STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

Northern Illinois Gas Company d/b/a Nicor Gas Company	)	
	)	Docket No. 21-XXXX
Proposed general increase in gas rates.	)	

Direct Testimony of

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Principal, The Brattle Group

On behalf of Northern Illinois Gas Company
d/b/a Nicor Gas Company

January 14, 2021

Nicor Gas Ex. 14.0

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I. INTRODUCTION AND BACKGROUND

A. WITNESS IDENTIFICATION

Q. What is your name, occupation, and business address?

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

B. BACKGROUND AND EXPERIENCE

Q. Briefly describe your educational and professional qualifications.

A. 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" 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, Illinois, Michigan, New Mexico, New York, Oregon, and Washington, as well as before the Bonneville Power Administration, Federal Energy Regulatory Commission ("FERC"), the Surface Transportation Board, the Alberta Utilities Commission, the Ontario Energy Board, and Mexico's Comisión Reguladora de Energía. I have provided white papers on cost of capital to the regulators in Australia, Canada, and Europe on cost of capital. I have testified or filed testimony on regulatory accounting issues before the Federal Energy Regulatory Commission, the Regulatory Commission of Alaska, the Michigan Public Service Commission, and 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. Nicor Gas Ex. 14.1 contains more information on my professional qualifications as well as a list of my prior testimonies and publications.

C. PURPOSE OF TESTIMONY AND SUMMARY OF CONCLUSIONS

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

A. Northern Illinois Gas Company d/b/a/ Nicor Gas ("Nicor Gas" or the "Company") has asked me to estimate the cost of equity that the Commission should allow Nicor Gas an opportunity to earn on the portion of its regulated gas utility rate base in Illinois supported by equity capital for the period beginning in 2022. I also consider the relative risk of the Company and its proposed capital structure to arrive at my recommendation for the allowed Return on Equity ("ROE").

Q. In what context is the determination of an appropriate allowed ROE for Nicor Gas being made?

A. The Commission's consideration of an allowed ROE for Nicor Gas takes place during uncertain economic and financial conditions due to the ongoing impacts of the COVID-19 pandemic, which has led to unprecedented low U.S. Treasury bond yields, substantial stock and commodity price declines, while at the same time measures of volatility spiked to all-time highs and remain elevated compared to long-term averages. Measures of the premium that investors require over and above the risk-free rate to invest in equities and bonds have increased as well. Going forward, the length and extent of the impacts of the pandemic are not known and will depend on how measures impacting commerce stay in

place and when a vaccine becomes widely available.[1] In light of this uncertainty, it is important to assure investors that the allowed ROE and capital structure is such that Nicor Gas can continue to raise the needed capital to continue to provide service to its customers, while also providing a return that is comparable to those that investors expect.

Nicor Gas' allowed ROE in its most recent rate case in October 2019 was 9.73%.[2] At that time, the Chicago Board of Options Exchange's CBOE Volatility Index ("VIX") – an index that provides a quantitative measure of investor perceived market volatility – was 20.56 whereas just a few months later on March 16, 2020, the VIX reached an all-time high of 82.69 and has remained at an elevated level since then. The VIX is currently at 21.57 and has averaged approximately 29.8 in 2020.[3] Similarly, Bloomberg's estimation of the market risk premium ("MRP") was at 7.01% in October 2019, reached a high of 9.8% in March 2020 and is currently at 7.85%.[4] Simply put, the financial markets have been in extreme turmoil and continue to exhibit unusual volatility, which has had negative impacts on investors, not just in terms of returns but also with regard to volatility and risk. However, it is important to look to recognize that the currently low Treasury yields are not reflective of a low cost of equity; indeed, the turmoil in the markets is indicative of risks about which equity investors must be concerned. Specifically, the data points to a return on equity today that are at least as high as those experienced at the time of Nicor Gas' prior rate case; filed in October 2019. That

[1] 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. I also note that the first vaccine is being administrated to selected groups in the U.S., U.K., and Canada.

[2] Illinois Commerce Commission, "Order, Proposed General Increase In Rates and Revisions to Other Terms and Conditions of Service (Tariffs filed November 9, 2019)", Docket No. 18-1775, October 2, 2019.

[3] www.CBOE.com accessed December 12, 2020 and Bloomberg, accessed December 18, 2020.

[4] *Id*, measured over a 10-year U.S. Government bond yield.

is, if we assume that 9.73% was appropriate in October 2019, then the ROE estimated today must be higher today. I provide more discussion of the current capital market conditions and their impact on the ROE for Nicor Gas in Section IV.

When evaluating the cost of equity, it is also important to consider business risks as long-term development for natural gas distribution utilities, such as Nicor Gas, has become more uncertain. Recently, cities across the country, such as Berkeley, California have imposed bans on natural gas hook-ups in new building. While cities within Nicor Gas' service territory have not imposed bans on gas hook-ups, environmental and ratepayer advocate groups in Illinois are calling for policymakers to incentivize building electrification to help the State achieve its climate and energy goals.[5] At the same time, the construction of natural gas infrastructure has become increasingly challenging. This makes the natural gas utility industry face increasing risks. I further discuss how these and other business risk factors affect the cost of equity in Section VI.

Q. Please summarize your recommendations for Nicor Gas' ROE.

A. I recommend that Nicor Gas be allowed to earn a 10.25% rate of return on the equity portion of its regulated rate base at the requested 54.549% equity capital structure. This ROE takes into account Nicor Gas' business risks, but not any unrecovered equity flotation costs. The recommendation is based on my finding that the estimated range for a natural gas utility sample's cost of equity is in the range of 9.0% to 11.0% prior to any consideration of, and without any adjustment for, company-specific risks or unrecovered equity flotation costs. The recommendation is based on my implementation of standard

[5] Tom DiChristopher, "Gas ban backers set their sights on Illinois building electrification," S&P Market Intelligence, September 4, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/gas-ban-backers-set-their-sights-on-illinois-building-electrification-60224263

cost of capital estimation models including two versions each of the Discounted Cash Flow ("DCF") model and the Capital Asset Pricing Model ("CAPM"), as well as an Implied Risk Premium analysis and an analysis of Nicor Gas' business risk. Figure 1 below summarizes the model results using the requested 54.549% equity capital structure. The table also presents the corresponding reasonable ranges, which I discuss further in Section IV below. Based on my consideration of the results from the various cost of capital estimation models as well as the context of Illinois and Nicor Gas' specific risk, I believe it is appropriate to place Nicor Gas' allowed return in the upper half of the reasonable ranges and near the upper bound.

Figure 1: Summary of Reasonable Ranges of Estimates at 54.549% Equity

	Gas Sample	**All Evidence**
CAPM/ ECAPM	9.25% - 9.75%	9.0% – 10.0%
DCF	8.5% – 11.0%	8.25% - 11.75%
Risk Premium	9.4% - 9.6%	N/A

I find a range of 9.0% to 11.0% ROE at Nicor Gas' 54.549% equity capital ratio to be reasonable based on a sample of regulated natural gas distribution utilities and complemented with a sample including natural gas utilities and highly regulated water utilities. In the current environment, where there has been considerable consolidation of the natural gas industry and regulatory initiatives to switch from natural gas to alternative sources of energy, I find it beneficial to confirm the estimates by additional companies and a sample of highly regulated water utilities that are in my opinion the closest to a natural gas utility sample. I provide a further explanation in Section V below.

Q. How is the remainder of your testimony organized?

A. Section III formally defines the cost of capital and explains the techniques for estimating it in the context of utility rate regulation. Section IV discusses conditions and trends in capital markets and their impacts on the cost of capital. Section V explains my analyses and presents the results. Section VI discusses Nicor Gas' business risk characteristics, unique risks facing Illinois-based natural gas utilities and other business risks specific to Nicor Gas that are relevant to my recommended allowed ROE. Finally, Section VII concludes with a summary of my recommendations.

II. ITEMIZED ATTACHMENTS

Q. Are you sponsoring any exhibits to your direct testimony?

A. Yes, I am sponsoring and have attached nine exhibits.

- Nicor Gas Exhibit ("Ex.") 14.1 – My *curriculum vitae*
- Nicor Gas Ex. 14.2 – Technical Appendix
- Nicor Gas Ex. 14.3 – Cost of Capital
- Nicor Gas Ex. 14.4 – Capital Expenditure Analysis
- Nicor Gas Ex. 14.5 Confidential – Cost of Capital Model
- Nicor Gas Ex. 14.6 Confidential – Implied Risk Premium Model
- Nicor Gas Ex. 14.7 Confidential – Bond Yields & MRP
- Nicor Gas Ex. 14.8 Confidential – Volatility Charts
- Nicor Gas Ex. 14.9 Confidential – FERC MRP

III. COST OF CAPITAL PRINCIPLES AND APPROACH

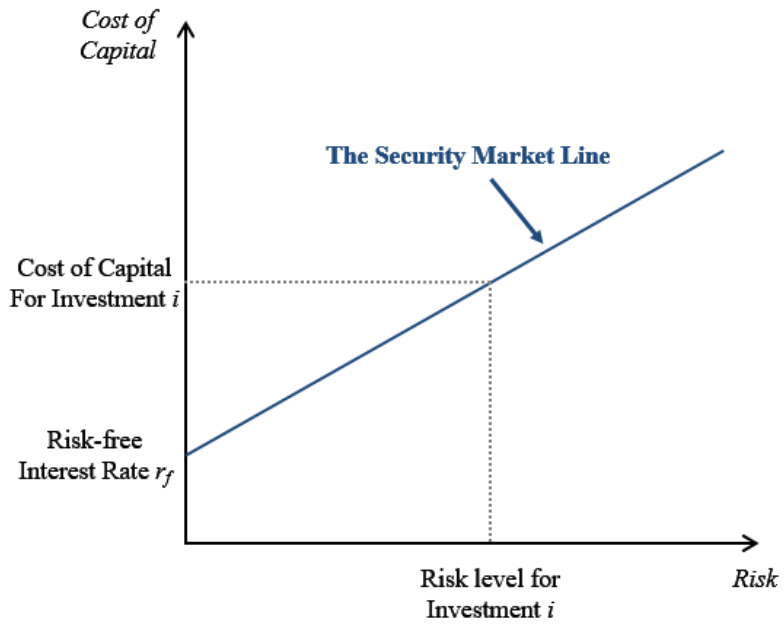
A. RISK AND THE COST OF CAPITAL

Q. How is the "Cost of Capital" defined?

A. The cost of capital is defined as the expected rate of return in capital markets on alternative investments of equivalent risk. Put differently, it is the rate of return investors require based on the risk-return alternatives available in competitive capital markets. The cost of capital is a type of opportunity cost: it represents the rate of return that investors could expect to earn elsewhere without bearing more risk. "Expected" is used in the statistical sense: the mean of the distribution of possible outcomes. The terms "expect" and "expected," as in the definition of the cost of capital itself, refer to the probability-weighted average over all possible outcomes.

The definition of the cost of capital recognizes a tradeoff between risk and return that can be represented by the "security market risk-return line" or "Security Market Line" for short. This line is depicted in Figure 2 below. The higher the risk, the higher the cost of capital required.

Figure 2: The Security Market Line



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

A. 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 "asset beta" or "unlevered beta." For a company with an asset 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.

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

A. The seminal guidance on this topic was provided by the U.S. Supreme Court in the *Hope* and *Bluefield* cases,[6] which found that:

- The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks;[7]
- 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.[8]

Importantly, this is not just a legal rule, but the appropriate set of standards to determine the true economic and financial cost of equity capital for a utility like Nicor Gas.

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

A. 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.[9] The cost of capital is the rate of return investors can expect to earn in capital markets on alternative investments of equivalent risk.[10]

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[6] *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").

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

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

[9] 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).

[10] 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).

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

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

A. To evaluate comparable business risk, I looked to a proxy group of regulated natural gas and water utilities. The natural gas and water utilities I consider have a high proportion of regulated assets and revenue, with the majority having more than 80% of assets subject to regulation. Additionally, they all have a network of assets that are used to serve end-use customers and they are capital intensive (meaning that each dollar in revenue requires substantial investment in fixed assets). 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 and between the capital structures of the proxy companies and also between the capital structures of the proxy companies and the regulatory capital structure that will be applied to Nicor Gas for ratemaking purposes. To determine where the estimated range of Nicor Gas' ROE reasonably falls, I compared the business risk of Nicor Gas to that of the proxy companies.

B. FINANCIAL RISK AND THE COST OF EQUITY

Q. How does capital structure affect the cost of equity?

A. Debtholders in a company have a fixed claim on the assets of the company and are paid prior to the company's owners (equity holders) who hold the inherently variable residual claim on the company's operating cash flows. Because equity holders only receive the profit that is left over after the fixed debt payments are made, higher degrees of debt in the capital structure amplify the variability in the expected rate of return earned by equity-holders. This phenomenon of debt resulting in financial leverage for equity holders means that, all else equal, a greater proportion of debt in the capital structure increases risk for equity holders, causing them to require a higher rate of return on their equity investment, even for an equivalent level of underlying business risk.

Q. How do differences in financial leverage affect the estimation of the cost of equity?

A. The DCF models and the CAPM rely on market data to estimate the cost of equity for the proxy companies, so the results reflect the value of the capital that investors hold during the estimation period (market values).

The authorized ROE in turn is applied to the regulatory equity portion of Nicor Gas' rate base. Because the cost of equity is measured using a group of proxy companies, it may well be the case that these companies finance their operations with a different debt and equity proportion than the proportion the Commission allows in Nicor Gas' capital structure. Specifically, the DCF models (and the CAPM) measure the cost of equity using market data and consequently are measures of the cost of equity using the proportion of debt and equity that is inherent in that data. Therefore, I consider the impact of any

difference between the financial risk inherent in those cost of equity estimates and the capital structure used to determine Nicor Gas' required return on equity.

