

Attachment JRW-1
Educational Background, Research, and Related Business Experience
J. Randall Woolridge

J. Randall Woolridge is a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed Faculty Fellow in Business Administration in the College of Business Administration of the Pennsylvania State University in University Park, PA. In addition, Professor Woolridge is Director of the Smeal College Trading Room and President and CEO of the Nittany Lion Fund, LLC.

Professor Woolridge received a Bachelor of Arts degree in Economics from the University of North Carolina, a Master of Business Administration degree from the Pennsylvania State University, and a Doctor of Philosophy degree in Business Administration (major area-finance, minor area-statistics) from the University of Iowa. He has taught Finance courses including corporation finance, commercial and investment banking, and investments at the undergraduate, graduate, and executive MBA levels.

Professor Woolridge's research has centered on empirical issues in corporation finance and financial markets. He has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance*, the *Journal of Financial Economics*, and the *Harvard Business Review*. His research has been cited extensively in the business press. His work has been featured in the *New York Times*, *Forbes*, *Fortune*, *The Economist*, *Barron's*, *Wall Street Journal*, *Business Week*, *Investors' Business Daily*, *USA Today*, and other publications. In addition, Dr. Woolridge has appeared as a guest to discuss the implications of his research on CNN's *Money Line*, CNBC's *Morning Call* and *Business Today*, and Bloomberg's *Morning Call*.

Professor Woolridge's stock valuation book, *The StreetSmart Guide to Valuing a Stock* (McGraw-Hill, 2003), was released in its second edition. He has also co-authored *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation, 1999) as well as a textbook entitled *Basic Principles of Finance* (Kendall Hunt, 2011).

Professor Woolridge has also consulted with corporations, financial institutions, and government agencies. In addition, he has directed and participated in university- and company- sponsored professional development programs for executives in 25 countries in North and South America, Europe, Asia, and Africa.

Over the past thirty-five years Dr. Woolridge has prepared testimony and/or provided consultation services in regulatory rate cases in the rate of return area in following states: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Washington, D.C. He has also testified before the Federal Energy Regulatory Commission.

J. Randall Woolridge

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120 Haymaker Circle
State College, PA 16801
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Academic Experience

Professor of Finance, the Smeal College of Business Administration, the Pennsylvania State University (July 1, 1990 to the present).

President, Nittany Lion Fund LLC, (January 1, 2005 to the present)

Director, the Smeal College Trading Room (January 1, 2001 to the present)

Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration (July 1, 1987 to the present).

Associate Professor of Finance, College of Business Administration, the Pennsylvania State University (July 1, 1984 to June 30, 1990).

Assistant Professor of Finance, College of Business Administration, the Pennsylvania State University (September, 1979 to June 30, 1984).

Education

Doctor of Philosophy in Business Administration, the University of Iowa. Major field: Finance.

Master of Business Administration, the Pennsylvania State University.

Bachelor of Arts, the University of North Carolina. Major field: Economics.

Books

James A. Miles and J. Randall Woolridge, *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation), 1999

Patrick Cusatis, Gary Gray, and J. Randall Woolridge, *The StreetSmart Guide to Valuing a Stock* (2nd Edition, McGraw-Hill), 2003.

J. Randall Woolridge and Gary Gray, *The New Corporate Finance, Capital Markets, and Valuation: An Introductory Text* (Kendall Hunt, 2003).

Research

Dr. Woolridge has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance*, the *Journal of Financial Economics*, and the *Harvard Business Review*.

S&P downgrades Eversource's ratings by 2 notches on offshore wind development

Friday, July 26, 2019 8:39 AM ET

By Nephele Kirong
Market Intelligence

Eversource Energy's decision to pursue growth through riskier contracted renewable assets prompted S&P Global Ratings to lower the company's ratings by two notches July 25.

S&P Global Ratings downgraded the company's issuer credit rating to A- from A+ and the senior unsecured rating to BBB+ from A. The commercial paper program was also changed to A-2 from A-1. The rating outlook is stable.

Sunrise Wind, an 880-MW offshore wind venture of Eversource and Danish power company Ørsted A/S, recently won in New York's offshore wind solicitation.

"We view contracted offshore wind as having considerably higher risks than the rest of Eversource's low-risk [transmission and distribution] portfolio," the rating agency said.

A further downgrade is possible over the next 12 to 24 months if Eversource's growth strategy suggests acceleration of offshore wind development activities beyond the agency's base-case expectation.

S&P Global Ratings also lowered the issuer credit ratings of subsidiaries Yankee Gas Services Co., NSTAR Gas Co. and Aquarion Co. to A- from A+.

The issuer credit ratings of electric subsidiaries NSTAR Electric Co., Connecticut Power & Light Co. and Public Service Co. of New Hampshire were also lowered to A from A+. The one-notch downgrade reflects the utilities having sufficient insulating measures to have their ratings higher than the Eversource group credit profile, according to S&P Global Ratings.

This S&P Global Market Intelligence news article may contain information about credit ratings issued by S&P Global Ratings. Descriptions in this news article were not prepared by S&P Global Ratings.

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Attachment JRW-3

Public Service of New Hampshire d/b/a Eversource Energy
Recommended Cost of Capital

Capital Source	Capitalization Ratios	Cost Rate	Weighted Cost Rate
Short-Term Debt	3.51%	2.45%	0.09%
Long-Term Debt	46.49%	4.37%	2.03%
Common Equity	<u>50.00%</u>	<u>8.25%</u>	<u>4.13%</u>
Total Capitalization	100.00%		6.24%

* Capital Structure Ratios are developed in Attachment JRW-5.

Attachment JRW-4
Public Service of New Hampshire d/b/a Eversource Energy
Summary Financial Statistics for Proxy Group

Panel A
Electric Proxy Group

Company	Operating Revenue (\$mil)	Percent Reg Elec Revenue	Percent Reg Gas Revenue	Net Plant (\$mil)	Market Cap (\$mil)	S&P Issuer Credit Rating	Moody's Long Term Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
ALLETE, Inc. (NYSE-ALE)	\$1,498.6	71%	0%	\$3,904.4	\$3,993.8	BBB+	Baa1	3.34	MN, WI	59.2%	8.2%	1.85
Alliant Energy Corporation (NYSE-LNT)	\$3,534.5	85%	13%	\$12,462.4	\$10,172.3	A-	Baa1	3.31	WI,IA,IL,MN	44.6%	11.4%	2.13
Ameren Corporation (NYSE-AEE)	\$6,291.0	85%	15%	\$22,810.0	\$16,366.8	BBB+	Baa1	3.64	IL,MO	46.2%	10.9%	2.11
American Electric Power Co. (NYSE-AEP)	\$16,195.7	88%	0%	\$55,099.1	\$37,379.9	A-	Baa1	2.99	10 States	42.7%	10.3%	1.96
Avangrid (NYSE-AVG)	\$6,291.0	56%	23%	\$22,810.0	\$16,366.8	BBB+	Baa1	3.53	NY,CT,ME	70.8%	3.9%	1.06
Avista Corp (NYSE-AVA)	\$1,396.9	64%	22%	\$4,648.9	\$2,881.1	BBB	Baa2	2.61	WA,OR,AK,ID	45.7%	7.80%	1.62
CMS Energy Corporation (NYSE-CMS)	\$6,873.0	66%	28%	\$18,126.0	\$13,966.2	BBB+	Baa1	2.67	MI	28.9%	14.2%	2.91
Consolidated Edison, Inc. (NYSE-ED)	\$12,337.0	70%	19%	\$41,749.0	\$25,673.3	BBB+	A3	3.03	NY,PA	44.8%	8.6%	1.52
Dominion Energy, Inc. (NYSE-D)	\$13,366.0	70%	15%	\$54,560.0	\$51,000.1	BBB+	NA	3.10	VA,NC,SC,OH,WV,UT	38.5%	12.31%	2.31
Duke Energy Corporation (NYSE-DUK)	\$24,521.0	90%	7%	\$91,694.0	\$63,736.1	A-	Baa1	2.47	NC,OH,FL,SC,KY	43.1%	6.2%	1.45
Edison International (NYSE-EIX)	\$12,657.0	100%	0%	\$41,348.0	\$18,107.4	BBB	Baa3	(0.48)	CA	45.1%	-2.4%	1.43
Entergy Corporation (NYSE-ETR)	\$11,009.5	85%	1%	\$31,974.4	\$16,448.0	BBB+	Baa2	0.69	LA,AR,MS,TX	32.8%	10.2%	1.86
Energy (NYSE-EVRG)	\$4,275.9	100%	0%	\$18,782.5	\$14,840.0	A-	Baa1	3.11	KS,MO	54.2%	7.9%	1.49
Eversource Energy (NYSE-ES)	\$8,448.2	79%	10%	\$25,610.4	\$21,470.9	A-	Baa1	3.67	CT,NH,MA	46.7%	9.2%	1.87
Exelon Corporation (NYSE-EXC)	\$11,009.5	56%	5%	\$31,974.4	\$46,448.0	BBB+	Baa2	2.44	PA,NJ,IL,MD,DC,DE	47.8%	6.4%	1.40
FirstEnergy Corporation (NYSE-FE)	\$11,261.0	91%	0%	\$29,911.0	\$18,851.1	BBB	Baa3	2.17	OH,PA,NY,NJ,WV,MD	25.8%	25.1%	2.77
Hawaiian Electric Industries (NYSE-HE)	\$2,860.8	89%	0%	\$4,830.1	\$4,060.1	BBB-	NA	3.87	HI	51.2%	9.6%	1.88
IDACORP, Inc. (NYSE-IDA)	NA	100%	0%	\$4,395.7	\$8,562.5	BBB	Baa1	3.85	ID	56.4%	9.8%	3.60
MGE Energy, Inc. (NYSE-MGEE)	\$559.8	72%	28%	\$1,509.4	\$2,303.7	A/A-	Aa2	7.69	WI	61.5%	10.6%	2.82
NextEra Energy, Inc. (NYSE-NEE)	\$16,727.0	71%	0%	\$70,334.0	\$83,224.6	A-	Baa1	5.87	FL	49.8%	17.3%	2.22
NorthWestern Corporation (NYSE-NWE)	\$1,192.0	77%	23%	\$4,521.3	\$2,991.2	BBB	NA	2.94	MT,SD,NE	47.8%	10.5%	1.54
OGE Energy Corp. (NYSE-OGE)	\$2,270.3	100%	0%	\$8,643.8	\$7,899.1	BBB+	Baa1	4.19	OK,AR	56.0%	10.8%	1.97
Pinnacle West Capital Corp. (NYSE-PNW)	\$3,691.2	95%	0%	\$14,029.6	\$16,260.8	A-	A3	4.04	AZ	50.6%	10.1%	3.04
Portland General Electric Company (NYSE-POR)	\$1,991.0	100%	0%	\$6,887.0	\$4,287.2	BBB+	A3	2.85	OR	50.3%	8.6%	1.71
PNM Resources, Inc. (NYSE-PNM)	\$1,436.6	100%	0%	\$5,234.6	\$3,360.4	BBB+	Baa3	1.73	NM,TX	37.6%	5.8%	1.92
PPL Corporation (NYSE-PPL)	\$7,785.0	94%	4%	\$34,458.0	\$20,457.2	A-	Baa2	3.37	PA,KY	34.6%	16.3%	1.75
Sempra Energy (NYSE-SRE)	\$1,991.0	56%	44%	\$6,887.0	\$31,467.5	BBB+	Baa1	2.02	CA,TX	43.1%	6.5%	1.63
Southern Company (NYSE-SO)	\$23,495.0	65%	14%	\$80,797.0	\$48,493.6	A-	Baa2	2.49	GA,FL,NJ,IL,VA,TN,MS	38.3%	8.4%	1.67
WEC Energy Group (NYSE-WEC)	\$7,679.5	58%	42%	\$22,000.9	\$22,541.0	A-	Baa1	3.76	WI,IL,MN,MI	45.3%	3.3%	2.30
Xcel Energy Inc. (NYSE-XEL)	\$11,537.0	84%	15%	\$36,944.0	\$25,972.7	A-	Baa1	3.21	MN,WI,ND,SD,MI	41.5%	10.7%	2.13
Mean	\$8,075.2	81%	11%	\$26,964.6	\$21,986.1	BBB+	Baa1	3.14		46.0%	9.6%	2.00
Median	\$6,873.0	85%	6%	\$22,405.5	\$16,407.4	BBB+	Baa1	3.10		45.5%	9.7%	1.87

