STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

Northern Illinois Gas Company d/b/a Nicor Gas Company	)	
	)	Docket No. 18-XXXX
Proposed general increase in gas rates.	)	

Direct Panel Testimony of

FRANK C. GRAVES

Principal
The Brattle Group

and

ROBERT S. MUDGE

Principal
The Brattle Group

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

November 9, 2018

TABLE OF CONTENTS

Page

I. INTRODUCTION

A. WITNESS IDENTIFICATION

Q. What are your names and business addresses?

A. Frank C. Graves and Robert S. Mudge. Although the teams we work with include individuals from other locations as well, our business address is 1 Beacon Street, Suite 2600, Boston, Massachusetts 02108.

Q. By whom and in what capacity are you employed?

A. We are both Principals at The Brattle Group ("Brattle"), an international consulting firm providing planning, policy analysis, and valuation support in energy and regulatory economics, commercial litigation support, and competition analysis. Mr. Graves lead the Utility Practice at Brattle. We have been retained as independent testifying expert witnesses to provide testimony on behalf of Northern Illinois Gas Company d/b/a Nicor Gas Company ("Nicor Gas" or the "Company").

B. BACKGROUND AND EXPERIENCE

Q. Mr. Graves, what relevant educational and professional qualifications and experience do you have?

A. For most of my professional career, I have worked in regulatory and financial economics, especially for electric and gas utilities, and in litigation matters related to securities litigation and risk management. My education includes an M.S. with a concentration in finance from the M.I.T. Sloan School of Management in 1980, and a B.A. in Mathematics from Indiana University in 1975. In regard to the cost of capital matters in this case, I have extensive experience in risk management and gas supply resource planning for natural gas distribution companies (as well as electric companies using gas

for generation), utility financial projections and revenue requirement analysis, and cost of capital estimation in a wide variety of settings for energy infrastructure and utility investments. I have given expert testimony on financial and regulatory issues before the Federal Energy Regulatory Commission ("FERC"), many state regulatory commissions, and state and federal courts. My background and qualifications are described in greater detail in the resume attached as Nicor Gas Exhibit ("Ex.") 14.01.

Q. Mr. Mudge, what relevant educational and professional qualifications and experience do you have?

A. My professional career has focused on corporate and financial issues facing companies including those in the electric and gas industries. Before joining Brattle, I was an investment and commercial banker at Rothschild, ABN AMRO, and Sanwa Bank. I also have practical experience as a Chief Financial Officer having served in that role for Brattle for several years. I received an M.B.A. in Finance and Economics from the University of Chicago, Graduate School of Business and a B.A. (cum laude) from Harvard College. I have given expert testimony on financial issues affecting the utility industry before FERC, state regulatory commissions, other state administrative agencies, and state and federal courts. My background and qualifications are described in greater detail in the resume attached as Nicor Gas Exhibit ("Ex.") 14.02.

Q. How will your joint testimony be presented?

A. We are presenting our testimony as a panel so that each of us can speak to the matters we address. Certain questions and answers, such as the two preceding this answer, may be expressly designated as being primarily or exclusively the responsibility of one of us. But, in general, we respond to questions jointly and the opinions we reach and the

recommendations we make reflect our joint work based on our collective knowledge and experience.

II. PURPOSE OF TESTIMONY AND SUMMARY OF CONCLUSIONS

Q. What are the purposes of your testimony?

A. We have been asked by Nicor Gas to assess for the Illinois Commerce Commission ("Commission" or "ICC") Nicor Gas' cost of equity capital and to explain how that cost of capital should be quantified for ratemaking purposes. To do that in the most accurate and unbiased way we need to address two questions: (1) what methods should be considered when measuring the cost of equity capital of a company like Nicor Gas, given the state of academic opinion in financial economics and the range of methods used in other regulatory jurisdictions, and (2) what is the result of applying those methods to determining the cost of equity capital of Nicor Gas. We also address several closely related questions, including assessing the impact of Nicor Gas' status as a member of the Southern Company family on its cost of capital.

Q. What, in summary, do you conclude about the methods the Commission should apply in its cost of capital estimations?

A. One of the Commission's responsibilities is to estimate as accurately as possible the cost of Nicor Gas' capital as determined by the market. The tools it uses to estimate those costs are means to that end. As the Commission, in describing its Staff's position in Nicor Gas' last case, explained:

> … the key consideration in determining the cost of equity is to ensure that the methodologies used to calculate ROE reasonably reflect investors' views of the market in general and the subject company in particular.

We understand that, for some time, the Commission has been presented with arguments by Staff and some interveners that it should only consider particular narrowly defined versions of the Discounted Cash Flow ("DCF") model and the Capital Asset Pricing Models ("CAPM"), which we will refer to for ease as the "Unadjusted Two-Model Approach." This approach is most meaningfully defined by what it *excludes*: an array of other related and complementary methodologies widely accepted by financial economists and recognized in other regulatory jurisdictions. In particular, it excludes alternative formulations of the CAPM, other risk positioning models, and Expected Earnings models. It also excludes *any* of the methods of correcting CAPM and DCF results for the fact that the capital structure of the proxy group will be different than the utility capital structure used in the ratemaking process to which the CAPM and DCF results are applied. Indeed, often methods appear to have been excluded simply because they have not been adopted in previous decisions, creating a "Catch-22" that preempts progressive change. The effect is to reduce the accuracy of the estimates and not in a neutral way. By shutting out this information, the results of the analyses are routinely lowered compared to more fulsome analyses.

Efforts to limit the Commission's analysis to only the results of the Unadjusted Two-Model Approach have persisted even as conditions and approaches for measuring risk have changed. Due to mergers, sample sizes for risk pricing have shrunk dramatically, while in parallel, the scope of investors' options to commit equity to energy supply and delivery has expanded. These changes make it more important that investors' knowledge and opinion about energy companies' risk and growth be thoroughly examined and vetted. For all these reasons, we urge the Commission to widen its use of

methodologies and data sources to include all approaches widely accepted by financial economists and recognized in other jurisdictions.

This is not a radical recommendation. The FERC's recent groundbreaking reconsideration of its own prior approach to setting allowed ROEs[1] (the "FERC Order") explicitly recognizes that different models offer complementary views of investor requirements and market expectations and that it is necessary to evaluate and consider all that evidence – not just the results of one or two models, as had been its past practice. The Illinois Commission itself has already significantly, if implicitly, moved away from reliance solely on unadjusted versions of the DCF and CAPM models, in that the Commission's own decisions typically approve costs of equity substantially greater than a strict application of the Unadjusted Two-Model Approach would yield — by almost 70 basis points over the last 6 years across 10 ICC decisions facing natural gas utilities. The exclusive application of the Unadjusted Two-Model Approach also yields results below the returns on equity awarded by other regulators nationally by about 80 basis points on average.

In sum, adhering to a limited approach yields results that are out of step with uncontroversial financial economics theory and practice, with regulatory decisions nationally, and with the decisions of this Commission.

[1] *Coakley v. Bangor Hydro-Electric Co.*, 165 FERC ¶ 61,030 (2018).

Q. What current cost of equity are you recommending the Commission should recognize for Nicor Gas?

A. The Commission, for ratemaking purposes, should recognize a 10.50% annual cost of equity for Nicor Gas, exclusive of any flotation costs. To determine this cost of equity for Nicor Gas, we first selected a sample of publicly-traded natural gas utilities that are subject to rate regulation for which we calculated the cost of equity using standard models and methods including DCF and CAPM, a Risk Premium model (as we and FERC use that term), and an Expected Earnings model (again, as we and FERC define it). Applying each of these models to our proxy group companies, we derived the following ranges of reasonable ROE estimates for a gas utility with 54.35% equity, which brackets our recommendation of an allowed ROE of 10.5% for Nicor Gas. Our results are summarized in the Figure 1 below.

Figure 1
Return on Equity Summary

	Reasonable Range	
	Low	High
CAPM	10.4%	10.5%
DCF	9.2%	10.8%
Risk Premium	10.2%	
Expected Earnings	11.2%	
Reasonable Range	10.25%	10.75%
Recommended ROE	10.5%	

Notes:
Estimates as of 8/31/2018

Q. How is your testimony organized?

A. We begin in Section III with a discussion of Commission's long-established task in assessing utilities' cost of equity and our conclusion – increasingly implicitly and explicitly accepted by regulators – that models beyond those incorporated into the

Unadjusted Two-Model Approach must be considered. Section IV elaborates on a key issue of importance to accurately measuring the cost of equity, namely financial leverage. Then, in Section V, we discuss recent changes in market conditions, followed, in Section VI by our analysis of Nicor Gas' required return on equity ("ROE") which is supported by several models of risk-aware equity pricing. We emphasize that, while we firmly believe that the models we present are the best and most accurate ways to assessing Nicor Gas' cost of equity, different practitioners can debate details. What is most important is that the Commission recognize the need, as it has implicitly attempted to do in the past, to arrive at an allowed return reflecting actual risk and market perceptions of that risk as measured by all the commonly applied models. Section VII lays out our recommendation for the allowed ROE to apply to Nicor Gas. Section VIII discusses the adjustment to ROE that would be necessary to allow for recovery of past equity issuance flotation costs (though that adjustment is not explicitly accounted for in our recommendation). Finally Section IX considers the question of whether the 2016 acquisition of Nicor Gas' former parent company AGL Resources by Southern Company has impacted Nicor Gas' cost of capital.

Q. Are there any exhibits to your testimony?

A. Yes. Attached to our direct panel testimony are:

- Nicor Gas Exhibit ("Ex.") 14.01: Resume of Frank Graves;
- Nicor Gas Ex. 14.02: Resume of Robert Mudge;
- Nicor Gas Ex. 14.03 Implied Risk Premium Model Calculations;
- Nicor Gas Ex. 14.04 Expected Earnings Model Calculations; and
- Nicor Gas Ex. 14.05 Cost of Equity Estimate Calculations.

III. ACCURATE DETERMINATION OF NICOR GAS' COST OF EQUITY

A. COST OF CAPITAL AND RISK

Q. What is the "Cost of Capital?"

A. The cost of capital is defined as the expected rate of return in capital markets on alternative investments of equivalent risk. In other words, it is the rate of return investors require based on the comparable risk-return alternatives available in competitive capital markets. Because investors have alternatives, including investing in other utilities, the cost of a utility's capital is a type of opportunity cost.[2]

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

A. Investors face two different types of risk from any financial investment in an enterprise: the business risk of the enterprise itself and the risk (lesser or greater) created by the financial characteristics of the particular claim held against those investments, *i.e.*, the types of securities that share in the overall performance to varying degrees. This is sometimes referred to as financial risk. Each of those categories of risk affect investors' willingness to invest in a particular financial asset and the return they require to make that investment.

The business risk of a company depends on the uncertainty and variability in the cash flows generated by the business as a whole (all its assets and operations, apart from how they are financed) and how these vary in relation to moves in the broader market. The financial risk of equity then depends on how it shares in that risky value of the enterprise relative to the other sources of capital used to finance the enterprise. That is affected by the, amount, terms, and rules of priority for payment to other stakeholders

[2] We mean "expected" in the statistical sense: the mean of the distribution of possible outcomes, referring to the probability-weighted average of possible returns over all possible outcomes.

(esp. creditors) who get their returns before the equity-holders. The enterprise risk is roughly common to all firms operating in a similar way in the same industry, while the financial risk varies with how each participant in the industry is financed. Each must be considered in evaluating the cost of equity. Section IV 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* decisions,[3] which found that:

- The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks;[4]
- 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.[5]

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

[4] *Hope*, 320 U.S. at 603.

[5] *Bluefield*, 262 U.S. at 680.

Q. How does this standard 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.[6] The cost of capital is the rate of return investors can expect to earn in capital markets on alternative investments of equivalent risk.[7]

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. If the allowed return on the utility investment is not at least as high as the expected return offered by alternative investments of equivalent risk, investors will choose these alternatives instead, and the utility's ability to raise capital and adequately fund its operations will be adversely impacted or even prevented. This is a fundamental concept in cost of capital proceedings for regulated utilities such as Nicor Gas.

B. IMPORTANCE OF DIVERSE MODELS

Q. Has there been a consensus in recent Commission decisions that only certain methods can be used to determine a utility's required equity returns?

A. No. The question of how to determine return on equity is often a matter of dispute among parties to rate proceedings and there are several models that are typically presented by applicants, the Staff, and interveners that shed light on the proper return.

---

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

[7] 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).

However, in Illinois, some parties, particularly Staff, have frequently argued that in effect the Commission must only use an Unadjusted Two-Model Approach in determining utilities' cost of equity. While there are modest variations from case to case in the details of the DFC and CAPM models that the advocates of this approach promotes, the approach is uniformly characterized by:

- Categorical rejection of any consideration of risk positioning beyond the CAPM, including rejections of the ECAPM, various versions of risk premium models, and expected earnings methods; and

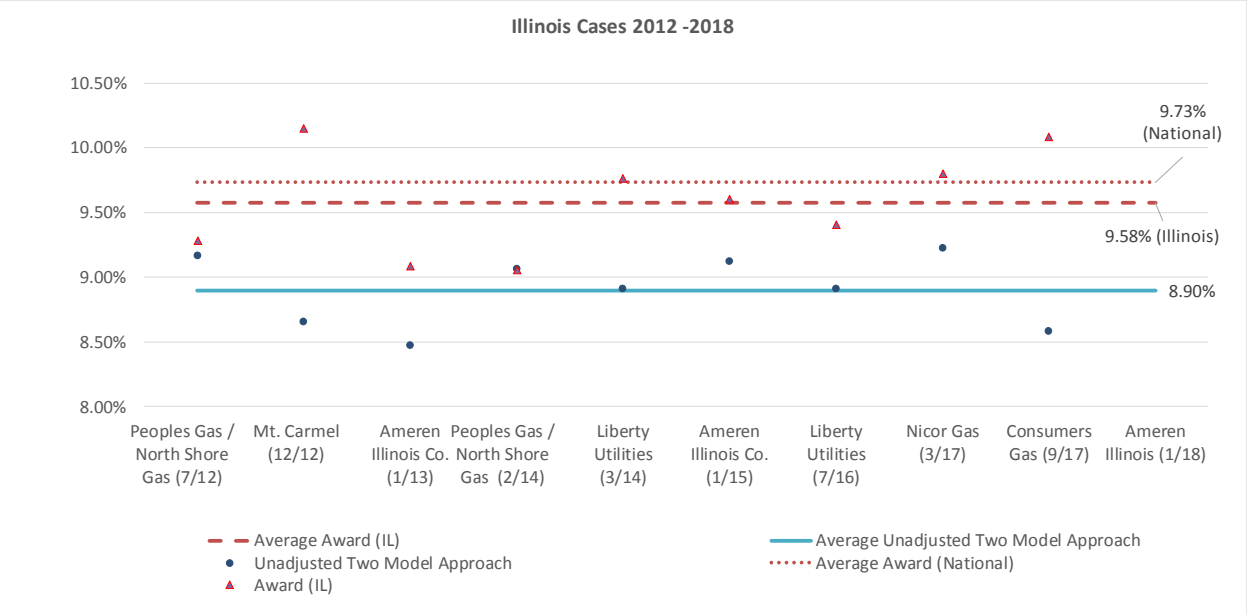
- Categorical rejection of any of the corrections for the consequences of having a capital structure that is more or less levered than the firms in the sample used to measure the cost of common equity. Indeed, advocates of the approach at times suggested that investors are indifferent to such differences, a conclusion that is completely contrary to received financial economics and rudimentary logic.