Differences in financial risk due to the different degree of financial leverage in Nicor Gas' regulatory capital structure compared to the capital structures of the proxy companies mean that the equity betas measured for the proxy companies must be adjusted before they can be applied in determining Nicor Gas' return on equity. Similarly, the cost of equity measured by applying the DCF models to the proxy companies' market data requires adjustment if it is to serve as an estimate of the appropriate allowed ROE for Nicor Gas at the regulatory capital structure that the Commission grants.

Importantly, taking differences in financial leverage into account does not change the value of the rate base. Rather, it acknowledges the fact that a higher degree of financial leverage in the regulatory capital structure imposes a higher degree of financial risk for an equity investment in Nicor Gas' rate base than is experienced by equity investors in the market-traded stock of the less leveraged proxy companies.

Q. How should financial risk be taken into account in analysis of required returns on equity using market data for a proxy group of companies?

A. The impact of financial risk is taken into account in an analysis of cost of equity using market-based models such as the DCF and CAPM in several manners.[11] One way is to determine the after-tax weighted-average cost of capital for the proxy group using the equity and debt percentages as the weight assigned to the cost of equity and debt.

[11] The impact of financial leverage on the risk premium model needs to be considered separately as it uses regulatory data rather than market data, meaning that differences in regulatory capital structures are relevant for this model.

Financial theory holds that for a given level of business risk, the weighted average cost of capital is constant over a broad set of capital structures, *i.e.*, the weighted average cost of capital is the same at, for example, 55 and 45 percent equity, as the cost of equity increases as the percentage of equity decreases. I estimate the weighted cost of capital for each utility in the proxy group based on that utility's capital structure. I then evaluate the average weighted cost of capital across the proxy group. Once the weighted cost of capital is determined for the proxy group, I can then determine the cost of equity that is required at Nicor Gas' capital structure. This approach assumes that the after-tax weighted average cost of capital is constant for a range that spans the capital structures used to estimate the cost of equity and the regulatory capital structure.

A second approach was developed by Professor Hamada, who estimated the cost of equity using the CAPM and made comparisons between companies with different capital structures using beta. Several variations of this approach have been developed, but they aim at capturing the same effect. This approach is well recognized and described in standard finance textbooks. Specifically, in the Hamada approach, the estimated beta is used to calculate what beta would be associated with a 100 percent equity financed firm to obtain a so-called all-equity or assets beta and then re-lever the beta to determine the beta associated with the regulatory capital structure. This requires an estimate of the systematic risk associated with debt (*i.e.*, the debt beta), which is usually quite small. In Nicor Gas Ex. 14.2, I set forth additional technical details regarding the methods that can be used to account for financial risk when estimating the cost of capital.

Q. Can you illustrate how the cost of equity changes, all else being equal, when the degree of leverage changes?

A. Yes. I constructed a simple example below, where only the leverage of a company varies. I assumed the return on equity is 11.00% at a 50% equity capital structure and determine the return on equity that would result in the same overall return if the percentage of equity in the capital structure were reduced to 45%. Importantly, regardless of the equity percentage, customers will pay $80 in capital costs – the only difference between the two companies is how that $80 is split between equity and debt holders.

Figure 3: Illustration of the Impact of Financial Risk on ROE

		Company A (50% Equity)	Company B (45% Equity)
Rate Base	[a]	$1,000	$1,000
Equity	[b]	$500	$450
Debt	[c]	$500	$550
Total Cost of Capital (8%)	[d] = [a] × 8%	$80.0	$80.0
Cost of Debt (5%)	[e] = [c] × 5%	$25.0	$27.5
Equity Return	[f] = [d] - [e]	$55.0	$52.5
Rate of Return on Equity (ROE)	**[g] = [f] / [b]**	**11.00%**	**11.67%**

Figure 3 above illustrates how financial risk[12] affects returns and the ROE. The overall return remains the same for both Company A and B at $80, but Company B with the lower equity share and higher financial leverage must earn a higher percentage ROE in order to maintain the same overall return. This higher percentage allowed ROE represents the increased risk to equity investors caused by the higher degree of leverage.

[12] Financial risk is risk that a company has due to its capital structure; specifically the higher a company's debt, the larger the financial risk.

The principle illustrated in Figure 3 is an example of the first adjustment I perform to account for differences in financial risk when conducting estimates of the cost of equity applicable to Nicor Gas.

Q. Does this approach apply to the risk premium analysis?

A. Yes, to the extent that there are differences between the capital structures of the companies used to determine the benchmark ROE and Nicor Gas, I need to consider whether I am comparing apples to apples. However, because the allowed ROE, which is used in the risk premium model, usually is applied to book value capital structures, it is the book value capital structure that is relevant for the risk premium method. Further, the average book value capital structure for natural gas utilities for which I have historical allowed ROE data on is close to that of Nicor Gas' capital structure, so I do not need to make any adjustments to the estimated ROE. I note, however, that for 2020 the average and median allowed equity capital structures for gas LDCs was 52.0% and 52.5%, respectively.[13]

C. APPROACH TO ESTIMATING THE COST OF EQUITY

Q. What approach do you use for determining the cost of equity for Nicor Gas?

A. I begin with first principles. The standard—economic and financial, as well as legal—for establishing a fair rate of return on equity requires that a regulated utility be allowed to earn a return equivalent to what an investor could expect to earn on an alternative investment of equivalent risk. Therefore, my approach to estimating the cost of equity for Nicor Gas focuses on measuring the expected returns required by investors to invest in

[13] S&P Global Market Intelligence, "Rate Case History" Online version as of November 30, 2020.

companies that face business and financial risks comparable to those faced by Nicor Gas. I use accepted capital market models in aid of that analysis.

Because certain models require market data, my considerations of comparable companies is restricted to those that have publicly traded stocks. To this end, I have selected two proxy groups consisting of publicly traded utilities. The first proxy group consists of companies providing primarily regulated natural gas distribution services and the second proxy group consists of highly regulated water utility companies.[14] I consider both the natural gas distribution sample and the much larger water-utility sample when deriving estimates of the representative cost of equity according to standard financial models.

I also perform an analysis of historical allowed ROEs for gas local distribution companies in relation to prevailing risk-free interest rates at the time the ROE was authorized, and use the implied allowed risk-premium relationship to estimate a utility cost of equity consistent with current economic conditions. The results of this implied risk premium analysis (sometimes referred to herein as the "Risk Premium" model) are an additional consideration that supports my recommendation and serves as a check on the reasonableness of my market-based results.

[14] I consider both a natural gas distribution utility sample (because Nicor Gas is a natural gas distribution utility) and a sample including water utilities. The latter sample has the advantage of being highly regulated and, like gas distribution utilities, being engaged in distributing a commodity through an extensive network of pipes. Additionally, there is no substitute for water, while there are initiatives to substitute gas for renewable sources. As a result, the estimates from water companies are less influenced by individual state policies or changing federal policies than those of the natural gas companies – i.e., they reflect to a larger degree the fundamental risks of regulated utilities. Lastly, the number of companies in the natural gas distribution industry has been reduced due to mergers and acquisitions, so the water utility industry serves to increase the number of available, fully regulated utilities that serve customers through a network of pipes.

IV. CAPITAL MARKET CONDITIONS AND THE COST OF CAPITAL

Q. What do you cover in this section?

A. In this section, I address recent changes in capital market conditions, the increased volatility in equity and debt markets, and how these factors affect 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.

Q. Why do you discuss capital market conditions in a testimony aimed at determining Nicor Gas' ROE?

A. Capital market conditions are important to cost of equity estimation methodologies and can affect the inputs to the cost of equity models. Inputs to the DCF model are affected by the economy in general, as economic growth will affect growth rates and utility stock prices. Consequently, the capital market developments affect the growth rates, dividend yields, and the assessment of estimates' reasonableness.

Furthermore, the risk-free rate is an input to the risk premium and CAPM. Therefore, recent and expected developments in government bond yields are important to assess the validity of any measure of the risk-free rate. Similarly, the Market Risk Premium ("MRP") is an input to the CAPM, so factors that affect the MRP (e.g. volatility and changes in investors' risk perceptions) are vital for accurate determination of the ROE.

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

A. Capital markets have seen historic changes this year. Starting in January 2020, long-standing trade tensions that were weighing on the economy began to ease. The U.S. signed Phase 1 of the U.S.-China Trade Agreement and also the USMCA. However, around the same time, a novel virus was beginning to spread in China and Europe. By March 2020, the World Health Organization declared that the COVID-19 outbreak was a pandemic. Many governments around the world, including in the U.S., sought measures to limit the health and economic impacts from the pandemic. By mid-March, local and state governments began issuing stay-at-home orders and major portions of the U.S. economy were shut down. As a result, over 68 million people in the U.S. have filed initial unemployment claims since March 21.[15] To help mitigate the economic impacts, the U.S. Federal Government passed the $2.1 trillion CARES Act on March 27, 2020.[16] The U.S. Federal Reserve also cut its policy rate to 0 to 0.25 percent and announced "unlimited" quantitative easing and emergency liquidity programs to support financial markets.[17] Despite this, the U.S. economy contracted substantially in the first half of 2020. According to the Bureau of Economic Analysis ("BEA") first and second quarter 2020 Gross Domestic Product ("GDP") decreased by annualized rate of 5.0% and 31.4%,

[15] U.S. Department of Labor, "Unemployment Insurance Weekly Claims," New Release, December 10, 2020.

[16] 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/.

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

respectively.[18] By June 2020, the National Bureau of Economic Research declared the U.S. was in a recession. As of the end of November 2020, the U.S. unemployment rate stands at 6.7% with permanent job losses at 3.7 million, up 2.5 million since February.[19] Most recently, the November 25, 2020 release from the Bureau of Economic Analysis indicates that real GDP increased by 33.1 percent in Q3, 2020[20] and that Blue Chip in December forecasted the 2021 unemployment rate to drop to 6.1 percent.[21]

Q. What are the expectations concerning the economic and financial impacts of the pandemic going forward?

A. The extent and length of the economic and financial impacts from COVID-19 are still unknown. The impacts on the economy and unemployment will depend on how long social-distancing measures are required and how long it takes to develop and distribute a vaccine. Recent surveys by economist, such as in the *Blue Chip Economic Indicators* ("BCEI") survey, indicate that the nominal U.S. GDP will decline by 2.4% in 2020 before recovering by 5.8% in 2021.[22] Whereas, the Congressional Budget Office ("CBO") expects real GDP will contract by 5.9% in 2020 and recovery by 4.8% in

[18] Bureau of Economic Analysis, "Gross Domestic Product, 2nd Quarter 2020 (Third Estimate); Corporate Profits, (Revised), U.S. Department of Commerce, September 30, 2020., accessed October 2, 2020, https://www.bea.gov/news/2020/gross-domestic-product-third-estimate-corporate-profits-revised-and-gdp-industry-annual.

[19] U.S. Department of Labor, "The Employment Situation – November 2020," News Release, December 4, 2020, accessed December 12, 2020, https://www.bls.gov/news.release/empsit.nr0.htm.

[20] Bureau of Economic Analysis, "Gross Domestic Product, Third Quarter 2020 (Second Estimate); Corporate Profits, Third Quarter 2020 (Preliminary Estimate)," news release November 25, 2020. https://www.bea.gov/news/2020/gross-domestic-product-3rd-quarter-2020-second-estimate-corporate-profits-3rd-quarter

[21] Wolters Kluwer Blue Chip Economic Indicators and PwC Analysis, December 2020, p. 3.

[22] Id., pp. 2-3.

2021,[23] which is consistent with a nominal GDP growth over 5% in 2021. BCEI estimates the long-term forecasted GDP growth at 4.1%[24] and that is the figure that impacts the cost of equity estimate in the DCF model. In August, the U.S. Federal Reserve announced a policy change whereby they would target inflation at 2% *on average* indicating the Federal Reserve may hold interest rates lower for longer.[25] After their September 2020 meeting, the Federal Reserve released economic projections indicating that policy rates would remain at current levels through 2023.[26] This will likely continue to exert downward pressure on interest rates over the near to medium term. While the length and extent of the economic impacts from COVID-19 are currently unknown, the impacts are expected to persist for some time until some until a vaccine is widely available and distributed.[27]

Q. How does this impact the cost of equity estimation for Nicor Gas?

A. It is important to remember that the cost of equity and capital structure established for Nicor Gas in this proceeding is expected to be in effect beyond the current extraordinary impacts of the COVID-19 pandemic. The analysis and recommendations should reflect

[23] Congressional Budget Office, "An Update to the Economic Outlook: 2020 to 2030," U.S. Department of Commerce, July 2020, accessed September 1, 2020, https://www.cbo.gov/publication/56465.

[24] Wolters Kluwer Blue Chip Economic Indicators and PwC Analysis, October 2020, p 14.

[25] U.S. Federal Reserve, "Federal Open Market Committee announces approval of updates to its Statement on Longer-Run Goals and Monetary Policy Strategy," August 27, 2020, accessed September 10, 2020, https://www.federalreserve.gov/newsevents/pressreleases/monetary20200827a.htm.

[26] U.S. Federal Reserve, "Table 1. Economic Projections of Federal Reserve Board members and Federal Reserve Bank presidents under their individual assumptions of projected appropriate monetary policy, September 2020," September 15, 2020, accessed September 21, 2020, https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20200916.pdf.

