Exhibit No.:	
Issue:	*Rate of Return*
Witness:	*J. Randall Woolridge*
Sponsoring Party:	*MoPSC Staff*
Type of Exhibit:	*Rebuttal Testimony*
Case No.:	*ER-2016-0179*
Date Testimony Prepared:	*January 20, 2017*

MISSOURI PUBLIC SERVICE COMMISSION

COMMISSION STAFF DIVISION

REBUTTAL TESTIMONY

OF

J. RANDALL WOOLRIDGE

UNION ELECTRIC COMPANY
D/B/A AMEREN MISSOURI

CASE NO. ER-2016-0179

Jefferson City, Missouri
January 2017

TABLE OF CONTENTS OF

REBUTTAL TESTIMONY OF

J. RANDALL WOOLRIDGE

UNION ELECTRIC COMPANY,
D/B/A AMEREN MISSOURI

CASE NO. ER-2016-0179

REBUTTAL TESTIMONY

OF

J. RANDALL WOOLRIDGE

UNION ELECTRIC COMPANY,
D/B/A AMEREN MISSOURI

CASE NO. ER-2016-0179

Q. PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.

A. My name is J. Randall Woolridge, and my business address is 120 Haymaker Circle, State College, PA 16801.

Q. HAVE YOU PREVIOUSLY PREPARED TESTIMONY IN THIS PROCEEDING?

A. Yes. I prepared a report for the Staff of the Missouri Public Service Commission as to the overall fair rate of return or cost of capital for the regulated electric utility services of Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri").

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. In my rebuttal testimony, I am providing a response to the Ameren Missouri's cost of capital testimony of Mr. Robert B. Hevert.

Q. PLEASE SUMMARIZE THE PRIMARY ISSUES REGARDING RATE OF RETURN IN THIS PROCEEDING.

A. The Company's rate of return recommendation is summarized in Exhibit JRW-12. Ameren Missouri has proposed a capital structure of 47.14% long-term debt, 1.06% preferred stock, and 51.80% common equity based on Ameren Missouri's projected capital structure as of December 31, 2016. Ameren Missouri recommended

a long-term debt cost rate of 5.39% and a preferred stock cost rate of 4.18%. Ameren Missouri witness Mr. Hevert has recommended an ROE of 9.90% for the electric utility operations of Ameren Missouri. Ameren Missouri's overall proposed rate of return is 7.713%.

Q. WHAT ARE THE PRIMARY ISSUES BETWEEN YOUR POSITION AND AMEREN MISSOURI'S WITH RESPECT TO THE COST OF CAPITAL?

A. The primary significant areas of disagreement in measuring Ameren Missouri's cost of capital are:

(1) Capital structure and debt cost rate. The rebuttal testimony on capital structure and debt cost rate issues is provided by Staff witness, David Murray;

(2) Risk of Ameren Missouri – Mr. Hevert argues that the mean ROE results from his equity cost rate approaches do not indicate an appropriate equity cost rate for Ameren Missouri due to several company-specific risk factors. I use the Company's S&P and Moody's issuer credit ratings which indicate that the Company's investment risk is similar to that of the Electric and Hevert Proxy Groups;

(3) Mr. Hevert's analyses and ROE results and recommendations are based on the assumption of higher interest rates and capital costs. I reviewed current market conditions and conclude that interest rates, despite the increase since the U.S. Presidential election, remain at low levels and are likely to remain low;

(4) Mr. Hevert's DCF equity cost rate estimates, and in particular the fact that: (a) He has given very little weight if any to his DCF results; (b) In his constant-growth and multi-stage growth DCF analyses, he has relied exclusively on the overly optimistic and upwardly biased EPS growth rate forecasts of Wall Street analysts and

Value Line; and (c) In his multi-stage DCF model, he has employed a terminal growth rate of 5.28% which is about 100 basis points above the projected long-term growth in U.S. GDP; and

(5) The projected long-term interest rate and market or equity risk premiums in Mr. Hevert's CAPM and RP approaches are inflated and are not reflective of market realities or expectations.

The rebuttal testimony on capital structure and debt cost rate issues is provided by Staff witness, David Murray. The other issues are addressed below.

A. The Investment Risk of Ameren Missouri

Q. PLEASE INITIALLY ADDRESS MR. HEVERT'S CLAIM ABOUT COMPANY'S INVESTMENT RISK.

A. Mr. Hevert indicates that the Company is riskier than other electric utilities and hence the mean ROE results for his proxy group from his equity cost rate approaches do not indicate an appropriate equity cost rate for Ameren Missouri. Between pages 21 and 35 of his testimony, Mr. Hevert specifically discusses Ameren Missouri's purported risks: (1) the regulatory environment; (2) environmental regulations and the Company's generation portfolio; and (3) the Company's declining customer usage and operating income dilution. His analysis is more qualitative than quantitative in nature, and he highlights factors such as customer growth and usage is down, and investment is up. However, he does not present any definitive overall risk measure that suggests Ameren Missouri is riskier than his proxy group.

Q. HOW HAVE YOU EVALUATED THE RISK OF THE COMPANY RELATIVE TO THE PROXY GROUPS?

A. As discussed in my initial report, I use credit ratings to assess the riskiness of Ameren Missouri to the proxy groups. Credit ratings are overall measures of risk, and consider the factors highlighted by Mr. Hevert, such as the regulatory environment, the Company's generation portfolio, and customer usage in determining a Company's risk level. In Exhibit JRW-4 of my initial report, I provided the S&P and Moody's issuer credit ratings for the companies in the two proxy groups. Ameren Missouri's issuer credit ratings are BBB+ according to S&P and Baa1 according to Moody's. These ratings are the same as the average S&P and Moody's issuer credit ratings for the Electric and Hevert Proxy Groups (BBB+ and Baa1). Therefore, I concluded that Ameren Missouri's investment risk is similar to the investment risk of the Electric and Hevert Proxy Groups.

B. <u>Capital Market Conditions</u>

Q. PLEASE ALSO ADDRESS THE DIFFERENCES BETWEEN THE ALTERNATIVE ASSUMPTIONS REGARDING CAPITAL MARKET CONDITIONS BETWEEN YOUR EQUITY COST RATE ANALYSES AND MR. HEVERT'S.

A. Mr. Hevert and I have significantly different opinions regarding capital market conditions. Mr. Hevert's analyses and ROE results and recommendations reflect the assumption of higher interest rates and capital costs. These are the same assumptions and results that he has used in past testimonies in recent years. In my initial report, I have reviewed current market conditions and conclude that, despite predictions of rising interest rates over the past decade, as well as the increase in interest rates since the U.S. Presidential election, long-term interest rates remain at low levels and are likely to remain so. As I discussed in my initial report at pages 11-12, investors buy and sell bonds and stocks every day in the markets, and they would not be buying long-term Treasury bonds or utility

stocks at their current yields if they expected interest rates to suddenly increase, thereby producing higher yields and negative returns.

