BEFORE THE
GEORGIA PUBLIC SERVICE COMMISSION

In the Matter of	**)**	
	)	
Georgia Power Company's 2022 Rate Case	**)**	**Docket No. 44280**
	)	
	)	
	)	

DIRECT TESTIMONY OF MARK E. ELLIS

ON BEHALF

OF GEORGIA INTERFAITH POWER & LIGHT

October 20, 2022

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FIGURES AND EXHIBITS (CONTINUED)

Exhibit	**(Attached)**
Exhibit MEE-1. Mark E. Ellis professional background	
Exhibit MEE-2. *Fed. Power Comm'n v. Hope Nat. Gas Co.*, 320 U.S. 591, 603 (1944)	

[*Remainder of page intentionally left blank.*]

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND PROFESSIONAL AFFILIATION.

A. My name is Mark E. Ellis. I am an economic and financial consultant. My business address is 8595 Nottingham Place, La Jolla, CA 92037.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING?

A. I am testifying on behalf of Georgia Interfaith Power and Light (GIPL).

Q. DO YOU CERTIFY UNDER PENALTY OF PERJURY THAT, TO THE BEST OF YOUR KNOWLEDGE, THE TESTIMONY YOU WILL GIVE IN THIS PROCEEDING IS TRUE AND CORRECT?

A. Yes.

Q. PLEASE SUMMARIZE YOUR EDUCATION AND PROFESSIONAL WORK EXPERIENCE.

A. I graduated from Harvard University with a Bachelor of Science in Mechanical and Materials Sciences and Engineering and from the Massachusetts Institute of Technology with a Master of Science in Technology and Policy.

I have over 25 years of professional experience in the energy industry. Before starting my consulting practice in 2020, I led the strategy function at Sempra Energy for fifteen years. My responsibilities included developing and implementing the enterprise-wide cost of capital estimation process. This critical corporate finance function entailed thorough and ongoing research of the academic and practitioner literature on the historical cost of capital and the various cost of capital estimation methodologies and models; creating a process to estimate, quarterly, the forward-looking, risk-adjusted cost of capital for Sempra's portfolio of companies spanning a variety of geographies and lines of business; and calibrating the results against historical data and reputable, objective third-party estimates.

Previously, I held various positions in strategy, project development, and engineering with McKinsey, ExxonMobil, Southern California Edison, and Sanyo Electric. Last year, I provided expert testimony on behalf of The Utility Reform Network (TURN) before the California Public Utilities Commission in PG&E's application (A.21-20-04-23) for a $7.5-billion wildfire cost securitization. Earlier in 2022, I provided expert testimony on behalf of The Protect Our Communities Foundation (PCF) before the California Public Utilities Commission in the three

California utilities' application (A.21-08-013 et seq.) to suspend the Cost of Capital Mechanism (CCM). I am currently working on or have completed other utility regulatory cases in New Hampshire, Hawaii, Georgia, and Wisconsin. Attachment MEE-1 contains more detail on my background.

A. Summary of Conclusions

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I have been asked by GIPL to assess Georgia Power Company's (GPC) test year 2023 cost of capital application to analyze and calculate the return on equity (ROE) and equity ratio that are (1) adequate to ensure that GPC, from 2023 to 2025, earns a return on its investments "commensurate with returns on investments in other enterprises having corresponding risk," and (2) "sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital."[1]

Q. GENERALLY, WHAT CONCLUSIONS DO YOU REACH FROM YOUR ANALYSIS AND CALCULATIONS?

A. The Commission can substantially reduce the authorized ROE requested by Georgia Power, and thereby customer costs (by a billion dollars per year), while still enabling Georgia Power to attract debt and equity investment capital, fairly compensate investors for risk, and maintain Georgia Power's current credit rating.

Q. WHAT ARE YOUR RECOMMENDED AUTHORIZED ROE AND EQUITY RATIO?

A. I recommend an authorized return on equity (ROE) equal to Georgia Power's cost of equity (COE) and paired with an equity ratio that, together with my recommended ROE, minimizes customer costs while maintaining Georgia Power's financial integrity, fairly compensating debt and equity investors for risk, and *improving* Georgia Power's credit rating. My recommended authorized ROE is 5.54% at an equity ratio of 61.7%.

[1] *Fed. Power Comm'n v. Hope Nat. Gas Co.*, 320 U.S. 591, 603 (1944) (attached as MEE-2).

B. Summary of Findings

1. Georgia Power's cost of capital testimony employs flawed models and assumptions that systematically produce upwardly biased ROE estimates.

Q. THERE IS A SIGNIFICANT DIFFERENCE BETWEEN YOUR RECOMMENDATIONS AND GEORGIA POWER'S RECOMMENDED ROE AND EQUITY RATIO. HOW DO YOU EXPLAIN THAT?

A. The divergence arises from differences in both the models and input assumptions used to determine our respective ROE and equity recommendations.

Georgia Power's cost of capital expert, Mr. James Coyne, uses four models in developing his recommended return on equity (ROE). Two of those models, the Risk Premium Analysis (RPA) and Expected Earnings Analysis (EEA), both suffer from a severe, invalidating conceptual flaw: they are based on utilities' authorized or forecast *return on equity*, not their actual *cost of equity* (COE), or the "the return *to the equity owner* … commensurate with returns on investments in other enterprises having corresponding risks."[2] Thus, these two models are not commonly used in finance outside of utility regulatory proceedings because they do not actually estimate the *cost* of equity. These models are akin to developing a nutrition recommendation based on what people *actually* eat, not on what they *should* eat to maintain a healthy weight.

The other two models used by Mr. Coyne – the discounted cash flow model (DCF) and capital asset pricing model (CAPM) – are widely used throughout finance to estimate the cost of capital. But Mr. Coyne's implementations of each suffer from numerous flaws which bias his results upward.

In implementing the DCF, Mr. Coyne uses unnecessarily long trailing price histories to calculate the dividend yield, which bias his figures upward, and he assumes demonstrably unrealistic, economically impossible long-term dividend growth rates.

In implementing the CAPM, he uses an interest rate forecast long and widely known to be systematically upwardly biased. He cherry-picks a beta calculation methodology that does not reflect current investor risk perceptions and applies the "Blume" adjustment that is not valid

[2] *Id*. (emphasis added).

for utilities, both of which upwardly bias his results. He fails to examine other, more robust beta estimation methodologies, investigate whether the pandemic-related changes in market conditions and investor perceptions of utility risk were temporary or have been sustained, or compare his results to the long-term history of utility betas.

Mr. Coyne's chosen methodology does not reflect the wide range of ways beta could be estimated, each of which could produce dramatically different results. As Nobel laureate Fischer Black, one of the pioneers of empirical testing of beta and the CAPM, famously admonished, "Watch out for data mining!"[3] – running an analysis several different ways but reporting only the outcomes that support one's conclusions.

To estimate the CAPM market risk premium, Mr. Coyne uses the same flawed implementation of the DCF used for his proxy group, again producing an economically impossible result.

Finally, Mr. Coyne fails to adjust his ROE estimates for differences in equity ratio among the proxy group members, and between the proxy group average and Georgia Power.

Mr. Coyne's capital structure recommendation is similarly deficient. While the testimony of Georgia Power's credit expert, Mr. David M. Fetter, refers to key metrics used in assessing credit quality, Mr. Coyne does not provide any analysis or calculations demonstrating how ROE affects those metrics, and how the impact of ROE on those metrics influences his proposed equity ratio. Regulators in other states have authorized ROEs that are substantially lower than those requested by Georgia Power, with comparable or lower equity ratios, without adversely impacting their utilities' credit ratings, suggesting the Commission can substantially reduce the ROE requested by Georgia Power, and thereby customer costs, while maintaining its credit rating.

[3] Fischer Black, *Beta and Return*, 20(1) J. Portfolio Management 8 (1993) (Available at hhtps://jpm.pm-research.com/content/20/1/8.)

2. More rigorous, fact-based analysis of Georgia Power's COE and credit metrics yields a recommended ROE roughly 50% lower and an equity ratio slightly higher than Georgia Power's proposal.

Q. PLEASE SUMMARIZE THE MAIN FINDINGS OF YOUR ROE ANALYSES FOR GEORGIA POWER.

A. Like Mr. Coyne, I use the DCF and CAPM, two models that are widely used throughout finance, to estimate the cost of capital. Unlike Mr. Coyne, I am careful to use realistic and rigorously supported assumptions about long-term dividend growth rates, current interest rates, and risk profiles and premia.

As I explain in Section III.A below, the equity ratio required to maintain any given level of credit quality depends on the ROE. Consequently, the ROE and equity ratio must be determined jointly. Instead of Mr. Coyne's crude equity ratio peer group comparison, which does not consider the most important metrics of credit quality, I model the inter-relationships between key credit metrics, ROE, and equity ratio to arrive at the optimal equity ratio that minimizes customer costs while meeting the return and credit quality requirements of both equity and debt investors.

Figure 1 summarizes the key findings of my review of Mr. Coyne's analysis, the modifications required to correct its deficiencies, the resulting COE estimates, and my ROE and equity ratio recommendations. More rigorous, fact-based, and accurate analyses result in a substantially lower recommendation for Georgia Power's ROE: 5.54%, roughly one half of Mr. Coyne's recommended 11.00%, and a slightly higher equity ratio, 61.7% vs. Mr. Coyne's 56%.

Based on my analysis of Georgia Power's general rate case filings, its proposed combined rate of return on both debt and equity, grossed up for taxes, accounts for more than 25% of its revenue requirement.[4] My recommended ROE and equity ratio would reduce Georgia Power customer costs by approximately 11%, over $1 billion, per year.

[4] M. Ellis analysis of data in 2022 Rate Case, Georgia Power Document Filing No. 190559, Ex. APA-SPA-ADH-MBR-1, Schedule 1 (June 24, 2022).

Figure 1. Comparison of Coyne and Ellis ROE methodologies and results[5]
Percent

Model	Coyne	Ellis	Comment
DCF	**8.99**	**5.97**	
Dividend yield	3.29	3.36	Coyne: excessively long trailing price histories (up to 180 trading days) introduces upward bias Ellis: one-month trailing price history (~21 trading days)
Constant growth rate	5.61	NA	Coyne: extrapolates DPS using analysts' 3-to-5-year EPS growth forecasts • Economically impossible • Estimates are upwardly biased • Low correlation between EPS and DPS forecasts • Inconsistency between EPS and DCF forecast starting periods • Results are inconsistent with analysts' own return forecasts
Initial growth rate	NA	5.49	Analysts' EPS growth rates for three years to mitigate upward bias
Terminal growth rate	NA	1.57	Based on long-term historical utility DPS growth rate equal to inflation
CAPM	**13.55**	**5.41**	
Risk-free rate (30-year Treasury) • Current • Forecast	 2.72 3.40	 NA 3.56	Coyne: current (30-trading day average) and forecast from source known to provide systematically upwardly biased estimates for decades Ellis: current (one-month trailing average) rate
Beta	0.85-0.88	0.48	Coyne: 5-year weekly; inflated due to early-2020 market turmoil and not reflective of current market conditions Ellis: 5-year monthly; balances long-term historical trend and current market conditions
Market risk premium • Historical • Forward	11.78-12.46 NA 11.78-12.46	3.86 4.86 2.87	Coyne: forward-looking using flawed CG DCF Ellis: average of forward-looking using MS DCF and long-term historical average; MS DCF long-term growth rate equal to pre-capita GDP
Risk Premium Analysis	**10.12**	**NA**	Conceptually invalid: equates COE to ROE
Expected Earnings Analysis	**11.03**	**NA**	Conceptually invalid: equates COE to ROE
Mean – Levered – Unlevered	**10.92** NA	**5.69** 4.78	 59% proxy group average *market* equity ratio
Flotation cost adjustment	**0.08**	**NA**	Conceptually invalid: assumes M/B ratio = 1.0
Equity ratio	**56**	**61.7**	
Relevered COE/ recommended ROE	**11.00**	**5.54**	

[5] 2022 Rate Case Hr'g Tr. Vol. 1 at 659-660 (Sept. 28, 2022); Ex. JMC-4. (Transcripts from the GPC Direct Testimony Hearings on September 28-30, 2022 are marked as Volume 1.)

C. Organization of testimony

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First, I review a few key conceptual issues related to the cost of capital and capital structure. Next, I provide a detailed assessment of Mr. Coyne's cost of equity estimation methodology and implementation. For the DCF and CAPM, the two of Mr. Coyne's four cost of equity models that are valid, I explain various modifications to his methodology and assumptions to correct for the deficiencies in Mr. Coyne's analyses and then provide the resulting COE estimates. I then apply the capital structure concepts reviewed in the first part of my testimony to determine the optimal equity ratio that minimizes customer costs while satisfying the demands of equity and debt investors. Finally, I estimate the potential savings to customers from adopting my recommended ROE and equity ratio instead of Mr. Coyne's proposal.

II. CONFUSION BETWEEN THE *RATE OF RETURN ON* CAPITAL AND *COST OF* CAPITAL HAS LED TO EXCESSIVE AUTHORIZED RETURNS.

A. *Rate of return on* capital and *cost of* capital are not the same: rate of return on capital is a financial performance metric, whereas cost of capital is the measure of economic cost described in the *Hope* case.

Q. WHAT IS THE OBJECTIVE IN SETTING A UTILITY'S AUTHORIZED RATE OF RETURN?

A. The authorized rate of return is the amount of money, expressed as a percentage of capital invested, that a utility is allowed to recover in customer rates to compensate debt and equity investors for assuming the risks of investing in the utility

The Supreme Court provides the guiding ratemaking principles in its 1944 *Hope Natural Gas* case, in which it directs ratemakers to arrive at "just and reasonable rates" by a "balancing of the investor and the consumer interests."[6] Consumer interests are straightforward: they want to minimize costs and rates. Investors include holders of both the utility's debt and equity. A utility's debt investors expect to receive their contractual interest payments. Debtholders therefore have a "legitimate concern with the financial integrity of the company whose rates are being regulated,"[7] i.e., the utility's credit quality and anticipated ability to fulfill its

[6] 320 U.S. 591, 603.
[7] *Id.*

obligations to debtholders. Equity investors expect a fair return, defined in *Hope* as "commensurate with returns on investments in other enterprises having corresponding risks."[8]

Q. HOW DOES THE RATE OF RETURN ON CAPITAL DIFFER FROM THE COST OF CAPITAL?

A. The rate of return on capital, often shortened to "rate of return," is an accounting metric of financial performance, calculated by dividing the value *returned* to investors – e.g., interest, net income – by the amount of capital invested. The cost of capital is the return investors *expect* on their investment. It is referred to as a "cost" because it reflects what investors demand in return for assuming the risk of the investment and, therefore, what companies must pay for that investment. The *rate of return* on each form of capital, whether calculated retrospectively or estimated prospectively, may or may not equal its respective *cost of capital*.

Q. HOW DOES THE *AUTHORIZED* RATE OF RETURN ON CAPITAL DIFFER FROM THE RATE OF RETURN AND THE COST OF CAPITAL?

A. The *authorized* rate of return refers to a specific use of this accounting metric to determine a utility's revenue requirement and customer rates. According to long-established ratemaking principles, which will be explained in more detail below, the authorized rate of return should be set equal to the cost of capital. Figure 2 summarizes the differences between these three sets of metrics for debt, equity, and the combined return.

[*Remainder of page intentionally left blank.*]

[8] *Id.*

Figure 2. Comparison of terminology: cost of capital, (rate of) return on capital, and authorized rate of return

	Cost	(Rate of) return	Authorized rate of return
Capital	*Cost of capital* Economic concept: payment investors require to assume risk of investment	*(Rate of) return on capital* Accounting concept: measured performance, historical or prospective	*Authorized rate of return* Regulatory concept: profitability benchmark determined by regulators to set utility revenue requirement and customer rates, balancing customer and investor interests
Equity	*Cost of equity (COE)* Forward-looking return, based on *market* value of equity, investors expect in compensation for risk assumed; not directly observable	*(Rate of) return on equity* Profitability metric equal to net income divided by *book* value of equity	*Authorized return on equity (ROE)* Per *Hope*, should equal cost of equity to ensure investors are adequately compensated at minimal customer cost
Debt	*Cost of debt* Forward-looking market-based interest rate on debt with commensurate credit risk, adjusted for *expected* default and liquidity risk	*(Rate of) return on debt* Contractual interest (coupon) rate, adjusted for *actual* default or transaction losses	*Authorized cost of debt* Contractual interest rate; weighted average of current (for existing debt) and expected (for anticipated new debt)

Q. WHAT PRINCIPLES DO YOU USE TO DETERMINE YOUR RECOMMENDED AUTHORIZED RATE OF RETURN?

A. As the National Association of Regulatory Utility Commissioners (NARUC) has explained, "Fundamental financial concepts demonstrate that the fair rate of return to use in ratemaking for a utility is its *cost of capital* in order to achieve the proper balance between customers and investors."[9] Mr. Coyne has also acknowledged, in ROE testimony in other jurisdictions, "that the allowed rate of return should equal the cost of capital."[10] The objective in setting a utility's authorized rate of return should, therefore, be to set the rate of return on each source of capital – debt and equity – as close as possible to the actual cost of each source of capital.

Q. DOES THE APPROACH TO CALCULATING COST OF EQUITY DIFFER FROM THE APPROACH TO CALCULATING COST OF DEBT?

A. Yes. The cost of outstanding debt can be directly determined from its contractual interest rates. Similarly, the cost of debt expected to be issued can be accurately determined from known interest rate indexes for debt of comparable credit quality, such as Moody's utility bond

[9] John D. Quackenbush, *Cost of Capital and Capital Markets: A Primer for Utility Regulators*, Nat'l Ass'n of Regul. Util. Comm's at 10 (2019) (emphasis added) https://bit.ly/3Th1lC8.

[10] Cal. Pub. Util. Comm'n, Docket No. A 22-04-008 et seq., Reporters' Transcript: Virtual Proceeding at 65 (September 12, 2022).

indexes, which, in turn, are based on interest rates directly observed in the market. In contrast, the cost of equity, both existing and to-be-issued, cannot be directly observed and must be estimated using various models.

Q. WHY IS THE DISTINCTION BETWEEN THE COST OF CAPITAL AND RATE OF RETURN IMPORTANT?

A. The cost of capital and rate of return (on capital) are entirely different concepts. The rate of return is a financial performance metric. The cost of capital is an economic concept. Nonetheless, they are frequently referred to interchangeably in utility regulatory proceedings, perhaps in part because finance professionals commonly refer to the cost of capital as the *expected* return (on capital).[11]

The muddling of the difference between the cost of capital and the rate of return is not just of semantic concern, particularly for the cost of equity, which must be estimated using various models rather than directly observed (like the cost of debt).

This confusion between the *cost of* capital and the *return on* capital has infiltrated some of the models commonly used in utility cost of capital proceedings to estimate the cost of equity. These models' apparent influence on regulatory decisions, though, does not make them correct or mean they provide a suitable basis for estimating the cost of equity.

Models that rely exclusively on historical or forecast utility rates of return on equity, without reference to utilities' actual cost of equity, should be rejected outright. Mr. Coyne uses two such models, one relying exclusively on historical authorized ROEs, the other on forecast ROEs. These models incorporate no information about the actual cost of equity and are therefore inherently flawed and produce invalid results. Consistent with the fairness principle described by NARUC, and Mr. Coyne's own statements, only models that estimate the *cost* of equity should be used to determine the authorized ROE.

[11] *See, e.g.*, TIM KOLLER, MARC GOEDHART ET AL., VALUATION, 5TH ED. MCKINSEY & CO. 35 (2010): "The cost of capital is the price charged by investors for bearing the risk that the company's future cash flows may differ from what they anticipate when they make the investment. The cost of capital to a company equals the minimum return that investors expect to earn from investing in the company. That is why the terms *expected return to investors* and *cost of capital* are essentially the same. The cost of capital is also called the discount rate, because you discount future cash flows at this rate when calculating the present value of an investment, to reflect what you will have to pay investors" (emphasis in original).

B. Multiple, diverse sources of evidence demonstrate that utilities' authorized ROEs far exceed their cost of equity.

Q. DO AUTHORIZED ROES REFLECT THE ACTUAL COST OF EQUITY?

A. No. Substantial, robust evidence suggests that authorized ROEs for nearly all U.S. utilities exceed their cost of equity. Georgia Power's ROE follows this national pattern. Below, I provide three diverse analyses that compellingly demonstrate, individually and collectively, the substantial gap between authorized ROEs and utilities' actual cost of equity: expected equity return forecasts produced by investment professionals, utility market-to-book ratios, and the increasing spread between authorized ROEs and interest rates.

1. Investment firms' expected return forecasts for the U.S. equity market as a whole – which is riskier, on average, than utilities – are consistently lower than utilities' authorized ROEs.

Q. ARE THERE OTHER PUBLIC SOURCES FOR COST OF EQUITY ESTIMATES OUTSIDE UTILITY REGULATORY PROCEEDINGS?

A. Utility cost of capital proceedings are not the only purpose for which expected returns on equity are estimated. Investment firms, such as JP Morgan, BlackRock, and T. Rowe Price, regularly publish capital market assumption reports (CMAs) – expected return forecasts for various asset classes. Figure 3 summarizes a survey of U.S. equity market return forecasts published by over thirty firms in 2021.

The CMA forecasts shown in Figure 3 are grouped by assumed investment horizon: less than ten years, ten years (the most common), and more than ten years.[12] The average across the longer-term 10-year and more-than-ten-year horizons, 5.7%, is approximately 40% less than the average ROE authorized for regulated utilities throughout the United States in 2021, 9.5%.[13] Not a single one of the forty-two expected return forecasts that I reviewed[14] is as high as the average ROE yielded by any of Mr. Coyne's models.

[12] Thirty-four CMA reports were reviewed, of which two were excluded due to insufficient data on investment horizon or return type (geometric or arithmetic).

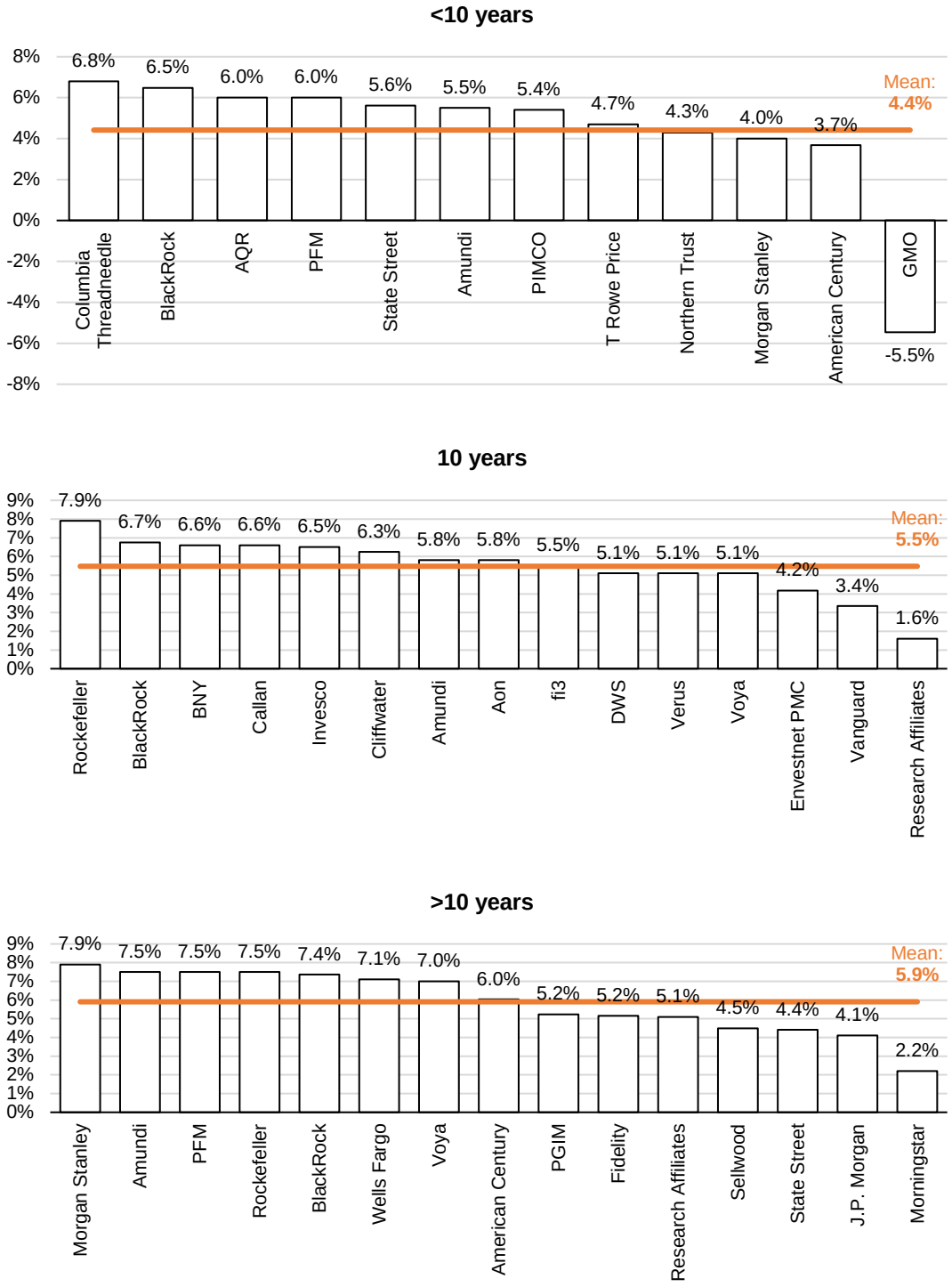
[13] M. Ellis analysis of S&P Global Market Intelligence data, https://www.spglobal.com/marketintelligence/en/ (last accessed October 6, 2022). [Hereinafter referred to as "M. Ellis analysis of S&P GMI data."]