[27] The Federal Reserve in their November 5, 2020 FOMC statement said, "The ongoing public health crisis will continue to weigh on economic activity, employment, and inflation in the near term, and poses considerable risk to the economic outlook over the medium term." https://www.federalreserve.gov/newsevents/pressreleases/monetary20200916a.htm.

expected market conditions that will prevail over the relevant rate period and not exclusively the current market conditions. As discussed further below, many of the inputs to the cost of equity estimation methodologies are currently at unprecedented levels. Sole reliance on current economic and financial conditions to estimate Nicor Gas' cost of equity would unfairly lock Nicor Gas and their customers into the current economic and financial environment. 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. However, the current conditions create an exorbitant amount of uncertainty about the future and, if the financial crisis can be used as a guide, investors' heightened perception of risk are likely to linger.

A. INTEREST RATES

Q. How do interest rates affect the cost of equity?

A. The current interest rate environment affects the 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 downwardly bias the cost of equity estimate. At the same time, a low interest rate is associated with a high market risk premium, so these two factors offset one another to a degree. To avoid any bias in the cost of equity estimate, 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 Nicor Gas' cost of equity over the relevant regulatory period. As the economy begins to recover, as forecasted, in 2021 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 during the time rates are expected to be in effect.

Q. What are the relevant developments regarding interest rates?

A. 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.[28] 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 caused 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

[28] Bloomberg as of October 15, 2020.

low of 0.339%.[29] Since then, long-term government bond yields have increased somewhat—10 year U.S. Government bond yields are currently at 0.95%.[30]

Most economists expect the economy to begin to recover in 2021.[31] This is expected to cause interest rates to rise from near-historic lows. BCEI December 2020 edition forecasts that the yield on 10-year U.S. Treasury bonds will increase from current levels of 0.95% to 1.1% in 2021[32] and then reach 1.4% in 2022 and 1.7% in 2023, respectively (see Figure 4). [33] That is, yields are expected to nearly double over the next two years. The expectations for 2022, 2023 and onwards is what is relevant for this proceeding as rates are expected to be in effect starting in 2022. Because the risk-free rate is an input to several cost of equity estimation models, the relationship between current and forecasted risk-free rates is an important consideration.

[29] 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

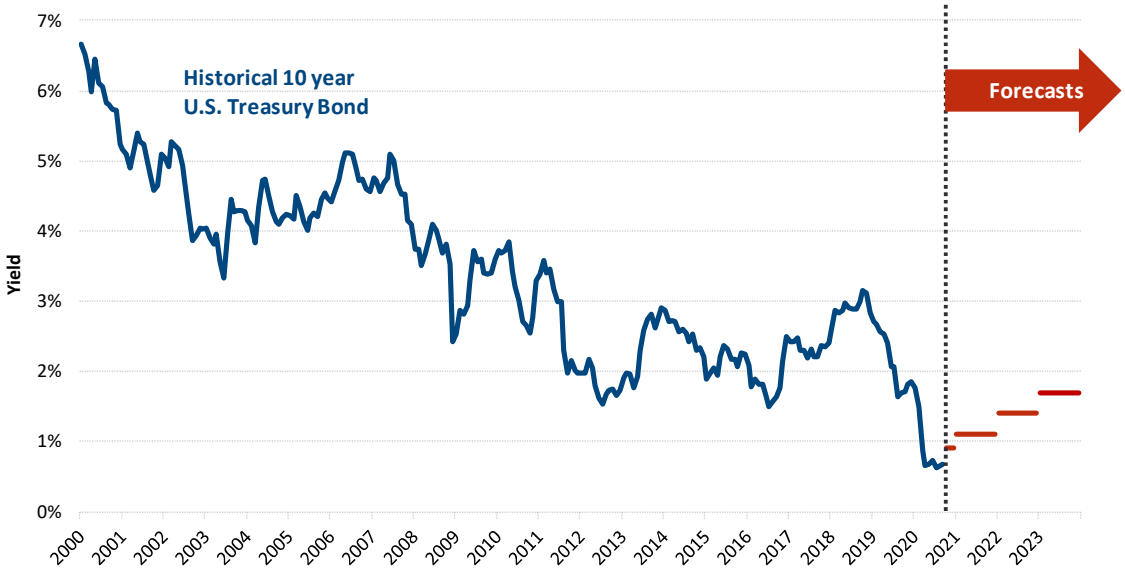
[30] Bloomberg as of December 18, 2020.

[31] For example, Wolters Kluwer Blue Chip Economic Indicators and PwC Analysis, December 2020 collects real GDP growth data from 40 financial institutions, academic institutions and other entities – all of whom predict a positive growth for 2021 with an average of 5.8%.

[32] Ibid., p. 3.

[33] Wolters Kluwer Blue Chip Economic Indicators and PwC Analysis, October 2020 p. 14.

Figure 4: Historic and Projected Ten-Year Treasury Bond Yields



Source: Historical data from Bloomberg. Forecasts from Blue Chip Economic Indicators October and December 2020 issue.

B. YIELD SPREADS

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

A. Bond yield spreads (also called credit spreads) reflect the premium that investors demand to hold debt securities (specifically corporate or utility 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.[34] More specifically, if both credit spreads and equity premiums are determined

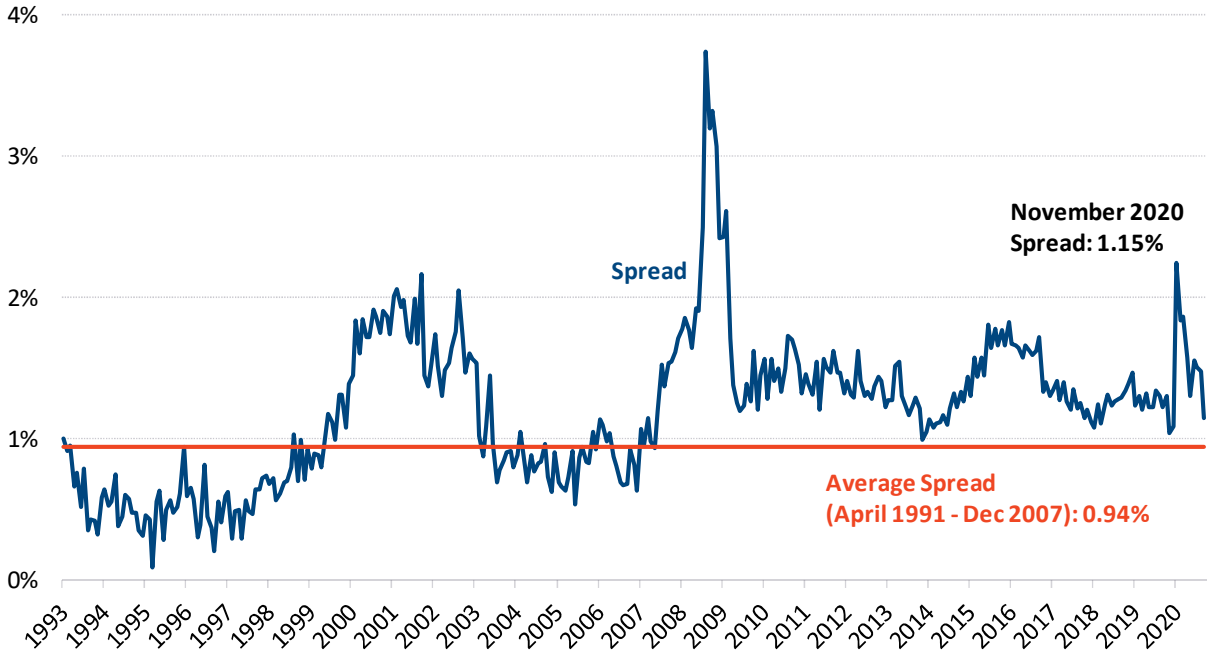
[34] This is the same issue as in cost of capital estimation more generally: the cost of debt can often be directly observed in the form of market bond yields, whereas the cost of equity must be estimated based on financial models.

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.

Q. How does the current spread between utility and U.S. government bond yields compare to historical spreads?

A. Utility bond yield spreads 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 5 below, the spread between 20-year A-rated utility bond yields and 20-year U.S. government bond yields is currently at 1.15%, approximately 21 basis points above the pre-financial crisis average of 0.94%. I note that the spread increased dramatically in early 2020, but has since declined some.

Figure 5: Yield Spread Between 20-Year Utility A-Rated Bonds and 20-Year U.S. Treasury Bonds

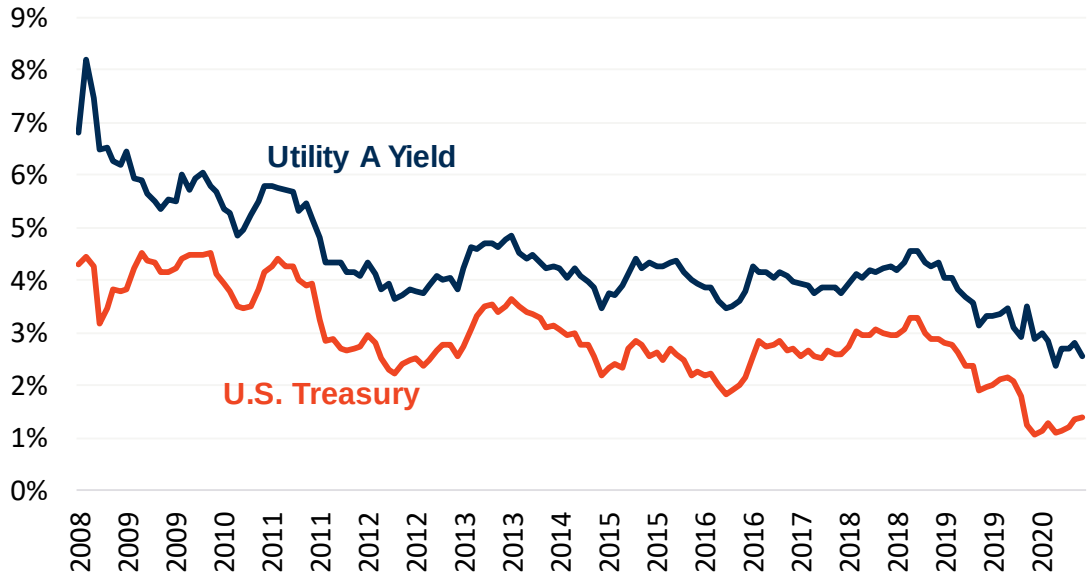


Source: Bloomberg as of 11/30/2020.

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 not changed materially for highly rated utility bonds[35] and taxes are 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 6 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 6: Utility A-Rated Bond Yields and 20 Year U.S. Treasury Bonds



Source: Bloomberg, data as of November 30, 2020

While spreads have narrowed since the height of the COVID-19 pandemic in March and April,[36] they remain elevated compared to the pre-COVID-19 period indicating lingering uncertainty and elevated risk. On April 2, 2020, S&P Global Ratings downgraded the outlook for North American utilities from "stable" to "negative" due to

[35] S&P Ratings reports Utility defaults are down slightly in 2020 versus 2019 year to date. S&P Global Ratings, "Corporate Defaults Slow In The Third Quarter While The Oil and Gas Total Remains High," October 2, 2020.

[36] For clarity, the height is referencing the financial impact from COVID-19.

COVID-19 risks, citing concerns about the adequacy of utilities' financial cushions to weather the financial downturn.[37] With heightened concern about utility credit, spreads and risk premiums are likely to remain elevated.

C. RISK PREMIUMS

Q. What is the current evidence regarding market volatility?

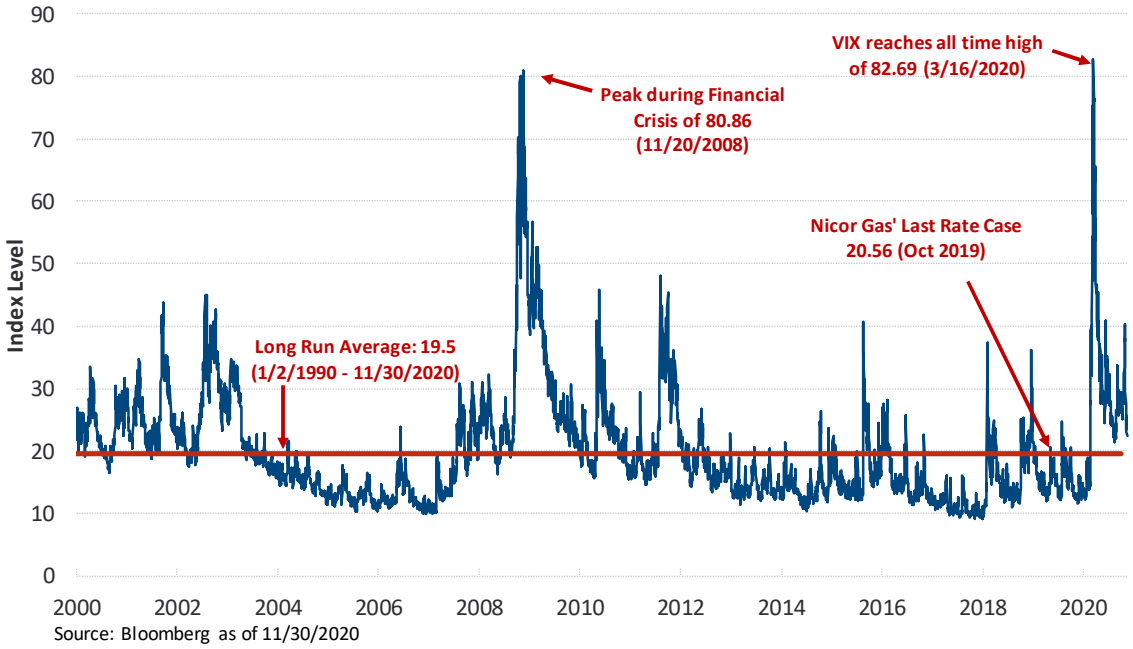
A. Recently, financial markets have become extremely volatile as shown in near-term common volatility measures, such as the VIX, which is frequently referred to as the market's fear index. The VIX reached an all-time high of 82.69 on March 16, 2020, which was higher than the peak of 80.86 during the Financial Crisis. Although, the VIX has slowly retreated from recent highs to 21.57 currently and it remains elevated relative to the long run average of 19.5.[38] Comparably, at the time of Nicor Gas' last rate case in October 2019, the VIX stood at approximately 20.56.[39] Clearly, investors are faced with higher volatility today than during Nicor Gas' most recent rate case and higher volatility implies a higher risk premium

[37] *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.

