mo

BEFORE THE
MICHIGAN PUBLIC SERVICE COMMISSION

DTE ELECTRIC COMPANY	**)**	
	)	
	)	**Case No. U-20836**
	)	
	)	

DIRECT TESTIMONY

OF

DR. BENTE VILLADSEN

LIST OF TOPICS ADDRESSED:

COST OF COMMON EQUITY CAPITAL

July 10, 2020

TABLE OF CONTENTS

BEFORE THE
MICHIGAN PUBLIC SERVICE COMMISSION

DTE ELECTRIC COMPANY	)	
	)	
	)	**Case No. U-20836**
	)	
	)	

DIRECT TESTIMONY OF DR. BENTE VILLADSEN

I. INTRODUCTION AND PURPOSE

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

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

Q2. Briefly describe your present responsibilities at The Brattle Group.

A2. As a Principal, it is my responsibility to research and direct research into the utility industry as it pertains to cost of capital and related issues. It is also my responsibility to consult on utility industry issues and testify on utility industry matters. Among my other duties is the supervision and training of staff and ensuring that work products are of high quality and accurate.

Q3. Briefly describe your education and professional qualifications.

A3. I have more than 20 years of experience working with regulated utilities on cost of capital and related matters. My practice focuses on cost of capital, regulatory finance, and accounting issues. I am the co-author of the text, "Risk and Return for Regulated Industries"[1] and a frequent speaker on regulated finance at conferences and webinars. I have testified or filed expert reports on cost of capital in Alaska, Arizona, California,

1 Bente Villadsen, Michael J. Vilbert, Dan Harris, A. Lawrence Kolbe, "*Risk and Return for Regulated Industries*," Academic Press, 2017.

Illinois, Michigan, New Mexico, New York, Oregon, and Washington, as well as before the Bonneville Power Administration, Federal Energy Regulatory Commission, the Surface Transportation Board, the Alberta Utilities Commission, and the Ontario Energy Board. I have provided white papers on cost of capital to the British Columbia Utilities Commission, the Canadian Transportation Agency as well as to European and Australian regulators on cost of capital. I have testified or filed testimony on regulatory accounting issues before the Federal Energy Regulatory Commission ("FERC"), the Regulatory Commission of Alaska, the Michigan Public Service Commission, the Texas Public Utility Commission as well as in international and U.S. arbitrations and regularly provide advice to utilities on regulatory matters as well as risk management.

I hold a Ph.D. from Yale University and as BS/MS from University of Aarhus, Denmark. Appendix A contains more information on my professional qualifications as well as a list of my prior testimonies and publications.

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

A4. DTE Electric Company ("DTE Electric" or the "Company") has asked me to estimate the cost of equity that the Michigan Public Service Commission (the "Commission") should allow DTE Electric an opportunity to earn on the equity-financed portion of its regulated utility rate base. My recommendation also considers the business and financial risk of the Company relative to the proxy companies to arrive at my recommendation for the allowed Return on Equity ("ROE").

Q5. Are you sponsoring any exhibits?

A5. Yes. I am sponsoring Exhibit A-14, Schedules D5.1 to D5.63 which contains the details of my analysis and supporting tables. I have provided a list of schedules of exhibits that I am sponsoring at the end of my testimony.

Q6. Were these Exhibits and the accompanying schedules prepared by you or under your supervision?

A6. Yes, it was.

II. SUMMARY OF CONCLUSIONS

Q7. Can you summarize your primary conclusions and opinions on the appropriate allowed ROE and business risk characteristics for DTE Electric?

A7. The current determination of DTE Electric's ROE takes place during extremely volatile market conditions due to the ongoing impacts from the COVID-19 pandemic, which has led to unprecedented low Treasury bond yields, substantial stock and oil price drops, while measures of volatility spiked to all-time highs and remain elevated compared to the long-term averages. At the same time, measures of the premium investors require over and above the risk-free rate to invest in equity has increased dramatically. In that light, it is important to assure investors that the allowed ROE and capital structure is such that DTE Electric not only can raise needed capital but also provide a return that is comparable to those that investors expect. DTE Electric's most recent rate case, U-20561 resulted in an ROE of 9.9 percent on a 50% equity capital structure,[2] and the prior rate case order in Case No. U-20162 from May 2019 resulted in an ROE of 10.0 percent on a 50% equity capital structure.[3] In May 2019, the market volatility measured by the Chicago Board Options Exchange's CBOE Volatility Index (VIX) was approximately 14.42, whereas the VIX reached an all-time high of 82.69 on March 16, 2020 and is currently at the elevated level of approximately 24.30. Similarly, Bloomberg's calculation of the market risk premium (the premium investors require over and above the risk-free rate to hold equity) was about 7.61% in May 2019. Since then it reached a high of 9.84% in March 2020 and as of June 1, 2020, it remains elevated at over 8.49%.[4] Simply put, the financial markets are in extreme turmoil, which has had a very negative impact on investors—not just in terms of return but also

---

2 Michigan Public Service Commission Order, Case No. U-20561, May 8, 2020, pp. 166-177.

3 Michigan Public Service Commission, Order, Case No. U-20162, May 2, 2019, pp. 54, 67.

4 Bloomberg, accessed June 1, 2020. Measured over 10-year US Treasury bond.

with regard to volatility and risk.[5] As a result, it is important to look to stability in investor allowed returns and recognize that the currently low Treasury yields are not reflective of a low cost of equity. Specifically, all data point to a higher return on equity as of today than at the time of the Company's previous rate case orders in May 2019 and May 2020. Put differently, if we assume 9.9 percent and 10.0 percent were appropriate in May 2020 and May 2019, respectively, then the ROE as of today must be higher. Consequently, I recommend a ROE of 10.25 percent for the additional reasons articulated below.

I calculate DTE Electric's cost of equity using two sets of data points of which one intends to capture the pre-COVID-19 financial reality and one that captures the later part of the COVID-19 financial environment. The reality that DTE Electric is likely to face going forward is unlikely to be captured by either set of input data, but more plausibly somewhere in between. To calculate the ROE that DTE Electric should be allowed an opportunity to earn, I used three distinct methods: (i) the Capital Asset Pricing Model (CAPM) and a variation thereof--the Empirical CAPM (ECAPM), (ii) the Discounted Cash Flow (DCF) model and a multi-stage variation, and (iii) a Risk Premium model. Each model has its pros and cons and I consider it important to consider multiple models.

As noted above, my recommendation relies on two sets of analyses. The first analysis reflects the market conditions and expectations prior to the impacts of COVID-19. The second analysis is as of May 2020 and reflects the heightened financial and economic uncertainty resulting from the pandemic, which has impacted many inputs to cost of equity estimation models. I consider a reasonable ROE for DTE Electric to be between these two sets of cost of equity calculations.

Regarding business risk, I note that risks for utilities have increased as demand has decreased, unemployment has risen dramatically, and a large portion of the economy

[5] I acknowledge that all of society has been impacted to a degree not seen in decades, but I focus my discussion on the financial and economic impacts in this report.

shut down for at least two months. The primary risk that DTE Electric and other utilities will face is a decline in load that is not fully compensated. This risk has been impacted by DTE Electric's recent relatively larger than average drop in load due to COVID-19,[6] the suspension of disconnects,[7] and not having a decoupling mechanism. I further discuss how these and other business risk factors affect the cost of equity in Section VI.

Based on my analyses of the three different cost of equity models, the two sets of market conditions, and DTE Electric's specific risks, I find that a reasonable return on equity for DTE Electric at the current time is 10.25 percent. This conclusion is based on the following observations:

- The reasonable range determined by each of the implemented models is as follows:

Figure 1: Summary of Reasonable Ranges and Estimates at 50% Equity

	Full Sample February 2020 [1]	Full Sample May 2020 [2]	High Capex Elec. February 2020 [3]	High Capex Elec. May 2020 [4]
CAPM/ ECAPM	9.00 - 10.0%	12.25 - 13.5%	8.5 - 8.75%	12.0 - 12.5%
DCF	8.75 - 10.25%	9.25 - 11.25%	9.0 - 10.25%	9.75 - 11.0%
Risk Premium	9.7 - 9.8%	n/a	n/a	n/a

[6] DTE Electric forecast an annual sales decrease of 6-9% for commercial sales, 18-22% for industrial sales, and 3-4% increase in residential sales. Whereas, EIA national average year-to-date and rolling 12 month sales declines of: -2.25% and -2% commercial, +1% and -3.8% industrial, and -6% and -3.25% residential, respectively.
DTE Energy, "DTE Business Update," May 27, 2020. Accessed June 4, 2020.
EIA, Electric Power Monthly, Released May 26, 2020. Accessed, June 4, 2020. https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_01
See also the testimony of Mr. Marcus B. Leuker for details on DTE Electric impacts.

[7] See testimony of Ms. Tamara Johnson.

These ranges reflect the financial conditions prior to the COVID-19 crisis (columns 1 and 3) as well as the current financial conditions (columns 2 and 4). Based on my analysis, I conclude as follows

- DTE Electric has higher business risk than the comparable electric utilities because of (1) customer non-payment risk due to recent economic uncertainties and lack of a revenue decoupling mechanism; (2) higher than average capital expenditure requirements making both an overall sample average and a High CapEx Electric range the most comparable; and (3) its ownership of nuclear generation, representing approximately 10% of its generation capacity.[8]

- The higher level of capital expenditures leads to higher risk, so that for example, the electric utilities that have a level of capital expenditures comparable to that of DTE Electric exhibit a CAPM/ECAPM and DCF cost of equity that is 0.2% to 0.7% higher than that of a sample that is not screened for capital expenditures. Hence, not only does financial economics indicate a higher ROE is warranted, but empirical data concurs.

- Covid-19 has increased investors required return, so that the Cost of Equity is higher today than what is reflected in the data the Commission reviewed in its May 2020 decision regarding DTEE's allowed ROE (9.9% in U-20561).

Q8. How is the remainder of your testimony organized?

A8. Section III formally defines the cost of capital and explains the techniques for estimating it in the context of utility rate regulation. Section III.A discusses conditions and trends in capital markets and their impact on the cost of capital, including impacts from the recent COVID-19 pandemic. Section V explains my analyses and presents the results. Section VI discusses DTE Electric's business risk characteristics, unique risks facing Michigan-based electric utilities, and other company-specific circumstances

[8] DTE Energy, 2019 10-K, p. 10.

relevant to my recommended allowed ROE. Finally, Section VII concludes with a summary of my recommendations.

III. COST OF CAPITAL PRINCIPLES AND APPROACH

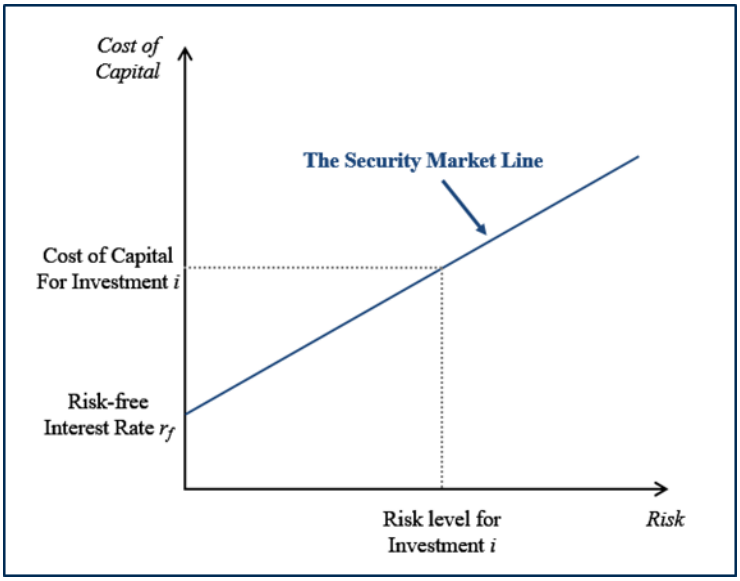
A. RISK AND THE COST OF CAPITAL

Q9. How is the "cost of capital" defined?

A9. The cost of capital is defined as the expected rate of return in capital markets on investments of equivalent risk. Cost of capital theory illustrates the direct relationship between risk and the expected rate of return – the higher the risk, the higher the cost of capital required. This relationship is represented in the "security market risk-return line" (or "Security Market Line" for short), which is depicted in Figure 2 below.

The cost of capital is comprised of the cost of debt and equity. Specifically, when estimating the cost of equity for a given asset or business, two categories of risk are important: (1) business risk and (2) financial risk. Business risk reflects the degree to which the cash flows generated by a business (and its assets) vary in response to moves in the broader market. Financial risk reflects the risk from the level of debt within a business.

Figure 2: The Security Market Line



Q10. What factors contribute to systematic risk for an equity investment?

A10. When estimating the cost of equity for a given asset or business venture, two categories of risk are important. The first is business risk, which is the degree to which the cash flows generated by the business (and its assets) vary in response to moves in the broader market. In context of the CAPM, business risk can be quantified in terms of an "assets beta" or "unlevered beta." For a company with an assets beta of 1, the value of its enterprise will increase (decrease) by 1% for a 1% increase (decline) in the market index.

The second category of risk relevant for an equity investment depends on how the business enterprise is financed and is called financial risk. Section III.B below explains how financial risk affects the systematic risk of equity.

Q11. What are the guiding standards that define a just and reasonable allowed rate of return on rate-regulated utility investments?

A11. The seminal guidance on this topic was provided by the U.S. Supreme Court in the *Hope* and *Bluefield* cases,[9] which found that:

- The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks;[10]
- The return should be reasonably sufficient to assure confidence in the financial soundness of the utility; and
- The return should be adequate, under efficient and economical management for the utility to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.[11]

Q12. How does the standard for just and reasonable rate of return relate to the cost of capital?

A12. The first component of the *Hope* and *Bluefield* standard, as articulated above, is directly aligned with the financial concept of the opportunity cost of capital.[12] The cost of capital is the rate of return investors can expect to earn in capital markets on alternative investments of equivalent risk.[13]

By investing in a regulated utility asset, investors are tying up some capital in that investment, thereby foregoing alternative investment opportunities. Hence, the

---

[9] 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").

[10] Hope, 320 U.S. at 603.

[11] Bluefield, 262 U.S. at 680.

[12] A formal link between the opportunity cost of capital as defined by financial economics and the proper expected rate of return for utilities was developed by Stewart C. Myers, "Application of Finance Theory to Public Utility Rate Cases*," Bell Journal of Economics & Management Science* 3:58-97 (1972).

[13] The opportunity cost of capital is also referred to as simply the "cost of capital," and can be equivalently described in terms of the "required return" needed to attract investment in a particular security or other asset (i.e., the level of expected return at which investors will find that asset at least as attractive as an alternative investment).

investors are incurring an "opportunity cost" equal to the returns available on those alternative investments. The allowed return on equity needs to be at least as high as the expected return offered by alternative investments of equivalent risk or investors will choose these alternatives instead. If it is not, the utility's ability to raise capital and fund its operations will be negatively impacted. This is a fundamental concept in cost of capital proceedings for regulated utilities such as DTE Electric.

Q13. Please summarize how you considered risk when estimating the cost of capital.

A13. To evaluate comparable business risk, I looked to a proxy group of regulated electric, natural gas, and water utilities. The electric, natural gas and water utilities I considered have a high proportion of regulated assets and revenue, with the majority of the natural gas and water utilities having more than 80% of assets subject to regulation (predominantly by state commissions). Additionally, all utilities I consider have a network of assets that are used to serve end customers and they are capital intensive (meaning that each dollar in revenue requires substantial investment in fixed assets). As discussed previously, I also look at a sub-group of electric utilities, which have a similarly high capital expenditure profile like DTE Electric. Further, (as explained in Section III.B below) I analyzed and adjusted for differences in financial risk due to different levels of financial leverage among the proxy companies. I also analyzed and adjusted for differences between the capital structures of the proxy companies and the regulatory capital structure that will be applied to DTE Electric for ratemaking purposes. To determine where in the estimated range DTE Electric's ROE reasonably falls, I compared the business risk of DTE Electric to that of the proxy group companies.

B. FINANCIAL RISK AND THE COST OF EQUITY

Q14. How does financial risk affect the estimation of a fair return on equity?

