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MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. EC-2002-1

REBUTTAL TESTIMONY

OF

ROGER A. MORIN

ON

BEHALF OF

UNION ELECTRIC COMPANY
d/b/a AmerenUE

Exhibit No. 137
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REBUTTAL TESTIMONY

OF

ROGER A. MORIN

CASE NO. EC-2002-1

Q. Please state your name and business address.

A. My name is Dr. Roger A. Morin. My business address is Georgia State University, Robinson College of Business, University Plaza, Atlanta, Georgia, 30303. I am Professor of Finance at the College of Business, Georgia State University and Professor of Finance for Regulated Industry at the Center for the Study of Regulated Industry at Georgia State University. I am also a principal in Utility Research International, an enterprise engaged in regulatory finance and economics consulting to business and government.

Q. Please describe your educational background.

A. I hold a Bachelor of Engineering degree and an MBA in Finance from McGill University, Montreal, Canada. I received my Ph.D. in Finance and Econometrics at the Wharton School of Finance at the University of Pennsylvania.

Q. Please summarize your academic and business career.

A. I have taught at the Wharton School of Finance at the University of Pennsylvania, Amos Tuck School of Business at Dartmouth College, Drexel University, University of Montreal, McGill University, and Georgia State University. I was a faculty member of Advanced Management Research International, and I am currently a faculty member of The Management Exchange Inc. and Exnet where I continue to conduct frequent national executive-level education seminars throughout the United States and

Canada. In the last 20 years, I have conducted numerous national seminars on "Utility Finance," "Utility Cost of Capital," "Alternative Regulatory Frameworks," and on "Utility Capital Allocation," which I developed on behalf of The Management Exchange Inc. in conjunction with Public Utilities Reports, Inc.

I have authored or co-authored several books, monographs, and articles in academic scientific journals on the subject of finance. They have appeared in a variety of journals, including The Journal of Finance, The Journal of Business Administration, International Management Review, and Public Utilities Fortnightly. I wrote a widely used treatise on regulatory finance, Utilities' Cost of Capital, Public Utilities Reports, Inc., Arlington, Va. 1984. My more recent book, Regulatory Finance, is a voluminous treatise on the application of finance to regulated utilities and was released by the same publisher in late 1994. Missouri Public Service Commission Staff referenced this text as a source for their cost of capital analysis and Staff witness Mr. Ronald Bible in his November 12, 2001 deposition acknowledged it as a reliable authority.[1] I have engaged in extensive consulting activities on behalf of numerous corporations, legal firms, and regulatory bodies in matters of financial management and corporate litigation. Schedule 1 describes my professional credentials in more detail. An **Executive Summary** of my testimony is included in Appendix A.

Q. Have you testified on cost of capital before?

A. Yes, I have been a cost of capital witness before more than 40 regulatory bodies in North America, including the Federal Energy Regulatory Commission, and the Federal Communications Commission. I have also testified before the following state

[1] MOPSC response to interrogatories 82-83 and Bible November Deposition, p. 23:16 to 24:6.

and provincial commissions:

Alabama	Indiana	New Brunswick	Pennsylvania
Alaska	Iowa	New Jersey	Quebec
Alberta	Kentucky	New York	South Carolina
Arizona	Louisiana	Newfoundland	South Dakota
British Columbia	Manitoba	North Carolina	Tennessee
California	Michigan	North Dakota	Texas
Colorado	Minnesota	Ohio	Utah
Florida	Mississippi	Oklahoma	Vermont
Georgia	Montana	Ontario	Washington
Hawaii	Nevada	Oregon	West Virginia
Illinois			

The details of my participation in regulatory proceedings are provided in Schedule 1.

Q. What is the purpose of this rebuttal testimony?

A. I have been asked to critique Mr. Bible's cost of capital testimony from a methodological perspective. Specifically, though Mr. Bible uses the names of well-known methodologies in describing how he estimates a future rate of return on equity ("ROE") for AmerenUE, he in fact applies these methodologies in ways that are so unique, and ultimately so unreliable, that they cannot be said to be generally accepted, and are far removed from the methodologies for estimating ROE that are reasonably relied upon, by experts in the field. Moreover, Mr. Bible's version of these methodologies has not been tested or subjected to peer review to determine their potential rate of error or overall ability to provide this Commission with reliable information by which to adjudicate the Staff's rate complaint. Indeed, a most striking feature of Mr. Bible's unique treatment of the data to produce his estimate is that it is, as he freely admits, simply of function of his own "judgment," which he apparently feels free to

change at any time, and does not originate from industry knowledge or any generally accepted approach by experts in the field.

Q. Please summarize Mr. Bible's rate of return recommendation.

A. Mr. Bible recommends a return on equity ("ROE") for AmerenUE in the range of 8.91% to 9.91% with a midpoint of 9.41%. In determining AmerenUE's cost of common equity capital, Mr. Bible applies the constant growth discounted cash flow ("DCF") method to Ameren Corporation. As separate "checks" on the results of his DCF analysis applied only to this one-company sample, he applies the same DCF analysis, separately, to a set of three electric utilities, and also performs Risk Premium and capital asset pricing model ("CAPM") analyses. In spite of the fact that the results of his various checks are significantly higher than the midpoint of his recommended range, he rejects the results of these various checks because they do not amount to "double" the results of his DCF calculation for Ameren. Thus, by applying a far-fetched homemade standard that has no basis in statistical, economic, or financial theory, Mr. Bible has made his recommendation hinge solely on the DCF method applied only to AmerenUE's parent company.

Q. Do you have any general comments on Mr. Bible's testimony?

A. Yes. Before I engage in specific criticisms of Mr. Bible's testimony, my initial reaction was that his recommended ROE of 9.41% was so radical and far-fetched that it constituted a typographical error. Further reading, however, confirmed that 9.41% was indeed his recommended return. My next reaction was that Mr. Bible's implementation of the DCF analysis on which his recommendation rests must be

seriously flawed, and I proceeded to investigate the specific details of Mr. Bible's methodologies.

My general reaction to his testimony--even ignoring his treatment of the data in his calculations that only serves to produce lower numbers--is that it is extremely narrow in scope. Mr. Bible has reduced and trivialized the process of determining cost of capital to a simple mechanical application of the DCF formula to a one-company sample. His recommendation rests entirely on the DCF methodology applied to a single observation, namely, Ameren Corporation data. He ignores the results from his comparable group of electric utilities and the results from other methodologies. Mr. Bible has not only put all his eggs in the DCF basket, he has fashioned a totally idiosyncratic DCF basket. This stands in sharp contrast with the practices of investment analysts, corporate analysts, and other finance experts and professionals who generally advocate the use of groups of comparable companies and several methods.

Also, I find that Mr. Bible's recommended 9.41% cost of equity for AmerenUE lies completely outside the zone of reasonableness and well outside the zone of currently authorized rates of return for electric utilities in the United States, and, as such, is difficult to take seriously.[2] Mr. Bible's draconian cost of equity recommendation of only 9.41%, if ever adopted, would result in the lowest rate of return award for an electric utility in the country, and by a wide margin. I hesitate to think of its adverse consequences on investors and ratepayers.

Finally, I find that Mr. Bible's testimony contains serious methodological

[2] As Schedule 17 to Ms. McShane's testimony shows, during AmerenUE's test year and update period, other States have allowed returns on equity ranging from a low of 10.50% to a high of 12.90%, for an average of 11.27%.

flaws, along with several inconsistencies from prior testimonies and from an earlier version of the same testimony for AmerenUE.

Q. What are the basic conclusions of your rebuttal to Mr. Bible's cost of equity testimony?

A. Mr. Bible's testimony is highly irregular and flawed, and grossly understates AmerenUE's cost of equity. A proper application of cost of capital methodologies would provide far more reasonable results. Mr. Bible's overall testimony and recommendations are well outside the mainstream of both financial theory and practice. As such, Mr. Bible's opinion as to an ROE for AmerenUE is so fundamentally unsupported, and as a result unreliable, as to offer this Commission mere speculation, guess, and conclusions founded simply on his own belief. In short, Mr. Bible's testimony cannot be credited with providing the Commission with any expert analysis that can give it insight in responsibly addressing the important issues in this case.

Q. Please summarize your specific criticisms of Mr. Bible's testimony.

A. I have several specific criticisms:

1. Allowed returns far out of the mainstream. Mr. Bible's recommended range is well out of line with rate of return awards in the industry, and lies completely outside the zone of currently allowed rates of return for utilities in the United States.

2. An unprecedented "double" standard to "check" the DCF estimate. Mr. Bible believes that results from his Risk Premium and CAPM analyses suggest a problem with his DCF calculation only if the results of those analyses are "two times" his DCF result. This standard -- that is his alone and has no source other than his

"judgment" – is so unreasonably broad as to make his Risk Premium and CAPM analyses wholly meaningless as checks on this DCF work, a consequence he freely admits. Moreover, this standard – essentially a range of ±9.41 % around his DCF-based recommendation -- is utterly arbitrary, as can be seen by comparing it to the range he claims, also without justification, is appropriate for AmerenUE's cost of capital, which is ±0.5 % around his midpoint.

3. Inappropriate reliance on a single method. As Mr. Bible admits, his "double" standard reduces the other methods he purportedly uses to "check" his DCF result to irrelevance. In truth then, Mr. Bible exclusively relies on the DCF method, an approach wholly at odds with recognized standards for cost of capital analysis.

4. Unreliable sample size. Mr. Bible's one-company DCF calculation that underlies his ROE recommendation produces highly unreliable results. A DCF estimate based on only one observation is statistically invalid, violates the Central Limit Theorem, and violates the fundamental precepts of rate of return regulation embodied in the *Bluefield* and *Hope* landmark cases. Similarly, Mr. Bible's sample of only three comparable electric utilities to check his DCF estimate is statistically invalid, and, at bottom, produces highly unreliable results.