[38] Bloomberg, as of December 18, 2020.

[39] Ibid.

Figure 7: VIX

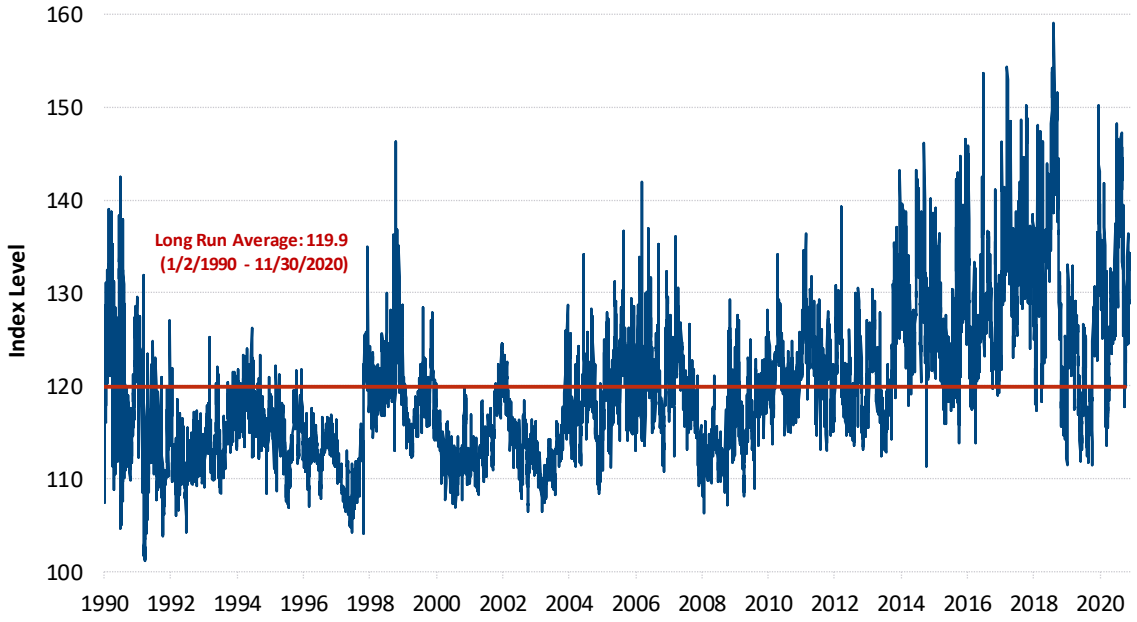


Source: Bloomberg as of 11/30/2020

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),[40] 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 8 below shows the development in the SKEW since 1990 and that the index has recently increased following a period of declining SKEW. The index spiked over 148.3 on June 30, 2020, which is 28.4 points above its long run average of 119.9. The recent spike in the SKEW shows that investors are willing to pay for protection against downside risks.

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

Figure 8: SKEW



Source: Bloomberg as of 11/30/2020

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.

Q. What is the Market Risk Premium?

A. In general, a risk premium is the amount of "excess" return—above the risk-free rate of return—that investors require to compensate them for taking on risk. As illustrated in Figure 2, the riskier the investment, the larger the risk premium investors will require.

The Market Risk Premium ("MRP") is the risk premium associated with investing in the market as a whole. Since the so-called "market portfolio" embodies the maximum

possible degree of diversification for investors,[41] the MRP is a highly relevant benchmark indicating the level of risk compensation demanded by capital market participants. It is also a direct input necessary to estimating the cost of equity using the CAPM and other risk-positioning models.

Q. What does the current evidence related to the Market Risk Premium show?

A. The heightened volatility has increased the premium that investors require to hold risky assets, especially when measured utilizing forward-looking methodologies that estimate expected market returns with reference to current dividend yields. This year, Bloomberg's forward looking estimate of the MRP for the U.S. increased to as high as 9.84% in March 2020 and is currently at 7.85%.[42] At the same time, the MRP measured using FERC's methodology consistent with Order 569-A increased to 9.12% as of November 30, 2020.[43] This is consistent with an increase in the MRP of 197 basis points relative to the historic average.[44]

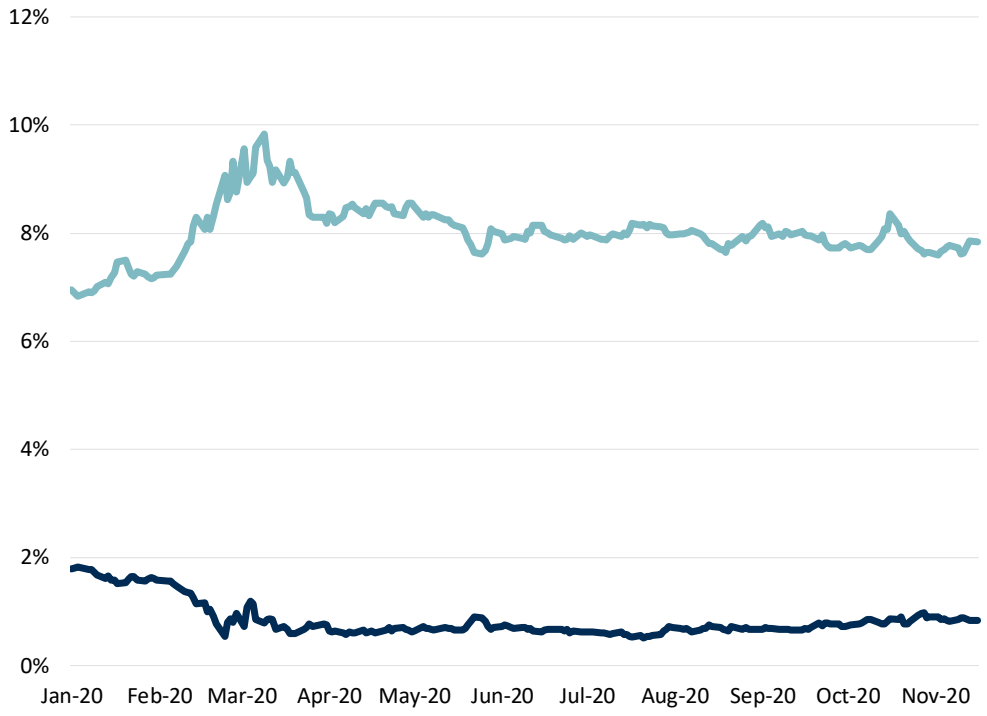
[41] In finance theory, the "market portfolio" describes a value-weighted combination of all risky investment assets (e.g., stocks, bonds, real estate) that can be purchased in markets. In practice, academics and financial analysts nearly always use a broad-based stock market index, such as the S&P 500, to represent the overall market.

[42] Bloomberg, as of December 12, 2020. Measured over a 10-year U.S. Treasury bond.

[43] FERC Opinion No. 569-A, Docket No. EL14-12-004, EL15-45-013, May 21, 2021, FERC Order on Rehearing, see also attached workpaper

[44] The long-term historical average arithmetic MRP as calculated by Duff & Phelps using the Ibbotson method is 7.15%. Source: Duff & Phelps 2019.

Figure 9: Bloomberg's Daily Market Risk Premium and Risk Free Rate



Q. Are higher risk premiums relevant given that treasures are near historic lows?

A. 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 the first time in history.[45] 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 9, the MRP has also increased as risk-free rates decreased.

[45] 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

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.[46] Morin finds that the risk premium increases by 0.52% for each 1% decline in the risk-free rate.[47] Thus, the risk premium is likely to increase as the risk-free rate declines. As shown in Figure 9 above, this phenomenon is also documented in the forward-looking market risk premium calculated by Bloomberg. According to Bloomberg, the current market risk premium is 7.85%,[48] which is higher than the historical average MRP of about 7.15%. It is also an increase over the forward-looking MRPs at the end of 2019 of 6.48%, which were much more in line with the historical average MRP.[49]

Q. Is there evidence that the Market Risk Premium will remain elevated going forward?

A. 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.[50] This analysis found a very high MRP after the financial crisis, relative to time periods prior the crisis.

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

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

[48] Bloomberg, accessed December 12, 2020. Measured over 10 Year U.S. Treasury bond yield.

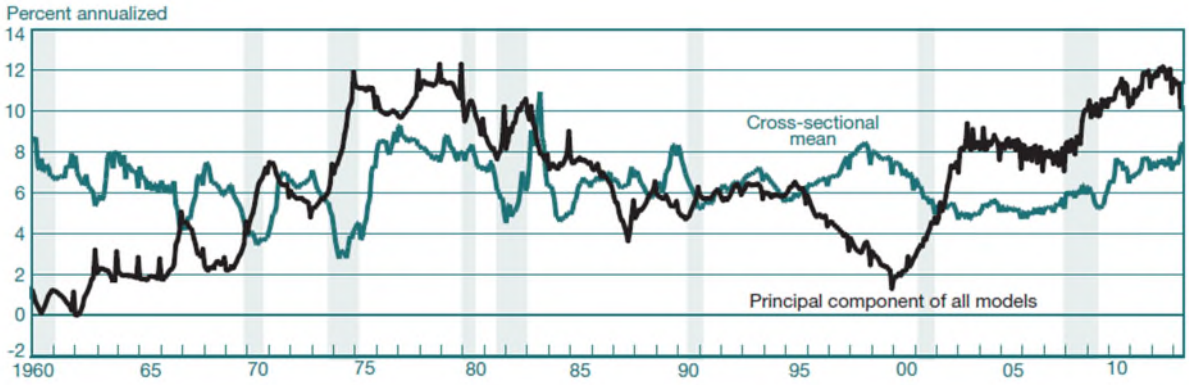
[49] Id.

[50] Fernando Duarte and Carlo Rosa, "The Equity Risk Premium: A Review of Models," *Federal Reserve Bank of New York*, December 2015 ("Duarte and Rosa, 2015") https://www.newyorkfed.org/research/staff_reports/sr714.html.

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.[51] 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 10 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. Specifically, the financial crisis saw high volatility and a flight to quality – just as today. 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 and the historically low interest rates.

[51] 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.

Figure 10: Duarte and Rosa's Chart 3
One-Year Ahead MRP and Cross-Sectional Mean of Models



Q. How have the economic developments you have discussed in this section of your direct testimony affected the return on equity and debt that investors require?

A. Utilities rely on investors in capital markets to provide funding to support their capital expenditure programs and efficient business operations. Investors consider the risk-return tradeoff in choosing how to allocate their capital among different investment opportunities. It is therefore important to consider how investors view the current economic conditions, including the plausible developments in the risk-free rate and the growth in the U.S. GDP.

These investors have been dramatically affected by the ongoing market uncertainty, so there are reasons to believe that their risk aversion remains elevated relative to pre-COVID-19 levels. As Nicor Gas is expected to be compensated as a utility on the equity component of its rate base, the same factors would affect Nicor Gas' equity.

V. ESTIMATING THE COST OF EQUITY

A. PROXY GROUP SELECTION

Q. How do you identify proxy companies of comparable business risk to Nicor Gas?

A. Nicor Gas is primarily engaged in the regulated natural gas distribution business. The business risk associated with these endeavors depends on many factors, including the specific characteristics of the service territory and regulatory environment in which the provider of these services operates. Consequently, it is not possible to identify publicly traded proxy companies that replicate every aspect of Nicor Gas' risk profile. However, selecting companies with business operations concentrated in regulated industries or having similar lines of business and/or business environments is an appropriate starting point for selecting one or more proxy groups of comparable risk to Nicor Gas.

As a second step, I must evaluate Nicor Gas and Illinois-specific risks to ensure that the Company's ROE is placed appropriately relative to the sample companies. To this end, I have selected a sample of natural gas distribution utilities and water utilities. Jointly these companies comprise the "Full Sample." I also report results for the gas distribution utilities that are included in the Full Sample and refer to that sample as the "Gas Sample." The proxy companies are similar to Nicor Gas in that they are rate regulated by state utility commissions, provide customers a product through a network of pipeline assets, and rely on substantial capital to provide service; i.e., they are capital intensive as is Nicor Gas.

It is important that a proxy group used to assess the cost of equity for Nicor Gas (absent of any unique Illinois or Company characteristics) is regulated, because regulation tends to place substantial requirements and also protections on the companies.

I also believe the physical characteristics of the industry – e.g., network, capital intensive, serving different customer groups (residential, commercial, industrial) – is a characteristic of Nicor Gas and of the selected natural gas distribution and water utilities. The network characteristic implies that assets cannot readily be employed in a different capacity, capital intensity affects the operating risks through the split between fixed and variable costs, and the customer composition affects the demand risk. For example, many natural gas and water utilities face declining per-customer demand due to conservation and regulation (legislation or voluntary commitments) in many jurisdictions, including Illinois, resulted in the moratoriums on disconnecting customers for non-payment during the COVID-19 pandemic or for a specified period of time. Consequently the amount of uncollected revenue has increased. Although the Commission has authorized Illinois utilities like Nicor Gas to recover certain COVID-19 related costs through a rider mechanism, the utility is still experiencing increased arrearages that result in reduced cash flows in the present and that instability is a source of financial risk.

Q. Why are you including water utilities in a "Full Sample" used for analysis of the cost of capital for a natural gas utility?