Data Source: Company 2018 SEC 10-K filings; Value Line Investment Survey, 2019.

Panel B
Bulkley Proxy Group

Company	Operating Revenue (\$mil)	Percent Reg Elec Revenue	Percent Reg Gas Revenue	Net Plant (\$mil)	Market Cap (\$mil)	S&P Issuer Credit Rating	Moody's Long Term Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
ALLETE, Inc. (NYSE-ALE)	\$1,498.6	71%	0%	\$3,904.4	\$3,993.8	BBB+	Baa1	3.34	MN, WI	59.2%	8.2%	1.85
Alliant Energy Corporation (NYSE-LNT)	\$3,534.5	85%	13%	\$12,462.4	\$10,172.3	A-	Baa1	3.31	WI,IA,IL,MN	44.6%	11.4%	2.13
Avangrid (NYSE-AVG)	\$6,291.0	56%	23%	\$22,810.0	\$16,366.8	BBB+	Baa1	3.53	NY,CT,ME	70.8%	3.9%	1.06
FirstEnergy Corporation (NYSE-FE)	\$11,261.0	91%	0%	\$29,911.0	\$18,851.1	BBB	Baa3	2.17	OH,PA,NY,NJ,WV,MD	25.8%	25.1%	2.77
Hawaiian Electric Industries (NYSE-HE)	\$2,860.8	89%	0%	\$4,830.1	\$4,060.1	BBB-	Baa2	3.87	HI	51.2%	9.6%	1.88
NorthWestern Corporation (NYSE-NWE)	\$1,192.0	77%	23%	\$4,521.3	\$2,991.2	BBB	A3	2.94	MT,SD,NE	47.8%	10.5%	1.54
Portland General Electric Company (NYSE-POR)	\$1,991.0	100%	0%	\$6,887.0	\$4,287.2	BBB+	A3	2.85	OR	50.3%	8.6%	1.71
PPL Corporation (NYSE-PPL)	\$7,785.0	94%	4%	\$34,458.0	\$20,457.2	A-	Baa2	3.37	PA,KY	34.6%	16.3%	1.75
Mean	\$4,551.7	83%	8%	\$14,973.0	\$10,147.5	BBB+	Baa1	3.17		48.0%	11.7%	1.84
Median	\$3,197.7	87%	2%	\$9,674.7	\$7,229.8	BBB+	Baa1	3.32		49.0%	10.0%	1.80

Data Source: Company 2018 SEC 10-K filings; Value Line Investment Survey, 2019.

Attachment JRW-4

Public Service of New Hampshire d/b/a Eversource Energy

Value Line Risk Metrics

Panel A
Electric Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
ALLETE, Inc. (NYSE-ALE)	0.65	A	2	85	95
Alliant Energy Corporation (NYSE-LNT)	0.60	A	2	85	95
Ameren Corporation (NYSE-AEE)	0.55	A	2	80	100
American Electric Power Co. (NYSE-AEP)	0.55	A+	1	85	100
Avangrid (NYSE-AVG)	0.40	B++	2	NMF	95
Avista Corp (NYSE-AVA)	0.60	A	2	70	90
CMS Energy Corporation (NYSE-CMS)	0.55	B++	2	85	100
Consolidated Edison, Inc. (NYSE-ED)	0.45	A+	1	100	100
Dominion Energy Inc. (NYSE-D)	0.55	B++	2	60	100
Duke Energy Corporation (NYSE-DUK)	0.50	A	2	90	100
Edison International (NYSE-EIX)	0.60	B+	3	15	85
Entergy Corporation (NYSE-ETR)	0.60	B++	2	60	95
Evergy (NYSE:EVRG)	NMF	B++	2	NMF	NMF
Eversource Energy (NYSE-ES)	0.55	A	1	95	100
Exelon Corporation (NYSE-EXC)	0.65	B++	2	60	95
FirstEnergy Corporation (NYSE-FE)	0.65	B++	2	40	90
Hawaiian Electric Industries (NYSE-HE)	0.55	A	2	60	100
IDACORP, Inc. (NYSE-IDA)	0.55	A	2	95	95
MGE Energy, Inc. (NYSE-MGEE)	0.55	A	1	90	85
NextEra Energy, Inc. (NYSE-NEE)	0.55	A+	1	70	100
NorthWestern Corporation (NYSE-NWE)	0.60	B++	2	85	95
OGE Energy Corp. (NYSE-OGE)	0.80	A	2	80	95
Pinnacle West Capital Corp. (NYSE-PNW)	0.55	A+	1	95	100
PNM Resources, Inc. (NYSE-PNM)	0.60	B+	3	75	85
Portland General Electric Company (NYSE-POR)	0.60	B++	2	85	95
PPL Corporation (NYSE-PPL)	0.70	B++	2	70	95
Sempra Energy (NYSE-SRE)	0.75	A	2	70	95
Southern Company (NYSE-SO)	0.50	A	2	85	100
WEC Energy Group (NYSE-WEC)	0.50	A+	1	90	100
Xcel Energy Inc. (NYSE-XEL)	0.50	A+	1	100	100
Mean	0.58	A	1.8	77	96

Data Source: Value Line Investment Survey, 2019.

Panel B
Bulkley Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
ALLETE, Inc. (NYSE-ALE)	0.65	A	2	85	95
Alliant Energy Corporation (NYSE-LNT)	0.60	A	2	85	95
Avangrid (NYSE-AVG)	0.40	B++	2	NMF	95
FirstEnergy Corporation (NYSE-FE)	0.65	B++	2	40	90
Hawaiian Electric Industries (NYSE-HE)	0.55	A	2	60	100
NorthWestern Corporation (NYSE-NWE)	0.60	B++	2	85	95
Portland General Electric Company (NYSE-POR)	0.60	B++	2	85	95
PPL Corporation (NYSE-PPL)	0.70	B++	2	70	95
Mean	0.59	A	2.0	73	95

Data Source: Value Line Investment Survey, 2019.