A14. Regardless of the method used to calculate the cost of equity (versions of the CAPM, DCF and risk premium), an issue in regulatory proceedings is how to apply data from a benchmark set of comparable securities when estimating a fair return on equity for

the target/regulated company.[14] It may be tempting to simply estimate the cost of equity capital for each of the proxy companies (using one of the above approaches) and average them. After all, the companies were chosen to be comparable in their business risk characteristics, so why would an investor necessarily prefer equity in one to the other (on average)?

The problem with this argument is that it ignores the fact that underlying asset risk (*i.e.*, the risk inherent in the lines of business in which the firm invests its assets) for each company is typically divided between debt and equity holders. The firm's debt and equity are therefore financial derivatives of the underlying asset return, each offering a differently structured claim on the cash flows generated by those assets. Even though the risk of the underlying assets may be comparable, a different capital structure splits that risk differently between debt and equity holders.

The relative structures of debt and equity claims are such that higher degrees of debt financing increase the variability of returns on equity, *even when the variability of asset returns remains constant*. Consequently, otherwise identical firms with different capital structures will impose different levels of risk on their equity holders. Stated differently, increased leverage adds financial risk to a company's equity.[15]

If the companies in a proxy group are truly comparable in terms of the systematic risks of the underlying assets, then the **overall cost of capital of each company** should be about the same across companies (except for sampling error), so long as they do not use extreme leverage or no leverage. This is because a firm's asset value (and return) is allocated between equity and debt holders. The expected return to the underlying

14 This is also a common valuation problem in general business contexts.

15 I refer to this effect in terms of financial risk because the additional risk to equity holders stems from how the company chooses to finance its assets. In this context financial risk is distinct from and independent of the business risk associated with the manner in which the firm deploys its cash flow generating assets. The impact of leverage on risk is conceptually no different than that faced by a homeowner who takes out a mortgage. The equity of a homeowner who finances his home with 90% debt is much riskier than the equity of one who only finances with 50% debt.

asset is therefore equal to the value weighted average of the expected returns to equity and debt holders – which is the overall cost of capital or the expected return on the assets of the firm as a whole.[16]

Q15. What is the theoretical basis supporting the notion that the overall cost of capital for each company should be about the same, regardless of capital structure?

A15. The notion that the overall cost of capital is constant across a broad middle range of capital structures is based upon the Modigliani-Miller theorem that choice of financing does not affect the firm's value. Franco Modigliani and Merton Miller eventually won Nobel Prizes in part for their work on the effects of debt.[17] Their 1958 paper made what is in retrospect a very simple point: if there are no taxes and no risk to the use of excessive debt, use of debt will have no effect on a company's operating cash flows (*i.e.*, the cash flows to investors as a group, debt and equity combined). If the operating cash flows are the same regardless of whether the company finances mostly with debt or mostly with equity, then the value of the firm cannot be affected at all by the debt ratio. In cost of capital terms, this means the overall cost of capital is constant regardless of the debt ratio, too.

Obviously, the simple and elegant Modigliani-Miller theorem makes some counterfactual assumptions: no taxes and no cost of financial distress from excessive debt. However, subsequent research, including some by Modigliani and Miller,[18] showed that while taxes and costs to financial distress affect a firm's incentives when choosing its capital structure as well as its overall cost of capital,[19] the latter can still

16 As this is on an after-tax basis, the cost of debt reflects the tax value of interest deductibility.

17 Franco Modigliani and Merton H. Miller (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment*," American Economic Review*, 48, pp. 261-297.

18 Franco Modigliani and Merton H. Miller (1963), "Corporate Income Taxes and the Cost of Capital: A Correction," *American Economic Review*, 53, pp. 433-443.

19 When a company uses a high level of debt financing, for example, there is significant risk of bankruptcy and all the costs associated with it. The so called costs of financial distress that occurs when a company is over-leveraged can increase its cost of capital. In contrast a company can generally decrease its cost

be shown to be constant across a broad range of capital structures.[20]

This reasoning suggests that one could compute the overall cost of capital for each of the proxy companies and then average to produce an estimate of the overall cost of capital associated with the underlying asset risk. Assuming that the overall cost of capital is constant, one can then re-arrange the overall cost of capital formula to estimate what the implied cost of equity is at the target company's capital structure on a book value basis.[21]

Q16. What other methods do you use to account for financial risk when determining the cost of equity?

A16. An alternative approach to account for the impact of financial risk is to examine the impact of leverage on beta in the CAPM. The so-called Hamada method allows a financial analyst to adjust for differences in financial risk by first translating the equity beta obtained from market data into an asset beta (or a zero-debt beta) using the comparable companies leverage and second relever (or translating) the asset beta for the comparable companies into an equity beta for the target company using the regulated entity's capital structure. [22]

While there are several versions of the Hamada adjustment procedures as discussed in the Appendix, the need to consider leverage is ubiquitous among finance practitioners when using the CAPM to estimate discount rates.

---

of capital by taking on reasonable levels of debt, owing in part to the deductibility of interest from corporate taxes.

20 This is a simplified treatment of what is generally a complex and on-going area of academic investigation. The roles of taxes, market imperfections and constraints, etc. are areas of on-going research and differing assumptions can yield subtly different formulations for how to formulate the weighted average cost of capital that is constant over all (or most) capital structures.

21 Market value capital structures are used in estimating the overall cost of capital for the proxy companies.

22 Hamada, R.S., "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stock", *The Journal of Finance*, 27(2), 1971, pp. 435-452.

C. Approach To Estimating the Cost of Equity

Q17. How do you approach your estimation of the cost of equity for DTE Electric?

A17. To analyze the cost of equity for DTE Electric, I evaluate companies of comparable business risk by choosing a proxy group of publicly traded regulated electric utilities as well as a group of highly regulated natural gas distribution and water utilities. These non-electric utilities are relevant because they generally face the same regulation as do electric utilities and are less prone to ongoing state-specific initiatives to reduce carbon emissions than are electric utilities. Specifically, I use three models to analyze the cost of equity for DTE Electric: (1) the Capital Asset Pricing Model (CAPM) as well as an Empirical version thereof, the ECAPM, (2) the Discounted Cash Flow (DCF) models (single-stage and multi-stage), and (3) the Risk Premium. With the recent increase in volatility and uncertainty in the markets, I estimate the cost of equity using two different implementations of the CAPM and DCF models to determine a fair and reasonable ROE for DTE Electric. The first reflects markets conditions and expectations prior to COVID-19 and the second reflects the current economic and financial conditions and the ongoing impacts of the pandemic. I consider both of these analyses to provide a reasonable range of the expected economic and financial conditions going forward. Section V further explains the analyses and results.

Q18. How does your approach and the models you employ compare to what the Commission has considered in prior DTE Electric proceedings?

A18. The Commission has in past decisions considered the DCF, CAPM, and Risk Premium models, as do I. Additionally, the Commission has recognized that "atypical market conditions" deserve consideration when setting the ROE.[23] The Commission also stated that it will "continue to monitor a variety of market factors in future applications, including market reactions to recent events and measures of volatility and uncertainty, as well as measures of investor confidence, and the utility's risk profile."[24] I further

[23] Michigan Public Service Commission Order for Case No. U-18255, April 18, 2018, p. 33.

[24] Michigan Public Service Commission Order for Case No. U-20561, May 8, 2020, pp. 177.

discuss the current capital market condition and the impacts they have on determining DTE Electric's cost of equity capital in Sections IV and V below.

IV. CAPITAL MARKET CONDITIONS

Q19. What do you cover in this section?

A19. In this section, I address recent changes in capital market conditions and the increased volatility in equity and debt markets and how that affects the cost of equity and its estimation. Specifically, I address (i) interest rate developments; (ii) recent changes in utility credit spreads; and (iii) investors perception of the market risk premium.

Q20. Can you provide a summary of recent events, which have impacted capital market conditions?

A20. Capital markets have seen historic changes in recent months due to global events, including the COVID-19 pandemic. In early 2020, long-standing economic uncertainties, which had been weighing on capital markets, were resolved. In January 2020, a series of trade deals were signed by the U.S. easing global trade tensions—Phase 1 of the U.S.-China trade deal and the USMCA were both signed in January. In addition, after years of negotiations, the United Kingdom finalized Brexit negotiations and withdrew from the European Union on January 31, 2020.

Around the same time, a novel virus was beginning to spread around the globe and on March 11, 2020 the World Health Organization declared the COVID-19 outbreak was a pandemic.[25] In response, many governments around the world strived to limit the health and economic impacts of the pandemic. In the U.S., state and local governments issued stay-at-home orders beginning in mid-March and encouraged people to practice social distancing. Large portions of the economy suddenly shut down which, so far, has

[25] World Health Organization, "WHO Director-General's opening remarks at the media briefing on COVID-19 – 11 March 2020", press release, March 11, 2020.
https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020

resulted in approximately 43 million people in the U.S. filing unemployment claims since March 21.[26] In Michigan, over one-third of the workforce has filed initial unemployment claims since the pandemic began, which is significantly higher than during the global financial crisis.[27] The outlook in Michigan is discussed in the testimony of Company witness Leuker.[28] To address the economic impacts, the U.S. Federal Government passed the $2.1 trillion CARES Act on March 27,[29] which is an economic stimulus package approximately 60% larger than the U.S. Government's 2019 discretionary spending budget.[30] The U.S. Federal Reserve cut its policy rate twice in March to its current level of 0 to 0.25 percent—a level last seen in the global financial crisis.[31] The U.S. Federal Reserve also announced "unlimited" quantitative easing and emergency liquidity programs to support financial markets. This has increased the Federal Reserve's balance sheet to a record high of over $7 trillion.[32] Despite this, business activity has slowed substantially. In April 2020, industrial production fell by 11.2% (the largest decline since the government began tracking the

---

26 U.S. Department of Labor, "Unemployment Insurance Weekly Claims," News Release, June 4, 2020.

27 Frank Witsil, "Michiganders filed nearly 58,0000 new unemployment claims last week," *Detroit Free Press*, May 28, 2020, accessed May 31, 2020, https://www.freep.com/story/news/local/michigan/2020/05/28/michigans-economy-jobless-unemployment-claims/5274023002/.

28 Testimony of Mr. Markus B. Leuker, Exhibit A-15, Schedule E4.

29 The White House, "Statement by the President," March 27, 2020, accessed April 16, 2020, https://www.whitehouse.gov/briefings-statements/statement-by-the-president-38/.

30 Congressional Budget Office, "10 Year Budget Projections – March 2020", accessed March 31, 2020, https://www.cbo.gov/about/products/budget-economic-data

31 U.S. Federal Reserve, "Federal Reserve Announces Extensive New Measures to Support the Economy," Press Release, March 23, 2020.

32 Reuters, "BRIEF – Fed balance sheet now tops $7 trillion," *Reuters*, May 21, 2020, accessed May 28, 2020, https://www.reuters.com/article/brief-fed-balance-sheet-now-tops-7-trill/brief-fed-balance-sheet-now-tops-7-trillion-idUSN9N2BX001

data 101 years ago) and manufacturing output declined by a record 13.7%.[33] Over 1.3 million people in the manufacturing sector have been laid off since March 2020.[34]

Q21. What are expectations going forward?

A21. The extent and length of the economic recovery from COVID-19 are as of yet unknown. The impact to GDP and unemployment will depend on how long social distancing measures remain in place and how long lingering consumption and behavioral changes persist. Currently, most economists expect a severe near-term negative impact to GDP with recovery by late 2020 to early 2021. Already, 1st quarter 2020 GDP decreased by an annual rate of 5.0% according to the Bureau of Economic Analysis.[35] The Federal Reserve Bank of Atlanta's GDPNow Forecast estimates a 52% annualized decline in 2nd quarter 2020 GDP.[36] Likewise, the Congressional Budget Office ("CBO") estimates a 38% annualized 2nd quarter GDP decline.[37]

The CBO estimates that real 2020 GDP will decline by 5.4% before recovering in 2021 when GDP will increase by 5.7%.[38,39] Similarly, Blue Chip Economic Indicators' ("BCEI") May 2020 survey expects real GDP to contract by 5.8% in 2020 but also forecasts the economy to recover by 4.0% in 2021.[40] However, BCEI cautions that

---

33 David Harrison, "Industrial Production U.S. Fell 11.2% in April," *The Wall Street Journal*, May 15, 2020. Accessed May 28, 2020, https://www.wsj.com/articles/industrial-production-in-u-s-fell-11-2-in-april-11589550482.

34 Id.

35 Bureau of Economic Analysis, "Gross Domestic Production, 1st Quarter 2020 (Second Estimate); Corporate Profits, 1st Quarter 2020 (Preliminary Estimate)," U.S. Department of Commerce, May 28, 2020. Accessed May 28, 2020, https://www.bea.gov/news/2020/gross-domestic-product-1st-quarter-2020-second-estimate-corporate-profits-1st-quarter.

36 Federal Reserve Bank of Atlanta, GDPNow, accessed June 2, 2020, https://www.frbatlanta.org/cqer/research/gdpnow?panel=4.

37 Congressional Budget Office, "Interim Economic Projections for 2020 and 2021," May 2020. Accessed May 28, 2020, https://www.cbo.gov/system/files/2020-05/56351-CBO-interim-projections.pdf.

38 *Id*.

39 I note that Company witness Leuker references real growth, while I reference nominal growth and that different sources for the actual figures may lead to slight differences.

40 *Blue Chip Economic Indicators*, May 2020, pp. 2-3.

despite the forecasted recovery, GDP levels will remain below 4th quarter 2019 levels through all of 2020 and 2021.[41] The impacts of the potential recession are just now becoming apparent—such as record unemployment and decreases in economic activity—and such impacts may persist for the near to medium-term. The longer-term impacts on consumer behaviors and investors' risk perceptions are yet to be determined.

Q22. How do these events impact the cost of equity estimation for DTE Electric?

A22. It is important to remember that the cost of equity and capital structure established for DTE Electric in this proceeding are expected to be in effect beyond the current extraordinary economic impacts of the COVID-19 pandemic. The analysis and recommendations should reflect expected market conditions and not exclusively the current market conditions. As discussed further below in this section, many of the input parameters to the cost of equity estimation methodologies are currently at unprecedented levels. Sole reliance on current economic conditions to anchor DTE Electric's cost of equity or capital structure would unfairly lock DTE Electric and its customers into the current extraordinary economic conditions. Doing so would also not provide a fair return, especially when compared to other utilities that did not undergo a cost of capital proceeding during this period. At the same time, the current market conditions create an exorbitant amount of uncertainty and if the financial crisis can be used as a guide, investors' heightened perceptions of risk is likely to linger.[42] To this end, I have analyzed DTE Electric's cost of equity reflecting the forecasted financial and economic conditions that prevailed prior to COVID-19 as well as the currently forecasted financial and economic conditions. As the economy begins to reopen and recover, economic and financial uncertainty is expected to decline. Therefore, these two analyses provide a reasonable range of cost of equity estimates, which reflect the

---

41 *Ibid*., p. 1.

42 See, for example, Fernando Duarte and Carlo Rosa, "The Equity Risk Premium: A Review of Models," *Federal Reserve of New York*, 2015. The authors show that not only did the MRP increase dramatically during the financial crisis of 2008-09, but the effect lingered through 2012-13 showing that a disruption to financial markets can linger for a long time.

expected economic and financial conditions that will prevail through mid-2022, the relevant regulatory period of this proceeding.

A. INTEREST RATES

Q23. How do interest rates affect the cost of equity estimation?