A. For several reasons. First, the natural gas distribution industry and the water utility industry share many characteristics such as the fact that both are highly regulated and commonly by the same regulatory body, based on a network of pipes and mains, capital intensive, and serving residential, commercial and industrial customers. Second, investors make comparisons across regulated companies, so it becomes important to consider whether the returns awarded Nicor Gas are comparable not only to other natural gas utilities but also to other similar risk benchmarks – I consider a broader sample of natural

gas and water utilities a reasonable such benchmark. Third, the natural gas distribution industry is expected to undergo substantial changes as customers, regulators and the legislature focus on carbon reductions. This means that initiatives in a specific state influences stock prices and analysts' evaluations along with more fundamental operating and market conditions. I therefore select a group of water utilities, where there are no carbon considerations, to assess whether the estimates from the gas LDCs are reasonable. Fourth, while the call for reductions in natural gas use in home heating, etc. has yet to receive substantial attention in Nicor Gas' service territory in Illinois, the focus on climate policy initiatives to reduce greenhouse gas ("GHG") emissions and limit the development of natural gas infrastructure in many jurisdictions does impact all natural gas utilities. For example, natural gas utilities previously traded at a premium to other regulated utilities, as measured by the S&P Utility Index. However, since mid-2019 around the time of the first natural gas bans, this premium disappeared. Recently, Guggenheim partners noted that gas utilities were trading at a 9% price-to-earnings premium over electric utilities but are more recently trading at a 14% discount.[52] That is, investors risk perceptions of natural gas utilities is changing, which is beginning to impact required returns.[53] In addition, Nicor Gas is smaller in size as measured by

[52] Tom DiChristopher, "Gas utility stocks slide nearly 8% in Q3 as sector remains out of favor," S&P Global Market Intelligence, October 5, 2020, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/gas-utility-stocks-slide-nearly-8-in-q3-as-sector-remains-out-of-favor-60578084.

[53] In a September 2020 research note, Moody's said "Although natural gas transportation and distribution companies continue to provide generally safe, reliable service while reducing emissions, there are ESG reputational risks associated with any hydrocarbon-based business, including financial governance policy risks around a higher cost of capital and lower asset returns over a multi-decade time horizon"
Tom DiChristopher, "Decarbonization push increases credit risk for gas infrastructure, Moody's says," S&P Global Market Intelligence, October 1, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/decarbonization-push-increases-credit-risk-for-gas-infrastructure-moody-s-says-60556758.

revenue or equity than the comparable companies. I therefore believe these companies provide a useful benchmark when evaluating the cost of equity for Nicor Gas.

Water utilities are better proxies for natural gas utilities than, for example, electric utilities for several reasons: (i) water utilities serve customers through a network of pipes similar to gas utilities, (ii) water utilities are highly regulated while some electric utilities own unregulated generation, (iii) water utilities and gas utilities are currently undertaking substantial investment in pipe replacement, and (iv) water utilities have generally had stable credit ratings similar to those of gas utilities.

Finally, and importantly, I note that my recommended ROE for Nicor Gas is fully supported by the gas utility sample but I find the water sample provides additional confirmation of the estimates. In other words, while I believe that it is important to consider the broader sample, for the reasons I have explained, it confirmed the same results as would result from the narrower gas-only sample. My recommendation, in other words, is reinforced by, but not reliant on, consideration of the broader sample.

Q. How you did you select the members of the Full Sample and the Gas Sample?

A. To identify companies suitable for inclusion in the Full Sample, I started with the universe of publicly traded companies in the natural gas and water utility industry as identified by Value Line Investment Analyzer ("Value Line"). I started with Value Line's list of publicly traded companies classified as gas LDCs or water utilities. Next, I reviewed business descriptions and financial reports of these companies and eliminated companies that had less than 50% of their assets dedicated to regulated utility activities in their industry; e.g., natural gas or water utility services.

With this group of companies, I applied further screening criteria to eliminate companies that have had recent significant events that could affect the market data necessary to perform cost of capital estimation. Specifically, I identified companies that have cut their dividends or engaged in substantial merger and acquisition ("M&A") activities over the relevant estimation window.[54] I eliminated companies with such dividend cuts because the announcement of a cut may produce disturbances in the stock prices and growth rate expectations in addition to potentially being a signal of financial distress. I generally eliminated companies with significant M&A activities because such events typically affect a company's stock price in ways that are not representative of how investors perceive its business and financial risk characteristics. For example, a utility's stock price will commonly jump upon the announcement of an acquisition to match the acquirer's bid.

Further, I require companies have an investment grade credit rating[55] and more than $300 million in annual revenues for liquidity purposes.[56] A final, and fundamental, requirement is that the proxy companies have the necessary data available for estimation.

Q. What are the characteristics of the Gas and Water Proxy Group?

A. I calculate my results for both the gas proxy group and for the combined Gas and Water Utility Proxy Group. The proxy group(s) are comprised of gas and water utilities whose

[54] As described in Sections V.B and V.C, the CAPM requires five years of historical data, while the DCF relies on current market data.

[55] 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.

[56] I relax my $300 annual revenue screening criteria to include two more companies—Middlesex Water and York Water Company—in recognition that these companies have very stable finances despite relatively low revenue.

primary source of revenues and majority of assets are subject to regulation. The final proxy group consists of the 9 gas and 6 water utilities listed in Figure 11 below.

All companies are engaged in the distribution of a commodity to end customers through a network of pipes and mains. While the product differs across gas and water utilities, they are all focused on distribution, a mix of residential, commercial and industrial customers and all are regulated. Further, the proxy group companies have an average credit ratings of approximately A, which is in line with Nicor Gas' credit rating of A from S&P Ratings.

Figure 11 and Figure 12 reports the proxy companies' annual revenues for the most recent four quarters as of 3Q 2020 and also reports the market capitalization, credit rating, beta and growth rate. The annual revenue, as well as the market cap, was obtained from Bloomberg. The credit rating is reported by Bloomberg.[57] The growth rate estimate is a weighted average between estimates from Thomson Reuters and *Value Line*. Betas were obtained from *Value Line.*

[57] In cases where a company does not have a S&P rating from Bloomberg, Moody's rating was obtained from Moody's, annual reports, or Bloomberg.

Figure 11: Gas Utility Proxy Group

Company	Annual Revenue (Q3 2020) ($MM)	Regulated Assets	Market Cap. (Q3 2020) ($MM)	Value Line Beta	S&P Credit Rating	Long-Term Growth Estimate
	[1]	[2]	[3]	[4]	[5]	[6]
Atmos Energy	$2,821	MR	$11,798	0.80	A	6.3%
Chesapeake Utilities	$483	R	$1,304	0.80	A-	8.0%
New Jersey Resources	$1,954	R	$2,627	0.95	A-	6.0%
NiSource Inc.	$4,868	R	$8,443	0.85	BBB+	6.9%
Northwest Natural	$761	MR	$1,379	0.80	BBB+	6.2%
ONE Gas Inc.	$1,499	R	$3,638	0.80	A	6.2%
South Jersey Inds.	$1,519	R	$1,957	1.05	BBB	10.7%
Southwest Gas	$3,233	MR	$3,511	0.95	BBB+	7.3%
Spire Inc.	$1,855	R	$2,725	0.85	A-	6.4%
Average	$2,110		$4,154	0.87	A-	7.1%

Sources and Notes:
[1]: Bloomberg as of November 30, 2020.
[2]: Key R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule No. BV-3 Panels A through I.
[4]: See Schedule No. BV-10
[5]: Bloomberg as of November 30, 2020.
[6]: See Schedule No. BV-5.

Figure 12: Water Utility Proxy Group

Company	Annual Revenue (Q3 2020) ($MM)	Regulated Assets	Market Cap. (Q3 2020) ($MM)	Value Line Beta	S&P Credit Rating	Long-Term Growth Estimate
	[1]	[2]	[3]	[4]	[5]	[6]
Amer. States Water	$477	R	$2,699	0.65	A+	5.2%
Amer. Water Works	$3,756	R	$25,696	0.85	A	7.3%
California Water	$782	R	$2,143	0.65	A+	15.1%
Middlesex Water	$140	R	$1,089	0.75	A	3.8%
SJW Group	$555	R	$1,724	0.85	A-	14.6%
York Water Co. (The)	$53	R	$557	0.80	A-	5.3%
Average	$960		$5,651	0.76	A	8.6%

Sources and Notes:
[1]: Bloomberg as of November 30, 2020.
[2]: Key R - Regulated (80% or more of assets regulated).
MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule No. BV-3 Panels A through I.
[4]: See Schedule No. BV-10
[5]: Bloomberg as of November 30, 2020.
[6]: See Schedule No. BV-5.

Q. How do the proxy companies compare to Nicor Gas in terms of financial metrics?

A. In 2019, Nicor Gas' regulated gas operations generated $1,937 million revenue.

Compared to the annual revenue of the proxy gas companies, Nicor Gas is smaller. Nicor

Gas' senior secured credit rating is A+ from S&P Global Ratings[58] and Aa3 from Moody's[59] and Nicor Gas' issuer ratings are A from S&P and A2 from Moody's, all of which are in line with the average credit rating of the natural gas and water proxy groups. Lastly, Nicor Gas is a regulated distribution company, as are the other proxy companies. One implication hereof is that Nicor, similar to the proxy companies, serves a mixture of residential, commercial, and industrial customers.

Q. What regulatory capital structure did you use for Nicor Gas?

A. As recommended by Nicor Gas Company Witness Gregory MacLeod (Nicor Gas Ex. 2.0), I use a capital structure including 54.549% equity in my recommendation. I understand this equity ratio is consistent with Nicor Gas' current capital structure and represents its actual projected capital structure during the test year.

B. THE CAPM BASED COST OF EQUITY ESTIMATES

Q. How, in sum, does the CAPM work?

A. CAPM assumes the collective investment decisions of investors in capital markets will result in equilibrium prices for all risky assets such that the returns investors expect to receive on their investments are commensurate with the risk of those assets relative to the market as a whole. The CAPM posits a risk-return relationship known as the Security Market Line (see Figure 2 in Section III), in which the required expected return on an asset (above the risk-free return) is proportional to that asset's relative risk as measured by that asset's beta.

[58] Southern Company, 2019 Annual Report, March 26, 2020, p. 77.

[59] Moody's Investors Services, Northern Illinois Gas Service Company, Ratings & Assessments, https://www.moodys.com/credit-ratings/Northern-Illinois-Gas-Company-credit-rating-554000

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 (as measured by beta) multiplied by the market risk premium. Mathematically, the relationship is given by the following equation:

$$\boldsymbol{r_s = r_f + \beta_s \times MRP} \quad (1)$$

- $\boldsymbol{r_S}$ is the cost of capital for investment S;
- $\boldsymbol{r_f}$ is the risk-free interest rate;
- $\boldsymbol{\beta_S}$ is the beta risk measure for the investment S; and
- $\boldsymbol{MRP}$ is the market equity risk premium.

The CAPM is a "risk-positioning model," which operates on the principle (corroborated by empirical data) that investors price risky securities to offer a higher expected rate of return than safe securities. It says that an investment, whose returns do not vary relative to market returns, should receive the risk-free interest rate (that is the return on a zero-risk security, the y-axis intercept in Figure 2), whereas investments of the same risk as the overall market (*i.e.*, those that by definition have average systematic market risk) are priced so as to expect to return the risk-free rate plus the MRP. Further, it says that the risk premium of a security over the risk-free rate equals the product of the beta of that security and the MRP.

1. INPUTS TO THE CAPM

Q. What inputs does your implementation of the CAPM require?

A. As demonstrated by equation (1), estimating the cost of equity for a given company requires a measure of the risk-free rate and the MRP, as well as a measure of the stock's beta. There are several choices and sources of data that inform the selection of these

inputs. I discuss these issues below (Additional technical detail, along with a discussion of the finance theory underlying the CAPM is provided in Nicor Gas Ex. 14.2).

Q. What value did you use for the risk-free rate?

A. I use the yield on a 20-year U.S. Treasury bond as the risk-free rate for purposes of my analysis. Recognizing the fact that the cost of capital set in this proceeding will be in effect starting in 2022, I rely on a forecast of what Government bond yields will be during the 2022-2023 period. In October 2020, the *Blue Chip Economic Indicators* ("*BCEI*") survey estimated the 10-year U.S. Treasury bond yields will be 1.40% in 2022 and 1.7% in 2023.[60] I take the average of these to arrive a projected 10-year U.S. Treasury bond yield of 1.55%. I then adjust this value upwards by 50 basis points to reflect the historical maturity premium for the 20-year U.S. Treasury bond yield over the 10-year U.S. Treasury bond yield.[61] This gives me a risk-free rate of 2.05%.

Additionally, it is important to recognize the implication of higher spreads between utility bond yields and U.S. Government bond yields. As of the end of November, this spread is approximately 30 basis points higher than it was prior to the 2008 financial crisis. One explanation of this is that prevailing government bond yields are depressed relative to longer-term market expectations due to monetary policy and flight-to-quality behaviors by investors. Therefore, I also consider a scenario in which the appropriate risk-free rate is conservatively 0.20% higher at 2.25% for 2022 and 2023.

[60] Wolters Kluwer Blue Chip Economic Indicators and PwC Analysis, Consensus Forecasts, October 2020, p. 14.

[61] This maturity premium is estimated by comparing the average excess yield on 20-year versus 10-year Government Bonds over the period 1990-2020, using data from Bloomberg.