5. Overemphasis on historical growth rates. Mr. Bible relies inappropriately on electric utility historical growth data in his DCF analysis despite sea changes occurring in the industry that make the past a very uncertain basis by which to estimate future rates of return. Moreover, the historical growth rates that Mr. Bible uses in his DCF analysis are redundant since historical growth patterns are already reflected in

analysts' growth forecasts, which he also uses. Compounding this fundamental flaw, Mr. Bible relies on historical data to do his calculations notwithstanding the fact that Ameren and two of the three comparable companies he selected have experienced recent mergers. As a result, data drawn from before these mergers is not comparable to data from after them, as the sources of this data expressly warn. Also, the stock price Mr. Bible uses in his DCF analysis is predicated on analysts' growth forecasts and not on historical growth rates.

In addition, Mr. Bible employs historical and projected dividend growth in his DCF analysis even though, as he should know, electric utilities are reducing dividend payouts. Because electric utilities are expected to lower their dividend payout ratio over the next several years in response to the gradual penetration of competition in the revenue stream and to the rising risk due to regulatory restructuring, dividend growth numbers embody a downward prejudice, and can no longer accurately convey useful information about the future economic activity of a utility. As a result, the use of historic or projected dividend growth (rather than earnings growth) is inappropriate in using the DCF model today, for they can only serve to artificially depress the results of the resulting estimate. Earnings growth projections are far more relevant.

6. Downward-biased CAPM beta estimate. Mr. Bible's beta estimate is downward-biased because current changes in the risk fundamentals of the electric utility industry due to the introduction of competition, deregulation, and restructuring are not fully reflected in the historical betas on which he relies.

7. Erroneously calculated CAPM market risk premium. Mr. Bible's estimate of the market risk premium erroneously relies in part on geometric

averages of historical market returns rather than on the correct arithmetic average. Similarly, Mr. Bible incorrectly relies on total returns instead of income returns on long-term government bonds to estimate the market risk premium.

ALLOWED RETURNS

Q. Is Mr. Bible's rate of return recommendation compatible with currently allowed returns in the electric utility industry?

A. No, it is not. Allowed returns, while certainly not a precise indication of a particular company's cost of equity capital, are nevertheless important determinants of investor growth perceptions and the approximate range of reasonable returns. They also serve to provide some perspective on the validity and reasonableness of Mr. Bible's recommendation.

The allowed return in the electric utility industry outside of Missouri during AmerenUE's test year and update period ranged from 10.50% to 12.90%. (See McShane Schedule 17.) This exceeds by a substantial margin Mr. Bible's anemic recommended ROE of 9.41% for AmerenUE. I also have examined the returns currently allowed on common equity for the three electric utilities in Mr. Bible's very small sample group as reported in C.A. Turner Utility Reports survey for April 2002. The currently authorized ROE for Mr. Bible's three-company sample is 11.1%, 11.7%, and 11.0%, for Allegheny Energy, Alliant Energy, and Cinergy, respectively. In short, Mr. Bible's recommendation is so far outside the zone of the currently allowed rates of return for his comparable companies, and so far outside the mainstream of authorized returns for electric utilities, that it is difficult to take seriously.

THE "DOUBLE" STANDARD

Q. Does Mr. Bible rely on a reasonable standard in judging his cost of equity estimates?

A. Absolutely not. Mr. Bible chose to rely on an arbitrary standard that is purely his, so that there is no way in which results other than the DCF applied to a single company can be taken into account. According to Mr. Bible, he would only question his recommendation if his results from other methods or results from comparable companies were "twice as much,"[3] as his solitary DCF calculation for Ameren alone. Indeed, Mr. Bible has been quite emphatic about rigidly applying this standard, as is illustrated by this exchange in one of his depositions:

> Q. In your deposition testimony last time around I believe you said that those crosschecks would not cause you to change or reconsider your DCF estimate unless they were double your DCF estimate.
>
> Is that pretty much how, then, interest rates might affect your DCF estimate?
>
> A. No. I said that – what I actually said in the previous deposition was, unless they doubled, it wouldn't cause me to go back and rethink or even look at the DCF. I mean, even if interest rates doubled, I'm not going to go back and change my DCF model just because of that.[4]

This standard is purely Mr. Bible's opinion and is not used by any reputable financial analysts. Mr. Bible's "double" standard also is not used by other Missouri Public Utility Service Commission Staff as evidenced by the following exchange that took place during Mr. Bible's deposition:

> Q. In that judgment that we're talking about in terms of when you believe that the comparable calculations are too far removed,

[3] *See* Bible November Deposition, p. 131:22 to 132:1.
[4] Bible April Deposition, p. 10:4 to 15.

your judgment of twice the DCF results, is that your perspective or is that a practice that is followed by other members of the Staff?

A. That's my perspective.

Q. Do you know how other Staff members approach that same question?

A. Not offhand I don't, no.

Q. Have you ever talked to them about it?

A. Yes.

Q. And do you have any kind of recollection of how other Staff members approach that?

A. As far as a specific number? No.[5]

Q. What are the consequences of Mr. Bible's "double" standard?

A. This "double" standard renders any test of Mr. Bible's recommendation irrelevant as any other test results could only question the validity of the 9.41 % return on equity if these other calculations came up with a cost of equity above 18.8 %. According to Mr. Bible, then, a Risk Premium or CAPM result of, say, 18%, would not suggest his 9.41% DCF result was inaccurate or even unreasonable. He would not even "look" at his DCF calculation to try to understand such a wide disparity in these results.

Logically, this must also mean that any rate of return results less than 18.8% are as reasonable as Mr. Bible's midpoint recommendation. That, of course, would also mean that AmerenUE's current return and rates are reasonable as well. If Mr. Bible's "double" standard is right, then, his DCF estimate for ROE cannot support the Staff's rate proposal. If it is wrong, Mr. Bible's own Risk Premium and CAPM

[5] Bible November Deposition, p. 136:14 to 137:2.

"checks" show his DCF result to be fundamentally flawed, and his DCF estimate even more obviously fails to support that rate proposal. Either way, the Staff has, with their rate of return testimony, fallen far short of meeting their burden under their complaint to prove that the massive rate reduction they seek is warranted or lawful.

Furthermore, under this standard, under which the results of other methodologies are rejected unless they are double the DCF result, calculations purportedly undertaken as a "cross check" will almost never have any impact on an ROE estimate, or serve to support the accuracy of the DCF estimate in any way. This certainly was the case here, as Mr. Bible repeatedly emphasized under questioning in his deposition. For example, when Mr. Bible was forced to admit that he has no real knowledge of the comparable companies he used in his calculations, he pointed out:

> And, again, your line of questioning is insignificant because I don't use this to determine directly the return on equity and rate of return for the Company.[6]

Mr. Bible could not have been more candid in underscoring that his "double" standard ultimately meant his "checks" had no impact on his rate of return recommendation:

> Q. So the results from any of your other – as you've made very clear, the results from your other methods didn't inform that the historical growth rates or the projected growth rates, those ranges didn't shape your judgment at all about this?
>
> A. No. Like I said, the CAPM, the risk premium, the comparable company analysis, those don't factor directly into the calculations that I do for return on equity and rate of return for AmerenUE.[7]

[6] Bible April Deposition, p. 28:25 to 29:3.
[7] Bible April Deposition, p. 53:10 to 18.

Given Mr. Bible's unique and arbitrary standard, he is surely correct that there is no way in which his estimate of the cost of equity can be influenced by methods other than his DCF calculation applied solely to Ameren itself. This approach clearly is outside the accepted standards in financial economics and makes Mr. Bible's recommendation highly unreliable.

Q. Does the arbitrariness of Mr. Bible's "double" standard have broader implications for the reasonableness of his recommended range for return on equity?

A. Yes. Mr. Bible recommends that a reasonable range for AmerenUE's return on equity is his midpoint of 9.41% ± 50 basis points (or 0.5%). It is standard practice for the width of an analyst's recommended range to be based on, or informed by, the range of results from different methodologies, the application of various methodologies to comparable companies, or the variation in projected growth rates used in the DCF calculation. Of course here, Mr. Bible has already adopted his "double" standard for evaluating the results of other "cross check" methodologies. If this "double" standard were used to create his ROE range, Mr. Bible would be proposing a range for AmerenUE's ROE around his midpoint of ± 9.41%, which, instead of a range of 50 basis points (0.5%), represents a swing of 9.41 basis points (9.41%), within which AmerenUE's current rates more than comfortably fit. Why one range should be so tight, while the other is so broad, Mr. Bible does not even attempt to explain. His only justification for his choice of the 50 basis point range for his ROE recommendation is that he has chosen it, as he made clear in the following exchange in his deposition:

> Q. Well, is there anything other than your own thinking that you refer to, whether it's a treatise or any other scholar or a policy of the staff to determine that plus or minus .5 percent is a reasonable range?

A. No, there is no specific reference. From my experience and my judgment, that's an adequate number to use around a midpoint to develop a range.[8]

Such bald, unsupported claims simply cannot pass muster as professional, competent analysis in the eyes of mainstream investment analysts, corporate analysts, and other finance professionals, and should not be treated as such by this Commission. Indeed, such subjective, personal opinion testimony as to a proper ROE for AmerenUE can only lead the Commission into the most arbitrary and capricious rate-setting.

INAPPROPRIATE RELIANCE ON A SINGLE METHOD

Q. Mr. Bible has limited the cost of equity estimation process to one methodology, namely, DCF. Does his failure to consider the results of other methods in his final recommendation make his results unreliable, if not highly biased?

A. Yes, it does. A fundamental problem in his testimony is the lack of corroborating evidence. There is simply no objective cross check on his one DCF result, given the arbitrary and meaningless standard he has set to assess the reasonableness of such checks. The 9.41% cost of equity recommended by Mr. Bible is unreasonably low, and is not a reliable estimate of AmerenUE's cost of equity capital. Had Mr. Bible correctly used all the market data and financial models available to him, his estimate would be significantly higher.

There are at least four broad generic methodologies available to measure the cost of equity: DCF, Risk Premium, and CAPM, which are market-oriented; and Comparable Earnings, which is accounting-oriented. Each generic market-based

[8] Bible April Deposition, p. 52:5-12.

methodology in turn contains several variants. Mr. Bible has chosen to rely on his own, idiosyncratic and erroneous application of one method, namely the constant growth (or standard) DCF method applied to one company.