[14] Some CMAs included forecasts for multiple time horizons, so the number of forecasts exceeds the number of reports.

CMA equity market return forecasts are a relevant and useful benchmark for utility ROEs because U.S. utilities, including Georgia Power, are lower-risk – both historically and prospectively – than the market, and therefore investors have *lower* return expectations for utilities than for the market. The fact that authorized utility ROEs are so much higher than the expected returns on the overall market, which is higher risk, is a compelling indicator that authorized ROEs far exceed utility investors' expected returns, i.e., utilities' actual cost of equity.

[*Remainder of page intentionally left blank.*]

Figure 3. U.S. equity market expected returns[15]
Nominal, geometric



[15] M. Ellis analysis of investment firm CMA reports.

2. Market-to-book ratios reveal that utilities' cost of equity is substantially lower than authorized ROEs.

Q. WHAT IS A MARKET-TO-BOOK RATIO?

A. "Market" value refers to the price one must pay to purchase a share of a company's stock at any given time. "Book" value refers to the net equity invested in a company. In general, market value reflects the discounted value of a company's future cash flows, while book value reflects the historical investment in the company. The market-to-book ratio (M/B) is a commonly used financial metric that indicates the amount of shareholder value added in excess of shareholders' return expectations.

Q. HOW DOES A MARKET-TO-BOOK RATIO RELATE TO RETURNS?

A. It is a well understood financial principle that a market-to-book ratio greater than 1.0 indicates the company is expected to earn a return on its investment in excess of the actual cost of capital. A positive net present value (NPV), i.e., the value of a company minus its investments, is the signature indicator of a rate of return that exceeds the cost of capital. NPV is equal to investment multiplied by (M/B – 1.0), so M/B exceeding 1.0 indicates that NPV is positive.

Q. WHAT DO UTILITY STOCK MARKET-TO-BOOK RATIOS REVEAL ABOUT ROES RELATIVE TO UTILITIES' COST OF EQUITY?

A. It has long been recognized that utilities' market-to-book (M/B) ratios provide insight into the relationship between authorized return and the true cost of capital. Legendary regulatory economist Alfred Kahn[16] called attention to this phenomenon over fifty years ago in his 1970 classic, *The Economics of Regulation: Principles and Institutions*:

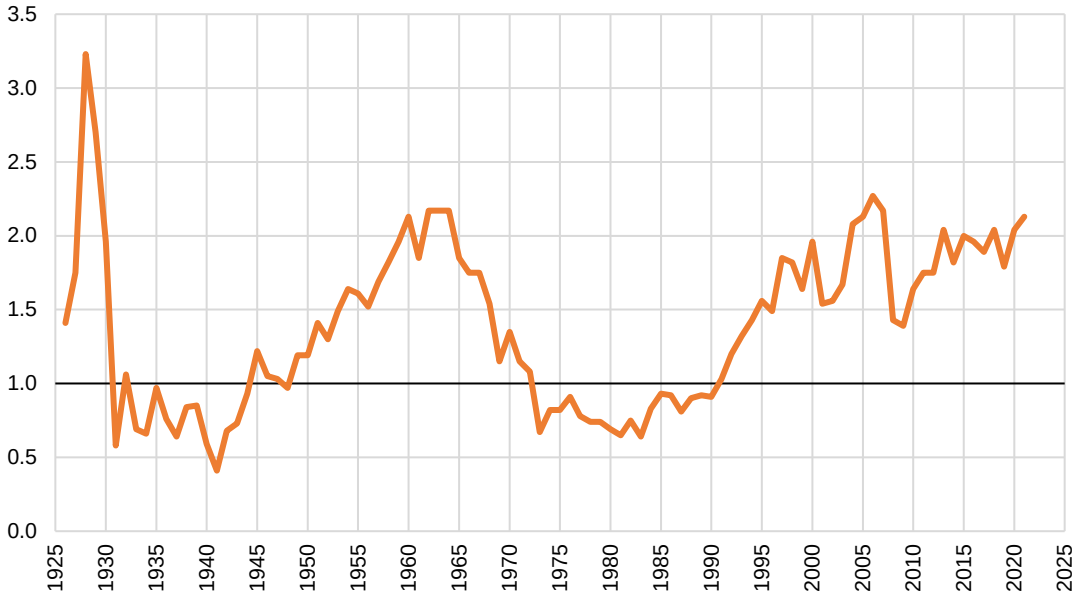
> [T]he sharp appreciation in the prices of public utility stocks, to one and half and then two times their book value during this period, reflected … a growing recognition that the companies in question were in fact being permitted to earn considerably more than their cost of capital. … The source of the discrepancy between market and book value has been that commissions have been allowing *r*'s [returns on equity] in excess of *k* [market cost of equity]; if instead they had set *r* equal to *k*, or proceeded at

[16] *See, e.g.*, Susan Lang, *Economist Alfred Kahn, 'father of airline deregulation' and former presidential adviser, dies at 93*, Cornell Chronicle (December 27, 2010) https://news.cornell.edu/stories/2010/12/alfred-kahn-father-airline-deregulation-dies-93.

> some point to do so … the discrepancy between market and book value … would have disappeared, or would never have arisen.[17]

Kahn was referring to the period of the late 1940s to 1965, but the observation that utilities trade above book value is equally valid today. As seen in Figure 4, the utility sector average M/B ratio has exceeded 1.0 for nearly thirty years and, except for a short period after the global financial crisis, has exceeded 1.5 since 1995.

Figure 4. Utility sector average market-to-book ratio[18]
Year-end



The average of Mr. Coyne's proxy group members' M/B ratios, listed in Figure 4, is even higher, at 2.1.[19] As Kahn observed, the utility sector trading at 1.5 to 2.0 times book value for decades clearly demonstrates that utilities have once again been "permitted to earn considerably more than their cost of capital."

[17] ALFRED KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS, MASS. INST. TECH. 48, fn. 60, 50 (1970).
[18] M. Ellis analysis of French Data Library (FDL) data https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html (last accessed October 2, 2022).
[19] M. Ellis analysis of S&P GMI data (last accessed October 2, 2022); M/B ratio is the monthly average for September 2022.

Figure 5. GPC proxy group market-to-book ratio and Value Line return on book equity[20]
September 2022

			Value Line return on book equity (%)		
Utility	**Ticker**	**M/B**	2022	2023	'25-'27
ALLETE	ALE	1.22	8.0	8.0	9.0
Alliant	LNT	2.46	11.0	11.0	11.0
Ameren	AEE	2.37	10.0	10.0	10.5
AEP	AEP	2.12	10.5	10.5	11.0
Duke	DUK	1.69	9.0	9.0	9.5
Edison Int'l	EIX	1.82	11.0	11.0	12.0
Entergy	ETR	1.98	10.5	10.5	11.0
Evergy	EVRG	1.65	8.5	9.0	10.0
Hawaiian Electric	HE	1.87	9.5	9.0	9.5
IDACORP	IDA	2.02	9.0	9.0	9.5
NextEra	NEE	4.61	12.5	11.5	13.5
OGE	OGE	1.90	12.0	12.0	13.0
Portland General	POR	1.63	9.5	9.5	10.0
Xcel	XEL	2.50	9.5	9.5	10.0
Mean		**2.13**	**10.0**	**10.0**	**10.7**

Another commonly referenced textbook on utility regulation, Kolbe, Read, and Hall's *The Cost of Capital: Estimating the Rate of Return for Public Utilities*, recommends using a M/B ratio of 1.0 as a "guide for regulators" in setting the cost of capital:[21]

> The market-to-book ratio expresses the market value of the firm's outstanding common stock to the book value of its equity. If the two are equal the expected return on the book will equal the expected return on the market value of the company, which in turn will equal the cost of capital for a company of that degree of risk.

Kahn and Kolbe, et al., drew their conclusions from the basic financial concept of net present value (NPV) discussed above. Because utilities trade at a premium to book value (i.e., invested capital), they have positive NPVs – prima facie evidence that they are earning more than their cost of capital.

[20] M. Ellis analysis of S&P GMI data (last accessed October 2, 2022); Company Response to STF-BAI-1-1 Attachment Coyne F.

[21] A. LAWRENCE KOLBE, JAMES A. READ, JR., GEORGE R. HALL, THE COST OF CAPITAL: ESTIMATING THE RATE OF RETURN FOR PUB. UTIL., CHARLES RIVER ASSOCIATES, INC. at 25 (1984).

Q. IN PRACTICAL, DOLLARS-AND-CENTS TERMS, WHAT DOES IT MEAN FOR A UTILITY TO HAVE A MARKET VALUE THAT IS HIGHER THAN ITS BOOK VALUE?

A. In practical terms, this means that, for every dollar of equity a utility invests, shareholders receive back not just their investment plus a reasonable return, which would be the case when M/B = 1.0, but additional value equivalent to their equity investment multiplied by (M/B – 1.0). At current M/B ratios near 2.0, authorized ROEs effectively double the value of utilities' equity investments, *on top of* returning their cost of equity. Such high returns are not necessary to attract capital and needlessly increase customer costs.

Q. ARE YOU ABLE TO CALCULATE GEORGIA POWER'S MARKET-TO-BOOK RATIO?

A. Georgia Power is not publicly traded, so its market value is not directly observable. Nonetheless, The Southern Company's market-to-book ratio, averaging 2.82 over the month of September 2022,[22] provides a reasonable estimate.

Q. IS MR. COYNE AWARE OF THE RELATIONSHIP BETWEEN THE MARKET-TO-BOOK RATIO AND RETURNS?

A Yes. Mr. Coyne has acknowledged that a market-to-book ratio greater than 1.0 necessarily implies that investors' expected return, i.e., the cost of equity, is less than their authorized return. In a recent cost of capital proceeding in California, Mr. Coyne testified to the following principles:

- "The terms 'expected return to investors' and 'cost of capital' are essentially the same."[23]
- "The allowed rate of return should equal the cost of capital,"[24] the NARUC fairness principle.
- "A typical [investor] expectation is the utility will earn its allowed return [on book equity]."[25] Mr. Coyne's Expected Earnings Analysis is predicated on this assumption,[26] and the Value Line reports from which the EEA draws

[22] M. Ellis analysis of S&P GMI data (last accessed Oct. 15, 2022).
[23] Cal. Pub. Util. Comm'n, Docket No. A 22-04-008 et seq., Reporters' Transcript: Virtual Proceeding at 62 (September 12, 2022).
[24] *Id*. at 65.
[25] *Id*. at 70.
[26] Ex. JMC-7.

its input assumptions explicitly state that the reports' ROE forecasts are based on allowed returns.[27]

- "[I]nvestors can't buy shares at book value … They [investors] can only buy them [shares of utility stocks] at market value."[28]
- "[M]arket-to-book values [of] electric and gas utilities all hover in around 2.0; although there is variation between companies. It's been a long-term trend towards increasing the market-to-book ratio for utilities."[29]
- It "would be highly unusual" to find "any company in [Mr. Coyne's proxy group] sample that does not have a market value greater than the book value."[30]
- "When market-to-book ratio is greater than 1.0 that means that investors are willing to pay more than book value for the same stream of cash flows."[31]
- "[W]hen an investor pays more for the same stream of cash flows, that necessarily implies a lower return."[32]

The logical conclusions from Mr. Coyne's testimony are that (1) investors' expected returns on *book* equity are based on authorized ROEs (as can be seen in Figure 5, which shows the Value Line ROE data used in Mr. Coyne's EEA; the averages, which range from 10.0% to 10.7%, are in line with the national average ROE authorized for electric utilities in 2020-22, 9.4%[33]); (2) investors pay more than book value when they invest in utilities; (3) investors' expected return on *their* investment, i.e., the cost of equity, must be *less* than the authorized ROE; and (4) according to NARUC's fairness principle, under which the ROE should be set equal to the COE, historical, current, and forecast ROEs, because they systematically exceed the cost of equity, can provide no basis for determining the appropriate authorized ROE.

[*Remainder of page intentionally left blank.*]

[27] *See, e.g.*, Company Response to STF-BAI-1-1 Attachment Coyne F at 5; Value Line, "American Elec. Pwr." at fn. E. (March 11, 2022).
[28] Cal. Pub. Util. Comm'n, Docket No. A 22-04-008 et seq., Reporters' Transcript: Virtual Proceeding at 72 (Sept. 12, 2022).
[29] *Id*. at 73.
[30] *Id*.
[31] *Id*.
[32] *Id*. at 74.
[33] M. Ellis analysis of S&P GMI data.

3. Authorized ROEs and interest rates have diverged without a corresponding increase in utilities' risk profile.

Q. WHY DO REGULATORS APPROVE AUTHORIZED ROES IN EXCESS OF UTILITIES' ACTUAL COST OF EQUITY?

A. A mathematical model called the Pólya urn can provide insight into why regulators have continued to approve authorized ROEs in excess of utilities' actual cost of capital.[34] Historical return on equity decisions can be thought of as balls in an urn. To decide on a new case, the regulator draws a ball from the urn. The ball is then replaced, along with a new ball – representing the current ROE decision – with the same value. This process of sampling-with-replacement-plus-duplication has a self-reinforcing property sometimes called the rich-get-richer or Matthew effect.

Of course, this model is over-simplified because regulators look at other information besides past authorized ROEs. The basic model can be modified to include additional balls in the urn representing new information, such as the estimated current cost of equity. Nonetheless, as long as regulators look at, much less rely on, past ROEs, changes in authorized ROEs will lag changes in the current true cost of equity.

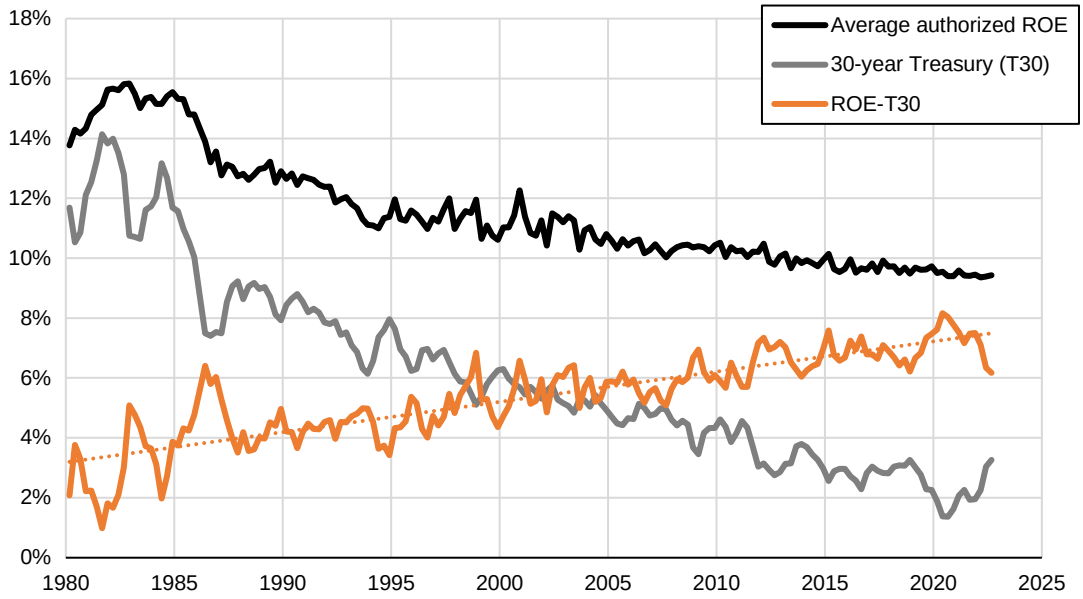
The basic utility regulatory model and risk profile have not changed significantly for decades, so the utility equity risk premium – the spread of the cost of capital over risk-free government interest rates – has remained stable. The Pólya urn model predicts that, in a market in which interest rates and, assuming a relatively stable utility equity risk premium, utilities' cost of equity have been trending downward for decades, authorized ROEs will consistently exceed the actual cost of equity, and the spread will widen over time.

The data confirm the Pólya urn model's prediction of such a widening spread between authorized ROEs and the actual cost of equity. Figure 6 shows the quarterly average authorized ROE for all U.S. utilities, the 30-year Treasury rate, and their difference. While interest rates have declined steadily since the mid-1980s, authorized ROEs have not kept pace. As a result, the ROE-Treasury spread has more than tripled, from approximately 2.3% in the early 1980s to 7.1% in the two years through September 2022. It can be estimated from the Pólya urn model

[34] *See, e.g.,* Learning Machines, *The Polya Urn Model: A simple simulation of "The Rich get Richer"* (Sept. 7, 2021) https://blog.ephorie.de/the-polya-urn-model-a-simple-simulation-of-the-rich-get-richer.

described above that, even under conservative assumptions, regulators, on average, assign no more than a 25% weight to the current cost of equity and at least 75% to recent ROEs. No evidence suggests that utilities' risk profile has systematically increased over this period, so setting ROEs higher and higher relative to utilities' actual cost of equity unnecessarily raises rates and costs to customers.

Figure 6. Quarterly average authorized ROE and 30-year Treasury rate[35]



Others have made similar observations about the growing divergence between authorized ROEs and utilities' actual COEs. In a study published in 2019 exploring potential explanations, Carnegie Mellon researchers David Rode and Paul Fischbeck concluded:[36]

[35] M. Ellis analysis of S&P GMI data (last accessed October 6, 2022); Federal Reserve Bank of St. Louis Economic Data (FRED) data (https://fred.stlouisfed.org/categories/115) (last accessed October 6, 2022).

[36] David C. Rode, Paul S. Fishchbeck, *Regulated equity returns: A puzzle*, 133 Energy Pol'y 1, 16 (2019) https://doi.org/10.1016/j.enpol.2019.110891 (emphasis in original).

> It would appear that regulators are authorizing excessive returns on equity to utility investors and that these excess returns translate into tangible profits for utility firms.
> …
> In the end, we may observe simply that what regulators *should* do, what regulators *say* they're doing, and what regulators *actually* do may be three very different things.

An analogy can be drawn between estimating the cost of equity and developing a nutrition recommendation. Looking at *actual* authorized ROEs to estimate the *required* ROE is akin to developing a calorie intake recommendation based on how much people *actually* eat, not what they need to maintain a healthy weight.

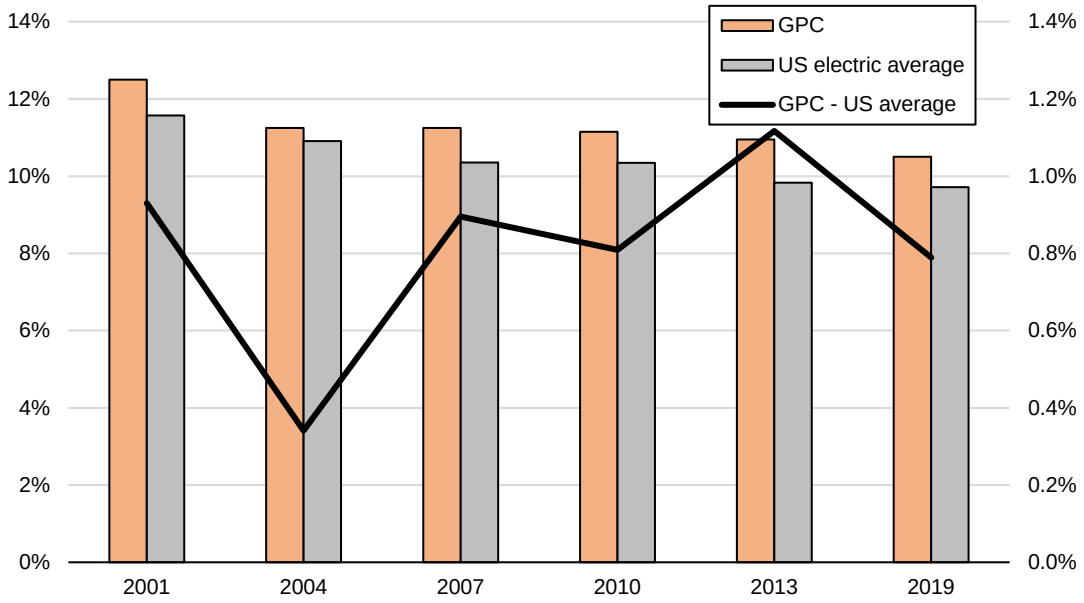
4. <u>These nationwide trends have been even more pronounced for Georgia Power.</u>

Q. DO THESE NATIONAL TRENDS APPLY TO GEORGIA POWER?

A. Yes. Authorized ROEs for Georgia Power have been set substantially higher than the national average authorized ROE for the last two decades, as seen in Figure 7, which shows the difference between GPC's authorized ROEs and the corresponding quarterly national average electric utility authorized ROE in GPC's last five cost of capital authorizations. On average, GPC's authorized ROEs have been 0.8% higher than the national electric utility average.

[*Remainder of page intentionally left blank.*]

Figure 7. GPC and average U.S. electric utility authorized ROE since 2000[37]



III. ROE AND CAPITAL STRUCTURE ARE INTERRELATED AND CANNOT BE DETERMINED SEPARATELY.

A. ROE and capital structure are interrelated through ROE's impact on cash flow.

Q. DOES THE CAPITAL STRUCTURE IMPACT CUSTOMER COSTS?

A. Yes. Capital structure refers to the share of a utility's investment that is funded by debt and equity. Because equity generally has a higher cost than debt, assuming no change in authorized ROE, a higher equity ratio tends to increase customer costs.

Q. DOES THE CAPITAL STRUCTURE IMPACT A UTILITY'S CREDIT QUALITY?

A. Yes. A primary determinant of a company's credit quality – its anticipated ability to repay its debts – is the amount of debt outstanding relative to the total amount of capital, both debt and equity, invested in the company. In general, a higher equity ratio tends to improve a utility's credit quality. Equity ratio is not the only determinant of credit quality, though. As will be explained in more detail below, credit quality is also determined by the amount of cash available to service the debt.

[37] M. Ellis analysis of S&P GMI data (last accessed October 6, 2022).

Q. PLEASE EXPLAIN THE RELATIONSHIP BETWEEN ROE AND CAPITAL STRUCTURE.

A. The testimony of Georgia Power's credit expert, Mr. Steven Fetter, reveals that ROE and capital structure are inextricably linked.

Mr. Fetter describes the importance of the ratio of funds from operations (FFO) to debt in rating agencies' assessments of utility credit quality.[38] FFO and similar cash flow metrics[39] measure the cash available to pay debt interest and principal. What he fails to clarify in his written testimony is that net income is a key component of FFO.[40] Net income, in turn, is the product of rate base, equity ratio, and ROE. Consequently, ROE and equity ratio are key determinants of FFO. During cross-examination, Mr. Fetter acknowledged the relationship between capital structure, ROE, and credit quality:

> Q. [Ms. Whitfield]: On page 14, you talk about key quantitative measures. Specifically, you reference FFO to debt and debt to EBITDA as two core financial ratios that are considered by credit agencies.
>
> A. [Mr. Fetter]: Yes.
>
> Q. Do both of those ratios include inputs that are affected by both capital structure and the return on equity?
>
> A. Well, it certainly factors in the equity/debt split because in one, the debt divides from the bottom and in the other, the debt is divided into by the EBITDA. As far as whether ROE gets factored into this, FFO – ROE ends up resulting in revenues and FFO is a certain measure and EBITDA is an earnings measure. And so ROE would impact those two items.[41]

In the context of the regulatory objective of setting a capital structure that appropriately balances customer and investor interests, as ROE increases, the amount of debt in the capital

[38] 2022 Rate Case Hr'g Tr. Vol. 1 at 799-800 (Sept. 28, 2022).

[39] Mr. Fetter refers to S&P's reliance on FFO; Moody's preferred cash flow metric is cash flow from operations (CFO). *See* GPC data request response STF-NEC-1-1 Attachment AG: Moody's Investors Service, *Georgia Power Company: Update to credit analysis* (October 13, 2021). Mr. Fetter also refers to the debt-to-EBITDA ratio. For utilities, debt-to-EBITDA is less important than FFO/D or CFO/D. For example, the only credit metric cited by Moody's in its "factors that could lead to an upgrade/downgrade" is CFO.

[40] The basic definition of FFO is net income + depreciation and amortization. *See, e.g.*, Corporate Finance Institute, *FFO – Funds from Operations: A measure of cash flow used in real estate* (Dec. 16, 2020) https://corporatefinanceinstitute.com/resources/knowledge/accounting/funds-from-operations-ffo/.

[41] 2022 Rate Case Hr'g Tr. Vol. 1 at 859 (Sept. 28, 2022).

structure can also increase while still maintaining the utility's credit quality; similarly, as the ROE declines, the equity ratio would need to increase to maintain the same creditworthiness.