Q. What value did you use for the Market Risk Premium?

A. Like the cost of capital itself, the MRP is a forward-looking concept. It is by definition the premium above the risk-free interest rate that investors can expect to earn by investing in a value-weighted portfolio of all risky investments in the market. The premium is not directly observable. Rather, it must be inferred or forecasted based on known market information. One commonly used method for estimating the MRP is to measure the historical average premium of market returns over the income returns on government bonds over a long historical period.[62] The average market risk premium from 1926 to the present (2019) is 7.15%.[63] I use this value of the MRP along with a risk-free rate of 2.25% in one of my CAPM scenarios.

However, investors may require a higher or lower risk premium, reflecting the investment alternatives and aggregate level of risk aversion at any given time. As explained in Section IV, there is evidence that investors' level of risk aversion is elevated relative to the time before the COVID-19 pandemic and may remain elevated for some time, even after the pandemic. In recognition of the evidence that forward-looking measures of expected market equity risk premium are higher than the long-term historical average, I also perform a CAPM calculation using Bloomberg's forecasted MRP of 7.35% and note the results using the FERC MRP.[64]

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[62] The longest period for which Duff & Phelps reports data is 1926 to current. Based on financial textbooks such as Ross, Westerfield and Jaffe, "*Corporate Finance*," 10'th Edition, 2013, pp. 324-327, I use the longest period for which reliable estimates are available – in this case 1926 to 2019.

[63] Duff & Phelps, *Ibbotson SBBI 2019 Valuation Yearbook* 10-21.

[64] Bloomberg as of September 30, 2020.

Q. What the parameters used in the scenarios and variations you considered in your CAPM and ECAPM analyses?

A. The parameters are displayed in Figure 13 below. In my CAPM and ECAPM analyses, I consider two sets of scenarios based on the empirical observation that the yield spread is higher than normal as is the forecast MRP, as discussed above in Section IV. The increase yield spreads could reflect the increase in MRP or downward pressure on the yield of government bonds due to monetary policy and flight-to-quality behaviors. Therefore, I use an unadjusted historic average MRP with the increased estimate of the risk-free rate in one scenario; whereas, in the second scenario I use an unadjusted forecasted risk-free rate with a higher estimate of the MRP. To be conservative, I do not simultaneously normalize the risk-free rate and elevate the MRP.

Scenario 1 uses the forecasted 20 year U.S. Treasury rate for 2022 and 2023 and then adjusted this to include 20 basis points to account for the current spread between utility and Government bond yields. This results in a Scenario 1 risk-free rate of 2.25%. I pair this with the long-term average historic MRP of 7.15% as estimated by Duff & Phelps.

In my second scenario, I use an unadjusted risk-free rate based on the forecasted 20 year U.S. Treasury rate for 2022 and 2023 of 2.05%. I then use Bloomberg's forecasted MRP of 7.35%.

Figure 13: CAPM and ECAPM Scenarios

	Scenario 1	Scenario 2
Risk-Free Interest Rate	2.25%	2.05%
Market Risk Premium	7.15%	7.35%

Q. What betas did you use for the companies in your proxy groups?

A. I used *Value Line* betas, which are estimated using the most recent five years of weekly historical returns data.[65] The *Value Line* levered equity betas are reported in Figure 11 and Figure 12 above. Importantly, these betas—which are measured (by *Value Line*) using the market stock return data of the proxy companies—reflect the level of financial risk inherent in the proxy companies' market value leverage ratios over the estimation period. Because Nicor Gas' regulatory capital structure includes a substantially higher proportion of debt financing than does the market data on the proxy companies used to estimate the ROE, the financial risk associated with an equity investment in Nicor Gas' rate base is correspondingly greater than the financial risk borne by investors in the proxy companies' publicly traded stock. Importantly, the DCF model and the CAPM-based models use market data to estimate the ROE, so that it is the market value capital structure that is the relevant comparison across companies. As the risk premium model's ROE estimates are based on book value capital structures, the relevant comparison is across book value capital structures for that model.

Consequently, standard textbook techniques are applied to unlever the *Value Line* betas reported in Figure 11 and Figure 12 above and relever the resulting asset betas at Nicor Gas' regulatory capital structure. *See* Nicor Gas Ex. 14.2.[66]

[65] See Value Line Glossary, accessible at http://www.valueline.com/Glossary/Glossary.aspx

[66] The Technical Appendix (Nicor Gas Ex. 14.2) to this testimony provides a detailed description of the standard textbook formulas used to implement the "Hamada" technique for unlevering measured equity betas based on the proxy companies' capital structures to calculate "asset betas" that measure the proxy companies' business risk independent of the financial risk impact of differing capital structures. The proxy group average asset betas are then relevered at the target capital structure (i.e., Nicor Gas' regulatory capital structure), with the precise relevered beta depending on the specific version of the unlevering/relevering formula employed.

2. THE EMPIRICAL CAPM

Q. What other equity risk premium models did you consider?

A. Empirical research has long shown 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.[67] A number of variations on the original CAPM theory have been proposed to explain this finding, but the observation itself can also be used to estimate the cost of capital directly, using beta to measure relative risk by making a direct empirical adjustment to the CAPM.

The second variation on the CAPM that I employ makes use of these empirical findings. It estimates the cost of capital with the equation,

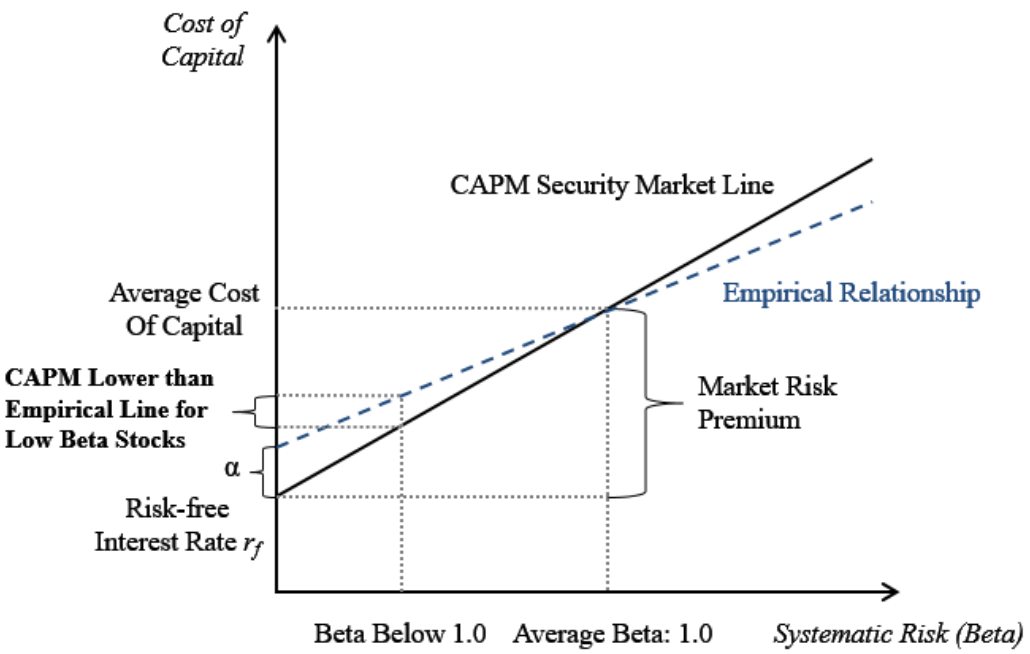
$$\boldsymbol{r_S = r_f + \alpha + \beta_S \times (MRP - \alpha)} \qquad (2)$$

where $\boldsymbol{\alpha}$ is the "alpha" adjustment of the risk-return line, a constant, and the other symbols are defined as for the CAPM (see equation (2) above).

I label this model the Empirical Capital Asset Pricing Model, or "ECAPM." The alpha adjustment has the effect of increasing the intercept but reducing the slope of the Security Market Line in Figure 2, which results in a Security Market Line that more closely matches the results of empirical tests. This adjustment is portrayed in Figure 14 below. In other words, the ECAPM produces more accurate predictions of eventual realized risk premiums than does the CAPM.

[67] *See* Figure A-2 in Nicor Gas Ex. 14.2 for references to relevant academic articles.

Figure 14: The Empirical Security Market Line



Q. Why do you use the ECAPM?

A. Academic research finds that the CAPM has not generally performed well as an empirical model. One of its short-comings is directly addressed by the ECAPM, which recognizes the consistent empirical observation that the CAPM underestimates the cost of capital for low beta stocks. In other words, the ECAPM is based on recognizing that the actual observed risk-return line is flatter and has a higher intercept than that predicted by the CAPM. The alpha parameter (α) in the ECAPM adjusts for this fact, which has been established by repeated empirical tests of the CAPM. In summary, these studies estimate alpha parameters that range between 1%[68] and 7.32%.[69] I apply an alpha parameter of 1.5% in my application of the ECAPM. Nicor Gas Ex. 14.2 provides further discussion of

[68] Black, Fischer. Beta and Return. *The Journal of Portfolio Management* 20 (Fall): 8-18.

[69] Fama, Eugene F. and Kenneth R. French. 1992. The Cross-Section of Expected Stock Returns. *Journal of Finance* 47 (June): 427-465.

the empirical findings that have tested the CAPM and also provides documentation for the magnitude of the adjustment, α.

3. RESULTS FROM THE CAPM BASED MODELS

Q. What were the results of the CAPM-based models?

A. The results of the CAPM and ECAPM estimation for the two proxy groups are presented in Figure 15 below. The ranges of results for each model (CAPM and ECAPM) reflect the application of different specific versions of the textbook formulas used to account for the impact of different financial leverage on financial risk.

Figure 15: CAPM and ECAPM Summary at 54.549% Equity Capital Structure

	Scenario 1	Scenario 2
	[1]	[2]
Gas Sample		
CAPM	9.3% - 9.7%	9.3% - 9.6%
ECAPM (α = 1.5%)	9.3% - 9.9%	9.3% - 9.9%
Water Sample		
CAPM	9.0% - 9.6%	9.0% - 9.5%
ECAPM (α = 1.5%)	9.1% - 10.1%	9.1% - 10.0%

Sources and Notes:
Ranges encompass estimates from Financial Risk Adjusted method and Hamada Adjustment with and without taxes.
[1]: Long-term Risk-free Rate of 2.25%, Long-term Market Risk Premium of 7.15%.
[2]: Long-term Risk-free Rate of 2.05%, Long-term Market Risk Premium of 7.35%.

Q. How do you interpret the results of your CAPM and ECAMP analyses?

A. The results in Figure 15 above range from approximately 9% to 10%.[70] As I previously discussed above, the established academic evidence indicates that the traditional CAPM tends to underestimate the cost of equity for lower-than-average risk companies, such as the natural gas and water utilities in Figure 11 and Figure 12, so the ECAPM results are more reliable and that the CAPM may under estimate the cost of equity for smaller companies such as Nicor Gas.

C. DCF BASED ESTIMATES

Q. How does the DCF model approach the estimation of a utility's cost of equity?

A. The DCF model aims to estimate the cost of capital for a given company directly, rather than based on its risk relative to the market as the CAPM does. The DCF method assumes that the market price of a stock is equal to the present value of the dividends that its owners expect to receive. The method also assumes that this present value can be calculated by the standard formula for the present value of a cash flow—literally a stream of expected "cash flows" discounted at a risk-appropriate discount rate. When the cash flows are dividends, that discount rate is the cost of equity capital:

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

Where,

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

[70] I round to the nearest 0.25 percent when determining ranges of reasonable results. I round to the nearest 0.25 percent because the cost of capital cannot, in my opinion, be determined with greater precision. As there are no results below 9.0 percent for the gas sample nor are there any below 9.1% for the ECAPM – hence I consider 9 percent a reasonable lower bound.

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

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

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

Importantly, this formula implies that if the current market price and the pattern of expected dividends are known, it is possible to "solve for" the discount rate r that makes the equation true. In this sense, a DCF analysis can be used to estimate the cost of equity capital implied by the market price of a stock and market expectations for its future dividends.

Many DCF applications assume that the growth rate lasts into perpetuity, so the formula can be rearranged algebraically to directly estimate the cost of capital. Specifically, the implied DCF cost of equity can then be calculated using the well-known "DCF formula" for the cost of capital:

$$\boldsymbol{r = \frac{D_1}{P_0} + g = \frac{D_0}{P_0} \times (1 + g) + g} \quad (4)$$

where $\boldsymbol{D_0}$ is the current dividend, which investors expect to increase at rate $\boldsymbol{g}$ by the end of the next period, and over all subsequent periods into perpetuity.

Equation (4) says that if equation (3) holds, the cost of capital equals the expected dividend yield plus the (perpetual) expected future growth rate of dividends. I refer to this as the single-stage DCF model; it is also known as the Gordon Growth model, in honor of its originator, Professor Myron J Gordon.

Q. Are there other versions of the DCF model?

A. Yes. There are several alternative versions, notably (i) multi-stage models, (ii) models that use cash flow rather than dividends, or versions that combine aspects of (i) and (ii).[71] One such alternative expands the Gordon Growth model to three stages. In the multistage model, earnings and dividends can grow at different rates, but must grow at the same rate in the final, constant growth rate period. [72]

In my implementation of the multi-stage DCF, I assume that companies grow their dividend for five years at the forecasted company-specific rate of earnings growth, with that growth then tapering over the next five years toward the growth rate of the overall economy (i.e., the long-term GDP growth rate forecasted to be in effect ten years or more into the future).

1. DCF INPUTS AND RESULTS

Q. What growth rate information do you use?

A. The first step in my DCF analysis (either constant growth or multi-stage formulations) is to examine a sample of investment analysts' forecasted earnings growth rates for companies in my proxy group. For the single-stage DCF and for the first stage of the multi-stage DCF, I use investment analyst forecasts of company-specific growth rates sourced from *Value Line* and Thomson Reuters *IBES.*

[71] The Surface Transportation Board uses a cash flow based model with three stages. See, for example, Surface Transportation Board Decision, "STB Ex Parte No. 664 (Sub-No. 1)," Decided January 23, 2009.