Q. Do Commission-awarded returns on equity conform to the Unadjusted Two-Model Approach?

A. No. In fact, a review of non-formula rate cases where return on equity analyses were presented since 2012 shows that the Commission awarded returns on equity differ significantly from the results of the Unadjusted Two-Model Approach. For example, our analysis shows that the several recent past recommendations of Staff, all based on some version of the Unadjusted Two-Model Approach, are about 70 basis points below the amounts ultimately awarded by the Commission. The strong implication is that while the Commission does not always expressly approve a particular other methodology or methodologies, it nearly without exception modifies upward the cost of equity that would result solely from application of the Unadjusted Two-Model Approach.

The data is reflected in Figure 2 below.

Figure 2
Illinois Cases Compared



We further observe that the gap between Commission awards and the results of applications of an Unadjusted Two-Model approach has ranged as high as 150 basis points in some cases. (Notably, the average shortfall between Staff recommendations for Illinois water utilities and Commission awards over the same period has also been approximately 70 basis points.)

Q. Does return on equity analysis limited to the Unadjusted Two-Model Approach yield results consistent with decisions of other regulators nationally?

A. No. As shown in Figure 2 above, a return on equity analysis limited to the Unadjusted Two-Model Approach has yielded results even further below national average awards since 2012: more than 80 basis points. An approach that accepted the Unadjusted Two-Model Approach as the sole source of data would result in allowed returns out of step with the norm.

Q. The Commission sets retail distribution rates for electric utility service in Illinois. The FERC sets transmission rates. How has FERC addressed the limitation of methodologies to a particular subset DCF or CAPM models?

A. The FERC Order discusses the replacing of FERC's longstanding reliance on just the DCF approach to also consider three additional approaches: 1) CAPM, 2) Implied Risk Premium, and 3) Expected Earnings. As the Order states, "[w]e propose to give each of those four models equal weight, by calculating a single cost of equity estimate for each model and then averaging those four figures together to produce the just and reasonable ROE."[8] FERC explained its rationale as follows: [9]

> In relying on a broader range of record evidence to estimate NETOs' cost of equity, we ensure that our chosen ROE is based on substantial evidence and bring our methodology into closer alignment with how investors inform their investment decisions.

Q. What is the background behind FERC's decision?

A. FERC's practice has long been to rely solely on the DCF methodology to establish a range of ROEs, or "zone of reasonableness". Then, from within the zone, an allowed base ROE would be determined, customarily the midpoint (for a group of companies) or median (for a single company). In order to seek departures from this practice, applicants were required to establish the existence of factors that cast doubt on a mechanical application of the DCF methodology, such as anomalous conditions in the capital markets. Estimation methodologies other than DCF, such as the CAPM, risk premium,

[8] 165 FERC ¶ 61,030 at PP 32-34.

[9] *Id*. at P 15.

and comparable earnings methods, were generally excluded from the analysis and were used only to refine the allowed ROE within the zone of reasonableness.

In 2014, FERC Opinion 531 refined FERC's DCF-based approach for electric transmission to replace what had been a "one-step" DCF described above with a "two-step" methodology (in part to recognize that the two-step DCF methodology was already FERC policy for oil and gas pipelines). Separately, FERC found it reasonable in the circumstances of the time to depart from a mechanistic application of the DCF. This was based on acknowledging the "model risk" inherent in applying the DCF under "anomalous" capital market conditions, namely the historically low interest rate environment that had existed since the financial crisis. Accordingly, Opinion 531 called for setting the allowed ROE halfway between the midpoint of the zone of reasonableness and the top of the zone.

In 2017, the D.C. Circuit Court of Appeals remanded and vacated Opinion 531. The court decision was noteworthy in not favoring of any particular stakeholders. Rather than suggesting any potential resolution, the Court instead determined that FERC had departed from evidentiary standards mandated by Section 206 of the Federal Power Act (FPA). Still the unanimous decision upended FERC's existing policy articulated in FERC Opinion No. 531. This left uncertainty both about the "default" policies properly applicable to near-term cases as well as long-term protocols.

The FERC Order is an effort to fill this vacuum.

Q. Is there any basis in economic theory or financial practice to limit analyses only to the Unadjusted Two-Model Approach?

A. No, the range of economically valid models are not limited to DCF and CAPM, let alone unadjusted versions of those models. Moreover, challenges to perceived imperfections of particular implementations of models or methods of measurement neither undermine the need to consider what models of that type can illuminate nor justify the rejection of any model not part of the Unadjusted Two-Model Approach. Indeed, there is no one uniformly perfect model for estimating the cost of equity, and the various models and estimation approaches each have different strengths and sensitivities. Customers and utility investors are both better served by regulation if the competing methods offered are compatible and comparable, i.e., if the disputes surround the more subjective elements about appropriate proxies, measurement periods, and weights to be given to alternative approaches.

Q. Can you illustrate the value of different models through a comparison of the CAPM and DCF models themselves?

A. Yes. The CAPM relies on an explicit measurement of systematic risk (beta) for which the cost of equity capital must compensate investors, but this parameter must be measured using historical data, and thus it changes slowly in response to recent changes in industry risk characteristics. Conversely, the DCF models incorporate current market prices and the most recent dividends and growth outlooks, enabling them to capture shifts over time. However, this also makes the DCF sensitive to short-term market phenomena that may or may not be representative of the capital market conditions and required investor returns that will prevail during the future period at issue.

Q. Are there any particular changes now occurring in the market that particularly counsel against more exclusive reliance on the DCF model?

A. Yes. The small number of sample firms available to serve as proxies for a gas utility, combined with the fairly small number of analysts reporting on those companies' expected growth, make this method more vulnerable to the timing and idiosyncratic personal views of the forecasters. This is discussed further below in Section VI.

Q. Can you please summarize your conclusions in this regard?

A. The Commission should consider a range of theoretically valid models and approaches when setting allowed returns on equity. Consideration of multiple estimation methods (and data sources) is an essential practice when estimating the cost of equity capital. Challenges to the particulars of given models should be evaluated on the merits and weighed by the Commission in its decision making process. But such criticisms are not reasons to ignore the results of such models, let alone to decide *a priori* **to reject them.** As our colleague, Professor Stewart C. Myers has eloquently advised: "Use more than one model when you can."[10]

It is especially important to heed this advice amidst the current economic conditions, since the unprecedented sustained low interest rate environment among investors can affect the results from various standard models in different ways.

[10] Stewart C. Myers, "On the Use of Modern Portfolio Theory in Public Utility Rate Cases: Comment," *Financial Management*, Autumn 1978, p. 67.

IV. TREATMENT OF FINANCIAL LEVERAGE

Q. Can you please briefly describe the basis for needing to adjust raw data obtained from proxy companies on their costs of capital in order to account for financial leverage?

A. There is universal agreement among financial economists that, all else equal, debt affects the risk of equity in a firm. More debt means more risk for equity holders and at extremes, more risk for the whole firm. This is not just an empirical observation but a logical and undisputed consequence of the fact that debt service is paid before profits are recognized or distributed, and debt has priority in bankruptcy, should that occur. In metaphorical terms, if we construe the total cash flows after expenses available to all investors in a company as a pie, the debt holders have a claim to the same quantity of pie (not the same proportion) regardless of how big the pie actually is in a given year. The equity holders get the residual pie after the creditors have had their fill. Obviously, the larger that debt claim the smaller and more variable the size of the residual for equity holders.

A practical implication of this is that the cost of equity measured for a company at one capital structure (e.g., 70% equity) is not comparable to that for a company with a different capital structure (e.g., 50% equity). This is true even if the two companies are otherwise identical. For instance, if you were told that you could invest in a company and expect to realize annual profits of 10%, that might be very appealing if it were a company with no debt, but if that company were 90% debt financed, you probably would (and should) regard that 10% as very meager. All else being equal, a company with more debt needs to earn more per dollar of equity investment to offset the fact that it is farther down the queue of rights to the cash flows, the more debt there is.

Q. How does this affect measuring and setting the ROE for regulated utilities?

A. For regulatory purposes in setting the allowed ROE, this means that you cannot simply average the ROE percentages estimated across firms with different capital structures and apply it to the utility in question, because those are measurements of the rates of return needed for just those specific amounts of equity capitalization, which vary across the sample. Those rates need to be somehow normalized for the effects of these differences before they can be applied to any other firm with a different capital structure. This is true regardless of how the ROE estimates were made, e.g. by DCF or CAPM. There are several ways to do this, all basically making the same type and nearly equivalent amount of adjustment, but with some refinements according to how stable the company's financing structure and tax rates are.

Q. What is the fundamental principle behind adjusting for leverage?

A. This goes back to the analogy about the pie. The amount of pie that the debtholders want is their share of the total capital times their average promised interest rate, while the equity holders need their share times an ROE commensurate with their residual risk (net of paying for the underlying debt). Those are what is measured in preparing a cost of capital study; their combination is the weighted average cost of capital (ATWACC, after an adjustment for the tax deductibility of interest). Once those numbers are known, they can be adjusted to determine how much pie the equity holders would get/need if the debt slice were different, *i.e.*, if it were the same as the book capitalization of the utility. This adjustment is essentially what all the approaches do, though some do it for special circumstances and some do it for the inputs to the cost of capital calculation rather than to the end components.

Q. What is the consequence of failing to recognize the effect of financial leverage on the cost of equity?

A. Categorical dismissal of adjusting for leverage is a very significant departure from received opinion in the financial economics community. There are dozens of papers on the effects of leverage on value and risk, starting with the famous Modigliani-Miller paper for which they received the Nobel Prize. That paper showed that absent tax savings, there is no incremental value created by debt financing. Rather, debt just changes who gets what share of the fixed pie. *A strict consequence of this is that the cost of equity has to be higher for a highly leveraged firm than for an equivalent unleveraged one; if this were not the case, it would be possible to arbitrage value differences across companies simply by refinancing them, i.e. by just rearranging who gets the money that flows from their business.* That cannot be the case in a competitive market equilibrium. Dozens of subsequent papers have generalized this result to include taxes and various kinds of different operating conditions, but none have refuted this basic finding that more debt increases risk and the cost of equity. The Staff can dispute the appropriate method for this adjustment, but not the fact that one is needed.

Q. What is the impact of ignoring financial leverage in estimating the cost of equity?

A. Per our estimates in the current proceeding (based on application of a simple DCF model to the Sub Sample described below), the impact could be as high as 200 basis points, from 9.4% to 11.4%, per Figure 3 below:

Figure 3
Impact of Ignoring Financial Leverage

		Unlevered Cost of Capital*		
		Market Data for Proxy Group	Difference	Book Implementation for Nicor
1	**Capital Structure**			
2	Debt	29%	16%	46%
3	Equity	71%	-16%	54%
4	Total	100%	0%	100%
5				
6	**Tax Rate**	27%	0%	27%
7				
8	**Cost of Capital**			
9	Debt	4.3%	-0.1%	4.2%
10	Equity	9.4%	2.0%	11.4%
11	Unlevered (after tax)	7.6%	0.0%	7.6%

* Based on Simple DCF Model applied to Subsample

Q. Why does the Commission need to adjust results derived using market value-capital structures before applying them to the book value capitalization of utilities used for ratemaking?

A. The measurements taken using with market data express a company's cost of equity in percentage terms per dollar of equity at those observed market capital structures. This tells us the unit price of risk, but it is the correct rate only if applied to the corresponding amount of equity. However, cost of service regulation does not apply returns to market value of equity but to book value, for good reasons: It is striving to give a fair return on and recovery of the utility's investment costs, not their value. If rates of return were awarded against market value, it would create a circular situation, whereby the allowed rate would either boost or suppress the market value gaining the allowance according to whether it was high or low.

In fact, most utilities have a much greater share of debt in their book capital structure than in their market values, i.e., they are more leveraged in book terms. As a result if the market cost of equity were granted against the book amount (cost basis), the utility shareholders would not be earning enough to offset their cost-recovery riskiness from the debt. The leverage adjustment increases the allowed return of equity from the market measured rate, but that greater rate is applied to a correspondingly smaller amount of equity than if applied to the greater market value of that equity. Making the adjustment keeps investors whole, and the equity competitive with other investment opportunities, exactly as sought under *Hope* and *Bluefield*. And, it results in a just and reasonable rate for customers as well.

Q. Is recognizing this adjustment just a backdoor approach to value-based pricing of equity?

A. No. Figure 3 above shows the costs of debt and equity for the current proxy group of utilities for Nicor Gas based on their market capitalization, and it compares that to Nicor Gas' corresponding costs based on its average book capitalization —including the adjustment for leverage needed for Nicor Gas' ROE. Note that the debt is a much larger percentage of the invested capital on a book basis than on a market basis. If the same unlevered cost of capital (here 7.6%) is allowed against the total book value of capital (debt plus equity, usually close to the net book value of ratebase, then we are treating each dollar of investment, whether market or book, as requiring the same overall return. That is, we are applying the overall market price of risk taken from the market to the book capital. But in order for that book unlevered return to be the same as the market

unlevered rate, the equity return must be higher than the market measured ROE, here by about 200 basis points.

