington Ingalls	$9,316	$3.44	$224.74	1.53%	8.9%
IDEXX Labs.	$23,411	$0.00	$275.33	n/a	n/a
IHS Markit	$25,221	$0.00	$63.72	n/a	n/a
Illinois Tool Works	$48,570	$4.00	$150.81	2.65%	4.2%
Illumina Inc.	$52,406	$0.00	$368.15	n/a	n/a
Incyte Corp.	$18,157	$0.00	$84.96	n/a	n/a
Ingersoll-Rand	$29,988	$2.12	$126.67	1.67%	10.3%

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Table No. BV-R23

Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Intel Corp.	$212,478	$1.26	$47.87	2.63%	7.6%
Intercontinental Exch.	$48,313	$1.10	$85.94	1.28%	8.5%
Interpublic Group	$8,538	$0.97	$22.59	4.29%	3.8%
Int'l Business Mach.	$122,818	$6.51	$137.90	4.72%	2.7%
Int'l Flavors & Frag.	$15,311	$3.07	$145.09	2.12%	6.3%
Int'l Paper	$17,125	$2.00	$43.32	4.62%	-1.8%
Intuit Inc.	$66,906	$1.88	$261.33	0.72%	16.5%
Intuitive Surgical	$59,750	$0.00	$524.55	n/a	n/a
Invesco Ltd.	$8,162	$1.24	$20.46	6.06%	0.9%
IPG Photonics	$7,994	$0.00	$154.25	n/a	n/a
IQVIA Holdings	$30,887	$0.00	$160.90	n/a	n/a
Iron Mountain	$8,857	$2.44	$31.30	7.80%	-1.0%
Jacobs Engineering	$11,462	$0.68	$84.39	0.81%	13.2%
Jefferies Fin'l Group	$5,626	$0.50	$19.23	2.60%	18.0%
Johnson & Johnson	$373,621	$3.85	$139.28	2.76%	6.5%
Johnson Ctrls. Int'l plc	$36,399	$1.04	$41.31	2.52%	24.6%
JPMorgan Chase	$353,074	$3.26	$111.80	2.92%	5.8%
Juniper Networks	$9,451	$0.76	$26.63	2.85%	4.7%
Kansas City South'n	$12,147	$1.44	$121.82	1.18%	13.6%
Kellogg	$18,085	$2.28	$53.57	4.26%	0.8%
KeyCorp	$17,569	$0.73	$17.75	4.11%	5.5%
Keysight Technologies	$16,344	$0.00	$89.81	n/a	n/a
Kimberly-Clark	$46,041	$4.12	$133.28	3.09%	3.3%

Table No. BV-R23

Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Kimco Realty	$7,754	$1.14	$18.48	6.17%	4.6%
Kinder Morgan Inc.	$46,176	$1.00	$20.88	4.79%	5.3%
KLA-Tencor	$19,029	$3.00	$118.20	2.54%	9.9%
Kohl's Corp.	$7,585	$2.68	$47.55	5.64%	10.2%
Kraft Heinz Co.	$37,509	$1.62	$31.04	5.22%	-3.7%
Kroger Co.	$17,069	$0.62	$21.71	2.86%	5.8%
L Brands	$7,264	$1.20	$26.10	4.60%	7.2%
L3 Technologies	$19,546	$3.40	$245.17	1.39%	
Laboratory Corp.	$16,875	$0.00	$172.90	n/a	n/a
Lam Research	$27,898	$4.40	$187.84	2.34%	-0.1%
Lamb Weston Holdings	$9,032	$0.80	$63.36	1.26%	11.4%
Lauder (Estee)	$65,861	$1.74	$183.11	0.95%	12.0%
Leggett & Platt	$4,982	$1.60	$38.37	4.17%	5.2%
Lennar Corp.	$15,651	$0.16	$48.46	0.33%	7.7%
Lilly (Eli)	$108,219	$2.58	$110.79	2.33%	10.4%
Lincoln Nat'l Corp.	$12,790	$1.56	$64.45	2.42%	10.6%
Linde plc	$108,482	$3.75	$200.80	1.87%	12.2%
LKQ Corp.	$8,245	$0.00	$26.61	n/a	n/a
Lockheed Martin	$101,457	$9.20	$363.54	2.53%	14.0%
Loews Corp.	$16,427	$0.25	$54.67	0.46%	21.3%
Lowe's Cos.	$78,991	$2.20	$100.91	2.18%	14.0%
LyondellBasell Inds.	$32,085	$4.20	$86.13	4.88%	4.2%
M&T Bank Corp.	$23,050	$4.00	$170.07	2.35%	8.3%