[72] See Nicor Gas Exhibit 14.2 for further discussion of the various versions of the DCF model, as well as the details of the specific versions I implement in this proceeding.

For the long-term growth rate for the final, constant-growth stage of the multistage DCF estimates, I use the long-term U.S. GDP growth forecast of 4.1% from Blue Chip Economic Indicators.[73] Thus, the long-run (or terminal) growth rate in the multi-stage model is nominal GDP growth.

Additionally, I relied on the dividend yield of the companies, which I estimate using the most recently available dividend information (currently) and the average of the last 15 days of stock prices ending November 30, 2020. As the single largest advantage of the DCF model is that it uses current market information, I find it is important to use a relatively short time period to determine the dividend yield – yet to avoid the bias caused by any one day. I believe a 15-day average accomplishes that goal. Because the stock price of utilities currently is higher than they historically have been and because some companies engage in share buybacks, the dividend yield underestimates the yield on cash distributions to investors.

Q. Please address the input data in the DCF model.

A. The Gordon Growth/single-stage DCF models require forecast growth rates that reflect investor expectations about the pattern of dividend growth for the companies over a sufficiently long horizon, but estimates are typically only available for 3-5 years.

One issue with the data is that it includes solely dividend payments as cash distributions to shareholders, while some companies also use share repurchases to distribute cash to shareholders. To the extent that companies in my samples use share repurchases, the DCF model using dividend yields will underestimate the cost of equity

[73] See Blue Chip Economic Indicators, October 2020, p. 14.

for these companies. While there are companies in my sample that have engaged in share buybacks in the past, the magnitude is currently not large.

A second issue is that the flight to quality has resulted in higher than usual stock prices for water utilities and hence lower than usual dividend yields. As a result, the dividend yield may be downward biased. The multi-stage DCF model additionally requires a measure of the long-term GDP growth.

Q. What cost of equity estimates did the DCF-based models yield for the proxy groups?

A. The results of the DCF-based estimation for the proxy groups are displayed below in Figure 16.

Figure 16: DCF Model Results at 54.549% Equity Capital Structure

	Simple	Multi-stage
	[1]	[2]
Gas Sample	10.9%	8.5%
Water Sample	12.5%	8.0%

Q. How do you interpret the results of your CAPM and ECAPM Analyses?

A. The DCF model estimates presented in Figure 16 range from 8.0% to 12.5%. As discussed above, there is unprecedented levels of volatility currently in the market. When market prices fall, dividend yields increase and reflect the increased cost of equity. However, the DCF model requires forecasted growth rates that are based on stable economic conditions to satisfy the constant dividend growth assumption. Growth rates may also be slower than dividend yields to reflect market uncertainty. Consequently, I believe a lower bound on the results is the multi-stage DCF results and give more weight to the results from the single stage DCF. Thus, the range for the gas sample is 8.5% to

11.0%, rounding to the nearest ¼ percent. The range for the full sample is wider at 8.25% to 11.75% (rounding to the nearest ¼ percent).

D. RISK PREMIUM MODEL ESTIMATES

Q. Did you estimate the cost of equity that results from analysis of risk premiums implied by allowed ROEs in past utility rate cases?

A. Yes. In this type of analysis, sometimes called the "risk premium model," the cost of equity capital for utilities is estimated based on the historical relationship between allowed ROEs in utility rate cases and the risk-free rate of interest at the time the ROEs were granted. These estimates add a "risk premium" implied by this relationship to the relevant (prevailing or forecast) risk-free interest rate:

$$Cost\ of\ Equity = r_f + Risk\ Premium \quad (5)$$

Q. What are the merits of this approach?

A. First, it estimates the cost of equity from regulated entities as opposed to holding companies, so that the relied-upon figure is directly applicable to a rate base. Second, the allowed returns are readily observable to market participants, who will use this one data input in making investment decisions, so that the information is at the very least a good check on whether the return is comparable to that of other investments. Third, I analyze the spread between the allowed ROE at a given time and the then-prevailing interest rate to ensure that I properly consider the interest rate regime at the time the ROE was awarded. This implementation ensures that I can compare allowed ROE granted at different times and under different interest rate regimes.

Q. How did you use rate case data to estimate the risk premiums for your analysis?

A. The rate case data from 1990 through Q3 2020 is derived from Regulatory Research Associates.[74] Using this data I compared (statistically) the average allowed rate of return on equity granted by U.S. state regulatory agencies in gas distribution rate cases to the average 20-year Treasury bond yield that prevailed in each quarter.[75] I calculated the allowed utility "risk premium" in each quarter as the difference between allowed returns and the Treasury bond yield, since this represents the compensation for risk allowed by regulators. Then I used the statistical technique of ordinary least squares ("OLS") regression to estimate the parameters of the linear equation:

$$Risk\ Premium = A_0 + A_1 \times (Treausury\ Bond\ Yield) \quad (6)$$

I derived my estimates of A_0 and A_1 using standard statistical methods (OLS regression) and found that the regression has a high degree of explanatory power in a statistical sense. I report my results for the respective classifications of rate cases below in Figure 17.[76] I note that the results displayed in Figure 17 below show that the risk premium model fits the data well as the R-squared for the full period and most recent period is above 0.87 and R-squared is a measure of how well the data fits the model. An R-squared above 0.8 indicates a solid result.

[74] S&P Market Intelligence, as of September 2020.

[75] 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.

[76] Nicor Gas Exhibit 14.6 contains my risk premium analysis.

Q. Is there evidence that the Risk Premium relationship has changed in recent years?

A. Yes. Following the Financial Crisis, U.S. Treasury bond yields have been near historic lows as a result of flight-to-quality behaviors by investors and accommodative money policies by the Federal Reserve. This trend continues today as investors and the Federal Reserve respond to the on-going economic impacts from the COVID-19 pandemic. Therefore, I ran a statistical analysis on the Risk Premium Model to test if the relationship between U.S. Treasury bond yields and allowed returns for U.S. gas utilities has changed since the low interest rate environment began. Specifically, I performed a structural break analysis to test if and when the OLS regression relationship (Equation 6) changed over the period 1990 to Q3 2020.[77] The structural break test finds a statistically significant change in the Risk Premium relationship occurred starting in Q1 2011. That is, the relationship between U.S. Treasury bond yields and the allowed return equity for U.S. natural gas utilities has significantly changed since the start of the low interest rate environment.

In Figure 17 below, I present the results from the Risk Premium Model over three time periods – the full period; 1990 to Q4 2010 prior to the structural break; and Q1-2011 to Q3 2020 after the structural break.

[77] I perform a *Quandt Likelihood Ratio (QLR) test* to determine if and when a structural break occurs in the data. The QLR conducts a chow test for each quarter from 1990 to Q3 2020 and find the highest F-statistic to determine when a possible structural break occurs. I subsequently performed an ANVOA test with a dummy intercept variable and interaction term to confirm the regression relationship better fits the data following the identified structural break.

Figure 17: Implied Risk Premium Model Estimates

	R Squared	Estimate of Intercept (A0)	Estimate of Slope (A1)	Implied Cost of Equity Range	
	[1]	[2]	[3]	[4]	[5]
Q1 2011 - Q3 2020	0.883	9.41%	-0.900	9.6%	9.6%
Q1 1990 - Q4 2010	0.711	8.34%	-0.534	9.3%	9.4%
Q1 1990 - Q3 2020	0.874	8.51%	-0.564	9.4%	9.5%

Sources and Notes:
[1]-[3]: Estimated Using S&P Market Intelligence, as of 11/30/2020.
[4]: Risk-free rate of 2.05%
[5]: Risk-free rate of 2.25% (includes utility yield spread adjustment of 0.20%)

Q. What conclusions did you draw from your risk premium analysis?

A. The results in Figure 17 indicate a range of ROE results of 9.4% to 9.6% for an average gas distribution utility based on the risk premium model. Given the evidence that the Risk Premium relationship has changed since 2011 with the low interest environment, I rely on the ROE's derived from the full period and Q1 2011 to Q3 2020 time period. This provides me with a reasonable range of 9.4% to 9.6%, which is consistent with the low end of the reasonable ranges of the CAPM and within the DCF estimates.While the risk premium model is based on historical allowed returns and not underpinned by fundamental financial principles in the manner of the CAPM and DCF models, I believe that this analysis, when properly designed, executed, and placed in the proper context, is a valid and useful approach to estimating utility ROEs. Because the risk premium analysis as implemented takes into account the interest rate prevailing during the quarter the decision that granted an ROE used in the analysis was issued, it provides a useful benchmark for the cost of equity in any interest environment. However, because the current economic conditions are highly unusual and not fully comparable to those prevailing during most of the period for which I have data, I find that limited weight

should be placed on the method unless consideration is given to the change in the relationship between interest rates and allowed ROEs.

E. SUMMARY OF RESULTS

Q. Before considering where Nicor Gas' cost of equity falls among the range of results, can you please summarize the results of the reasonable ranges of cost of equity supported by the models you have discussed?

A. Assuming a 54.549% equity capital structure for Nicor Gas, I find the reasonable range of ROE results displayed in Figure 18. Next, I consider Nicor Gas and Illinois specific risks to inform my recommendation of a reasonable ROE for Nicor Gas.

Figure 18: Summary of Reasonable Ranges

	Gas Sample	All Evidence
CAPM/ ECAPM	9.25% - 9.75%	9.0% – 10.0%
DCF	8.5% – 11.0%	8.25% - 11.75%
Risk Premium	9.4% - 9.6%	N/A

Q. Based on the results above, what is a reasonable range for the proxy group?

A. Based on the results above, I find that a reasonable range for the CAPM / ECAPM is 9.25 to 9.75 percent, a reasonable range for the DCF is 8.5 to 11.0 percent, and the risk premium is about 9.4 to 9.6 percent.

VI. NICOR GAS SPECIFIC CIRCUMSTANCES

A. BUSINESS RISK CHARACTERISTICS

Q. How does the business risk of Nicor Gas compare to that of the sample?

A. Like the gas sample companies, Nicor Gas' business is concentrated in the regulated gas distribution industry. It also has a credit rating that is comparable to that of the sample. In its last rate case proceeding, Nicor Gas received a revenue decoupling mechanism for residential customers.[78] Decoupling mechanisms are common among natural gas utilities – S&P Regulatory Research Associates reports more than half of U.S. natural gas utilities have some form of decoupling mechanism.[79] However, regulatory policy plays a role in the business risk of Nicor Gas.

Additionally, in the current environment of declining energy demand and an emphasis on decreasing carbon emissions, there is some uncertainty about future natural gas demand growth. Illinois, like many states, has several initiatives to reduce CO2 emissions significantly. Specifically, in January 2019, Governor JB Pritzker signed Executive Order 6 (2019) which committed the State of Illinois to joining the U.S. Climate Alliance and committing to the goals of the Paris Climate Agreement.[80] Members of the U.S. Climate Alliance have committed to reduce greenhouse gas emissions by 26-28% below 2005 levels by 2025.

[78] Illinois Commerce Commission, "Order, Proposed General Increase in Rates and Revisions to Other Terms and Conditions of Service. (Tariffs filed November 9, 2018," Docket No. 18-1775, October 2, 2019, p. 147.

[79] S&P Global, "RRA Regulatory Focus: Alternative ratemaking plans in the U.S.," April 16, 2020

[80] Governor of the State of Illinois, Executive Order 2019-06, January 23, 2019, https://www2.illinois.gov/Pages/government/execorders/2019_6.aspx.

At a more local level, some cities have shifted their policy focus to reducing reliance on natural gas. For example, the City of Berkeley's ban on natural gas hook-ups in new buildings[81] and regulations pertaining to new housing's ability to use renewable resources are being introduced. For example, California has a requirement that all new homes have solar panels by 2020, while other states are considering similar regulations.[82] At the same time, there are substantial efforts to increase non-carbon heating through, for example, incentives for heat pumps installation, which will reduce the amount of gas (and/or oil) used for heating.[83] In Illinois, for example, advocates are calling on policy makers to incentivize electrification of heating as an alternative to natural gas heating.[84] The recent focus on reducing or eliminating the role of natural gas in several states is impacting investors risk perceptions of the natural gas utility industry. Natural gas utilities previously traded at a premium (on a price-to-earnings basis) to other utilities; however, around the time of the first gas ban in Berkeley, natural gas utilities have lost their premium and have recently began trading at a discount to electric utilities.[85] To the

[81] Ravani, Sarah, "Berkeley becomes first U.S. city to ban natural gas in new homes," *San Francisco Chronicle*, July 2019. For clarity, my recommended ROE of 10.25% (excluding any recovery of unrecovered flotation costs) in this proceeding **does not** incorporate the risks of such bans but merely points to potential future risks to the industry.

[82] Los Angeles Times, "Starting in 2020, all new homes in California must come with solar panels" by Jack Flemming, Dec, 14, 2018.

[83] For example, ComEd offers residential customers rebates for installing heat pumps. https://www.comed.com/WaysToSave/ForYourHome/Pages/HeatingCoolingRebates.aspx

[84] Tom DiChristopher, "Gas ban backers set their sights on Illinois building electrification," S&P Market Intelligence, September 4, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/gas-ban-backers-set-their-sights-on-illinois-building-electrification-60224263

[85] Tom DiChristopher, "Gas utility stocks slide nearly 8% in Q3 as sector remains out of favor," S&P Global Market Intelligence, October 5, 2020, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/gas-utility-stocks-slide-nearly-8-in-q3-as-sector-remains-out-of-favor-60578084.

extent that the risks discussed above continue, the business risk of the gas LDC industry would increase substantially. This risk is not included in my current recommendation.