Curiously, Mr. Coyne's capital structure analysis makes no reference whatsoever to any credit metrics. Instead, he bases his equity ratio recommendation, 56%, solely on a peer comparison.[42]

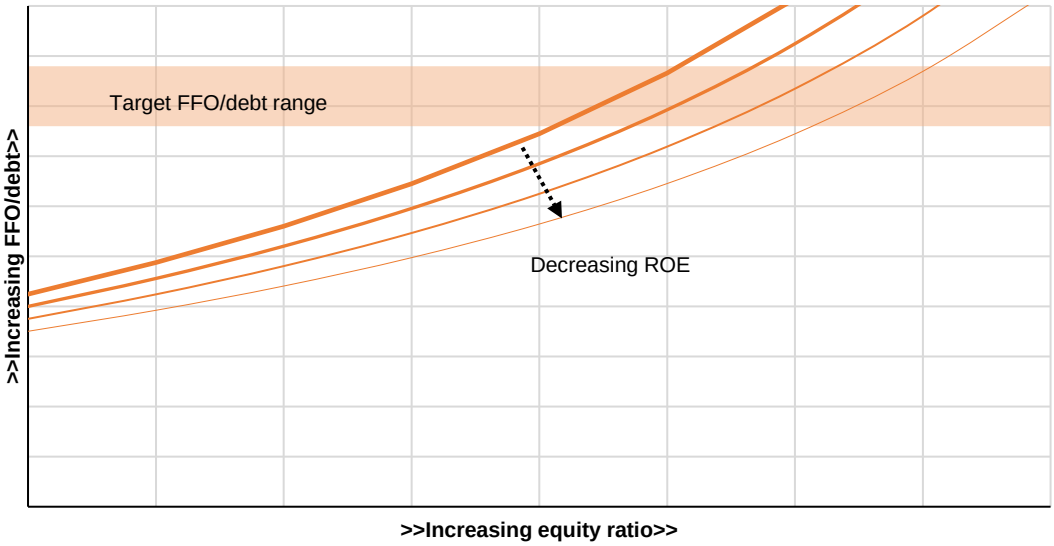
Q. HOW SHOULD A UTILITY'S CAPITAL STRUCTURE BE DETERMINED?

A. The appropriate capital structure can be determined more rigorously by using the analytical methods and metrics employed by credit rating agencies and as described by Mr. Fetter. The level of debt that can be accommodated in the capital structure will vary with ROE, because funds from operation (FFO), a key determinant of a utility's creditworthiness, is based on net income, and net income is based on ROE, for any given credit rating and its corresponding FFO/debt ratio.

Figure 8 illustrates the relationships between equity ratio, ROE, and FFO/debt. The horizontal axis is the equity ratio; the vertical axis is FFO/debt. The light orange horizontal band represents the range of FFO/debt that corresponds to the utility's desired credit rating. The dark orange arcing lines correspond to different levels of authorized ROE, with increasing line thickness representing increasing ROE. Holding the equity ratio constant, FFO/debt declines as the ROE is reduced (moving down from a thicker ROE line to a thinner line). But the decline in FFO/debt when ROE is reduced can be reversed by increasing the equity ratio (moving along the thinner ROE line up and to the right). Any number of combinations of ROE and equity ratio can meet the level of FFO/debt needed to maintain the utility's credit rating. A higher ROE requires less equity to maintain the same FFO/debt and credit rating; a lower ROE can maintain the same FFO/debt and credit rating if it is paired with a higher equity ratio.

[42] 2022 Rate Case Hr'g Tr. Vol. 1 at 672 (Sept. 28, 2022); Ex. JMC-10.

Figure 8. Illustrative relationships between equity ratio, ROE, and FFO/debt



Many observers see utilities' healthy credit ratings and low cost of debt and conclude that the best way to reduce customer costs is to increase the amount of debt in the capital structure. As explained above, current authorized ROEs far exceed utilities' actual cost of equity, so ample scope exists for the Commission to reduce Georgia Power's ROE without adversely affecting its ability to raise equity. At typical utility credit ratings, savings from a lower ROE, after grossing up for taxes, generally more than make up for the incremental cost of any additional equity required in the capital structure. For example, based on analysis of data provided in Moody's October 2021 Georgia Power credit opinion,[43] every 1.0% reduction in ROE reduces total customer costs by approximately 2.0%, *even after* accounting for the approximately 2.0% increase in equity ratio needed to maintain Georgia Power's current cash flow-to-debt ratio.[44]

Total customer costs can be reduced by decreasing the ROE while increasing the equity ratio to maintain the utility's creditworthiness (i.e., its cash flow-to-debt) because the trade-off is not one-for-one. Net income accounts for about 50% of GPC's FFO; other items, such as

[43] M. Ellis analysis of data provided in GPC data request response STF-NEC-1-1 Attachment AG: Moody's Investors Service, *Georgia Power Company: Update to credit analysis* at 10; Ex. 9; Ex. 10 (October 13, 2021).

[44] Moody's preferred cash flow metric is cash flow from operations (CFO), not FFO, and the analysis is based on Moody's CFO/debt data. The basic definition of CFO is net income + depreciation and amortization + changes in working capital, i.e., FFO + changes in working capital. *See* Corporate Finance Institute, *How to Calculate FCFE from CFO?* (Dec. 16, 2020) https://corporatefinanceinstitute.com/resources/knowledge/accounting/how-to-calculate-fcfe-from-cfo/.

depreciation and amortization, account for the rest. Consequently, a relatively large reduction in net income due to a sharp cut in ROE would reduce FFO by roughly half as much in percentage terms. In addition, ROE is grossed-up for taxes, which are not included in FFO, so the savings to customers from a lower ROE is amplified. Rather than "leverage up," i.e., reduce the equity ratio and increase debt, at current ROEs to reduce rates, it is more cost-effective to use any spare credit capacity to reduce the utility's ROE, or even to increase the equity ratio if necessary to maintain a target credit rating, than to increase debt.

Reducing ROE and increasing the equity ratio has the additional benefit of reducing debt-to-capitalization, another key metric used by rating agencies to assess credit quality.[45]

B. Georgia Power's capital structure proposal does not address the interaction between ROE and capital structure.

Q. DOES GEORGIA POWER'S CAPITAL STRUCTURE PROPOSAL TAKE INTO ACCOUNT THE INTERACTION BETWEEN ROE AND CAPITAL STRUCTURE?

A. As Mr. Coyne acknowledged during cross examination, he developed his capital structure recommendation without incorporating the interrelationship between credit quality, ROE, and equity ratio.[46] Neither Mr. Coyne nor Mr. Fetter provides any analysis or calculations demonstrating how FFO/debt interacts with ROE and how that interaction influences GPC's proposed equity ratio. As a result, how much GPC's proposed ROE and/or the equity ratio could be reduced to lower customer costs while still maintaining its desired investment-grade credit rating cannot be assessed from the testimony and data GPC has provided.

GPC's analysis should have included a detailed analysis of the relationships between ROE, equity ratio, and creditworthiness and the impact of different combinations of equity ratio and ROE on customers, lenders, and shareholders so that the Commission could examine the ability of Georgia Power to obtain sufficient capital while minimizing customer costs. The Commission should require Georgia Power to provide a detailed analysis of the relationships between ROE, equity ratio, and creditworthiness so that the Commission possesses the facts it needs to come to fact-based conclusions about Georgia Power's authorized capital structure.

[45] *See, e.g.*, GPC data request response STF-NEC-1-1 Attachment AG: Moody's Investors Service, *Georgia Power Company: Update to credit analysis* at 3 (October 13, 2021).

[46] 2022 Rate Case Hr'g Tr. Vol. 1 at 764-66 (Sept. 28, 2022). Mr. Coyne acknowledges that his capital structure analysis did not involve any analysis of credit metrics like those cited by Mr. Fetter.

C. Georgia Power's ROE and equity ratio can be modified to reduce customer costs without adversely affecting GPC's ability to raise capital.

Q. CAN GEORGIA POWER'S PROPOSED ROE AND/OR EQUITY RATIO BE MODIFIED IN A WAY THAT REDUCES CUSTOMER RATES WHILE MAINTAINING THEIR CREDITWORTHINESS?

A. Evidence from other states suggests both the ROEs and equity ratios proposed by Georgia Power can be reduced while maintaining their creditworthiness. Figure 9 summarizes recent utility rate cases in which the authorized ROE was 9% or less. All of the equity ratios are below the 56% proposed by Georgia Power, yet all of the companies listed in Figure 9 below nonetheless also have comparable or better credit ratings, maintaining their ability to attract capital.

Figure 9. Recent authorized ROEs at or below 9%[47]

Company	State	Service type	Date	ROE (%)	Equity ratio (%)	Issuer credit rating		
						S&P	Moody's	Fitch
Orange & Rockland	NY	E/G	3/19	9.00	48.0	A-	Baa2	BBB+
Otter Tail Power	SD	E	5/19	8.75	52.9	BBB+	A3	BBB
Consolidated Edison NY	NY	E/G	1/20	8.80	48.0	A-	Baa1	BBB+
Central Maine Power	ME	E	2/20	8.25	50.0	A	A2	BBB+
NY State E&G	NY	E/G	11/20	8.80	48.0	A-	Baa1	BBB+
Rochester G&E	NY	E/G	11/20	8.80	48.0	NR	Baa1	BBB+
Corning Natural Gas	NY	G	5/21	8.80	48.0	NR	NR	NR
El Paso Electric	NM	E	6/21	9.00	49.2	NR	Baa2	BBB
Brooklyn Union Gas	NY	G	8/21	8.80	48.0	BBB+	Baa2	BBB
KeySpan Gas East	NY	G	8/21	8.80	48.0	BBB+	Baa1	BBB+
Arizona Public Service	AZ	E	11/21	8.70	54.7	BBB+	A3	BBB+
Central Hudson G&E	NY	E/G	11/21	9.00	50.0	A-	Baa1	BBB+
Commonwealth Edison	IL	E	12/21	7.36	48.7	BBB+	A3	BBB+
Ameren Illinois	IL	E	12/21	7.36	51.0	BBB+	A3	NR
Niagara Mohawk	NY	E/G	1/22	9.00	48.0	BBB+	Baa1	NR
Green Mountain Power	VT	E	8/22	8.57	50.0	A	NR	NR

[47] M. Ellis analysis of S&P GMI; Moody's (https://www moodys.com/); FitchRatings (https://www fitchratings.com/) (last accessed October 6, 2022).

IV. MR. COYNE EMPLOYS FLAWED MODELS AND ASSUMPTIONS THAT SYSTEMATICALLY PRODUCE UPWARDLY BIASED ROE ESTIMATES FOR GEORGIA POWER.

A. Mr. Coyne's methodology relies, in part, on conceptually flawed models.

Q. HOW DOES MR. COYNE ESTIMATE GEORGIA POWER'S ROE?

A. Mr. Coyne employs four different models to estimate Georgia Power's ROE: (1) constant-growth discounted cash flow model (CG DCF); (2) capital asset pricing model (CAPM); (3) risk premium analysis (RPA); and (4) expected earnings analysis (EEA). In the CG DCF, CAPM, and EEA, Mr. Coyne estimates ROEs for a number of proxy group companies and bases his recommended ROEs on the proxy group average.

Q. WHAT IS YOUR OVERALL ASSESSMENT OF MR. COYNE'S APPROACH?

A. Although two of Mr. Coyne's models, the CG DCF and CAPM, are widely used by financial professionals and utility cost of capital experts to estimate the cost of equity, his implementations are deeply flawed. They rely on unrealistic, systematically upwardly biased assumptions that invalidate their results. I describe these deficiencies in more detail in Sections IV.C and IV.E below.

The other two models, RPA and EEA, while frequently used by utility cost of capital experts, are not commonly used elsewhere in finance outside utility regulatory proceedings, and both suffer a severe, invalidating conceptual flaw.

Q. WHAT IS THE INVALIDATING CONCEPTUAL FLAW IN THE RPA AND EEA?

A. Both the RPA and EEA confuse the cost of equity and the return on equity, estimating the cost of equity from historic or forecast returns on equity. The RPA consists of a linear regression model of historical quarterly-average authorized ROEs against historical quarterly-average 30-year Treasury yield. Mr. Coyne's EEA estimates the cost of equity using ROE forecasts provided by investment research firm Value Line. The primary drivers of Value Line's ROE forecasts for the proxy group companies, in turn, are the companies' most recent authorized ROEs.[48]

Both the RPA and EEA are essentially models of past ROE decisions, not the actual cost of equity. By design, therefore, they repeat the historic overearnings arising from the excess

[48] *See, e.g.,* GPC data request response STF-BAI-1-1 Attachment Coyne F at 5: Value Line, "American Elec. Pwr." (March 11, 2022), fn. E.

ROEs authorized in the past. As explained in Section II.A above, the cost of equity and the return on equity are two entirely different concepts; there is no basis to assume that they will or should be equal. In fact, as explained in Section II.B above, authorized ROEs have diverged dramatically from utilities' actual cost of equity, as reflected in the disparity between authorized ROEs and substantially lower forecast returns for the U.S. equity market as a whole, despite the latter's higher risk; utility market-to-book ratios exceeding 1.0 for decades; and the growing divergence between average authorized ROEs and interest rates. Basing a utility's authorized ROE on historically authorized ROEs without any reference to the *actual cost of equity*, as both the RPA and EEA do, merely perpetuates these errors.

A simple calculation illustrates the EEA's conceptual flaw in equating ROE and COE. ROE is the ratio of earnings to the book value of equity. But investors cannot buy shares at book value; they must pay market value. The market value of the stocks Mr. Coyne chose to include in his peer group tend to trade at a significant premium over book value, currently an average of 2.1x. Mathematically, if investors pay more than book value for the same stream of earnings, their expected return, i.e., the cost of equity, *must* be less than the ROE calculated using the book value.[49] For companies earning just their cost of equity, the *expected* return, i.e., the cost of equity, can be estimated by dividing earnings per share (EPS) by equity book value per share (BVPS).[50] EPS can be expressed as the product of ROE and book value per share, so COE can similarly be expressed as ROE divided by the market-to-book ratio.[51] COEs so calculated are dramatically lower than Mr. Coyne's EEA estimates. For example, Value Line's forecast '25-'27 ROE for Alliant Energy Corporation is 11.0%,[52] and as of September 30, 2022, Alliant's market-to-book ratio was 2.17,[53] so investors' expected return would be

[49] A simple example illustrates why this must be true. Suppose one pays $1 for an investment that guarantees a payment of $0.10 – a return of $0.010/$1.00 = 10% – every year into perpetuity. If instead the initial cost was $2 instead of $1 for the same perpetual stream of $0.10 per year, the return would be $0.10/$2.00 = 5%. If the initial investment for the *identical* cash flow stream is higher, the return is lower.

[50] Aswath Damodaran, *Implied Equity Risk Premium: Principles & Mechanics* at 5 https://pages.stern.nyu.edu/~adamodar/pdfiles/eqnotes/webcasts/ERP/ImpliedERP.pdf (last accessed July 22, 2022).

[51] COE = EPS / stock price = ROE x book value per share / stock price = ROE / M/B.

[52] GPC data request response STF-BAI-1-1 Attachment Coyne F at 2: Value Line, "Alliant Energy" (March 11, 2022).

[53] M. Ellis analysis of S&P GMI (last accessed October 2, 2022).

only approximately 11.0/2.17 = 5.07%.[54] As Kahn explained, and Mr. Coyne has acknowledged (see Section II.B.2 above), M/B ratios greater than 1.0 imply COE is less than ROE. It is simply mathematically impossible for COE to equal ROE when M/B is not equal to 1.0, yet Mr. Coyne's RPA and EEA are nonetheless premised on this mathematical impossibility.

FERC has also recognized the flaws in the RPA and EEA. In Opinion No. 569 (November 2019), FERC rejected the use of both the RPA and EEA to estimate the cost of equity. With regard to the EEA, FERC explained "that relying on the Expected Earnings model would not satisfy the requirements of *Hope*":

> In particular, we find that the record does not support departing from our traditional use of market-based approaches to determine base ROE. Under the market-based approach, the Commission sets a utility's ROE to equal the estimated return that investors would require in order to purchase stock in the utility at its current market price. In *Hope*, the Supreme Court explained that "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks." In order to determine this, we must analyze the returns that are earned on "investments in other enterprises having corresponding risks," but investors cannot invest in an enterprise at book value and must instead pay the prevailing market price for an enterprise's equity. As a result, the expected return on a utility's book value does not reflect "returns on investments in other enterprises" because book value does not reflect the value of any investment that is available to an investor in the market, outside of the unlikely situation in which market value and book value are exactly equal. Accordingly, *we find that relying on the Expected Earnings model would not satisfy the requirements of* Hope.[55]

FERC initially rejected the RPA for similar reasons:

[54] The EEA suffers other flaws, such as the growth adjustment to book value which does not account for new share issuance, but their effect is minor relative to the central conceptual flaw of confusing ROE and COE.

[55] Ass'n of Bus. Advocating Tariff Equity v. Midcontinent Indep. Sys. Operator, Inc., Docket No. EL14-12-003, Opinion No. 569, 169 FERC at 103 ¶ 61,129 (emphasis added) (2019).

> [T]he Risk Premium model is likely to provide a less accurate current cost of equity estimate than the DCF model or CAPM because it relies on previous ROE determinations, whose resulting ROE may not necessarily be directly determined by a market-based method, whereas the DCF and CAPM methods apply a market-based method to primary data. For example, previous ROE determinations may not involve an explicit determination as to whether an ROE is just and reasonable, but instead focused on whether to allow an ROE incentive adder or were approving a preexisting RTO-wide ROE for a new RTO member. Similarly, many previous ROE determinations used in the Risk Premium model were the product of rate case settlements. Such settlements often involve compromises on a variety of issues present in a rate case, of which the appropriate ROE is only one. Consequently, such settlements could include ROEs that are not representative of the market cost of equity because the ROEs were negotiated above or below that market cost of equity in order to form an overall settlement package, together with negotiated outcomes on other issues, that were acceptable to the parties.[56]

Although FERC subsequently reinstated the RPA in Opinion No. 569-A (May 2020), the D.C. Circuit Court of Appeals found that FERC's reinstatement of the RPA was arbitrary and capricious and has vacated Opinion 569-A.[57]

In the same California cost of capital proceeding referenced in Section II.B.2 above, Mr. Coyne acknowledged that his Risk Premium Analysis and Expected Earnings Analysis are not based on utilities' cost of equity:

[*Remainder of page intentionally left blank.*]

[56] Ass'n of Bus. Advocating Tariff Equity v. Midcontinent Indep. Sys. Operator, Inc., Docket No. EL14-12-003, Opinion No. 569, 169 FERC at 166 ¶ 61,129 (2019).

[57] Van Ness Feldman, LLP, *D.C. Circuit Court of Appeals Decision Puts FERCs Revised Method for ROE Determinations in Question* (August 10, 2022) https://www.vnf.com/dc-circuit-court-of-appeals-decision-puts-fercs-revised-method-for-roe-determinations-in-question.

Q. Isn't it true that two of your models, the risk premium analysis, RPA, and the expected earnings analysis, EEA, are not based on the utilities' actual cost of equity?

A. Yeah.

Q. The RPA is based on historical authorized ROEs; correct?

A. It's based on an historic relationship between allowed return by regulatory commissions and Treasury yields.

Q. The EEA is based on forecast ROEs; correct?

A. Yes. That's based on a forecast of ROEs.[58]

Despite his acknowledgement that ROE systematically exceeds COE, Mr. Coyne's RPA and EEA nonetheless estimate COE based on historical and forecast ROEs – in direct contradiction to the NARUC fairness principle that he has endorsed. For these reasons, the results of Mr. Coyne's EEA and RPA models should be rejected outright.

B. Mr. Coyne fails to account for differences in equity ratios among the proxy group members.

Q. HOW DOES THE EQUITY RATIO AFFECT THE COST OF EQUITY?

A. All else equal, a lower equity ratio tends to raise the cost of equity. This can be understood intuitively. The cash generated by a business is pledged to holders of its debt and equity, with debtholders having first priority. As the equity ratio declines, a smaller share of the cash goes to equity owners. To the extent there is uncertainty in the cash generated, it is amplified by a lower equity ratio, increasing the riskiness of those cash flows. This increased risk is reflected in a higher cost of equity.

The companies in Mr. Coyne's proxy group have different equity ratios, and their average, 53%,[59] is different from the 56% he proposes for Georgia Power, so their costs of equity cannot be used to estimate Georgia Power's under his proposed equity ratio. In addition, Mr. Coyne compares the equity ratios on a book basis; this is incorrect. When determining the cost of capital, the market value of equity should be used.[60]

[58] Cal. Pub. Util. Comm'n, Docket No. A 22-04-008 et seq., Reporters' Transcript: Virtual Proceeding at 65-66 (September 12, 2022) [edited for clarity].

[59] Ex. JMC-10.

[60] *See, e.g.,* TIM KOLLER, MARC GOEDHART ET AL., VALUATION, 5TH ED. MCKINSEY & CO. 204 (2010): "Where possible, you should estimate *market* values of the elements of the current capital structure" (emphasis added).

I will revisit adjusting the COE model results for differences in equity ratios among the proxy group members, and between the proxy group average and Georgia Power, in Section V.A below.

C. Mr. Coyne's DCF model uses upwardly biased dividend yield calculations and unrealistically extrapolates analyst earnings growth forecasts into perpetuity, producing economically impossible results.

Q. WHAT IS YOUR ASSESSMENT OF MR. COYNE'S DCF MODEL?

A. Mr. Coyne uses the constant-growth version of the DCF model (CG DCF) in his analysis, with a growth rate equal to equity analysts' consensus 3-to-5-year EPS growth rate estimates. The key shortcoming in his implementation of the CG DCF is the assumption that dividends can grow at analysts' estimated EPS growth rates into perpetuity. This economically impossible assumption upwardly biases his results dramatically.

Q. PLEASE DESCRIBE THE CONSTANT-GROWTH DCF MODEL.

A. The constant-growth DCF is based on the well-known and widely used mathematical formula for the value of a growing perpetuity stream of cash flows. It assumes a single, constant rate of cash flow growth. In the constant-growth DCF model used by Mr. Coyne and many other modelers, the cash flows are expected dividends, and the perpetuity value formula can be expressed as:

$$M_0 = D_0 \frac{(1+g)}{(k-g)}$$

where M_0 refers to the current market value (stock price), D_0, the current dividend (typically four times the most recent quarterly payment), g, the forecast perpetuity growth rate, and k, the cost of equity. Rearranging terms, the cost of equity can be expressed as a function of the dividend yield, d ($\frac{M_0}{D_0}$), and growth rate:

$$k = d(1+g) + g$$

In some implementations of the CG DCF, the first-year dividend yield is calculated by multiplying the current yield by $1 + \frac{g}{2}$, instead of $1 + g$, to account for the quarterly, not

annual, payment of dividends. Mr. Coyne uses this approach.[61] Typically, the cost of equity is estimated for each member of the proxy group, with the mean or median reflecting the cost of equity for the target company. Mr. Coyne uses the mean.

The general DCF model, which can allow for varying growth rates over time, is a particularly apt representation of stock returns because its assumptions realistically reflect several key features of share prices and expected returns. First, the DCF model's perpetual cash flow stream assumption mirrors equity's claim on a firm's cash flows into perpetuity. Second, the assumption of steady growth in dividends over time reasonably reflects their much greater stability relative to other potential measures of profitability, like earnings or cash flow. Third, the resulting single discount rate into perpetuity is consistent with the no-arbitrage principle of finance. If investors expected higher (lower) returns in the future, they would impute that into the price today and bid up (down) the price accordingly, such that near-term and long-term returns roughly equilibrate.[62]

But the *constant growth* version of the DCF used by Mr. Coyne is not well-suited for estimating the cost of equity for a utility or any other stock, for two reasons. First, it is not realistic to assume that a utility will maintain its current 3-to-5-year growth rate into perpetuity. At any given time, the 3-to-5-year growth rate will deviate from its long-term trend due to any number of factors, such as weather; economic conditions; new capital projects; regulatory, tax, and other policy changes; and unforeseen events like the Covid-19 pandemic. Second, the results of the CG DCF are particularly sensitive to the perpetuity growth rate assumption. The inaccuracy introduced by assuming a relatively short-term growth rate will be sustained forever invalidates the results of Mr. Coyne's CG DCF. Mr. Coyne's use of analyst estimates, a source

[61] 2022 Rate Case Hr'g Tr. Vol. 1 at 654 (Sept. 28, 2022). It can be demonstrated mathematically that, for dividend yields as of the starting time period of the model (t_0), the common method of using four times the most recent quarterly dividend is already slightly conservative relative to a more accurate quarterly model, and this adjustment is therefore not necessary.

[62] Some equity return projections vary with forecast horizon, generally due to a valuation-reversion assumption in the model, e.g., price-to-earnings ratios returning to their long-term historical average over an initial horizon and remaining at that level afterward. *See, e.g.*, BlackRock Investment Institute, *Capital market assumptions* (2022) https://www.blackrock.com/institutions/en-us/insights/charts/capital-market-assumptions. Whether variation in expected equity returns across different forecast horizons can be estimated with any accuracy is a subject of ongoing debate among academic and investment professionals. Some forecasters assume no mean reversion in their return forecasts. *See, e.g.*, AQR Capital Management, *2014 Capital Market Assumptions for Major Asset Classes* (2014) https://www.aqr.com/Insights/Research/Alternative-Thinking/2014-Capital-Market-Assumptions-for-Major-Asset-Classes).

widely known to be upwardly biased, for his growth rate assumption further invalidates his results.

1. Mr. Coyne's dividend yield calculations use unnecessarily long trailing price histories, introducing upward bias to his estimates.

Q. HOW DOES MR. COYNE CALCULATE THE CURRENT DIVIDEND YIELD?

A. To calculate the dividend yield, Mr. Coyne divides four times the most recent quarterly dividend by the trailing average share price over 30, 90, and 180 trading days.[63]

While it is advisable to use a multi-day average of the share price to reduce the effect of any day-to-day price fluctuations that are not reflective of investors' long-term expectations, *all three* of Mr. Coyne's averages are unnecessarily long. Because share prices have a general tendency to trend upward over time, the longer the backward-looking averaging period, the lower the share price will tend to be, introducing upward bias into the dividend yield. Averaging the most recent month of data, approximately 21 trading days, better balances the competing objectives of mitigating the potential short-term volatility cited by Mr. Coyne and reflecting current investor expectations.