This results in a dollar allowance for return on equity that is larger than it would have been without the adjustment, but it is applied to a much smaller quantity of equity (the book value) than the market value. Thus, it is not equivalent to simply awarding the market-required dollar amount to the book value of capital, but is much lower. One way of seeing this is that the market value of the debt and equity combined is higher than their joint book value, but jointly each is earning the 7.6% overall unlevered rate, on average. Thus, this is not value-based pricing.

Q. Is there any new financial risk being captured in this calculation?

A. No. Importantly, while this is sometimes called the adjustment for financial risk, there is no new total risk being recognized. Rather, it is just recognizing that the shares of who bears the risk are different as a function of the amount of debt capitalization. This is not a controversial effect in financial economics. There are numerous methods for making the appropriate adjustment, which differ slightly according to how they view the stability of capital structure and tax rates over time, but these differences are secondary compared to making the adjustment at all. There is no dispute in finance theory that this is a necessary adjustment for calculating the cost of equity properly.

In essence, the Commission is being asked to compare estimates that are apples and oranges. To the extent the estimates not adjusted for financial risk are incomplete, the midpoint between them and the utility is not descriptive of the real financial situation facing the utility but is describing a fiction in which some true costs (especially of leverage) are half-ignored. What is necessary to satisfy the intention to debate reasonable

costs would be for the Staff to use a broader set of sources that convey more information about likely risks and needs, and to make some kind of leverage adjustment that they feel matches the leverage situation of the utility.

V. IMPACT OF CURRENT ECONOMIC CONDITIONS

A. INTEREST RATES

1. Overview

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

A. Interest rates are interactive with utility cost of capital estimation in a number of ways: First, at a very basic level, it is intuitive that *absolute* levels of interest rates should be indicative of the cost of capital generally, all else equal. This notion is embedded in traditional methods for estimating the cost of capital. For example, the CAPM utilizes as one of its inputs a measure of the risk-free rate, for which the yield on a U.S. government bond is typically used as a proxy. The estimated cost of equity using the CAPM increases (decreases) by 1% when the relied-upon risk-free rate (e.g., the government bond rate) increases (decreases) by 1%, again all else equal.

Second, *relative* levels of interest rates are also important. Investors consider a risk-return tradeoff and select investments based upon the desired level of risk. The spread between the yield on utility (or corporate) bonds and government bonds (the "yield spread") represents a risk premium —or "excess" return above the risk-free rate of return — that investors require to compensate them for taking on risk. The riskier the investment, the larger the risk premium investors will require.

In general, the Market Risk Premium (MP) 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,[11] the MP is a highly relevant benchmark indicating the level of risk compensation demanded by capital market participants.[12]

Yield spreads and the MP may or may not be positively correlated with general levels of interest rates.

Third, interest rates may have an additional effect on cost of capital estimation because stock and bond investments can be *substitutes* competing for investor dollars, albeit on a risk-adjusted basis. This is particularly powerful for relatively low-risk utility stocks that can serve as reasonable alternatives to bonds. For this reason, interest rates and the utility cost of capital can be positively correlated. Importantly, however, the strength of this *substitution effect* can ebb and flow depending on interest rate environments.

As discussed below, some interest market conditions, particularly those that mark major transitions, can lead to distortion in cost of capital estimation techniques, and call for adjustment.

2. Rising Interest Rate Environment

Q. What are the relevant developments regarding interest rates?

A. Interest rates, including the long-term government bond yields that are typically used to represent the risk-free rate in the context of regulated utility ratemaking, have remained

---

[11] In finance theory, the "market portfolio" describes a value-weighted combination of *all* risky investment assets (including stocks, bonds, real estate, etc…) 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.

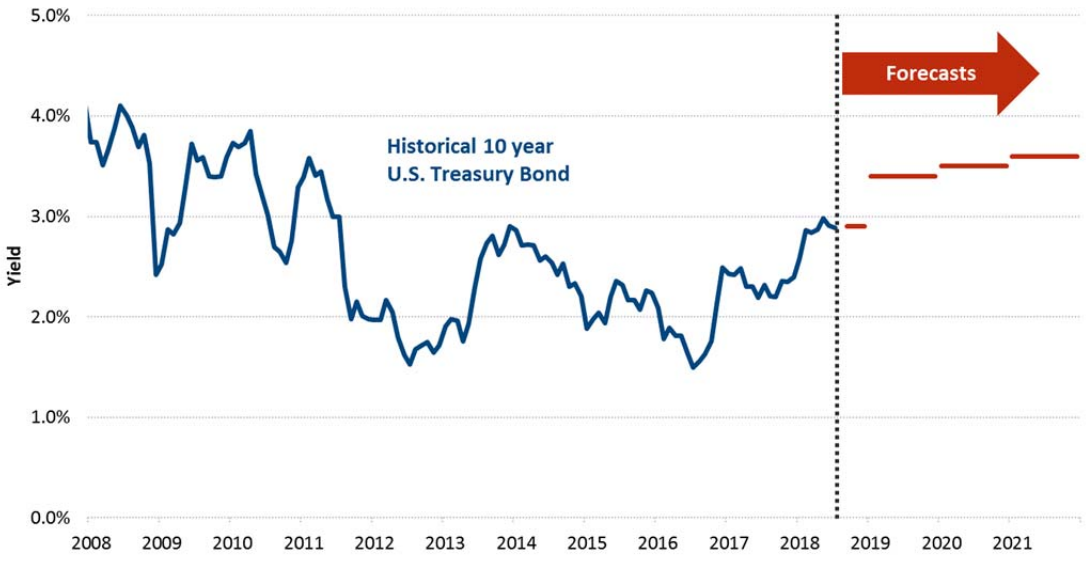
[12] Indeed, in risk-positioning models such as the CAPM, the risk premium for an asset is estimated in relation to the Market Risk Premium by "positioning" the asset's systematic risk (as measured by market beta) relative to the risk of the market portfolio (which, by definition, has a beta of 1).

extremely low in the years since the global financial crisis of 2008. However, yields have increased substantially over the past year and are forecasted to continue on their upward trajectory in coming years. For example, since hitting its all time low in July of 2016, the yield on 10-year U.S. Treasury bonds has more than doubled to nearly 3% at the time of our analysis.[13]

Furthermore, the consensus forecast from Blue Chip Economic Indicators — which surveys more than 50 institutional market analysts and participants, including major banks, academic finance departments, credit rating agencies, institutional investors, and Fortune 500 companies — is that the yield on 10-year Treasury bonds will increase to 3.5% by 2020 and continue to increase in 2021 and beyond. Figure 4 below plots these expected increases in the 10-year Treasury bond yield.

[13] Bloomberg as of 8/31/2018. The August 2018 average 10 year U.S. Treasury yield was 2.98%. On July 5th 2016, the 10 year U.S. treasury yield closed at 1.37%.

Figure 4
Historical and Projected 10 year Treasury Bond Yields



Source: Historical data from Bloomberg. Forecasts from Blue Chip Economic Indicators March 2018 issue.

Q. What forces contributed to the sustained period of very low interest rates over the decade following the financial crisis?

A. The monetary policy actions of the Federal Reserve in response to the financial crisis were a key driver of the low interest rates. In normal times, the Federal Reserve's Federal Open Market Committee ("FOMC") undertakes market actions to influence interest rates—especially the so-called "federal funds rate"[14] — subject to its statutory mandate to maximize employment and keep inflation under control. In response to the financial crisis, the FOMC drastically reduced its target federal funds rate from 5¼% in August 2007 to 0 - ¼% starting in December 2008.[15] The Federal Reserve's zero interest

[14] The federal funds rate is the rate at which large banks lend and borrow funds in the short term. It is therefore influential in determining market interest rates throughout the economy.

[15] *See* FOMC Statements issued August 7, 2007 and December 16, 2008, accessed at https://www.federalreserve.gov/monetarypolicy/fomc_historical.htm

rate policy remained in effect for the next 7 years, ending in December 2015 when the FOMC finally raised its federal funds target to ¼ - ½%.[16]

Concurrent with its sustained monetary policy actions related to the short term federal funds rate, the Federal Reserve also implemented several unprecedented policy interventions with the explicit goal of reducing interest rates on long-term borrowing instruments. This "quantitative easing" program of long-term government bonds served to keep Treasury yields at very low levels for an extended period of time. And importantly, even after the FOMC ceased buying securities, it maintained trillions of dollars' worth of Treasuries and government-backed MBSs on its balance sheet, continuing to reinvest the principle when the assets expired.[17]

Global economic conditions also contributed to the unprecedented low rates on U.S. government debt. For example, at the height of the European sovereign debt crisis in 2011-2012, flight from European bonds and yield-lowering actions by the European Central Bank ("ECB") spurred increased demand for U.S. Treasury bonds-thus driving up prices and bringing yields down. This pattern repeated in 2016 in the period leading up to, and especially following, the "Brexit" vote. Indeed, on July 10, 2016, shortly after Great Britain officially voted to leave the European Union, the 10-year U.S. Treasury Yield reached its all-time low of 1.37%.[18]

---

[16] *See* FOMC Statement, December 16, 2015, accessed at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm

[17] As of October 4, 2018, the Federal Reserve's long-term Treasury and Agency securities balance was at $4.0 trillion. *See* Board of Governors of the Federal Reserve System, Credit and Liquidity Programs and the Balance Sheet, accessed at https://www.federalreserve.gov/releases/h41/20181004/.

[18] Yield from Bloomberg. *See also* "U.S. 10-Year Treasury Yield Closes at Record Low" *The Wall Street Journal*, July 5, 2016, accessed at https://www.wsj.com/articles/government-bond-yields-in-u-s-europe-hit-historic-lows-1467731411.

Q. What forces have contributed to the current rising trend in interest rates?

A. As shown in Figure 4, U.S. Treasury bond yields have been on a clear increasing trend since their low point in mid-2016. This is consistent with the Federal Reserve's recognition that the economy has strengthened, employment conditions remain strong, and inflation-while still below its 2% target-has begun to increase. The FOMC has responded by increasing the target federal funds rate seven times since ending the zero interest rate policy in December 2015, including at its last six quarterly meetings. After the most recent hike announced at the FOMC's September 26, 2018 meeting, the federal funds target rate stands at 2 - 2 ¼%.[19] Additionally, in the March meeting, the Federal Reserve signaled the possibility of accelerating the rate of increases over the next few years.[20]

Importantly, the Federal Reserve has also recently enacted "Policy Normalization" procedures, whereby it is gradually decreasing its holdings of long-term bonds by not reinvesting principal from expiring securities. These procedures took effect starting in October 2017 and have continued at an accelerating pace ever since.[21]

In summary, central bank monetary policy action is aligned with and supportive of a continued gradual steady increase in interest rates, including yields on risk-free long-term government bonds. This is consistent with the economic forecasts of continued increases in the risk-free rate continuing through the period at issue in this proceeding.

---

[19] *See* FOMC Statement, September 26, 2018, accessed at https://www.federalreserve.gov/newsevents/pressreleases/monetary20180926a.htm

[20] *See* FOMC Minutes, March 20-21, 2018, accessed at https://www.federalreserve.gov/monetarypolicy/fomcminutes20180321.htm

[21] *See* FOMC Communications related to Policy Normalization, accessed April 16, 2018 at https://www.federalreserve.gov/monetarypolicy/policy-normalization.htm

Q. What implications does a climate of rising interest rates have for cost of capital estimation?

A. One consequence is that we believe it is appropriate to use the consensus forecasted rate for the risk-free rate in the CAPM because the forecast reflects expected conditions over the ratemaking period (while the current T-bond yield is a snapshot that just describes the immediate circumstances).

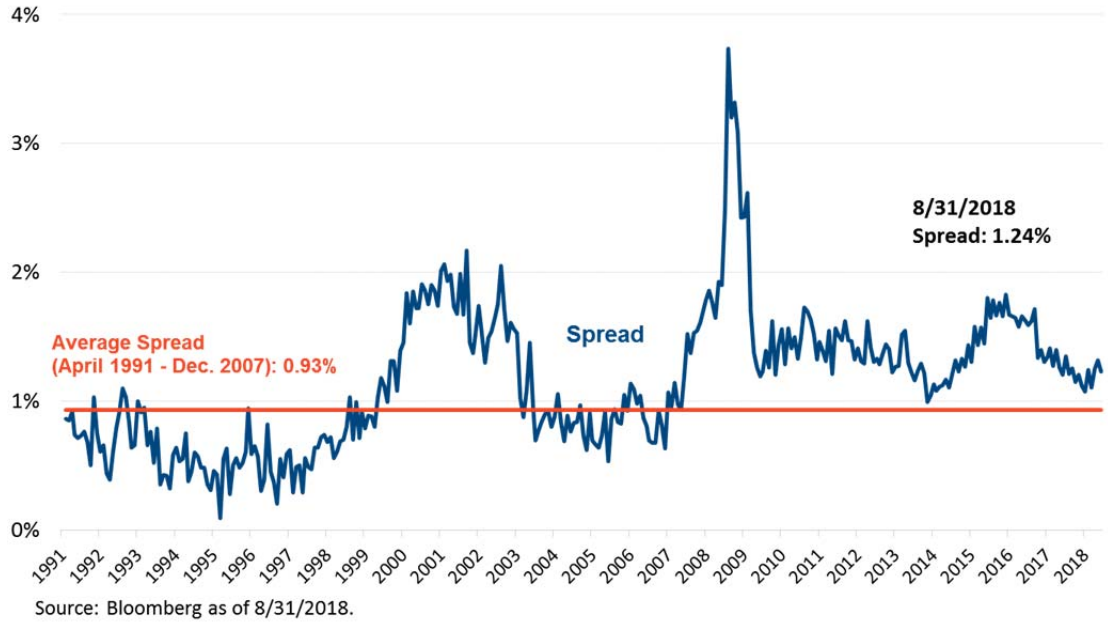
3. Yield Spreads and Risk Premiums

Q. What are the relevant developments regarding yield spreads?

A. One observable risk premium is the spread between yields on risk-free Treasury bonds and the yields on corporate bonds of the same maturity. Unlike U.S. government bonds, debt instruments issued by corporate entities come with some probability of default and have some associated level of systematic risk. To compensate for this risk, corporate bonds-including utility bonds-offer higher expected returns (as measured by the market yield) than do government bonds.