However, when estimating equity costs, which essentially deals with the estimation of something that cannot be objectively and certainly known, that is, investor expectations, no single methodology provides foolproof results. Each methodology requires the exercise of considerable judgment on the reasonableness of the assumptions underlying the methodology and on the reasonableness of the proxies used to validate the theory. The well-recognized failure of the traditional DCF model to account for changes in relative market valuation is a vivid example of the potential shortcomings of the DCF model when applied to a given company, as I show below. It follows that more than one methodology should be employed in arriving at a reliable judgment on the cost of equity and that these methodologies should be applied across a spectrum of comparable-risk companies.

As I discuss extensively in Chapter 9 of my book, Regulatory Finance, there is no single model that conclusively determines or estimates the expected return for an individual company. Each model possesses its own way of examining investor behavior, its own premises, and its own set of simplifications of reality. Each model proceeds from different fundamental premises which cannot be validated empirically. Investors do not subscribe to any one method, nor does the stock price reflect the application of any one single method by the price-setting investor.

Absent any hard evidence as to which method outdoes the other, all relevant evidence should be used and weighted equally in order to minimize judgmental

error, measurement error, and conceptual infirmities. I submit that the Commission should rely on the results of a variety of methods applied to a variety of comparable groups, and not, as Mr. Bible has done, on one particular method applied to one company. A single DCF result is not a reliable predictor of the stock price and of the cost of equity reflected in that price, just as there is no guarantee that a single CAPM or Risk Premium result could not constitute a reliable explanation of that stock price or the cost of equity.

Q. Does the financial literature support the use of more than a single method?

A. Yes. Authoritative financial literature strongly supports the use of multiple methods. For example, Professor Brigham, a widely respected scholar and finance academician, asserts:

> In practical work, it is often best to use all three methods - CAPM, bond yield plus risk premium, and DCF - and then apply judgement when the methods produce different results. People experienced in estimating capital costs recognize that both careful analysis and some very fine judgements are required. It would be nice to pretend that these judgements are unnecessary and to specify an easy, precise way of determining the exact cost of equity capital. Unfortunately, this is not possible.[9]

In a subsequent edition of his best-selling corporate finance textbook, Dr. Brigham discusses the various methods used in estimating the cost of common equity capital, and states:

> However, three methods can be used: (1) the Capital Asset Pricing Model (CAPM), (2) the discounted cash flow (DCF) model, and (3) the bond-yield-plus-risk-premium approach. These methods should not be regarded as mutually exclusive -

[9] Eugene F. Brigham and Louis C. Gapenski, Financial Management Theory and Practice, p. 256 (4th ed., Dryden Press, Chicago, 1985)

> no one dominates the others, and all are subject to error when used in practice. Therefore, when faced with the task of estimating a company' cost of equity, we generally use all three methods.....[10]

Mr. Bible should have heeded to Professor Brigham's admonitions in this regard as well.

Another prominent finance scholar, Professor Stewart Myers, in his best selling corporate finance textbook, points out:

> The constant growth formula and the capital asset pricing model are two different ways of getting a handle on the same problem.[11]

In an earlier article, Professor Myers explains:

> Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means you should not use any one model or measure mechanically and exclusively. Beta is helpful as one tool in a kit, to be used in parallel with DCF models or other techniques for interpreting capital market data.[12]

Q. Doesn't the broad usage of the DCF methodology in past regulatory proceedings make it superior to other methods?

A. No, it does not. While the DCF model has been well entrenched in financial theory in the past, uncritical acceptance of the standard DCF equation vests the model with a degree of infallibility that simply is not there.

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[10] Id. at p. 348.
[11] R. A. Brealey and S. C. Myers, Principles of Corporate Finance, p. 182 (3rd ed., McGraw Hill, New York, 1988)
[12] S. C. Myers, "On the Use of Modern Portfolio Theory in Public Utility Rate Cases: Comment," Financial Management, p. 67 (Autumn 1978).

One of the leading experts on regulation, Dr. C. Phillips discusses the dangers of relying solely on the DCF model:

> [U]se of the DCF model for regulatory purposes involves both theoretical and practical difficulties. The theoretical issues include the assumption of a constant retention ratio (i.e. a fixed payout ratio) and the assumption that dividends will continue to grow at a rate 'g' in perpetuity. Neither of these assumptions has any validity, particularly in recent years. Further, the investors' capitalization rate and the cost of equity capital to a utility for application to book value (i.e. an original cost rate base) are identical only when market price is equal to book value. Indeed, DCF advocates assume that if the market price of a utility's common stock exceeds its book value, the allowable rate of return on common equity is too high and should be lowered; and vice versa. Many question the assumption that market price should equal book value, believing that "the earnings of utilities should be sufficiently high to achieve market-to-book ratios which are consistent with those prevailing for stocks of unregulated companies.
>
> ...[T]here remains the circularity problem: Since regulation establishes a level of authorized earnings which, in turn, implicitly influences dividends per share, estimation of the growth rate from such data is an inherently circular process. For all of these reasons, the DCF model 'suggests a degree of precision which is in fact not present' and leaves 'wide room for controversy about the level of k [cost of equity]'.[13]

Sole reliance on the DCF model simply ignores the capital market evidence and investors' use of other theoretical frameworks such as the CAPM. The DCF model is only one of many tools to be employed in conjunction with other methods to estimate the cost of equity. It is not a superior methodology which supplants other financial theory and market evidence.

Q. Should the underlying assumptions of the DCF model be treated with caution?

[13] C. F. Phillips, The Regulation of Public Utilities Theory and Practice, pp. 376-77. (Public Utilities Reports, Inc., 1988) pp. 376-77. [Footnotes omitted]

A. Yes, they should, particularly in today's rapidly changing utility industry. Notwithstanding the fundamental thesis that several methods and/or variants of such methods should be used in measuring equity costs, Mr. Bible has exclusively relied on a methodology that, to those familiar with the industry and the accepted norms for estimating the cost of equity, is dangerously fragile at this time.

Several fundamental and structural changes have transformed the energy utility industry from the times when the standard DCF model and its assumptions were developed. Deregulation, increased competition triggered by national policy, accounting rule changes, changes in customer attitudes regarding utility services, the evolution of alternative energy sources, and mergers-acquisitions have all influenced stock prices in ways vastly different from the early assumptions of the DCF model. These changes suggest that some of the raw assumptions underlying the standard DCF model, particularly that of constant growth and constant relative market valuation, are of questionable pertinence at this point in time for utility stocks, and that the DCF model should be complemented, at a minimum, by alternate methodologies to estimate the cost of common equity.

Similarly, the historical growth rates that are employed by Mr. Bible in implementing the growth component of the DCF model are downward-biased by the impact of increased competition on eroding margins, diversification and restructuring activities in recent years. This is addressed at length in my discussion of Mr. Bible's use of historical growth rates in Section 5 below.

Q. Is the constant relative market valuation assumption inherent in the DCF model always reasonable?

A. No. Caution must also be exercised when implementing the standard DCF model in a mechanistic fashion, for it may fail to recognize changes in relative market valuations. The traditional DCF model is not equipped to deal with surges in market-to-book (M/B) and price-earnings (P/E) ratios.

The standard DCF model assumes a constant market valuation multiple, that is, a constant P/E ratio and a constant M/B ratio. That is, the model assumes that investors expect the ratio of market price to dividends (or earnings) in any given year to be the same as the current ratio of market price to dividend (or earnings) ratio, and that the stock price will grow at the same rate as the book value. This must be true if the infinite growth assumption is made.

This assumption is somewhat unrealistic under current conditions. The DCF model is not equipped to deal with sudden surges in M/B and P/E ratios, as was experienced by several utility stocks, in recent years. The ratios are anything but constant, thus violating one of the crucial assumptions of the DCF model.

Q. Can you illustrate the impact of volatile market-to-book ratios on the DCF market return by means of a simple example?

A. Application of the DCF model produces estimates of common equity cost that are consistent with investors' expected return only when stock price and book value are reasonably similar, that is, when the M/B is close to unity. As shown below, application of the standard DCF model to utility stocks understates the investor's expected return when the M/B ratio of a given stock exceeds unity. This is particularly relevant in the current capital market environment where utility stocks are trading at M/B ratios well above unity. The converse is also true; that is, the DCF model overstates

the investor's return when the stock's M/B ratio is less than unity. The reason for the distortion is that the DCF market return is applied to a book value rate base by the regulator, that is, a utility's earnings are limited to earnings on a book value rate base.

The simple numerical illustration shown in the table below demonstrates the result of applying a market value cost rate to book value rate base under three different M/B scenarios. The three columns correspond to three M/B situations: the stock trades below, equal to, and above book value, respectively. The last situation is noteworthy and representative of the current capital market environment. The DCF cost rate of 10%, made up of a 5% dividend yield and a 5% growth rate, is applied to the book value rate base of $50 to produce $5.00 of earnings. Of the $5.00 of earnings, the full $5.00 are required for dividends to produce a dividend yield of 5% on a stock price of $100.00, and no dollars are available for growth. The investor's return is therefore only 5% versus his required return of 10%. A DCF cost rate of 10%, which implies $10.00 of earnings, translates to only $5.00 of earnings on book value, a 5% return. The situation is reversed in the first column when the stock trades below book value. The $5.00 of earnings is more than enough to satisfy the investor's dividend requirements of $1.25, leaving $3.75 for growth, for a total return of 20%. This is because the DCF cost rate is applied to a book value rate base well above the market price. Therefore, the DCF cost rate produces less than the investor's required return when stock prices are well above book, as is the case presently.