2. Mr. Coyne's perpetuity growth rate is based on analysts' 3-to-5-year growth rate forecasts, producing economically impossible results.

Q. HOW DOES MR. COYNE ESTIMATE EACH PEER UTILITY'S PERPETUITY GROWTH RATE?

A. While estimating the current dividend yield is fairly straightforward (although, as just explained, the potential for bias exists even there), estimating the perpetuity growth rate is more subjective. Mr. Coyne uses analysts' consensus 3-to-5-year estimated earnings-per-share (EPS) growth rate provided by Value Line, Thomson First Call (as reported by Yahoo! Finance),[64] and Zacks.[65]

[63] 2022 Rate Case Hr'g Tr. Vol. 1 at 653-54 (Sept. 28, 2022).

[64] The providers of EPS estimates have consolidated and changed their names numerous times over the last two decades. First Call was integrated with I/B/E/S in 2000 and discontinued in 2012 (https://libguides mit.edu/c.php?g=387236&p=2626822). I/B/E/S is now provided by Refinitiv (https://www refinitiv.com/en/financial-data/company-data/ibes-estimates). Refinitiv is the source of Yahoo! Finance's estimates (https://help.yahoo.com/kb/finance-for-web/SLN2310 html).

[65] Mr. Coyne's EPS growth rate forecast sources use the following forecast horizons: Value Line, '19-'21 to '25-'27 (*see, e.g.*, STF-BAI-1-1 Attachment Coyne F); Zack's, 3 to 5 years (https://www.zacks.com/stocks/); Yahoo! Finance, next 5 years (https://finance.yahoo.com/).

The DCF is a model of *dividends*, not earnings, so it would be preferable to use explicit dividend-per-share (DPS) forecasts. While some analysts, such as Value Line, provide DPS forecasts, they are less common, so EPS forecast are typically used instead.

Q. IS IT REASONABLE TO ASSUME ANALYSTS' CONSENSUS GROWTH RATES INTO PERPETUITY IN A DCF MODEL?

A. No. There are several problems with using analysts' estimates for the perpetuity growth rate. A wealth of academic research over decades has found that analyst forecasts tend to be optimistic.[66] Several other observations and analyses demonstrate the unreasonableness of using analysts' 3-to-5-year EPS growth rate estimates for the perpetuity dividend growth rate in the constant-growth DCF model.

Q. WHAT IS YOUR FIRST OBSERVATION OR ANALYSIS THAT DEMONSTRATES THE UNREASONABLENESS OF USING ANALYSTS' 3-TO-5-YEAR EPS GROWTH RATE ESTIMATES FOR THE PERPETUITY DIVIDEND GROWTH RATE IN THE CG DCF?

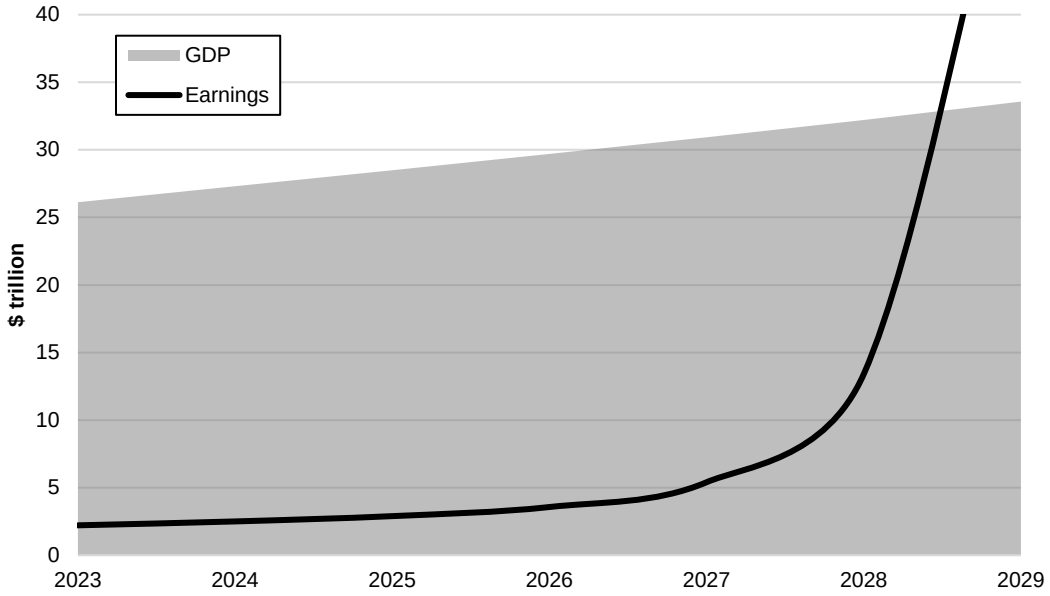
A. It is economically impossible for analyst earnings growth forecasts to be sustained even for one decade, much less into perpetuity. Figure 10 compares the forecast aggregate earnings of the U.S. publicly-traded companies for which analysts provide EPS growth forecasts[67] to forecast U.S. GDP.[68] Currently, these companies' combined earnings are equal to roughly 8% of U.S. GDP. Yet if analysts' growth projections were correct, they would exceed total U.S. GDP in just six years.

[66] *See, e.g.*, Marc Goedhart, Rishi Raj, Abjishek Saxena, *Equity analysts: Still too bullish*, McKinsey Quarterly (Apr. 2010), https://www mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/equity-analysts-still-too-bullish. For a more recent example, *see also* Stefano Cassella, Benjamin Golez, Huseyin Gulen, Peter Kelly, *Horizon Bias and the Term Structure of Equity Returns* (Nov. 2021), https://ssrn.com/abstract=3328970.

[67] M. Ellis analysis of S&P GMI data for 1,780 U.S. stocks. Excludes companies with growth rates less than -100%.

[68] Sum of the forecasts for each company. Analysts' EPS estimates and growth rates from S&P GMI as of June 30, 2022. GDP forecast is average of Congressional Budget Office, *The 2022 Long-Term Budget Outlook* (July 2022), https://www.cbo.gov/system/files/2022-07/57054-2022-07-LTBO.xlsx.; Energy Info. Admin., *Annual Energy Outlook 2022 Macroeconomic Indicators* (March 2022), Table 20 https://www.eia.gov/outlooks/aeo/excel/aeotab20.xlsx; Soc. Sec. Admin., *The 2022 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* (June 2022), Supplemental Single-Year Tables, https://www.ssa.gov/OACT/TR/2022/SingleYearTRTables_TR2022.xlsx.

Figure 10. U.S. stock market forecast earnings vs. forecast GDP



The Research Foundation of CFA Institute has made a similar critique of projecting analysts' estimates beyond their forecast horizon:[69]

> Consensus long-term earnings growth estimates routinely exceed sustainable GDP growth. The current consensus growth rate for earnings on the S&P 500, according to the Zacks Investment Research survey, is 10 percent, which, if we assume a consensus inflation expectation of 2-3 percent, corresponds to 7-8 percent real growth. Real earnings growth of 8 percent is six times the real earnings growth of the past century, however, and three times the consensus long-term GDP growth rate. This growth is not possible.

Mr. Coyne himself has acknowledged the potential unreasonableness of assuming analyst growth rates into perpetuity in his CG DCF model, testifying in a recent rate case, "the Multi-Stage DCF can be used when there is concern that short-term growth rates may not be sustainable over the longer-term."[70]

[69] Robert D. Arnott, *Equity Risk Premium Myths: Rethinking the Equity Risk Premium*, 2011(4) CFA Institute 97 (2011) https://bit.ly/3TjGiig.

[70] New Brunswick Energy and Utilities Board Docket No. 491, Liberty Utilities (Gas New Brunswick), *Prepared Direct Testimony: James M. Coyne*, at 39 (March 2021).

Q. WHAT IS YOUR SECOND OBSERVATION OR ANALYSIS THAT DEMONSTRATES THE UNREASONABLENESS OF USING ANALYSTS' 3-TO-5-YEAR EPS GROWTH RATE ESTIMATES FOR THE PERPETUITY DIVIDEND GROWTH RATE IN THE CG DCF?

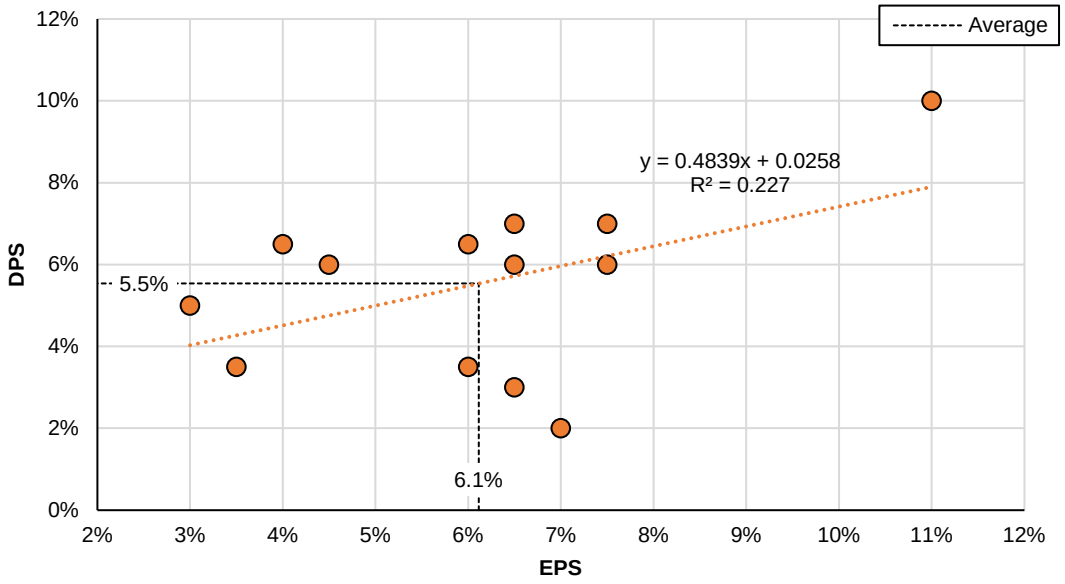
A. Mr. Coyne is correct that "[o]ver the long term … dividend growth can only be sustained by earnings growth,"[71] and EPS and DPS do tend to have similar growth rates over extended, multi-decade periods of time. Nonetheless, EPS growth rates are poor proxies for DPS growth over the 3-to-5-year horizon of analysts' EPS forecasts. This is observed in both forecast and historical data.

Few analysts provide both DPS and EPS projections, but Value Line, one source of Mr. Coyne's growth estimates, does provide both EPS and DPS growth forecasts, and its EPS and DPS projections vary considerably. Figure 11 compares Value Line's forecast EPS and DPS growth rates for the members of Mr. Coyne's proxy group. On average, the DPS growth rate is lower, 5.5% vs 6.1% for EPS; EPS overestimates expected dividend growth, introducing upward bias into Mr. Coyne's DCF results. More importantly, as shown in Figure 11, a cross-plot of Value Line's EPS and DPS growth rate estimates, the correlation between the two sets of numbers is low (R^2 coefficient of 0.23).

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[71] 2022 Rate Case Hr'g Tr. Vol. 1 at 654-55.

Figure 11. Value Line forecast EPS and DPS forecast growth rates[72]

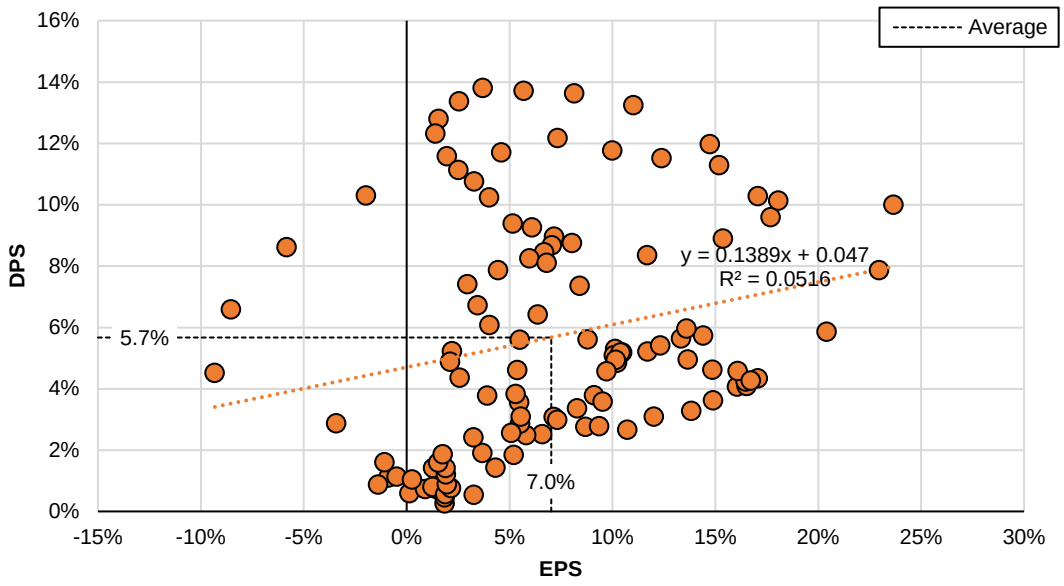


Historically, the variation between EPS and DPS is even greater. Figure 12 compares historical 5-year EPS and DPS growth rates for the S&P 500 from January 1988 through March 2022. Historically, average EPS growth has also been greater than DPS, 7.0% vs. 5.7%, and the correlation between EPS and DPS is even lower than for the forecast growth – R^2 coefficient of just 0.05.

[*Remainder of page intentionally left blank.*]

[72] M. Ellis analysis of data provided in GPC data request response STF-BAI-1-1 Attachment Coyne F: (Value Line reports for each member of Mr. Coyne's proxy group).

Figure 12. Historical S&P 500 EPS and DPS 5-year growth rates[73]



In both the historical and projected data, the average growth rate for EPS is higher than for DPS, seemingly contradicting Mr. Coyne's assertion that "earnings per share [and] dividends per share … grow at the same constant rate."[74] But EPS and DPS do, in fact, grow at roughly the same *compound* rate over the *long term*.[75] Nonetheless, analysts' 3-to-5-year forecast horizons are not long-term, and simply because earnings are more volatile than dividends, the figure reported for EPS growth over analysts' 3-to-5-year forecast period will tend to be higher than DPS, as both the historical growth rates in Figure 12 and the forecast growth rates in Figure 11 demonstrate.

This is due to the mathematical relationship between compound, or *geometric*, and *arithmetic* average growth rates.[76] An illustrative example demonstrates the principle. Suppose both EPS and DPS both grow at a compound average growth rate (CAGR) of 5% over 25 years, but they take different paths to get there. DPS grows at the same 5% every year, or

[73] M. Ellis analysis of data from S&P Dow Jones Indices, *S&P 500 Earning and Estimate Report* (September 30, 2022) https://www.spglobal.com/spdji/en/documents/additional-material/sp-500-eps-est.xlsx.

[74] 2022 Rate Case Hr'g Tr. Vol. 1 at 654.

[75] "Compound" refers to the single, constant growth rate at which an initial value would need to grow to reach a final value. Importantly, the initial value could follow any number of different growth paths to achieve the same compound growth rate. EPS and DPS can have the same compound growth rate over an extended, multi-decade period, but have very different growth rates over the intervening 5-year periods.

[76] *See, e.g.*, Educba, *Difference Between Geometric vs. Arithmetic Mean*, https://www.educba.com/geometric-mean-vs-arithmetic-mean/ (last accessed Oct. 20, 2022).

27.6% over each 5-year period. Annual EPS growth varies between -5% and +15% over each 5-year period, say 15% in the first 5 years, followed by -5%, 0%, 6%, and 10% over the next four 5-year periods. The average of the DPS growth rates over each of the 5-year periods is 5.0%, but the average of the EPS growth rates is 5.2%. The effect is relatively small, but it is another source of upward bias introduced by using EPS growth rates as a proxy for DPS growth.

For the two reasons observed in both forecast and historical data – overestimation on average and low correlation – EPS is a poor proxy for DPS, and it is inappropriate to assume that analysts' relatively short-term EPS growth estimates reasonably reflect investors' DPS growth expectations into perpetuity.

Q. WHAT IS YOUR THIRD OBSERVATION OR ANALYSIS THAT DEMONSTRATES THE UNREASONABLENESS OF USING ANALYSTS' 3-TO-5-YEAR EPS GROWTH RATE ESTIMATES FOR THE PERPETUITY DIVIDEND GROWTH RATE IN THE CG DCF?

A. EPS growth rate horizons are likely not compatible with the CG DCF's forecast horizon. The starting time periods of analysts' estimates are not specified with precision. S&P explains of its estimates:[77]

> Long Term Growth Rate (LTG) is a compound annual growth rate based on current and projected EPS values provided directly by the analysts. … Most analysts define LTG as an estimated average rate of earnings growth for the next 3-5 years. The exact time frame differs from broker to broker. Since the analysts providing LTG may differ from the analysts providing fiscal year estimates and the variation in time periods of 3-5 years, it is not possible to reconcile LTG with fiscal year estimates.

The starting points for Yahoo! Finance's estimates are similarly unknown:[78]

[77] *See* YCharts Financial Glossary, *Long Term Growth Rate*, https://ycharts.com/glossary/terms/eps_est_long_term_growth (last accessed July 22, 2022) (reporting estimates provided by S&P).

[78] *See* Stockopedia Financial Ratio Glossary, *Long Term Growth Forecast*, https://www.stockopedia.com/ratios/long-term-growth-forecast-5107/ (last accessed July 22, 2022) (Referring to Reuters, now Refinitiv, the source of Yahoo! Finance's estimates). *See also,* Yahoo!, *Exchanges and data providers on Yahoo Finance*, https://help.yahoo.com/kb/finance-for-web/SLN2310 html.

> [A]s most analysts do not provide the basis of the calculation of their growth rates, the estimates collected are assumed to include a combination of past and future years with at least one future period included, and are calculated on a compounded annual growth rate (CAGR) basis.

Value Line *does* specify the starting point and forecast horizon of its estimates. Nonetheless, Value Line's growth rate forecast horizons are virtually certain not to be consistent with the dividend yield used in the CG DCF, i.e., the end of the last trading day of the share price averaging period. The starting period for the Value Line growth estimates used by Mr. Coyne, for example, is '19-'21, the midpoint of which, June 2020, is almost three years before the first dividend payment in his DCF model.[79]

EPS can vary significantly from one year to the next, typically much more than the annual variation in DPS. Without knowing the forecast period, it is not possible to determine whether the estimate reflects the growth rate over the three to five years, much less the rate into perpetuity, from the starting point of the CG DCF. Following a year of poor performance, for example, expected growth would be elevated, potentially significantly above what could be sustained long-term.

The incompatibility of the growth estimates can be clearly observed in the data itself. For example, Value Line's growth rate for Edison International is reported as "not meaningful" because the company reported a loss in 2018, the first year of its growth forecast period. Yahoo! Finance's and Zacks's growth rates are both positive, presumably because the starting point of their growth rate forecasts are years in which Edison International reported a profit.[80]

[79] Mr. Coyne calculates average stock prices through April 30, 2022; *see* Ex. JMC-4, fn. 2. The CG DCF assumes annual dividend payments start one year later, or April 30, 2023.
[80] Ex. JMC-4.

Q. WHAT IS YOUR FOURTH OBSERVATION OR ANALYSIS THAT DEMONSTRATES THE UNREASONABLENESS OF USING ANALYSTS' 3-TO-5-YEAR EPS GROWTH RATE ESTIMATES FOR THE PERPETUITY DIVIDEND GROWTH RATE IN THE CG DCF?

A. The expected returns produced by a CG DCF model assuming DPS grows into perpetuity at analysts' 3-to-5-year EPS growth rates are inconsistent with analysts' own expected return forecasts.

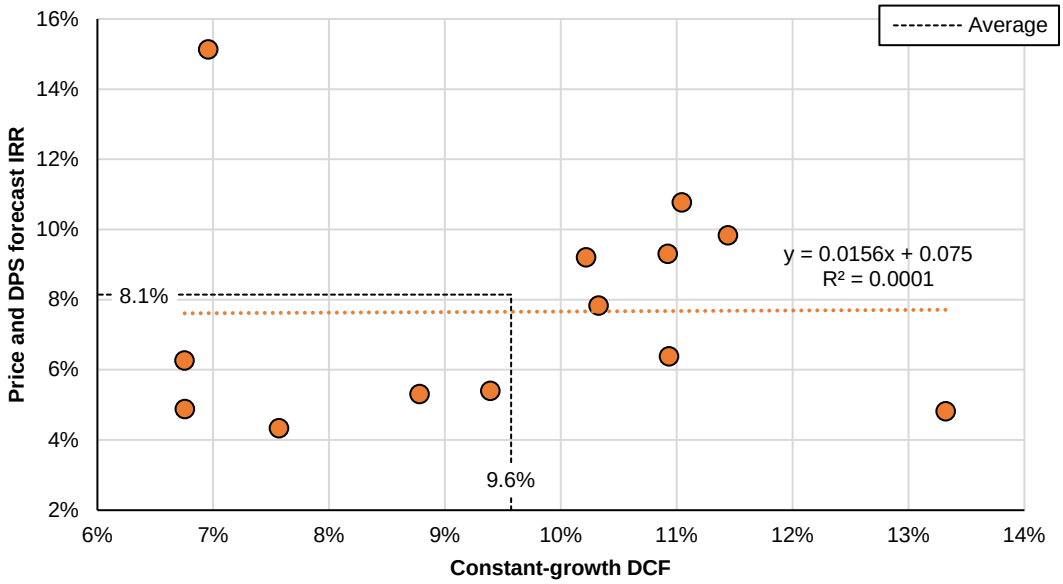
In addition to their EPS and DPS growth rates, Value Line publishes a variety of other forecasts, including for share prices.[81] These forecasts can be used to estimate Value Line's own expected return for each company, which can be compared to the CG DCF results using Value Line's dividend yield and EPS growth rate forecasts in Mr. Coyne's model.[82] Figure 13 compares the results of the two models. The horizontal axis is the COE estimated using Mr. Coyne CG DCF and Value Line's yield and EPS growth rate assumptions; the vertical axis is COE implied by Value Line's own dividend and price forecasts.

On average, the CG DCF COE estimates (9.6%) are significantly higher than the COE implied by Value Line's price and dividend forecast (8.1%). More importantly, there is virtually no correlation between the two sets of model results (R^2 = 0.0). A CG DCF COE based on Value Line's dividend yield and EPS growth bears almost no resemblance to the COE implied in its own dividend and price forecast. The analysts that provide 3-to-5-year EPS growth forecasts clearly do not assume those rates apply to dividends or will be sustained into perpetuity, as Mr. Coyne does. For Mr. Coyne's proxy group, Value Line assumes DPS will grow more slowly, on average, than EPS beyond its forecast horizon.

[81] Value Line reports do not include actual share price forecasts, but EPS and price-earnings multiple (P/E) forecasts. Price can be calculated by multiplying these two figures: P = EPS x P/E. *See* GPC data request response STF-BAI-1-1 Attachment Coyne F (Value Line reports for each member of Mr. Coyne's proxy group).

[82] A simple DCF model can be constructed from Value Line's most recent annual average price (investment), dividend forecast (with missing years interpolated assuming a constant growth rate), and'25-'27 price forecast (exit value). The COE is the internal rate of return (IRR) of this cash flow stream.

Figure 13. COE based on Value Line CG DCF and price and DPS forecast IRR[83]



Q. WHAT IS YOUR FIFTH OBSERVATION OR ANALYSIS THAT DEMONSTRATES THE UNREASONABLENESS OF USING ANALYSTS' 3-TO-5-YEAR EPS GROWTH RATE ESTIMATES FOR THE PERPETUITY DIVIDEND GROWTH RATE IN THE CG DCF?

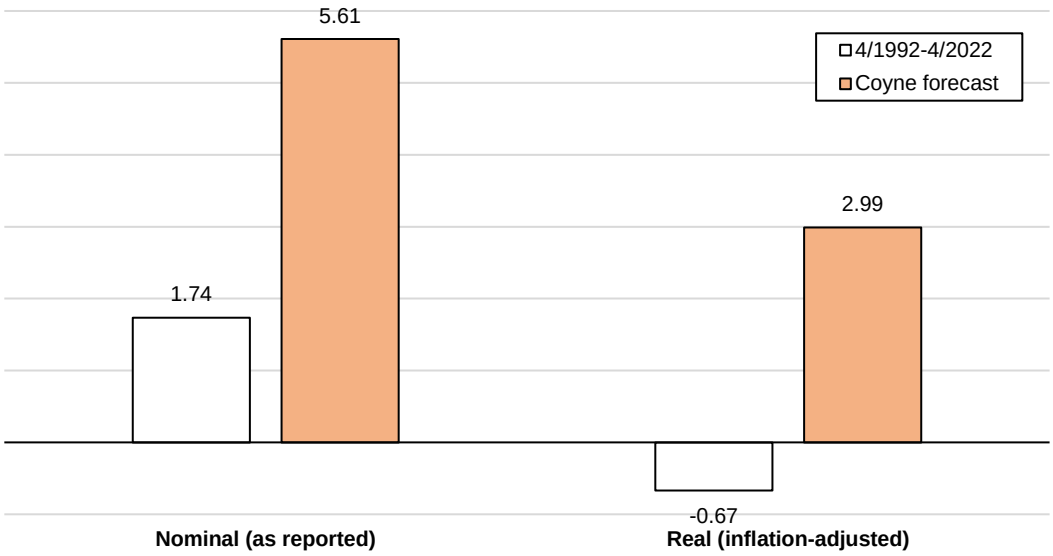
A. Analyst earnings (and, by assumption, dividend) growth forecasts tend to be higher than the companies' long-term historical results, additional evidence that analysts' 3-to-5-year growth forecasts are not sustainable into perpetuity and are therefore unreasonable assumptions in a CG DCF model.