Table No. BV-R23

Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Macerich Comp. (The)	$4,723	$3.06	$33.49	9.14%	0.2%
Macy's Inc.	$6,650	$1.51	$21.46	7.04%	-9.7%
Marathon Oil Corp.	$11,644	$0.26	$14.21	1.83%	46.7%
Marathon Petroleum	$36,265	$2.12	$55.88	3.79%	6.6%
Marriott Int'l	$46,049	$1.92	$140.29	1.37%	7.0%
Marsh & McLennan	$50,362	$1.82	$99.75	1.82%	8.4%
Martin Marietta	$14,191	$1.98	$230.11	0.86%	15.2%
Masco Corp.	$11,448	$0.50	$39.24	1.27%	9.7%
MasterCard Inc.	$267,366	$1.32	$264.53	0.50%	18.4%
Mattel Inc.	$3,759	$0.00	$11.21	n/a	n/a
Maxim Integrated	$16,386	$1.84	$59.82	3.08%	7.9%
McCormick & Co.	$20,576	$2.31	$155.01	1.49%	9.5%
McDonald's Corp.	$157,499	$4.80	$207.66	2.31%	6.5%
McKesson Corp.	$25,713	$1.56	$134.39	1.16%	5.5%
Medtronic plc	$130,681	$2.16	$97.39	2.22%	6.9%
Merck & Co.	$216,539	$2.20	$83.85	2.62%	9.8%
MetLife Inc.	$46,701	$1.78	$49.67	3.58%	6.5%
Mettler-Toledo Int'l	$20,675	$0.00	$840.00	n/a	n/a
MGM Resorts Int'l	$15,277	$0.52	$28.57	1.82%	34.4%
Microchip Technology	$20,704	$1.51	$86.70	1.74%	10.4%
Micron Technology	$42,029	$0.00	$38.59	n/a	n/a
Microsoft Corp.	$1,028,394	$1.84	$133.96	1.37%	14.8%
Mid-America Apartment	$13,242	$3.84	$117.76	3.26%	7.0%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Mohawk Inds.	$10,508	$0.00	$147.47	n/a	n/a
Molson Coors Brewing	$11,973	$1.75	$56.00	3.13%	0.9%
Mondelez Int'l	$78,142	$1.10	$53.90	2.04%	5.8%
Monster Beverage	$34,553	$0.00	$63.83	n/a	n/a
Moody's Corp.	$38,403	$2.00	$195.31	1.02%	11.1%
Morgan Stanley	$73,324	$1.20	$43.81	2.74%	8.9%
Mosaic Company	$9,409	$0.22	$25.03	0.88%	8.3%
Motorola Solutions	$27,126	$2.28	$166.73	1.37%	11.8%
MSCI Inc.	$19,822	$2.52	$238.79	1.06%	14.5%
Mylan N.V.	$9,797	$0.00	$19.04	n/a	n/a
Nasdaq Inc.	$15,936	$1.88	$96.17	1.95%	6.3%
National Oilwell Varco	$8,271	$0.20	$22.23	0.90%	41.0%
Nektar Therapeutics	$6,042	$0.00	$35.58	n/a	n/a
NetApp Inc.	$15,067	$1.92	$61.70	3.11%	13.7%
Netflix Inc.	$161,770	$0.00	$367.32	n/a	n/a
Newell Brands	$6,427	$0.92	$15.42	5.97%	-22.2%
Newmont Goldcorp	$20,449	$0.56	$38.47	1.46%	12.5%
News Corp. 'A'	$7,858	$0.20	$13.49	1.48%	12.4%
News Corp. 'B'	$8,081	$0.20	$13.96	1.43%	12.4%
NextEra Energy	$97,979	$5.16	$204.86	2.52%	8.3%
Nielsen Hldgs. plc	$7,938	$1.40	$22.60	6.19%	1.0%
NIKE Inc. 'B'	$131,597	$0.88	$83.95	1.05%	15.8%
NiSource Inc.	$10,672	$0.80	$28.80	2.78%	4.6%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Noble Energy	$10,539	$0.48	$22.40	2.14%	24.8%
Nordstrom Inc.	$4,862	$1.48	$31.86	4.65%	8.9%
Norfolk Southern	$51,438	$3.44	$199.33	1.73%	13.1%
Northern Trust Corp.	$19,121	$2.40	$90.00	2.67%	11.7%
Northrop Grumman	$54,068	$5.28	$323.11	1.63%	7.4%
Norwegian Cruise Line	$11,166	$0.00	$53.63	n/a	n/a
NRG Energy	$9,104	$0.12	$35.12	0.34%	34.3%
Nucor Corp.	$16,632	$1.60	$55.10	2.90%	-4.0%
NVIDIA Corp.	$99,407	$0.64	$164.23	0.39%	10.6%
Occidental Petroleum	$37,207	$3.15	$50.28	6.26%	3.6%
Omnicom Group	$17,834	$2.65	$81.95	3.23%	3.0%