Figure 5 plots the yield spread for A-rated utility bonds compared to Treasury bonds for the longest period of available data. As the figure shows, utility yield spreads spiked dramatically with the onset of the financial crisis and have remained elevated to their pre-crisis average level.

Figure 5
Spread between A-rated Utility Bond and 20 year Government Bond Yield



Source: Bloomberg as of 8/31/2018.

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

A. As shown in Figure 5 above, the spread between A-rated utility bond yields and government bond yields has increased. Based on available data from 1990 through the end of 2007, the average level of the spread was 0.93%. In contrast, the average spread over the last 15 trading days in August 2018 (the 15 days leading up to our study date), was approximately 30 bps higher at 1.24 %.

Q. What are the implications of elevated yield spreads to the cost of equity?

A. The yield spread is simply one form of risk premium, albeit for assets (corporate bonds) that are relatively lower risk compared to equity securities (i.e., stock). Academic research suggests that the premium for systematic risk is one factor affecting the level of

corporate bond yield spreads.[22] Consequently, one explanation for the elevated yield spread is that investors are requiring a higher premium to take on market risk than they did on average prior to the financial crisis. Since corporate bonds have relatively lower betas compared to the stock market, this explanation would indicate a proportionally higher degree of elevation in the MRP for any given degree of elevation in the BBB utility bond spread.

An alternative explanation for the elevated yield spread is that the yield on Treasury bills remains "artificially" low due to the lingering after-effects of Fed's unprecedented monetary policy. Under this explanation, the yield spread would be expected to return to its historical average level as the risk free rate returns to more "normal" levels.

In this filing, although we observe that the yield spread still is large enough to suggest an upward adjustment to the CAPM parameters, we are not applying one for conservatism.

Q. Is there in fact evidence that the MRP has been elevated since the time of the 2008 financial crisis?

A. Yes. A December 2015 study by Duarte and Rosa of the Federal Reserve of New York aggregates the results of many models of the required MRP in the U.S. and tracks them over time. This analysis finds a very high MRP in recent years. The analysis estimates the MRP that results from a range of models each year from 1960 through the present.[23]

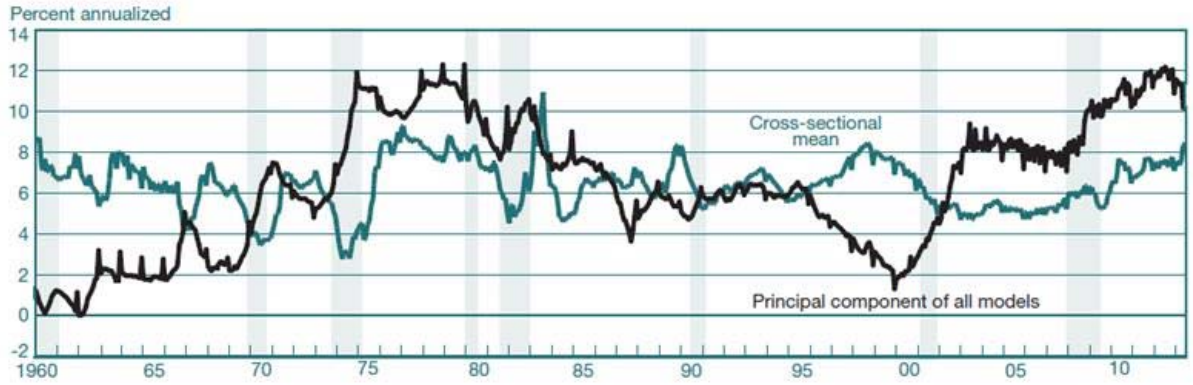
---

[22] "Explaining the Rate Spread on Corporate Bonds," Edwin J. Elton, Martin J. Gruber, Deepak Agarwal, and Christopher Mann, *The Journal of Finance*, February 2001, pp. 247-277.

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

The analysis then reports the average as well as the first principal component of results.[24] The analysis finds that the models used to determine the risk premium are converging to provide more comparable estimates and that the average annual estimate of the MRP was at an all-time high in 2013. These estimates are reasonably consistent with those obtained from Bloomberg and the consistent elevation of the MRP over the historical figure indicates that the elevated level has persisted. Figure 6 below shows Duarte and Rosa's summary results.

Figure 6
Duarte and Rosa's Chart 3
One-Year Ahead MRP and Cross-Sectional Mean of Models



Q. Do you have any data showing how estimates of the MRP have evolved over the more recent past?

A. Yes. Bloomberg publishes a forward-looking estimate of the MRP based on market prices and expected dividends for U.S. stocks.[25] Figure 7

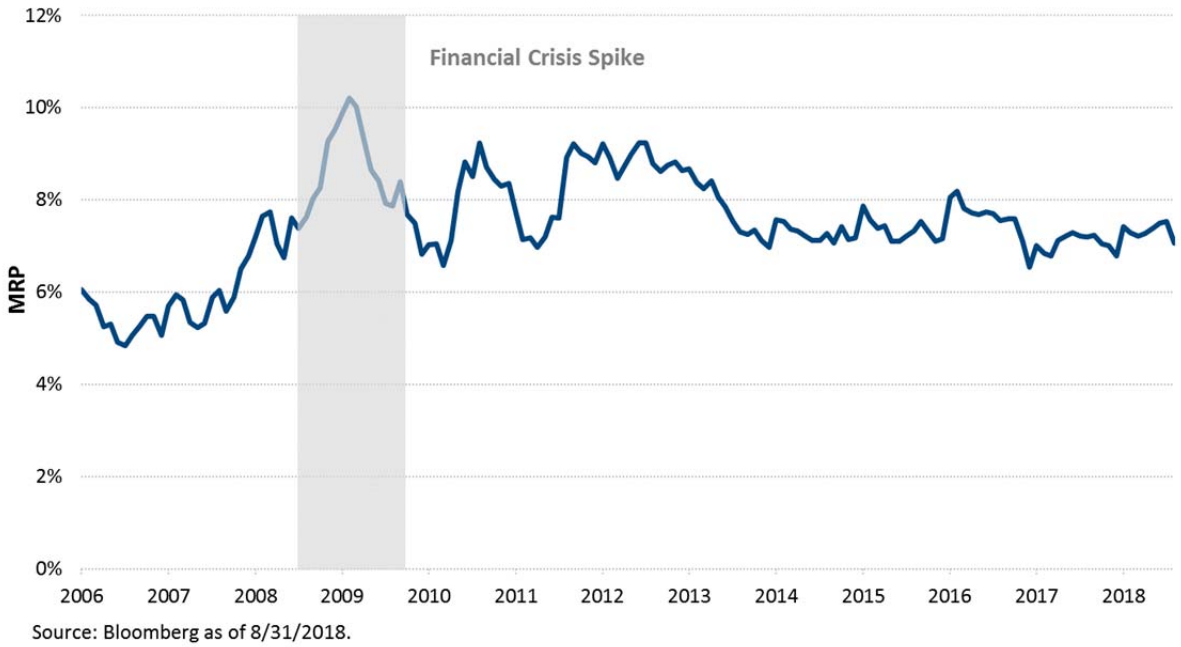
[24] Duarte & Rosa emphasize the "first principal component" of the 20 models. This means that the authors used statistics to compute the weighted average combination of the models that captures the most variability among the 20 models over time.

[25] Bloomberg's calculation of the expected market return is based on an implementation of a multi-stage DCF model (*see* Section VI.E.1 below) applied to all dividend paying stocks in the S&P 500

displays the development of Bloomberg's forecasted MRP since 2006.

Consistent with the results of the Duarte and Rosa study, the Bloomberg MRP increased substantially with the onset of the financial crisis and has remained elevated relative to pre-crisis levels. Though the August 2018 average forward looking MRP reported by Bloomberg is in line with the long-term historical average MRP,[26] the average since the 2008 financial crisis in 2008 was 7.8%.[27]

Figure 7
Bloomberg Forward looking MRP (2006-2018)



Source: Bloomberg as of 8/31/2018.

index; Bloomberg calculates the MRP by subtracting the current 10-year Treasury bond yield from the estimated expected market return.

[26] As noted below, Duff & Phelps calculates the historical average MRP at 7.07 percent.

[27] Average of Bloomberg forecasted MRP for the U.S. from January 2009 - August 2018. Bloomberg as of 8/31/2018.

Q. What implications does an elevated MRP have for cost of capital estimation?

A. A cost of equity estimate based on the current risk-free rate (at historic lows) and a historical average market risk premium (below recent levels) will be downward biased relative to current conditions. Hence, it is necessary to "normalize" the risk-free rate in CAPM model inputs, which we have done be utilizing a forecast for what government bond yields will be throughout the period at issue in this case.

4. Demand for Utility Stocks

Q. What other implications can rising interest rates have for utility cost of capital estimation?

A. In times of economic uncertainty (such as in recent years) investors seek to reduce their exposure to market risk. This precipitates a so-called "flight to safety," wherein demand for low-risk government bonds rises at the expense of demand for higher-risk investments. However, this has driven bond yields down to levels at which investors are seeking alternative investments, hence increasing demand for relatively safe utility stocks and driving down their dividend yields as well.

Cost of capital estimation techniques based on currently observable dividend yields —such as DCF —may thus understate utility cost of capital simply because of recently high demand for utility stocks. In a rising interest rate environment, as bond yields increase, investor tastes may shift away from utility stocks and raise the cost of capital in ways not captured by a DCF analysis.

B. MARKET VOLATILITY

Q. How do you factor the stock market's volatility into your analysis?

A. Academic research has found that investors expect a higher risk premium during more volatile periods. The higher the risk premium, the higher the required ROE. For example, French, Schwert, & Stambaugh (1987) found a positive relationship between the expected MRP and volatility:

> We find evidence that the expected market risk premium (the expected return on a stock portfolio minus the Treasury bill yield) is positively related to the predictable volatility of stock returns. There is also evidence that unexpected stock returns are negatively related to the unexpected change in the volatility of stock returns. This negative relation provides indirect evidence of a positive relation between expected risk premiums and volatility.[28]

One implication of this finding is that the MRP tends to increase when market volatility is high, even when investors' level of risk aversion remains unchanged.

A measure of the market's expectations for volatility is the VIX index, which measures the 30-day implied volatility of the S&P 500 index.[29] These indices are also referenced as the "market's fear gauge."[30] While the VIX has recently been trading substantially below its long term historical average of approximately 19.4, it spiked

---

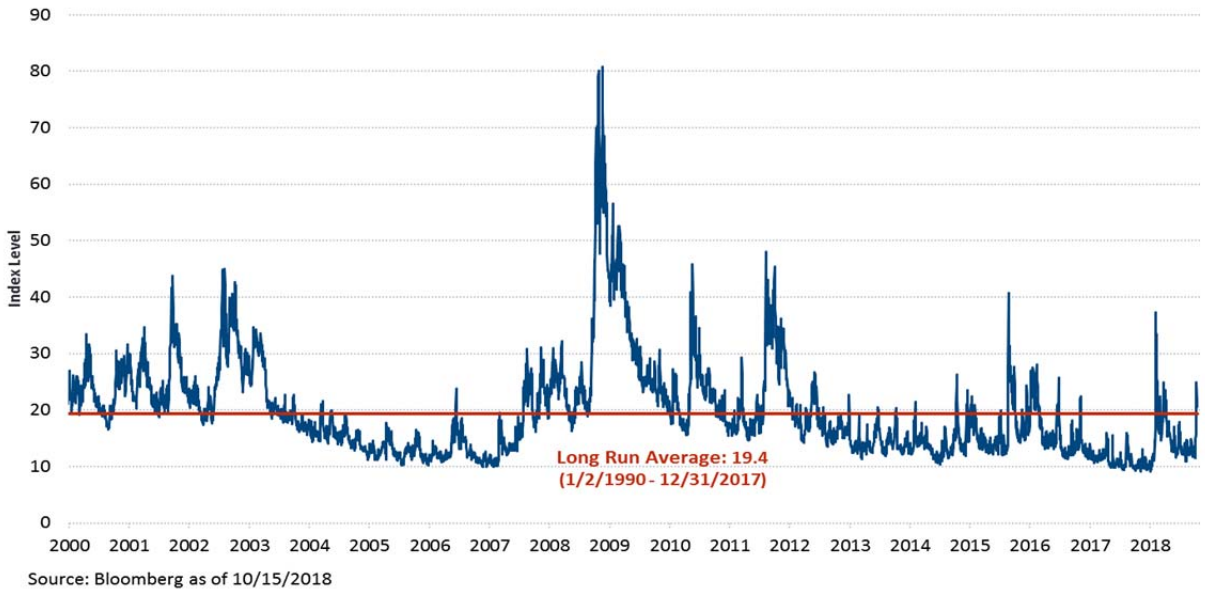
[28] K. French, W. Schwert, and R. Stambaugh (1987), "Expected Stock Returns and Volatility," *Journal of Financial Economics*, Vol. 19, p. 3.

[29] *See*, for example, Chicago Board Option Exchange at: http://www.cboe.com/micro/VIX/vixintro.aspx

[30] CNBC, "VIX, the Market's Fear Gauge Plunges in Historic One-Week Move," July 5, 2016.

substantially above that level in early October concurrent with a significant drop in the stock market.