C. Overview of Equity Cost Rate Approaches

Q. WHAT ARE THE DIFFERENCES BETWEEN YOUR DCF MODEL AND MR. HEVERT'S DCF MODEL?

A. I have employed the traditional constant-growth DCF model. Mr. Hevert has also used this model, as well as a multi-stage growth version of the model. There are several errors in Mr. Hevert's DCF analyses: (1) He has given little to no weight to his constant-growth DCF results; (2) In his constant-growth and multi-stage growth DCF analyses, he has relied exclusively on the overly optimistic and upwardly biased EPS growth rate forecasts of Wall Street analysts and *Value Line;* and (3) In his multi-stage DCF model, he has employed a terminal growth rate of 5.28% which is excessive for a number of reasons, especially the fact that it is not reflective of prospective economic growth in the U.S. and is about 100 basis points above the projected long-term growth in U.S. Gross Domestic Product ("GDP"). On the other hand, when developing the DCF growth rate that I have used in my analysis, I have reviewed thirteen growth rate measures, including historical and projected growth rate measures, and have evaluated growth in dividends, book value, and earnings per share.

Q. PLEASE DISCUSS THE DIFFERENCES BETWEEN YOUR APPLICATION OF THE CAPM AND THAT OF MR. HEVERT.

A. The CAPM approach requires an estimate of the risk-free interest rate, beta, and the market risk premium. The primary issue is Mr. Hevert's estimate of the market risk premium. Mr. Hevert's market risk premium is excessive and does not reflect current market

fundamentals. As I highlight in my testimony, there are three methods for estimating a market or equity risk premium – historical returns, surveys, and expected return models. Mr. Hevert uses projected market risk premiums of 10.50% and 11.10%. Mr. Hevert's projected market risk premiums use analysts' EPS growth rate projections to compute an expected market return and market risk premium. These EPS growth rate projections and the resulting expected market returns and risk premiums include unrealistic assumptions regarding future economic and earnings growth and stock returns. I have used a market risk premium of 5.5%, which: (1) employs three different approaches to estimating a market premium; and (2) uses the results of many studies of the market risk premium. As I note, my market risk premium reflects the market risk premiums: (1) determined in recent academic studies by leading finance scholars; (2) employed by leading investment banks and management consulting firms; and (3) found in surveys of companies, financial forecasters, financial analysts, and corporate CFOs.

Q. PLEASE DISCUSS THE ERRORS WITH MR. HEVERT'S RISK PREMIUM MODEL.

A. Mr. Hevert estimates an equity cost rate using an alternative risk premium model. His risk premium is based on the historical relationship between the yields on long-term Treasury bond yields and authorized returns on equity ("ROEs") for electric utility companies. There are several issues with this approach. First and foremost, this approach is a gauge of commission behavior and not investor behavior. Capital costs are determined in the market place through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions

evaluate not only capital market data in setting authorized ROEs, but also take into account other utility- and rate case-specific information in setting ROEs. As such, Mr. Hevert's risk premium approach and results reflect other factors used by utility commissions in authorizing ROEs in addition to capital costs. This may especially be true when the authorized ROE data includes the results of rate cases that are settled and not fully litigated. Second, Mr. Hevert's methodology produces an inflated measure of the risk premium because his approach uses historical authorized ROEs and Treasury yields, and the resulting risk premium is applied to projected Treasury yields. Finally, the risk premium is inflated as a measure of investor's required risk premium, since electric utility companies have been selling at market-to-book ratios in excess of 1.0. This indicates that the authorized rates of return have been greater than the return that investors require.

Q. ARE THESE ERRORS REFLECTED IN THE DIFFERENCES BETWEEN MR. HEVERT'S RP RESULTS AND THE AVERAGE STATE-LEVEL AUTHORIZED ROEs FOR ELECTRIC UTILITY COMPANIES NATIONWIDE?

A. Yes. Mr. Hevert's RP equity cost rate estimates for electric utility companies range from 10.04% to 10.39%. These figures overstate actual state-level authorized ROEs; the average authorized ROE for electric utilities was 9.64% in the first three quarters of 2016, according to Regulatory Research Associates.[1]

Q. PLEASE REVIEW MR. HEVERT'S EQUITY COST RATE APPROACHES AND RESULTS.

A. Mr. Hevert has developed a proxy group of electric utility companies and employs DCF, CAPM, and RP equity cost rate approaches. Mr. Hevert's equity cost rate

[1] *Regulatory Focus*, Regulatory Research Associates, July, 2016. The electric utility authorized ROEs exclude the authorized ROEs in Virginia which include generation adders.

estimates for the Company are summarized on page 1 of Exhibit JRW-13. Based on these figures, he concludes that the appropriate equity cost rate for the Company is 9.90%. As I discuss below, there are a number of issues with the inputs, applications, and results of his equity cost rate models.

D. The Company's DCF Approach

Q. PLEASE SUMMARIZE MR. HEVERT'S DCF ESTIMATES.

A. On pages 43-49 of his testimony, Appendix A, and in Schedules RBH-1 and RBH-2, Mr. Hevert develops an equity cost rate by applying the DCF model to the Hevert Proxy Group. Mr. Hevert's DCF results are summarized in Panel A of Exhibit JRW-13. He uses constant-growth and multistage growth DCF models. Mr. Hevert uses three dividend yield measures (30, 90, and 180 days) in his DCF models. In his constant-growth DCF models, Mr. Hevert has relied on the forecasted EPS growth rates of Zacks, First Call, and *Value Line*. His multi-stage DCF model uses analysts' EPS growth rate forecasts as a short-term growth rate and his projection of GDP growth as the long-term growth rate. For all three models, he reports Mean Low, Mean, and Mean High results. His DCF results are summarized in Panel A of Exhibit JRW-13 and range from 8.23% to 10.40%.

Q. WHAT ARE THE ERRORS IN MR. HEVERT'S DCF ANALYSES?

A. The primary issues in Mr. Hevert's DCF analyses are: (1) the lack of weight he gives to his constant-growth DCF results, (2) his exclusive use of the overly optimistic and upwardly biased EPS growth rate forecasts of Wall Street analysts and *Value Line*, and (3) the use of an inflated terminal growth rate of 5.28% in his multi-stage DCF model that is not reflective of prospective economic growth in the U.S. and is more than 100 basis points above the projected long-term GDP growth;

1. The Low Weight Given to the Constant-Growth DCF Results

Q. HOW MUCH WEIGHT HAS MR. HEVERT GIVEN HIS DCF RESULTS IN ARRIVING AT AN EQUITY COST RATE FOR THE COMPANY?

A. Apparently, very little, if any at all. The average of his mean constant-growth stage DCF equity cost rates is only 8.8%. Had he given these results more weight, or even any weight, he would have arrived at a much lower equity cost rate recommendation.