Value Line Risk Metrics

Beta

A relative measure of the historical sensitivity of a stock's price to overall fluctuations in the New York Stock Exchange Composite Index. A beta of 1.50 indicates a stock tends to rise (or fall) 50% more than the New York Stock Exchange Composite Index. The "coefficient" is derived from a regression analysis of the relationship between weekly percentage changes in the price of a stock and weekly percentage changes in the NYSE Index over a period of five years. In the case of shorter price histories, a smaller time period is used, but two years is the minimum. Betas are adjusted for their long-term tendency to converge toward 1.00.

Financial Strength

A relative measure of the companies reviewed by *Value Line*. The relative ratings range from A++ (strongest) down to C (weakest).

Safety Rank

A measurement of potential risk associated with individual common stocks. The Safety Rank is computed by averaging two other *Value Line* indexes the Price Stability Index and the Financial strength Rating. Safety Ranks range from 1 (Highest) to 5 (Lowest). Conservative investors should try to limit their purchases to equities ranked 1 (Highest) and 2 (Above Average) for Safety.

Earnings Predictability

A measure of the reliability of an earnings forecast. Earnings Predictability is based upon the stability of year-to-year comparisons, with recent years being weighted more heavily than earlier ones. The most reliable forecasts tend to be those with the highest rating (100); the least reliable, the lowest (5). The earnings stability is derived from the standard deviation of percentage changes in quarterly earnings over an eight-year period. Special adjustments are made for comparisons around zero and from plus to minus.

Stock Price Stability

A measure of the stability of a stock's price. It includes sensitivity to the market (see Beta as well as the stock's inherent volatility). *Value Line's* Stability ratings range from 1 (highest) to 5 (lowest).

Source: *Value Line Investment Analyzer*.

Attachment JRW-5

Public Service of New Hampshire d/b/a Eversource Energy
Capital Structure Ratios and Debt Cost Rates

Panel A - Eversource Energy Proposed Capital Structure and Debt Cost Rates

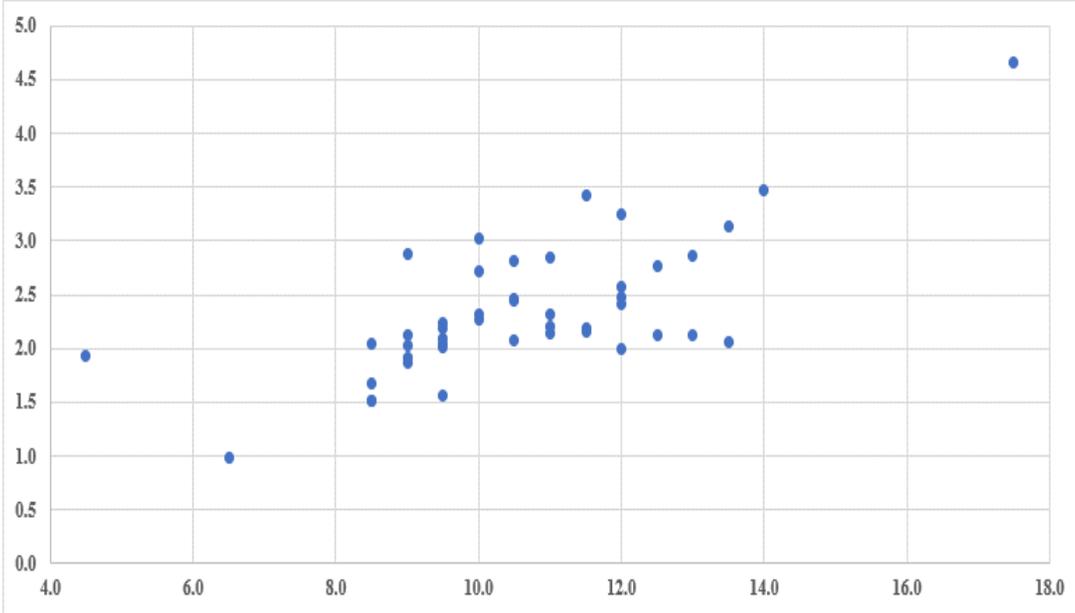
Capital Source	Capitalization Ratios	Cost Rate
Short-Term Debt	3.17%	2.45%
Long-Term Debt	41.98%	4.37%
Common Equity	<u>54.85%</u>	
Total Capitalization	100.00%	

Panel B - Staff's Proposed Capital Structure Ratios and Debt Cost Rates

Capital Source	Capitalization Ratios	Adjustment Factor	Adjusted Ratios	Cost Rate
Short-Term Debt	3.17%	1.10736	3.51%	2.45%
Long-Term Debt	41.98%	1.10736	46.49%	4.37%
Common Equity	<u>54.85%</u>	0.91162	<u>50.00%</u>	
Total Capitalization	100.00%		100.00%	

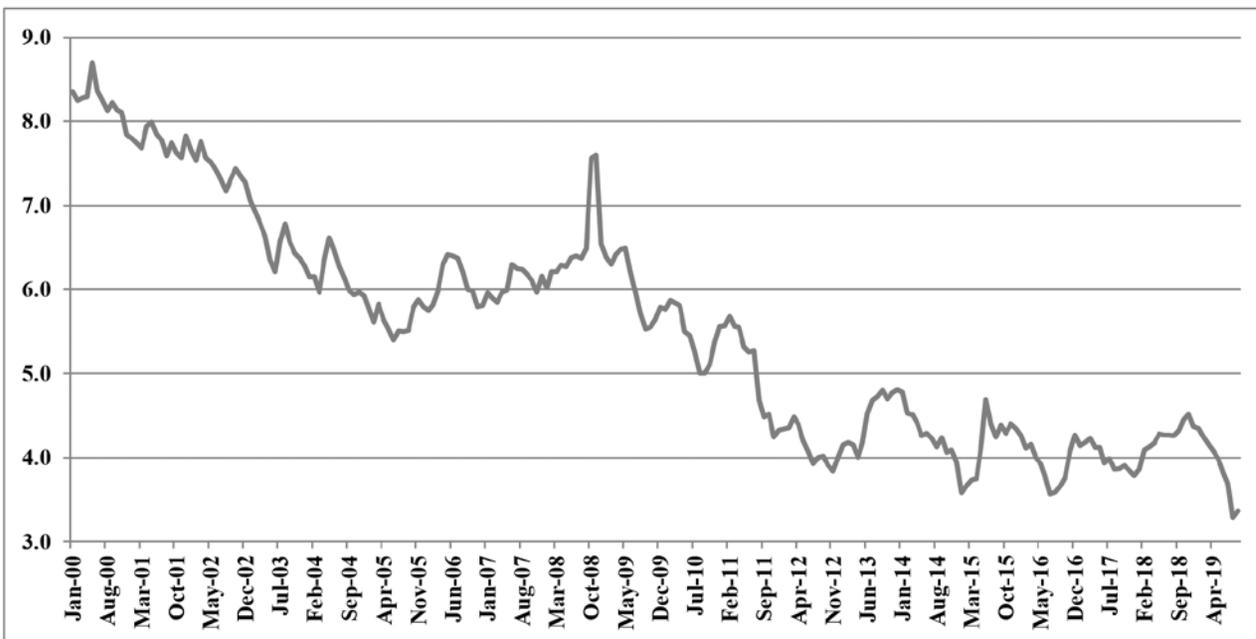
Attachment JRW-6
Electric Utilities and Gas Distribution Companies

Market-to-Book



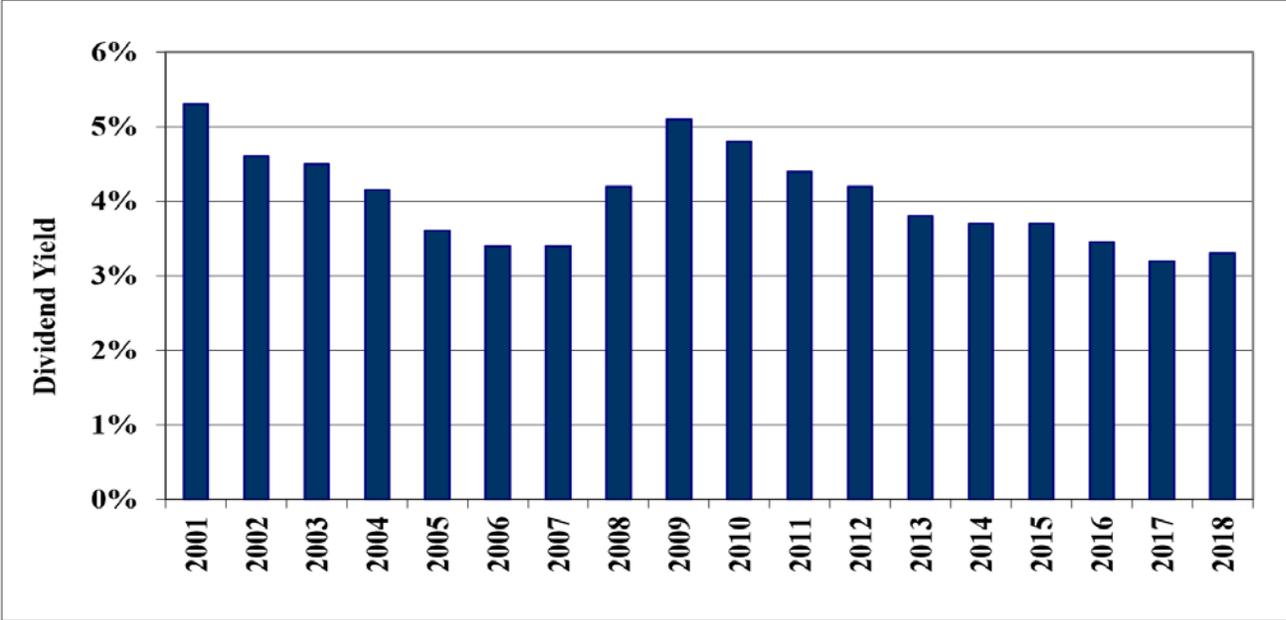
Expected Return on Equity
R-Square = .50, N=43