Figure 8
VIX Index

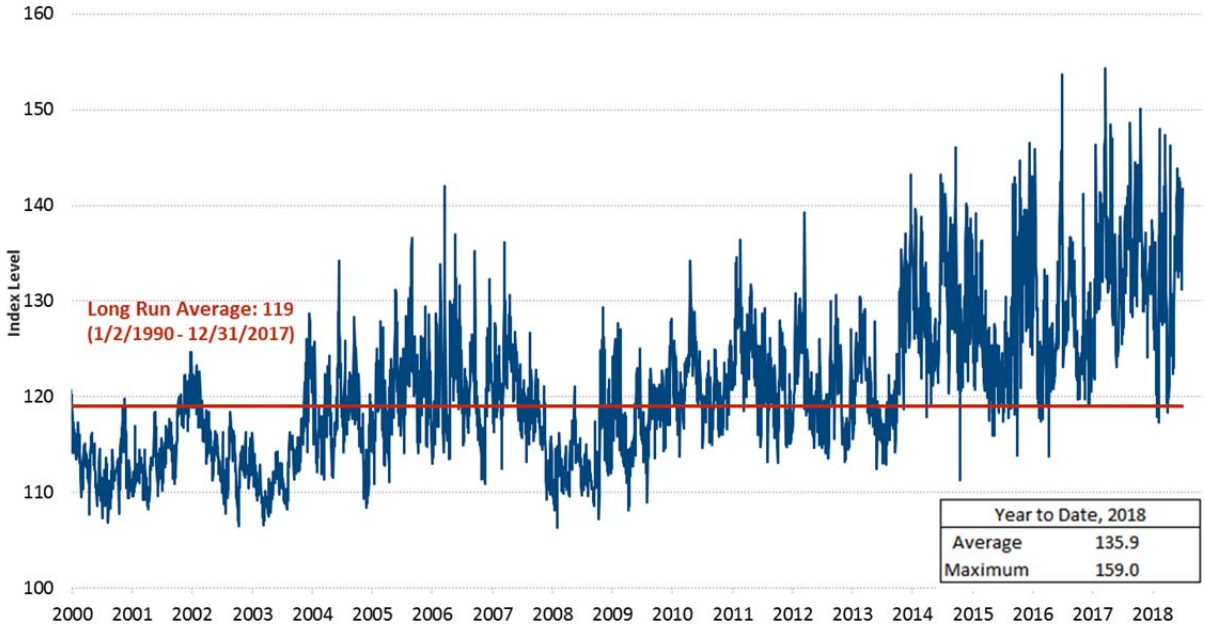


Source: Bloomberg as of 10/15/2018

Q. Do you look at any other indexes regarding market volatility?

A. Yes. 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), offers a reason to be cautious of interpreting recent low VIX levels as an indicator of improved capital market certainty over the long term. A SKEW value of 100 indicates outlier returns are unlikely, but as the SKEW increases, the probability of outlier returns become more significant. Figure 9 shows that the SKEW currently stands at almost 132, while the index has averaged 119 over the last 27 years. This indicates that investors are willing to pay for protection against downside risk and thus are exhibiting signs of elevated risk aversion concerns of downside tail risk.

Figure 9
SKEW Index



Source: Bloomberg as of 10/15/2018

Q. Are there reasons why capital markets may exhibit high volatility going forward?

A. Yes. A few contributing reasons to capital market volatility recently include ongoing trade wars between the United States and China, challenging negotiations occurring in the European Union regarding finalization of the exit of Great Britain, and the newly minted agreement replacing the North American Free Trade Agreement ("NAFTA").

Throughout 2018, the U.S. and China have been in a trade war, with the latest announcement coming on September 18th by China in response to a September 17th U.S. declaration of tariffs on $200 billion of Chinese exports.[31] As this trade war has developed, uncertainty in the markets has increased significantly because investors do not

[31] The U.S. announced a 10% tariff on these goods for the remainder of 2018, which will escalate to a 25% tariff afterward. The Chinese retaliation included $60 billion of U.S. goods. *See* The Trade War is on: How We Got Here and What's Next, Bloomberg, 9/18/2018.

know when or if tariffs will be implemented on products affecting companies in which they hold equity. On any given day, a tariff could be announced, significantly affecting the value of a company or companies. Thus, the current market landscape is relatively volatile.

To further the instability facing U.S. markets resulting from the trade war with China, the removal of NAFTA and the implementation of the United States-Mexico-Canada Agreement ("USMCA") has been an ongoing source of insecurity for all investors and those doing business throughout North America. Though the USMCA was settled in September, the ongoing process of negotiations has been far from transparent and had led to significant concerns of the fallout for investors holding equity in any business needing to trade across the applicable borders. Even with the agreement upon the USMCA, certain tariffs and trade rules will change, likely leading investors to be unsure of the direction of certain businesses.

Q. What is meant by the term "risk aversion"?

A. Risk aversion is the recognition that investors dislike risk, which means that for any given level of risk, investors must expect to earn an appropriate return to be induced to invest. An increase in risk aversion means that investors now require a higher return for that same level of risk.

In times of economic uncertainty, investors seek to reduce their exposure to market risk. This precipitates a so-called "flight to safety," wherein demand for low-risk government bonds rises at the expense of demand for stocks. If yields on bonds are extraordinarily low, however, any investor seeking a higher expected return must choose alternative investments such as stocks, real estate, gold or collectibles. Of course, all of

these investments are riskier than government bonds, and investors demand a risk premium (perhaps an especially high one in times of economic uncertainty) for investing in them. But short of accepting meager returns, investors simply have few alternatives to returning to the stock market. Utility stocks may have experienced the "flight to safety" phenomenon to a larger degree than other stock because they traditionally have paid a substantial portion of their earnings as dividends. Therefore, investors who have sought income from their investments and found government bonds too unattractive may have accepted a higher risk and invested in utility stock with the goal of receiving periodic dividend payments.

C. THE NEW TAX LAW INCREASES RISKS FACING REGULATED UTILITIES

Q. How will the Tax Cuts and Jobs Act of 2017 affect regulated utilities?

A. The Tax Cuts and Jobs Act of 2017 (Public Law 115-97) ("TCJA"), signed into law on December 22, 2017, reduces the federal corporate marginal tax rate from 35% to 21%. Although the tax law is likely to be a net positive for investors in unregulated companies, it is likely that customers, rather than shareholders, of regulated companies will reap the majority of the benefits because the savings in income taxes will flow through to customers. The reduction in income tax will likely increase the risks facing regulated companies because the effect of the law will be a reduction in their cash flows.

Q. How will the TCJA reduce the cash flows of regulated companies?

A. The law can reduce cash flows for regulated companies in several ways. First, the reduction in the corporate tax rate reduces the income tax allowance needed, i.e., the ROE "gross up" for income tax is smaller. This results in a reduced revenue requirement and decreased pre-tax cash flows. Second, on an after tax basis, the benefit of any

accelerated tax depreciation will go down in proportion to the reduction in tax rate, leading to a reduction in after-tax cash flows. Third, regulated utilities will need to refund Excess Deferred Income Taxes ("EDIT") to their customers through lower rates. The creation of EDIT relates to Accumulated Deferred Income Tax ("ADIT"), which represents the timing difference in depreciation for income tax and regulatory purposes. Typically, depreciation for tax purposes is accelerated relative to regulatory depreciation so that Deferred Income Tax ("DIT") is positive in the early years of a regulated asset's life and negative in the later years. The assumption is that ADIT will be zero for any asset at the end of its regulatory life; however, that would not be true with a change in the corporate tax rate, unless EDIT is addressed. Because of the reduction in the corporate tax rate, the excess ADIT becomes EDIT that will be refunded to customers over the remaining life of the asset. As the EDIT is amortized, it will increase the rate base, but on net the return of EDIT will reduce the utility's cash flows, both before and after taxes, until the EDIT has been exhausted.[32] Finally, the law eliminates bonus depreciation. Bonus depreciation allowed utilities to recognize additional depreciation for tax purposes during the first year of an asset's operation. While bonus depreciation reduced rate base, it created an upfront increase in a utility's cash flows in the form of lower tax payments. Thus, the elimination of bonus depreciation will negatively impact some utilities' after tax cash flows.

[32] This is true because the return on a dollar of increased rate base is less than the cash flow from a dollar of depreciation.

Q. How will the TCJA affect the expected volatility of cash flows for regulated companies?

A. This example assumes that the revenue requirement has been adjusted to account for the lower corporate income tax rate. For regulated companies, the change in the income tax allowance will result in greater volatility of net income (and cash flow) because the regulatory income tax allowance provides a "buffer" against the impact of variations in expected costs and expected revenue on net income. Consider for example the effect on net income of a 10% increase in sales. All else equal, net income would increase by about 6.5% for a 35% income tax rate, (i.e. 0.10 times (1 – 0.35)), but would increase by 7.9% for a 21% income tax rate. The change would be similar for a decrease in revenue. Moreover, the variation in net income is likely to be systematic in that variations in revenue are generally related to variations in the economy. Recall that systematic risk is the type of risk that affects the cost of capital.

Q. How will the TCJA affect a regulated company's credit metrics?

A. Credit metrics are likely to be negatively impacted due to a reduction in the regulated utilities' cash flow because cash flow metrics are closely observed by the ratings agencies. The reduction in income tax allowance, the expected refunds of EDIT, and the loss of bonus depreciation will reduce cash flow. Yet the tax reform has not impacted the amount of assets, a portion of which will be debt-financed, necessary to serve the utilities' customers. Decreases to the cash flow metrics, such as cash flow to debt ratios closely monitored by credit rating agencies to inform their credit opinions, negatively

impacts the credit profile of many regulated utilities.[33] These effects suggest that the allowed ROE, the amount of equity in the capital structure, or possibly both should be increased to offset the negative effects of the income tax law. While the uncertainty surrounding the passage of a tax reform bill has been removed, it is unlikely that these impacts on the cost of capital will immediately appear in the estimation models. The law has not yet been in place for even one fiscal quarter. A longer period of market data and updates of analyst forecasts is needed before the cost of capital estimation models will begin to show the impacts of the new tax law.

Notwithstanding these decreases in cash flow metrics and increased volatility of earnings, both of which increase financial risk, we do not make an upward adjustment to our estimate of the cost of equity for the new tax code.

VI. ESTIMATING THE COST OF EQUITY

A. OVERVIEW

Q. What approaches have you used to assess Nicor Gas' cost of equity?

A. We have estimated Nicor Gas' cost of equity based on ROEs observed for comparable companies using a range of estimation methods and adjusted for financial leverage, as further described below.

[33] "Moody's changes outlooks on 25 US regulated utilities primarily impacted by tax reform," Moody's Investor Service, Global Credit Research, January 19, 2018, and "Tax reform is credit negative for sector, but impact varies by company," Moody's Investor Service, Sector Comment, January 24, 2018. Also "U.S. Tax Reform: For Utilities' Credit Quality, Challenges Abound," S&P Global Ratings, Rating Direct, January 24, 2018; and "Tax Reform Impact on the U.S. Utilities, Power & Gas Sector: Tax Reform Creates Near-Term Credit Pressure for Regulated Utilities and Holding Companies," Fitch Ratings, Special Report, January 24, 2018.

Q. How have you considered risk when estimating Nicor Gas' cost of equity?

A. To ensure comparable business risk, we looked to samples of regulated electric and gas distribution utilities. Further, we analyzed and adjusted for differences in financial risk due to different levels of financial leverage among the sample companies and between the capital structures of the sample companies and the regulatory capital structure that will be applied to Nicor Gas for ratemaking purposes. To determine where in the estimated range Nicor Gas' ROE reasonably falls, we compared the business risk of Nicor Gas to that of the sample utilities and also considered recent capital markets developments.

B. SAMPLE SELECTION

Q. Please summarize how you selected the Gas Local Distribution Company ("LDC") sample companies.

A. To identify companies suitable for use in the Gas LDC sample, we started with the universes of publicly traded gas utilities as identified by Value Line Investment Analyzer ("Value Line"). Next, we reviewed business descriptions and financial reports of these companies and eliminated any that are not primarily focused on gas distribution. Specifically, we eliminated companies which had less than 50% of their assets dedicated to regulated gas utility activities.[34]

With this group of companies, we applied further screening criteria to eliminate companies which have had recent significant events that could affect the market data necessary to perform cost of capital estimation. Specifically, we identified companies

[34] We analyzed the most recent annual filing available for each company. In this instance, the most recent filings are for fiscal year 2017.

that have cut their dividends or engaged in substantial merger and acquisition ("M&A") activities over the relevant estimation window.[35] We eliminated companies with such dividend cuts because the announcement of a cut may create disturbances in the stock prices and growth rate expectations in addition to potentially being a signal of financial distress. We 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.[36]

Further, we require companies have an investment grade credit rating[37] and more than $300 million in annual revenues to ensure liquidity. A final, and fundamental, requirement is that the sample companies have the necessary data available for estimation.

Q. Did you relax any of your sample selection criteria to obtain a more robust Expanded Gas LDC Sample?

A. Yes. In applying all of our sample selection criterion to the universe of publically traded companies reported by Value Line, we arrived at a sample consisting of five companies, Atmos Energy, Chesapeake Utilities, Northwest Natural Gas, ONE Gas, and Southwest Gas. These companies comprise what we are calling the Gas LDC Subsample. To form more statistically robust estimates, we relax our criteria for M&A and dividend cuts,

[35] As described in Sections VI.D.1 VI.E.2 respectively, the CAPM requires five years of historical data, while the DCF relies on current market data.

[36] As we discuss below, we relax certain criteria to form an Expanded Gas LDC Sample as a robustness check.

[37] In some cases, a sample companies 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, we assign the company the average credit rating of the rest of the sample.

which allowed for the inclusion of four additional companies. By adding these four companies-NiSource, Spire Inc., South Jersey Industries, and New Jersey Resources-to the Gas LDC Subsample, we obtain a nine-company "Expanded Gas LDC Sample".

The four companies included in the expanded sample (but excluded from the subsample) have had dividend cuts or significant M&A activity within the last five years, and thus are not suitable for use in CAPM estimation (since the Value Line betas we rely on are estimated using the last 5 years of historical stock market data). However, since the DCF model relies on recent data not directly influenced by these cuts and acquisitions, we do analyze the Expanded Gas LDC Sample when estimating the DCF models.

Q. What are the characteristics of the Expanded Gas LDC Sample?

A. The Expanded Gas LDC Sample consists of nine companies that have most of their revenue generating assets dedicated to the regulated distribution of natural gas in the U.S. By analyzing their annual financial statements, we determined that all of the subsample companies and all but two of the companies in the expanded sample have at least 80% regulated assets, thus meeting the criteria for EEI's "regulated" category, as designated with an "R" in Figure 10 below. The expanded sample contains two companies that fall into EEI's "mostly regulated" (50% - 79% regulated assets) category.

The subsample companies are indicated with an asterisk. We note that the financial characteristics of the Gas LDC Subsample and the Expanded Gas LDC Sample do not differ significantly.