EFFECT OF MARKET-TO-BOOK RATIO ON MARKET RETURN

	Situation 1	*Situation 2*	*Situation 3*
1 Initial purchase price	$25.00	$50.00	$100.00
2 Initial book value	$50.00	$50.00	$50.00
3 **Initial M/B**	**0.50**	**1.00**	**2.00**

DCF Return 10% = 5% + 5%	**10.00%**	**10.00%**	**10.00%**
Dollar Return	$5.00	$5.00	$5.00
Dollar Dividends 5% Yield	$1.25	$2.50	$5.00
Dollar Growth 5% Growth	$3.75	$2.50	$0.00
Market Return	**20.00%**	**10.00%**	**5.00%**

In summary, caution and judgment are required in interpreting the results of the DCF model because of (1) the effect of changes in risk and growth on electric utilities, (2) the fragile applicability of the DCF model to utility stocks in the current capital market environment, and (3) the practical difficulties associated with the growth component of the DCF model. Hence, there is a clear need to go beyond the DCF results and take into account the results produced by alternate methodologies in arriving at a ROE recommendation, as Mr. Bible should have done.

UNRELIABLE SAMPLE SIZE

Q. Please explain why Mr. Bible's sample size leads to unreliable recommendations.

A. Mr. Bible's ROE recommendation hinges solely on the results of a DCF analysis performed on only one company, namely, AmerenUE's parent company, Ameren. Results from comparable companies are not given any weight in forming his recommendation, given the impossible standard he has set for assessing the reasonableness of his recommendation.

Q. Does this approach for estimating the rate of return based on the results for one company square with the fundamental precepts of regulation?

A. No, it does not. The heart of utility regulation is the setting of just and reasonable rates by way of a fair and reasonable return. The landmark U. S. Supreme Court *Bluefield* and *Hope* cases set the foundations for the notion of a fair return and the

standard against which just reasonable rates are measured. As the Court explained in *Bluefield*:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties ...[14]

In the *Hope* case, the Supreme Court likewise stated:

> From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock ... By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks.[15]

Mr. Bible appears to rely on these decisions as he quotes the same passage from the *Bluefield* case on page 5 and refers to the "corresponding risk" in the Supreme Court's discussion of the *Hope* case on p. 6 line 9.

The economic logic underlying these standards is straightforward. There is an opportunity cost associated with the funds that capital suppliers provide a public utility. That cost is the expected return foregone by not investing in other enterprises of corresponding risks. Thus, the expected rate of return on a public utility's equity capital should equal the expected rate of return on equity of other firms having comparable risks.

In contrast to these standards, the core of Mr. Bible's approach to setting a fair and reasonable rate of return for a public utility is to rely exclusively on a DCF

[14] *Bluefield Water Works & Improvement Company v. Public Service Comm.*, 262 U.S. 679 (1923) at 692-3.
[15] *Federal Power Commission et al v. Hope Natural Gas Co.*, 320 U.S. 591 (1944) at 603.

analysis of a one-company sample. Results from comparable companies are not given any weight in arriving at his final ROE recommendation. Mr. Bible's exclusive reliance on Ameren as his sample does not square well with the *Hope* and *Bluefield* guidelines. The rate of return standard, as expounded clearly in *Hope* and *Bluefield*, is to allow an equity return commensurate with returns on investments in other enterprises having corresponding risks. This fundamental paradigm clearly suggests the analysis of comparable risk investments.

Not only is Mr. Bible's view in direct violation of the fundamental precepts of the *Hope* and *Bluefield* standards of fair return, it is also in contradiction of the economic concept of opportunity cost, which clearly hinges on the use of comparable investment opportunities. Moreover, it is transparent that the DCF model should be applied to comparable risk firms in recognition of the fact that utilizing a portfolio of similar companies acts to reduce the chance of either overestimating or underestimating the cost of equity. The academic and professional literature has a long and rich tradition of applying cost of capital methodologies on a sample of comparable companies rather than on a one-company sample. For example, as Professors Brealey and Myers explained:

> The simple constant-growth DCF formula is an extremely useful rule of thumb, but no more than that. Naive trust in the formula has led many financial analysts to silly conclusions. We have stressed the difficulty of estimating [the cost of equity] by analysis of one stock only. Try to use a large sample of equivalent-risk securities. Even that may not work, but at least it gives an analyst a fighting chance, because the inevitable errors in estimating [the cost of equity] for a single security tend to balance out across a broad sample.[16]

[16] Brealey & Myers (6th ed.), supra, at 69.

By relying solely on a one-company estimate, the Commission would set a very dangerous precedent for future ratemaking procedures. A one-company sample is likely to contain a high degree of measurement error and may be distorted by short-term aberrations. The Commission's hands should not be bound to one single company-specific estimate of equity costs.

Q. Dr. Morin, Mr. Bible did calculate DCF and CAPM results for a group of three comparable utilities. Assuming he had given appropriate weight to these results and assuming his results were based on appropriate calculations, is a sample of three comparable companies sufficient to produce a reliable cost of equity recommendation?

A. No, it is not. A sample of only three comparable companies is far too small, subject to measurement error, and in violation of the Central Limit Theory of statistics. Moreover, the results of Mr. Bible's DCF application to his sample of three utilities are clouded by recent mergers for two of his sample companies, rendering the use of historical growth rates highly problematic and unreliable, if not useless.

Q. Is there any evidence that Mr. Bible's results are unreliable?

A. Yes, there is. To illustrate the lack of reliability of the results produced from such a small sample, Mr. Bible's Schedule 20 displays his various growth rates. The growth rates are scattered all over, ranging from a low of 1% to a high of 10%. The huge variability in the growth results demonstrates the lack of reliability in this too-limited sample.

OVEREMPHASIS ON HISTORICAL GROWTH RATES

Q. Is Mr. Bible's reliance on historical growth rates appropriate for the purpose of estimating a utility's cost of equity in today's rapidly changing industry?

A. No, absolutely not. As mentioned above, the historical growth rates that are employed by Mr. Bible in implementing the growth component of the DCF model are highly inappropriate and downward-biased due to the impact of increased competition on eroding margins, diversification, and restructuring activities in recent years. Acquisitions, startup expenses and front-end capital investments associated with diversification, a reduction of dividend payout ratios, and restructuring efforts in the light of intensifying competition in recent years have retarded and diluted historical growth rates, and such growth is not representative of many utilities' long-term growth potential.

Given the dramatic changes in the electric utility industry's operating environment, the need to be forward-looking is apparent. In this environment, historically based measures of risk and growth are necessarily unreliable, if not useless, and are likely to be downward-biased in assessing present circumstances.

Moreover, the fundamental risks of electric utilities are changing rapidly. This structural shift in risk is not fully reflected in the historical growth rates. Hence, backward-looking growth and statistical analysis fails to fully reflect the fact that the risks of electric utilities have escalated, and will only provide limited evidence that the risk and the cost of capital have increased. Therefore, caution must be exercised when applying any of the growth estimating techniques directly to recent historical utility company data. Not surprisingly, FERC has explicitly rejected the use of historical

growth rates. For example, FERC in its recent Opinion 445 decided to rely on IBES analysts' earnings forecast and retention ratios to estimate growth.

Another reason for caution is that the stock price used as input in the dividend yield component may be biased by structural changes and changing investor expectations in the electric utility industry. Stock prices can also be influenced by mergers and acquisitions possibilities, by speculation concerning asset restructurings and deregulation of certain assets, and by corporate takeover rumors.

Q. Please explain why Mr. Bible's use of historical growth rates in applying the DCF model to electric utilities is inappropriate and leads to highly biased results.

A. In arriving at his proxies for the DCF growth component, Mr. Bible considers 5-year and 10-year historical growth rates in dividends, book value, and earnings as reported by Value Line. I disagree with the use of electric utility historical growth rates at this time.

In a stable industry, it may be reasonable to assume that historical growth rates in dividends and earnings influence investors' assessment of the long-run growth rate of future dividends and earnings. However, because of sea changes in the industry, historical growth rates have little relevance as proxies for future long-term growth. They are downward-biased by the sluggish earnings performance and many utilities' reduction of dividend payout ratios in the last decade, due to the structural transformation of the electric utility business from a regulated monopoly to a competitive environment.

As discussed in Chapter 5 of my book, Regulatory Finance, it is highly inappropriate to rely on historical growth rates when a utility or the industry is in

transition. If a period is characterized by non-recurrent events, historical earnings growth become unrepresentative of future growth, and analysts' growth forecasts provide a more realistic and representative growth proxy for what was likely to happen in the future.[17] I conclude that "it is perilous to apply historical growth when a utility is in a transition between growth paths."[18]

In addition, Mr. Bible's calculation of historical growth rates for AmerenUE is simply meaningless and deeply flawed. Mr. Bible's source for the data he uses to calculate his historical growth rates, Value Line, explicitly stresses that "Premerger data are for Union Electric only and are not comparable to Ameren data."[19] Value Line comments in the same way on Alliant Energy's data and on Cinergy.[20] This means Mr. Bible's historical growth rates are not even based on data for the same company: the data prior to 1997 is for Union Electric, while the later data is for Ameren, including CIPS and unregulated subsidiaries. As Value Line warns, this data is not comparable. In fact, Mr. Bible admitted in depositions that he is not familiar with the most basic industry developments in recent years (such as FERC Orders 888 and 2000) nor with basic facts about the comparable utilities he selected.[21] He represents that he does not need to know these facts because Value Line and other financial analysts' reports on which he relies have adequately considered these facts. However, this basic lack of personal knowledge also means that Mr. Bible has absolutely no basis for his rejection of Value Line's and other analysts' projected growth rates or for his application

[17] See also Regulatory Finance, p. 149-157.
[18] Id. p. 153.
[19] Value Line Investment Survey, January 4, 2002 (provided by Staff in response to JJC-16).
[20] Value Line Investment Survey, January 4, 2002.
[21] See Bible November Deposition, p. 107 and April Deposition, p. 28-29.

of historic growth rates. As Ms. McShane shows, Mr. Bible's unsupported judgment serves to understate in a very material fashion his DCF results for Ameren as well as for his three comparable companies. His inappropriate reliance on historic growth rates serves to understate his recommended ROE by 175 basis points. I strongly recommend that the Commission reject Mr. Bible's uninformed, erroneous, and highly biased results and ROE recommendation.