ONEOK Inc.	$27,820	$3.67	$68.81	5.33%	13.8%
Oracle Corp.	$195,459	$0.96	$56.97	1.69%	9.4%
O'Reilly Automotive	$28,767	$0.00	$369.32	n/a	n/a
PACCAR Inc.	$24,494	$3.30	$71.66	4.61%	-1.3%
Packaging Corp.	$8,879	$3.16	$95.32	3.32%	3.7%
Parker-Hannifin	$21,610	$3.52	$170.01	2.07%	9.6%
Paychex Inc.	$29,507	$2.48	$82.29	3.01%	9.1%
PayPal Holdings	$133,221	$0.00	$114.46	n/a	n/a
Pentair plc	$6,272	$0.72	$37.20	1.94%	6.9%
People's United Fin'l	$6,613	$0.71	$16.78	4.23%	13.7%
PepsiCo Inc.	$184,606	$3.82	$131.13	2.91%	4.7%
PerkinElmer Inc.	$10,535	$0.28	$96.34	0.29%	14.0%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Perrigo Co. plc	$6,338	$0.84	$47.62	1.76%	1.7%
Pfizer Inc.	$241,341	$1.44	$43.32	3.32%	5.6%
Philip Morris Int'l	$121,306	$4.56	$78.53	5.81%	5.0%
Phillips 66	$41,613	$3.70	$93.54	3.96%	-8.7%
Pinnacle West Capital	$10,525	$3.04	$94.09	3.23%	5.0%
Pioneer Natural Res.	$25,400	$0.64	$153.86	0.42%	42.7%
PNC Financial Serv.	$60,866	$3.80	$137.28	2.77%	8.2%
PPG Inds.	$27,357	$1.92	$116.71	1.65%	9.5%
PPL Corp.	$22,500	$1.65	$31.01	5.32%	0.6%
Price (T. Rowe) Group	$25,662	$3.08	$109.71	2.81%	3.1%
Principal Fin'l Group	$15,802	$2.16	$57.92	3.73%	6.3%
Procter & Gamble	$275,365	$2.98	$109.65	2.72%	6.3%
Progressive Corp.	$46,539	$0.40	$79.93	0.50%	15.8%
Prologis	$49,966	$2.20	$80.10	2.75%	-6.1%
Prudential Fin'l	$40,421	$4.00	$101.00	3.96%	8.5%
Public Serv. Enterprise	$29,630	$1.90	$58.82	3.23%	4.9%
Public Storage	$41,276	$8.20	$238.17	3.44%	17.0%
PulteGroup Inc.	$8,747	$0.45	$31.62	1.42%	1.4%
PVH Corp.	$7,007	$0.15	$94.64	0.16%	11.1%
Qorvo Inc.	$8,248	$0.00	$66.61	n/a	n/a
Qualcomm Inc.	$91,572	$2.48	$76.07	3.26%	27.1%
Quanta Services	$5,398	$0.16	$38.19	0.42%	12.5%
Quest Diagnostics	$13,471	$2.12	$101.81	2.08%	5.4%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Ralph Lauren	$8,833	$2.75	$113.59	2.42%	11.3%
Raymond James Fin'l	$11,586	$1.40	$84.55	1.66%	9.0%
Raytheon Co.	$49,857	$3.77	$173.88	2.17%	12.7%
Realty Income Corp.	$21,086	$2.83	$68.97	4.10%	7.8%
Red Hat Inc.	$33,269	$0.00	$187.76	n/a	n/a
Regency Centers Corp.	$11,233	$2.34	$66.74	3.51%	9.1%
Regeneron Pharmac.	$33,451	$0.00	$313.00	n/a	n/a
Regions Financial	$14,769	$0.58	$14.94	3.88%	9.8%
Republic Services	$30,545	$1.58	$86.64	1.82%	9.5%
ResMed Inc.	$17,288	$1.48	$122.03	1.21%	11.1%
Robert Half Int'l	$6,683	$1.28	$57.01	2.25%	6.3%
Rockwell Automation	$19,190	$3.91	$163.83	2.39%	7.9%
Rollins Inc.	$11,997	$0.42	$35.87	1.17%	8.2%
Roper Tech.	$37,688	$1.85	$366.26	0.51%	3.0%
Ross Stores	$36,723	$1.05	$99.12	1.06%	8.9%
Royal Caribbean	$24,978	$2.80	$121.21	2.31%	12.1%
S&P Global	$55,862	$2.28	$227.79	1.00%	9.3%
salesforce.com	$116,935	$0.00	$151.73	n/a	n/a
SBA Communications	$25,452	$0.00	$224.84	n/a	n/a
Schein (Henry)	$10,303	$0.00	$69.90	n/a	n/a
Schlumberger Ltd.	$54,172	$2.00	$39.74	5.03%	20.4%
Schwab (Charles)	$53,643	$0.68	$40.19	1.69%	6.1%
Seagate Technology	$12,941	$2.52	$47.12	5.35%	6.8%