Figure 10
Expanded Gas LDC Sample

Company	Annual Revenues (USD million) [1]	Regulated Assets [2]	Market Cap. 2018 Q2 (USD million) [3]	Beta [4]	S&P Credit Rating (2018) [5]	Long Term Growth Est. [6]
Atmos Energy *	$3,136	R	$9,783	0.60	A	6.9%
Chesapeake Utilities*	$683	R	$1,271	0.70	A-	7.7%
Northwest Nat. Gas*	$718	R	$1,770	0.65	A+	6.9%
ONE Gas Inc.*	$1,641	R	$3,835	0.65	A	6.7%
Southwest Gas*	$2,759	R	$3,729	0.75	BBB+	6.2%
NiSource	$5,043	R	$9,006	0.55	BBB+	6.5%
Spire Inc.	$1,985	R	$3,498	0.65	A-	3.3%
South Jersey Industries	$1,322	M	$2,749	0.75	BBB+	9.9%
New Jersey Resources	$2,804	M	$3,815	0.70	A-	6.0%
Average	$2,232		$4,384	0.67		6.7%
Subsample Average	$1,787		$4,078	0.67		6.9%

Sources and Notes:
[1]: Bloomberg as of 06/30/2018.
[2]: Company 10-Ks. See Table No. RSM-2.
[3]: See Table No. RSM-3 Panels A through I.
[4]: See Supporting Schedule # 1 to Table No. RSM-10.
[5]: S&P Credit Ratings from Research Insight as of 2018 Q2.
[6]: See Table No. RSM-5.
* Denotes company is part of the subsample

Q. How does the sample in your analysis compare to the sample in used in Nicor Gas' ROE analysis in its 2017 Rate Case?

A. The 5-member core sample has changed, with Chesapeake Utilities and ONE Gas Inc. replacing South Jersey Industries and New Jersey Resources, which have both been removed due to recent M&A activity.

Q. Did the change in sample materially impact your analysis?

A. The above change in the 5-member core sample had the effect of depressing average DCF-derived ROEs by approximately 20 basis points.

C. CAPITAL STRUCTURE

Q. What regulatory capital structure for Nicor Gas did you employ in your analysis?

A. We use the capital structure recommended by Nicor Gas witness Todd Perkins (Nicor Gas Ex. 2.0), consisting of 54.35% equity and 45.65% debt. We note that Nicor Gas' requested 54.35% equity ratio is slightly higher than average compared to regulatory capital structures determined in recent U.S. utility rate cases. It is also substantially lower than the market value equity ratios for the Expanded Gas LDC Sample.

D. CAPM BASED COST OF EQUITY ESTIMATES

Q. Can you please briefly explain the CAPM?

A. In the CAPM 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, in which the required expected return on an asset is proportional to that asset's relative risk as measured by that asset's beta.

More precisely, the CAPM states that the cost of capital for an investment, S (e.g., a particular common stock), is given by the following equation:

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

- $\boldsymbol{r_S}$ 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, whereas investments of the same risk 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 of interest and the MRP, as well as a measurement of the stock's beta. There are many methodological choices and sources of data that inform the selection of these inputs. We discuss these issues below.

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

A. We used the yield on a 20-year U.S. Treasury bond as the risk-free asset for purposes of our analysis. Recognizing the fact that the cost of capital set in this proceeding will be in place over the next several years, we rely on a forecast of what Treasury bond yields will be in 2020. Specifically, Blue Chip Economic Indicators ("BCEI") projects that the yield on a 10-year Government Bond will be 3.5% by 2020.[38] We adjust this value upward by 50 basis points, which is our estimate of the representative maturity premium for the 20-year over the 10- year Government Bond. This gives me 4.0% as an estimate of the risk-free rate.

Q. What value did you use for the MRP?

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, and 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 some long historical period. Duff and Phelps performs such a calculation of the MRP. The average market risk premium from 1926 to the present (2017) is 7.07%.[39] We use this value of the MRP in our CAPM analyses.

We also note that Bloomberg's forward-looking market-implied MRP is currently estimated at 7.0% (when expressed relative to 20-year bond yields) and was above the

[38] *Blue Chip Economic Indicators,* March 2018, p. 14.

[39] Duff & Phelps, *Ibbotson SBBI 2018 Valuation Yearbook,* pp. 10-21.

7.07% long-term historical average value throughout January - July 2018, including a July average estimate of 7.5%. (*See* Section V above.) The fact that recent forward-looking estimates of the MRP exceed the historical average level is consistent with the broader body of evidence that risk premiums have remained elevated relative to their pre-financial crisis levels. Therefore, we believe the 7.07% long-term historical average MRP value we rely on is a reasonable and conservative estimate of what the market risk premium will be during the period at issue in this proceeding.

Q. What is the basis for stating that the current MRP is higher than its historical average?

A. Academic articles that were written in the late 1990s or early 2000s often found that the U.S. MRP at the time was lower than the its historical average based on various forward looking models, such as market-wide versions of the DCF model. An article by Duarte and Rosa of the Federal Reserve of New York summarizes many of these models and also estimates the MRP from the models each year from 1960 through the present.[40]

The authors find that the models are converging to provide more consensus around the estimate and that the average annual estimate of the MRP is consistent with the academic literature and with forward-looking estimates such as Bloomberg's. Their analysis shows that the U.S. MRP was lower than its long-term historical average in the early 2000s, but is currently at an all-time high. Chart 3 from Duarte & Rosa 2015 was reproduced in Figure 6, which shows the average estimated MRP (relative to 30-day T-bill yields) for 20 models.

[40] Fernando Duarte and Carlo Rosa, "The Equity Risk Premium: A Consensus of Models," Federal Reserve Bank of New York, December 2015 (Duarte & Rosa 2015).

These findings are broadly consistent with the forward-looking MRP's calculated by Bloomberg albeit a bit higher even after downward adjustment for the maturity premium.

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

A. We used Value Line betas, which are estimated using the most recent five years of weekly historical returns data.[41] The Value Line levered equity betas measured for the sample companies are reported in Figure 10. Importantly, as explained in above, these betas —which are measured (by Value Line) using the market stock return data of the sample companies —reflect the level of financial risk inherent in the sample companies' market value leverage ratios over the estimation period. Since Nicor Gas' regulatory capital structure includes a substantially higher proportion of debt financing compared to the sample companies,[42] 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 sample companies' publicly traded stock.

2. The Empirical CAPM

Q. What other equity risk premium model do you use?

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

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

[42] Nicor Gas' proposed 45.5% debt financing is above the maximum of 5-year average debt ratios measured for the Expanded Gas LDC sample. The average debt percentage of the Expanded Gas LDC sample is 35.8%.

premiums than predicted. 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.

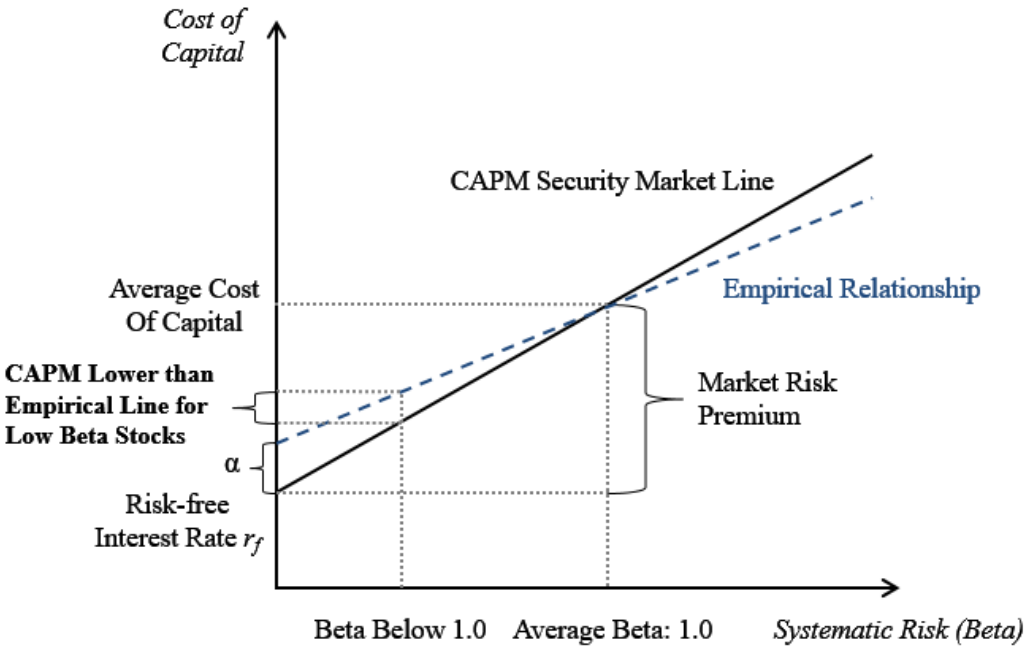
The second variation on the CAPM that we employ makes use of these empirical findings. It estimates the cost of capital with the equation,

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

where α 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).

We 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 which results in a Security Market Line that more closely matches the results of empirical tests. This adjustment is portrayed in Figure 11 below. In other words, the ECAPM produces more accurate predictions of eventual realized risk premiums than does the CAPM.

Figure 11
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.

3. Results from the CAPM Based Models

Q. Please summarize the parameters of the scenarios and variations you considered in your CAPM and ECAPM analyses.

A. The parameters are displayed in Figure 12 below. As discussed above, the risk free interest rate represents Blue Chip Economic Indicators projection for the 10-year Treasury Yield to prevail in 2020, adjusted to a 20-year horizon. The MRP is the long-term historical arithmetic average of annual realized premiums of U.S. stock market returns over long-term (approximately 20-year maturity) Treasury bond income returns from 1926 to 2017 as reported by Duff and Phelps.

Figure 12
Parameters for Scenarios in Risk Positioning Analyses

Risk-Free Interest Rate	4.00%
Market Risk Premium	7.07%

Q. Please summarize the results of the CAPM-based models.

A. The results of CAPM and ECAPM estimation for the Gas LDC Subsample is presented in Figure 13 below.

Figure 13
CAPM Summary
Gas LDC Subsample

	CAPM	ECAPM (α = 1.5%)
ATWACC Method	10.1%	10.7%

Note: Long-Term Risk Free Rate of 4.00%, Long-Term Market Risk Premium of 7.07%.

E. THE DCF BASED ESTIMATES

1. Single and Multi-Stage DCF Models

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

A. The DCF model attempts 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 simply 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:

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

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

$\boldsymbol{D_t}$ 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 make the assumption 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:

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

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. We 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 of the University of Toronto.

Q. Are there other versions of the DCF model?

A. Yes. There are many 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). 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.

In our implementation of the multi-stage DCF, we assume that companies grow their dividend for 5-years at the forecasted company-specific rate of earnings growth, with that growth then tapering over the next 5-years toward the growth rate of the overall economy (i.e., the long-term GDP growth rate forecasted to be in effect 10 years or more into the future).

Q. What are the relative strengths and weaknesses of the DCF versus CAPM based methodologies for estimating the cost of equity capital?

A. Current market conditions affect all cost of capital estimation models to some degree, but the DCF model has at least one advantage over the CAPM-based models as it includes contemporaneous stock prices and forward-looking growth, whereas the CAPM relies on historical data to estimate systematic risk (beta) and (in some cases) the market risk premium.

2. DCF Inputs and Results

Q. What growth rate information do you use?

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

For the long-term growth rate for the final, constant-growth stage of the multistage DCF estimates, we use the long-term U.S. GDP growth forecast of 4.2% from Blue Chip Economic Indicators. Thus, the long-run (or terminal) growth rate in the multi-stage model is nominal GDP growth.

Q. What are the pros and cons of the input data?

A. Both the Gordon Growth and 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. In the

multi-stage version, we taper these growth rates toward a stable growth rate corresponding to a forecast of long-term GDP growth for all companies.

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 our samples use share repurchases, the DCF model using dividend yields will underestimate the cost of equity for these companies.

Q. Please summarize the DCF based cost of equity estimates for the samples.

A. The results of the DCF based estimation for the Gas LDC Subsample and Expanded Gas LDC Sample are displayed below in Figure 14.

Figure 14
DCF Model Results: Gas LDC Samples

Subsample	
Single-Stage	11.4%
Multi-Stage	8.4%
Expanded Sample	
Single-Stage	10.8%
Multi-Stage	8.3%

Q. How do you interpret the results of your DCF analyses?

A. As discussed above, the DCF models are currently estimated based on dividend yields that may be expected to decline as interest rates continue to rise in the coming months and years. As a consequence, the multi-stage DCF model's assumption that current prices reflect investor's expectations that dividend growth will converge with the rate of

GDP growth in the long term may underestimate how that pattern of expected dividends will be valued in the market throughout the period for which the rates decided in this proceeding will be in effect. Thus, while we acknowledge that the single-stage DCF model makes the strong assumption that current 3-5 year EPS growth expectations will persist into perpetuity, we conclude that a reasonable estimate of the cost of equity falls somewhere between what is estimated by the two versions of the model. In considering the results from both the Gas LDC and Electric samples, we believe the DCF model supports a reasonable range of 9.2% to 10.8% for Nicor Gas' cost of equity.

F. RISK PREMIUM MODEL ESTIMATES

Q. Did you estimate the cost of equity that results from an 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:

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

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 clearly observable to market participants, who will use this one data input to 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, we

analyze the spread between the allowed ROE at a given time and the then prevailing interest rate to ensure that we properly consider the interest rate regime at the time the ROE was awarded. This implementation ensures that we 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 1990-2018 is derived from Regulatory Research Associates. Using this data we 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. We 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 we used the statistical technique of ordinary least squares ("OLS") regression to estimate the parameters of the linear equation:

$$\boldsymbol{Risk\ Premium} = \boldsymbol{A_0} + \boldsymbol{A_1} \times (\boldsymbol{Treasury\ Bond\ Yield}) \qquad (8)$$

We derived our estimates of A_0 and A_1 using standard statistical methods (OLS regression) and find that the regression has a high degree of explanatory power in a statistical sense ($R^2 = 0.852$) are statistically significant and the parameter estimates, $A_0 = 8.41\%$ and $A_1 = -0.547$, are statistically significant. The negative slope coefficient reflects the empirical fact that regulators grant smaller risk premiums when risk-free interest rates (as measured by Treasury bond yields) are higher. This is consistent with past observations that the premium investors require to hold equity over government bonds increases as government bond yields decline. In the regression described above the risk premium declined by less than the increase in Treasury bond yields. Therefore,

the allowed ROE on average declined by less than 100 basis points when the government bond yield declined by 100 basis points. Based on this analysis, we find that the current market conditions are consistent with an ROE of 10.2% for the average gas distribution utility.