Q. AT PAGE 19-20 OF HIS TESTIMONY, MR. HEVERT SUGGESTS THAT EQUITY COST RATE RESULTS FROM THE CONSTANT-GROWTH DCF MODEL ARE SUSPECT DUE, IN PART, TO THE RELATIVELY HIGH VALUATION LEVELS OF UTILITY COMPANIES. PLEASE RESPOND.

A. Mr. Hevert expresses concerns with the constant-growth DCF model results because utility valuations have increased and are high on both an absolute and relative level. Mr. Hevert indicates that the relative high valuations of utilities and resulting low dividend yields are not associated with high growth rates. However, as discussed in a recent Moody's article, the higher valuation of utilities can be attributed to the reduced risk of the utility industry.[2]

> As utilities increasingly secure more up-front assurance for cost recovery in their rate proceedings, we think regulators will increasingly view the sector as less risky. The combination of low capital costs, high equity market valuation multiples (which are better than or on par with the broader market despite the regulated utilities' low risk profile), and a transparent assurance of cost recovery tend to support the case for lower authorized returns, although utilities will argue they should rise, or at least stay unchanged.

[2] Moody's Investors Service, "Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles," March 10, 2015, p. 3.

Therefore, the high valuation of utilities reflects the low cost of equity capital as well as the lower risk of utilities.

2. Analysts' EPS Growth Rate Forecasts

Q. PLEASE DISCUSS MR. HEVERT'S DCF GROWTH RATE.

A. At pages 45-46 of his testimony, Mr. Hevert discusses why he has relied exclusively on the long-term EPS growth rate forecasts of Wall Street analysts. To support this approach, he cites the results of a number of studies.

Q. PLEASE EVALUATE THIS APPROACH.

A. There are a number of issues with this approach.

First, as I discussed in my cost of capital report, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Hence, in my opinion, consideration must be given to other indicators of growth, including historical prospective dividend growth, internal growth, as well as projected earnings growth.

Second, a study by Lacina, Lee, and Xu (2011) has shown that analysts' long-term earnings growth rate forecasts are not more accurate at forecasting future earnings than naïve random walk forecasts of future earnings.[3]

And finally, and most significantly, it is well-known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased.[4] At page 46 of his testimony, Mr. Hevert cites a number of published studies to support the use of analysts' projections in the DCF model. The articles cited by Mr. Hevert (by Vander Weide and Carleton (1988), Harris (1986), Brigham, Shome, and Vinson (1985), and by

[3] M. Lacina, B. Lee and Z. Xu, *Advances in Business and Management Forecasting (Vol. 8),* Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, pp.77-101.

[4] See page 25 and footnote 23 of my initial cost of capital report.

Harris and Marston (1992)) are all nearly thirty years old. This is does not reflect the current research on the topic. In my direct testimony, I have cited a number of articles published since that time which highlight the upward bias in analysts' EPS growth rate estimates. Given the upward bias in analysts' long-term EPS growth rates, using these growth rates as a DCF constant growth rate produces an overstated equity cost rate. A study by Easton and Sommers (2007) found that optimism in analysts' earnings growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[5]

3. The GDP Growth Rate in the Multi-Stage DCF Analysis

Q. PLEASE DISCUSS MR. HEVERT'S MULTI-STAGE DCF ANALYSIS.

A. At pages 49-57 of his testimony, Appendix B, and in Schedule RBH-3, Mr. Hevert has employed a multi-stage growth DCF model in which: (1) the first-stage is the average projected analyst growth rate of Wall Street analysts as published by First Call, Zacks, and *Value Line;* and (2) the terminal stage is his projected measure of long-term GDP growth. He uses a long-term nominal GDP growth rate of 5.28% which is based on (1) a real GDP growth rate of 3.24% which is calculated over the 1929-2015 time period and (2) an inflation rate of 1.98%.

Q. WHAT ARE THE PRIMARY ERRORS WITH MR. HEVERT'S MULTI-STAGE DCF ANALYSIS?

A. There are two primary errors with Mr. Hevert's multi-stage DCF analysis; (1) the first-stage DCF growth rate is the average projected EPS growth rate from Wall Street analysts which, as discussed above, are overly optimistic and upwardly biased; and (2) the

[5] Easton, P., & Sommers, G. (2007). Effect of analysts' optimism on estimates of the expected rate of return implied by earnings forecasts. *Journal of Accounting Research*, 45(5), 983–1015.

long-term GDP growth rate is based on historical GDP growth and is about 100 basis points above long-term projections of GDP growth.

Q. PLEASE IDENTIFY THE ERRORS WITH MR. HEVERT'S PROJECTED LONG-TERM GDP GROWTH RATE OF 5.28%.

A. There are two major errors in this analysis. First, Mr. Hevert has not provided any theoretical or empirical support that long-term GDP growth is a reasonable proxy for the expected growth rate of the companies in his proxy group. Five-year and ten-year historic measures of growth for earnings and dividends for electric utility companies, as shown on page 3 of Exhibit JRW-10, suggest growth that is more than 100 basis points below Mr. Hevert's 5.28% GDP growth rate. Mr. Hevert has provided no evidence as to why investors would rely on his estimate of long-term GDP growth as the appropriate growth rate for electric utility companies.

The second error is the magnitude of Mr. Hevert's long-term GDP growth rate estimate of 5.28%. On page 1 of Exhibit JRW-14 of my testimony, I provide an analysis of GDP growth since 1960. Since 1960, nominal GDP has grown at a compounded rate of 6.58%. Whereas GDP has grown at a compounded rate of 6.58% since 1960, economic growth in the U.S. has slowed considerably in recent decades. Page 2 of Exhibit JRW-14 provides the nominal annual GDP growth rates over the 1961 to 2015 time period. Nominal GDP growth grew from 6.0% to over 12% from the 1960s to the early 1980s due in large part to inflation and higher prices. With the exception of an uptick during the mid-2000s, annual nominal GDP growth rates have declined to the 3.5% to 4.0% range over the past five years.

The components of nominal GDP growth are real GDP growth and inflation. Page 3 of Exhibit JRW-14 shows the annual real GDP growth rate over the 1961 to 2015 time period.

Real GDP growth has gradually declined from the 5.0% to 6.0% range in the 1960s to the 2.0% to 3.0% range during the most recent five-year period. The second component of nominal GDP growth is inflation. Page 4 of Exhibit JRW-14 shows inflation as measured by the annual growth rate in the Consumer Price Index ("CPI") over the 1961 to 2015 time period. The large increase in prices from the late 1960s to the early 1980s is readily evident. Equally evident is the rapid decline in inflation during the 1980s as inflation declined from above 10% to about 4%. Since that time inflation has gradually declined and has been in the 2.0% range or below over the past five years.