Table No. BV-R23

Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Sealed Air	$6,584	$0.64	$42.78	1.50%	13.2%
Sempra Energy	$37,138	$3.95	$137.44	2.87%	8.2%
Sherwin-Williams	$41,981	$4.52	$458.29	0.99%	13.9%
Simon Property Group	$49,420	$8.65	$159.76	5.41%	8.6%
Skyworks Solutions	$13,289	$1.52	$77.27	1.97%	9.5%
SL Green Realty	$6,744	$3.52	$80.37	4.38%	-10.8%
Smith (A.O.)	$7,704	$0.88	$47.16	1.87%	7.5%
Smucker (J.M.)	$13,302	$3.46	$115.19	3.00%	4.6%
Snap-on Inc.	$9,057	$3.93	$165.64	2.37%	7.3%
Southern Co.	$57,300	$2.50	$55.28	4.52%	2.2%
Southwest Airlines	$27,555	$0.72	$50.78	1.42%	12.0%
Stanley Black & Decker	$21,696	$2.70	$144.61	1.87%	9.6%
Starbucks Corp.	$101,108	$1.60	$83.83	1.91%	13.1%
State Street Corp.	$20,965	$1.94	$56.06	3.46%	0.9%
Stryker Corp.	$75,712	$2.08	$205.58	1.01%	10.6%
SunTrust Banks	$27,293	$2.00	$62.85	3.18%	9.0%
SVB Fin'l Group	$11,578	$0.00	$224.59	n/a	n/a
Symantec Corp.	$13,477	$0.30	$21.76	1.38%	10.0%
Synchrony Financial	$23,620	$0.88	$34.67	2.54%	21.9%
Synopsys Inc.	$17,927	$0.00	$128.69	n/a	n/a
Sysco Corp.	$35,914	$1.56	$70.72	2.21%	10.9%
Take-Two Interactive	$12,720	$0.00	$113.53	n/a	n/a
Tapestry Inc.	$9,005	$1.35	$31.73	4.25%	6.2%

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Table No. BV-R23

Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Target Corp.	$43,992	$2.64	$86.61	3.05%	8.4%
TE Connectivity	$32,098	$1.84	$95.78	1.92%	10.4%
TechnipFMC	$11,360	$0.52	$25.94	2.00%	27.6%
Teleflex Inc.	$15,510	$1.36	$331.15	0.41%	13.9%
Texas Instruments	$108,769	$3.08	$114.76	2.68%	8.0%
Textron Inc.	$12,073	$0.08	$53.04	0.15%	11.7%
Thermo Fisher Sci.	$117,502	$0.76	$293.68	0.26%	11.1%
Tiffany & Co.	$11,166	$2.40	$93.64	2.56%	8.7%
TJX Companies	$64,126	$0.92	$52.88	1.74%	8.6%
Torchmark Corp.	$9,722	$0.69	$89.46	0.77%	7.9%
Total System Svcs.	$22,688	$0.52	$128.27	0.41%	11.2%
Tractor Supply	$13,057	$1.40	$108.80	1.29%	11.4%
TransDigm Group	$25,300	$0.00	$483.80	n/a	n/a
Travelers Cos.	$39,076	$3.28	$149.52	2.19%	11.8%
TripAdvisor Inc.	$6,475	$0.00	$46.29	n/a	n/a
Twitter Inc.	$26,685	$0.00	$34.90	n/a	n/a
Tyson Foods 'A'	$29,072	$1.55	$80.74	1.92%	5.5%
U.S. Bancorp	$83,118	$1.57	$52.40	3.00%	5.9%
UDR Inc.	$12,284	$1.37	$44.89	3.05%	-34.2%
Ulta Beauty	$20,167	$0.00	$346.89	n/a	n/a
Under Armour 'A'	$11,408	$0.00	$25.35	n/a	n/a
Under Armour 'C'	$9,990	$0.00	$22.20	n/a	n/a
Union Pacific	$117,611	$3.52	$169.11	2.08%	13.1%