Figure 14 compares the proxy group average growth forecasts to their historical 30-year (1992-2022) DPS compound annual growth rates (CAGR). On average, forecast rates are approximately 4% higher, in both nominal (as reported) and real (inflation-adjusted) terms, than the historical average. The ~4% difference between historical and forecast growth highlights the unreasonableness of assuming analysts' estimates into perpetuity.[84]

[83] M. Ellis analysis of data provided in GPC data request response STF-BAI-1-1 Attachment Coyne F (Value Line reports for each member of Mr. Coyne's proxy group).

[84] Forecast growth rates are adjusted by the monthly average Treasury-TIPS spread for April 2022, 2.54%, to correspond with Mr. Coyne's analysis.

Figure 14. Proxy group average historical and Coyne forecast dividend per share growth[85]
Percent



Q. GIVEN THE NUMEROUS SHORTCOMINGS OF ANALYSTS' FORECASTS, SHOULD THEY BE USED AT ALL IN DCF MODELS?

A. Discounted cash flow models can be a robust approach to estimating expected returns and are widely used throughout finance. The key shortcoming of the constant-growth version of the DCF model – assuming a relatively short-term growth rate into perpetuity – can be easily remedied by assuming that analysts' estimated growth rates apply only for a limited period, after which they converge toward a market- or sector-average terminal growth rate in a multi-stage DCF model (MS DCF), which I describe in more detail in IV.D below. Despite the various deficiencies in analysts' estimates even in the short-term, they are viewed as the best available estimates of near-term investor expectations. That said, relatively little weight should be placed on them in estimating the cost of equity, and the MS DCF model can weight them more appropriately.

[85] M. Ellis analysis of S&P GMI and U.S. Bureau of Labor Statistics (BLS) data (last accessed October 2, 2022); Ex. JMC-4.

3. Mr. Coyne's flawed DCF results should be disregarded.

Q. WHAT IS YOUR CONCLUSION REGARDING MR. COYNE'S DCF RESULTS?

A. Mr. Coyne's DCF model results should be disregarded completely. While, in principle, a constant-growth DCF model could be used to estimate the cost of equity, Mr. Coyne's implementation is deeply flawed. Its dividend yield calculations use excessively long historical price data series, introducing upward bias into the results. More critically, Mr. Coyne's DCF unrealistically assumes analysts' EPS growth estimates are valid for forecasting dividends into perpetuity. Several analyses demonstrate the invalidity of this assumption: the economic impossibility of sustaining EPS growth forecasts even for one decade, much less into perpetuity; the low correlation between analysts' EPS and DPS growth forecasts; the unknown starting period for analyst growth forecasts and therefore likely inconsistency with the DCF model's starting period; the inconsistency between the CG DCF results and analysts' own implied expected return estimates; and the wide disparity between analyst forecasts and utilities' long-term historical DPS growth rates.

D. The Multi-Stage DCF should be used instead of the CG DCF because it allows more realistic cash flow projections, yielding more accurate results.

1. The multi-stage DCF model enhances the CG DCF by allowing different dividend growth rates over time.

Q. WHAT IS THE MULTI-STAGE DCF MODEL?

A. The multi-stage DCF model (MS DCF) enhances the CG DCF by allowing different dividend growth rates over time. As we saw previously, analysts' estimated 3-to-5-year growth rates are too high to be sustained in perpetuity, and may be biased. But analyst estimates should not be ignored completely. Analysts' estimated 3-to-5 year growth rates provide useful information about the relative expected growth across companies. Over the long term though, it is reasonable to assume investors expect growth rates, in real terms, to revert to their long-term historical trends. The MS DCF explicitly models different growth rates over time.

The MS DCF can incorporate any number of stages. For equity valuation, a three-stage model is commonly used, in which the initial stage uses analysts' estimates over their 3-to-5-year forecast horizon, and the terminal stage uses the long-term real historical growth rate plus current long-term inflation expectations. In between lies a transition phase, typically 5 to 15

years, in which the growth rate is the simple average of the initial and terminal rates. The MS DCF model can be expressed as:

$$1 = d\frac{1+g_1}{k-g_1}\left(1-\left(\frac{1+g_1}{1+k}\right)^{t_1}\right) + d\left(\frac{1+g_1}{1+k}\right)^{t_1}\frac{1+g_2}{k-g_2}\left(1-\left(\frac{1+g_2}{1+k}\right)^{t_2}\right) + d\left(\frac{1+g_1}{1+k}\right)^{t_1}\left(\frac{1+g_2}{1+k}\right)^{t_2}\frac{1+g_3}{k-g_3}$$

where d is the current dividend yield; g_1, g_2, and g_3 are the initial, transition, and terminal growth rates, respectively (where $g_2 = \sqrt{(1+g_1)(1+g_3)} - 1$);[86] t_1 and t_2 are the initial and transition stage durations; and k is the cost of equity such that the equation is true. Substantial precedent exists for the MS DCF model, in both its two- and three-stage forms, in both corporate finance and regulatory contexts.[87]

In my implementation of the MS DCF, I assume an initial growth stage of three years – the low end of analysts' EPS growth rate forecast horizon, to mitigate the effect of their upward bias – and a 10-year transition. To account for the quarterly distribution of dividends, I convert the reported rates to quarterly and multiply the number of periods in the initial and transition phases by 4.[88] The dividend yield is the most recent quarterly dividend divided by the average price over December 2021.

2. The MS DCF's initial growth rate can be estimated from analysts' EPS growth forecasts.

Q. HOW DO YOU ESTIMATE THE INITIAL GROWTH RATE FOR THE MS DCF?

A. I use an average of analysts' EPS growth forecasts from S&P Global Market Intelligence (S&P GMI), Yahoo! Finance, and Zacks.

3. The MS DCF's terminal growth rate can be estimated from expected inflation, based on utilities' long-term historical dividend growth.

Q. HOW DO YOU ESTIMATE THE TERMINAL GROWTH RATE FOR THE MS DCF?

A. The terminal growth rate is intended to reflect a sector-wide dividend growth rate toward which all stocks in the peer group are expected to converge over the long term. Figure 15 shows real

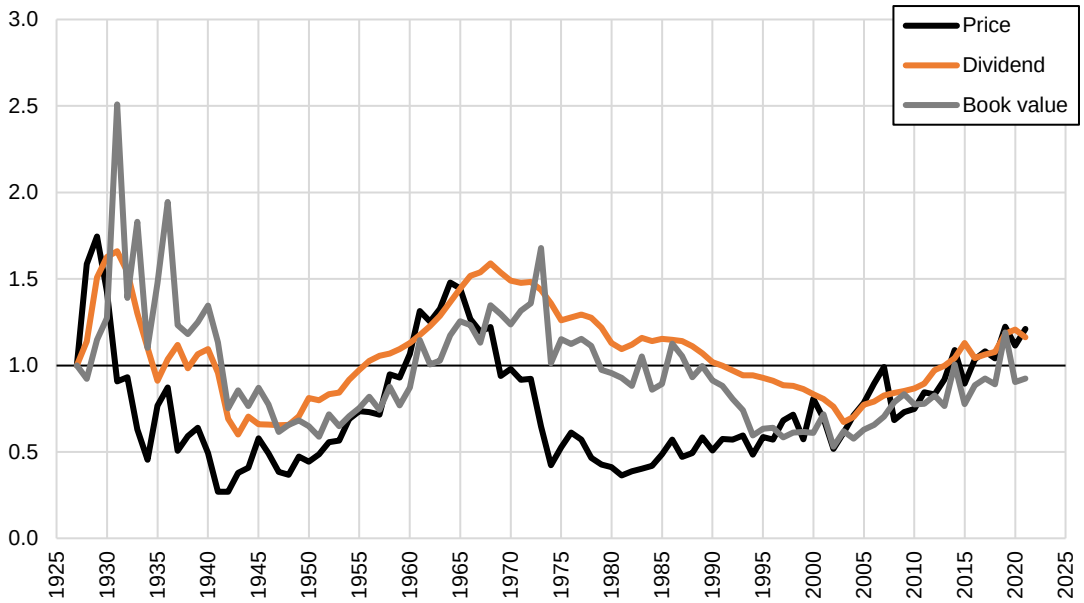
[86] The geometric mean of g_1 and g_3 is used to ensure consistency between annual and quarterly versions of the model.

[87] *See, e.g.*, RICHARD BREALEY, STEWART MYERS, FRANKLIN ALLEN, PRINCIPLES OF CORPORATE FINANCE, MCGRAW HILL/IRWIN 10TH ED. at 83-88 (2010).; Surface Transportation Board, *Use of a multi-stage discounted cash flow model in determining the railroad industry's cost of capital*, 73 Fed. Reg. 47642, 47642-47644 (2008) https://bit.ly/3s9fIMT.

[88] All rates are converted from annual (r_a) to quarterly (r_q) using the formula: $r_q = (1+r_a)^{\frac{1}{4}} - 1$.

utility-sector dividend, price, and book value per share from 1927 through 2020. While there have been periods of growth and decline, the long-term trend for both has been in line with inflation for over 90 years. Based on this long-term history, the terminal growth rate in the MS DCF for the GPC proxy group is assumed to be equal to long-term inflation.

Figure 15. Utility sector real dividend and book value per share, 1927-2021[89]
1927=1.0



For the market as a whole, long-term real DPS growth has tracked GDP per capita, about 1.9% per year.[90] At any given time, some sectors grow faster, some slower. The technology and healthcare industries, for example, have sustained DPS growth rates higher than the market average for decades. Utilities are a mature industry, though, and end-use demand for electricity, gas, and water has grown more slowly than GDP for decades, so it is not unreasonable for utility companies' per-share dividend growth to lag the market as whole. The long-term track record of essentially zero real dividend growth further highlights the unreasonableness of Mr. Coyne's assumption that analyst growth forecasts can be sustained into perpetuity.

[89] M. Ellis analysis of FDL and BLS data (both last accessed October 2, 2022).
[90] *See, e.g.*, ROGER IBBOTSON, JAMES HARRINGTON, STOCKS, BONDS, BILLS, AND INFLATION 2021 SUMMARY EDITION, CFA INSTITUTE RESEARCH FOUNDATION BOOKS at 157-60 (2021) (analysis is for total payout to account for the effect of net stock repurchases).

Q. HOW DO YOU ESTIMATE EXPECTED LONG-TERM INFLATION?

A. For expected long-term inflation, I use Treasury-TIPS spreads. TIPS are Treasury Inflation-Protected Securities, which provide investors a return equivalent to inflation plus the quoted TIPS yield. The difference in yield between Treasurys and TIPS of equal maturity is a current measure of the market's forward-looking inflation expectation over the life of the bonds.

The MS DCF uses inflation for the terminal, not initial or transition, growth rate, so inflation into perpetuity is estimated at the end of the transition phase, not from today. I use the expected inflation, i_{lt}, rate over the period from 20 to 30 years from now, as implied by the difference in the 30-year and 20-year Treasury-TIPS spreads:

$$i_{lt} = \left(\frac{(1+i_{30})^{30}}{(1+i_{20})^{20}}\right)^{\frac{1}{10}} - 1$$

Using average Treasury yields for the month of September 2022, the long-term inflation estimate is 1.45%.[91]

4. <u>The MS DCF produces COE estimates substantially lower than Mr. Coyne's CG DCF.</u>

Q. WHAT ARE YOUR MS DCF COE RESULTS?

A. Figure 16 summarizes the MS DCF results for the GPC proxy group. The average COE for the GPC proxy group is 6.0% – substantially lower than Mr. Coyne's corresponding CG DCF average results of 8%-10%.[92]

[*Remainder of page intentionally left blank.*]

[91] M. Ellis analysis of FRED data (last accessed October 2, 2022).
[92] 2022 Rate Case Hr'g Tr. Vol. 1 at 656 (Sept. 28, 2022).

Figure 16. GPC proxy group multi-stage discounted cash flow COE[93]
As of September 2022

Utility	Price	DPS	Yield %	Initial growth rate (%) S&P GMI	Yahoo!	Zacks	Average	COE %
ALLETE	57.42	2.60	4.53	6.11	8.70	8.15	7.65	8.25
Alliant	60.19	1.71	2.84	6.03	6.30	6.16	6.16	5.50
Ameren	90.72	2.36	2.60	7.25	6.37	7.20	6.94	5.36
AEP	99.21	3.12	3.14	6.25	6.25	6.11	6.20	5.92
Duke	104.95	4.02	3.83	5.64	5.62	6.09	5.78	6.70
Edison Int'l	66.00	2.80	4.24	4.15	4.35	2.97	3.82	6.61
Entergy	113.82	4.04	3.55	6.13	6.19	6.76	6.36	6.50
Evergy	66.72	2.29	3.43	6.37	3.71	5.24	5.11	6.00
Hawaiian Electric	38.13	1.40	3.67	5.28	1.30	2.57	3.05	5.73
IDACORP	107.90	3.00	2.78	4.62	2.70	2.67	3.33	4.78
NextEra	85.43	1.70	1.99	9.88	9.35	9.66	9.63	5.03
OGE	40.35	1.64	4.06	1.50	1.90	3.47	2.29	5.96
Portland General	49.99	1.81	3.62	4.25	3.16	4.63	4.01	5.93
Xcel	72.91	1.95	2.67	6.12	7.04	6.43	6.53	5.37
Mean			**3.36**				**5.49**	**5.97**

Q. DO YOU USE THE MS DCF ELSEWHERE IN YOUR ANALYSIS?

A. Yes. I use it as one of two methods to estimate the market risk premium for the CAPM.

E. Mr. Coyne makes unrealistic, upwardly biased assumptions for all three inputs into his CAPM.

Q. WHAT IS THE CAPITAL ASSET PRICING MODEL?

A. Mr. Coyne's analysis incorporates another well-known COE model, the capital asset pricing model (CAPM). It estimates the cost of equity, k, from the formula:

$$k = r_f + \beta(r_m - r_f)$$

where r_f is the risk-free rate (typically a long-term U.S. Treasury), r_m is the expected return on the market, and β is a measure of risk of the company in question relative to the market. The market risk premium (MRP), the difference between the market return and the risk-free rate, $r_m - r_f$, reflects the additional return investors require as compensation for taking on equity market risk. The CAPM is a simple model of the fundamental financial risk-reward trade-off: investors demand higher returns as risk increases.

[93] S&P GMI; Refinitiv via Yahoo! Finance (https://finance.yahoo.com/); Zacks (https://www.zacks.com/) (last accessed October 2, 2022).

1. The source of Mr. Coyne's risk-free rate assumption has a long and widely known track record of upwardly biased interest rate forecasts.

Q. WHAT RISK-FREE RATE DOES MR. COYNE USE IN HIS CAPM?

A. Mr. Coyne uses the 30-year Treasury (T30). Because the models estimate the expected return on equity, which is a claim on cash flows into perpetuity, the longest-term rate available should be used. The 30-year Treasury is the longest-term risk-free rate, so the T30 is an appropriate term. Mr. Coyne calculates his CAPM COE estimates using both recent historical average and forecast Treasury rates.

Q. DO YOU HAVE ANY CONCERNS WITH MR. COYNE'S RISK-FREE RATE ESTIMATES?

A. Yes, I have two concerns. First, as with the average price calculation for the dividend yield in his DCF model, Mr. Coyne's historical T30 averaging period, 30 days, is too long. Curiously, Mr. Coyne provides no explanation for the use of different averaging periods in the two different models. One month of trading data, typically 20-22 days, is sufficient. Nonetheless, the difference in trailing averaging periods for interest rates generally does not introduce any bias in the results because, unlike stock prices, which tend to exhibit an upward trend over time, daily movements interest rates are random.

Q. WHAT IS YOUR SECOND CONCERN WITH MR. COYNE'S RISK-FREE RATE ESTIMATES?

A. My second concern involves his use of a forecast rate. Using a forecast rate creates inconsistencies with the time horizon of the DCF, which is estimated as of today (or, more precisely, as of the end of the trailing price averaging period). The mathematical formula for the present value of a periodic time series upon which the DCF is based discounts the stream of future cash flows to a "time zero" one period before the first payment. The resulting discount rate is as of that time zero. The first payment in the DCF model is typically assumed to occur one time step from today; therefore, the rate determined by the DCF model is as of today. Using an interest rate expected at some future date in the CAPM produces a COE as of that future date, not today, and that COE is not directly comparable to the DCF's COE.

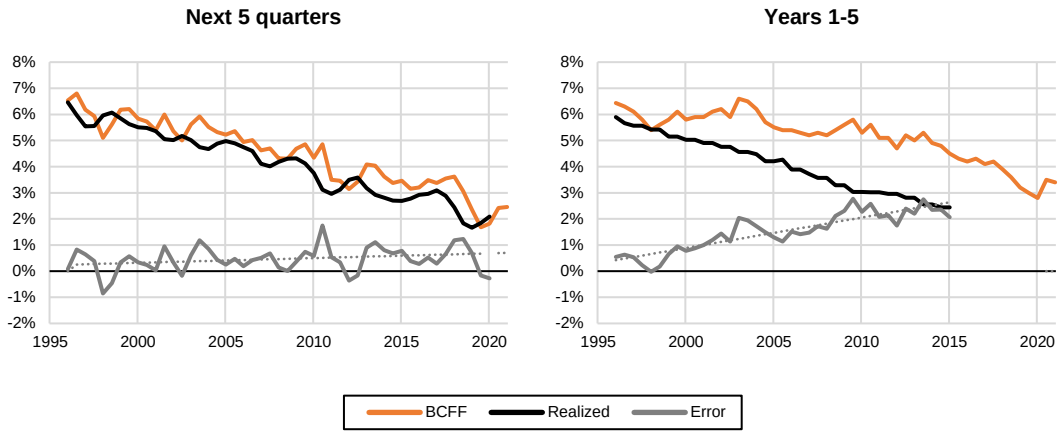
Ignoring the consistency concern, even if we did want to use a forecast rate, in general, commonly available interest rate forecasts are no better predictors of future interest rates than the current market rate. Most importantly, though, I am particularly concerned about Mr.

Coyne's chosen source for his interest rate forecast, Blue Chip Financial Forecasts (BCFF). BCFF's 30-year Treasury forecast has an exceptionally poor track record.

Q. HOW ACCURATE HAVE THE BLUE CHIP FINANCIAL FORECASTS 30-YEAR TREASURY FORECASTS BEEN IN THE PAST/HISTORICALLY?

A. BCFF has a multi-decade track record of producing systematically upwardly-biased forecasts, and the errors have only increased over time. Figure 17 compares the BCFF forecasts used by Mr. Coyne – the average of the next five quarters and years one to five – to their corresponding future average realized rates, going back to BCFF's first long-range forecast in December 1996. The chart shows that BCFF's 30-year Treasury forecasts have consistently overestimated future rates, and the forecast errors have tended to increase over time.

Figure 17. BCFF 30-year Treasury forecast vs. average realized rate[94]



Q. HOW DOES MR. COYNE JUSTIFY HIS USE OF FORECASTS WITH SUCH A POOR TRACK RECORD?

A. Mr. Coyne cites a Massachusetts regulatory decision to argue that "Blue Chip Financial Forecasts is widely relied on by investors and provides a useful proxy for investor expectations for the risk-free rate."[95] BCFF may be relied upon by *some* investors, but no basis exists for Mr. Coyne's claim that BCFF forecasts represent a reasonable proxy for investor expectations.

[94] M. Ellis analysis of BCFF and FRED data. From June 2002 through June 2005, BCFF forecast the long-term average of the 20-year Treasury instead of the 30-year. Those forecasts are used in this analysis and compared to subsequent actual 20-year Treasury rates.

[95] 2022 Rate Case Hr'g Tr. Vol. 1 at 660 (Sept. 28, 2022).

BCFF has no more than a hundred thousand subscribers,[96] less than 0.1% of the hundreds of millions of investors who are exposed to Treasury rates through direct investments or as a benchmark for other investments.[97] Although utility cost of capital experts routinely argue that these forecasts represent the "market's view," 0.1% in no way represents the market. The hundreds of millions of market participants respond to all kinds of information, and the small slice of the market used by Mr. Coyne, via BCFF, does not represent an adequate or reasonably proxy.

Mr. Coyne's argument also implicitly assumes that investors rely *only* on BCFF forecasts, to the exclusion of all other ways that investors might develop their expectations; that they rely on BCFF's forecasts as-is, with no adjustment for their historical inaccuracy; and that investors' only use of the forecasts is for investment decisions. None of Mr. Coyne's assumptions is true. The consistent errors in BCFF forecasts are well-known; the Congressional Budget Office has issued public reports on BCFF's interest rate forecasting errors for nearly twenty years.[98] Many investors undoubtedly take BCFF's forecasts "with a grain of salt" and inform their decisions with other forecasts and information. Finally, BCFF reports include dozens of other forecasts, as well as commentary and analysis. Investors might "rely" on the reports for that other content, not BCFF's interest rate forecasts, per se.

Q. SUPPOSE WE IGNORED THE CONCERN YOU EXPRESSED ABOUT CONSISTENCY WITH THE DCF AND WANTED A FORECAST RISK-FREE INTEREST RATE ASSUMPTION FOR THE CAPM. WHAT SHOULD WE USE?

A. It turns out that current interest rates generally provide an unbiased forecast of future rates. Figure 18 is a cross-plot of the 20-year Treasury rate one year ahead against the current rate. Current interest rates account for approximately 91% of the variation in future interest rates;

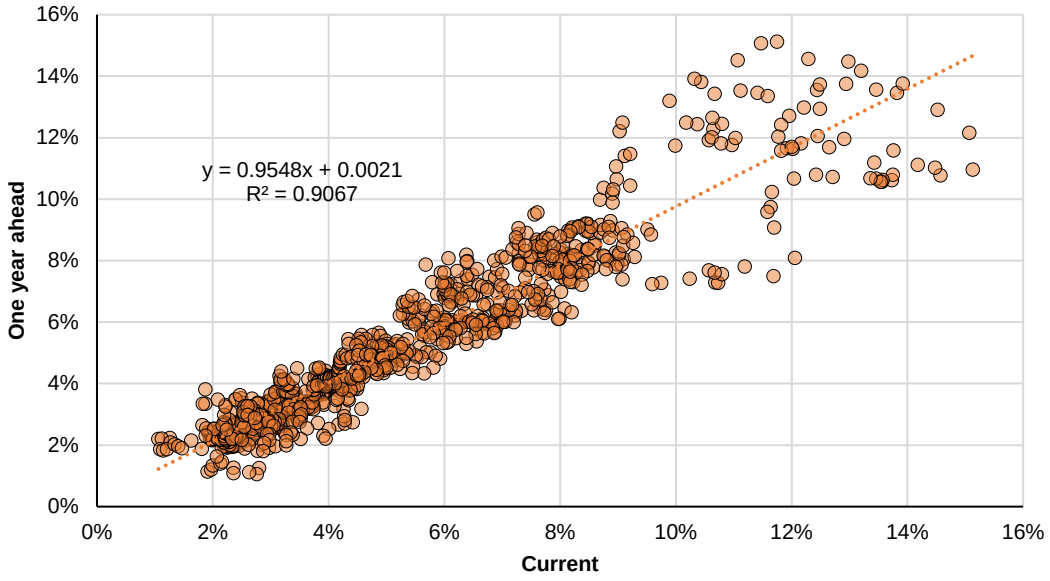
[96] In the 2020 annual report of Wolter Kluwers, BCFF's owner, $905 million of revenue was attributed to the Legal & Regulatory segment, of which BCFF is just 1 of 99 offerings. *See* https://www.wolterskluwer.com/en/legal/our-solutions. BCFF costs approximately $2,500/year. Even assuming BCFF accounts for 10% of segment revenue – roughly ten times the segment average – BCFF has no more than 40,000 subscribers.

[97] More than half of U.S. adults and households are invested in the stock market. *See, e.g.*, Kim Parker and Richard Fry, *More than half of U.S. households have some investment in the stock market*, Pew Research Center (March 25, 2020), https://www.pewresearch.org/fact-tank/2020/03/25/more-than-half-of-u-s-households-have-some-investment-in-the-stock-market/; Lydia Saad and Jeffrey Jones, *What Percentage of Americans Owns Stock*, Gallup (May 12, 2022), https://news.gallup.com/poll/266807/percentage-americans-owns-stock.aspx.

[98] *See, e.g.*, Congressional Budget Office, *CBO's Economic Forecasting Record* at 13, 18 (Nov. 2002), https://www.cbo.gov/sites/default/files/107th-congress-2001-2002/reports/11-07-economicforecast.pdf.

for rates two years in the future, current interest rates explain 83% of the variation in future interest rates, and for rates in three years, current interest rates explain 79%. Regardless of the forecast horizon, the current rate is unbiased – exhibiting no tendency to be systematically too high or too low.[99] Similar predictive validity is obtained for 30-year Treasury and corporate bonds.[100]

Figure 18. Twenty-year Treasury rate, one year in the future vs. current[101]
January 1925-September 2022



More intuitively, markets are forward-looking. If investors expect interest rates to rise, their expectations will be incorporated into current yields. Consider the alternative. Suppose an investor expects the yield on the 30-year Treasury to rise from its current ~3% to 4% over the next six months. There is an inverse relationship between a bond's value and a bond's yield; when the yield rises, the value falls, and vice versa. An investor who expects bond yields to rise would not buy a bond today, because to do so would be to invest expecting a loss; better not to buy the bond at all. But market participants *do* buy at the current 3%, implying that the

[99] The bias in a forecast can be assessed from the decomposition of the mean square error into bias, inefficiency, and random variation components. For the 20-year Treasury, bias accounts for less than 0.2% of forecast error at all three forecast horizons. *See, e.g.*, Jacob Mincer and Zarnowitz, *The Evaluation of Economic Forecasts*, Economic Forecasts and Expectations: Analysis of Forecasting Behavior and Performance at 3-46 (NBER, 1969), http://www nber.org/chapters/c1214.