A23. The current interest rate environment affects cost of equity estimation in several ways. Most directly, the Capital Asset Pricing Model (CAPM) takes as one of its inputs a measure of the risk-free rate (see Figure 2). The estimated cost of equity using the CAPM decreases (increases) by one percentage point when the risk free rate decreases (increases) by one percentage point. Therefore, to the extent that prevailing government yields are depressed due to economic uncertainties related to COVID-19 or the monetary policy responses, using current yields as the risk-free rate will depress the CAPM estimate below what is representative of the forward-looking cost of equity, which will be in effect during the relevant regulatory period. Put another way, with current government bond yields downwardly biased due to flight-to-quality behavior by investors and "unlimited" quantitative easing programs by the U.S. Federal Reserve, using current yields in the CAPM will also downward bias the cost of equity estimate. To avoid such a bias it is important to use a forecasted risk-free rate and consider whether the rate needs to be normalized (or the risk premium investors require needs to be adjusted) to ensure the resulting CAPM estimate reflects a non-biased estimate of DTE Electric's cost of equity over the relevant regulatory period. As the economy begins to recover, as forecasted, in late 2020 and 2021, which is prior to the start of the projected test period in this proceeding, interest rates are expected to increase from current lows. Therefore, the allowed fair return on equity for utilities should reflect the future interest rate environment.

Q24. What is the current evidence regarding interest rates?

A24. Interest rates are currently near historic lows due to flight-to-quality behaviors by investors as well as the Federal Reserve's expansion of its quantitative easing programs. Interest rates on 10-year U.S. Government bonds were at 1.86% at the end

of 2019.[43] As large parts of the economy began to shut down in response to the pandemic, investors fled riskier assets for safer assets. This demand for U.S. government bonds causes bond yields to decrease rapidly. On March 9, 2020, the entire U.S. yield curve fell below 100 bps for the first time in history and the 10-year U.S. government bond yield hit a record low of 0.339%.[44] Since then, long-term government bond yields have increased somewhat—10 year U.S. Government bond yields are currently at 0.928%.[45]

Most economists expect the economy to begin to recover in late 2020 and 2021.[46] This is expected to cause interest rates to rise from near-historic lows. Blue Chip Economic Indicators' ("BCEI") May 2020 edition forecasts that the yield on 10-year treasury bonds will increase to 1.2% by 2021.[47] That is, the consensus forecast is that the yield on long-term treasury bonds will double over the next year. BCEI projects the 10-year government bond yield will be 2.3% and 2.5% in 2022 and 2023, respectively, in their most recent long-term forecast.[48] The expectations for 2021 and onward is what is relevant for this proceeding as rates are expected to be in effect through April 2022. Because the risk-free rates is an input to several cost of equity estimation models, the relationship between current and forecasted risk-free rates is an important consideration.

B. YIELD SPREADS

Q25. Why are bond yield spreads relevant to your cost of equity analysis?

---

43 Bloomberg as of June 5, 2020.

44 Sunny Oh, "Treasury yield curve sinks below 1% after oil and coronavirus worries rout stocks," *Market Watch*, March 9, 2020, accessed March 31, 2020, https://www.marketwatch.com/story/30-year-treasury-yield-tumbles-below-1-after-oil-and-coronavirus-worries-rout-stocks-2020-03-09

45 Bloomberg, as of June 5, 2020.

46 For example, Blue Chip Economic Indicators, May 2020 collects real GDP growth data from 40 financial institutions, academic institutions and other entities – almost all of whom predict a positive growth for 2021 with an average of 4.0 percent.

47 Blue Chip Economic Indicators, April 2020, p. 3. The maturity premium for a 20-year treasury bond over a 10-year treasury bond is about 50 basis points.

48 *Blue Chip Economic Indicators*, March 2020, p. 14.

A25. Bond yield spreads (also called credit spreads) reflect the premium that investors demand to hold debt securities (specifically corporate bonds) that are not risk free. Analogously, the Market Risk Premium (MRP)—which is a key input to the CAPM cost of equity estimation—represents the risk premium that investors require to hold equities rather than risk-free government bonds.

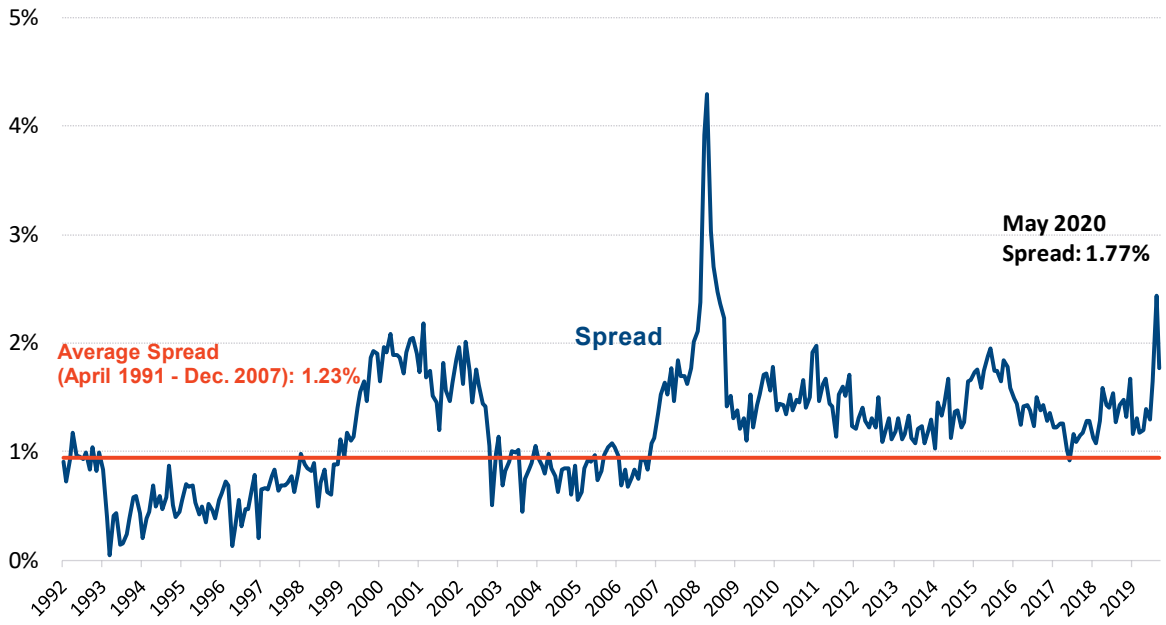
If bond yields are influenced to some extent by the same underlying market factors that drive the systematic risk premium for equities, shifts in directly observable credit spreads can assist with inference about changes in the MRP, which itself must be estimated.[49] More specifically, if both credit spreads and equity premiums are determined in part by the general premium required by investors for bearing systematic risk, then an increase in credit spreads may indicate an increase in the forward-looking MRP.

Q26. How does the current spread between utility and government bond yields compare to the historical spread?

A26. Utility bond yields have increased substantially recently as investors require additional compensation to hold non-government debt due to the increased business risks and economic uncertainties. As shown in Figure 3 below, spreads between 20-year A-rated utility bond yields and 20-year U.S. government bond yields are currently at 1.77%, approximately 50 basis points above the pre-financial crisis average of 1.23%.

[49] This is the same issue as in cost of capital estimation more generally: the cost of debt can often be directly observed in the form of market bond yields, whereas the cost of equity must be estimated based on financial models.

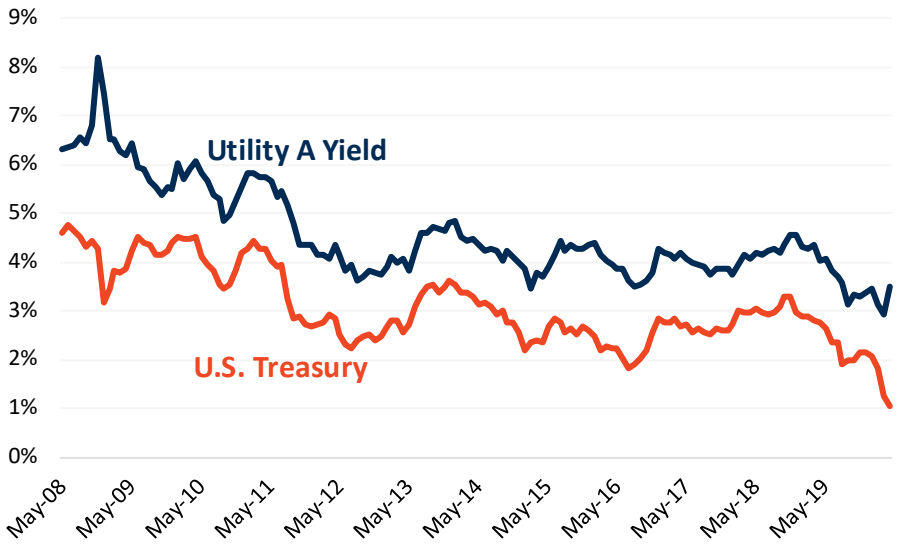
Figure 3: Yield Spread Between Utility A-rated Bonds Yields and. 20 Year U.S. Treasury Bonds



Source: Bloomberg, data as of June 5, 2020.

The yield spread is commonly thought to be explained by default risk, taxes, downward pressure on government bond yields due to monetary policy, or the equity risk premium. Hence, an increase in the spread could be caused by any or all of these components. As the default risk has generally not changed and taxes are generally a very small portion of the spread, the remaining components: downward pressure and the equity risk premium must explain the majority of the spread increase. Figure 4 below illustrates that the increased spread is attributable both to lower yields on government bonds and also an increased premium required by investors to hold riskier assets.

Figure 4: Utility A-Rated Bond Yields and 20 Year U.S. Treasury Yields



Source: Bloomberg, data as of June 5, 2020.

While spreads have narrowed since the height of the COVID-19 pandemic in March and April, they remain elevated compared to the pre-COVID-19 period indicating lingering uncertainty and elevated risk. On April 2, 2020, S&P Global downgraded the outlook for North American utilities from "stable" to "negative" due to COVID-19 risks, citing concerns about the adequacy of utilities' financial cushions to weather the financial downturn.[50] With heightened concern about utility credit, spreads and risk premiums are likely to remain elevated. In Section VI below, I further discuss how these and other risks affect DTE Electric's business risk profile.

C. Risk Premiums

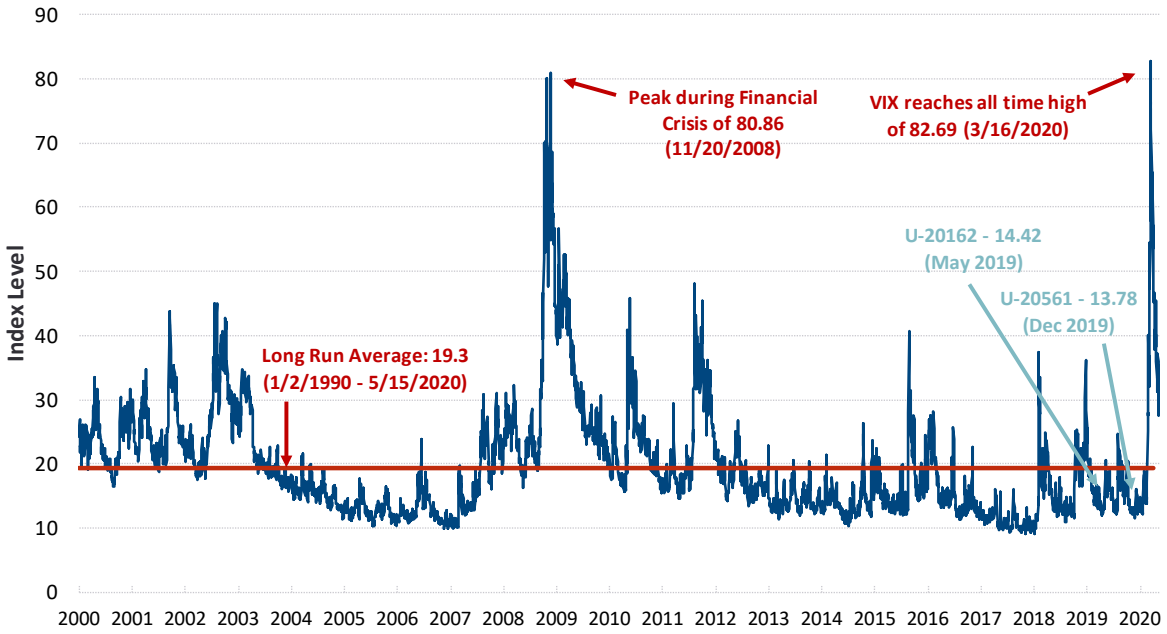
Q27. What is the current evidence regarding market volatility?

A27. Recently, financial markets have become extremely volatile as shown in near-term common volatility measures, such as the VIX, which is frequently referred to as the

[50] *S&P Global Market Intelligence*, "S&P lowers North American utilities outlook to negative on coronavirus risk," April 2, 2020, Accessed April 3, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/s-p-lowers-north-american-utilities-outlook-to-negative-on-coronavirus-risk-57886477.

market's fear index. The VIX reached an all-time high of 82.69 on March 16, 2020, which was higher than the peak of 80.86 during the Financial Crisis. Although, the VIX has slowly retreated from recent highs to 24.30, it remains elevated relative to the long run average of 19.3. Comparably, at the time of the Commission's Order in Case No. U-20162 (May 2019), the VIX stood at approximately 14.42 and at the close of the record in U-20561 (December 2019) the VIX was 13.78. Clearly, investors are faced with substantially higher volatility today than during DTE Electric's recent rate cases and higher volatility implies a higher risk premium.

Figure 5
VIX



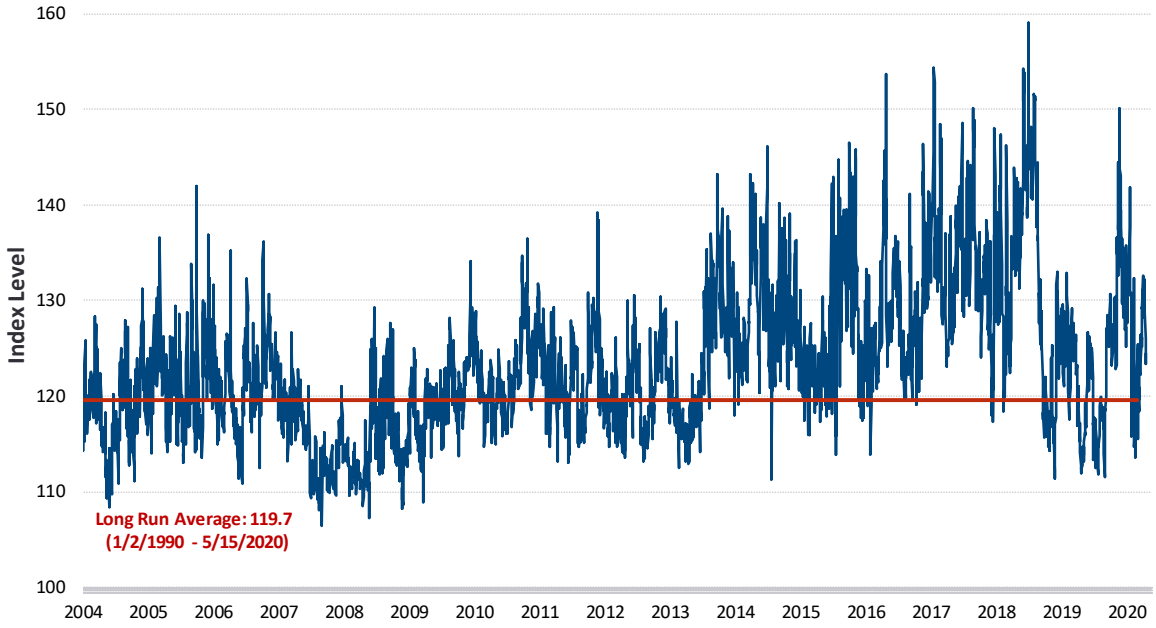
Source: Bloomberg as of 5/15/2020

Similarly, the SKEW index, which measures the market's willingness to pay for protection against negative "black swan" stock market events (*i.e.*, sudden substantial downturns),[51] shows that investors are cautious. A SKEW value of 100 indicates outlier returns are unlikely, but as the SKEW increases, the probability of outlier returns becomes more significant. Figure 6 below shows the development in the SKEW since

[51] For example, http://www.cboe.com/products/vix-index-volatility/volatility-indicators/skew.

2005 and that the index has recently increased following a period of declining SKEW. The index spiked over 141 on February 19, 2020, which is 22 points above its long run average of 119. The recent spike in the SKEW shows that investors are willing to pay for protection against downside risks.