Table No. BV-R23

Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
United Cont'l Hldgs.	$22,841	$0.00	$87.55	n/a	n/a
United Parcel Serv.	$87,564	$3.84	$103.27	3.72%	7.3%
United Rentals	$10,401	$0.00	$132.63	n/a	n/a
United Technologies	$111,210	$2.94	$130.20	2.26%	8.6%
UnitedHealth Group	$234,762	$4.32	$244.01	1.77%	13.5%
Universal Health `B'	$11,551	$0.40	$130.39	0.31%	7.6%
Unum Group	$6,984	$1.12	$33.55	3.34%	6.3%
V.F. Corp.	$34,287	$2.04	$87.35	2.34%	5.1%
Valero Energy	$35,018	$3.60	$85.61	4.21%	9.4%
Varian Medical Sys.	$12,131	$0.00	$136.13	n/a	n/a
Ventas Inc.	$24,753	$3.23	$68.35	4.73%	6.9%
VeriSign Inc.	$24,749	$0.00	$209.16	n/a	n/a
Verisk Analytics	$23,668	$1.00	$146.46	0.68%	8.9%
Verizon Communic.	$236,769	$2.45	$57.13	4.29%	2.5%
Vertex Pharmac.	$45,779	$0.00	$183.38	n/a	n/a
Viacom Inc. 'B'	$11,805	$0.80	$29.87	2.68%	3.6%
Visa Inc.	$342,118	$1.08	$173.55	0.62%	15.7%
Vornado R'lty Trust	$12,148	$2.64	$64.10	4.12%	17.3%
Vulcan Materials	$17,884	$1.24	$137.31	0.90%	18.9%
Wabtec Corp.	$11,246	$0.48	$71.76	0.67%	14.0%
Walgreens Boots	$54,066	$1.76	$54.67	3.22%	2.0%
Walmart Inc.	$315,106	$2.14	$110.49	1.94%	3.7%
Waste Management	$49,200	$2.05	$115.37	1.78%	8.6%

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Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Waters Corp.	$14,972	$0.00	$215.24	n/a	n/a
WEC Energy Group	$26,207	$2.43	$83.37	2.91%	5.8%
WellCare Health Plans	$14,390	$0.00	$285.07	n/a	n/a
Wells Fargo	$208,858	$1.84	$47.32	3.89%	10.3%
Welltower Inc.	$29,599	$3.54	$81.53	4.34%	13.0%
Western Digital	$13,053	$2.00	$47.55	4.21%	-13.8%
Western Union	$8,520	$0.80	$19.89	4.02%	1.2%
WestRock Co.	$9,184	$1.82	$36.47	4.99%	10.8%
Weyerhaeuser Co.	$19,342	$1.36	$26.34	5.16%	5.0%
Whirlpool Corp.	$8,966	$4.80	$142.36	3.37%	5.0%
Williams Cos.	$34,315	$1.52	$28.04	5.42%	10.8%
Willis Towers Wat. plc	$24,414	$2.60	$191.54	1.36%	10.8%
Wynn Resorts	$13,345	$4.00	$123.99	3.23%	14.0%
Xcel Energy Inc.	$30,510	$1.65	$59.49	2.77%	6.2%
Xerox Corp.	$7,999	$1.00	$35.41	2.82%	9.1%

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Estimation of S&P 500 Cost of Equity - DDM

Company Name	Market Cap ($Millions)	VL Indicated Annual Dividend ($)	VL Stock Price ($)	Annual Dividend Yield, calculated	EPS Long Term Growth Mean (Consensus)
[1]	[2]	[3]	[4]	[5] = [3] / [4]	[6]
Market Cap Weighted Average				**2.42%**	**9.97%**
Xilinx Inc.	$29,919	$1.48	$117.92	1.26%	12.6%
Xylem Inc.	$14,727	$0.96	$83.64	1.15%	15.5%
Yum! Brands	$33,831	$1.74	$110.67	1.57%	15.1%
Zimmer Biomet Hldgs.	$23,630	$0.98	$117.74	0.83%	4.3%
Zions Bancorp.	$8,213	$1.26	$45.98	2.74%	7.5%
Zoetis Inc.	$54,015	$0.66	$113.49	0.58%	11.3%

Sources and Notes:

[1] - [4]: Value Line Investment Analyzer as of 6/27/2019.

[5] - [6]: Return "n/a" if the company does not issue dividends.

[6]: Thomson Reuters as of 6/30/2019.