The graphs on pages 2, 3, and 4 of Exhibit JRW-14 provide very clear evidence of the decline in nominal GDP as well as its components, real GDP and inflation, in recent decades. To gauge the magnitude of the decline in nominal GDP growth, Table 1 provides the compounded GDP growth rates for 10-, 20-, 30-, 40- and 50- years. Whereas the 50-year compounded GDP growth rate is 6.65%, there has been a monotonic and significant decline in nominal GDP growth over subsequent 10-year intervals. These figures clearly suggest that nominal GDP growth in recent decades has slowed and that a growth rate in the range of 4.0% to 5.0% is more appropriate today for the U.S. economy. Mr. Hevert's long-term GDP growth rate of 5.28% is clearly inflated.

Table 1
Historic GDP Growth Rates

10-Year Average - 2006-2015	**3.28%**
20-Year Average - 1996-2015	**4.36%**
30-Year Average - 1986-2015	**4.87%**
40-Year Average - 1976-2015	**6.19%**
50-Year Average - 1966-2015	**6.65%**

Q. ARE THE LOWER GDP GROWTH RATES OF RECENT DECADES CONSISTENT WITH THE FORECASTS OF GDP GROWTH?

A. Yes. A lower range is also consistent with long-term GDP forecasts. There are several forecasts of annual GDP growth that are available from economists and government agencies. These are listed on page 5 of Exhibit JRW-14. Economists, in the February 2016 *Survey of Professional Forecasters*, forecast the mean 10-year nominal GDP growth rate to be 4.5%.[6] The U.S. Energy Information Administration ("EIA"), in its projections used in preparing the *Annual Energy Outlook*, forecasted long-term GDP growth of 4.3% for the period 2015-2040.[7] The Congressional Budget Office ("CBO"), in its forecasts for the period 2016 to 2040, projected a nominal GDP growth rate of 4.1%.[8] Finally, the Social Security Administration ("SSA"), in its Annual OASDI Report, projected a nominal GDP growth rate of 4.4% for the period 2016-2090.[9] These four forecasts and projections of GDP growth from economists and government agencies range from 4.1% to 4.5%.

Q. DOES MR. HEVERT PROVIDE ANY REASONS WHY HE HAS IGNORED THE WELL-KNOWN LONG-TERM REAL GDP FORECASTS OF THE CBO, SSA, AND EIA?

A. No.

[6]Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters* (Feb. 2016), https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/.

[7]U.S. Energy Information Administration, *Table 20 of the Annual Energy Outlook 2016* (Sept. 15, 2016), http://www.eia.gov/forecasts/aeo/tables_ref.cfm.

[8]Congressional Budget Office, *The 2016 Long-term Budget Outlook* (July 2016), www.cbo.gov/publication/51129.

[9] Social Security Administration, *2016 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program* (June 22, 2016), http://www.ssa.gov/oact/tr/2016/X1_trLOT.html.

Q. WHAT IS WRONG WITH MR. HEVERT'S REAL GDP FORECAST ON HISTORIC DATA AND IGNORING THE WELL-KNOWN LONG-TERM GDP FORECASTS OF THE CBO AND EIA?

A. In developing a DCF growth rate for his constant-growth DCF analysis, Mr. Hevert has totally ignored historic EPS, DPS, and BVPS data and relied solely on the long-term EPS growth rate projections of Wall Street analysts and *Value Line*. However, in developing a terminal DCF growth rate for his multi-stage growth DCF analysis, Mr. Hevert has also totally ignored the well-known long-term real GDP growth rate forecasts of the CBO and EIA and relied solely on historic data going back to 1929. Simply put, he is inconsistent with his methodology.

E. CAPM Approach

Q. PLEASE DISCUSS MR. HEVERT'S CAPM.

A. At pages 57-62 of his testimony, Appendix C, and in Schedules RBH-4 and RBH-5, Mr. Hevert estimates an equity cost rate by applying a CAPM model to his proxy group. The CAPM approach requires an estimate of the risk-free interest rate, beta, and the equity risk premium. Mr. Hevert uses two different measures of the 30-Year Treasury bond yield (a) current yield of 2.65% and a near-term projected yield of 3.08%; (b) two different Betas (an average Bloomberg Beta of 0.615 and an average *Value Line* Beta of 0.770), and (c) two market risk premium measures - a Bloomberg, DCF-derived market risk premium of 10.50% and *Value Line* derived market risk premium of 11.10%. Based on these figures, he finds a CAPM equity cost rate range from 9.11% to 11.63%. Mr. Hevert's CAPM results are summarized in Panel B of page 1 of Exhibit JRW-13.

1. Market Risk Premiums

Q. WHAT ARE THE ERRORS IN MR. HEVERT'S CAPM ANALYSES?

A. The primary errors in Mr. Hevert's CAPM analysis are the market premiums of 10.50% and 11.10% which are based on the upwardly-biased long-term EPS growth rate estimates of Wall Street analysts.

Q. PLEASE ASSESS MR. HEVERT'S MARKET RISK PREMIUMS DERIVED FROM APPLYING THE DCF MODEL TO THE S&P 500 AND VALUE LINE INVESTMENT SURVEY.

A. For his Bloomberg and *Value Line* market risk premiums, Mr. Hevert computes market risk premiums of 10.50% and 11.10% by: (1) calculating an expected market return by applying the DCF model to the S&P 500; and then (2) subtracting the current 30-year Treasury bond yield from the calculation. Mr. Hevert's estimated expected market returns from these are 13.14% (using Bloomberg three- to five-year EPS growth rate estimates) and of 13.75% (using *Value Line* three- to five-year EPS growth rate estimates). Mr. Hevert also uses (1) a dividend yield of 2.2% and an expected DCF growth rate of 11.03% for Bloomberg and (2) a dividend yield of 2.04% and an expected DCF growth rate of 11.71% for *Value Line*. These results are not realistic in today's market.

Q. HOW DID MR. HEVERT ERR WHEN ANALYZING MARKET PREMIUMS?

A. The primary error is that Mr. Hevert computed the expected market return using the DCF model with the growth rate being the projected 5-year EPS growth rate from Wall Street analysts. As explained below, this produces an overstated expected market return and equity risk premium.

Q. WHAT EVIDENCE CAN YOU PROVIDE THAT MR. HEVERT'S GROWTH RATES ARE ERRONEOUS?

A. Mr. Hevert's expected long-term EPS growth rates of 11.03% for Bloomberg and 11.71% for *Value Line* represent the forecasted 5-year EPS growth rates of Wall Street analysts. There are two errors with this approach: (1) as previously discussed, the EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased; and (2) expected long-term EPS growth rates of 11.03% and 11.71% are excessive and not consistent with historic and projected growth in earnings and the economy.