Figure 6
SKEW



Source: Bloomberg as of 5/15/2020

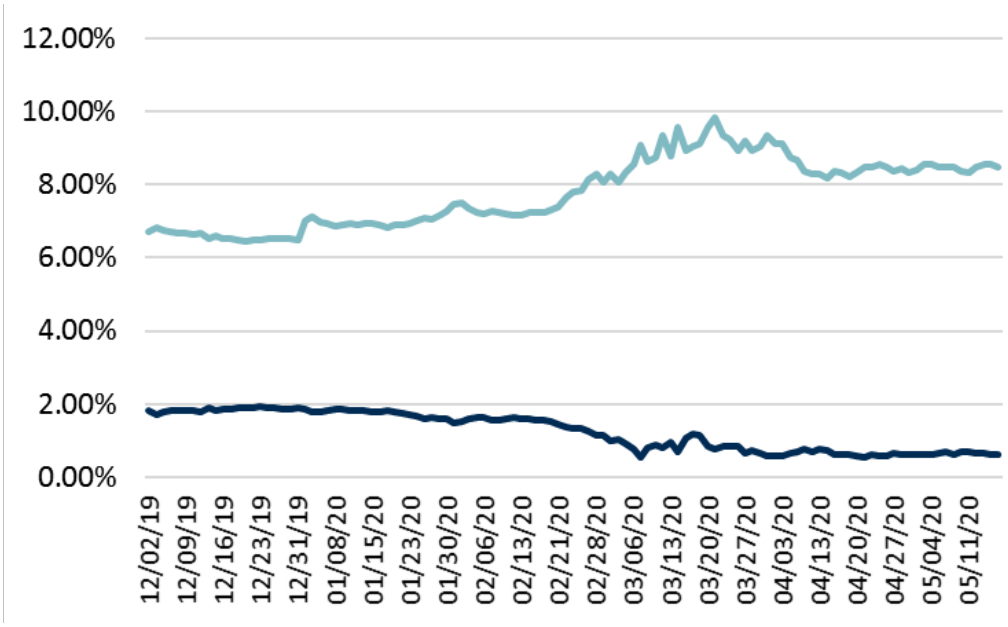
The currently very high level of both the VIX and SKEW is consistent with day-to-day observations of volatile financial markets and shows that investors are cautious about investing in equity. Such circumstances lead investors to require a higher premium to invest in assets or financial instruments that are not risk-free.

Q28. Can you explain the current evidence related to the market equity risk premium?

A28. The heightened volatility has increased the premium that investors require to hold risky assets, especially when measured based on forward-looking methodologies that estimate expected market returns with reference to current dividend yields. Bloomberg's estimate of the market equity risk premium ("MRP") for the U.S. has

increased to as high as 9.84% and is currently at 8.49%.[52] At the same time, the market equity risk premium that results from FERC's methodology increased to 9.64% and 10.02% as of March 20, 2020 using the Midcontinent Independent System operator ("MISO") and New England Transmission Owners' ("NETO") methodology, respectively.[53,54] This is consistent with an increase in the MRP of 150-300 basis points relative to the historical average.[55]

Figure 7: Bloomberg's Daily Market Equity Risk Premium and Risk Free Rate



Q29. Are higher equity risk premiums relevant given that treasuries are near historic lows?

A29. Yes—this is highly relevant for cost of equity estimation as current risk-free rates are extremely low. On March 9, 2020, the entire U.S. yield curve settled below 1.00% for

---

52 Bloomberg, accessed June 1, 2020. Measured over 10 Year U.S. Treasury bond.

53 FERC Opinion No. 569, Docket No. EL14-12-003, EL15-45-000, November 21, 2019, FERC Order Directing Briefs, Docket No. EL11-66-001 et al., October 16, 2018; see also attached workpaper.

54 A more recent calculation of the MRP using FERC's methodology shows and MRP in the range of 8.52% (NETO) and 8.97% (Opinion 569-A, MISO)

55 The long-term historical average arithmetic MRP as calculated by Duff & Phelps using the Ibbotson method is 6.91 percent. Source: Duff & Phelps 2019.

the first time in history.[56] Since then, U.S. Government bond yields have increased somewhat with the 20-year and 30-year bond yields at or slightly above 1.00%. This decrease in bond yields has occurred as investors fled to safer assets due to the heightened market uncertainty. As shown above in Figure 7, the market equity risk premium has also increased as risk-free rates decreased.

Further, as shown in both academic and industry analysis, the allowed risk premium over the risk-free rate is inversely related to the risk-free rate. For example, Villadsen *et al.* (2017) found that the allowed risk premium increases by approximately 0.44% for each 1% decline in the risk-free rate.[57] Morin finds that the risk premium increases by 0.52% for each 1% decline in the risk-free rate.[58] Thus, the risk premium is likely to increase as the risk-free rate declines. This phenomenon is also documented in the forward-looking market risk premium calculated by Bloomberg. According to Bloomberg, the current market risk premium is 7.92 percent, which is substantially higher than the historical average MRP of about 6.9 percent. It is also an increase over the forward-looking MRPs at the end of 2019, which were much more in line with the historical average MRP.

Q30. Is there evidence that the MRP will remain elevated going forward?

A30. Yes. In 2015, Duarte and Rose of the Federal Reserve of New York performed a study that aggregated the results of many models of the required MRP in the United States and tracked them over time.[59] This analysis found a very high MRP after the financial crisis, relative to time periods prior the crisis.

---

[56] According to the Federal Reserve, the yield on the 10-year, 20-year, and 30-year Treasury bonds on March 9, 2020 was 0.54%, 0.87%, and 0.99% respectively. These yields have since increased slightly. Source:https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yield

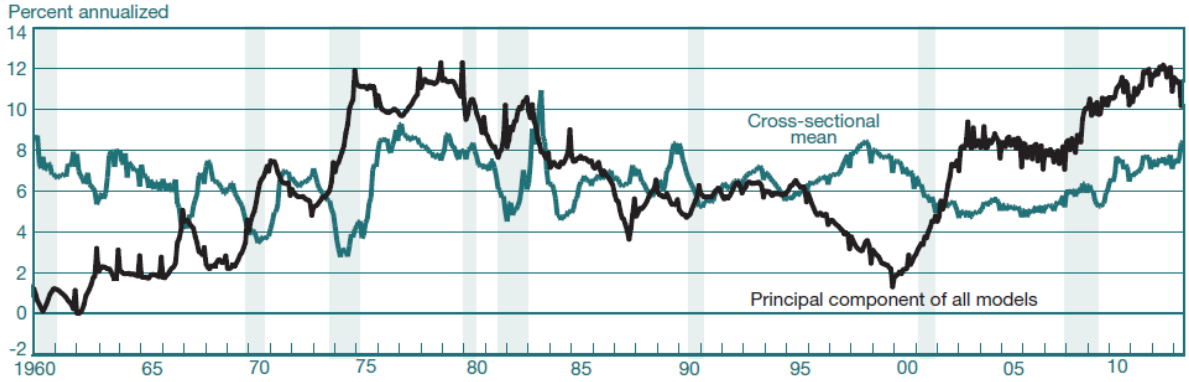
[57] Bente Villadsen, Michael J. Vilbert, Dan Harris, and A. Lawrence Kolbe, "*Risk and Return for Regulated Industries*," Academic Press, 2017, pp. 118-119.

[58] Roger A. Morin, "*New Regulatory Finance*," Public Utilities Reports, Inc., 2006, pp. 123-125.

[59] Fernando Durate and Carlo Rosa, "The Equity Risk Premium: A Review of Models," *Federal Reserve Bank of New York*, December 2015 ("Duarte and Rosa, 2015")

The authors estimated the MRP that resulted from a range of models each year from 1960 through the time of their study. The authors then reported the average as well as the first principal component of the results.[60] The authors found that the models used to determine the risk premium were converging to provide comparable estimates and that the average annual estimate of the MRP had reached an all-time high in 2012-2013. (Figure 6 below is a copy of the summary chart from Duarte and Rosa's 2015 paper). These directional trends identified by Duarte and Rosa are reasonably consistent with those observed from Bloomberg and they further support the proposition that the elevation of the MRP over its historical pre-crisis levels was a persistent feature of capital markets in the time following the financial crisis. Therefore, it is reasonable to expect that the current MRP will remain elevated compared to historical levels, especially given the uncertainty related to the extent of economic and financial impacts from COVID-19.

Figure 8: Duarte and Rosa's Chart 3
One-Year Ahead MRP and Cross-Sectional Mean of Models



https://www.newyorkfed.org/research/staff_reports/sr714.html.

[60] Duarte and Rosa emphasize the "first principal component" of the 20 models. This means that the authors used statistics to compute the weighted average combination of the models that captures the variability among the 20 models over time.

V. ESTIMATING THE COST OF EQUITY

A. APPROACH TO COST OF EQUITY ESTIMATION

Q31. Can you explain your approach to estimating the cost of equity for DTE Electric in the current environment?

A31. As discussed in Section IV, the current extraordinary financial and economic uncertainty related to COVID-19 has led to increased risk perception by investors which has impacted the inputs and assumptions that are used in cost of equity estimation methodologies. It is important to remember that DTE Electric's cost of equity and capital structure established in this proceeding will be in effect through at least mid-2022. As a result, I estimated DTE Electric's cost of equity using two sets of analyses. The first estimates the cost of equity using inputs and assumptions as of the end of February 2020 and reflects the financial and economic conditions and forecasts prior to COVID-19. The second is a modified implementation that uses inputs and assumptions as of May 2020 and reflects the heightened financial and economic uncertainty due to the on-going COVID-19.

I rely on both sets of analyses to determine a reasonable and fair return on equity for DTE Electric. Given the substantial impacts that COVID-19 has already had on the economy and financial markets, DTE Electric's return on equity should certainty be higher than it was at the beginning of the year. However, as the economy begins to reopen and progress is made on treatments and a vaccine for COVID-19, risk is expected to decrease from current levels. Therefore, the results of these analyses serve to establish a reasonable range of expected economic and financial conditions to determine a cost of equity recommendation.

Q32. Can you further describe your two approaches to estimating the cost of equity?

A32. The two approaches both analyze DTE Electric's cost of equity using the CAPM/ECAPM and DCF models.[61] In addition, both approaches rely on the same set of regulated electric, natural gas, and water utilities in my proxy groups.

The key difference is that the two approaches are estimated at two different points in time – pre-COVID-19 (February 2020) and current conditions (May 2020). As a result, the cost of equity parameters, such as the market equity risk premium and growth estimates, reflect the market conditions and expectations that existed at the time. Secondly, the systematic risk of utilities (beta) has increased by 60% to 80% relative to their historical levels and that of early 2020. Therefore, in my second approach (May 2020), I use daily betas measured from January 1, 2020 through May 15, 2020. This allows me to capture change in systematic risk since the onset of COVID-19. Using five and half months of daily betas allows me to have enough observations to ensure that the betas are statistically meaningful while only capturing recent changes in the systematic risk. Whereas, in the pre-COVID-19 approach, I use five year weekly beta as of February 2020.

In the remainder of Section V, I present the inputs, assumptions, and results from both cost of equity estimation approaches.

B. PROXY GROUP SELECTION

Q33. How do you identify sample companies of comparable business risk to DTE Electric?

A33. DTE Electric is a regulated electric utility. The business risk associated with these business activities depend on several factors, including the specific characteristics of the service territory and regulatory environment in which the utility operates. Consequently, it is not possible to identify publicly traded companies that replicate every aspect of DTE Electric's business risk profile. However, an appropriate starting

[61] I also utilize the Risk Premium approach, which relies on information from past rate cases, historical yields on government bonds and BCEI's latest long-term government bond yield forecast (published March 2020). Therefore, I only implement the Risk Premium approach once. See Section V.F.

pointing to create proxy groups of comparable business risk to DTE Electric is to select other companies whose primary business operations are concentrated in regulated industries or companies that have similar lines of business and/or business environments. As a second step, I must evaluate DTE Electric or Michigan-specific risks to ensure that the Company's ROE is appropriately placed relative to the proxy samples.

To that end, I have selected two proxy groups composed of regulated utility companies that focus on (i) the provision of electricity to end-users ("Electric Utility Proxy Group") and (ii) the provision of other highly-regulated utility services (*i.e.*, natural gas or water) to end customers. These proxy groups are similar to DTE Electric in that they are rate regulated by state utility commissions, serve customers through a network of assets, and rely on substantial capital to provide service—that is, they are capital intensive like DTE Electric.

It is important that the proxy groups used to assess the cost of equity for DTE Electric (absent any unique Michigan or Company specific characteristics) are comprised of regulated entities, because regulation tends to place substantial requirements and protections on the companies. I also believe the physical characteristics of the industry—*e.g.*, network, capital intensive, serving many different customers—are characteristics of DTE Electric and of other highly regulated utilities. The network characteristic implies that assets cannot readily be employed in a different capacity; the capital intensive characteristic affects the operating risks through the split between fixed and variable costs; and the customer composition affects the demand risk.

Q34. How do you identify suitable utilities for inclusion in your proxy groups?

A34. First, I start with the universe of publicly traded electric, natural gas distribution, or water utilities reported by Value Line Investment Analyzer ("Value Line"). It is necessary to focus on publicly traded companies because non-traded entities do not have the necessary stock price data to utilize the financial models relied upon to estimate the cost of equity. Second, I narrow down this universe of electric, natural gas

distribution, or water utilities identified by Value Line using the following screening criteria:

- Must be an investment grade utility
- Must have annual revenues greater than $300 million
- Must pay dividends with no dividend cuts for three years
- Cannot have engaged in substantial merger or acquisition activity for three years.
- Must have sufficient data for estimation

Third, I review business descriptions and financial reports of these companies and eliminate those that have less than 50% of their assets dedicated to regulated utility activities. Within this group of companies, I apply further screening criteria to eliminate companies with recent significant events (*i.e.*, litigation) that could affect the market data necessary to perform cost of capital estimation.

To the degree that a subset or subsets of these utilities have risk characteristics that match those of DTE Electric to a larger extent, subset(s) will be created and analyzed. For example, DTE Electric has a larger capital expenditure than the average company does in the electric sample, so I consider a subset of that sample that has capital expenditures that are at the same level as those of DTE Electric.

Q35. What are the results of your sample selection process?

A35. The selection process produced a proxy group of 29 regulated electric utilities, 7 natural gas distribution utilities, and 5 water utilities. Figure 9, Figure 10, and Figure 11 below list these utilities and selected financial characteristics.

Q36. What are the characteristics of your Electric Utility Proxy Group?

A36. The Electric Utility Proxy group is comprised of electric utilities whose primary source of revenues and the majority of its assets are subject to regulation. The final proxy group consists of 29 electric utilities listed in Figure 9 below. These companies own regulated electric utility subsidiaries and are classified by EEI as either “regulated” (having at least 80% of their assets dedicated to regulated utility operations) or “mostly

regulated" having less than 80% regulated assets.[62] (These EEI categories are designated with an "R" or "M" in the Figure below). Therefore, the Electric Utility Proxy Group is broadly representative of the regulated electric industry from a business risk perspective.

Figure 9 reports the proxy companies' annual revenues for the most recent four quarters as of Q4 2019, the companies' market capitalization, credit rating, beta, and growth rates. The market capitalization, betas, and growth estimates for both cost of equity estimation dates are presented side-by-side. The annual revenue as well as the market capitalization was obtained from Bloomberg. The credit rating is reported by Bloomberg. The growth rate estimate is a weighted average between estimates from Thomas Reuters and *Value Line*. The betas were obtained from *Value Line* for my February 2020 analysis. The daily betas in the May 2020 analysis were obtained from Bloomberg.

62 Edison Electric Institute (EEI), Financial Report, 2019. Note: I eliminate any companies with less than 50% of regulated assets. See Appendix B for further detail.