[100] The 20-year Treasury is used here because much more historical data are available.

[101] M. Ellis analysis of FRED data (last accessed October 2, 2022).

market overall does *not* expect rates to rise in the future. Current yields are the best predictor of future yields, especially for longer-term bonds.

The predictive validity of current rates has been acknowledged among utility cost of capital experts. Reviewing the academic research, Roger Morin, author of the frequently cited practitioner text, *New Regulatory Finance*, concludes, "The literature suggests that on balance, the bond market is very efficient in that it is difficult to consistently forecast interest rates with greater accuracy than a no-change [from the current interest rate] model."[102]

BCFF's consistently poor track record, the high predictive validity of current interest rates, and economic intuition are consistent with an extensive body of research on the superiority of simple prediction models to both more complex models and expert judgment.[103]

Current interest rates are the most accurate and unbiased publicly available estimates for future interest rates that I am aware of. Conveniently, using the current rate also entirely skirts the potential concern about horizon inconsistency with the DCF.

2. Mr. Coyne cherry-picks his beta calculation methodology, ignoring the wide variety of valid potential approaches and best practice for choosing among them.

Q. HOW DOES MR. COYNE ESTIMATE THE BETA IN HIS CAPM MODEL?

A. Mr. Coyne uses beta estimates from two different financial data providers, Value Line and Bloomberg. He uses Value Line's betas as reported. Mr. Coyne overrides Bloomberg's default settings and uses only a subset of the beta estimates Bloomberg provides, such that the calculation methodology and resulting beta estimates he reports for Bloomberg are very similar to Value Line's.

Importantly, Mr. Coyne selects two nearly identical beta calculation methodologies among the multitude of methodologies commonly used by practitioners and academics, specifically the two that currently tend to produce the highest results.

Q. HOW DO BLOOMBERG AND VALUE LINE ESTIMATE THEIR BETAS?

A. Both Bloomberg and Value Line estimate beta from the slope of a linear regression model of a stock's returns against the returns of the market overall. Both calculate "raw" betas from a

[102] ROGER A. MORIN, NEW REGULATORY FINANCE, PUB. UTIL. REPORTS at 172 (2006).
[103] *See, e.g.*, DANIEL KAHNEMAN, OLIVIER SIBONY, CASS SUNSTEIN, NOISE: A FLAW IN HUMAN JUDGMENT, HACHETTE BOOK GROUP at 111-147 (2021).

regression of trailing weekly, price-only returns of the stock in question against the corresponding market returns. Both also report "Blume-adjusted" betas – a weighted-average of approximately 2/3 of the raw beta and 1/3 of the market average of 1.0 – to correct for an empirically observed tendency for betas, on average, to regress toward the market mean over time that I discuss in more detail below.[104] Other details of their respective methodologies differ, which is why their beta estimates are not exactly the same even after Mr. Coyne's modifications to Bloomberg's defaults. Figure 19 summarizes the key elements of Value Line's and Bloomberg's beta estimation methodologies.

Figure 19. Value Line and Bloomberg beta estimation methodologies[105]

Parameter	Value Line	Bloomberg (default)
Return frequency	Weekly	Weekly
Trailing history	5 years	2 years
Index	NYSE Composite	S&P 500
Return calculation		
Price-only/total	Price-only	Price-only
Excess/absolute	Absolute	Absolute
Simple/logarithmic	Logarithmic	Simple
Blume adjustment parameters	0.65 x raw + 0.37	None (unadjusted) 2/3 x raw + 1/3
Rounding	Nearest 0.05	None
Updating frequency	Approximately quarterly	Daily

Q. MR. COYNE WRITES, "[I]T IS IMPORTANT TO EMPHASIZE THAT BETA COEFFICIENTS ARE CALCULATED OVER A FIVE-YEAR PERIOD." IS FIVE YEARS OF WEEKLY RETURNS WITH THE BLUME ADJUSTMENT THE ONLY WAY TO CALCULATE BETA?

A. No. Academic studies commonly use five years of *monthly* returns, without the Blume adjustment. Other financial data providers, including some used by Mr. Coyne elsewhere in his analysis, calculate beta using different trailing histories, return frequencies, and without the Blume adjustment. Yahoo! Finance and Zacks – data sources for some of Mr. Coyne's other

[104] Value Line reports only the Blume-adjusted beta. Bloomberg reports both raw and adjusted beta.

[105] Value Line, "Estimation of Beta by Value Line"; Bloomberg Professional Workstation Guide; "BETA, HRA, BETA, HRA, and CORR Calculation FAQs." Simple price-only returns: $r = \frac{P_{t+1}}{P_t} - 1$; logarithmic price-only returns: $r = \ln \frac{P_{t+1}}{P_t}$.

cost of capital analyses[106] – use five years of monthly returns and are unadjusted, like many academic studies. S&P Global Market Intelligence (S&P GMI), another data source frequently cited by Mr. Coyne,[107] reports 1- and 3-year betas using daily returns, also without the Blume adjustment.[108]

Bloomberg's default trailing history is 2 years. Bloomberg allows users to override several of its calculation parameters, such as the trailing history, market index, and return frequency. Bloomberg also reports both raw and adjusted beta by default. Mr. Coyne apparently overrode Bloomberg's default trailing history parameter and simply ignored its raw beta estimates to arrive at the Bloomberg betas used in his CAPM, which are nearly identical to those provided by Value Line.

Figure 20 lists recent betas from S&P GMI, Yahoo! Finance, and Zacks for Mr. Coyne's GPC proxy group. The average betas are 0.43 and 0.76 for S&P GMI using 1 and 3 years of daily returns, and 0.48 for Yahoo! Finance and Zacks, both using 5 years of monthly returns. All four sources' beta estimates are lower than Mr. Coyne's 0.85-0.88 figures.[109]

Figure 20. S&P GMI, Yahoo! Finance, and Zacks betas[110]
As of September 30, 2022

Utility	Ticker	S&P GMI 1-year daily	S&P GMI 3-year daily	Yahoo! Finance 5-year monthly	Zacks 5-year monthly
ALLETE	ALE	0.44	0.88	0.61	0.61
Alliant	LNT	0.39	0.66	0.46	0.47
Ameren	AEE	0.40	0.72	0.36	0.35
AEP	AEP	0.42	0.61	0.34	0.34
Duke	DUK	0.32	0.71	0.35	0.35
Edison Int'l	EIX	0.53	0.82	0.68	0.67
Entergy	ETR	0.42	0.84	0.57	0.57
Evergy	EVRG	0.44	0.84	0.48	0.48
Hawaiian Electric	HE	0.41	0.66	0.32	0.32
IDACORP	IDA	0.38	0.73	0.56	0.56
NextEra	NEE	0.68	0.84	0.46	0.46
OGE	OGE	0.44	0.77	0.65	0.67
Portland General	POR	0.34	0.81	0.52	0.51
Xcel	XEL	0.37	0.68	0.35	0.34
Mean		**0.43**	**0.76**	**0.48**	**0.48**

[106] Mr. Coyne uses Yahoo! Finance and Zacks EPS growth rates in his DCF model. *See* Ex. JMC-4.
[107] *See, e.g.*, Ex. JMC-9.
[108] M. Ellis analysis of S&P GMI data.
[109] Ex. JMC-5.2.
[110] M. Ellis analysis of S&P GMI data; Yahoo! Finance; Zacks.

Q. WHY DO BLOOMBERG AND OTHER FINANCIAL DATA PROVIDERS USE DIFFERENT BETA CALCULATION METHODOLOGIES, PROVIDE MULTIPLE ESTIMATES, AND ALLOW USERS TO OVERRIDE THEIR DEFAULTS?

A. Beta is intended to be a *forward-looking* measure of relative risk, so it is inherently uncertain. It cannot be measured directly (like an interest rate) and is usually estimated from *historical* data, as the slope of the regression of the returns of a stock against the returns of the market over a recently-ended historical period. Estimates based on historical data generally reasonably reflect future expectations, because most companies' risk profiles change slowly over time. Slowly changing risk profiles prove particularly true for the relatively stable and predictable utility sector.

But if a dramatic change in the market or in individual stocks occurs, as in the pandemic-related market turmoil of early 2020, that change will influence the beta estimate for as long as the period of change is included in the trailing data used in the beta calculation, even if investors' risk perceptions have returned to their level prior to the dramatic change. Analysts should always examine whether the change in market conditions was temporary or is sustained. Mr. Coyle's analysis suffers from his failure to examine whether the pandemic-related change in market conditions was temporary or has been sustained.

Q. HOW CAN WE DETERMINE WHETHER THE CHANGE IN INVESTORS' RISK PERCEPTIONS WAS TEMPORARY OR HAS BEEN SUSTAINED?

A. Determining whether the change in investors' risk perception was temporary or has been sustained is typically done by examining how betas calculated using different amounts of trailing data and returns calculated at different frequencies – for example, daily, weekly, or monthly – have changed over time.

Q. IS THE NEED TO ESTIMATE BETA USING DIFFERENT METHODOLOGIES WELL KNOWN?

A. Yes. Utility cost of capital expert witnesses Michael Vilbert and Bente Villadsen have written about the trade-offs of different methodologies, highlighting the need to consider shorter calculation intervals in the wake of abrupt disruptions such as was experienced first during and then immediately after the pandemic-driven bout of market turmoil in early 2020:

> The choices for the interval for the return data and the length of the beta estimation window involve trade-offs between obtaining more observations through the choice of a longer window and/or more frequent return data, ensuring that no structural change has occurred during the estimation window, and avoiding problems due to insufficient trading activity. … Balancing these considerations, economists typically recommend estimating beta using daily, weekly, or monthly returns over the most recent 2- to 5-year period, with weekly being the more common, *except if there are reasons to think that the industry might be subject to recent changes in systematic risk so that the use of a more recent data window is desirable*.[111]

The need to examine beta using different calculation methodologies is also reflected in data providers' offerings. As explained previously, Bloomberg allows users to easily override its default beta calculation parameters. S&P GMI, in addition to reporting betas calculated using 1 and 3 years of trailing data, provides its users with spreadsheet models that allow them to modify all of its beta calculation parameters.

In using both Value *and* Bloomberg betas, Mr. Coyne implicitly acknowledges that no single beta calculation methodology necessarily reflects current investor expectations. But the differences in the Value Line and (modified) Bloomberg beta methodologies he uses are immaterial. Their different market indexes – NYSE Composite for Value Line, S&P 500 for Bloomberg – are nearly perfectly correlated (0.96 correlation[112]), and their slightly different Blume adjustment weights yield differences in beta of 2% or less across the range of typical raw utility betas (0.4-1.0). Mr. Coyne's chosen methodologies hardly reflect the wide range of ways beta could be calculated, each of which could produce dramatically different results. As Nobel laureate Fischer Black, one of the pioneers of empirical testing of beta and the CAPM, famously admonished, "Watch out for data mining!"[113] – running an analysis several different ways but reporting only the outcomes that support one's conclusions.

[111] BENTE VILLADSEN, MICHAEL J. VILBERT, DAN HARRIS, LAWRENCE KOLBE, RISK AND RETURN FOR REGULATED INDUSTRIES, ACADEMIC PRESS at 73-76 (2017) (emphasis added).

[112] Correlation between five years of weekly, simple, price-only, absolute returns for the S&P 500 and NYSE Composite Indexes, through February 25, 2022. M. Ellis analysis of S&P GMI data.

[113] Fischer Black, *Beta and Return*, 20(1) J. Portfolio Management 8 (1993), https://jpm.pm-research.com/content/20/1/8.

Q. WHICH METHODOLOGICAL DIFFERENCES ACCOUNT FOR THE MOST VARIATION IN BETA ESTIMATES?

A. The largest potential sources of variation in beta estimates arise from their trailing return history duration, return calculation frequency, and Blume adjustment parameters.

Q. HOW DOES THE DURATION OF TRAILING RETURN HISTORY AFFECT BETA ESTIMATES?

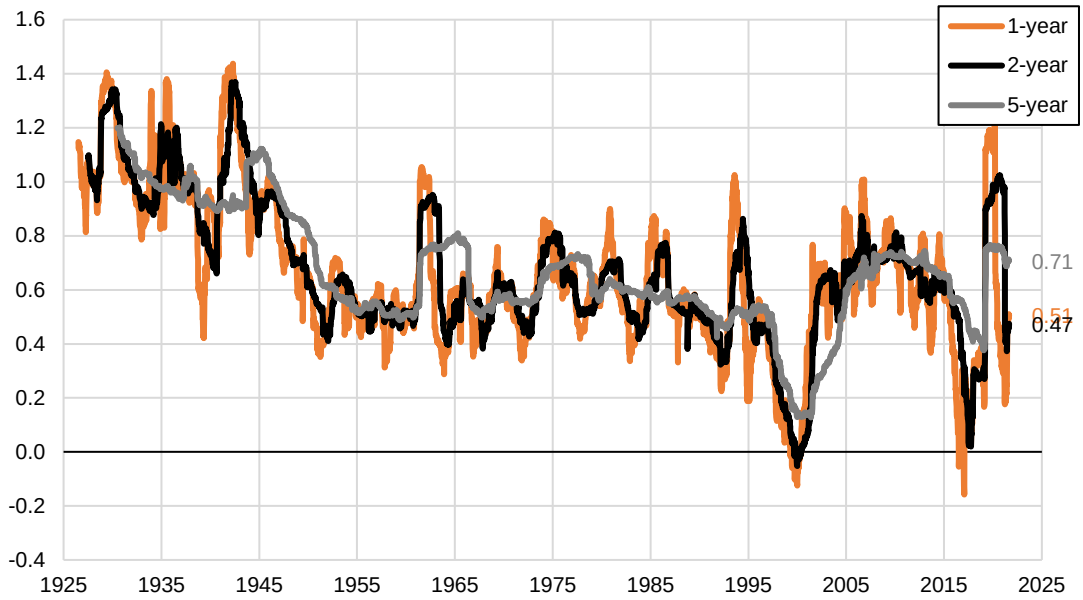
A. Following bouts of high market volatility, such as was experienced in the early days of the pandemic in February and March 2020, betas will be affected as long as the trailing history includes the volatile period, even if market conditions have stabilized. For example, S&P GMI reports unadjusted betas calculated from both 1 and 3 years of daily returns.[114] As of July 27, 2022, the average 1-year beta for the proxy group, which does not include the volatile period, was 0.28; the average 3-year beta, which does include the volatile period, was 0.72.[115] For comparison, on the same day, Yahoo! Finance's and Zacks's group average 5-year unadjusted betas using monthly returns were 0.45.[116]

Figure 21 plots the raw beta for the entire utility sector using 1, 2, and 5 years of weekly returns from June 1926 through May 2022. At any given time, beta can be very sensitive to the trailing history used. As of the end of August 2022, the betas using the 1-, 2-, and 5-year trailing histories were 0.51, 0.47, and 0.71, respectively.

[*Remainder of page intentionally left blank.*]

[114] Personal correspondence with S&P GMI (November 2021).
[115] M. Ellis analysis of S&P GMI data (last accessed October 2, 2022).
[116] M. Ellis analysis of Yahoo! Finance data (last accessed October 2, 2022); Zacks data (last accessed October 2, 2022).

Figure 21. Utility sector raw beta – trailing return history sensitivity[117]
July 1926-August 2022



In general, betas calculated using longer return histories tend to be the more stable over time, as the effect of any short-term period of volatility is reduced by longer surrounding periods of stability. Because utility cost of capital proceedings seek a relatively long-term estimate, it might be tempting to conclude that a longer trailing history is preferred in estimating a utility's beta for purposes of authorizing an ROE. As Vilbert and Villadsen astutely recommend, though, "if there are reasons to think that the industry might be subject to recent changes in systematic risk … the use of a more recent data window is desirable."[118] The current 5-year beta of 0.71, driven by the market turmoil of early 2020, is higher than its historical average since 1955 of approximately 0.55. The 1- and 2-year betas, at 0.51 and 0.47, respectively, are in-line with their long-term historical averages. After the brief period of unusual market volatility in early 2020 not seen since the World War II era, investor perceptions of utility risk quickly settled to their pre-pandemic levels. Because of their shorter trailing histories, the 1- and 2-year betas are more reflective of *current* investor sentiment.

Figure 21 also betrays Mr. Coyne's claim that "the recent movement in betas captures a trend that began five years ago but has been accelerated by the recent market conditions" and

[117] M. Ellis analysis FDL (last accessed July 20, 2022).
[118] BENTE VILLADSEN, MICHAEL J. VILBERT, DAN HARRIS, LAWRENCE KOLBE, RISK AND RETURN FOR REGULATED INDUSTRIES, ACADEMIC PRESS at 73-76 (2017).

that "[t]he substantial increase in Beta coefficients for the proxy group companies represents a significant departure from how investors have typically viewed utilities relative to the broader market and is not just COVID-19 related."[119] Regardless of the duration of the trailing return used, utility sector betas were in a decade-plus-long decline before the pandemic. Once the early-pandemic period of market turmoil fell out of the trailing historical data, as with the 1- and 2-year betas, betas returned to their pre-pandemic levels.

The sharp declines in the 1- and 2-year betas in Figure 21 make it clear that Mr. Coyne's elevated 5-year weekly betas are not valid indicators of current investor expectations but purely artifacts of the inclusion of a transitory and short-term market anomaly.

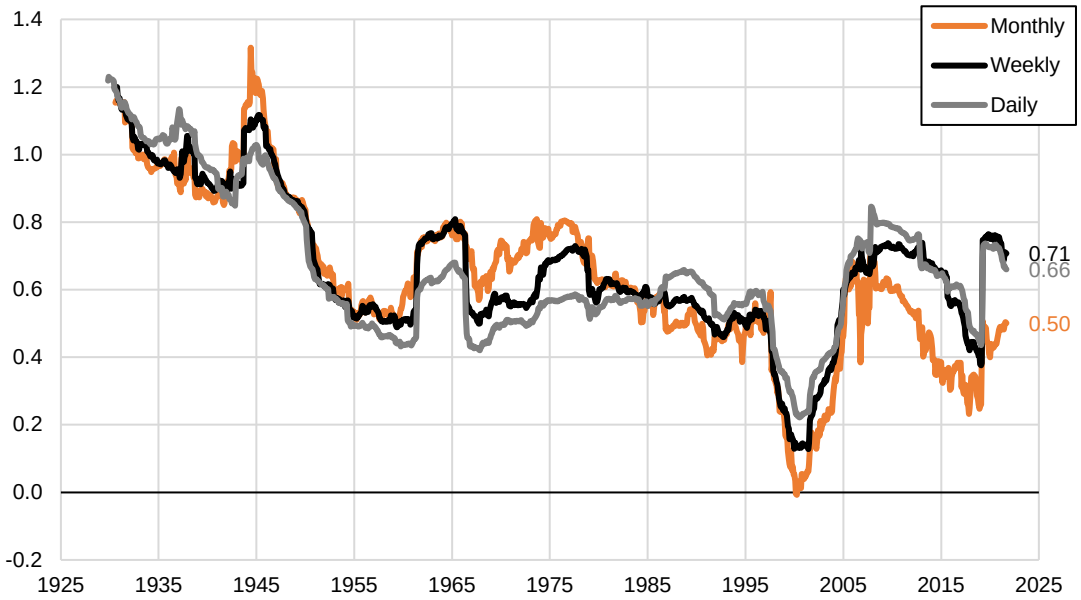
Q. HOW DOES THE FREQUENCY OF RETURN CALCULATION AFFECT BETA ESTIMATES?

A. Figure 22 plots the raw beta for the entire utility sector using 5 years of monthly, weekly, and daily returns from June 1926 through May 2022. As with the trailing history, at any given time, beta can be very sensitive to the return calculation frequency used. As of the end of August 2022, the betas using the monthly, weekly, and daily trailing histories were 0.50, 0.71, and 0.66, respectively. In general, betas tend to be more stable at higher return calculation frequencies. For any given trailing history duration (e.g., 1, 2, or 5 years), shorter return frequencies generate more data for use in the beta calculation: weekly returns generate approximately four times more data than monthly; daily approximately five times more than weekly. As the return frequency increases, any extreme data points are averaged with a larger number of "typical" data points, which tends to mitigate abrupt changes in beta over time.

This finding would tend to recommend using shorter return frequencies, due to their greater stability over time. But the choice of return frequency should reflect the time horizon of the analysis in which the CAPM-derived cost of equity will be used. Utility cost of capital proceedings seek to estimate a cost of equity that applies over a multi-year period. This consideration recommends a longer calculation frequency.

[119] 2022 Rate Case Hr'g Tr. Vol. 1 at 660-61 (Sept. 28, 2022).

Figure 22. Utility sector 5-year raw beta – return calculation frequency sensitivity[120]
July 1926-August 2022



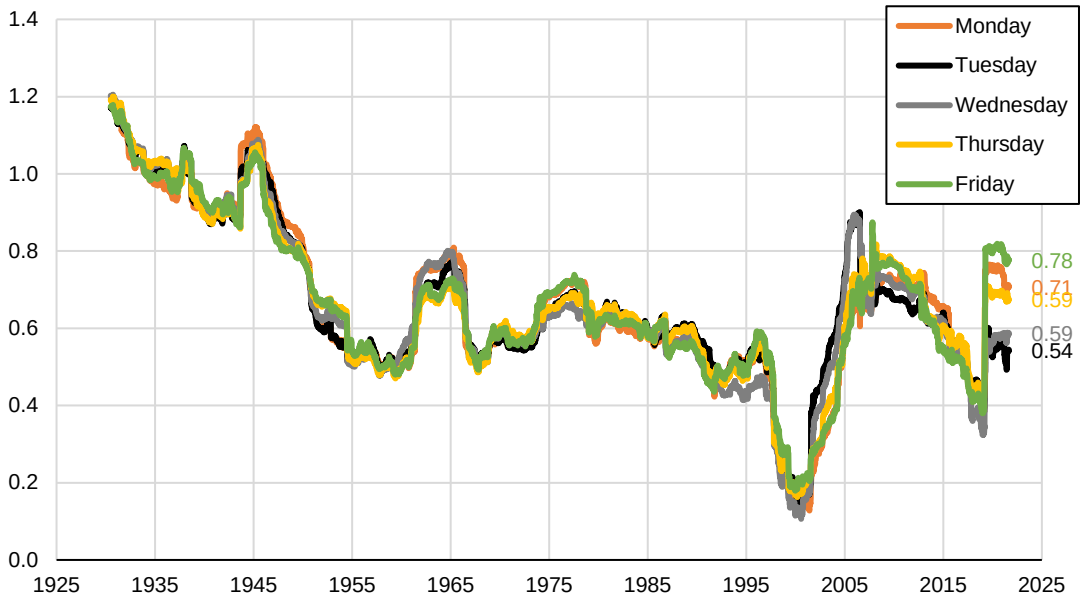
Q. HOW DO OTHER BETA CALCULATION PARAMETERS IMPACT THE VARIATION IN BETA ESTIMATES?

A. Even a beta calculation parameter as seemingly arbitrary as the day of the week on which weekly returns are calculated can materially affect the beta estimate. Figure 23 shows the 5-year trailing beta, i.e., raw Value Line-equivalent, with returns calculated on each weekday. Currently, Friday yields the highest beta, 0.78, but simply changing the calculation day to Tuesday reduces the beta to 0.54, 31% lower. This day-of the-week return calculation effect is only partially mitigated by averaging multiple utilities. The stock prices of individual companies within the sector tend to move together on any given day, so weekly returns calculated on the same day will tend to be similar.

This finding highlights the deficiency in Mr. Coyne's analysis in failing to examine alternative beta calculation methodologies and the potential arbitrariness of his selected methodologies. It also further highlights the need for caution in using the mechanically calculated betas provided by Value Line, Bloomberg, or other financial data providers, particularly betas calculated using weekly returns, without examining how they've changed over time or comparing them to long-term historical averages.

[120] M. Ellis analysis of FDL data (last accessed October 2, 2022).

Figure 23. Utility sector 5-year weekly raw beta – return calculation day sensitivity[121]
July 1926-August 2022



Q. YOU LISTED THE BLUME ADJUSTMENT AS A THIRD SOURCE OF VARIATION IN BETA ESTIMATES. WHAT IS THE ORIGIN OF THE BLUME ADJUSTMENT?

A. The Blume adjustment is based on an analysis conducted by Wharton professor Marshall Blume in the early 1970s. Analyzing beta-sorted portfolios, he found a tendency for betas, on average, to regress toward the market average beta, 1.0, from one time period to the next.[122] Based on this finding, some providers of beta estimates report adjusted betas that are a weighted average of the raw estimate and the market mean. The most common weighting is 2/3 on the raw beta, 1/3 on the market beta (1.0):[123]

$$\beta_{adjusted} = \frac{2}{3}\beta_{raw} + \frac{1}{3}.$$

For stocks with raw betas below 1.0, like most utilities historically, the effect of the adjustment is to increase the beta one-third of the way toward 1.0. For example, a stock with a raw beta of 0.4 would have an adjusted beta of 2/3 x 0.4 + 1/3 = 0.6. For its adjusted beta,

[121] M. Ellis analysis of FDL data (last accessed October 2, 2022).
[122] Marshall E. Blume, *On the Assessment of Risk*, 26:1 J. Finance at 1-10 (1971) https://onlinelibrary.wiley.com/doi/10.1111/j.1540-6261.1971.tb00584.x.
[123] The 2/3 and 1/3 weights are based on the regression coefficients Blume presented in his original paper, which regressed betas in one period against betas in the previous period.