As reported on page 22 of Mr. Bible's testimony, feeble historical growth rates of 1.50% are certainly not representative of Ameren's long-term earning power, and produce unreasonably low DCF estimates, well outside reasonable limits of probability and common sense. Moreover, historical growth rates are largely redundant because such historical growth patterns are already incorporated in the analysts' growth forecasts that Mr. Bible also uses.

I therefore recommend that the Commission reject historical growth rates as proxies for expected growth in the DCF calculation at this time of profound change in the industry.

Q. Does Mr. Bible compute his DCF growth rate for the comparable companies in a consistent fashion in both his July 2001 and March 2002 testimony?

A. No, he does not. In his March 2002 testimony, he inexplicably switches course dramatically in computing DCF growth rates for the three comparable companies. In his July 2001 testimony Mr. Bible relies directly on Value Line's earnings per share growth forecast. In his most recent testimony, however, Mr. Bible averages Value Line's growth projections for dividends, book value, and earnings per share. (See his Schedule 20 Column 4 and the Bible April Deposition, p. 37). This opportunistic switch in

computing growth rates – which was entirely undocumented and only acknowledged when Mr. Bible was directly questioned by counsel in his deposition -- profoundly reduces Mr. Bible's results. Mr. Bible's arbitrary averaging of Value Line growth forecasts reduces the true Value Line forecasted earnings growth for the comparable companies by 329 basis points and the estimated DCF cost of equity for the comparable companies by approximately 55 basis points.[22] This kind of opportunistic switch in methodology is highly unsettling, disturbing, and certainly casts a dark shadow on the credibility of Mr. Bible's recommendation. Moreover, as I show below, dividend growth forecasts are inappropriate proxies for the long-term growth in the DCF model at this time.

Q. Should Mr. Bible have considered Value Line's dividend growth forecast in his DCF analysis?

A. No, he should not. It is inappropriate to use the projected dividend growth of electric utilities in this industry environment. The problem with the use of Value Line's dividend growth forecasts, besides the fact that these forecasts are only one individual firm's forecasts, is that they are largely dominated by the anticipated dividend policy of a company over the next few years, not the true growth prospects that form the basis for investors' valuation of the particular company's stock.

Q. What is the impact of changing dividend policies on the reliability of dividend growth projections?

A. The reason for skepticism about dividend growth projections as an indication of a company's economic future is that it is widely expected that energy utilities will lower their dividend payout ratio over the next several years in response to

[22] See McShane Table 6 for a calculation of the 329 bps and note that 55 bps = (1/2) x (1/3) x 329 bps.

the gradual penetration of competition in the revenue stream. In other words, earnings and dividends are not expected to grow at the same rate in the future. According to the latest edition of Value Line, the expected dividend growth for the electric utility industry is far less than the expected earnings growth over the next few years.

Whenever the dividend payout ratio is expected to change, the intermediate growth rate in dividends cannot equal the long-term growth rate, because dividend and earnings growth must adjust to the changing payout ratio. The DCF model's underlying assumptions of constant perpetual growth and constant payout ratio are clearly not met. The implementation of the standard DCF model is of questionable relevance in this circumstance.

Because the dividend payout ratio of utilities is expected to decline, so that near-term dividend growth is not representative of long-term growth prospects, only earnings growth forecasts will reasonably reflect investors' valuation of a company's stock and thus represent the far better growth value for use in DCF calculations.

For that reason, Mr. Bible's DCF results must, again, be treated with caution and accorded little, if any, weight.

Q. Is the consensus earnings growth forecast of analysts an appropriate proxy for expected growth in the DCF model?

A. Yes, it is. And given Mr. Bible's admitted lack of personal knowledge of the industry, he should have relied exclusively on such consensus forecasts in his DCF analysis. The best proxy for the growth component of the DCF model for Ameren and for Mr. Bible's sample of comparable companies is the analysts' consensus forecast of earnings growth. The DCF estimates based on dividend growth and Mr. Bible's

erroneous historic growth calculations should be discarded for reasons cited earlier. Mr. Bible should have relied only on analysts' consensus earnings growth forecasts as proxies for investors' growth expectations in applying the DCF model. These forecasts are made by large reputable organizations, and the data are readily available to investors and are representative of the consensus view of investors.

Q. What does the published academic literature say on the subject of using analyst growth forecasts in the DCF model?

A. Published studies in the academic literature demonstrate that growth forecasts made by security analysts are reasonable indicators of investor expectations, and that investors rely on analysts' forecasts. Cragg and Malkiel ["*Expectations and the Structure of Share Prices*", Chicago: University of Chicago Press, 1982] present detailed empirical evidence that the average analysts' expectation is more similar to expectations being reflected in the marketplace than are historical growth rates. Cragg and Malkiel show that historical growth rates do not contain any information that is not already reflected in analysts' growth forecasts. A study by Professors Vander Weide and Carleton, "*Investor Growth Expectations: Analysts vs. History*," (The Journal of Portfolio Management, Spring 1988), also confirms the superiority of analysts' forecasts over historical growth extrapolations. Another study by Timme & Eiseman, "*On the Use of Consensus Forecasts of Growth in the Constant Growth Model: The Case of Electric Utilities*," (Financial Management, Winter 1989), produces similar results.

Several studies in the 1990s suggest that analysts either systematically under-react or over-react to new information. However, these findings do not contradict

the earlier literature's conclusion that analysts' earnings forecasts are a better proxy for investors' growth expectations than historical averages.

DOWNWARD-BIASED CAPM BETA ESTIMATES

Q. Dr. Morin, do you agree with Mr. Bible's estimates of "beta" as used in the Capital Asset Pricing Model or "CAPM"?

A. No, I do not. Mr. Bible utilizes the historical beta estimates reported by Value Line for Ameren and each of his three comparable companies in his electric utility sample. These historical betas of electric utilities should be ignored at this time for important reasons. The electric utility industry is highly unstable at this time, given the significant changes in the industry. Electric utility stocks have become increasingly disconnected from overall stock market movements. Electric utility stocks "have a life of their own" and have been increasingly driven by industry-specific factors in recent years, including corporate restructurings, mergers, asset divestitures, and regulatory change. The effects of changes in the level of risk in measured betas, hence on cost of capital, have been analyzed in the empirical finance literature, and this research has shown that a "random shock" that changes the true beta cannot be immediately measured by a beta estimated from historical data. For example, rising investor risk perceptions cause a decline in stock prices, leading to a decline in utility stock returns relative to the returns of the overall market, which in turn produces low historical betas even though investors expected beta and the associated cost of equity has not declined.

The historical betas of electric utilities are downward-biased from a technical perspective. Ongoing changes in risk fundamentals are not yet being fully reflected in historical beta estimates. The historical betas of approximately 0.56 reported

by Value Line for the electric utility industry are not indicative of future trends in the industry. By construction, backward-looking betas are sluggish in detecting fundamental future changes in a company's risk. For example, if an electric utility suddenly experiences a quantum increase in its business risk, as is the case under the stimulus of ongoing restructuring and competition, one expects an increase in beta. However, if 60 months of return data are used to estimate beta, only one of the 60 data points reflects the new information, one month after the company experiences its increase in business risk. Thus, the change in risk only has a minor effect on the historical beta. Even one year later, only 12 of the 60 return points reflect the event.

This type of bias certainly applies to electric utilities today. The fundamental risks of electric utilities are changing rapidly. A beta truly reflective of market conditions is likely to be higher than that implied by a simple comparison of historical risk measures. Given the dramatic changes occurring in the electric utility operating environment, the need to be forward-looking is apparent.

ERRONEOUSLY CALCULATED CAPM MARKET RISK PREMIUM

Q. Do you agree with Mr. Bible's approach to estimating the market risk premium?

A. No, I do not. As shown on page 26 of his testimony, Mr. Bible determines two market risk premium estimates. First, he determines a long-term market risk premium over the period 1926-2000 using the difference between the *arithmetic* average of the return on stocks and the total return on long-term Treasury bonds reported in the Ibbotson Associates 2001 Valuation Yearbook. Second, he determines a market risk premium over the period 1991-2000 using the difference between the *geometric* average

of the return on stocks and the total return on long-term Treasury bonds. Both the use of a geometric average and the use of the total return on long-term government bonds are incorrect.

Q. Please explain why Mr. Bible's use of a geometric average is incorrect.

A. Only the use of arithmetic means is correct for forecasting purposes and for estimating the cost of capital. As demonstrated formally in Chapter 11 of my book, Regulatory Finance, pp. 275-277, and in Brealey & Myers best-selling corporate finance textbook, Principles of Corporate Finance, (6^{th} ed.), pp. 157-160, only arithmetic averages can be used as estimates of cost of capital and market risk premium, and that the geometric mean is not an appropriate measure of the market risk premium. Similarly, Ibbotson Associates, Mr. Bible's own source of data, state that:

> For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless rates is the relevant number.[23]

Surprisingly, this error is committed by Mr. Bible in spite of the fact that the widely-used Ibbotson Associates publication from which his market risk premium estimate is derived contains a detailed and rigorous explanation why it is incorrect to use geometric averages for the purposes estimating the cost of capital.[24]

Q. Why is the arithmetic mean the correct method for estimating the cost of capital?

[23] Ibbotson Associates: Stocks, Bonds, Bills, and Inflation Valuation Edition 2001 Yearbook p. 61.
[24] Ibbotson Associates: Stocks, Bonds, Bills, and Inflation Valuation Edition 2001 Yearbook p. 61-63.

A. The use of the arithmetic mean appears counter-intuitive at first glance, because we commonly use the geometric mean return to measure the average annual achieved return over some time period. For example, the long-term performance of a portfolio is frequently assessed using the geometric mean return. The achieved or retrospective return is measured by the geometric average.

But performance appraisal is one thing, and cost of capital estimation is another matter entirely. In estimating the cost of capital, the goal is to obtain the rate of return that investors expect, that is, a target rate of return. On average, investors expect to achieve their target return prospectively. This target expected return is best captured by the arithmetic average. In statistical parlance, the arithmetic average is the unbiased measure of the expected value of repeated observations of a random variable. This is not the case for the geometric mean.