Q. WHY ARE EPS GROWTH RATES OF 11.03% and 11.71% INCONSISTENT WITH THE HISTORIC AND PROJECTED GROWTH IN EARNINGS AND THE ECONOMY?

A. Long-term EPS growth rates of 11.03% and 11.71% are not consistent with historic or projected economic and earnings growth in the U.S for several reasons: (1) long-term growth in EPS is far below Mr. Hevert's projected EPS growth rates; (2) more recent trends in GDP growth, as well as projections of GDP growth, suggest slower long-term economic and earnings growth in the future; and (3) over time, EPS growth tends to lag behind GDP growth.

The long-term economic, earnings, and dividend growth rate in the U.S. has only been in the 5% to 7% range. I performed a study of the growth in nominal GDP, S&P 500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960. The results are provided on page 1 of Exhibit JRW-14, and a summary is provided in Table 2 below.

Table 2
GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

Nominal GDP	**6.58%**
S&P 500 Stock Price	**6.69%**
S&P 500 EPS	**6.64%**
S&P 500 DPS	**5.76%**
Average	**6.42%**

The results are presented graphically on page 6 of Exhibit JRW-14. In sum, the historical long-run growth rates for GDP, S&P EPS, and S&P DPS are in the 5% to 7% range.

Q. DO MORE RECENT DATA SUGGEST THAT U.S. ECONOMIC GROWTH IS FASTER OR SLOWER THAN THE LONG-TERM DATA?

A. As previously discussed and presented in Table 1, the more recent trend suggests lower future economic growth than the long-term historic GDP growth. The historic GDP growth rates for 10-, 20-, 30-, 40- and 50- years clearly suggest that nominal GDP growth in recent decades has slowed to the 4.0% to 5.0% area. By comparison, Mr. Hevert's long-run growth rate projections of 11.03% and 11.71% are vastly overstated. These estimates suggest that companies in the U.S. would be expected to: (1) increase their growth rate of EPS by almost 100% in the future and (2) maintain that growth indefinitely in an economy that is expected to grow at about one-half of his projected growth rates.

Q. WHAT LEVEL OF GDP GROWTH IS FORECASTED BY ECONOMISTS AND VARIOUS GOVERNMENT AGENCIES?

A. As previously discussed, there are several forecasts of annual GDP growth that are available from economists and government agencies. These are listed in page 5 of Exhibit JRW-14. These forecasts suggest long-term GDP growth rate in the 4.1% - 4.5% range.

Q. WHY IS GDP GROWTH RELEVANT IN YOUR DISCUSSION OF MR. HEVERT'S USE OF THE LONG-TERM EPS GROWTH RATES IN DEVELOPING A MARKET RISK PREMIUM FOR HIS CAPM?

A. Because, as indicated in recent research, the long-term earnings growth rates of companies are on average limited to the growth rate in GDP.

Q. PLEASE EXPLAIN THE LINK BETWEEN ECONOMIC AND EARNINGS GROWTH AND EQUITY RETURNS.

A. Brad Cornell of the California Institute of Technology recently published a study on GDP growth, earnings growth, and equity returns. He finds that long-term EPS growth in the U.S. is directly related to GDP growth, with GDP growth providing an upward limit on EPS growth. In addition, he finds that long-term stock returns are determined by long-term earnings growth. He concludes with the following observations:[10]

> The long-run performance of equity investments is fundamentally linked to growth in earnings. Earnings growth, in turn, depends on growth in real GDP. This article demonstrates that both theoretical research and empirical research in development economics suggest relatively strict limits on future growth. In particular, real GDP growth in excess of 3 percent in the long run is highly unlikely in the developed world. In light of ongoing dilution in earnings per share, this finding implies that investors should anticipate real returns on U.S. common stocks to average no more than about 4–5 percent in real terms.

Given current inflation in the 2% to 3% range and real returns in the 4% to 5% range, the results imply nominal expected stock market returns in the 6% to 8% range. As such, Mr. Hevert's projected earnings growth rates and implied expected stock market returns and

[10] Bradford Cornell, "Economic Growth and Equity Investing," *Financial Analysts Journal* (January-February, 2010), p. 63.

equity risk premiums are not indicative of the realities of the U.S. economy and stock market. As such, his expected CAPM equity cost rate is significantly overstated.

Q. PLEASE PROVIDE A SUMMARY ASSESSMENT OF MR. HEVERT'S PROJECTED EQUITY RISK PREMIUM DERIVED FROM EXPECTED MARKET RETURNS.

A. Mr. Hevert's market risk premium derived from his DCF application to the S&P 500 is inflated due to errors and bias in his study. Investment banks, consulting firms, and CFOs use the equity risk premium concept every day in making financing, investment, and valuation decisions. On this issue, the opinions of CFOs and financial forecasters are especially relevant. CFOs deal with capital markets on an ongoing basis since they must continually assess and evaluate capital costs for their companies. They are well aware of the historical stock and bond return studies of Ibbotson. The CFOs in the December 2016 *CFO Magazine* – Duke University Survey of about 300 CFOs shows an expected return on the S&P 500 of 5.70% over the next ten years. In addition, the financial forecasters in the February 2016 Federal Reserve Bank of Philadelphia survey expect an annual nominal market return of 5.34% over the next ten years. As such, with a more realistic equity or market risk premium, the appropriate equity cost rate for a public utility should be in the 8.0% to 9.0% range and not in the 10.0% to 11.0% range.

F. Risk Premium Approach

Q. PLEASE REVIEW MR. HEVERT'S RP ANALYSIS.

A. At pages 62-67 of his testimony, Appendix D, and in Schedule RBH-5, Mr. Hevert estimates an equity cost rate using a RP model. Mr. Hevert develops an equity cost rate by: (1) regressing the authorized returns on equity for electric utility companies from

the January 1, 1980, to May, 2016, time period on the thirty-year Treasury Yield; and (2) adding the appropriate risk premium established in step (1) to three different thirty-year Treasury yields: (a) current yield of 2.65% and a near-term projected yield of 3.08%, and a long-term projected yield of 4.45%. Mr. Hevert's RP results are provided in Panel C of Exhibit JRW-13. He reports RP equity cost rates ranging from 10.04% to 10.39%.

Q. WHAT ARE THE ERRORS IN MR. HEVERT'S RP ANALYSIS?

A. The two issues are: (1) the long-term projected 30-Year Treasury yield of 4.45%; and (2) primarily, the excessive risk premium.

1. Base Yield

Q. WHAT IS THE ISSUE WITH THE PROJECTED LONG-TERM TREASURY RATE OF 4.45%?

A. The 4.45% projected yield is more than 150 basis points above the current 30-year Treasury rate. This figure is simply not reasonable. Thirty-year Treasury bonds are currently yielding about 3.0%. Institutional investors would not be buying bonds at this yield if they expected interest rates to increase so dramatically in the coming years. An increase in yields of 150 basis points on 30-year Treasury bonds in the next couple years would result in significant capital losses for investors buying bonds today at current market yields.