Bloomberg uses the common 2/3 and 1/3 weights. Value Line's weights are similar: 0.67 and 0.35, respectively. Value Line also rounds to the nearest 0.05.[124]

As Vilbert and Villadsen note, "analysts have different views on whether to use raw or adjusted betas,"[125] hence the reporting of unadjusted betas by Bloomberg, S&P GMI, Yahoo! Finance, and Zacks.

Q. IS THE BLUME ADJUSTMENT VALID FOR UTILITIES?

A. No, it is not. The Blume adjustment is based on an observation of the tendency of betas, *on average*, to regress toward 1.0. But not every stock exhibits this tendency. Blume did not investigate whether and how this tendency might vary across stocks with different characteristics.

Rutgers professor Richard Michelfelder investigated the validity of the beta adjustment specifically for utility stocks and found no evidence of the average tendency observed by Blume.[126] This can be clearly seen in Figure 24, which shows the same 7-year monthly beta used by Blume in his original analysis for the entire utility sector going back to 1926. Since the 1950s, the beta for the utility sector as a whole has tended to regress toward 0.50-0.60, not 1.0.[127]

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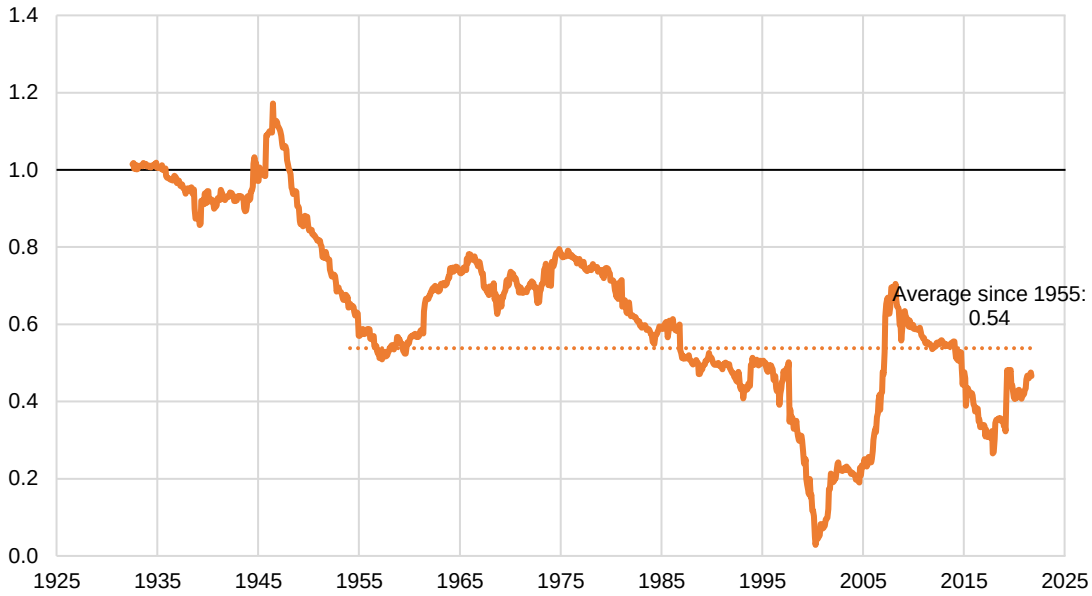
[124] Value Line, "Value Line's Estimation of Beta," personal correspondence (October 6, 2021).

[125] BENTE VILLADSEN, MICHAEL J. VILBERT, DAN HARRIS, LAWRENCE KOLBE, RISK AND RETURN FOR REGULATED INDUSTRIES, ACADEMIC PRESS at 80 (2017).

[126] Richard A. Michelfelder and Panayiotis Theodossiou, *Public Utility Beta Adjustment and Biased Costs of Capital in Public Utility Rate Proceedings*, 26:9 The Electricity Journal at 60-68 (2013).

[127] One might ask whether the utility sector average reflects the tendency of individual utility stocks. Betas are additive, so a tendency for individual utility stocks to regress toward 1.0, on average, would be reflected in the industry beta. Blume used the same logic to extrapolate from the portfolios he analyzed to individual stocks. *See* Eugene F. Fama and Kenneth R. French, *The Capital Asset Pricing Model: Theory and Evidence*, 18:3 J. Economic Perspectives 25, 31 (2004), https://pubs.aeaweb.org/doi/pdfplus/10.1257/0895330042162430.

Figure 24. Utility sector 7-year monthly raw beta[128]
July 1926-August 2022



Blume speculated as to why betas, on average, tend to regress toward 1.0 over time.[129] High-beta firms tend to be newer and smaller; as they mature and grow, they become more risk-averse. In contrast, low-beta firms tend to run out of low-risk investment opportunities and must accept more risk to stay in business. Neither of these causal explanations applies to utility operating companies, like Georgia Power and the publicly traded members of the GPC proxy group. They are large and mature, and their investments tend to have consistently low risk profiles over time. These attributes combine to keep utilities' betas sustainably and significantly below 1.0.

Empirical analysis specifically investigating utility betas, grounded in sound economic reasoning, demonstrates that utility betas do not have a tendency to regress toward the market average and therefore should not be Blume-adjusted.[130]

[128] Market capitalization-weighted average of all NYSE-, AMEX-, or NASDAQ-listed utilities. M. Ellis analysis of FDL data.

[129] Marshall E. Blume, *Betas and Their Regression Tendencies*, 30:3 The Journal of Finance 785-795 (1975), https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1540-6261.1975.tb01850.x.

[130] Blume used mean squared error (MSQ) to assess the accuracy of his adjustment. It can be shown that the standard 2/3 and 1/3 weights increase the MSQ for utility betas by approximately 35%.

Q. WHAT ARE YOUR CONCLUSIONS ABOUT MR. COYNE'S CHOICE OF BETA ESTIMATION METHODOLOGY?

A. The variation in the three most recent beta estimates in Figure 21 suggests we should not unthinkingly use the most recent trailing betas from Value Line, Bloomberg, or any other data provider. It's important to keep in mind that all methodologies are intended to produce *estimates of investors' future expectations*. The elevated current 5-year betas used by Mr. Coyne are artifacts of arbitrary choices of calculation period; there is no reason to believe they reflect investors' current long-term expectations.

The seven-week bout of market volatility in early 2020 was an anomaly, and investor perceptions of utility risk quickly returned to their pre-pandemic levels. The 5-year return history used in Mr. Coyne's beta estimates does not accurately reflect current investor sentiment.

The betas used by Mr. Coyne are inflated because they are (1) Blume-adjusted and (2) incorporate an anomalous period that does not reflect investors' *current, long-term* expectations.

3. Mr. Coyne estimates his market risk premium using a constant-growth DCF model with the same flawed perpetuity growth assumption as his proxy group DCF analysis.

Q. HOW DOES MR. COYNE ESTIMATE THE THIRD ASSUMPTION IN THE CAPM, THE MARKET RISK PREMIUM?

A. Mr. Coyne estimates the market risk premium (MRP) using the same constant-growth discounted cash flow model he uses for the proxy group in his DCF analysis. As detailed in Section IV.C.2 above, Mr. Coyne's fatally flawed implementation of the CG DCF erroneously assumes analysts' 3-to-5-year EPS growth estimates can be sustained into perpetuity, a deficiency of which he is aware. This assumption is invalid for several reasons, perhaps the most compelling of which is that it is simply economically impossible for the market to sustain analysts' forecast growth rates for even a decade, much less forever. Since 1926, U.S. stock market dividend growth has averaged 4.9% (1.9% in real terms)[131] – roughly 40% of the 12.4%-14.2% range assumed by Mr. Coyne.[132] The market has never sustained 12.4% dividend

[131] M. Ellis analysis of FDL data (last accessed October 2, 2022).
[132] Ex. JMC-5.1.

growth for even seven years, much less into perpetuity – certainly raising a legitimate "concern that short term growth rates may not be sustainable over the longer-term." Mr. Coyne nonetheless ignores his own advice and uses the constant growth DCF to estimate his CAPM MRP. Consequently, Mr. Coyne's MRP results beggar belief: at 11.8%-12.5%, they are roughly 2.5 times the long-term historical average of approximately 5%.

4. Mr. Coyne's flawed CAPM results should be disregarded.

Q. WHAT IS YOUR OVERALL ASSESSMENT OF THE CAPM AND MR. COYNE'S IMPLEMENTATION OF IT?

A. The CAPM is conceptually sound and one of the most widely used COE models in corporate finance. But Mr. Coyne's implementation choices – a forecast, not current, risk-free interest rate; a cherry-picked adjusted beta that is not reflective of current market conditions or utilities' long term risk profile; and a flawed MRP model – yields systematically upwardly-biased results. His flawed CAPM results should be disregarded.

F. Implementing the CAPM with more rigorously estimated assumptions produces substantially lower COE estimates.

Q. PLEASE EXPLAIN YOUR IMPLEMENTATION OF THE CAPM.

A. There are three components to the CAPM: the risk-free rate, beta, and the market risk premium. For the risk-free rate I use the current, not forecast, 30-year Treasury rate.

As explained above in Section IV.E.2, beta is the most subjective of the three CAPM parameters, and no single calculation methodology produces the most reasonable estimates in all market conditions. Based on my review of the latest research literature, I use the betas provided by Yahoo! Finance, calculated using five years of monthly returns. Five-year monthly betas are consistent with cost of capital proceedings' objective of estimating a multi-year cost of equity, and their current values strike a reasonable balance between current market sentiment and the long-term historical average for utilities.

I estimate the market risk-premium from the average of the long-term historical trend and a forward-looking estimate calculated using the MS DCF.

1. The risk-free rate, one of the three CAPM inputs, should be estimated from the current, not forecast, interest rate.

Q. HOW DO YOU ESTIMATE THE RISK-FREE RATE?

A. Like Mr. Coyne, I use the 30-year Treasury. I use the most recent full-month average 30-year Treasury rate, for September 2022, of 3.56%. As explained above in Section IV.E.1, current market interest rates provide an unbiased estimate of future rates and are generally superior to publicly available "expert" forecasts.

2. Betas calculated using five years of monthly returns are consistent with the objective of a cost of capital proceeding and strike an appropriate balance between recent market conditions and utilities' long-term historical risk profile.

Q. HOW DO YOU ESTIMATE BETA?

A. As explained in Section IV.E.2 above, no single, widely used approach to estimating beta exists. Beta estimates can vary substantially depending, in particular, on the historical trailing period used, return calculation frequency, and adjustment for long-term trend reversion. I use 5-year monthly betas such as those provided by Yahoo! Finance and Zacks and commonly used in academic studies. Five-year betas using monthly returns are consistent with cost of capital proceedings' objective of estimating a multi-year expected cost of equity. The current average of 0.48 for the GPC proxy group, shown in Figure 20, strikes an appropriate balance between the long-term historical range 0.5-0.6 and current subdued investor perceptions of risk, as reflected in 1-year betas using daily returns of approximately 0.4.

3. The market risk premium estimate should reflect both current market conditions and the long-term historical trend.

Q. WHY CAN'T WE JUST LOOK UP THE MRP LIKE, SAY, WE CAN LOOK UP A STOCK PRICE OR INTEREST RATE?

A. The market risk premium is the difference between investors' expectations of future stock returns and the risk-free (interest) rate. While interest rates are directly observable, expected future market returns are not. The MRP must therefore be estimated. A historical average is a useful check for reasonableness, but the cliché, "past performance is no guarantee of future results," applies. Instead, analysts use a variety of models and input assumptions to estimate the MRP.

Q. HOW DO YOU ESTIMATE THE MARKET RISK PREMIUM?

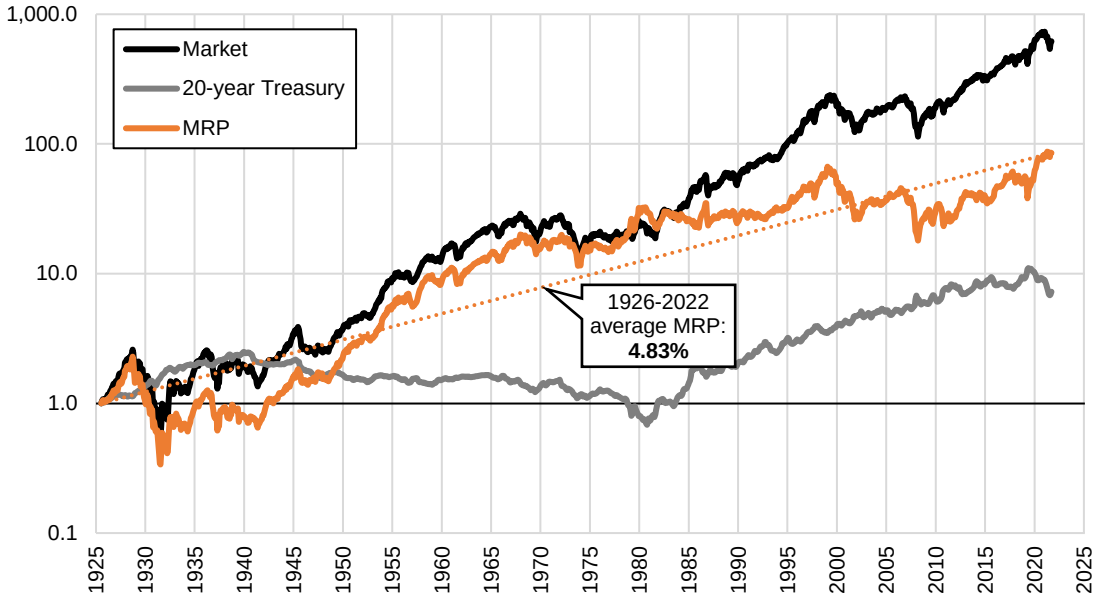
A. I use the average of two methods, one historical, the other forward-looking.

Q. HOW DO YOU ESTIMATE THE HISTORICAL MARKET RISK PREMIUM?

A. I use the long-term historical difference in the average real total returns on the market and long-term Treasury bond.[133]

Figure 25 shows the long-term historical real returns on the market and 20-year Treasury bonds, as well as the implied MRP, from June 1926 through August 2022. Over the last 96+ years, stocks have outperformed 20-year Treasurys by 4.83% per year.

Figure 25. Market, 20-year Treasury, and MRP real total return index[134]
June 1926=1.0 (log scale)



The historical MRP is calculated using 20-year Treasury data because that is the most extensive Treasury bond data set available.[135] Because I use the 30-year Treasury in my CAPM

[133] Total bond return is the monthly interest (the yield divided by 12) plus any capital gain or loss, estimated as the change in value from discounting the remaining interest payments (i.e., the previous time period's interest rate) and outstanding principal at the current time period's interest rate. This method is widely used, for example, by NYU finance professor Aswath Damodaran (*see, e.g.*, http://people.stern nyu.edu/adamodar/pc/datasets/histretSP.xls) and UCLA finance professor Ivo Welch (*see, e.g.*, Ivo Welch, *A Different Way to Estimate the Equity Premium (for CAPM and One-Factor Model Use Only)*, (2008) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1077876).

[134] M. Ellis analysis of FDL data (last accessed October 2, 2022).

[135] The early historical monthly data available for long-term Treasurys is not specifically for the 20-year. A simple regression model is used to adjust the long-term Treasury data to estimate the 20-year yield.

analysis, though, the premium is reduced by the current difference in the inflation-adjusted 20- and 30-year Treasurys (TIPS), 0.08%, for a 30-year real MRP of 4.75%. Adjusted for the 30-year inflation rate estimated from the Treasury-TIPS spread, 2.24%, the nominal MRP is 4.86%.

Q. HOW DO YOU ESTIMATE THE FORWARD-LOOKING MRP?

A. I apply the same multi-stage DCF model I use for the GPC proxy group to the market as a whole, represented by the S&P 500 Index, and subtract the current 30-year Treasury.

Q. HOW DO YOU ESTIMATE THE CURRENT DIVIDEND YIELD FOR THE S&P 500 INDEX?

A. I use the same methodology I use for the proxy group members: the most recent dividend paid, through September 30, 2022, divided by the average price of the index over the month of September 2022. The current annualized yield is 1.73%.[136]

Q. HOW DO YOU ESTIMATE THE INITIAL GROWTH RATE FOR THE S&P 500 INDEX?

A. I use the weekly estimate provided in S&P's weekly S&P 500 earnings and estimate report. I use this source because it is publicly available, well-known, frequently updated, and produced by the party with the most intimate knowledge of the index. As of September 30, 2022, S&P's estimate for the S&P 500 Index's 3-to-5-year growth rate is 13.6%.[137]

Q. HOW DO YOU ESTIMATE THE TERMINAL GROWTH RATE FOR THE S&P 500 INDEX?

A. Many analysts incorrectly assume long-term dividend growth equal to nominal GDP growth. Historically, per-share payout growth, whether measured as dividends or dividends plus net share buybacks, has tracked GDP per capita.[138] I assume a terminal growth rate based on forecast real long-term per-capita GDP plus the current market forecast for long-term inflation, estimated as described in Section IV.D.3.

[136] M. Ellis analysis of S&P GMI data (last accessed October 2, 2022).

[137] S&P Dow Jones Indices, S&P 500 Earning and Estimate Report (September 30, 2022), https://www.spglobal.com/spdji/en/documents/additional-material/sp-500-eps-est.xlsx (last accessed October 2, 2022).

[138] *See, e.g.*, ROGER IBBOTSON, JAMES HARRINGTON, STOCKS, BONDS, BILLS, AND INFLATION 2021 SUMMARY EDITION, CFA INSTITUTE RESEARCH FOUNDATION BOOKS at 157-60 (2021) (Analysis is for total payout to account for the effect of net stock repurchases).

For long-term per-capita GDP growth, I use the average of the most recent long-term CPI-adjusted forecasts from three government agencies: the Congressional Budget Office (CBO),[139] the Energy Information Administration (EIA),[140] and the Social Security Administration (SSA).[141] I use the compound annual growth rate from 2042 to remove any near-term transitory effects, such as post-Covid economic recovery, and to align with the time period used to estimate long-term inflation (years 21 through 30 from today).

TIPS payouts are tied to CPI, so the Treasury-TIPS spread provides a forecast of *consumer* price inflation. In contrast, real GDP forecasts are deflated by the GDP deflator, which reflects the prices of all domestic expenditures, including by businesses and government. For consistency with the CPI forecast derived from the Treasury-TIPS spread, which reflects only the prices paid by consumers, I use each agency's nominal GDP forecast deflated by its CPI forecast, rather than its GDP deflator forecast. Figure 26 summarizes the three agencies' real long-term per-capita GDP forecasts.

Figure 26. Real long-term per-capita GDP forecasts
Percent

		GDP				Nominal		CPI-deflated
Forecast	**Horizon**	Real	Deflator	Nominal	Population	**GDP pc**	**CPI**	**GDP pc**
CBO	2052	1.52	2.00	3.55	0.24	3.30	2.26	1.02
EIA	2050	1.99	2.28	4.32	0.33	3.98	2.40	1.55
SSA[142]	2100	NA	NA	4.09	0.42	3.65	2.40	1.22
Mean		1.76	2.14	3.99	0.33	3.64	2.35	1.26
+ Treasury-TIPS long-term inflation						**2.85**	1.57	

The average of the CBO, EIA, and SSA (the agencies) CPI-deflated long-term per-capita GDP growth rates is 1.26%. Adding the same long-term inflation expectation, 1.57%, used to estimate the terminal growth rate in the proxy group MS DCF in Section IV.D.3 above gives a nominal rate of 2.85%.[143] The corresponding average of the CBO, EIA, and SSA long-term

[139] Congressional Budget Office, *The 2022 Long-Term Budget Outlook*, (July 2022), https://www.cbo.gov/system/files/2022-07/57054-2022-07-LTBO.xlsx.
[140] Energy Info. Admin., *Annual Energy Outlook 2022*, (March 2022), https://www.eia.gov/outlooks/aeo/excel/aeotab20.xlsx.
[141] Soc. Sec. Admin., *The 2022 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*, (June 2022) (https://www.ssa.gov/OACT/TR/2022/SingleYearTRTables_TR2022.xlsx).
[142] SSA does not forecast real GDP or the GDP deflator, only nominal GDP and CPI.
[143] Because these are compound growth rates, the geometric sum is used, $(1+g)(1+i)-1$.

per-capita nominal GDP growth rates is 3.64%. I use the market-implied long-term inflation rate rather than the agencies' for two reasons. First, although all three forecasts are the agencies' most recent, they are stale in comparison to the September 2022 average Treasury rates used to estimate inflation. Second, as demonstrated by the analysis of BCFF forecasts, market-derived data are generally considered less biased and more accurate indicators of investor expectations than expert forecasts.

Q. WHAT IS YOUR FORWARD-LOOKING MRP?

A. The S&P 500 MS DCF yields a forecast return of 6.43%. This result is consistent with the buy-side equity return forecasts summarized in Figure 3, which average 5.9% over the 10+-year horizon. Subtracting the current T30, 3.57%, gives an MRP of 2.87%.

Q. AND YOUR COMBINED MRP?

A. The average of my historical (4.86%) and forward-looking (2.87%) MRPs is 3.86%.

4. Implementing the CAPM with more rigorously estimated parameters yields COE estimates approximately one-third of Mr. Coyne's values.

Q. WHAT ARE THE RESULTS OF YOUR CAPM ANALYSIS?

A. The Yahoo! Finance and Zacks 5-year monthly betas for the GPC proxy group, listed in Figure 20, are both 0.48. The corresponding COE is 5.41%,[144] approximately 40% of the 13.55% average of Mr. Coyne's estimates.[145]

Q. RECENT UTILITY BOND YIELDS ARE CLOSE TO, AND EVEN EXCEED, YOUR MS DCF AND CAPM RESULTS, 5.97% AND 5.41%, RESPECTIVELY. SHOULDN'T THE PREMIUM OVER BOND YIELDS BE GREATER?

A. To compare my COE results to utility bond yields, we must use the monthly average yield that corresponds to the proxy group's average credit-rating, Baa1, for September 2022,[146] the averaging period of the inputs to my MS DCF and CAPM. Moody's provides several widely referenced utility bond yield indexes, but not specifically for Baa1-rated utility bonds. Nonetheless, the Baa1 yield can be estimated by interpolating between Moody's Baa and A

[144] COE = 3.57% + 0.48 x 3.86% = 5.41%
[145] 2022 Rate Case Hr'g Tr. Vol. 1 at 662 (Sept. 28, 2022).
[146] M. Ellis analysis of S&P GMI data (last accessed October 16, 2022). S&P credit ratings are used; it is assumed that, on average, the ratings are comparable to Moody's.

monthly average utility bond yields for September 2022, 2/3 x 5.61% + 1/3 x 5.28% = 5.50% – higher than my CAPM result of 5.41%.[147]

But a utility COE estimate – an expected return on equity – cannot be directly compared to the corresponding utility bond yield. Reported bond yields are yields to maturity, assuming no default. Default risk for bonds with a Baa1 rating reduces their expected returns by approximately 0.46%. Similarly, bonds are not as liquid as stocks and attract a liquidity premium of approximately 0.33%.[148] Deducting the default and liquidity premia from the Baa1 utility bond yield to maturity reduces it to approximately 4.74%, 1.24% and 0.67% lower than my MS DCF and CAPM COE estimates, respectively.

There is no hard-and-fast rule for what the spread of equity returns over the corresponding cost of debt should be. My MS DCF and CAPM results are consistent with my forward-looking MRP and beta estimates, third-party forecasts for total market returns, and the widely recognized low risk profile of utilities.

G. Mr. Coyne's flotation cost adjustment is not analytically sound and is therefore unwarranted.

Q. MR. COYNE ADDS A FLOTATION COST ADJUSTMENT TO HIS ROE MODEL RESULTS. IS A FLOTATION COST ADJUSTMENT WARRANTED?

A. No. A flotation cost adjustment is not warranted. Mr. Coyne cites Roger Morin's *New Regulatory Finance* in support of adding a flotation cost adjustment,[149] but the application of the flotation cost adjustment provided in Morin's book is conceptually flawed. The math relied on by Mr. Coyne for his recommendation shows that shareholders make money from the issuance of new stock, so flotation cost adjustments are especially inappropriate.

[147] The ratings of Moody's A- and Baa-rated utility bond indexes are comparable to Moody's A2 and Baa2 ratings, respectively. The intermediate ratings are A3 and Baa1, so Georgia Power's Baa1 rating falls two-thirds of the way between A and Baa.

[148] Wolfgang Bühler and Monika Trapp, *Time-Varying Credit Risk and Liquidity Premia in Bond and CDS Markets*, CFR Working Papers 09-13, University of Cologne, Centre for Financial Research at 37 (2008), https://www.fdic.gov/analysis/cfr/2008/april/trapp-buhler.pdf.

[149] 2022 Rate Case Hr'g Tr. Vol. 1 at 669 (Sept. 28, 2022).

Mr. Morin's flotation cost adjustment assumes that the market price of the equity issued is equal to book value.[150] But, as shown in Figure 4 above, the average market-to-book ratio of the GPC proxy group is 2.1. As implied by the very formula provided by Mr. Morin, when the market price is greater than book value, new equity issuance is accretive to existing shareholders – that is, a share of the proceeds of the new issuance accrues to them.[151]

Morin derives the flotation cost adjustment from the formula for the extended DCF model under the assumption of continuous external stock financing:

$$k = \frac{D_1}{P} + br + sv,$$

where b is the earnings retention ratio, r is ROE, s is the annual rate of new equity issuance (expressed as a share of existing book equity), and v is the accretion factor, equal to $1 - \frac{B}{P}$. He then adjusts P for flotation costs, f, so that $1 - \frac{B}{P(1-f)}$.[152] But as long as $(1 - f)$ exceeds $\frac{B}{P}$, i.e., the reciprocal of the market-to-book ratio, existing shareholders *gain* from new share issuance. Mr. Coyne estimates flotation costs to be 2.47%, so $1 - f$ = 0.98, much greater than the reciprocal of the GPC proxy group average M/B ratio, 1/2.1 = 0.48.