The geometric mean answers the question of what constant return you would have had to achieve in each year to have your investment growth match the return achieved by the stock market. In contrast, the arithmetic mean answers the question of what growth rate is the best estimate of the future amount of money that will be produced by continually reinvesting in the stock market. It is the rate of return which, compounded over multiple periods, gives the mean of the probability distribution of ending wealth. As a consequence, only the arithmetic mean is appropriate for estimations of the cost of capital. Appendix 1 in Chapter 11 of my book, Regulatory Finance provides a numerical example to show that the arithmetic mean is appropriate for calculations of the cost of capital.

While the geometric mean is the best estimate of actual performance over a long period of time, this does not contradict the statement that the arithmetic mean, compounded over the number of years for which an investment is held, provides the best estimate of the ending wealth value of the investment. The reason is that an investment with uncertain returns will have a higher ending wealth value than an investment that simply earns (with certainty) its compound or geometric rate of return every year. In other words, more money, or terminal wealth, is gained by the occurrence of higher than expected returns than is lost by lower than expected returns.

In capital markets, where returns are a probability distribution, the answer that takes account of uncertainty, the arithmetic mean, is thus the correct one for estimating discount rates and the cost of capital.

Q. You noted that Mr. Bible relies on total returns rather than income returns on the long-term government bonds. Is it appropriate to calculate the market risk premium using the total return on long-term government bonds?

A. No, it is not. As discussed above the reliance on total returns as opposed to income returns serves to greatly downwards bias the estimated market risk premium.

Q. Why should the market risk premium be calculated using income returns rather than total returns?

A. Total returns have three components: the income return, the capital appreciation return, and the reinvestment return. The only component that is truly riskless is the income return for which reason it is the right benchmark to measure risk premia against. As I note in my text, Regulatory Finance,

> the long-term government bond *income* (yield) returns are subtracted. The reason for subtracting the bond *income* returns

> instead of the total return is that the yield of the bond reflects the market's expectations at the time of purchase. This is not the case with total returns, which can be biased by unanticipated capital losses due to adverse interest rate movements.[25]

Similarly, Ibbotson Associates on page 56 states

> The equity risk premium is calculated by subtracting the arithmetic mean of the government bond income return from the arithmetic mean of the stock market total return.[26]

To conclude, when measuring the market risk premium with historical data the correct measures rely upon the arithmetic mean and government bond income returns.

Q. What is the net effect of Mr. Bible's erroneous reliance on the geometric mean and total returns on long-term government bonds?

A. The net effect of Mr. Bible's reliance on the geometric mean and total returns on long-term government bonds as opposed to the arithmetic mean and income returns on long-term government bonds is to decrease his estimate of the required market risk premium by up to 4.40% (440 basis points). This in turn decreases his CAPM cost of equity estimate by up to 2.4% (240 basis points). The latter estimate is derived by using Mr. Bible's assumed beta of 0.55 and multiplying it by 4.40%, the difference between the 1991-2000 arithmetic mean computed using income returns and the geometric mean using total returns reported by Mr. Bible.[27]

Q. Does this conclude your rebuttal testimony?

A. Yes, it does.

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[25] Regulatory Finance, p. 313 n. 6.
[26] Ibbotson Associates: Stocks, Bonds, Bills, and Inflation Valuation Edition 2001 Yearbook p. 56.
[27] The aforementioned Ibbotson Associates publication used by Mr. Bible reports on p. 65 that the Market Risk Premium for the period 1991-2000 was 11.6%, compared to Mr. Bible's 7.27%. See also Ms. McShane's Table 8.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

The Staff of the Missouri Public Service Commission, Complainant,	)	
vs.	)	Case No. EC-2002-1
Union Electric Company, d/b/a AmerenUE, Respondent.	)	

AFFIDAVIT OF ROGER A. MORIN

STATE OF GEORGIA)
) **ss**
CITY OF ATLANTA)

Roger A. Morin, being first duly sworn on his oath, states:

1. My name is Roger A. Morin. I work in Atlanta, Georgia, and I am employed by Georgia State University.

2. Attached hereto and made a part hereof for all purposes is my Rebuttal Testimony on behalf of Union Electric Company d/b/a AmerenUE consisting of 38 pages and Appendix A and Schedule 1, all of which have been prepared in written form for introduction into evidence in the above-referenced docket.

3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct.

Roger A. Morin

Subscribed and sworn to before me this 6th day of May, 2002.

Notary Public

My commission expires:

EXECUTIVE SUMMARY

Roger A. Morin

Professor of Finance at the College of Business, Georgia State University and Professor of Finance for Regulated Industry at the Center for the Study of Regulated Industry at Georgia State University; author of the widely-used treatise on regulatory finance, Utilities' Cost of Capital, and, more recently, Regulatory Finance.

* * * * * * * * * * *

1. Staff witness Ronald Bible has recommended a return on equity ("ROE") for AmerenUE in the range of 8.91% to 9.91%, with a midpoint of 9.41%. Mr. Bible's opinion as to an appropriate ROE for AmerenUE rests on his own unique approach that is not generally accepted, and indeed is far removed from the methodologies for estimating ROE that are reasonably relied upon by experts in the field. Mr. Bible's idiosyncratic approach does not originate from industry knowledge or any generally accepted approach and certainly has not been tested or subjected to peer review to determine its potential rate of error or its overall ability to provide this Commission with reliable information. At bottom, Mr. Bible's opinion as to an ROE for AmerenUE is so far outside the mainstream of financial theory and practice, is so fundamentally unsupported, and is, therefore, so unreliable, that it cannot be credited with providing the Commission any expert analysis that can assist it in responsibly addressing the important issues in this case.

My conclusion that Mr. Bible's approach is highly irregular and his recommendation flawed, grossly understating AmerenUE's cost of equity, is strikingly illustrated by the fact that his recommended 9.41% cost of equity lies well outside the zone of currently authorized rates of return for electric utilities in the United States

outside of Missouri, which, for AmerenUE's test year and update period, ranged from a low of 10.50% to a high of 12.90%. (This data is set out in Schedule 17 to the testimony of Kathleen McShane.) If adopted, Mr. Bible's draconian cost of equity recommendation of 9.41% would result in the lowest rate of return award for an electric utility in the country, and by a wide margin.

2. Mr. Bible has reduced and trivialized the process of determining cost of capital to a simple mechanical application of the DCF formula to Ameren alone, that is, to a one-company sample. In one obvious example of such trivialization, Mr. Bible ignores the results from his comparable group of three electric utilities and the results from other methodologies, notwithstanding the fact that these comparable companies currently have authorized returns on equity of 11.0%, 11.1%, and 11.7%. Mr. Bible does this in reliance on a "double" standard he simply creates, under which he will only question his DCF estimate if his results from other methods or results from comparable companies are "twice as much."

This "standard," which is purely Mr. Bible's and is not used by any reputable financial analysts or by others on the Commission's Staff, is so unreasonably broad as to make his Risk Premium and CAPM analyses wholly meaningless as checks on this DCF work, a consequence he freely admits. Moreover, this standard – essentially a range of ±9.41 % (or 941 basis points) around his DCF-based recommendation -- is utterly arbitrary, as can be seen by comparing it to the "reasonable range" he claims, also without justification, is appropriate for AmerenUE's cost of capital, which is only ±0.5 % (or 50 basis points) around his midpoint.

3. As Mr. Bible admits, his "double" standard reduces his other results, which he purportedly uses to "check" his DCF result, to irrelevance. In truth then, Mr. Bible exclusively relies on a single DCF result, an approach wholly at odds with recognized standards for cost of capital analysis. His one-company DCF calculation is statistically invalid, violates the Central Limit Theorem, and violates the fundamental precepts of rate of return regulation embodied in the *Bluefield* and *Hope* landmark cases. Similarly, Mr. Bible's sample of only three comparable electric utilities to check his DCF estimate is statistically invalid, and, at bottom, produces highly unreliable results.

4. Mr. Bible relies inappropriately on electric utility historical growth data in his DCF analysis despite sea changes occurring in the industry that make the past a very uncertain basis by which to estimate the future growth rates needed for DCF calculations. Moreover, the historical growth rates that Mr. Bible uses in his DCF analysis are redundant (or double-count the past) since historical growth patterns are already taken into consideration in analysts' consensus growth forecasts, which he also uses. Compounding this fundamental flaw, Mr. Bible relies on historical data to do his calculations notwithstanding the fact that Ameren and two of the three comparable companies he selected have experienced recent mergers. As a result, data drawn from before these mergers is not comparable to data from after them, as the sources of this data expressly warn.

5. Mr. Bible employs historical and projected dividend growth in his DCF analysis even though, as he should know, electric utilities are reducing dividend payouts over the next several years in response to the gradual penetration of competition in the revenue stream and to the rising risk due to regulatory restructuring. As a result,

dividend growth numbers embody a downward prejudice, and can no longer accurately convey useful information about the future economic activity of a utility. Without a doubt, the use of historic or projected dividend growth (rather than earnings growth) is inappropriate in using the DCF model today, for they can only serve to artificially depress the results of the resulting estimate. Earnings growth projections are far more relevant.

6. Mr. Bible artificially creates a downward bias in his CAPM analyses by using historical beta estimates, because current changes in the risk fundamentals of the electric utility industry due to the introduction of competition, deregulation, and restructuring are not fully reflected in the historical betas on which he relies. Mr. Bible's estimate of the market risk premium, also for his CAPM work, erroneously relies in part on geometric averages of historical market returns (rather than on the correct arithmetic average) and on total returns on long-term government bonds (rather than income returns on long-term government bonds), which serves to substantially depress his estimate of the required market risk premium.

RESUME OF ROGER A. MORIN

(Spring 2002)

NAME: Roger A. Morin

ADDRESS: 10403 Big Canoe
Jasper, GA 30143, USA

TELEPHONE: (706) 579-1480 business office
(706) 579-1481 business fax
(404) 651-2674 office-university

E-MAIL ADDRESS: profmorin@msn.com

DATE OF BIRTH: 3/5/1945

PRESENT EMPLOYER: Georgia State University
Robinson College of Business
Atlanta, GA 30303

RANK: Professor of Finance

HONORS: Professor of Finance for Regulated Industry & Director Center for the Study of Regulated Industry, College of Business, Georgia State University.