2. Risk Premium

Q. WHAT ARE THE ISSUES WITH MR. HEVERT'S RISK PREMIUM?

A. There are several problems with this approach. The methodology produces an inflated measure of the risk premium because the approach uses historic authorized ROEs and Treasury yields, and the resulting risk premium is applied to projected Treasury yields. Since Treasury yields are always forecasted to increase, the resulting risk premium would be

smaller if done correctly, which would be to use projected Treasury yields in the analysis rather than historic Treasury yields.

In addition, Mr. Hevert's RP approach is a gauge of *commission* behavior and not *investor* behavior. Capital costs are determined in the market place through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also take into account other utility- and rate case-specific information in setting ROEs. As such, Mr. Hevert's approach and results reflect other factors such as capital structure, credit ratings and other risk measures, service territory, capital expenditures, energy supply issues, rate design, investment and expense trackers, and other factors used by utility commissions in determining an appropriate ROE in addition to capital costs. This may especially be true when the authorized ROE data includes the results of rate cases that are settled and not fully litigated.

Finally, Mr. Hevert's methodology produces an inflated required rate of return since utilities have been selling at market-to-book ratios in excess of 1.0 for many years. This indicates that the authorized rates of return have been greater than the return that investors require. The relationship between ROE, the equity cost rate, and market-to-book ratios was explained earlier in this testimony. In short, a market-to-book ratio above 1.0 indicates a company's ROE is above its equity cost rate. Therefore, the risk premium produced from the study is overstated as a measure of investor return requirements and produced an inflated equity cost rate.

Q DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Increase Its Revenues for Electric Service	))))	Case No. ER-2016-0179

AFFIDAVIT OF J. RANDALL WOOLRIDGE

COMMONWEALTH OF PENNSYLVANIA	)	
	)	ss.
COUNTY OF CENTRE	)	

COMES NOW J. RANDALL WOOLRIDGE and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing Rebuttal Testimony; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

J. RANDALL WOOLRIDGE

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Centre, Commonwealth of Pennsylvania, at my office in State College, PA, on this 19th day of January, 2017.

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
MARY L HART
Notary Public
STATE COLLEGE BORO., CENTRE COUNTY
My Commission Expires Aug 26, 2017

Mary L. Hart
Notary Public

Exhibit JRW-12

Union Electric Company

Company's Proposed Cost of Capital

Capital Source	Capitalization Ratio	Cost Rate	Weighted Cost Rate
Long-Term Debt	47.14%	5.39%	2.54%
Preferred Stock	1.06%	4.18%	0.04%
Common Equity	51.80%	9.90%	5.13%
Total	100.00%		7.71%

Union Electric Company

Panel A
Summary of Mr. Hevert's Constant Growth DCF Results

	Mean Low	Mean	Mean High
30-Day Average	8.23%	8.74%	9.20%
90-Day Average	8.29%	8.80%	9.26%
180-Day Average	8.47%	8.98%	9.45%

Summary of Mr. Hevert's Multi-Stage Growth DCF Results

	Mean Low	Mean	Mean High
30-Day Average	9.19%	9.49%	9.77%
90-Day Average	9.35%	9.65%	9.92%
180-Day Average	9.82%	10.13%	10.40%

Panel B
Summary of Mr. Hevert's CAPM Results

	Bloomberg Derived Market Risk Premium 10.50%	*Value Line* Derived Market Risk Premium 11.10%
Average Bloomberg Beta - 0.616		
Current 30-Year Treasury - 2.65%	9.11%	9.49%
Near-Term Projected 30-Year Treasury (3.08%)	9.55%	9.92%
Average Value Line Beta - 0.769		
Current 30-Year Treasury - 2.65%	10.72%	11.18%
Near-Term Projected 30-Year Treasury (3.08%)	11.15%	11.62%

Panel C
Summary of Mr. Hevert's Bond Yield RP Results

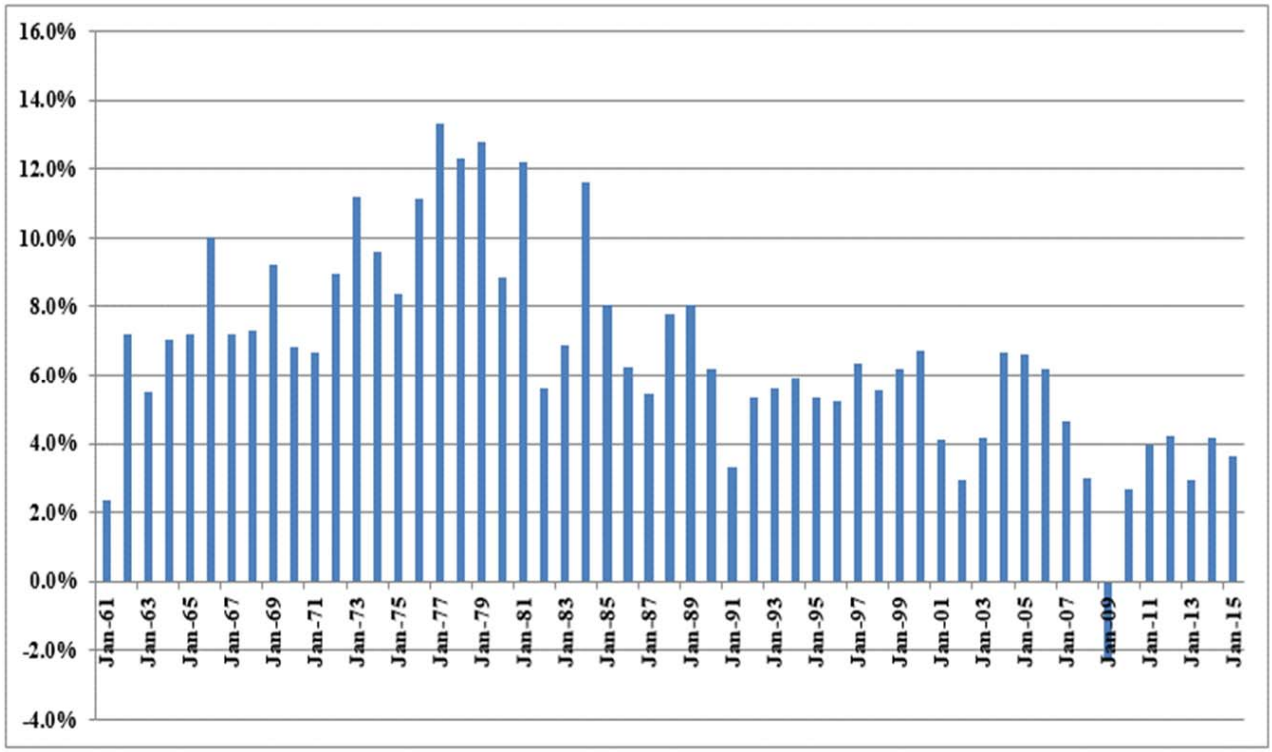
	Low	Mid	High
Long-Term Treasury Yield	2.65%	3.08%	4.45%
Risk Premium	7.39%	6.97%	5.94%
Bond Yield Risk Premium	10.04%	10.05%	10.39%