Attachment JRW-7
Long-Term 'A' Rated Public Utility Bonds



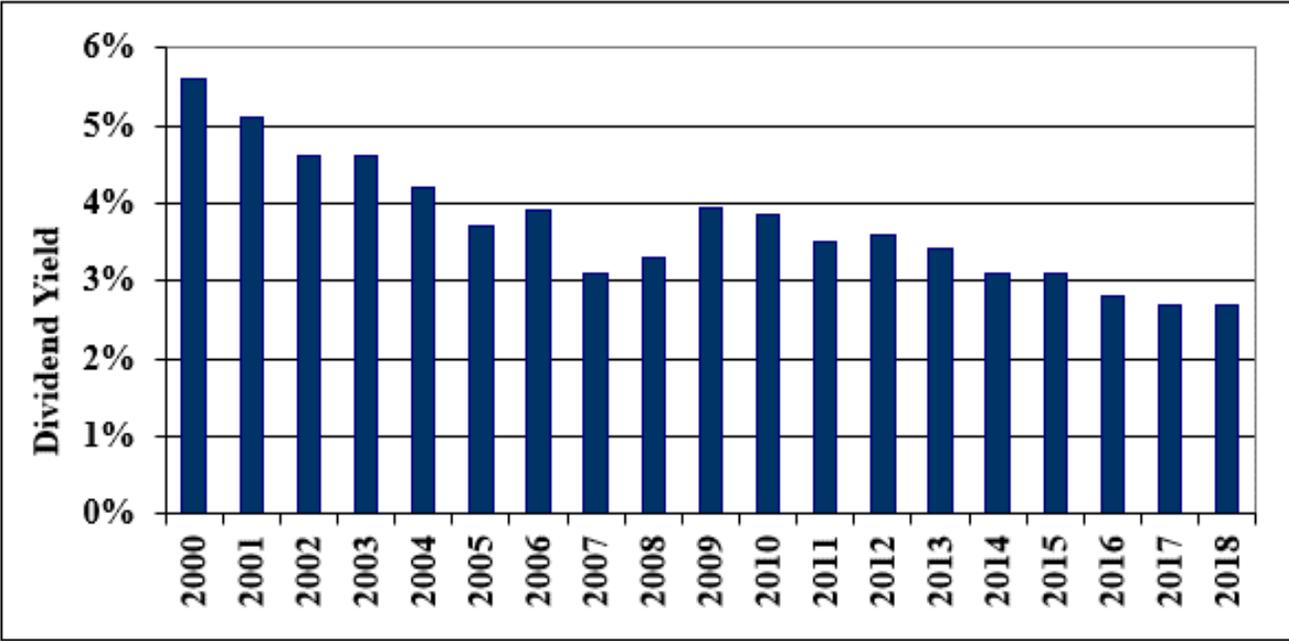
Attachment JRW-7

Panel A
Electric Utility Average Dividend Yield



Data Source: Value Line Investment Survey.

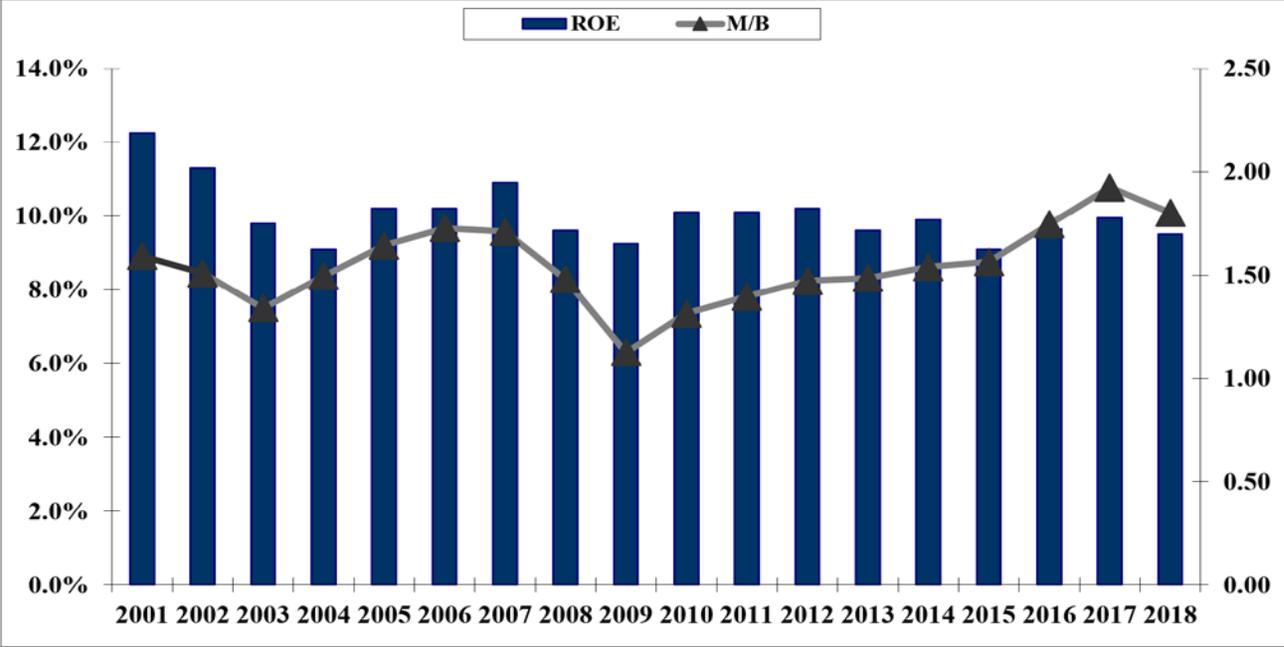
Panel B
Gas Distribution Company Average Dividend Yield



Data Source: Value Line Investment Survey.

Attachment JRW-7

Electric Utility Average Return on Equity and Market-to-Book Ratios



Data Source: Value Line Investment Survey.

Attachment JRW-7
Industry Average Betas*
Value Line Investment Survey Betas**
22-Jan-19