Q. UNDER THE NARUC FAIRNESS PRINCIPLE, ROE SHOULD EQUAL THE ACTUAL COST OF EQUITY. THIS WOULD IMPLY THAT THE MARKET-TO-BOOK RATIO EQUALS 1.0, IN WHICH CASE NEW EQUITY ISSUANCE WOULD NOT BE ACCRETIVE. IF THE COMMISSION ADHERES TO THE NARUC FAIRNESS PRINCIPLE, SHOULD ROE BE ADJUSTED FOR FLOTATION COSTS?

A. No. Even if the M/B ratio is equal to 1.0, there is no reason to adjust the ROE for new equity issuance costs.

Purchasers of the newly issued equity know that a portion of proceeds will cover transaction costs, and the offering price reflects this information. There is no need to compensate new investors for issuance costs, which they knowingly pay when they purchase new shares, with an adjustment to the ROE. Similarly, existing shareholders know that the company may issue new equity over time. These costs, and their potential effect on expected

[150] ROGER A. MORIN, NEW REGULATORY FINANCE, PUB. UTIL. REPORTS at 328 (2006): "If P_0 is regarded as the proceeds per share actually received by the company from which dividends and earnings will be generated, that is, [if] P_0 equals B_0, the book value per share, …"

[151] MYRON J. GORDON, THE COST OF CAPITAL TO A PUBLIC UTILITY at 31-32 (1974).

[152] ROGER A. MORIN, NEW REGULATORY FINANCE, PUB. UTIL. REPORTS at 332-33 (2006).

returns, are likewise reflected in investors' willingness to buy, hold, or sell shares that determines share prices.

Mr. Coyne's flotation cost adjustment is small and is overwhelmed by the imprecision in his models. At 0.08%, it amounts to less than 2% of the 8.99%-13.55% range of Mr. Coyne's base ROE results.[153] To add a flotation cost adjustment is akin to the elementary school student, who, upon being asked what they learned during a field trip to the science museum, proudly says, "Earth is 4.5 billion years and [glancing at a clock] six hours and forty-three minutes old."

Mr. Coyne's flotation cost adjustment is conceptually flawed and not materially significant. It should be disregarded.

V. GEORGIA POWER'S ROE AND EQUITY RATIO SHOULD OPTIMALLY BALANCE CUSTOMER AND INVESTOR INTERESTS.

A. COE model results must be adjusted for differences in equity ratio.

Q. IN SECTION IV.B ABOVE, YOU DISCUSSED ADJUSTING COE MODEL RESULTS FOR DIFFERENCES IN EQUITY RATIOS AMONG THE PROXY GROUP MEMBERS. HOW DO YOU DO THAT?

A. The MS DCF and CAPM yield levered costs of equity. To account for differences in capital structure among the proxy group members, the COE results are unlevered to estimate the cost of equity assuming 100% equity financing.[154] The unlevered cost of equity, k_u, is typically expressed as an adjustment to beta in the CAPM:

$$k_u = r_f + \beta_u(r_m - r_f),$$[155]

where the unlevered beta, β_u, is expressed in terms of the levered equity beta, β_e:

[153] 2022 Rate Case Hr'g Tr. Vol. 1 at 668 (Sept. 28, 2022).

[154] The unlevered cost of equity differs from the weighted average cost of capital ("WACC"). The unlevered cost of capital assumes 100% equity financing; the WACC assumes the company's current capital structure. While under the Modigliani and Miller theorem of capital structure independence, the cost of capital should be the same regardless of capital structure, the WACC typically overstates the unlevered cost of equity because the *expected* return on corporate debt is lower than the yield due to default and liquidity risk.

[155] *See, e.g.*, ASWATH DAMODARAN, DAMODARAN ON VALUATION: SECURITY ANALYSIS FOR INVESTMENT AND CORPORATE FINANCE, WILEY 2ND ED. at 129 (2006).

$$\beta_u = \frac{E}{D+E}\beta_e.$$[156]

For consistency and comparability, I apply the same methodology – unlevering relative to the risk-free rate, not the company's cost of debt – to the MS DCF model results:

$$k_u = r_f + \frac{E}{D+E}\beta_l\left(r_m - r_f\right)$$

$$k_e - r_f = \beta_l\left(r_m - r_f\right)$$

$$k_u = r_f + \frac{E}{D+E}\left(k_e - r_f\right)$$

$$k_u = \frac{D}{D+E}r_f + \frac{E}{D+E}k_e,$$

where D and E refer to debt and equity, respectively. Best practice is to use market, not book, values for both debt and equity as market reflects investors' actual exposure; they buy and sell securities at market value, not book.[157] Market values for the debt carried by the proxy group members are not readily available, though, so book value is assumed.

[*Remainder of page intentionally left blank.*]

[156] Unlevered beta is sometimes adjusted for taxes (the "Hamada" adjustment). As explained in Damondaran in *Valuation*, when the capital structure is constant over time, as it is with utilities, then the value of tax shields tracks the value of operating assets. Thus, the risk of tax shields will mirror the risk of operating assets and have the same discount rate, i.e., the unlevered cost of equity. *Id*. at 790-93.

[157] *See, e.g.*, TIM KOLLER, MARC GOEDHART ET AL., VALUATION, 5TH ED. MCKINSEY & CO. 35 at 204 (2010): "Where possible, you should estimate *market* values of the elements of the current capital structure" (emphasis added).

Figure 27. Proxy group levered COEs, equity ratios, and unlevered COEs[158]
Percent, as of September 2022

	Levered COE				
Utility	MSDCF	CAPM	Average	**Equity ratio**	**Unlevered COE**
ALLETE	8.25	5.92	7.08	56	5.52
Alliant	5.50	5.36	5.43	65	4.78
Ameren	5.36	4.93	5.15	61	4.53
AEP	5.92	4.87	5.40	57	4.61
Duke	6.70	4.91	5.81	52	4.73
Edison Int'l	6.61	6.17	6.39	42	4.75
Entergy	6.50	5.76	6.13	47	4.76
Evergy	6.00	5.41	5.71	56	4.77
Hawaiian Electric	5.73	4.80	5.26	62	4.62
IDACORP	4.78	5.72	5.25	74	4.81
NextEra	5.03	5.34	5.18	71	4.71
OGE	5.96	6.11	6.03	62	5.09
Portland General	5.93	5.55	5.74	56	4.78
Xcel	5.37	4.89	5.13	61	4.52
Mean	**5.97**	**5.41**	**5.69**	**59**	**4.78**
Standard deviation	*0.87*	*0.48*	*0.57*		*0.25*
High	*8.25*	*6.17*	*7.08*		*5.52*
Low	*4.78*	*4.80*	*5.13*		*4.52*
High – low	*3.47*	*1.37*	*1.95*		*1.00*

The variation in the unlevered COE estimates is much lower than in the levered COEs, with approximately half the standard deviation (0.25 vs 0.57) and range (1.00 vs. 1.95). The underlying businesses of the proxy group members are very similar, so their risk profiles and corresponding overall costs of capital are expected to be similar as well. Their equity ratios vary considerably, though, from 42% to 74%, which introduces variation in their levered costs of equity. This variation due to differences in equity ratios makes levered COEs an inappropriate basis for determining the ROE of a target company, like Georgia Power, which will likely have a different equity ratio.

Q. HOW DO YOU USE THE PROXY GROUP AVERAGE UNLEVERED COE TO DETERMINE YOUR RECOMMENDATION FOR GEORGIA POWER'S ROE, WHICH IS LEVERED?

A. The unlevered COE is "relevered" using the same formula described above, the terms of which can be rearranged as:

$$k_e = \frac{D+E}{E} k_u + \frac{D+E}{D} r_f.$$

[158] M. Ellis analysis of S&P GMI data; market equity ratio based on September 2022 average.

In Section III above, I explained that the equity ratio depends on ROE. ROE, in turn, depends on the equity ratio. They can be determined jointly, in an iterative calculation process that is easily performed in common spreadsheet software like Microsoft Excel or Google Sheets.

B. ROE and equity ratio should be optimized to minimize customer costs while meeting investor requirements.

Q. IN SECTION III.A ABOVE, YOU PROVIDED AN ILLUSTRATIVE ANALYSIS OF THE INTER-RELATIONSHIPS BETWEEN EQUITY RATIO, ROE, AND CREDIT QUALITY. CAN YOU CONDUCT THAT ANALYSIS SPECIFICALLY FOR GEORGIA POWER?

A. Yes. Such an analysis can be conducted for Georgia Power using data provided in Moody's most recent credit update.[159]

Figure 28 applies the analysis illustrated in Figure 8 above to the financial data provided in Moody's October 2021 credit update for Georgia Power. As before, different levels of ROE are represented by the upward curving lines. As the equity ratio increases along the horizontal axis, so does the cash flow-to-debt ratio, depicted on the vertical axis. Here, cash flow from operations (CFO) is used instead of FFO, for consistency with Moody's preferred metric.[160] Black dashed horizontal lines have been added at the CFO/debt levels that correspond to potential target credit ratings: Georgia Power's current Baa1 ([redacted]% CFO/debt) and an upgrade to A3 ([redacted]%).[161]

The dark gray dot on the upper of the two ROE arcs represents Georgia Power's proposed 11.00% ROE and 56% equity ratio. The corresponding CFO/debt ratio is indicated by the

[159] GPC data request response STF-NEC-1-1 Attachment AG: Moody's Investors Service, "Georgia Power Company: Update to credit analysis" (October 13, 2021). Data from Moody's is used, not the financial data in GPC's regulatory filing, because Moody's makes various adjustments to GPC's reported financials that are not explained in sufficient detail to replicate using GPC's data.

[160] *See* GPC data request response STF-NEC-1-1 Attachment AG: Moody's Investors Service, *Georgia Power Company: Update to credit analysis* (October 13, 2021). Moody's preferred cash flow metric is cash flow from operations (CFO), not FFO, and the analysis is based on Moody's CFO/debt data. The basic definition of CFO is net income + depreciation and amortization + changes in working capital, i.e., FFO + changes in working capital. *See* Corporate Finance Institute, *How to Calculate FCFE from CFO?* (Dec. 16, 2020) https://corporatefinanceinstitute.com/resources/knowledge/accounting/how-to-calculate-fcfe-from-cfo/.

[161] In the Moody's credit analysis provided in GPC data request Trade Secret response STF-NEC-1-1 Attachment AG, Moody's provides CFO/debt thresholds for up- and downgrades of [redacted]% and [redacted]%, respectively. The threshold for GPC's current rating is estimated as the midpoint, [redacted]%.

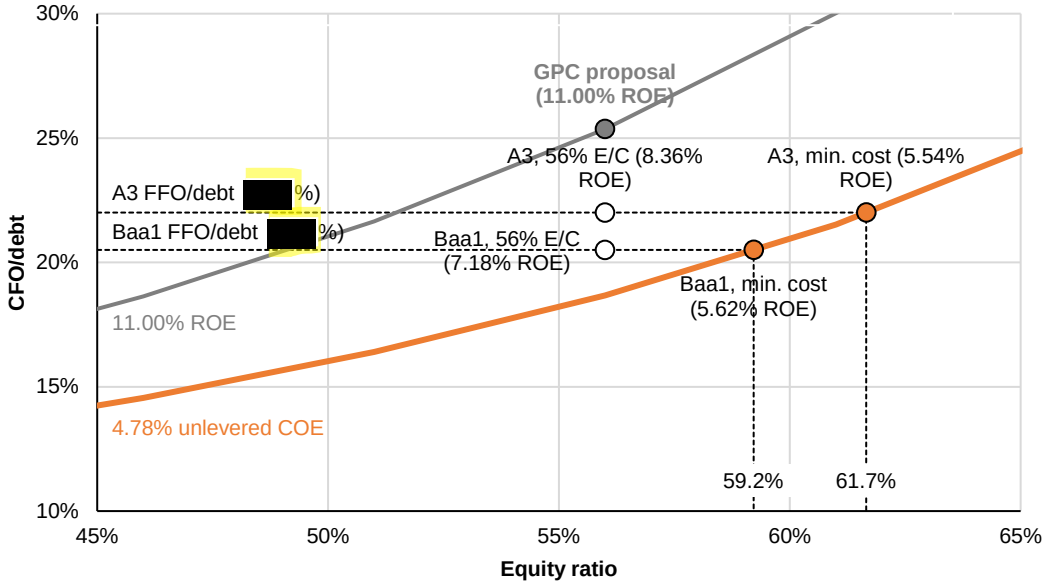
height of the dot on the vertical axis, [redacted]% – well above the [redacted]% required to maintain Georgia Power's current Baa1 credit rating. Either or both of Georgia Power's proposed ROE and equity ratio can be reduced to lower customer costs while still satisfying investor demands.

The lower of the two ROE arcs represents Georgia Power's 4.78% unlevered (100% equity) COE. As discussed previously, the corresponding levered ROE will increase as the equity ratio declines. To maintain Georgia Power's current Baa1 rating would require an equity ratio of 59.2%, slightly higher than GPC's proposal, and an ROE of 5.62%. If instead a higher A3 credit rating is targeted, the equity ratio and ROE would need to be 61.7% and 5.54%, respectively. The trade-off, in terms of customer costs, associated with these higher equity ratios will be quantified below.

The two white dots immediately below GPC's proposal illustrate scenarios in which an equity ratio constraint is imposed, here equal to GPC's proposed 56%. To maintain target credit ratings of Baa1 or A3, the ROE would need to be increased to 7.18% and 8.36%, respectively. The trade-off, in terms of customer costs, associated with an equity ratio constraint will also be quantified below.

[*Remainder of page intentionally left blank.*]

Figure 28. Relationship between equity ratio, ROE, and credit quality for Georgia Power



C. An optimized ROE and equity ratio can significantly reduce customer costs while meeting the demands of both equity and debt investors.

Q. HOW WOULD AN OPTIMIZED ROE AND EQUITY RATIO IMPACT CUSTOMER COSTS?

A. Figure 29 compares the revenue requirement (pre-tax) weighted average rate of return for the five scenarios depicted in Figure 28. The ROE optimized for a Baa1 rating, 5.62%, is 49% lower than Mr. Coyne's proposed ROE of 11.00% (line 2). Even with the higher 59.2% equity ratio, after grossing up for taxes, the revenue requirement ROR, 5.92%, is 40% lower than GPC's 9.83% (lines 6-7). If a higher A3 credit rating is targeted, the additional cost of the required higher 61.7% equity ratio is almost completely offset by the lower levered ROE of 5.54%,[162] and the revenue requirement ROR increases only slightly to 5.95%.

Figure 29 also shows the average annual total revenue requirement under each of the five scenarios (line 8). Based on analysis of Georgia Power's general rate case filings, its proposed combined rate of return for both debt and equity, the latter grossed up for taxes, accounts for

[162] It is assumed that there is no change in the cost of debt at the higher A1 credit rating over the 2023-25 period. New issuance accounts for approximately 18% of Georgia Power's net long-term debt at the end of 2025. The difference in yield between A3- and Baa1-rated utility bonds is approximately 0.11%. The change in interest costs would therefore be approximately 18% x 0.11% = 0.02% by the end of the forecast period. M. Ellis analysis of data in Ex. APA SPA ADH MBR-3, Schedule 3, Workpaper 4.

more than 25% of its revenue requirement.[163] The total revenue requirement under GPC's proposal averages $9.14 billion per year from 2023 through 2025. Optimized ROEs and equity ratios, under either the Baa1 or A3 target credit rating, reduce total customer costs by over 11% (line 10) or more than $1.0 billion per year (line 9).

An equity ratio constraint would impose fairly substantial costs on customers, increasing the revenue requirement ROR to 6.96% and 7.84% under Baa1 and A3 credit rating targets, respectively – an increase of nearly 100 and 200 basis points relative to the corresponding minimum-cost scenarios. While total customer costs are lower than under GPC's proposal, they are only 50% to 70% of the reduction without an equity ratio constraint. These results further demonstrate the flaw in the "leverage up" (reduce the equity ratio) argument described in Section III.A above. It is much more cost effective to use any spare credit capacity to reduce ROE than to increase debt.

Figure 29. Revenue requirement (pre-tax) rate of return under different weighted under GPC proposal, minimum cost, and equity ratio constraint scenarios
Percent (except lines 8 and 9)

		GPC proposal	Minimum cost		Equity ratio constraint	
			Baa1	A3	Baa1C	A3
1	Equity ratio	56.0	59.2	61.7	56.0	56.0
2	ROE	11.00	5.62	5.54	7.18	8.36
3	Cost of debt	3.59	3.59	3.59	3.59	3.59
4	Rate of return	7.74	4.79	4.79	5.60	6.26
5	Tax rate	25.3	25.3	25.3	25.3	25.3
6	**Rev. requirement rate**	**9.83**	**5.92**	**5.95**	**6.96**	**7.84**
7	*ΔGPC proposal*		*-40*	*-39*	*-29*	*-20*
8	**Rev. requirement ($ B)**	**9.14**	**8.09**	**8.10**	**8.37**	**8.61**
9	Customer savings ($ billion per year)		-1.05	-1.04	-0.77	-0.53
10	*ΔGPC proposal*		*-11.5%*	*-11.4%*	*-8.4%*	*-5.8%*

Q. WHAT ARE THE IMPLICATIONS OF AN OPTIMIZED ROE AND EQUITY RATIO ON RESIDENTIAL CUSTOMER BILLS?

A. Average residential customer bills can be estimated from Georgia Power's total retail base rate revenue and sales of electricity forecast for the 12 months ending July 31, 2023,[164] and Budget

[163] M. Ellis analysis of data in Ex. APA-SPA-ADH-MBR-1, Schedule 1.
[164] 2022 Rate Case, Georgia Power Document Filing No. 190559, App. Ex. 1-2 Workpaper 1 (June 24, 2022).

2022 Load and Energy Forecast customer count projection.[165] Assuming the 11% cost reduction under either of the optimized ROE/equity ratio scenarios applies uniformly across customer classes, Georgia Power residential customers would save approximately $135 per year.

Q. WHAT ARE YOUR ROE AND EQUITY RATIO RECOMMENDATIONS FOR GEORGIA POWER?

A. I recommend the A3 target credit rating scenario for Georgia Power, 5.54% ROE and 61.7% equity ratio, for several reasons. Both the A3 and Baa1 scenarios are consistent with the Supreme Court's guidance provided in *Hope Natural Gas* to set "just and reasonable rates" through a "balancing of the investor and the consumer interests." In contrast, Mr. Coyne's recommendation and the two equity ratio-constrained scenarios are overly generous to investors at the expense of customers and therefore fail the *Hope* standard.

The A3 and Baa1 scenarios have the same estimated cost to customers over the 2023-25 timeframe. This is largely because the analysis assumes the improved credit rating does not materially reduce Georgia Power's average cost of debt during the 2023-25 timeframe. Beyond 2025, though, the average cost of debt would be materially lower under the A3 scenario, reducing customer costs relative to the Baa1 scenario. Figure 30 summarizes my COE analysis and ROE and equity ratio recommendations.

[*Remainder of page intentionally left blank.*]

[165] 2022 IRP, Georgia Power Document Filing No. 188519, PD Vol. 1, 4 PD Load and Energy Forecast, PD B2022 Load and Energy Forecast 2022 to 2041 at 18, Section 2 (January 31, 2022).

Figure 30. Summary of Georgia Power COE analysis and recommended ROE and equity ratio
Percent

Model	COE	Key assumptions
DCF	**5.97**	
Dividend yield	3.36	Most recent quarterly dividend divided by one-month trailing price history (~21 trading days)
Initial growth rate	5.49	Analysts' EPS growth rates for three years to mitigate upward bias
Terminal growth rate	1.57	Based on long-term historical utility DPS growth rate equal to inflation
CAPM	**5.41**	
Risk-free rate	3.56	Current (one-month trailing average) 30-year Treasury
Beta	0.48	5-year monthly balances long-term historical trend and current market conditions
Market risk premium • Historical • Forward	3.86 4.86 2.87	Average of forward-looking using MS DCF and long-term historical average; MS DCF long-term growth rate equal to pre-capita GDP
Mean COE – Levered	**5.69**	
– Unlevered	4.78	59% proxy group average *market* equity ratio
Equity ratio	**61.7**	
Relevered COE/ recommended ROE	**5.54**	

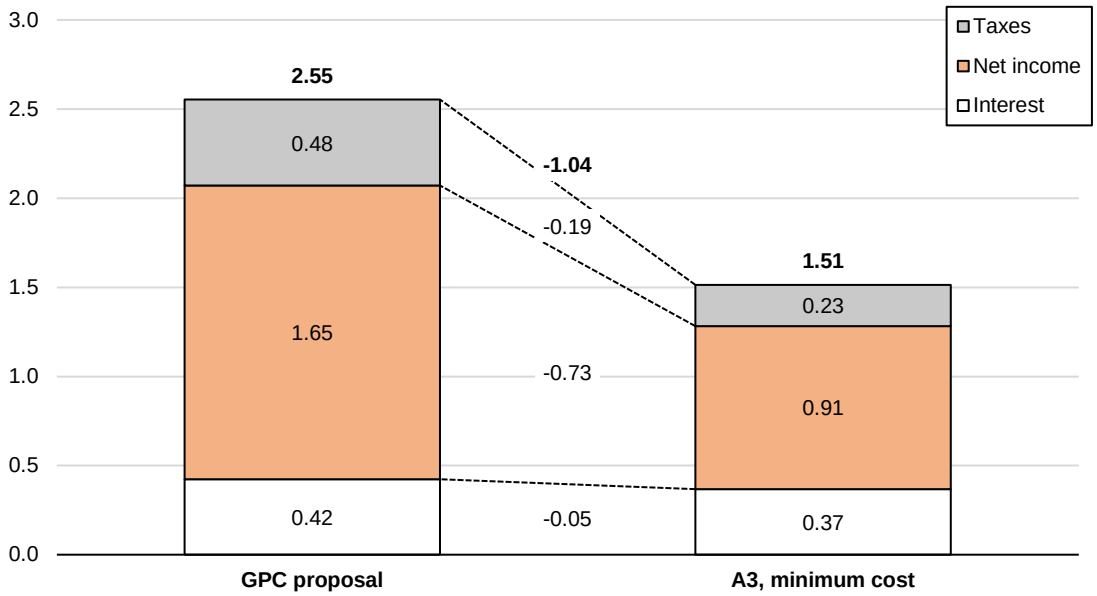
Q. IF THE COMMISSION ADOPTS YOUR ROE AND EQUITY RATIO RECOMMENDATIONS, HOW WOULD THE SOUTHERN COMPANY'S SHAREHOLDERS BE AFFECTED?

A. ROEs in excess of the cost of equity resembles a zero-sum game, with the interests of shareholders and customers in direct opposition. If the Commission adopted my recommended ROE and equity ratio, I would expect The Southern Company share price to experience a one-time downward adjustment as investors reset their expectations about future returns. Southern would still be able to access the equity markets, because Georgia Power's ROE, based on its actual cost of equity, i.e., investors' *expected* return,[166] would be sufficient to satisfy investors' demands. Investors who purchase shares after the one-time adjustment would earn returns comparable to the return current Southern shareholders expect.

[166] "Cost of equity" and "*expected* return on equity" are synonymous. *See supra* footnote 11.

I said that ROE above the cost of equity *resembles* a zero-sum game between shareholders and customers. It is not quite zero-sum between these two parties, though, because there is a third party: the tax authorities. ROE is grossed-up for taxes; to the extent ROE is reduced, taxes are also reduced. In aggregate, a lower ROE provides approximately one-third more benefit to customers than shareholders lose in foregone profit.[167] As shown in Figure 31, of the $1.04-billion reduction in revenue requirement return under the A3 scenario (Figure 29, line 9), the decline in Georgia Power's net income accounts for $740 million; $190 million is foregone taxes, of which approximately $150 million (77.5%) is Federal.[168]

Figure 31. Interest, ROE, and income tax revenue requirement under GPC proposal and A3 minimum cost scenario
$ billion



It is important to recognize that *Hope* established that regulators are not obligated to maintain utility stock market valuations, and that such an obligation would make a nonsense of regulators' consumer protection mandate:

> Ratemaking is indeed but one species of price-fixing. The fixing of prices, like other applications of the police power, may reduce the value of the property which is being regulated. But the fact

[167] Georgia Power's marginal tax rate is approximately 25%. The tax gross-up is 1/(1 – 25%) = $1^{1}/_{3}$. *See* Ex. APA-SPA-ADH-MBR-1, Schedule 1 Total Company.

[168] Georgia corporate income tax rate of 5.75%, Federal, 21%. After deducting state taxes, the net Federal rate is (1 – 5.75%) x 21% = 19.79%; 19.79% / (19.79% + 5.75%) = 77.49%.

> that the value is reduced does not mean that the regulation is invalid. It does, however, indicate that "fair value" is the end product of the process of ratemaking, not the starting point, as the Circuit Court of Appeals held. The heart of the matter is that rates cannot be made to depend upon "fair value" when the value of the going enterprise depends on earnings under whatever rates may be anticipated.[169]

The impact on Southern's stock price should not factor at all into the Commission's determination of the appropriate ROE and equity ratio.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

[*Remainder of page intentionally left blank.*]

[169] 320 U.S. 591, 601.