EDUCATIONAL HISTORY

- Bachelor of Electrical Engineering, McGill University, Montreal, Canada, 1967.
- Master of Business Administration, McGill University, Montreal, Canada, 1969.
- PhD in Finance & Econometrics, Wharton School of Finance, University of Pennsylvania, 1976.

EMPLOYMENT HISTORY

- Lecturer, Wharton School of Finance, Univ. of Pa., 1972-3

- Assistant Professor, University of Montreal School of Business, 1973-1976.

- Associate Professor, University of Montreal School of Business, 1976-1979.

- Professor of Finance, Georgia State University, 1979-2002

  - Professor of Finance for Regulated Industry and Director, Center for the Study of Regulated Industry, College of Business, Georgia State University, 1985-2002

- Visiting Professor of Finance, Amos Tuck School of Business, Dartmouth College, Hanover, N.H., 1986

OTHER BUSINESS ASSOCIATIONS

- Communications Engineer, Bell Canada, 1962-1967.

- Member of the Board of Directors, Financial Research Institute of Canada, 1974-1980.

- Co-founder and Director Canadian Finance Research Foundation, 1977.

- Vice-President of Research, Garmaise-Thomson & Associates, Investment Management Consultants, 1980-1981.

- Executive Visions Inc., Board of Directors, Member

- Board of External Advisors, College of Business, Georgia State University, Member 1987-1991

PROFESSIONAL CLIENTS

AT & T Communications

Alagasco - Energen

Alaska Anchorage Municipal Light & Power

Alberta Power Ltd.

Ameren

American Water Works Company

Ameritech

Baltimore Gas & Electric

B.C. Telephone

B C GAS

Bell Canada

Bellcore

Bell South Corp.

Bruncor (New Brunswick Telephone)

Burlington-Northern

C & S Bank

Cajun Electric

Canadian Radio-Television & Telecomm. Commission

Canadian Utilities

Canadian Western Natural Gas

Centel

Centra Gas

Central Illinois Light & Power Co

Central Telephone

Central South West Corp.

Cincinnatti Gas & Electric

CONSULTING CLIENTS (CONT'D)

Cinergy Corp

Citizens Utilities

City Gas of Florida

CN-CP Telecommunications

Commonwealth Telephone Co.

Columbia Gas System

Consolidated Natural Gas

Constellation Energy

Deerpath Group

Edison International

Edmonton Power Company

Energen

Engraph Corporation

Entergy Corp.

Entergy Arkansas Inc.

Entergy Gulf States Utilities, Inc.

Entergy Louisiana, Inc.

Entergy New Orleans, Inc.

Florida Water Association

Fortis

Garmaise-Thomson & Assoc., Investment Consultants

Gaz Metropolitain

General Public Utilities

Georgia Broadcasting Corp.

Georgia Power Company

GTE California

CONSULTING CLIENTS (CONT'D)

GTE Northwest Inc

GTE Service Corp.

GTE Southwest Incorporated

Gulf Power Company

Havasu Water Inc.

Hope Gas Inc.

Hydro-Quebec

ICG Utilities

Illinois Commerce Commission

Island Telephone

Jersey Central Power & Light

Kansas Power & Light

Manitoba Hydro

Maritime Telephone

Metropolitan Edison Co.

Minister of Natural Resources Province of Quebec

Minnesota Power & Light

Mississippi Power Company

Mountain Bell

Nevada Power Company

Newfoundland Board of Public Utilities

Newfoundland Light & Power - Fortis Inc.

New Tel Enterprises Ltd.

New York Telephone Co.

Nova Scotia Utility and Review Board

Northern Telephone Ltd.

CONSULTING CLIENTS (CONT'D)

Northwestern Bell

Northwestern Utilities Ltd.

NUI Corp

NYNEX

OG&E

Oklahoma G & E

Ontario Telephone Service Commission

Orange & Rockland

Pacific Northwest Bell

People's Gas System Inc.

People's Natural Gas

Pennsylvania Electric Co.

Price Waterhouse

PSI Energy

Public Service Elec & Gas

Quebec Telephone

Regie de l'Energie du Quebec

Rochester Telephone

SaskPower

Sierra Pacific Power Company

Sierra Pacific Resources

Southern Bell

Southern States Utilities

South Central Bell

Sun City Water Company

The Southern Company

CONSULTING CLIENTS (CONT'D)

Touche Ross and Company

Trans-Quebec & Maritimes Pipeline

US WEST Communications

Union Heat Light & Power

Utah Power & Light

Vermont Gas Systems Inc.

MANAGEMENT DEVELOPMENT AND PROFESSIONAL EXECUTIVE EDUCATION

- Canadian Institute of Marketing, Corporate Finance, 1971-73
- Hydro-Quebec, "Capital Budgeting Under Uncertainty, 1974-75
- Institute of Certified Public Accountants, Mergers & Acquisitions, 1975-78
- Investment Dealers Association of Canada, 1977-78
- Financial Research Foundation, bi-annual seminar, 1975-79
- Advanced Management Research (AMR), faculty member, 1977-80
- Financial Analysts Federation, Educational chapter: "Financial Futures Contracts" seminar
- Exnet Inc. a.k.a. The Management Exchange Inc., faculty member,1981-2002, National Seminars:

Risk and Return on Capital Projects

Cost of Capital for Regulated Utilities

Capital Allocation for Utilities

Alternative Regulatory Frameworks

Utility Directors' Workshop

Shareholder Value Creation for Utilities

Real Options in Utility Capital Investments

Fundamentals of Utility Finance in a Restructured Environment

- Georgia State University College of Business, Management Development Program, faculty member, 1981-1994

EXPERT TESTIMONY & UTILITY CONSULTING AREAS OF EXPERTISE

Rate of Return

Capital Structure

Generic Cost of Capital

Phase-in Plans

Costing Methodology

Depreciation

Flow-Through vs Normalization

Revenue Requirements Methodology

Utility Capital Expenditures Analysis

Risk Analysis

Capital Allocation

Divisional Cost of Capital, Unbundling

Publicly-owned Municipals

Telecommunications, CATV, Energy, Pipeline, Water

Incentive Regulation & Alternative Regulatory Plans

Shareholder Value Creation

Value-Based Management

REGULATORY BODIES:

Federal Communications Commission

Federal Energy Regulatory Commission

Georgia Public Service Commission

South Carolina Public Service Commission

North Carolina Utilities Commission

Pennsylvania Public Service Commission

Ontario Telephone Service Commission

Quebec Telephone Service Commission

Newfoundland Board of Commissioners of Public Utilities

Georgia Senate Committee on Regulated Industries

Alberta Public Service Board

Tennessee Public Service Commission

Oklahoma State Board of Equalization

Mississippi Public Service Commission

Minnesota Public Utilities Commission

Canadian Radio-Television & Telecommunications Comm.

New Brunswick Board of Public Commissioners

Alaska Public Utility Commission

National Energy Board of Canada

Florida Public Service Commission

Montana Public Service Commission

Arizona Corporation Commission

Quebec Natural Gas Board

Quebec Regie de l'Energie

New York Public Service Commission

Washington Utilities & Transportation Commission

Manitoba Board of Public Utilities

New Jersey Board of Public Utilities

Alabama Public Service Commission

Utah Public Service Commission

Nevada Public Service Commission

Louisiana Public Service Commission

Colorado Public Utilities Board

West Virginia Public Service Commission

Ohio Public Utilities Commission

California Public Service Commission

Hawaii Public Service Commission

Illinois Commerce Commission

British Columbia Board of Public Utilities

Indiana Utility Regulatory Commission

Minnesota Public Utilities Commission

Texas Public Service Commission

Michigan Public Service Commission

Iowa Board of Public Utilities

SERVICE AS EXPERT WITNESS

Southern Bell, So. Carolina PSC, Docket #81-201C

Southern Bell, So. Carolina PSC, Docket #82-294C

Southern Bell, North Carolina PSC, Docket #P-55-816

Metropolitan Edison, Pennsylvania PUC, Docket #R-822249

Pennsylvania Electric, Pennsylvania PUC,Docket#R-822250

Georgia Power, Georgia PSC, Docket # 3270-U, 1981

Georgia Power, Georgia PSC, Docket # 3397-U, 1983

Georgia Power, Georgia PSC, Docket # 3673-U, 1987

Georgia Power, F.E.R.C., Docket # ER 80-326, 80-327

Georgia Power, F.E.R.C., Docket # ER 81-730, 80-731

Georgia Power, F.E.R.C., Docket # ER 85-730, 85-731

Bell Canada, CRTC 1987

Northern Telephone, Ontario PSC

GTE-Quebec Telephone, Quebec PSC, Docket 84-052B

Newtel., Nfld. Brd of Public Commission PU 11-87

CN-CP Telecommunications, CRTC

Quebec Northern Telephone, Quebec PSC

Edmonton Power Company, Alberta Public Service Board

Kansas Power & Light, F.E.R.C., Docket # ER 83-418

NYNEX, FCC generic cost of capital Docket #84-800

Bell South, FCC generic cost of capital Docket #84-800

American Water Works - Tennessee, Docket #7226

Burlington-Northern - Oklahoma State Board of Taxes

Georgia Power, Georgia PSC, Docket # 3549-U

GTE Service Corp., FCC Docket #84-200

Mississippi Power Co., Miss. PSC, Docket U-4761

Citizens Utilities, Ariz. Corp. Comm., D # U2334-86020

Quebec Telephone, Quebec PSC, 1986, 1987, 1992

Newfoundland L & P, Nfld. Brd. Publ Comm. 1987, 1991

Northwestern Bell, Minnesota PSC, #P-421/CI-86-354

GTE Service Corp., FCC Docket #87-463

Anchorage Municipal Power & Light, Alaska PUC, 1988

New Brunswick Telephone, N.B. PUC, 1988

Trans-Quebec Maritime, Nat'l Energy Brd. of Cda, '88-92

Gulf Power Co., Florida PSC, Docket #88-1167-EI

Mountain States Bell, Montana PSC, #88-1.2

Mountain States Bell, Arizona CC, #E-1051-88-146

Georgia Power, Georgia PSC, Docket # 3840-U, 1989

Rochester Telephone, New York PSC, Docket # 89-C-022

Noverco - Gaz Metro, Quebec Natural Gas PSC, #R-3164-89

GTE Northwest, Washington UTC, #U-89-3031

Orange & Rockland, New York PSC, Case 89-E-175

Central Illinois Light Company, ICC, Case 90-0127

Peoples Natural Gas, Pennsylvania PSC, Case

Gulf Power, Florida PSC, Case # 891345-EI

ICG Utilities, Manitoba BPU, Case 1989

New Tel Enterprises, CRTC, Docket #90-15

Peoples Gas Systems, Florida PSC

Jersey Central Pwr & Light, N.J. PUB, Case ER 89110912J

Alabama Gas Co., Alabama PSC, Case 890001

Trans-Quebec Maritime Pipeline, Cdn. Nat'l Energy Board

Mountain Bell, Utah PSC,

Mountain Bell, Colorado PUB

South Central Bell, Louisiana PS

Hope Gas, West Virginia PSC

Vermont Gas Systems, Vermont PSC

Alberta Power Ltd., Alberta PUB

Ohio Utilities Company, Ohio PSC

Georgia Power Company, Georgia PSC

Sun City Water Company

Havasu Water Inc.