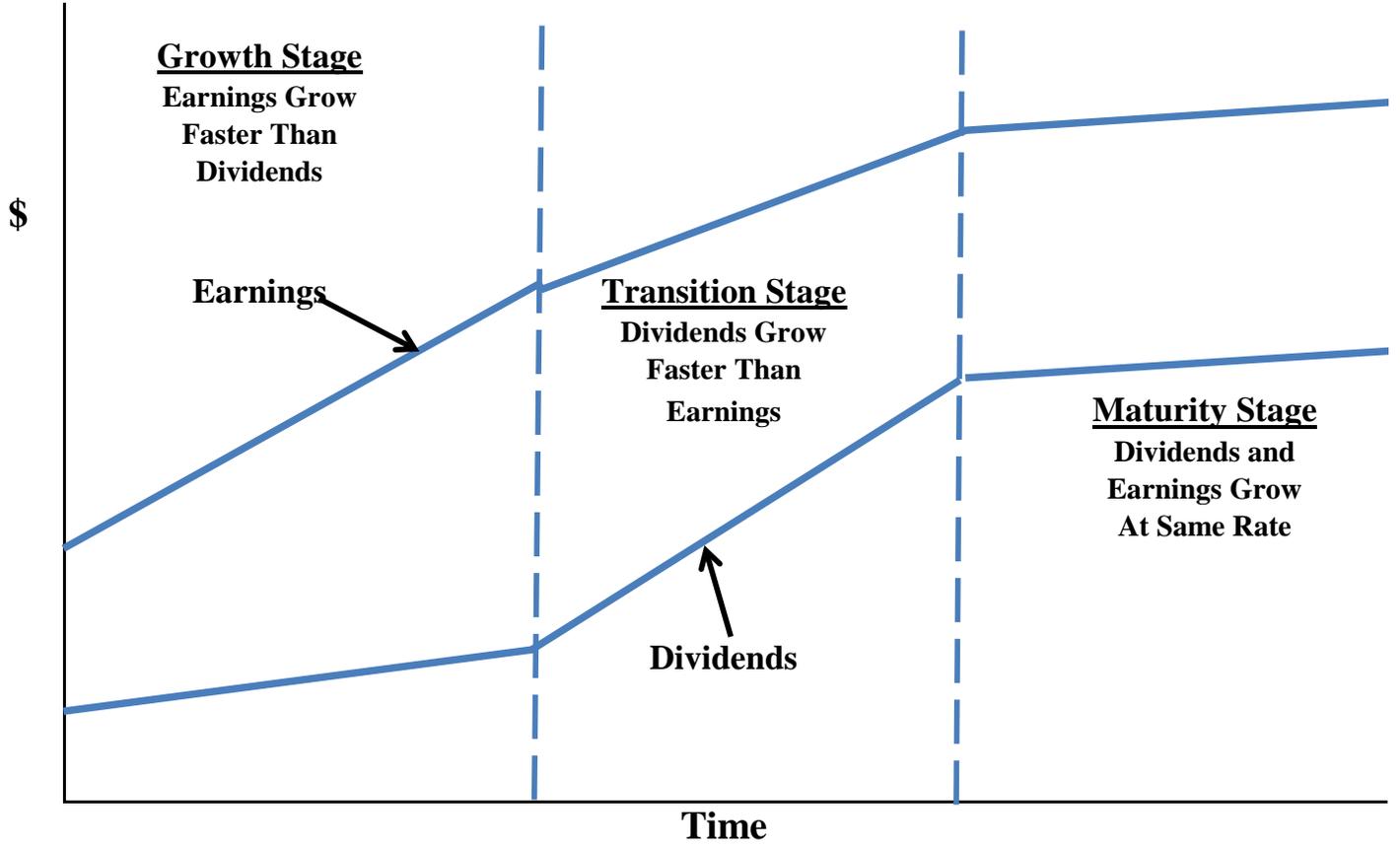
Rank	Industry	Beta	Rank	Industry	Beta	Rank	Industry	Beta
1	Petroleum (Producing)	1.71	34	Telecom. Equipment	1.15	67	Medical Services	1.01
2	Metals & Mining (Div.)	1.64	35	Internet	1.15	68	Recreation	1.01
3	Natural Gas (Div.)	1.63	36	Financial Svcs. (Div.)	1.15	69	IT Services	1.01
4	Oilfield Svcs/Equip.	1.61	37	Retail (Hardlines)	1.14	70	Med Supp Non-Invasive	0.99
5	Maritime	1.51	38	Semiconductor Equip	1.14	71	Telecom. Services	0.99
6	Steel	1.49	39	Entertainment Tech	1.13	72	Retail Store	0.98
7	Oil/Gas Distribution	1.40	40	Publishing	1.13	73	Pharmacy Services	0.98
8	Metal Fabricating	1.37	41	Computer Software	1.13	74	Information Services	0.97
9	Chemical (Specialty)	1.34	42	Paper/Forest Products	1.13	75	Investment Co.(Foreign)	0.96
10	Chemical (Diversified)	1.33	43	Precision Instrument	1.12	76	Healthcare Information	0.96
11	Pipeline MLPs	1.33	44	Public/Private Equity	1.12	77	Funeral Services	0.95
12	Heavy Truck & Equip	1.31	45	Retail Automotive	1.12	78	Med Supp Invasive	0.95
13	Chemical (Basic)	1.30	46	Power	1.12	79	Reinsurance	0.92
14	Building Materials	1.30	47	Wireless Networking	1.12	80	Environmental	0.91
15	Petroleum (Integrated)	1.30	48	Retail Building Supply	1.11	81	Cable TV	0.90
16	Homebuilding	1.28	49	Bank (Midwest)	1.11	82	Insurance (Prop/Cas.)	0.90
17	Railroad	1.27	50	Packaging & Container	1.11	83	Thrift	0.89
18	Auto Parts	1.27	51	Furn/Home Furnishings	1.11	84	Restaurant	0.88
19	Biotechnology	1.27	52	Human Resources	1.10	85	Tobacco	0.88
20	Engineering & Const	1.25	53	Drug	1.10	86	Household Products	0.86
21	Office Equip/Supplies	1.24	54	Advertising	1.10	87	Investment Co.	0.85
22	Hotel/Gaming	1.24	55	Shoe	1.09	88	Beverage	0.83
23	Automotive	1.24	56	Bank	1.09	89	Food Processing	0.82
24	Insurance (Life)	1.24	57	Newspaper	1.08	90	R.E.I.T.	0.82
25	Semiconductor	1.21	58	Toiletries/Cosmetics	1.08	91	Precious Metals	0.82
26	Machinery	1.20	59	Entertainment	1.07	92	Retail/Wholesale Food	0.80
27	Air Transport	1.20	60	Telecom. Utility	1.07	93	Water Utility	0.70
28	Electrical Equipment	1.20	61	Foreign Electronics	1.07	94	Natural Gas Utility	0.67
29	Electronics	1.20	62	Aerospace/Defense	1.05	95	Electric Util. (Central)	0.63
30	Trucking	1.19	63	Industrial Services	1.05	96	Electric Utility (West)	0.62
31	E-Commerce	1.18	64	Apparel	1.05	97	Electric Utility (East)	0.55
32	Computers/Peripherals	1.16	65	Educational Services	1.03			
33	Diversified Co.	1.16	66	Retail (Softlines)	1.02		Mean	1.10

* Industry averages for 97 industries using Value Line's database of 1,710 companies.

** Value Line computes betas using monthly returns regressed against the New York Stock Exchange Index for five years.

These betas are then adjusted as follows: $VL\ Beta = \{(2/3) * Regressed\ Beta\} + \{(1/3) * (1.0)\}$ to account to tendency for Betas to regress toward average of 1.0. See M. Blume, "On the Assessment of Risk," *Journal of Finance*, March 1971.

Attachment JRW-8
DCF Model



Attachment JRW-9

**Public Service of New Hampshire d/b/a Eversource Energy
Discounted Cash Flow Analysis**

**Panel A
Electric Proxy Group**

Dividend Yield*	3.15%
Adjustment Factor	<u>1.025</u>
Adjusted Dividend Yield	3.23%
Growth Rate**	<u>5.00%</u>
Equity Cost Rate	8.25%

* Page 2 of Attachment JRW-9

** Based on data provided on pages 3, 4, 5, and
6 of Attachment JRW-9

**Panel B
Bulkley Proxy Group**

Dividend Yield*	3.20%
Adjustment Factor	<u>1.0225</u>
Adjusted Dividend Yield	3.27%
Growth Rate**	<u>4.50%</u>
Equity Cost Rate	7.75%

* Page 2 of Attachment JRW-9

** Based on data provided on pages 3, 4, 5, and
6 of Attachment JRW-9

Attachment JRW-9

Public Service of New Hampshire d/b/a Eversource Energy
Monthly Dividend Yields

Panel A
Electric Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
ALLETE, Inc. (NYSE-ALE)	\$2.35	2.86%	2.77%	2.80%
Alliant Energy Corporation (NYSE-LNT)	\$1.42	2.69%	2.71%	2.82%
Ameren Corporation (NYSE-AEE)	\$1.98	2.62%	2.59%	2.62%
American Electric Power Co. (NYSE-AEP)	\$2.80	3.06%	3.06%	3.13%
Avangrid (NYSE-AVG)	\$1.76	3.60%	3.52%	3.50%
Avista Corporation (NYSE-AVA)	\$1.55	3.28%	3.28%	3.43%
CMS Energy Corporation (NYSE-CMS)	\$1.53	2.48%	2.46%	2.58%
Consolidated Edison, Inc. (NYSE-ED)	\$2.96	3.34%	3.30%	3.36%
Dominion Resources, Inc. (NYSE-D)	\$3.67	4.47%	4.60%	4.70%
Duke Energy Corporation (NYSE-DUK)	\$3.78	4.18%	4.10%	4.18%
Edison International (NYSE-EIX)	\$2.45	3.59%	3.43%	3.62%
Entergy Corporation (NYSE-ETR)	\$3.72	3.17%	3.24%	3.48%
Evergy, Inc. (NYSE-EVRG)	\$2.02	3.18%	3.15%	3.27%
Eversource Energy (NYSE-ES)	\$2.14	2.60%	2.61%	2.74%
Exelon Corp. (NYSE-EXC)	\$1.45	3.24%	3.14%	3.05%
FirstEnergy Corporation (ASE-FE)	\$1.56	3.29%	3.33%	3.50%
Hawaiian Electric Industries (NYSE-HE)	\$1.28	2.90%	2.88%	2.95%
IDACORP, Inc. (NYSE-IDA)	\$2.68	2.55%	2.49%	2.56%
MGE Energy, Inc. (NYSE-MGEE)	\$1.41	1.86%	1.85%	1.93%
NextEra Energy Inc. (NYSE-NEE)	\$5.00	2.16%	2.20%	2.34%
NorthWestern Corporation (NYSE-NWE)	\$2.30	3.24%	3.18%	3.20%
OGE Energy Corp. (NYSE-OGE)	\$1.55	3.63%	3.59%	3.61%
Pinnacle West Capital Corp. (NYSE-PNW)	\$3.13	3.54%	3.38%	3.34%
PNM Resources, Inc. (NYSE-PNM)	\$1.16	2.36%	2.30%	2.35%
Portland General Electric Company (NYSE-POR)	\$1.54	2.77%	2.75%	2.81%
PPL Corporation (NYSE-PPL)	\$1.65	4.89%	5.21%	5.28%
SEMPRA Energy (NYSE-SRE)	\$3.87	2.66%	2.70%	2.80%
Southern Company (NYSE-SO)	\$2.48	4.00%	4.09%	4.32%
WEC Energy Group (NYSE-WEC)	\$2.36	2.64%	2.57%	2.72%
Xcel Energy Inc. (NYSE-XEL)	\$1.62	2.63%	2.58%	2.67%
Mean		3.1%	3.1%	3.2%
Median		3.1%	3.1%	3.1%

Data Source: <http://quote.yahoo.com>, December, 2019.