Q. How does Nicor Gas' capital expenditures impact business risk?

A. As discussed in standard MBA textbooks, such as Brealey, Myers, and Allen, operating leverage – the proportion of fixed cost in a company's cost structure – can affect business risk.[86] That is, a higher amount of capital expenditures can increase the amount of fixed cost relative to variable costs thereby increasing operating leverage. Companies with higher operating leverage are more susceptible to fluctuations in revenues – as revenues fluctuate, variable costs will change to a certain extent but fixed costs remain the same. This problem is especially acute in the current economic environment arising for utilities experiencing changes in demand and also those that have moratoriums of utility shut-offs due to non-payment.[87]

The natural gas utility industry (and water utility industry) is facing increased capital expenditures as new regulations require utilities to replace aging distribution infrastructure. Nicor Gas, for example, is in the midst of the nine year "Investing in Illinois" infrastructure project targeting safety and reliability enhancements to the distribution system – Nicor Gas is forecasting $400 million of capital expenditures under the program in 2020.[88] Compared to the other sample companies, Nicor Gas' capital expenditures are higher than most of the proxy companies (see Figure 19). Nicor's five year growth in capital expenditures from 2015 to 2019 was the fourth highest amongst

[86] Brealey, Myers, and Allen, "Principles of Corporate Finance," 10th Edition, 2011, pp. 248-249.

[87] I note that Nicor Gas' revenue decoupling mechanism for its residential customer segment mitigates some of these impacts.

[88] Southern Company, "2019 Annual Report," March 26, 2020, page 57.

the 15 proxy companies. Similarly, Nicor's 2019 capital expenditures were 5th highest amongst the proxy companies. All else equal, the higher amount of capital expenditures and capital intensity makes Nicor Gas more risky than its peers.

Figure 19: Capital Expenditures for Nicor Gas and Proxy Group Companies

		2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	Rank
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Atmos Energy	[A]	$993	$1,095	$1,222	$1,501	$1,806	1.0	1.1	1.2	1.5	1.8	6
Chesapeake Utilities	[B]	$144	$170	$175	$240	$185	1.0	1.2	1.2	1.7	1.3	16
New Jersey Resources	[C]	$290	$316	$272	$369	$514	1.0	1.1	0.9	1.3	1.8	7
NiSource Inc.	[D]	$1,361	$1,475	$1,696	$1,818	$1,802	1.0	1.1	1.2	1.3	1.3	15
Northwest Natural	[E]	$118	$138	$213	$219	$242	1.0	1.2	1.8	1.9	2.0	3
ONE Gas Inc.	[F]	$294	$309	$356	$394	$417	1.0	1.1	1.2	1.3	1.4	14
South Jersey Inds.	[G]	$344	$279	$273	$341	$504	1.0	0.8	0.8	1.0	1.5	11
Southwest Gas	[H]	$488	$530	$624	$766	$938	1.0	1.1	1.3	1.6	1.9	5
Spire Inc.	[I]	$292	$320	$460	$595	$809	1.0	1.1	1.6	2.0	2.8	2
Amer. States Water	[J]	$87	$130	$113	$127	$152	1.0	1.5	1.3	1.4	1.7	8
Amer. Water Works	[K]	$1,160	$1,311	$1,434	$1,586	$1,654	1.0	1.1	1.2	1.4	1.4	13
California Water	[L]	$177	$229	$259	$272	$274	1.0	1.3	1.5	1.5	1.5	10
Middlesex Water	[M]	$26	$47	$50	$72	$89	1.0	1.8	2.0	2.8	3.5	1
SJW Group	[N]	$96	$129	$141	$136	$164	1.0	1.3	1.5	1.4	1.7	9
York Water Co. (The)	[O]	$14	$13	$25	$17	$21	1.0	0.9	1.8	1.2	1.4	12
Sample Average	[P]	$392	$433	$488	$564	$638	1.0	1.2	1.4	1.6	1.8	
Nicor Gas	[Q]	$477	$528	$628	$757	$930	1.0	1.1	1.3	1.6	2.0	4

Sources and Notes:
[1] - [5]: Capital IQ
[6] - [10]: Indexed to 2015
[11]: Rank based on 2015-2019 CAGR in capital expenditures
[P]: Average [A] - [O]
[Q] ICC Form 21, Nicor Gas

Q. How have the current market uncertainties impacted Nicor gas?

A. At a similar to many other states, Illinois Governor Pritzker issued a stay-at-home order on March 21, 2020 which restricted gatherings and non-essential business activities to mitigate the impacts of COVID-19.[89] As a result, many business closed down and terminated or furloughed employees. As of the end of November, the Illinois Department

[89] State of Illinois Coronavirus (COVID-19) Response, "Stay at Home FAQ," accessed October 15, 2020, https://coronavirus.illinois.gov/s/stay-at-home-faqs#:~:text=%EF%BB%BFStay%20At%20Home%20FAQ,and%20essential%20businesses%20and%20operations.

of Employment Security reports that the State's unemployment rate is 6.5%, a 3.1% increase since November 2019.[90] Illinois, like many states, enacted moratoriums on utility disconnects due to non-payment. On March 28, 2020, Illinois Governor JB Pritzker put in place a moratorium in utility disconnections and lay payment fees during the declared COVID-19 public health crisis. While these protections expired in July, Nicor and other state regulated utilities voluntarily agreed to extend the moratorium for customers impacted by COVID-19 through March 31, 2021.[91]

The risk that utilities face is that declines in loads will not be fully compensated and customer non-payments resulting from rising unemployment or business shutdowns. As a result, utilities continue to serve all their customers, even if they are not collecting revenue from all their customers.

The potential for an adverse impact to utilities such as Nicor Gas is echoed by, for example, Moody's, which notes that the credit rating agency is watching the impact on usage, non-collectible amounts and the regulatory response.[92] As I mentioned previously, Nicor Gas recently was granted a revenue decoupling mechanism, but just for its residential customers. As a result, about 15% of Nicor Gas' revenues rely on per-dekatherm charges to recover fixed costs that are at a higher risk of under-recovery due to demand reductions.[93] Broadly, while decoupling mechanisms may mitigate the impacts

[90] Illinois Department of Employment Security, "Current Monthly Unemployment Rates, Illinois, U.S. & Metro Areas," accessed January 11, 2021, https://www2.illinois.gov/ides/lmi/Pages/Current_Monthly_Unemployment_Rates.aspx.

[91] Illinois Commerce Commission, "State Regulated Utility Moratorium Extended through Winter 2021 for Eligible Customers," Press Release, September 22, 2020.

[92] Moody's, "Northern Illinois Gas Company," July 10, 2020.

[93] Nicor Gas' revenue is split approximately 71% residential, 23% commercial, and 6% industrial. Residential customers are approximately 91% of Nicor Gas' total customer count, while commercial and industrial customers represent approximately 8% and 1%, respectively. Source: Nicor Gas.

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).

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.[94]

Q. Can you please summarize your assessment of Nicor Gas' business risk relative to the sample?

A. Compared to the sample, Nicor Gas is engaged in the same line of business and has a comparable credit rating. Nicor Gas recently received a revenue decoupling mechanism, similar to many other natural gas utilities, however this regulatory mechanism only applies to Nicor Gas' residential customer segment. Nicor Gas also has relatively higher capital expenditures than other natural gas utilities, which puts the company at higher risk especially in the current economic environment. I also note that the impact of carbon reduction policies could substantially increase the risk profile of Nicor Gas, I have not taken these aspects into account in my ROE recommendation. I simply note that these factors need to be monitor closely as the impact could be substantial in future years. Consequently, Nicor Gas is more risky than the average or median risk profile of the sample companies.

[94] 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.

B. RECOVERY OF FLOTATION COSTS

Q. What are flotation costs and why are they relevant for Nicor Gas?

A. Just as with debt financing, Nicor Gas may periodically need to issue equity to finance rate base, but will incur costs when doing so. These equity flotation costs subtract from the issuance proceeds available to finance the utility. Therefore, utilities should be able to recover flotation costs, just as they are able to recover debt issuance fees.

In this case, I am informed by Nicor Gas that it incurred flotation costs associated with its equity issuances that have never been recovered in rates.[95] These costs took the form of underwriting fees paid at the time the shares were issued, and amounting to just over 2.5 percent (on average) of the proceeds raised by the issuances.[96] The effect of these fees is that only $97.5 out of every $100 raised in equity issuances was actually available to fund Nicor Gas' rate base, with the other 2.5 percent representing a necessary cost associated with financing investment and operations. Since these costs were not recovered as expenses at the time they were incurred, they should appropriately be recovered via an adjustment to the return on equity going forward.

Q. How should Nicor Gas recover any unrecovered flotation costs?

A. I generally recommend that flotation costs be treated similar to any other cost of running the business and therefore recovered in rates over an appropriate period of time, so that Nicor Gas be allowed to recover flotation costs similar to how it recovers the cost of

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[95] Direct Testimony of Nicor Gas witness MacLeod (Nicor Gas Ex. 2.0); *see also* Nicor Gas Schedule D-5, provided as Nicor Gas Ex. 2.4. I am aware that the Commission has in the past made legal determinations about the evidence supporting those costs and their purpose; I do not comment on those legal conclusions.

[96] See Schedule D-5, provided as Nicor Gas Ex. 2.4.

issuing debt. I recommend a simple amortization that allocates the flotation costs equally over a reasonable time period.

In the alternative, some jurisdictions allow for the recovery of flotation costs in the allowed ROE – thus, they increase the allowed ROE by an amount that ensures the recovery of flotation costs. The magnitude of the increase in the ROE can be determined using a variation of the DCF model. Specifically, the DCF model in (4) above can be modified to take into account the percentage of total proceeds that were used to cover flotation costs. Specifically, instead of the standard DCF model in (4) above, the following formula is used

$$r = \frac{D_1}{P_0(1-f)} + g$$

where f is the percentage of proceeds lost to underwriting fees or other flotation costs. This formula recognizes that if shares trade at (for example) $100, but 2.5 percent of the proceeds of the initial issuance of those shares was spent on underwriting fees, only $\$100 \times (1 - 0.025) = \$97.5$ represents the value invested in cash-flow generating assets. Therefore, it is relative to this "adjusted" price—not the nominal market price—that investors' required return should be measured.

Below in Figure 20, I compare the flotation costs-adjusted formula to the standard DCF formula using values for the dividend yield, growth rate, and financial leverage that are representative of the natural gas utility sample. The impact of flotation costs is the difference between the calculated ROE with flotation costs and without flotation costs. I note that in the Figure below, I use the average growth rate for the gas sample as representative, which results in a flotation cost of 10 bps.

Figure 20: Representative Flotation Cost Adjustment

		Without Flotation Cost Adjustment	With Flotation Cost Adjustment
Flotation cost share of issuance proceeds	[a]		2.5%
Dividend Yield (D1/P0)	[b]	3.8%	3.9%
Growth Rate	[c]	7.1%	7.1%
Simple DCF Cost of Equity	[d]	10.9%	11.0%
Equity to Market Value Ratio	[e]	56.3%	56.3%
Debt to Market Value Ratio	[f]	43.7%	43.7%
Implied Marginal Cost of Debt	[g]	2.8%	2.8%
Tax Rate	[h]	27.1%	27.1%
Simple DCF Overall Cost of Capital	[i]	7.03%	7.08%
Nicor Gas' Regulatory Equity %	[j]	55%	55%
Nicor Gas' Regulatory Debt %	[k]	45%	45%
Nicor Gas' Implied Marginal Cost of Debt (A)	[l]	2.7%	2.7%
Implied Cost of Equity	[m]	11.2%	11.3%
Flotation Costs Adjustment	[n]		0.10%

VII. COST OF CAPITAL RECOMMENDATIONS

Q. Please summarize your conclusion regarding Nicor Gas' risk and the necessary return.

A. Nicor Gas has a higher risk than the average sample company. I therefore recommend that Nicor Gas be placed in the upper half of the range from about 9.0 percent to 11.0 percent before flotation costs. I also note that Nicor Gas was allowed an ROE of 9.73 percent in October 2019, when financial market was in much less turmoil, so that the cost of equity today is higher than back in October 2019.

Q. What do you recommend for Nicor Gas' cost of equity in this proceeding?

A. The CAPM/ ECAPM show a reasonable range of 9.0% to 10.0% for the full sample before company-specific adjustments. The DCF model shows a reasonable range of 8.25% to 11.75% for the full sample rounding to the nearest ¼ percent with the gas sample indicating a lower higher end of the range of about 8.5 to 11.0 percent. The Risk Premium model shows an estimate of 9.4% to 9.6%. These ranges pertain to the proxy group, so it is important to consider where in the range Nicor Gas is reasonably placed and whether Nicor Gas fits within the range. As discussed above, Nicor Gas is of higher risk than the average proxy company because it is smaller, has a higher capital intensity, and is located in a state that has experienced a more severe impact of COVID-19 than the country in general. Additionally, I find that the cost of equity today is higher than when Nicor Gas' cost of equity was determined last. Consequently, I find that Nicor Gas should be placed towards the upper end of the reasonable range of 9.0% to 11.0%.

Specifically, I recommend Nicor Gas be allowed to earn a ROE of 10.25% on the equity used to finance rate base at the requested 54.549% equity capital structure. I note that if I average the CAPM and constant-growth DCF for the gas sample, it results in a ROE of 10.2%, which is consistent not only with my recommendation but also with Commission Staff's preferred methods. Taking into account unrecovered flotation costs, this yields a final recommended ROE for ratemaking purposes of 10.35%.

VIII. CONCLUSION

Q. Does this conclude your Direct Testimony?

A. Yes, it does.