Figure 9: Electric Utility Sample

Company	Annual Revenues (USD million)	Regulated Assets	S&P Credit Rating (2019)	February 2020			May 2020		
				Market Cap. 2019 Q4 (USD million)	Betas	Long Term Growth Est.	Market Cap. 2019 Q4 (USD million)	Betas	Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
ALLETE	$1,300	MR	BBB+	$4,146	0.60	6.2%	$3,155	1.08	6.6%
Alliant Energy	$3,586	R	A-	$13,207	0.55	5.1%	$11,774	0.92	5.4%
Amer. Elec. Power	$15,580	R	A-	$46,134	0.50	5.4%	$40,157	0.86	5.6%
Ameren Corp.	$5,975	R	BBB+	$18,635	0.50	4.9%	$17,715	1.00	6.1%
CMS Energy Corp.	$6,898	R	BBB+	$17,626	0.50	6.7%	$16,449	0.90	7.4%
DTE Energy	$13,100	MR	BBB+	$24,580	0.50	4.7%	$17,390	1.11	6.0%
Entergy Corp.	$10,842	R	BBB+	$23,696	0.60	1.9%	$18,609	1.09	6.1%
MGE Energy	$568	MR	AA-	$2,728	0.50	5.1%	$2,194	1.14	4.9%
OGE Energy	$2,175	MR	BBB+	$8,765	0.70	3.7%	$5,961	0.96	3.8%
Otter Tail Corp.	$919	R	BBB	$2,058	0.70	5.8%	$1,655	1.23	7.1%
WEC Energy Group	$7,559	R	A-	$28,739	0.45	5.8%	$28,187	0.91	5.9%
AVANGRID Inc.	$6,397	R	BBB+	$15,586	0.40	5.7%	$13,584	0.92	6.3%
Consol. Edison	$12,537	MR	A-	$29,649	0.40	3.1%	$26,631	0.84	3.0%
Duke Energy	$24,767	R	A-	$66,149	0.45	4.0%	$57,750	1.01	4.1%
Eversource Energy	$8,622	R	A-	$27,427	0.55	5.6%	$26,511	1.00	6.1%
Exelon Corp.	$34,912	R	BBB+	$43,755	0.65	1.1%	$33,737	1.17	0.9%
NextEra Energy	$18,049	MR	A-	$117,074	0.50	7.9%	$106,031	1.00	9.4%
PPL Corp.	$7,708	MR	A-	$27,130	0.65	2.3%	$18,399	1.06	2.0%
Public Serv. Enterprise	$10,168	R	BBB+	$29,575	0.60	4.6%	$21,252	0.93	4.2%
Southern Co.	$21,583	MR	A-	$68,803	0.50	3.9%	$55,432	1.06	4.6%
Unitil Corp.	$441	R	BBB+	$928	0.45	4.4%	$758	1.07	4.8%
Black Hills	$1,731	R	BBB+	$4,782	0.65	4.9%	$3,730	1.15	4.9%
Hawaiian Elec.	$2,871	R	BBB-	$5,034	0.55	3.1%	$4,666	0.89	3.5%
IDACORP Inc.	$1,369	MR	A-	$5,365	0.50	2.9%	$4,344	0.98	3.1%
NorthWestern Corp.	$1,263	MR	BBB	$3,857	0.55	3.3%	$3,162	1.14	3.7%
Pinnacle West Capital	$3,548	R	A	$9,899	0.45	4.3%	$8,335	1.05	5.1%
PNM Resources	$1,447	R	BBB+	$4,015	0.50	4.8%	$2,902	1.14	7.5%
Portland General	$2,106	R	BBB+	$4,974	0.55	4.4%	$4,158	1.09	4.3%
Xcel Energy Inc.	$11,564	R	A-	$33,026	0.45	5.2%	$31,060	0.95	5.9%
Average	$8,262		BBB+	$23,702	0.53	4.5%	$20,196	1.02	5.1%

Sources and Notes:
[1]: Bloomberg; Q4 2018 - Q4 2019
[2]: See Schedule No. BV-2. Key:
R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: S&P Rating from Bloomberg as of 2019 Q4.
[4]: See February 2020 Schedule No. BV-3 Panels A through H.
[5]: Value Line 5 year weekly betas.
[6]: See February 2020 Schedule No. BV-5.
[7]: See May 2020 Schedule No. BV-3 Panels A through H.
[8]: Bloomberg 5.5 months of daily betas.
[9]: See May 2020 Schedule No. BV-5.
PNM Resources downgraded to BBB as of April 6, 2020.
Allete downgraded to BBB as of April 22, 2020.

Q37. What are the characteristics of the Natural Gas Utility Proxy Group?

A37. The Natural Gas Utility sample consists of seven companies that have the majority of their revenue generating assets dedicated to regulated distribution of natural gas in the U.S.

Figure 10 reports the sample companies' annual revenues for the most recent four quarters ended December 2019 and the percentage of their assets devoted to regulated activities. It also displays each company's market capitalization and S&P credit rating as well as betas from *ValueLine* and Bloomberg and the weighted average long-term (3 to 5 year) earnings growth estimate for the company from Thomson Reuters and *Value Line.*[63] Similarly, the market capitalization, beta, and growth estimates for both cost of equity estimations are presented side-by-side.

The average Natural Gas Utility sample company devotes over 80% of its assets to regulated activities, which are primarily related to the local distribution of natural gas.[64] Therefore, these sample companies are nearly pure-plays in the natural gas distribution industry. Moreover, the regulatory framework in the jurisdictions in which the Natural Gas Utility sample companies operate are substantially similar to those prevailing in Michigan. Therefore, I believe that although they do not engage in electric distribution or generation, the Gas LDC sample companies are directly comparable to DTE Electric in terms of regulatory environment, exposure to residential, commercial, and industrial customers and capital expenditures. Like electric utilities, they operate a network that cannot be moved or repurposed. Gas LDCs tend to be mostly distribution only entities, which reduces risk relative to generation (or production), but similar to electric utilities, they are subject to state legislator and regulatory commission initiatives. More recently, electric utilities have mostly seen a larger demand impact from COVID-19 than has gas utilities. Because of the comparable regulatory environment and both industries being based on a large network of fixed assets, I believe their overall business risk is comparable.[65]

63 In some cases, a proxy company does not have a credit rating from any of the major rating agencies. However, if they were to be rated, they would receive an investment grade rating. In these instances, I assign the company the average credit rating of the rest of the proxy group.

64 While some of the companies in the Natural Gas sample own gas transmission assets, the majority of those assets are state regulated and not FERC regulated, indicating they are not long-haul transmission lines.

65 I also note that a number of utilities operate both electric and gas operations.

Figure 10: Natural Gas Utility Sample

Company	Annual Revenues (USD million)	Regulated Assets	S&P Credit Rating (2019)	February 2020			May 2020		
				Market Cap. 2019 Q4 (USD million)	Betas	Long Term Growth Est.	Market Cap. 2019 Q4 (USD million)	Betas	Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Atmos Energy	$2,901	MR	A	$13,387	0.55	6.9%	$11,788	0.95	7.0%
Chesapeake Utilities	$516	R	A	$1,569	0.60	8.4%	$1,404	1.07	7.8%
New Jersey Resources	$2,564	R	AA-	$3,977	0.65	5.0%	$2,922	1.19	5.0%
Northwest Natural	$747	R	A+	$2,184	0.55	7.0%	$1,838	1.17	5.8%
ONE Gas Inc.	$1,642	R	A	$4,876	0.60	5.9%	$4,005	1.11	5.9%
Southwest Gas	$3,063	R	BBB+	$4,161	0.65	9.1%	$3,343	1.11	9.1%
Spire Inc.	$1,931	R	A-	$4,190	0.60	5.7%	$3,588	1.02	5.7%
Average	$1,909		A	$4,906	0.60	6.9%	$4,127	1.09	6.6%

Sources and Notes:
[1]: Bloomberg; Q4 2018 - Q4 2019
[2]: See Schedule No. BV-2. Key:
R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: S&P Rating from Bloomberg as of 2019 Q4.
[4]: See February 2020 Schedule No. BV-3 Panels A through H.
[5]: Value Line 5 year weekly betas.
[6]: See February 2020 Schedule No. BV-5.
[7]: See May 2020 Schedule No. BV-3 Panels A through H.
[8]: Bloomberg 5.5 months of daily betas.
[9]: See May 2020 Schedule No. BV-5.
Chesapeake Utilities Assumes Sample Average S&P Credit Rating Value
New Jersey Resources rated Aa3 by Moody's and not rated by S&P, converted to S&P Rating of AA-
Northwest Natural Gas Company rating used for Northwest Natural

Q38. What are the characteristics of the Water Utility sample?

A38. The water sample consists of five companies whose primary source of revenues and majority of assets and revenues are subject to regulation. These companies own regulated water utilities or subsidiaries that may operate in multiple states in the U.S. The water utility sample is broadly representative of the regulated water distribution industry from a business risk perspective. Additionally, it is worth noting, similar to electric utilities and natural gas distribution utilities, water utilities are highly capital intensive and face the need to maintain and upgrade aging infrastructure networks designed to deliver commodities to end use customers. As such, the business risk characteristics of the Electric, Water, and Natural Gas Utility samples are broadly similar. Additional, investor owned electric utilities, natural gas utilities, and water

utilities in the same jurisdictions are generally regulated by the same regulatory entity.[66]

Figure 11 reports the proxy companies annual revenues for the most recent four quarters as of Q4 2019 and the percentage of their assets devoted to regulated activities. It also displays each company's market capitalization, S&P credit rating, 5-year adjusted weekly beta from *ValueLine*, 5.5 months of adjusted daily betas from Bloomberg, and the weighted average long-term (3 to 5 year) earnings growth rate estimate for the company from Thomson Reuters and *Value Line*. The market capitalization, beta, and growth estimates for both cost of equity estimation dates are also presented side-by-side.

The average water utility sample company devotes over 90% of its assets to regulated activities related primarily to the distribution of water and has an average S&P credit rating of A. Given the proven long-term financial stability of these companies, I relax my $300 million annual revenue screening criteria to include two additional companies—Middlesex Water, and York Water Company—in recognition that these companies have very stable finances despite relatively low revenues.[67] This is consistent with my standard practice as both companies have reasonable trading volumes and their inclusion ensures a sample of at least five companies.

---

[66] In 43 of the 50 states, the same commissions that regulate electric and gas utilities also regulate water utilities.

[67] Value Line lists 10 water companies of which 2 (Consolidated Water and Global Water) are developers rather than utilities, while Essential Utilities (previously Aqua America) recently acquired Peoples and therefore eliminated as is SJW Group for its acquisition of CT Water. Additionally, Artesian Water is closely owned and therefore eliminated. That leaves five companies, which is then what I include. I note that Middlesex Water and York Water Company have maintained A-range credit ratings since at least the global financial crisis. Their annual revenues have increased by 50-75% from 2008 to 2019.

Figure 11: Water Utility Sample

Company	Annual Revenues (USD million)	Regulated Assets	S&P Credit Rating (2019)	February 2020 Market Cap. 2019 Q4 (USD million)	February 2020 Betas	February 2020 Long Term Growth Est.	May 2020 Market Cap. 2019 Q4 (USD million)	May 2020 Betas	May 2020 Long Term Growth Est.
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Amer. States Water	$464	R	A+	$3,189	0.60	5.9%	$2,959	0.97	6.3%
Amer. Water Works	$3,573	R	A	$21,963	0.50	6.5%	$21,445	0.97	7.7%
California Water	$703	R	A+	$2,472	0.60	7.0%	$2,403	0.95	8.2%
Middlesex Water	$136	R	A	$1,104	0.70	3.3%	$987	0.98	3.6%
York Water Co. (The)	$51	R	A-	$597	0.65	7.6%	$523	1.17	6.8%
Average	$985		A	$5,865	0.61	6.0%	$5,663	1.01	6.5%

Sources and Notes:
[1]: Bloomberg; Q4 2018 - Q4 2019
[2]: See Schedule No. BV-2. Key:
R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: S&P Rating from Bloomberg as of 2019 Q4.
[4]: See February 2020 Schedule No. BV-3 Panels A through H.
[5]: Value Line 5 year weekly betas.
[6]: See February 2020 Schedule No. BV-5.
[7]: See May 2020 Schedule No. BV-3 Panels A through H.
[8]: Bloomberg 5.5 months of daily betas.
[9]: See May 2020 Schedule No. BV-5.

Q39. How do the two proxy groups compare to DTE Electric in terms of financial metrics?

A39. DTE Electric's regulated electric operations generated an annual revenue of $5.2 billion in 2019, [68] which is lower than the average annual revenues for the Electric Utility proxy groups and higher than the average for the Natural Gas and Water utility averages. DTE Electric's S&P credit rating is A-, which is higher than the Electric Utility proxy group average but slightly below the average for the Natural Gas and Water utility proxy groups. DTE Electric is a regulated entity as are all of my proxy companies, but I note that the Natural Gas and Water utility proxy groups have a higher average of regulated assets compared to DTE Electric. The proxy groups, like DTE Electric, operate a capital-intensive network of assets, which are subject to state regulation.

[68] DTE 2019 10-K, p. 32.

C. FINANCIAL RISK ADJUSTMENT

Q40. Can you explain the difference between the data relied upon to estimate the cost of equity and the regulatory rate base to which the cost of equity is applied?

A40. Both the CAPM and the DCF models rely on market data to estimate the cost of equity for the sample companies, so the results reflect the value of the capital that investors hold during the estimation period (market values). The allowed return on equity is applied to rate base, which is determined using historical cost and hence reflect the (net) book values of assets.

Q41. Why is this difference important to the estimation of the cost of equity?

A41. Taking the level of financial risk or leverage into account is necessary to reflect the fact that different capital structure ratios have different levels of financial risk. Specifically, all else equal, higher levels of debt financing increases the risk faced by equity investors. Therefore, investors require higher ROEs from companies with more debt than from comparable business risk companies with less debt. To reflect the effect of capital structure on the cost of equity, I adjust the cost of equity estimates I obtain from applying the models to the market data of the proxy companies. I do so using two different approaches: (1) the overall cost of capital approach and (2) the Hamada approach. I provide further details of these two approaches in Appendix B.[69]

[69] In recognition of the Commission's past decision to not rely on the overall cost of capital approach, my CAPM / ECAPM recommended range is based on the Hamada approach. This approach cannot be applied to the DCF model, so I choose to conservatively eliminate the highest estimate from my recommended range.

D. CAPM/ ECAPM Approach and Cost of equity Estimates

1. CAPM Approach

Q42. Can you briefly explain the CAPM?

A42. The CAPM is a "risk-positioning model" that models the direct relationship between risk and return illustrated in the Security Market Line (see Figure 2 above). More precisely, the CAPM states that the cost of capital for an investment, S (*e.g.*, a particular common stock), is determined by the risk-free rate plus the stock's systematic risk multiplied by the market risk premium (MRP). Mathematically, the relationship is shown by the following formula:

Formula 1

$$r_s = r_f + \beta_s \times MRP$$

where r_S is the cost of capital for investment S;

r_f is the risk-free interest rate;
β_S is the beta risk measure for the investment S; and
MRP is the market equity risk premium.

2. ECAPM Approach

Q43. Can you briefly explain the ECAPM?