Growth Rates
GDP, S&P 500 Price, EPS, and DPS

	GDP	S&P 500	Earnings	Dividends	
1960	535.1	58.11	3.10	1.98	
1961	547.6	71.55	3.37	2.04	
1962	586.9	63.10	3.67	2.15	
1963	619.3	75.02	4.13	2.35	
1964	662.9	84.75	4.76	2.58	
1965	710.7	92.43	5.30	2.83	
1966	781.9	80.33	5.41	2.88	
1967	838.2	96.47	5.46	2.98	
1968	899.3	103.86	5.72	3.04	
1969	982.3	92.06	6.10	3.24	
1970	1049.1	92.15	5.51	3.19	
1971	1119.3	102.09	5.57	3.16	
1972	1219.5	118.05	6.17	3.19	
1973	1356.0	97.55	7.96	3.61	
1974	1486.2	68.56	9.35	3.72	
1975	1610.6	90.19	7.71	3.73	
1976	1790.3	107.46	9.75	4.22	
1977	2028.4	95.10	10.87	4.86	
1978	2278.2	96.11	11.64	5.18	
1979	2570.0	107.94	14.55	5.97	
1980	2796.8	135.76	14.99	6.44	
1981	3138.4	122.55	15.18	6.83	
1982	3313.9	140.64	13.82	6.93	
1983	3541.1	164.93	13.29	7.12	
1984	3952.8	167.24	16.84	7.83	
1985	4270.4	211.28	15.68	8.20	
1986	4536.1	242.17	14.43	8.19	
1987	4781.9	247.08	16.04	9.17	
1988	5155.1	277.72	24.12	10.22	
1989	5570.0	353.40	24.32	11.73	
1990	5914.6	330.22	22.65	12.35	
1991	6110.1	417.09	19.30	12.97	
1992	6434.7	435.71	20.87	12.64	
1993	6794.9	466.45	26.90	12.69	
1994	7197.8	459.27	31.75	13.36	
1995	7583.4	615.93	37.70	14.17	
1996	7978.3	740.74	40.63	14.89	
1997	8483.2	970.43	44.09	15.52	
1998	8954.8	1229.23	44.27	16.20	
1999	9510.5	1469.25	51.68	16.71	
2000	10148.2	1320.28	56.13	16.27	
2001	10564.6	1148.09	38.85	15.74	
2002	10876.9	879.82	46.04	16.08	
2003	11332.4	1111.91	54.69	17.88	
2004	12088.6	1211.92	67.68	19.41	
2005	12888.9	1248.29	76.45	22.38	
2006	13684.7	1418.30	87.72	25.05	
2007	14322.9	1468.36	82.54	27.73	
2008	14752.4	903.25	65.39	28.05	
2009	14414.6	1115.10	59.65	22.31	
2010	14798.5	1257.64	83.66	23.12	
2011	15379.2	1257.60	97.05	26.02	**Average**
2012	16027.2	1426.19	102.47	30.44	
2013	16498.1	1848.36	107.45	36.28	
2014	17183.5	2058.90	113.01	39.44	
2015	17803.4	2043.94	106.32	43.16	
Growth Rates	**6.58**	**6.69**	**6.64**	**5.76**	**6.42**

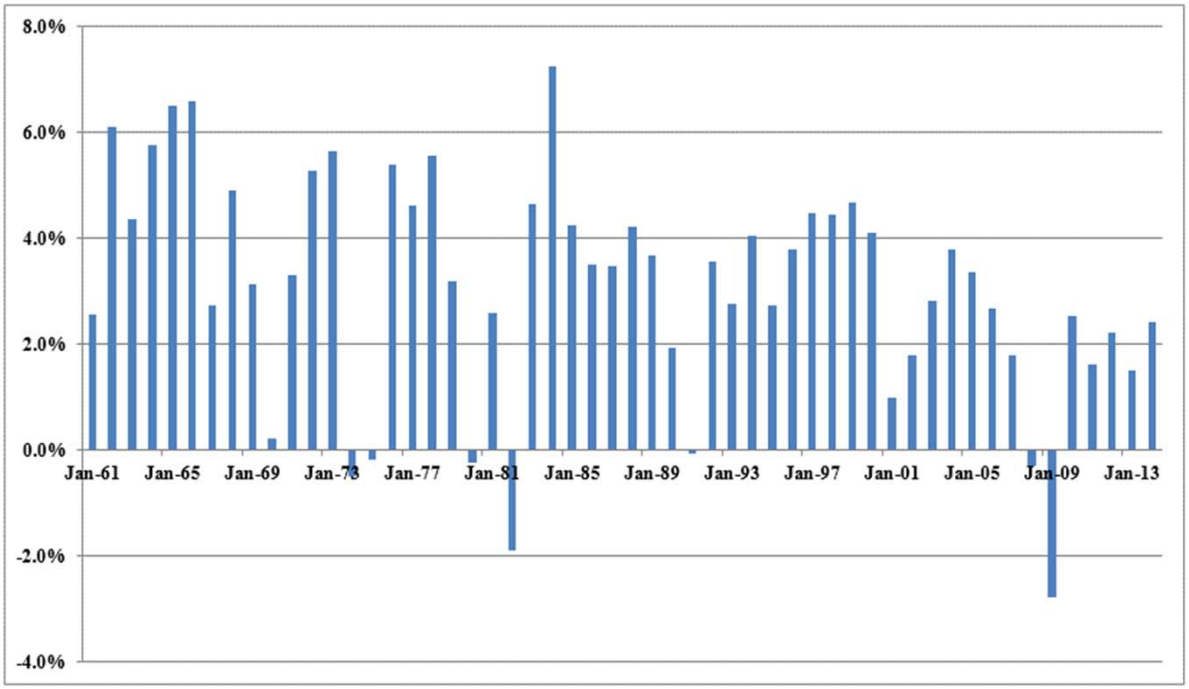
Data Sources: GDPA -http://research.stlouisfed.org/fred2/series/GDPA/downloaddata
S&P 500, EPS and DPS - http://pages.stern.nyu.edu/~adamodar/