Panel B
Bulkley Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
ALLETE, Inc. (NYSE-ALE)	\$2.35	2.86%	2.77%	2.80%
Alliant Energy Corporation (NYSE-LNT)	\$1.42	2.69%	2.71%	2.82%
Avangrid (NYSE-AVG)	\$1.76	3.60%	3.52%	3.50%
FirstEnergy Corporation (ASE-FE)	\$1.56	3.29%	3.33%	3.50%
Hawaiian Electric Industries (NYSE-HE)	\$1.28	2.90%	2.88%	2.95%
NorthWestern Corporation (NYSE-NWE)	\$2.30	3.24%	3.18%	3.20%
Portland General Electric Company (NYSE-POR)	\$1.54	2.77%	2.75%	2.81%
PPL Corporation (NYSE-PPL)	\$1.65	4.89%	5.21%	5.28%
Mean		3.3%	3.3%	3.4%
Median		3.1%	3.0%	3.1%

Data Source: <http://quote.yahoo.com>, December, 2019.

Attachment JRW-9

Public Service of New Hampshire d/b/a Eversource Energy
DCF Equity Cost Growth Rate Measures
Value Line Historic Growth Rates

Panel A
Electric Proxy Group

Company	Value Line Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
ALLETE, Inc. (NYSE-ALE)	1.0	3.0	5.5	4.0	3.0	5.5
Alliant Energy Corporation (NYSE-LNT)	4.5	7.5	4.0	4.5	7.0	4.5
Ameren Corporation (NYSE-AEE)	0.5	-3.5	-0.5	4.5	2.5	0.5
American Electric Power Co. (NYSE-AEP)	3.0	4.5	4.0	5.0	5.0	3.5
Avangrid (NYSE-AVG)						
Avista Corp (NYSE-AVA)	5.5	8.5	4.0	5.0	4.5	4.5
CMS Energy Corporation (NYSE-CMS)	10.0	21.5	4.5	7.0	7.0	5.5
Consolidated Edison, Inc. (NYSE-ED)	2.5	2.0	4.0	2.0	2.5	4.0
Dominion Energy Inc. (NYSE-D)	3.0	7.5	4.5	3.5	7.5	6.5
Duke Energy Corporation (NYSE-DUK)	2.5	7.0	1.0	0.5	3.0	1.5
Edison International (NYSE-EIX)	-3.5	6.5	3.0	-9.0	11.0	3.0
Entergy Corporation (NYSE-ETR)	0.5	3.0	1.0	-0.5	1.0	-2.5
Energy (NYSE-EVRG)						
Eversource Energy (NYSE-ES)	8.0	9.5	6.5	7.0	8.0	5.0
Exelon Corporation (NYSE-EXC)	-5.5	-3.5	7.0	-3.5	-7.0	4.5
FirstEnergy Corporation (NYSE-FE)	-7.0	-2.5	-8.0	-2.5	-5.0	-17.5
Hawaiian Electric Industries (NYSE-HE)	5.0		3.0	4.0		3.5
IDACORP, Inc. (NYSE-IDA)	7.0	6.5	5.5	4.0	10.0	5.0
MGE Energy, Inc. (NYSE-MGEE)	4.5	3.0	5.5	3.5	4.0	6.0
Nextera Energy, Inc. (NYSE-NEE)	6.0	9.0	8.5	6.0	10.5	9.5
NorthWestern Corporation (NYSE-NWE)	8.5	5.0	5.5	7.0	7.0	8.0
OGE Energy Corp. (NYSE-OGE)	4.0	6.5	7.5	1.0	9.5	6.0
Pinnacle West Capital Corp. (NYSE-PNW)	4.5	2.5	2.5	5.0	3.0	4.5
PNM Resources, Inc. (NYSE-PNM)	7.0	2.5		6.0	11.0	1.0
Portland General Electric Company (NYSE-POR)	3.5	4.5	2.5	4.0	4.5	3.5
PPL Corporation (NYSE-PPL)		2.5	1.0	-0.5	2.0	-4.0
Sempra Energy (NYSE-SRE)	1.0	10.0	5.5	2.0	7.5	4.0
Southern Company (NYSE-SO)	3.0	3.5	4.0	2.5	3.5	3.0
WEC Energy Group (NYSE-WEC)	8.5	15.5	8.5	6.0	11.0	10.5
Xcel Energy Inc. (NYSE-XEL)	5.5	4.5	4.5	5.0	6.0	4.5
Mean	3.4	5.4	3.9	3.0	5.2	3.3
Median	4.0	4.5	4.0	4.0	5.0	4.5
Average of Median Figures =				4.3		

Data Source: Value Line Investment Survey.

Panel B
Bulkley Proxy Group

Company	Value Line Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
ALLETE, Inc. (NYSE-ALE)	1.0	3.0	5.5	4.0	3.0	5.5
Alliant Energy Corporation (NYSE-LNT)	4.5	7.5	4.0	4.5	7.0	4.5
Avangrid (NYSE-AVG)						
FirstEnergy Corporation (NYSE-FE)	-7.0	-2.5	-8.0	-2.5	-5.0	-17.5
Hawaiian Electric Industries (NYSE-HE)	5.0		3.0	4.0		3.5
NorthWestern Corporation (NYSE-NWE)	8.5	5.0	5.5	7.0	7.0	8.0
PNM Resources, Inc. (NYSE-PNM)	7.0	2.5		6.0	11.0	1.0
PPL Corporation (NYSE-PPL)		2.5	1.0	-0.5	2.0	-4.0
Mean	3.2	3.0	1.8	3.2	4.2	0.1
Median	4.8	2.8	3.5	4.0	5.0	3.5
Average of Median Figures =				3.9		

Data Source: Value Line Investment Survey.

Attachment JRW-9

Public Service of New Hampshire d/b/a Eversource Energy
DCF Equity Cost Growth Rate Measures
Value Line Projected Growth Rates

Panel A
Electric Proxy Group

Company	Value Line			Value Line		
	Projected Growth			Sustainable Growth		
	Est'd. '16-'18 to '22-'24			Return on Equity	Retention Rate	Internal Growth
Earnings	Dividends	Book Value				
ALLETE, Inc. (NYSE-ALE)	6.0	5.0	3.5	9.5%	37.0%	3.5%
Alliant Energy Corporation (NYSE-LNT)	6.5	5.5	7.5	10.0%	38.0%	3.8%
Ameren Corporation (NYSE-AEE)	6.5	6.0	5.0	10.5%	39.0%	4.1%
American Electric Power Co. (NYSE-AEP)	4.0	5.5	4.0	10.5%	29.0%	3.0%
Avangrid (NYSE-AVG)	8.5	3.0	1.0	5.5%	30.0%	1.7%
Avista Corp (NYSE-AVA)	3.5	4.0	3.5	8.0%	29.0%	2.3%
CMS Energy Corporation (NYSE-CMS)	7.0	7.0	7.5	14.0%	41.0%	5.7%
Consolidated Edison, Inc. (NYSE-ED)	3.0	3.5	3.5	8.5%	33.0%	2.8%
Dominion Energy Inc. (NYSE-D)	6.5	5.0	7.0	13.0%	21.0%	2.7%
Duke Energy Corporation (NYSE-DUK)	6.0	2.5	2.5	8.5%	30.0%	2.6%
Edison International (NYSE-EIX)	NMF	3.5	5.5	11.0%	47.0%	5.2%
Entergy Corporation (NYSE-ETR)	0.5	4.0	4.0	11.0%	29.0%	3.2%
Evergy (NYSE-EVRG)	NMF	NMF	NMF	8.5%	31.0%	2.6%
Eversource Energy (NYSE-ES)	5.5	5.5	4.5	9.0%	38.0%	3.4%
Exelon Corporation (NYSE-EXC)	9.0	5.5	5.0	9.0%	52.0%	4.7%
FirstEnergy Corporation (NYSE-FE)	6.5	3.5	7.0	16.0%	35.0%	5.6%
Hawaiian Electric Industries (NYSE-HE)	2.5	3.0	4.0	9.5%	34.0%	3.2%
IDACORP, Inc. (NYSE-IDA)	3.5	7.0	4.0	9.5%	37.0%	3.5%
MGE Energy, Inc. (NYSE-MGEE)	6.0	5.0	5.5	10.5%	48.0%	5.0%
Nextera Energy, Inc. (NYSE-NEE)	10.5	10.0	7.5	12.5%	40.0%	5.0%
NorthWestern Corporation (NYSE-NWE)	3.0	4.5	3.5	9.0%	34.0%	3.1%
OGE Energy Corp. (NYSE-OGE)	6.5	7.0	3.5	11.5%	30.0%	3.5%
Pinnacle West Capital Corp. (NYSE-PNW)	5.0	6.0	3.5	10.5%	34.0%	3.6%
PNM Resources, Inc. (NYSE-PNM)	7.0	7.0	4.0	9.5%	42.0%	4.0%
Portland General Electric Company (NYSE-POR)	4.5	6.5	3.0	9.0%	34.0%	3.1%
PPL Corporation (NYSE-PPL)	1.5	2.0	5.5	13.0%	36.0%	4.7%
Sempra Energy (NYSE-SRE)	11.0	8.0	6.5	12.0%	42.0%	5.0%
Southern Company (NYSE-SO)	3.5	3.0	3.5	12.5%	27.0%	3.4%
WEC Energy Group (NYSE-WEC)	6.0	6.0	3.5	12.0%	33.0%	4.0%
Xcel Energy Inc. (NYSE-XEL)	5.5	6.0	5.0	11.0%	38.0%	4.2%
Mean	5.5	5.2	4.6	10.5%	35.6%	3.7%
Median	6.0	5.5	4.0	10.5%	34.5%	3.5%
Average of Median Figures =		5.2			Median =	3.5%

* Est'd. '16-'17 to '22-'24' is the estimated growth rate from the base period 2016 to 2018 until the future period 2022 to 2024.