A43. Another risk-positioning model is the Empirical CAPM (ECAPM), which builds upon the CAPM. Empirical research has found that the CAPM tends to overstate the actual sensitivity of the cost of capital to beta: low-beta stocks tend to have higher risk premiums than predicted by the CAPM and high-beta stocks tend to have lower risk premiums than predicted. The ECAPM corrects for this by adjusting the CAPM using the formula below:

Formula 2

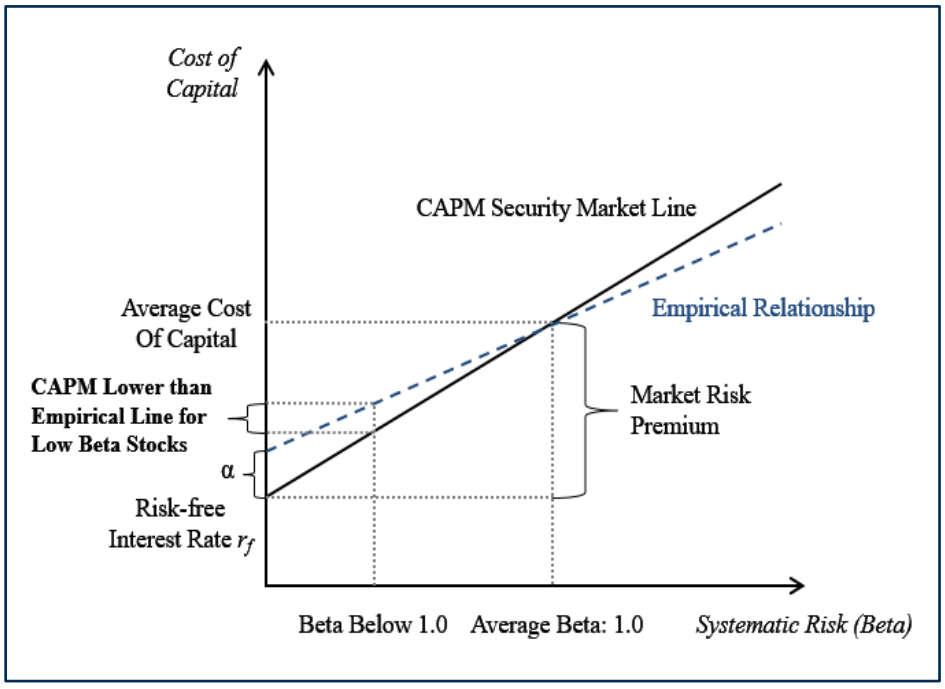
$$r_S = r_f + \alpha + \beta_S \times (MRP - \alpha)$$

where α is the "alpha" adjustment of the risk-return line, a constant; and

r_S, r_f, β_S, and MRP are defined in Formula 1 above.

The alpha adjustment has the effect of increasing the intercept but reducing the slope of the Security Market Line in Figure 12, which results in a Security Market Line that more closely matches the results of empirical tests. The impact on the Security Market Line is illustrated in Figure 12 below. In the ECAPM implementation, I use an alpha of 1.5 based on academic research documenting the magnitude of alpha.[70]

Figure 12
The Empirical Security Market Line



3. CAPM/ ECAPM Cost of Equity Estimates

Q44. Can you summarize the parameters of the scenarios and variations you considered when conducting your CAPM and ECAPM analyses?

70 See Black, Fisher. 1993. Beta and Return. *The Journal of Portfolio Management* 20 (Fall): 8-18; Black, Fisher, Michael C. Jensen, and Myron Scholes. 1972. The Capital Asset Pricing Model: Some Empirical Tests. *Studies in the Theory of Capital Markets*, edited by Michael C. Jensen, pp. 79-121. New York: Praeger; Fama, Eugene F. and James D. MacBeth. 1972. Risk, Returns and Equilibrium: Empirical Tests. *Journal of Political Economy* 81 (3): pp. 607-636; Fama, Eugene F. and Kenneth R. French. 1992. The Cross-Section of Expected Stock Returns. *Journal of Finance* 47 (June): pp. 427-465; Fama, Eugene F. and Kenneth R. French. 2004. The Capital Asset Pricing Model: Theory and Evidence. *Journal of Economic Perspectives* 18 (3): pp. 25-46.

A44. I performed each CAPM/ ECAPM analysis using different sensitivities to obtain a range of cost of equity estimates. I perform the analyses using two different scenarios for the risk free rate and MRP. For each of my cost of equity estimations, I determine the risk free rate and MRP based on the market conditions prevailing at the time.

In my first estimation, I use CAPM and ECAPM inputs as of the end of February 2020. In Scenario I, I use a long-term historic MRP of 6.91% and a forecasted risk-free rate of 3.05%.[71] In Scenario II, I present a sensitivity test by increasing the MRP by 100 basis points to 7.91% to reflect the forecasted MRP at the time. I combine this forecasted MRP with a risk-free rate of 2.80%. Thus, the spread between utility and government bonds are not simultaneously reflected in the risk-free rate and the MRP. In both of these scenarios, I utilize five years of weekly betas from *ValueLine* to estimate the cost of equity.

In my second estimation, I use inputs as of mid-May 2020, which reflects the changes in risk perceptions and heighted economic uncertainties due to COVID-19. In Scenario I, I use the long-term historic MRP of 6.91%[72] and forecasted risk-free rate of 3.30%.[73] Similar to the risk-free rate in my February 2020 Scenario I analysis, I have conservatively added about half of the 100 bps yield spread premium between utility and government bonds.[74] In Scenario II, I utilize Bloomberg's forecasted MRP of 7.92% combined with a risk-free rate of 2.80%. Similarly, the spread between utility

71 The MRP of 6.91% is sourced from Duff & Phelps 2019. The risk-free rate is derived from the most recently published March 10, 2020 Blue Chip Economic Indicators (BCEI) forecasted 10-year Treasury yield of 2.3 percent for 2022. Our analysis relies on the 20-year Treasury yield as a measure of the risk-free rate. Therefore, I adjust the BCEI forecasted 10-year Treasury yield to approximate a 20-year Treasury yield. First, I add a maturity premium of 50 bps to the BCEI forecast to approximate the 20-year Treasury bond yield. Then, I add a yield spread premium of 25 bps. The yield spread premium reflects the empirical observation that the spread between utility and Treasury bond yields is currently elevated for a risk-free rate of 3.05 percent. This is discussed further in the Appendix B, which also shows the derivation of the 25 basis points.

72 Bloomberg as of April 30, 2020. The forecasted market equity risk premium is discussed further in Appendix B.

73 The increase in the risk-free rate in Scenario I for the May 2020 analysis relative to the Scenario I for February 2020 reflects an increase in the spread between the yield of A-rated utility bonds and the yield on government bonds of the same maturity.

74 Bloomberg, as of May 15, 2020. See Appendix B, Section V.C. for additional details.

and government bonds are not simultaneously reflected in the risk-free rate and the MRP. To capture the changes in systematic risk, I use 5.5 months of daily betas from Bloomberg in both Scenarios.

Figure 13
Scenarios in CAPM/ ECAPM Analysis

	February 2020		May 2020	
	Scenario I	Scenario II	Scenario I	Scenario II
Risk-Free Rate	3.05%	2.80%	3.30%	2.80%
MRP	6.91%	7.91%	6.91%	7.92%

Q45. Can you summarize the results from your CAPM and ECAPM analyses?

A45. The results from the CAPM and ECAPM models are presented in Figure 14, Figure 15, and Figure 16 below. I also present a sub-sample of high capital expenditure electric utilities in Figure 17. In the figures below, the results across all the samples increased by 300 to 400 bps from February 2020 to May 2020. However, the relative relationships of each samples' results remained broadly consistent. The lowest results are from the Electric Sample but the highest results from the sample are comparable to those obtained from other highly regulated distribution entities. For example, the highest estimates from the CAPM from the electric sample, 12.2 percent in May 2020 and 8.0 percent in February 2020, are below all estimates from the natural gas and water utility samples. Similarly, the highest ECAPM estimates for the electric utility sample, 12.2 percent and 8.6 percent, are towards the low end of the natural gas estimates from the ECAPM in Scenario I and below all Scenario II ECAPM estimates. They are also below all ECAPM estimates for the water sample. As the natural gas and water utilities on average have a higher proportion of their assets subject to regulation, there are indications that the electric sample is facing unusual circumstances. I view regulation as being a key driver of risk for utilities.

Figure 14: CAPM/ ECAPM Cost of Equity Estimates – Electric Utility Sample

	Deemed Common Equity Percentage 50%			
	February 2020		May 2020	
	Scenario 1 [1]	Scenario 2 [2]	Scenario 1 [3]	Scenario 2 [4]
Electric Sample				
CAPM	7.4% - 7.8%	7.8% - 8.1%	11.2% - 11.6%	11.9% - 12.2%
ECAPM (α = 1.5%)	8.0% - 8.6%	8.3% - 8.9%	11.0% - 11.6%	11.6% - 12.2%

Sources and Notes:
[1]: Long-Term Risk Free Rate of 3.05%, Long-Term Market Risk Premium of 6.91%.
[2]: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.91%.
[3]: Long-Term Risk Free Rate of 3.30%, Long-Term Market Risk Premium of 6.91%.
[4]: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.92%.

Figure 15: CAPM/ ECAPM Cost of Equity Estimates – Natural Gas Utility Sample

	Deemed Common Equity Percentage 50%			
	February 2020		May 2020	
	Scenario 1 [1]	Scenario 2 [2]	Scenario 1 [3]	Scenario 2 [4]
Gas Sample				
CAPM	8.3% - 9.0%	8.8% - 9.4%	12.2% - 12.9%	13.1% - 13.6%
ECAPM (α = 1.5%)	8.7% - 9.8%	9.2% - 10.2%	11.8% - 12.7%	12.6% - 13.5%

Sources and Notes:
[1]: Long-Term Risk Free Rate of 3.05%, Long-Term Market Risk Premium of 6.91%.
[2]: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.91%.
[3]: Long-Term Risk Free Rate of 3.30%, Long-Term Market Risk Premium of 6.91%.
[4]: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.92%.

Figure 16: CAPM/ ECAPM Cost of Equity Estimates – Water Utility Sample

	Deemed Common Equity Percentage 50%			
	February 2020		May 2020	
	Scenario 1 [1]	Scenario 2 [2]	Scenario 1 [3]	Scenario 2 [4]
Water Sample				
CAPM	8.8% - 9.7%	9.4% - 10.3%	12.9% - 14.4%	13.9% - 15.2%
ECAPM (α = 1.5%)	9.0% - 10.6%	9.6% - 11.1%	12.4% - 14.4%	13.3% - 15.2%

Sources and Notes:
[1]: Long-Term Risk Free Rate of 3.05%, Long-Term Market Risk Premium of 6.91%.
[2]: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.91%.
[3]: Long-Term Risk Free Rate of 3.30%, Long-Term Market Risk Premium of 6.91%.
[4]: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.92%.

Figure 17: CAPM/ECAPM Cost of Equity Estimates – Electric Sample w/ High CapEx

	Deemed Common Equity Percentage 50%			
	February 2020		May 2020	
	Scenario 1 [1]	Scenario 2 [2]	Scenario 1 [3]	Scenario 2 [4]
Electric Sample - High Capex				
CAPM	7.9% - 8.2%	8.3% - 8.6%	11.4% - 11.9%	12.1% - 12.5%
ECAPM (α = 1.5%)	8.3% - 9.0%	8.8% - 9.4%	11.1% - 11.8%	11.8% - 12.4%

Sources and Notes:
[1]: Long-Term Risk Free Rate of 3.05%, Long-Term Market Risk Premium of 6.91%.
[2]: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.91%.
[3]: Long-Term Risk Free Rate of 3.30%, Long-Term Market Risk Premium of 6.91%.
[4]: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.92%.

Q46. How do you interpret the result of your CAPM and ECAPM analyses?

A46. The increase in results across all samples from February 2020 to May 2020 reflects the increased risk and uncertainty currently prevailing in the market and the economy.

Broadly speaking, I consider the Scenario II results from both sets of analyses to be more relevant in the current market conditions, where the returns investors require over and above the risk-free rate is elevated to very large degree. As these conditions may change, I implemented the CAPM/ ECAPM in Scenario II with a MRP of 7.91 percent and 7.92 percent (an increase of 100 basis points over the historical MRP). Consequently, I view the CAPM/ECAPM results as supportive of a ROE in the range of 9 percent to 10 percent in February 2020 and 12 ¼ to 13 ½ percent in May 2020. The low end is determined as the high end estimated for the electric sample and rounded to the nearest ¼ percent – this is also the low end of the full sample. The high end was determined as the high end of the results obtained from both the natural gas and water sample using the Hamada adjustment and the CAPM (10 percent and 13.7 percent), but ignored the highest figures obtained using the weighted average cost of capital approach in deference to the Commission's prior orders.[75] Again, I round the figure to the nearest ¼ percent. I note that the CAPM/ ECAPM results for the electric sample is below the results for the natural gas and water utility sample. However, if I consider a sample of electric utilities with high capital expenditures to depreciation similar to that of DTE Electric, the Scenario II results from February 2020 increase by approximately 0.3 percent indicating that this aspect of DTE Electric's operations matters.

E. DCF Approach and Cost of Equity Estimates

Q47. Can you describe the discounted cash flow approach to estimating the cost of equity?

A47. The DCF model estimates the cost of capital for a given company directly, rather than based on its risk relative to the market as the CAPM does. There are two variations of the DCF model, the single-stage DCF and multi-stage DCF, as explained below.

75 See Workpapers in Exhibit A-14.

1. Single-Stage DCF Approach

Q48. Can you please briefly describe the single-stage DCF and the inputs used to determine the cost of equity?

A48. Yes. The single-stage DCF model assumes that the current market price of a stock is equal to the present value of the dividends that its owners expect to receive. The expected stream of future dividends is discounted at a risk-appropriate rate to arrive at the present value of the dividends, represented by the current stock price. In this application of the DCF, the risk-appropriate rate is the cost of equity. Mathematically, the DCF model is shown in the formula below:

Formula 3

$$\boldsymbol{P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \cdots + \frac{D_T}{(1+r)^T}}$$

where $\boldsymbol{P_0}$ is the current market price of the stock;

$\boldsymbol{D_t}$ is the dividend expected at the end of period $\boldsymbol{t}$;

$\boldsymbol{T}$ is the last period in which a dividend is to be received; and

$\boldsymbol{r}$ is the cost of equity capital.

Formula 3 implies that if one knows the current market price of a stock and its expected stream of future dividends, then it is possible to solve for the cost of equity r. The single-stage DCF model assumes that the stream of future dividends will grow at a constant rate into perpetuity. This assumption allows Formula 3 to be algebraically rearranged into the formula below to directly estimate the cost of equity:

Formula 4

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

where $\boldsymbol{D_0}$ is the current dividend; and

$\boldsymbol{g}$ is the constant growth rate of the current dividend.

Another variation of the DCF model relaxes the restrictive constant growth rate assumption and instead, allows the dividend to grow at different rates at different points

in time. This variation is known as the multi-stage DCF model and is further explained below.

2. Multi-Stage DCF Approach

Q49. Can you briefly describe the multi-stage DCF and the inputs used to determine the cost of equity?

A49. The multi-stage DCF accommodates different dividend growth rates at different points in time. Specifically, in the implementation of the multi-stage DCF, I assume three different growth rate phases. In the first phase, companies grow their dividend for five years at the forecasted company-specific rate of earnings growth. In the second phase, the company-specific growth rate incrementally steps down (or steps up) to the overall growth rate of the economy, represented by the long-term GDP growth rate. Finally, in the third phase, companies grow their dividend at the long-term GDP growth rate into perpetuity.

As previously described, I calculate both the single- and multi-stage DCF for two cost of equity estimations. The first is using inputs, such as growth rates, from prior to the pandemic. The second uses current inputs reflecting the current financial and economic uncertainties. The growth rates utilized in both DCF implementations are shown in Figure 9, Figure 10, and Figure 11 above.

3. DCF Cost of Equity Estimates

Q50. What are the results from your DCF based cost of equity estimates for your samples?

A50. The financial risk adjusted single- and multi-stage DCF cost of equity estimates are presented in Figure 18, Figure 19, and Figure 20 below. I also present a sub-sample of high capital expenditure electric utilities in Figure 21.

Figure 18: DCF Cost of Equity Estimate – Electric Utility Sample

Electric Sample	February 2020	May 2020
Simple	9.4%	10.2%
Multi-Stage	8.5%	9.1%

Figure 19: DCF Cost of Equity Estimate – Natural Gas Utility Sample

Gas Sample	February 2020	May 2020
Simple	12.0%	11.8%
Multi-Stage	8.8%	9.0%

Figure 20: DCF Cost of Equity Estimate – Water Utility Sample

Water Sample	February 2020	May 2020
Simple	10.6%	11.4%
Multi-Stage	7.8%	8.1%

Figure 21: DCF Cost of Equity Estimate - Electric Sample w/ High CapEx

Electric Sample - High Capex	February 2020	May 2020
Simple	10.2%	11.0%
Multi-Stage	9.0%	9.7%

Q51. How do you interpret the results from your DCF analyses?