Nominal GDP Growth Rates
Annual Growth Rates - 1961-2015



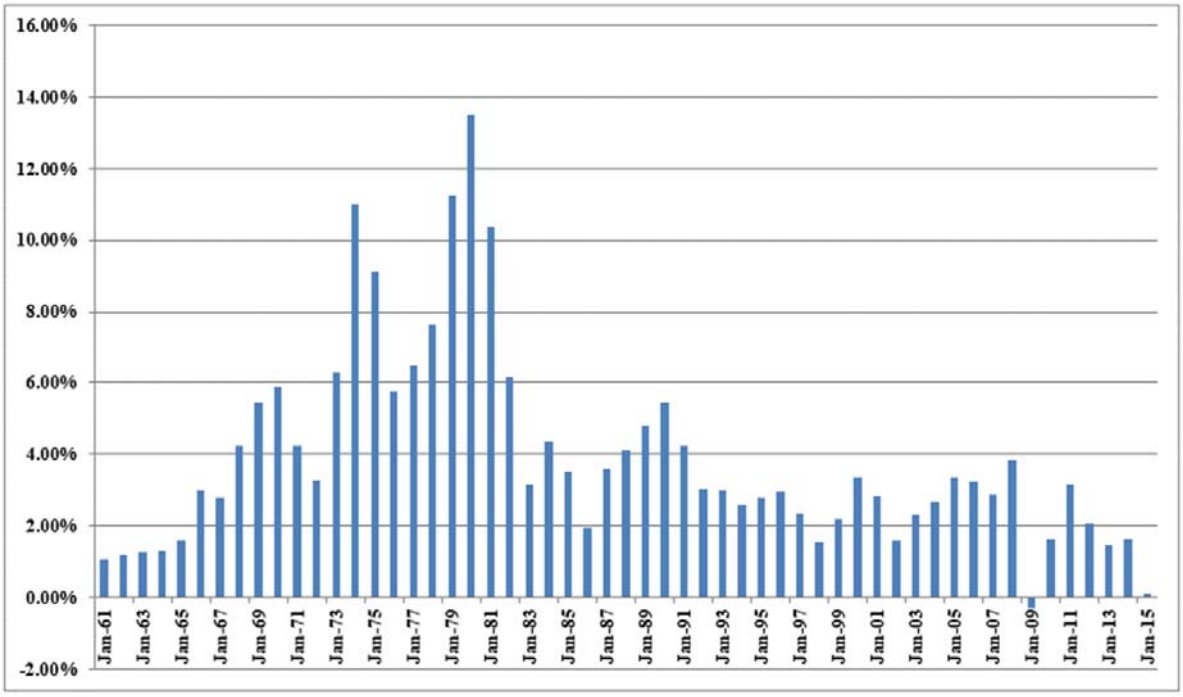
Data Sources: GDPA -http://research.stlouisfed.org/fred2/series/GDPA/downloaddata

Annual Real GDP Growth Rates
1961-2015



Data Sources: GDPC1 -http://research.stlouisfed.org/fred2/series/GDPC1/downloaddata

Annual Inflation Rates
1961-2015



Data Sources: CPIAUCSL -http://research.stlouisfed.org/fred2/series/CPIAUCSL/downloaddata

Panel A
Historic GDP Growth Rates

10-Year Average	**3.28%**
20-Year Average	**4.36%**
30-Year Average	**4.87%**
40-Year Average	**6.19%**
50-Year Average	**6.65%**

Calculated using GDP data on Page 1 of Exhibit JRW-14

Panel B
Projected GDP Growth Rates

	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	**2016-2026**	**4.1%**
Survey of Financial Forecasters	**Ten Year**	**4.5%**
Social Security Administration	**2016-2090**	**4.4%**
Energy Information Administra	**2015-2040**	**4.3%**

Sources:

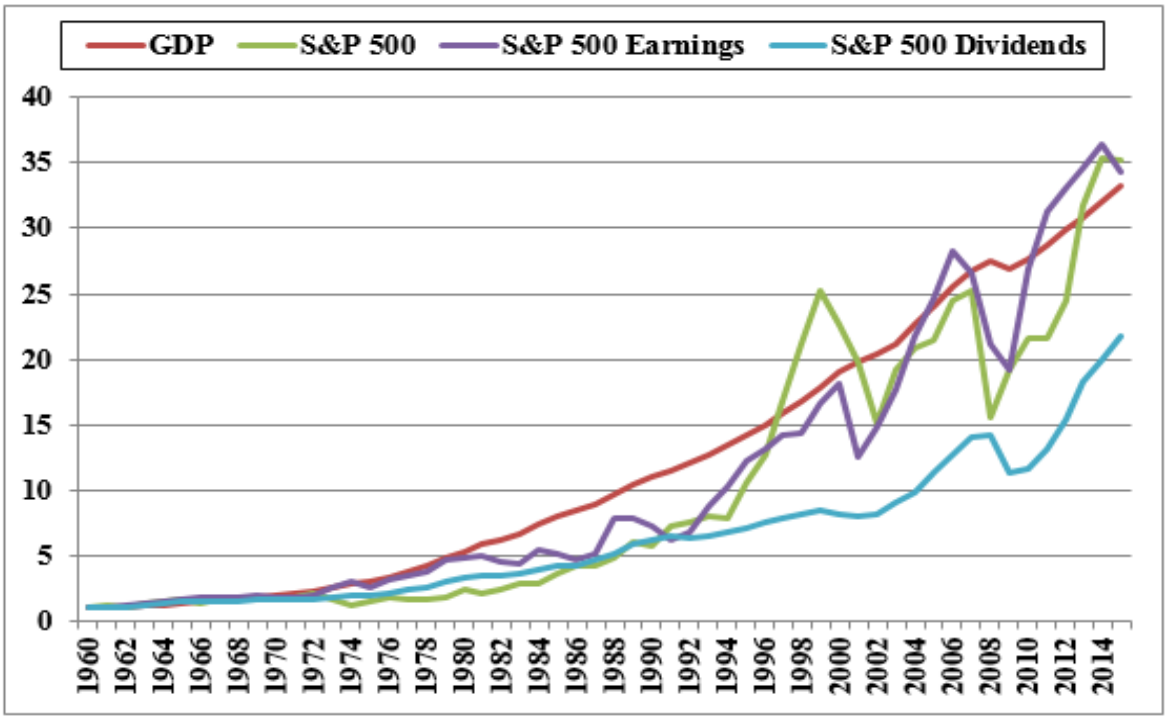
www.cbo.gov/publication/51129

http://www.eia.gov/forecasts/aeo/tables_ref.cfm Table 20

http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters

http://www.ssa.gov/oact/tr/2016/X1_trLOT.html

Long-Term Growth of GDP, S&P 500, S&P 500 EPS, and S&P 500 DPS



	GDP	S&P 500	S&P 500 EPS	S&P 500 DPS
Growth Rates	6.58%	6.69%	6.64%	5.76%