Data Source: Value Line Investment Survey.

* Entergy, Exelon, and FirstEnergy was excluded from the DCF analysis due to negative projected EPS growth rates.

Panel B
Bulkley Proxy Group

Company	Value Line			Value Line		
	Projected Growth			Sustainable Growth		
	Est'd. '16-'18 to '22-'24			Return on Equity	Retention Rate	Internal Growth
Earnings	Dividends	Book Value				
ALLETE, Inc. (NYSE-ALE)	6.0	5.0	3.5	9.5%	37.0%	3.5%
Alliant Energy Corporation (NYSE-LNT)	6.5	5.5	7.5	10.0%	38.0%	3.8%
Avangrid (NYSE-AVG)	8.5	3.0	1.0	5.5%	30.0%	1.7%
FirstEnergy Corporation (NYSE-FE)	6.5	3.5	7.0	16.0%	35.0%	5.6%
Hawaiian Electric Industries (NYSE-HE)	2.5	3.0	4.0	9.5%	34.0%	3.2%
NorthWestern Corporation (NYSE-NWE)	3.0	4.5	3.5	9.0%	34.0%	3.1%
Portland General Electric Company (NYSE-POR)	4.5	6.5	3.0	9.0%	34.0%	3.1%
PPL Corporation (NYSE-PPL)	1.5	2.0	5.5	13.0%	36.0%	4.7%
Mean	4.9	4.1	4.4	10.2%	34.8%	3.6%
Median	5.3	4.0	3.8	9.5%	34.5%	3.4%
Average of Median Figures =		4.3			Median =	3.4%

* Est'd. '16-'17 to '22-'24' is the estimated growth rate from the base period 2016 to 2018 until the future period 2022 to 2024.

Data Source: Value Line Investment Survey.

* Entergy, Exelon, and FirstEnergy was excluded from the DCF analysis due to negative projected EPS growth rates.

Attachment JRW-9

Public Service of New Hampshire d/b/a Eversource Energy
DCF Equity Cost Growth Rate Measures
Analysts Projected EPS Growth Rate Estimates

Panel A
Electric Proxy Group

Company	Yahoo	Zacks	Mean
ALLETE, Inc. (NYSE-ALE)	7.00%	7.20%	7.1%
Alliant Energy Corporation (NYSE-LNT)	5.40%	5.49%	5.4%
Ameren Corporation (NYSE-AEE)	4.30%	6.16%	5.2%
American Electric Power Co. (NYSE-AEP)	6.05%	5.65%	5.9%
Avangrid (NYSE-AVG)	6.20%	7.39%	6.8%
Avista Corporation (NYSE-AVA)	3.50%	3.36%	3.4%
CMS Energy Corporation (NYSE-CMS)	7.50%	6.42%	7.0%
Consolidated Edison, Inc. (NYSE-ED)	2.78%	2.00%	2.4%
Dominion Resources, Inc. (NYSE-D)	4.41%	4.78%	4.6%
Duke Energy Corporation (NYSE-DUK)	4.65%	4.84%	4.7%
Edison International (NYSE-EIX)	3.90%	5.27%	4.6%
Entergy Corporation (NYSE-ETR)	-1.50%	7.00%	2.8%
Evergy, Inc. (NYSE-EVRG)	6.70%	6.43%	6.6%
Eversource Energy (NYSE-ES)	5.60%	5.63%	5.6%
Exelon Corp. (NYSE-EXC)	0.46%	4.50%	2.5%
FirstEnergy Corporation (ASE-FE)	-6.60%	6.00%	
Hawaiian Electric Industries (NYSE-HE)	3.40%	4.22%	3.8%
IDACORP, Inc. (NYSE-IDA)	2.50%	3.85%	3.2%
MGE Energy, Inc. (NYSE-MGEE)	4.00%	N/A	4.0%
NextEra Energy Inc. (NYSE-NEE)	7.99%	7.98%	8.0%
NorthWestern Corporation (NYSE-NWE)	3.20%	2.73%	3.0%
OGE Energy Corp. (NYSE-OGE)	3.50%	4.51%	4.0%
Pinnacle West Capital Corp. (NYSE-PNW)	4.41%	4.91%	4.7%
PNM Resources, Inc. (NYSE-PNM)	6.35%	5.60%	6.0%
Portland General Electric Company (NYSE-POR)	4.10%	4.54%	4.3%
PPL Corporation (NYSE-PPL)	0.50%	N/A	0.5%
SEMPRA Energy (NYSE-SRE)	10.05%	7.73%	8.9%
Southern Company (NYSE-SO)	1.56%	4.50%	3.0%
WEC Energy Group (NYSE-WEC)	6.15%	6.14%	6.1%
Xcel Energy Inc. (NYSE-XEL)	5.20%	5.42%	5.3%
Mean	4.1%	5.4%	4.8%
Median	4.4%	5.5%	4.7%

Data Sources: www.zacks.com, http://quote.yahoo.com, November 6, 2019.

FirstEnergy is excluded due to negative projected EPS growth rate.

Panel B
Bulkley Proxy Group

Company	Yahoo	Zacks	Mean
ALLETE, Inc. (NYSE-ALE)	7.00%	7.20%	7.1%
Alliant Energy Corporation (NYSE-LNT)	5.40%	5.49%	5.4%
Avangrid (NYSE-AVG)	6.20%	7.39%	6.8%
FirstEnergy Corporation (ASE-FE)	-6.60%	6.00%	
Hawaiian Electric Industries (NYSE-HE)	3.40%	4.22%	3.8%
NorthWestern Corporation (NYSE-NWE)	3.20%	2.73%	3.0%
Portland General Electric Company (NYSE-POR)	4.10%	4.54%	4.3%
PPL Corporation (NYSE-PPL)	0.50%	N/A	0.5%
Mean	2.9%	5.4%	4.4%
Median	3.8%	5.5%	4.3%

Data Sources: www.zacks.com, http://quote.yahoo.com, November 6, 2019.

FirstEnergy is excluded due to negative projected EPS growth rate.

Attachment JRW-9

Public Service of New Hampshire d/b/a Eversource Energy
DCF Growth Rate Indicators

Growth Rate Indicator	Electric Proxy Group	Bulkley Proxy Group
Historic <i>Value Line</i> Growth in EPS, DPS, and BVPS	4.3%	3.9%
Projected <i>Value Line</i> Growth in EPS, DPS, and BVPS	5.2%	4.3%
Sustainable Growth ROE * Retention Rate	3.5%	3.4%
Projected EPS Growth from Yahoo and Zack - Mean/Median	4.8%/4.7%	4.4%/4.3%

Attachment JRW-10

Public Service of New Hampshire d/b/a Eversource Energy
Capital Asset Pricing Model

Panel A
Electric Proxy Group

Risk-Free Interest Rate	3.75%
Beta*	0.55
<u>Ex Ante Equity Risk Premium**</u>	<u>5.75%</u>
CAPM Cost of Equity	6.9%

* See page 3 of Attachment JRW-10

** See pages 5 and 6 of Attachment JRW-10

Panel B
Bulkley Proxy Group

Risk-Free Interest Rate	3.75%
Beta*	0.60
<u>Ex Ante Equity Risk Premium**</u>	<u>5.75%</u>
CAPM Cost of Equity	7.2%

* See page 3 of Attachment JRW-10

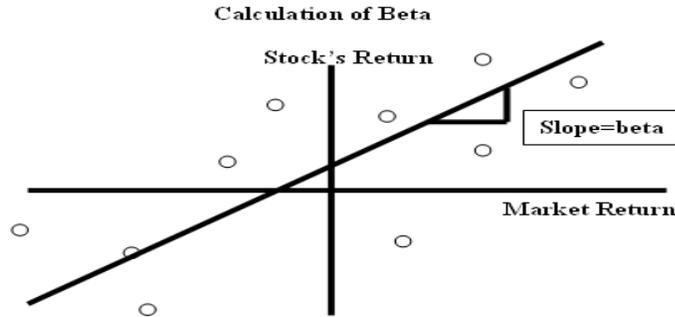
** See pages 5 and 6 of Attachment JRW-10

Attachment JRW-10

Thirty-Year U.S. Treasury Yields
2013-2019



Source: Federal Reserve Bank of St. Louis, FRED Database.