A51. The range of estimates obtained from the DCF methods is wide ranging from 7.8 percent to 12.0 percent in February 2020 and 8.1 percent to 11.8 percent in May 2020. However, if I eliminate the lowest and highest estimate and round to the nearest ¼ percent, the range becomes 8 ½ percent to 10 ½ percent in February 2020 and 9 percent to 11 ½ percent in May 2020. I trim these ranges symmetrically to 8 ¾ percent to 10 ¼ percent in February 2020 and 9 ¼ percent to 11 ¼ percent in May 2020, which is supported by the full sample's results as well as by the subset of electric utilities that resemble DTE Electric with respect to high capital investments.

F. Risk Premium Approach and Cost of Equity Estimate

Q52. Can you briefly describe the Risk Premium approach to estimating the cost of equity?

A52. The Risk Premium approach adds a "risk premium" to the current risk-free rate to estimate the current cost of equity, as shown in Formula 5 below.

Formula 5

$$\boldsymbol{Cost\ of\ Equity = r_f + Risk\ Premium}$$

The risk premium component of Formula 5 is estimated using the allowed ROEs and prevailing risk-free rates from past utility rate cases. In our implementation, I calculate the risk premium as the difference between allowed ROEs and the prevailing quarterly 20-year Treasury bond yield over the period 1990-2019.[76] This difference represents the compensation for risk allowed by regulators. I use the statistical technique of ordinary least squares (OLS) regression to estimate the parameters of the linear equation:

Formula 6

$$\boldsymbol{Risk\ Premium = A_0 + A_1 \times (r_f)}$$

where $\boldsymbol{A_0}$ and $\boldsymbol{A_1}$ are parameters to be estimated by the regression technique; and

$\boldsymbol{r_f}$ is the risk-free rate as measured by the 20-year Treasury bond yield.

Q53. How are the parameters to the Risk Premium approach estimated?

A53. The parameters estimated by regression analysis (*i.e.*, OLS) are shown in Figure 22 and Figure 23 below. Additionally, the regression analysis finds that the risk-free rate has a high degree of statistical explanatory power in capturing changes in the risk premium. The negative coefficient $\boldsymbol{A_1}$ reflects the empirical fact that regulators grant lower risk premiums–and by extension, lower allowed ROEs–when the risk-free rate is higher.

76 I rely on the 20-year government bond to be consistent with the analysis using the CAPM to avoid confusion about the risk-free rate. While it is important to use a long-term risk-free rate to match the long-lived nature of the assets, the exact maturity is a matter of choice.

This is consistent with the observation that investors require a higher risk premium to hold equities over government bonds as bond yields decline. I then use the parameters from the regression analysis, A_0 and A_1, to estimate the cost of equity using the Scenario 1 and Scenario 2 risk-free rates (shown in Figure 13 above).

Q54. Can you describe the results from your Risk Premium model?

A54. Applying the calculated risk premium and Scenario I risk-free rate of 3.05% to Formula 5 above results in an estimated cost of equity of 9.8% for U.S. electric utilities at, on average, 49% equity. Likewise, applying the calculated risk premium and Scenario II risk-free rate of 2.80% to Formula 5 above results in an estimated cost of equity of 9.7% for U.S. electric utilities at 49% equity. The cost of equity results for U.S. electric utilities are reported in Figure 22 and Figure 23 below.

Figure 22: Implied Risk Premium Model Estimate, Scenario I

Risk Premium = A_0 + (A_1 x Treasury Bond Rate)				
R Squared	0.898			
Estimate of Intercept (A_0)	8.45%			
Estimate of Slope (A_1)	-0.560			
Predicted Risk Premium 6.75%	+	**Exp. Treasury Bond Rate** 3.05%	=	**Est. Cost of Equity for All Electric Utilities** 9.8%

Figure 23: Implied Risk Premium Model Estimate, Scenario II

Risk Premium = A_0 + (A_1 x Treasury Bond Rate)				
R Squared	0.898			
Estimate of Intercept (A_0)	8.45%			
Estimate of Slope (A_1)	-0.560			
Predicted Risk Premium 6.89%	+	**Exp. Treasury Bond Rate[2]** 2.80%	=	**Est. Cost of Equity for All Electric Utilities** 9.7%

Q55. How do you interpret the results from your Risk Premium model?

A55. Based on the Risk Premium model using the forecasted interest rate indications, an appropriate ROE for the average electric utility is in the range of 9.7 to 9.8 percent. This range is consistent with the estimates obtained from the sample DCF and CAPM model for the electric utility sample. It is below the indicators for the natural gas and water utility samples.

G. SUMMARY RESULTS

Q56. Can you briefly summarize the results from the various models you employed to estimate the cost of equity for DTE Electric.

A56. Based on the discussions above, I obtain the following estimates for my proxy groups (rounding to the nearest ¼ percent). For the CAPM and ECAPM models, the table

focuses on Scenario II as I do not believe the historical MRP is sufficient in this environment.

Figure 24: ROE Estimates

	February 2020			May 2020	
	CAPM/ ECAPM	DCF	Risk Premium	CAPM/ ECAPM	DCF
Full Sample	9.00 - 10.0%	8.75 - 10.25%	n/a	12.25 - 13.5%	9.25 - 11.25%
Electric Sample	8.0 - 8.25%	8.5 -9.5%	9.7 - 9.8%	11.5 - 12.0%	9.0 - 10.25%
Gas Sample	9.25 -9.5%	8.75 -12.0%	n/a	13.0 - 13.5%	9.0 - 11.75%
Water Sample	9.5 - 10.5%	7.75 - 10.75%	n/a	13.25 - 14.0%	8.0% - 11.5%
Electric Sample w/ High CapEx	8.5 - 8.75%	9.0 - 10.25%	n/a	12.0 - 12.5%	9.75 - 11.0%

Given the current financial conditions and the current expectations for the financial recovery, I look for a reasonable range that is between my two sets of analyses. I note that it is imperative to look towards the higher end or above of the February 2020 estimates but towards the lower end for the May 2020 results. This indicates a range of upper nine's to mid ten's. The placement of DTE Electric within this range of estimates as well as any specific adjustments to the results depend on DTE Electric's risk characteristics, which I discuss next.

VI. DTE ELECTRIC SPECIFIC CIRCUMSTANCES AND ROE RECOMMENDATION

A. REGULATORY ENVIRONMENT

Q57. Are there any differences in the regulatory environment in which the comparable companies and DTE Electric operates?

A57. Like many of the sample companies, DTE Electric benefits from certain regulatory policies that reduce regulatory lag, including a forward test year for rate cases, and an annual Power Supply Cost Recovery ("PSCR") clause for expenses such as fuel,

capacity, energy, transmission, and purchased power.[77] Subject to Commission review, the Company is permitted to include construction work in progress ("CWIP") for pollution control measures and significant new infrastructure projects in rate base.[78] Cost-tracking mechanisms such as these are also in effect in states affecting several of the sample companies.[79] However, unlike some of the sample companies, DTE Electric does not currently have a revenue decoupling mechanism (since a 2012 Court of Appeals ruling reversed Michigan Public Service Commission approval for such a program that DTE Electric had implemented) or lost revenue adjustment mechanism ("LRAM") in place, as some sample companies do.[80]

Q58. How does the business risk of DTE Electric compare to that of the sample?

A58. Like the sample companies, DTE Electric's business is concentrated in regulated electric generation and distribution, and as mentioned above, DTE Electric does have some regulatory mechanisms in place that are comparable to those of the proxy group companies, but in these times of declining load the lack of a decoupling mechanism is a large business risk. DTE Electric estimates that declining load will result in a $30-$50 million decrease in 2020 operating earnings.[81] DTE Electric also has a credit rating of A-, which is comparable to those of the proxy sample companies.

---

77 S&P Global Market Intelligence, Commission Details for the Michigan Public Service Commission, accessed April 8, 2020, https://platform.mi.spglobal.com/interactivex/CommissionDetails.aspx?Printable=1&id=4081574&Type=1&State=MI.

78 *Id*.

79 Lillian Federico, "Alternative ratemaking plans in the U.S.," S&P Global Market Intelligence, Regulatory Research Associates. April 16, 2020, accessed April 21, 2020, https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#news/article?id=58062563&KeyProductLinkType=6.

80 *Edison Electric Institute*, "Alternative Regulation for Evolving Utility Challenges: An Updated Survey," January 2013. Many of the companies in my comparable sample have a decoupling mechanism in place. This means that these companies benefit from regulatory provisions allowing them to recover their fixed costs independent of volumetric charges: if the utilities' customers use less electricity than was forecast, the decoupling mechanism ensures that the utilities can recover their cost despite the decrease in variable revenues.

81 DTE Energy, "DTE Business Update," May 27, 2020, accessed May 28, 2020.

Regulatory policy plays a role in the business risk of the Company. In the current environment of market uncertainty, the fact that DTE Electric does not have a revenue decoupling mechanism or a fixed variable pricing policy in place puts it at an increased risk of under-recovering its cost of service relative to some companies in the sample group that benefit from such mechanisms. Because the Company recovers much of its fixed cost through per-kWh charges to their customers (i.e. does not benefit from full revenue decoupling or fixed variable pricing), it will be at risk for under-recovery during economic uncertainties. DTE Electric does not have a decoupling mechanism, which more than half of U.S. electric utilities do. This indicates that DTE Electric's business risk is higher than that of its peers.[82]

Michigan also allows competitive retail choice for electricity, which may erode sales volume, although state law caps the alternative supply in a utility's service territory at 10 percent of the preceding years' sales.

B. MICHIGAN ECONOMY

Q59. How do current economic uncertainties impact the business risk of DTE Electric?

A59. The recent economic impacts from the COVID-19 pandemic has increased the business risk of utilities, including DTE Electric. As governments issued stay-at home orders in response to the pandemic, many parts of the economy shut down. This led to an unprecedented rise in unemployment as many companies struggle to stay in business. As of the week ending May 30, 2020, the U.S. Department of Labor reports that approximately 43 million people across the U.S. have lost their job in the past four weeks.[83] Blue Chip Economic Indicators' May 2020 survey forecasts unemployment reaching 15.3% in Q2 2020 and will average 10.6% in 2020 and 8.0% in 2021.[84]

---

82 Regulatory Research Associates, "RRA Regulatory Focus: Adjustment Clauses," September 2018.

83 U.S. Department of Labor, "Unemployment Insurance Weekly Claims," News Release, June 4, 2020.

84 Blue Chip Economic Indicators, May 10, 2020, p. 1.

Michigan's economy has been hit particularly hard. In Michigan alone, over 1.7 million people, approximately a third of the state's workforce, has filed initial unemployment claims since March 15, 2020.[85] The number of weekly unemployment claims in Michigan since mid-March are higher than claims any week going back to at least 2000, including during the global financial crisis. Michigan recently lifted its stay-at-home order however people are still encouraged to work remotely, if possible, and many restaurants and retail locations are only allowed to operate at reduced capacity, depending on their location.[86] Automakers in Michigan were allowed to resume production on May 11, 2020.[87]

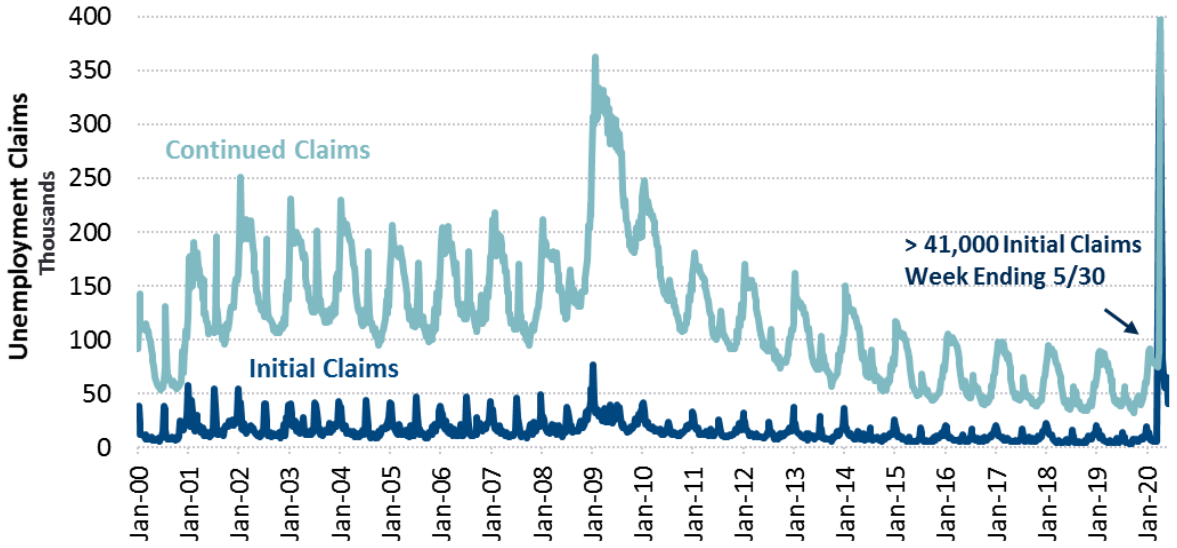
---

[85] Frank Witsil, "Michiganders filed nearly 58,0000 new unemployment claims last week," *Detroit Free Press*, May 28, 2020, accessed May 31, 2020, https://www.freep.com/story/news/local/michigan/2020/05/28/michigans-economy-jobless-unemployment-claims/5274023002/.

[86] Paul Egan, "Michigan stay home order lifted: What you can and can't do," *The Detroit Free Press*, June 2, 2020, accessed June 3, 2020.

[87] Ben Klayman, David Shepardson, "Michigan governor allows coronavirus-hit manufactures to reopen on May 11," *Reuters,* May 7, 2020. Accessed May 31, 2020, https://www.reuters.com/article/us-health-coronarivus-usa-michigan-exclu/michigan-governor-allows-coronavirus-hit-manufacturers-to-reopen-on-may-11-idUSKBN22J2OG.

Figure 25: Michigan Initial Unemployment Claims



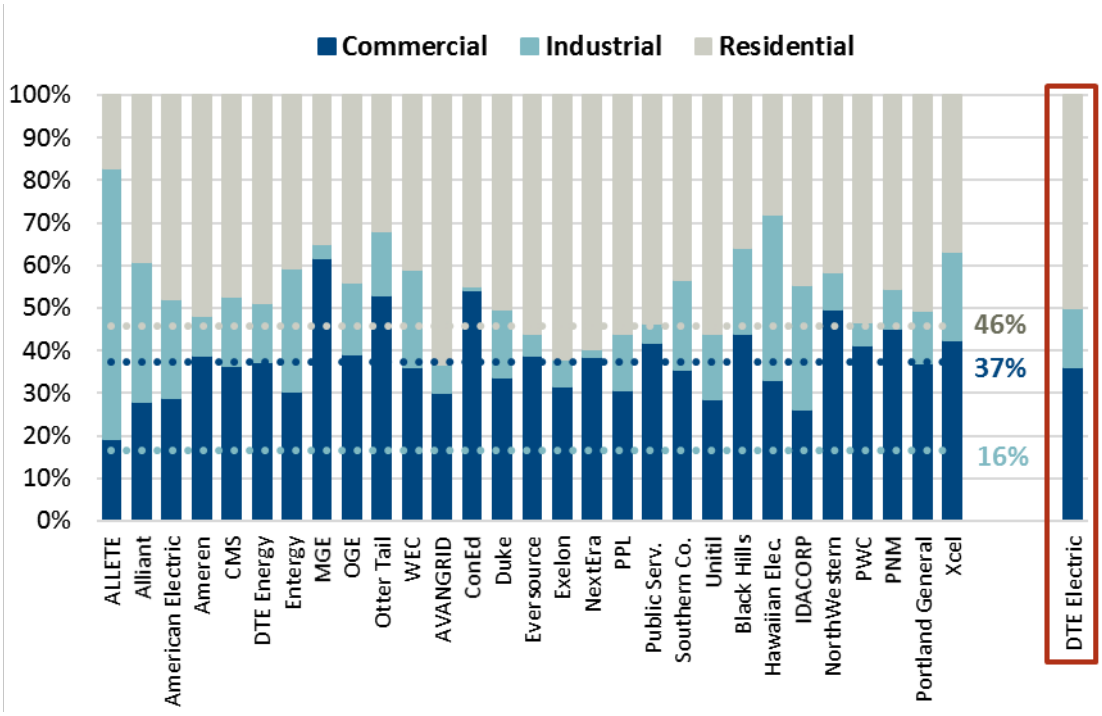
Source: U.S. Department of Labor, Continued Claims as of May 23, 2020.