Centra Gas (Manitoba) Co.

Central Telephone Co. Nevada

AGT Ltd., CRTC 1992

BC GAS, BCPUB 1992

California Water Association, California PUC 1992

Maritime Telephone 1993

BCE Enterprises, Bell Canada, 1993

Citizens Utilities Arizona gas division 1993

PSI Resources 1993-5

CILCORP gas division 1994

GTE Northwest Oregon 1993

Stentor Group 1994-5

- Bell Canada 1994-1995
- PSI Energy 1993, 1994, 1995, 1999
- Cincinnati Gas & Electric 1994, 1996, 1999
- Southern States Utilities, 1995
- CILCO 1995, 1999
- Commonwealth Telephone 1996
- Edison International 1996, 1998
- Citizens Utilities 1997
- Stentor Companies 1997
- Hydro-Quebec 1998
- Entergy Gulf States Louisiana 1998
- Detroit Edison, 1999
- Entergy Gulf States, Texas, 2000
- Hydro Quebec TransEnergie, 2001
- Sierra Pacific Company, 2000, 2001, 2002
- Nevada Power Company, 2001
- Mid American Energy, 2001, 2002
- Entergy Louisiana Inc. 2001, 2002
- Mississippi Power Company, 2001, 2002
- Entergy Gulf States, Louisiana, 2001, 2002
- Oklahoma Gas & Electric Company, 2002

Public Service Electric & Gas, 2001, 2002

NUI Corp (Elizabethtown Gas Company), 2002

Jersey Central Power & Light, 2002

PROFESSIONAL AND LEARNED SOCIETIES

- Engineering Institute of Canada, 1967-1972
- Canada Council Award, recipient 1971 and 1972
- Canadian Association Administrative Sciences, 1973-80
- American Association of Decision Sciences, 1974-1978
- American Finance Association, 1975-2002
- Financial Management Association, 1978-2002

ACTIVITIES IN PROFESSIONAL ASSOCIATIONS AND MEETINGS

- Chairman of meeting on "New Developments in Utility Cost of Capital", Southern Finance Association, Atlanta, Nov. 1982

- Chairman of meeting on "Public Utility Rate of Return", Southeastern Public Utility Conference, Atlanta, Oct. 1982

- Chairman of meeting on "Current Issues in Regulatory Finance", Financial Management Association, Atlanta, Oct. 1983

- Chairman of meeting on "Utility Cost of Capital", Financial Management Association, Toronto, Canada, Oct. 1984.

- Committee on New Product Development, FMA, 1985

- Discussant, "Tobin's Q Ratio", paper presented at Financial Management Association, New York, N.Y., Oct. 1986

- Guest speaker, "Utility Capital Structure: New Developments", National Society of Rate of Return Analysts 18th Financial Forum, Wash., D.C. Oct. 1986

- Opening address, "Capital Expenditures Analysis: Methodology vs Mythology," Bellcore Economic Analysis Conference, Naples Fla., 1988.

PAPERS PRESENTED:

"An Empirical Study of Multiperiod Asset Pricing," annual meeting of Financial Management Assoc., Las Vegas Nevada, 1987.

"Utility Capital Expenditures Analysis: Net Present Value vs Revenue Requirements", annual meeting of Financial Management Assoc., Denver, Colorado, October 1985.

"Intervention Analysis and the Dynamics of Market Efficiency", annual meeting of Financial Management Assoc., San Francisco, Oct. 1982

"Intertemporal Market-Line Theory: An Empirical Study," annual meeting of Eastern Finance Assoc., Newport, R.I. 1981

"Option Writing for Financial Institutions: A Cost-Benefit Analysis", 1979 annual meeting Financial Research Foundation
"Free-lunch on the Toronto Stock Exchange", annual meeting of Financial Research Foundation of Canada, 1978.

"Simulation System Computer Software SIMFIN", HP International Business Computer Users Group, London, 1975.

"Inflation Accounting: Implications for Financial Analysis." Institute of Certified Public Accountants Symposium, 1979.

OFFICES IN PROFESSIONAL ASSOCIATIONS

- President, International Hewlett-Packard Business Computers Users Group, 1977

- Chairman Program Committee, International HP Business Computers Users Group, London, England, 1975

- Program Coordinator, Canadian Assoc. of Administrative Sciences, 1976

- Member, New Product Development Committee, Financial Management Association, 1985-1986

- Reviewer: Journal of Financial Research

Financial Management

Financial Review

Journal of Finance

PUBLICATIONS

"Risk Aversion Revisited", Journal of Finance, Sept. 1983

"Hedging Regulatory Lag with Financial Futures," Journal of Finance, May 1983. (with G. Gay, R. Kolb)

"The Effect of CWIP on Cost of Capital," Public Utilities Fortnightly, July 1986.

"The Effect of CWIP on Revenue Requirements" Public Utilities Fortnightly, August 1986.

"Intervention Analysis and the Dynamics of Market Efficiency," Time-Series Applications, (New York: North Holland, 1983. (with K. El-Sheshai)

"Market-Line Theory and the Canadian Equity Market," Journal of Business Administration, Jan. 1982, M. Brennan, editor

"Efficiency of Canadian Equity Markets," International Management Review, Feb. 1978

"Intertemporal Market-Line Theory: An Empirical Test," Financial Review, Proceedings of the Eastern Finance Association, 1981

BOOKS

Utilities' Cost of Capital, Public Utilities Reports Inc., Arlington, Va., 1984.

Regulatory Finance, Public Utilities Reports Inc., Arlington, Va., 1994

Driving Shareholder Value, McGraw-Hill, January 2001

MONOGRAPHS

Determining Cost of Capital for Regulated Industries, Public Utilities Reports, Inc., and The Management Exchange Inc., 1982 - 1993. (with V.L. Andrews)

Alternative Regulatory Frameworks, Public Utilities Reports, Inc., and The Management Exchange Inc., 1993. (with V.L. Andrews)

Risk and Return in Capital Projects, The Management Exchange Inc., 1980,(with B. Deschamps)

Utility Capital Expenditure Analysis, The Management Exchange Inc., 1983.

Regulation of Cable Television: An Econometric Planning Model, Quebec Department of Communications, 1978.

"An Economic & Financial Profile of the Canadian Cablevision Industry". Canadian Radio-Television & Telecommunication Commission (CRTC), 1978

Computer Users' Manual: Finance and Investment Programs, University of Montreal Press, 1974, revised 1978.

Fiber Optics Communications: Economic Characteristics, Quebec Department of Communications, 1978.

"Canadian Equity Market Inefficiencies", Capital Market Research Memorandum, Garmaise & Thomson Investment Consultants, 1979.

MISCELLANEOUS CONSULTING REPORTS

"Operational Risk Analysis: California Water Utilities, Calif. Water Association, 1993.

"Cost of Capital Methodologies for Independent Telephone Systems", Ontario Telephone Service Commission, March 1989.

"The Effect of CWIP on Cost of Capital and Revenue Requirements", Georgia Power Company,1985.

"Costing Methodology and the Effect of Alternate Depreciation and Costing Methods on Revenue Requirements and Utility Finances", Gaz Metropolitan Inc., 1985.

"Simulated Capital Structure of CN-CP Telecommunications: A Critique", CRTC, 1977.

"Telecommunications Cost Inquiry: Critique",CRTC,1977.

"Social Rate of Discount in the Public Sector", CRTC Policy Statement 1974.

"Technical Problems in Capital Projects Analysis", CRTC Policy Statement, 1974.

RESEARCH GRANTS

"Econometric Planning Model of the Cablevision Industry", International Institute of Quantitative Economics, CRTC

"Application of the Averch-Johnson Model to Telecommunications Utilities", Canadian Radio-Television Commission (CRTC)

"Economics of the Fiber Optics Industry", Quebec Dept. of Communications

"Intervention Analysis and the Dynamics of Market Efficiency", Georgia State Univ. College of Business, 1981

"Firm Size and Beta Stability", Georgia State University College of Business, 1982

"Risk Aversion and the Demand for Risky Assets", Georgia State University College of Business, 1981.

Chase Econometrics, Interactive Data Corp., Research Grant, $50,000 per annum, 1986-1989.

UNIVERSITY SERVICE

- University Senate, elected departmental senator 1987-1989, 1998-2002
- Faculty Affairs Committee, elected departmental representative
- Professional Continuing Education Committee member
- Director Master in Science (Finance) Program
- Course Coordinator, Corporate Finance, MBA program
  - Chairman, Corporate Finance Curriculum Committee
  - Executive Education: Departmental Coordinator 2000
  - University Senate Committee on Commencement
  - University Senate Committee on Student Discipline