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

A. The ROE of 10.2 % resulting from the implied risk premium analysis falls comfortably within the middle of the wider ranges of cost of equity estimates supported by our CAPM / ECAPM (9.8% - 10.5%) and DCF (9.2% - 10.8%) analysis. We believe that this analysis, when properly designed and executed and placed in the proper context, can provide useful benchmarks for evaluating whether the estimated ROE is consistent with recent practice. Our risk premium model cost of equity estimates demonstrate that the results of our DCF and CAPM analyses are in line with the allowed return of utility regulators. Because the risk premium analysis as implemented takes into account the interest rate prevailing during the quarter the decision was issued, it provides a useful benchmark for the cost of equity in any interest environment.

G. EXPECTED EARNINGS ANALYSIS

Q. Did you estimate the cost of equity that results from an analysis of Expected Earnings for your utility samples?

A. Yes. The Expected Earnings method provides an additional indicator of investor requirements by examining the ratio of earnings to book equity for comparable companies. The Expected Earnings method is by definition a forward looking measure.

Q. Why did you include the Expected Earnings method among your cost of equity measures?

A. We have included the Expected Earnings method as a reference point because it is among the cost of equity estimation methods proposed in FERC's order of October 16, 2018 to be used to determine ROEs for electric transmission. The Expected Earnings method produces a relevant investor benchmark because it represents the opportunity cost of choosing one utility investment over another.

Q. How is the Expected Earnings method implemented?

A. The Expected Earnings method is based on investment analyst earnings forecasts for comparable companies over a 3 to 5 year period. The earnings forecasts are divided by book equity reported at each year-end to calculate raw ROEs.

Additionally, it is customary to recognize that book equity reported at year-end typically overstates average book equity for a given year. Thus, an adjustment factor is applied to correct for this effect.

Q. What are the merits of this approach?

A. This method cuts through the complication and various assumptions involved with DCF and CAPM method and instead provides an "apples to apples" comparison of what ROEs investor would expect for companies of similar risks. Book ROE is a good approximation since it is similar to utilities' return on rate base. In addition, expected earnings are published by investment analysts for relatively uniform timeframes, 3 to 5 years out, making it easy to compare on a forward looking basis.

This analysis is also in line with FERC Order 165 FERC ¶ 61,030 issued October 16, 2018 which recognized Dr. William E. Avera's expected earnings method as a way to

help "inform the just and reasonable placement of the ROE within the zone of reasonableness established … by the DCF methodology."

Q. What data and assumptions did you use in implementing the Expected Earnings Approach?

A. We relied on Value Line Investment Analyzer (VL)'s company specific data sheet as of August 31, 2018 for each sample company's Estimated Return on Common Equity 2021 – 2023. This is equivalent to unadjusted ROEs in our calculation. We then multiply the unadjusted ROEs by an adjustment factor to arrive at adjusted ROEs. The adjustment factor is calculated per the methodology used by Dr. Avera and referenced in the FERC Order to capture average levels of book equity we computed the change in equity as the 5-year compounded annual growth rate of total common equity for the period 2017 - 2021. Then we applied the following formula to calculate an adjustment factor for each sample company:

$$Adjusted\ Factor = 2 * \frac{1 + Change\ in\ Equity}{2 + Change\ in\ Equity}$$

Finally, we take the median of adjusted ROEs — per FERC practice in calculating the central tendency for single companies — for the sample group to form an ROE based on the Expected Earnings approach.

Q. What conclusions did you draw from your expected earnings analysis?

A. The median expected adjusted ROE is 11.2%, which is slightly higher than ranges of cost of equity estimates supported by our CAPM / ECAPM (10.4% - 10.5%) and DCF (9.2% - 10.8%) analysis.

VII. NICOR GAS' SPECIFIC CHARACTERISTICS AND THE COST OF EQUITY

A. RECOMMENDED ALLOWED ROE FOR NICOR GAS

Q. What, in summary, does your ROE evidence show?

A. Based on our application of standard cost of capital models to a representative sample (and sub-sample) of publicly-traded natural gas utility companies-with appropriate adjustments for differences in financial leverage we derived the range of cost of equity estimates displayed in Figure 15 below.

Figure 15
Range of ROE Estimates for Gas LDCs

	Sub-sample Range		Reasonable Range	
	Low	High	Low	High
CAPM	10.1%	10.7%	10.4%	10.5%
DCF	8.4%	11.4%	9.2%	10.8%
Risk Premium	10.2%		10.2%	
Expected Earnings	11.2%		11.2%	
Reasonable Range			10.25%	10.75%
Recommended ROE			10.5%	

Notes:
Estimates as of 8/31/2018

Based on our assessment of the merits of the various models and their results as affected by prevailing economic and capital market conditions, we find that an ROE in the range of 10¼ to 10¾% is reasonable for the gas distribution utilities when applied to a capital structure with 54.35% equity.

Q. What do you recommend for Nicor Gas' allowed return on equity?

A. We recommend an allowed ROE of 10.5% for Nicor Gas. That figure is in the middle of our recommended range of 10¼ to 10¾% for the cost of equity of a typical sample natural gas utility with Nicor Gas' business risk and financial leverage.

B. NICOR GAS' CAPITAL INTENSITY

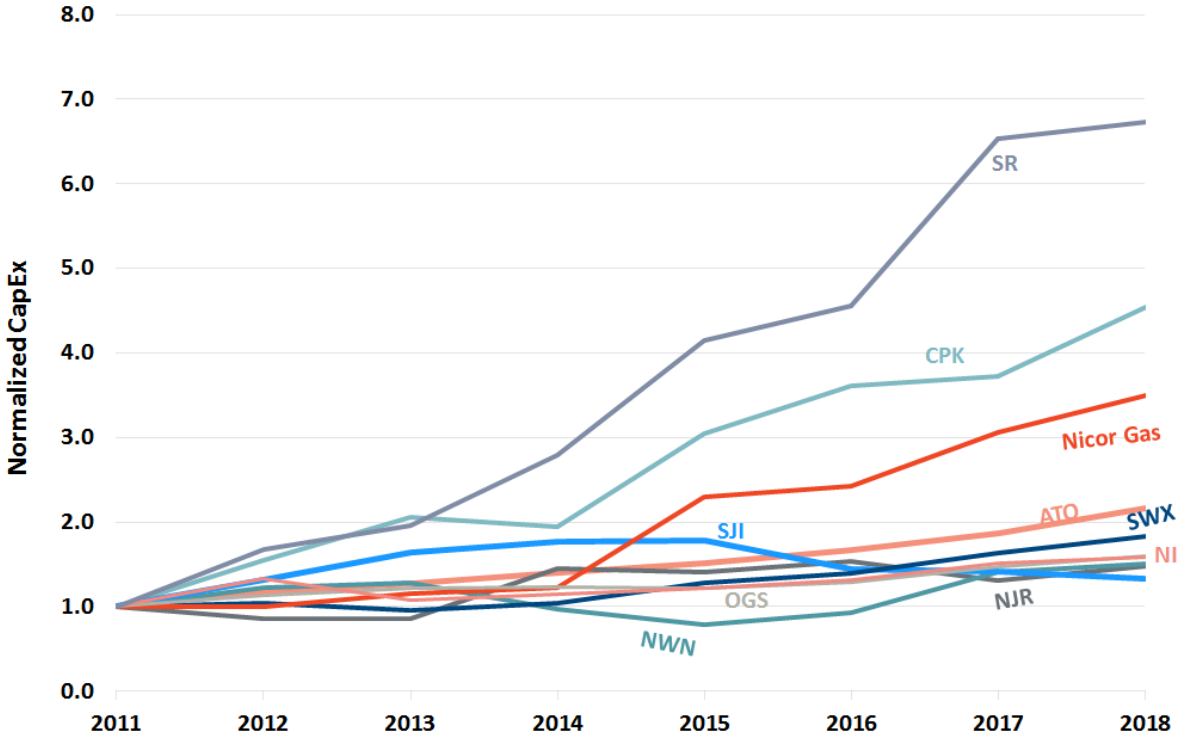
Q. Has Nicor Gas recently engaged in substantial capital expenditures?

A. Yes, Nicor Gas has recently incurred substantial — and substantially increased — capital expenditures as it updates its distribution system. Nicor Gas has spent $503 million and $637 million on capital expenditure programs in 2016 and 2017, respectively, and are on track for capital expenditures of $727 million in 2018. The large capital expenditure potentially serves to increase the capital intensity of Nicor Gas' business operations, thereby also increasing its so-called operating leverage.

Q. Have Nicor Gas' capital expenditures increased more substantially than those of the natural gas utility companies in your sample?

A. Yes. While the natural gas utility industry in general is facing increased capital spending requirements to repair and replace aging distribution infrastructure, Nicor Gas' expenditures have increased more rapidly compared to most of the proxy group companies. This is illustrated in Figure 16 below, which compares the trajectory of capital expenditures for Nicor Gas and the sample companies, with each company's spending indexed to its 2011 levels.

Figure 16
Recent Capital Expenditure Growth
For Nicor Gas and Natural Gas Sample Companies



Sources and Notes: Capital IQ and Nicor Gas; 2018 values are partially forecasted or extrapolated based on partial-year actuals.

As the figure demonstrates, Nicor Gas' capital expenditures have growth faster between 2011 and 2015 / 2016 than any members of the sample except Chesapeake Utilities and Spire, Inc. (both of which are included in the expanded sample used for our DCF estimate, but excluded from the subsample from which we derive our CAPM estimates).

Q. How does capital intensity relate to operating leverage?

A. Increased capital expenditure can increase the degree of fixed versus variable costs. The higher fixed costs are relative to revenue, the higher is the company's operating leverage. As illustrated in Figure 17, operating leverage increases the company's exposure to income fluctuations. In the example below, we consider two utilities: Utility A and Utility B. Each utility as a benchmark expects revenues of $1,000 and total costs (fixed

and variable) of $900. However, while fixed costs are only 40% of Utility A's revenue, they make up 60% of Utility B's revenue. At the same time, variable costs are 50% of revenues for Utility A but only 30% of revenues for Utility B. In the top panel of Figure 17, the expected outcome is shown and illustrate that both entities expect to earn a net income of $100.

However, if revenues decline by 10% as shown in the bottom panel of the figure, Utility B will experience a greater shock to its income (equity return) than Utility A. This is because variable costs can be expected to decline in proportion to revenue, but fixed costs are just that-fixed. Therefore a degree of operating leverage (i.e., a higher proportion of fixed costs in the cost structure) increases risk to equity holders all else equal.

Figure 17
Illustration of Risk Imposed by Operating Leverage

		Utility A	Utility B
Revenue	[a]	$1,000	$1,000
Variable Costs	[b]	($500)	($300)
Fixed Costs	[c]	($400)	($600)
Net Income	[d] = sum([a]:[c])	$100	$100
As Revenue and Variable Costs Decline by 10%...			
Revenue	[e] = [a] x (90%)	$900	$900
Variable Costs	[f] = [b] x (90%)	($450)	($270)
Fixed Costs	[g] = [c]	($400)	($600)
Net Income	[h] = sum([e]:[g])	$50	$30
Decline in Income	[i] = [h] - [d]	($50)	($70)
Percentage Decline in Income	[j] = [i] / [d]	-50%	-70%

Q. Have you considered any measure of Nicor Gas' operating leverage?

A. Yes. Figure 18 below presents the ratio of revenue to gross property plant and equipment ("PP&E" or "plant") for Nicor Gas and the sample companies in several recent years. This ratio provides a measure of operating leverage, with a lower ratio representing greater leverage. Two things are clear from the table. First, operating leverage for natural gas utilities has increased recently, as one would expect based on their increasing capital spending requirements. For example, the average sample company generated approximately 65 cents of revenue for each dollar of plant assets in service in 2011, but was able to generate less than 40 cents per dollar of PP&E since 2016. Second, Nicor Gas also exhibits this trend, and also has consistently generated substantially less revenue per unit of plant investment than the average sample company.

Figure 18
Revenue to Gross PP&E Comparison
Proxy Group v. Nicor Gas

		Revs / Gross PP&E							
		2011	2012	2013	2014	2015	2016	2017	2018
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Atmos Energy	[a]	61.44%	46.52%	51.96%	57.22%	37.44%	24.40%	24.71%	25.58%
Chesapeake Utilities	[b]	66.83%	56.30%	55.17%	56.48%	42.91%	40.50%	44.22%	44.88%
New Jersey Resources	[c]	164.54%	120.22%	157.98%	152.41%	87.05%	65.72%	74.35%	87.66%
Northwest Nat. Gas	[d]	31.12%	26.22%	25.99%	25.20%	23.43%	21.07%	23.70%	21.52%
South Jersey Inds.	[e]	47.72%	35.54%	31.76%	33.79%	32.02%	31.93%	36.63%	45.28%
Southwest Gas	[f]	36.98%	35.75%	34.31%	35.09%	38.43%	36.35%	34.80%	36.30%
ONE Gas Inc.	[g]	40.50%	32.24%	37.27%	37.50%	30.15%	26.41%	26.95%	27.36%
NiSource	[h]	28.08%	22.93%	19.55%	29.77%	24.50%	22.41%	22.52%	22.47%
Spire Inc.	[i]	111.79%	67.45%	51.23%	44.50%	41.40%	32.77%	33.07%	35.09%
Sample Average	[j]	65.45%	49.24%	51.69%	52.44%	39.70%	33.51%	35.66%	38.46%
Nicor Gas	[k]				46.63%	29.35%	25.42%	27.14%	25.82%

Sources and Notes:
[a] - [i]: Capital IQ.
[j]: Average([a] - [i])
[k]: Provided by Nicor Gas.
[8]: 2018 values are partially forecasted or extrapolated based on partial-year actuals.

Q. What are the implications of Nicor Gas' capital intensity as it relates to this proceeding?

A. Since Nicor Gas relies heavily on investment in capital plant, it is essential that the Company be allowed to earn a fair and risk-appropriate return on that investment.

VIII. EQUITY FLOTATION COSTS

Q. Are there any other Nicor Gas-specific considerations relevant to determination of its allowed ROE?

A. Yes. We are informed by Nicor Gas that it incurred flotation costs associated with its equity issuances that have never been recovered in rates.[43] These costs took the form of underwriting fees paid at the time the shares were issued, and amounting to just over 2.5% (on average) of the proceeds raised by the issuances.[44] 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% 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.