The primary risk that DTE Electric and other utilities will face is a decline in load that is not fully compensated and customer non-payments resulting from businesses shutting down or people being laid off. These impacts will be felt most strongly for utilities with large commercial and industrial customer bases or utilities that serve areas hit hardest by layoffs. DTE Electric's revenue by customer class is approximately 47% residential, 34% commercial, 13% industrial, and 6% other.[88] This is approximately equal to the averages for my electric utility proxy companies, as shown in Figure 26. However, with Michigan unemployment rising and business activity decreasing, DTE Electric may be impacted on both its residential and C&I customer segments. In their recent investor presentation, DTE Electric estimates that annual commercial sales will be down by 6-9% and annual industrial sales will decrease by 18-22% compared to prior estimates for 2020. Combined, this equates to a $70-$100 million operating earnings decrease. This is offset somewhat by a 3-5% increase in annual residential sales which DTE Electric estimates would increase operating earnings by $40-$50 million.[89]

[88] DTE Energy, 2018 10K, p. 85. Other comprises mainly municipal lighting

[89] DTE Energy, "DTE Business Update," May 27, 2020, accessed May 28, 2020.

Figure 26: 2018 Revenue by Customer Class



Source: EIA

Many utilities, including DTE Electric, have volunteered or have been mandated to suspend disconnects of customers due to non-payment during this period of economic uncertainty. [90] As a result, utilities continue to serve all their customers, even if they are not collecting revenues from all their customers. As discussed above, utilities such as DTE Electric that rely on per-kWh charges to recover fixed costs are at higher risk of under-recovery due to demand reductions. While decoupling mechanisms may mitigate the impacts utilities are still at heightened business risk given the broad economic impacts across all customer classes and structural limitations regarding decoupling mechanism (e.g. caps of cost recovery, limitations on sharing across customer classes, or the rate of amortizing balances). In response, the Michigan Public Service Commission allowed utilities, including DTE Electric, to track and defer

[90] For information on DTE Electric's response, see testimony of Ms. Tamara Johnson.

uncollectible expenses that are in excess of the amounts used to set current rates, starting on March 24, 2020.[91]

Rating agencies have also noted the increased risk for utilities. On April 2, S&P Global Ratings lowered its outlook for North American utilities from "stable" to "negative" citing concerns about the financial cushions of utilities.[92] S&P also said they expect that a prolonged recession may cause utilities to reduce capital spending and potentially cut dividends. This could affect utilities ability to attract capital and would undoubtedly increase their business risk.

C. CAPITAL EXPENDITURES

Q60. How does DTE Electric's capital expenditures impact its business risk and cost of equity estimation?

A60. As of now, the regulatory regime in Michigan is rated Above Average/ 3 by Regulatory Research Associates, which indicates that investors perceived risk of owning securities issued by Michigan utilities, such as DTE Electric, is slightly above average (i.e. favorable).[93] This is important when economic conditions are uncertain, as they are now, and when utilities have large capital investments.

When Moody's affirmed DTE Electrics credit rating in October 2019, it cited DTE Electric's elevated capital expenditures as it transitions its generation fleet from predominately coal-fired generation to a fleet centered around natural gas and renewable generation facilities. A key consideration for the stable rating outlook was an "expectation that the regulatory environment in Michigan remains constructive,

---

91 Michigan Public Service Commission, "Order," Case No. U-20757, April 15, 2020. Accessed May 31, 2020, https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t000000BRC2YAAX.

92 S&P Global Market Intelligence ,"S&P lowers North American utilities outlook to negative on coronavirus risk," April 2, 2020, Accessed April 3, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/s-p-lowers-north-american-utilities-outlook-to-negative-on-coronavirus-risk-57886477.

93 S&P Global Market Intelligence, Regulatory Research Associates, "Michigan Public Service Commission," accessed April 17, 2020.

enabling [DTE Electric] to recover the cost of and earn a reasonable return on, prudently incurred capital investments." [94] Hence, the elevated capital expenditure programs for DTE Electric is an important consideration for investors. Below in Figure 27, I show how DTE Electric's capital expenditures compare to the electric utility companies in my proxy group.

Q61. Have you analyzed the cost of equity for other utilities with equivalent levels of capital expenditures?

A61. Yes, to further examine the impact of capital expenditures on the cost of equity for electric utilities, I examined a subsample of electric utilities that had capital expenditure to depreciation above 2.5 on average. This subset of companies had an ROE that was 20 to 70 basis points higher than the overall sample average[95] and more in line with that of, for example, the natural gas utility sample. Hence, empirical evidence supports that DTE Electric merits a higher ROE than that estimated for the average electric utility in the sample and therefore reliance on the natural gas and water utilities has merit.

[94] Moody's Investor Services, "Rating Action: Moody's place DTE Energy's long-term rating on review for downgrade; affirms the rating of its utilities," October 22, 2019, accessed April 17, 2020.

[95] The average capital expenditure to depreciation for the electric utilities in this subsample is 2.9.

Figure 27: Sample Companies' Capital Expenditure to Depreciation Ratios

Company	Sample	Capital Investment ($M)	Depreciation ($M)	Capital Investment / Depreciation
Atmos Energy	Gas	(1,693)	391	4.33
Chesapeake Utilities	Gas	(185)	45	4.07
New Jersey Resources	Gas	(481)	92	5.24
Northwest Natural	Gas	(223)	91	2.44
ONE Gas Inc.	Gas	(417)	180	2.31
Southwest Gas	Gas	(938)	303	3.09
Spire Inc.	Gas	(823)	179	4.59
ALLETE	Electric	(597)	202	2.96
Alliant Energy	Electric	(1,640)	567	2.89
Amer. Elec. Power	Electric	(6,144)	2,515	2.44
Ameren Corp.	Electric	(2,442)	995	2.45
CMS Energy Corp.	Electric	(2,104)	992	2.12
DTE Energy	Electric	(2,997)	1,263	2.37
Entergy Corp.	Electric	(4,487)	1,881	2.39
MGE Energy	Electric	(164)	72	2.29
OGE Energy	Electric	(636)	355	1.79
Otter Tail Corp.	Electric	(207)	78	2.66
WEC Energy Group	Electric	(2,261)	926	2.44
AVANGRID Inc.	Electric	(2,740)	946	2.90
Consol. Edison	Electric	(3,238)	1,684	1.92
Duke Energy	Electric	(11,122)	4,548	2.45
Eversource Energy	Electric	(2,911)	885	3.29
Exelon Corp.	Electric	(7,248)	4,252	1.70
NextEra Energy	Electric	(5,875)	4,216	1.39
PPL Corp.	Electric	(3,083)	1,199	2.57
Public Serv. Enterprise	Electric	(3,166)	1,248	2.54
Southern Co.	Electric	(7,555)	3,038	2.49
Unitil Corp.	Electric	(119)	52	2.29
Black Hills	Electric	(818)	209	3.91
Hawaiian Elec.	Electric	(458)	278	1.65
IDACORP Inc.	Electric	(279)	169	1.65
NorthWestern Corp.	Electric	(316)	173	1.83
Pinnacle West Capital	Electric	(1,210)	591	2.05
PNM Resources	Electric	(616)	268	2.30
Portland General	Electric	(606)	409	1.48
Xcel Energy Inc.	Electric	(4,225)	1,765	2.39
Amer. States Water	Water	(152)	35	4.29
Amer. Water Works	Water	(1,654)	582	2.84
California Water	Water	(274)	89	3.07
Middlesex Water	Water	(89)	17	5.33
York Water Co. (The)	Water	(21)	8	2.67
DTE Electric*		**(2,200)**	**946**	**2.67**
Total Sample Average		**(2,103)**	**922**	**2.73**
Gas Average		(680)	183	3.72
Electric Average		(2,733)	1,234	2.33
Water Average		(438)	146	3.64

Source: CapIQ, data as of end of fiscal year 2019. Data accessed April 17, 2020.
* Capital investment and Depreciation value taken from DTE Electric 2019 10K, PDF pg. 68 and 72.

D. NUCLEAR GENERATION

Q62. Does DTE Electric's ownership of the Fermi 2 Nuclear Generating Plant affect the Company's risk profile?

A62. Yes. Although empirical tests of the effects of the ownership of nuclear generating plants on the cost of capital have not shown a statistically significant increase in the cost of capital, ownership clearly increases the total risk of the Company. The cost of capital is affected by business risk which is the risk remaining after diversifiable risk is removed from total risk.

The additional risk of the Fermi 2 Nuclear Generation Plant is likely to be largely diversifiable, but it is also asymmetric. Asymmetric risk refers to a downside risk for which there is no corresponding upside to balance the risk.

Q63. If the risk of Fermi 2 does not affect the cost of capital, what do you recommend that the Commission do?

A63. First, the Commission should recognize that the risk of nuclear power plants is asymmetric. The Commission should remove the asymmetric risk if there is an event at the plant because the Company has not been previously compensated through its cost of capital for potential loss. Second, the empirical tests of the effect of nuclear power plants on the cost of capital are likely too "weak" in the sense that is extremely difficult to develop a test likely to detect the effects of nuclear generating assets on the cost of capital for a company. That is because there are so many other factors that affect the cost of capital. For example, nuclear plants are generally owned by holding companies with many other types of assets and are affected by varying regulatory policies. It may well be that nuclear generating plants increase the cost of capital even though empirical tests have not been able to detect it. I regard ownership of Fermi 2 as one more factor indicating that the Company is riskier than the sample on average.

Q64. Can you summarize your assessment of DTE Electric's business risk relative to the sample companies?

A64. In consideration of the factors mentioned above, I believe DTE Electric is of higher than average business risk relative to the sample companies.

VII. COST OF CAPITAL RECOMMENDATION

Q65. What do you recommend for DTE Electric's cost of equity in this proceeding?

A65. The cost of equity estimates from my analyses range widely as summarized below, but as discussed in each section, the most reasonable result from the estimation process are those summarized in Figure 28 below.

Figure 28: Summary of Reasonable Cost of Equity Estimates

	Full Sample February 2020 [1]	Full Sample May 2020 [2]	High Capex Elec. February 2020 [3]	High Capex Elec. May 2020 [4]
CAPM/ ECAPM	9.00 - 10.0%	12.25 - 13.5%	8.5 - 8.75%	12.0 - 12.5%
DCF	8.75 - 10.25%	9.25 - 11.25%	9.0 - 10.25%	9.75 - 11.0%
Risk Premium	9.7 - 9.8%	n/a	n/a	n/a

Based on the figures above, it is evident that the current cost of equity is elevated substantially relative to that of February 2020. Past studies such as that of Duarte and Rosa in 2015, indicates that the impact of a financial crisis lingers. Consequently, it is reasonable to place DTE Electric at the very top of the estimates from February 2020, but below the high end of the May 2020 estimates. As the cost of capital has increased in recent months as discussed in Section IV, a reasonable ROE needs to be above DTE Electric's recently allowed ROE. Consequently, I conservatively recommend a ROE of 10.25 percent.

VIII. LIST OF EXHIBIT SCHEDULES

Q66. Can you provide a list of your exhibit schedules and their descriptions?

A66. Below, I provide a list of schedules that I am sponsoring as part of Exhibit A-14.

Exhibit A-14 – February 2020 Full Sample

Schedule	Description
D5.1	Table of Contents
D5.2	Classification of Companies by Assets
D5.3	Market Value of the Sample
D5.4	Capital Structure Summary of the Sample
D5.5	Estimated Growth Rates of the Sample
D5.6	DCF Cost of Equity of the Sample
D5.7	Overall After-Tax DCF Cost of Capital of the Sample
D5.8	DCF Cost of Equity at DTE Electric's Proposed Capital Structure
D5.9	Risk-Free Rates
D5.10	Risk Positioning Cost of Equity of the Sample
D5.11	Overall After-Tax Risk Positioning Cost of Capital of the Sample
D5.12	Risk Positioning Cost of Equity at DTE Electric's Proposed Capital Structure
D5.13	Unlevered Asset Beta
D5.14	Sample Average Asset Beta Relevered at DTE Electric's Proposed Capital Structure
D5.15	Risk Positioning Cost of Equity using Levered Betas

1

Exhibit A-14 – February 2020 Sub-Sample – High CAPEX

Schedule	Description
D5.16	Table of Contents
D5.17	Classification of Companies by Assets
D5.18	Market Value of the Electric Sample w/ High Capex
D5.19	Capital Structure Summary of the Electric Sample w/ High CAPEX
D5.20	Estimated Growth Rates of the Electric Sample w/ High CAPEX
D5.21	DCF Cost of Equity of the Electric Sample w/ High CAPEX
D5.22	Overall After-Tax DCF Cost of Capital of the Electric Sample w/ High CAPEX
D5.23	DCF Cost of Equity at DTE Electric's Proposed Capital Structure
D5.24	Risk-Free Rates
D5.25	Risk Positioning Cost of Equity of the Electric Sample w/ High CAPEX
D5.26	Overall After-Tax Risk Positioning Cost of Capital of the Electric Sample w/ High CAPEX
D5.27	Risk Positioning Cost of Equity at DTE Electric's Proposed Capital Structure
D5.28	Unlevered Asset Beta
D5.29	Electric Sample w/ High CAPEX Average Asset Beta Relevered at DTE Electric's Proposed Capital Structure
D5.30	Risk Positioning Cost of Equity using Levered Betas

Exhibit A-14 – May 2020 Full Sample

Schedule	Description
D5.31	Table of Contents
D5.32	Classification of Companies by Assets
D5.33	Market Value of the Sample
D5.34	Capital Structure Summary of the Sample
D5.35	Estimated Growth Rates of the Sample
D5.36	DCF Cost of Equity of the Sample
D5.37	Overall After-Tax DCF Cost of Capital of the Sample
D5.38	DCF Cost of Equity at DTE Electric's Proposed Capital Structure
D5.39	Risk-Free Rates
D5.40	Risk Positioning Cost of Equity of the Sample
D5.41	Overall After-Tax Risk Positioning Cost of Capital of the Sample
D5.42	Risk Positioning Cost of Equity at DTE Electric's Proposed Capital Structure
D5.43	Unlevered Asset Beta
D5.44	Sample Average Asset Beta Relevered at DTE Electric's Proposed Capital Structure
D5.45	Risk Positioning Cost of Equity using Levered Betas

Exhibit A-14 – May 2020 Sub-Sample – High CAPEX

Schedule	Description
D5.46	Table of Contents
D5.47	Classification of Companies by Assets
D5.48	Market Value of the Electric Sample w/ High Capex
D5.49	Capital Structure Summary of the Electric Sample w/ High CAPEX
D5.50	Estimated Growth Rates of the Electric Sample w/ High CAPEX
D5.51	DCF Cost of Equity of the Electric Sample w/ High CAPEX
D5.52	Overall After-Tax DCF Cost of Capital of the Electric Sample w/ High CAPEX
D5.53	DCF Cost of Equity at DTE Electric's Proposed Capital Structure
D5.54	Risk-Free Rates
D5.55	Risk Positioning Cost of Equity of the Electric Sample w/ High CAPEX
D5.56	Overall After-Tax Risk Positioning Cost of Capital of the Electric Sample w/ High CAPEX
D5.57	Risk Positioning Cost of Equity at DTE Electric's Proposed Capital Structure
D5.58	Unlevered Asset Beta
D5.59	Electric Sample w/ High CAPEX Average Asset Beta Relevered at DTE Electric's Proposed Capital Structure

D5.60 Risk Positioning Cost of Equity using Levered Betas

Exhibit A-14 – Risk Premium

Schedule	**Description**
D5.61	Table of Contents
D5.62	Scenario 1: Risk Premiums Determined by Relationship Between Authorized ROES and Long-term Treasury Bond Rate
D5.63	Scenario 2: Risk Premiums Determined by Relationship Between Authorized ROES and Long-term Treasury Bond Rate

Q67. Does this conclude your testimony?

A67. Yes.