[43] Direct Testimony of Elizabeth W. Reese, Nicor Gas Ex. 2.0; Final Order at 94, ICC Docket No. 04-0779 (September 20, 2004); Nicor Gas Ex. 24.0, Ruschau Rebuttal, ICC Docket No. 08-0363 (the Company agreed to withdraw its request to recover these costs in order to narrow the issues, while preserving its right to recover such costs in the future).

[44] See Schedule D-5 (The precise share of proceeds spent on flotation costs averaged over the four specific issuances was 2.54 percent) Contemporaneous documents associated with each issuance for which there are unrecovered issuance expense are provided by Nicor Gas as part of its workpapers in support of Schedule D-5.

Q. How can Nicor Gas' ROE be adjusted to allow recovery of equity issuance costs?

A. A standard approach to adjusting the allowed ROE to provide recovery of all past equity issuance costs can be implemented via a straightforward adjustment to the single-stage DCF model. In place of the standard single-stage DCF formula (equation 7), 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% of the proceeds of the initial issuance of those shares was spent on underwriting fees, only $\$100 \times (1 - 0.025) = \$97.5$ represents 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.

Comparing the flotation cost-adjusted formula to the standard DCF formula for values of the dividend yield, growth rate, and financial leverage that are representative of the natural gas utility sample (see Figure 19 below), we find that 10 basis points is an appropriate ROE adjustment to allow recovery of costs amounting to 2.5% of equity issuance proceeds.

Figure 19
Representative Flotation Cost Adjustment

		Without Flotation Cost Adjustment	With Flotation Cost Adjustment
[1]		[2]	[3]
Flotation cost share of issuance proceeds	[a]		2.54%
Dividend Yield (D1/P0)	[b]	2.64%	2.71%
Growth Rate	[c]	6.40%	6.40%
Simple DCF Cost of Equity	[d]	9.04%	9.11%
Equity to Market Value Ratio	[e]	0.708	0.708
Debt to Market Value Ratio	[f]	0.292	0.292
Implied Marginal Cost of Debt	[g]	4.3%	4.3%
Tax Rate	[h]	27.1%	27.1%
Simple DCF Overall Cost of Capital	[i]	7.32%	7.36%
Nicor Gas's Regulatory Equity %	[j]	0.544	0.544
Nicor Gas's Regulatory Debt %	[k]	0.456	0.456
Nicor Gas's Implied Marginal Cost of Debt	[l]	4.2%	4.2%
Implied Cost of Equity	[m]	10.88%	10.97%

Sources and Notes:
[3,a]: Nicor Gas
[3,b] = [2,b] / (1 - [3,a])
[b]-[c]: Representative sample value. See Ex. 14.05, Table No. RSM-6.
[d] = [b] + [c]
[e]-[h]: Representative sample value. See Ex. 14.05, Table No. RSM-7
[i] = [e]*[d] + [f]*[g]*(1 - [h])
[j]-[l]: Nicor Gas capital structure. See Ex. 14.05, Table No. RSM-8.
[m] = ([i] - [k]*[l]*(1 - [h]) / [j]

IX. NICOR GAS' ACQUISITION AND THE COST OF CAPITAL

Q. In evaluating the cost of capital for Nicor Gas, did you consider whether the acquisition of Nicor Gas has impacted its cost of capital?

A. Yes. As required in the ICC's Order in Docket No. 15-0558, we analyzed "the impact, if any, of Nicor Gas' affiliation with Southern Company and its other subsidiaries on the

cost of capital of Nicor Gas."[45] Because Nicor Gas is financed partly with equity and partly with debt, we considered the impact, if any, on both sources of capital. We first observe that the cost of capital is determined by risk of the assets and not by the owner. Second, because we the ICC applies an embedded cost of debt when setting rates for Nicor Gas and other regulated utilities, we examined the circumstances of Nicor Gas' debt financing and reviewed relevant credit rating reports.

Q. What finance principles are relevant to the question of whether Nicor Gas' acquisition by Southern Company affected its cost of capital?

A. As we explained above, it is the risk associated with a particular project or business venture — *not* the risk of the company (or other ownership entity) undertaking the project — determines what investors' (equivalent risk) alternatives are, and thus determines the risk-appropriate expected return (i.e., the cost of capital) they require to invest in the venture. Professors Brealey, Myers, and Allen articulate this fundamental principle succinctly in their seminal corporate finance textbook *Principles of Corporate Finance*, stating that, "[*t]he opportunity cost of capital depends on the use to which that capital is put,"* and "[t]he true cost of capital depends on project risk, not on the company undertaking the project."[46]

In addition to owning Nicor Gas and several other natural local gas distribution utilities via its 2016 acquisition of AGL Resources (now called Southern Company Gas), Southern Company owns several vertically integrated rate-regulated electric utility

---

[45] ICC Order in Docket No. 15-0558, Appendix A, issued June 7, 2016.

[46] Richard A. Brealey, Stewart C. Myers, and Franklin Allen, *Principles of Corporate Finance*, 11th Edition (2014) p. 219-220.

operating companies in the southeastern United States, as well as Southern Power, an operating subsidiary that "constructs, acquires, owns, and manages power generation assets, including renewable energy projects, and sells electricity at market-based rates in the wholesale market."[47] Each of these entities will have a cost of capital that corresponds to the risks of the assets in the specific line of business in which it operates.

Q. What are the implications of this principle for the determination of Nicor Gas' cost of capital in a regulatory context?

A. A near-universal practice in rate-of-return regulation in the United States (and elsewhere) is that the rate requirement for the regulated entity should be determined by treating that entity on a stand-alone basis. In other words, the cost of capital is determined for — and based on the characteristics of — the specific utility that is the subject of regulation, rather than for some other corporate entity that owns or is otherwise affiliated with the subject utility. This aligns with the finance principle outlined above as well the enduring precedents established in the *Hope* and *Bluefield* decisions. To implement this principle, we selected a sample of comparable local gas distribution utility companies to estimate the cost of equity for Nicor Gas — hence attempting to capture the risk of the underlying assets and the line of business in which they are used.

[47] Southern Company 2017 Annual Report, p. 165 (Note 13 to Consolidated Financial Statements, titled "Segment and Related Information").

Q. Are there any practical nuances of regulatory ratemaking that could make it possible for changes in ownership to affect Nicor Gas' cost of debt, despite the principle that the cost of capital depends on its use and not its owner?

A. Yes. Nicor Gas (like most rate regulated utilities in the U.S.) recovers the "embedded cost of debt," which reflects the actual interest payments (as well as issuance cost, and any discounts or premia) that Nicor Gas will incur during the test period. The determination of the amount is based on the specific debt issuances (including past issuances) that will be outstanding during the test period. Consequently, the potential exists for Nicor Gas' embedded cost of debt to have changed as the result of a merger or acquisition if the ownership change lead to a restructuring of the Company's debt securities.

Q. Is it the case that Southern Company's 2016 acquisition of AGL Resources caused changes in the debt financing of Nicor Gas?

A. No. A study and comparison of AGL Resources's 2015 SEC Form 10-K and Southern Company Gas' 2016 and 2017 SEC Form 10-K suggests that Nicor Gas' debt financing policy was unchanged by the acquisition, and that specific changes in Nicor Gas' debt securities during those years resulted from the maturing of certain long-term debt, rather than any restructuring by its new owners. Moreover, these annual reports indicate that the debt financing policy for Nicor Gas — a policy which appears to have survived the acquisition unchanged — treats Nicor Gas' debt securities as <u>separate and segregated</u> from bond issuances, credit facilities, and commercial paper programs used to finance the

other gas utilities owned by Southern Company Gas. For example, Southern Company Gas' 2017 10-K[48] states:

> Southern Company Gas' 100% -owned subsidiary, Southern Company Gas Capital, was established to provide for certain of Southern Company Gas' ongoing financing needs through a commercial paper program, the issuance of various debt, hybrid securities, and other financing arrangements. Southern Company Gas fully and unconditionally guarantees all debt issued by Southern Company Gas Capital and the gas facility revenue bonds issued by Pivotal Utility Holdings. **Additionally, substantially all of Nicor Gas' properties are subject to the lien of the indenture securing its first mortgage bonds. Nicor Gas is not permitted by regulation to make loans to affiliates or utilize Southern Company Gas Capital for its financing needs**.

Nicor Gas' parent company annual reports — both before and after the Southern acquisition — also make specific statements regarding the restriction and segregation of Nicor Gas' long-term borrowing (in the form of first mortgage bonds secured by its assets) and short-term borrowings (in the form of bank credit facilities and commercial paper programs).[49]

Given that Nicor Gas' assets are financed by debt securities restricted to that purpose, and that Nicor Gas cannot receive financing from its parent or affiliate entities, it would be difficult to see how any changes in Nicor Gas' embedded cost of debt could be attributed directly to the change of ownership during 2016.

---

[48] Southern Company's 2017 SEC Form, 10-K, p. II-634 (Note 6 to Financial Statements, titled "Financing") (emphasis added); *see also* Southern Company's 2016 SEC Form 10-K, p. II-625 (Note 6 to Financial Statements, titled "Financing"). AGL Resources's 2015 10-K contains an analogous statement, at p. 83 (Note 9 to Consolidated Financial Statements, titled "Debt and Credit Facilities").

[49] *See* Southern Company's 2017 SEC Form 10-K, pp. II-635 and II-636, Southern Company's 2016 SEC Form 10-K, pp. II-626 and II-627, and AGL Resources's 2015 SEC Form 10-K, pp. 83-84.

Q. What about any impact the acquisition may have had on Nicor Gas' credit ratings?

A. Credit ratings by the major credit ratings agencies (e.g., S&P, Moody's, and Fitch) contribute substantially to the Company's ability to raise debt capital and the terms under which it can do so. While any changes in Nicor Gas' credit ratings around the time of the merger would not directly affect its embedded cost of debt, such changes could influence any new debt securities it might issue going forward, and so could be considered relevant to the question of how the acquisition affected its cost of capital.

A review of credit rating agency reports around the time of the August 24, 2015 announcement of Southern Company's acquisition of AGL Resources reveals that the transaction was likely neutral to slightly positive from the standpoint of Nicor Gas' credit ratings. On the day of the announcement Moody's affirmed its long-term and short-term issuer ratings for both Nicor Gas and AGL Resources, stating that "[t]he acquisition by Southern Company does not impact the fundamentals of AGL [Resources] and Nicor Gas' credit profiles. We expect AGL [Resources] to continue to execute its capital investment program…."[50]

Similarly, at the time of the announcement Fitch affirmed Nicor Gas' ratings and outlook on announcement of the merger, even while placing Southern Company on "negative watch" and AGL Resources on "positive watch". Fitch stated that it "expects Nicor Gas' credit metrics to remain strong for its rating category with sufficient headroom to absorb potential regulatory concessions required for merger approval," but also noted that "[a]n upgrade at AGL [Resources] as a result of this transaction will not

[50] Moody's Rating Action: "Moody's affirms AGL Capital and Nicor Gas; outlooks stable," issued August 24, 2015.

warrant a positive rating action at [Nicor Gas] due to the expected low level of synergy benefits for Nicor Gas and relatively restrictive Illinois regulations."[51]

S&P, which emphasizes a "group" approach to determining ratings for affiliated entities, viewed the merger announcement as a positive for AGL Resources and its subsidiaries, including Nicor Gas, ultimately upgrading the long-term issuer ratings for those subsidiaries from BBB+ to A- upon the closing of the transaction.[52] However, S&P's ratings justifications did not take explicit account of the fact that Nicor Gas' debt is restricted and segregated from that of the other affiliates.

Q. What about any ratings agency actions since the time of the merger?

A. While Moody's, Fitch, and S&P revised their credit rating outlooks for Southern Company and certain of its subsidiaries to negative during 2017, only S&P's outlook revision applied to Nicor Gas.[53] As mentioned above, this simply reflects that S&P, unlike the other two agencies, takes a "group" approach to credit ratings, such that any actions applied to Southern Company are automatically attributed to all of its subsidiaries, notwithstanding the fact that Nicor Gas' long-term financing is obtained and secured independently from Southern Company or its other subsidiaries.

Similarly, on August 10, 2018, S&P placed Southern Company (and all of its subsidiaries according to the "group" approach) on "CreditWatch Negative" – warning of

[51] Fitch Ratings: "Fitch Places Southern on Negative Watch & AGL on Positive Watch Following Acquisition Announcement," issued August 24, 2015.

[52] S&P Global RatingsDirect: "AGL Resources Inc. And Subs Rating Raised to 'A-' on Close of Acquisition By Southern Co.; Outlook Negative," issued June 30, 2016.

[53] Southern Company's 2017 SEC Form 10-K, pp. II-56.

potential for a credit rating downgrade.[54] This action, which was reversed (i.e., the negative watch was lifted) on September 28, 2018,[55] was related to capital costs and construction arrangements associated with the Vogtle Nuclear power plant units being developed by Southern Company subsidiary Georgia Power Co., which is also a co-owner of the facility. During the time the "watch" was in effect, Nicor Gas' senior secured credit rating from S&P remained an A and neither Moody's nor Fitch issued a negative outlook or credit watch for Nicor Gas or its direct parent entity, Southern Company Gas.[56] Furthermore, I am informed by the Company that at no point during S&P's negative watch did Nicor Gas raise or attempt to raise debt financing.

Q. What do you conclude regarding the impact, if any, on Nicor Gas' cost of capital of its affiliation with Southern?

A. Under standard regulatory principles and the implementation thereof (e.g., reliance on a comparable sample), there is no impact on the cost of equity. Further, because Nicor Gas' debt financing is (and was) separate from that of the other gas utility companies that make up Southern Company Gas (formerly AGL Resources), any changes in its embedded cost of debt during 2016, 2017, or to date in 2018 cannot reasonably be attributed to the acquisition transaction. This finding is supported by the fact that the major credit rating agencies did not perceive material changes to Nicor Gas' credit profile as a result of the Southern / AGL Resources merger.

---

[54] S&P Global Ratings, Research Update: Southern Co. and Subsidiaries Ratings Placed On CreditWatch Negative, August 10, 2018.

[55] S&P Global Ratings, Research Update: Southern Co. and Subsidiaries Ratings Affirmed, Taken Off Watch Negative Following Vogtle Decision; Outlook Negative, September 28, 2018.

[56] See workpapers to Schedule D-8.

Q. Does this conclude your direct testimony?

A. Yes.