Panel A
Electric Proxy Group

Company	Beta
ALLETE, Inc. (NYSE-ALE)	0.65
Alliant Energy Corporation (NYSE-LNT)	0.60
Ameren Corporation (NYSE-AEE)	0.55
American Electric Power Co. (NYSE-AEP)	0.55
Avangrid (NYSE-AVG)	0.40
Avista Corp (NYSE-AVA)	0.60
CMS Energy Corporation (NYSE-CMS)	0.55
Consolidated Edison, Inc. (NYSE-ED)	0.45
Dominion Energy Inc. (NYSE-D)	0.55
Duke Energy Corporation (NYSE-DUK)	0.50
Edison International (NYSE-EIX)	0.60
Entergy Corporation (NYSE-ETR)	0.60
Evergy (NYSE:EVRG)	NMF
Eversource Energy (NYSE-ES)	0.55
Exelon Corporation (NYSE-EXC)	0.65
FirstEnergy Corporation (NYSE-FE)	0.65
Hawaiian Electric Industries (NYSE-HE)	0.55
IDACORP, Inc. (NYSE-IDA)	0.55
MGE Energy, Inc. (NYSE-MGEE)	0.55
NextEra Energy, Inc. (NYSE-NEE)	0.55
NorthWestern Corporation (NYSE-NWE)	0.60
OGE Energy Corp. (NYSE-OGE)	0.80
Pinnacle West Capital Corp. (NYSE-PNW)	0.55
PNM Resources, Inc. (NYSE-PNM)	0.60
Portland General Electric Company (NYSE-POR)	0.60
PPL Corporation (NYSE-PPL)	0.70
Sempra Energy (NYSE-SRE)	0.75
Southern Company (NYSE-SO)	0.50
WEC Energy Group (NYSE-WEC)	0.50
Xcel Energy Inc. (NYSE-XEL)	0.50
Mean	0.58
Median	0.55

Data Source: *Value Line Investment Survey*, 2019.

Panel B
Bulkley Proxy Group

Company	Beta
ALLETE, Inc. (NYSE-ALE)	0.65
Alliant Energy Corporation (NYSE-LNT)	0.60
Avangrid (NYSE-AVG)	0.40
FirstEnergy Corporation (NYSE-FE)	0.65
Hawaiian Electric Industries (NYSE-HE)	0.55
NorthWestern Corporation (NYSE-NWE)	0.60
Portland General Electric Company (NYSE-POR)	0.60
PPL Corporation (NYSE-PPL)	0.70
Mean	0.59
Median	0.60

Data Source: *Value Line Investment Survey*, 2019.

**Attachment JRW-10
Risk Premium Approaches**

	Historical Ex Post Returns	Surveys	Expected Return Models and Market Data
Means of Assessing The Market Risk Premium	Historical Average Stock Minus Bond Returns	Surveys of CFOs, Financial Forecasters, Companies, Analysts on Expected Returns and Market Risk Premiums	Use Market Prices and Market Fundamentals (such as Growth Rates) to Compute Expected Returns and Market Risk Premiums
Problems/Debated Issues	Time Variation in Required Returns, Measurement and Time Period Issues, and Biases such as Market and Company Survivorship Bias	Questions Regarding Survey Histories, Responses, and Representativeness Surveys may be Subject to Biases, such as Extrapolation	Assumptions Regarding Expectations, Especially Growth

Source: Adapted from Antti Ilmanen, "Expected Returns on Stocks and Bonds," *Journal of Portfolio Management*, (Winter 2003).

Attachment JRW-10

Capital Asset Pricing Model
Market Risk Premium

Summary of Market Risk Premium Studies

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range		Midpoint of Range	Mean	Median
						Low	High			
Historical Risk Premium										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2019	1928-2018	Historical Stock Returns - Bond Returns	Arithmetic				6.26%	
					Geometric				4.66%	
	Dimson, Marsh, Staunton - Credit Suisse Repo	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
					Geometric					
	Bate	2008	1900-2007	Historical Stock Returns - Bond Returns	Geometric				4.50%	
	Shiller	2006	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				7.00%	
					Geometric				5.50%	
	Siegel	2005	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				6.10%	
					Geometric				4.60%	
	Dimson, Marsh, and Staunton	2006	1900-2005	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
	Goyal & Welch	2006	1872-2004	Historical Stock Returns - Bond Returns					4.77%	
	Median									5.50%
Ex Ante Models (Puzzle Research)										
	Claus Thomas	2001	1985-1998	Abnormal Earnings Model					3.00%	
	Arnott and Bernstein	2002	1810-2001	Fundamentals - Div Yld + Growth					2.40%	
	Constantinides	2002	1872-2000	Historical Returns & Fundamentals - P/D & P/E					6.90%	
	Cornell	1999	1926-1997	Historical Returns & Fundamental GDP/Earnings		3.50%	5.50%	4.50%	4.50%	
	Easton, Taylor, et al	2002	1981-1998	Residual Income Model					5.30%	
	Fama French	2002	1951-2000	Fundamental DCF with EPS and DPS Growth		2.55%	4.32%		3.44%	
	Harris & Marston	2001	1982-1998	Fundamental DCF with Analysts' EPS Growth					7.14%	
	McKinsey	2002	1962-2002	Fundamental (P/E, D/P, & Earnings Growth)		3.50%	4.00%		3.75%	
	Siegel	2005	1802-2001	Historical Earnings Yield	Geometric				2.50%	
	Grabowski	2006	1926-2005	Historical and Projected		3.50%	6.00%	4.75%	4.75%	
	Maheu & McCurdy	2006	1885-2003	Historical Excess Returns, Structural Breaks,		4.02%	5.10%	4.56%	4.56%	
	Bostock	2004	1960-2002	Bond Yields, Credit Risk, and Income Volatility		3.90%	1.30%	2.60%	2.60%	
	Bakshi & Chen	2005	1982-1998	Fundamentals - Interest Rates					7.31%	
	Donaldson, Kamstra, & Kramer	2006	1952-2004	Fundamental, Dividend yld., Returns., & Volatility		3.00%	4.00%	3.50%	3.50%	
	Campbell	2008	1982-2007	Historical & Projections (D/P & Earnings Growth)		4.10%	5.40%		4.75%	
	Best & Byrne	2001	Projection	Fundamentals - Div Yld + Growth					2.00%	
	Fernandez	2007	Projection	Required Equity Risk Premium					4.00%	
	DeLong & Magin	2008	Projection	Earnings Yield - TIPS					3.22%	
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2019	Projection	Normalized with 3.5% Long-Term Treasury Yield					5.50%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Market Risk Premia	2019	Projection	Fundamental Economic and Market Factors					4.29%	
	KPMG	2019	Projection	Fundamental Economic and Market Factors					5.75%	
	Damodaran	2019	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					5.09%	
	Social Security									
	Office of Chief Actuary		1900-1995							
	John Campbell	2001	1860-2000	Historical & Projections (D/P & Earnings Growth)	Arithmetic	3.00%	4.00%	3.50%	3.50%	
			Projected for 75 Years		Geometric	1.50%	2.50%	2.00%	2.00%	
	Peter Diamond	2001	Projected for 75 Years	Fundamentals (D/P, GDP Growth)		3.00%	4.80%	3.90%	3.90%	
	John Shoven	2001	Projected for 75 Years	Fundamentals (D/P, P/E, GDP Growth)		3.00%	3.50%	3.25%	3.25%	
	Median									4.29%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2019	10-Year Projection	About 20 Financial Forecasters					1.85%	
	Duke - CFO Magazine Survey	2019	10-Year Projection	Approximately 200 CFOs					4.62%	
	Welch - Academics	2008	30-Year Projection	Random Academics		5.00%	5.74%	5.37%	5.37%	
	Fernandez - Academics, Analysts, and Compan	2019	Long-Term	Survey of Academics, Analysts, and Companies					5.60%	
	Median									5.37%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Median									4.06%
Mean										4.80%
Median										4.83%

Attachment JRW-10

Capital Asset Pricing Model
Market Risk Premium

Summary of 2010-19 Market Risk Premium Studies

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range		Midpoint of Range	Mean	Average
						Low	High			
Historical Risk Premium	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2019	1928-2018	Historical Stock Returns - Bond Returns	Arithmetic				6.26%	
					Geometric				4.66%	
	Dimson, Marsh, Staunton _Credit Suisse Report	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
					Geometric					
	Median									5.36%
Ex Ante Models (Puzzle Research)	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2019	Projection	Normalized with 3.5% Long-Term Treasury Yield					5.50%	
	Mschichowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Market Risk Premia	2019	Projection	Fundamental Economic and Market Factors					4.29%	
	KPMG	2019	Projection	Fundamental Economic and Market Factors					5.75%	
	Damodaran	2019	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					5.09%	
		Median								
Surveys	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
	Survey of Financial Forecasters	2019	10-Year Projection	About 20 Financial Forecasters					1.85%	
	Duke - CFO Magazine Survey	2019	10-Year Projection	Approximately 200 CFOs					4.62%	
	Fernandez - Academics, Analysts, and Companies	2019	Long-Term	Survey of Academics, Analysts, and Companies					5.60%	
		Median								
Building Block	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Median									4.06%
Mean										5.01%
Median										5.24%

Duff & Phelps Risk-Free Interest Rates and Equity Risk Premium Estimates

**Duff & Phelps Recommended
U.S. Equity Risk Premium (ERP) and
Corresponding Risk-free Rates (R_f);
January 2008–Present**

For additional information, please visit
www.duffandphelps.com/CostofCapital

<i>Date</i>	<i>Risk-free Rate (R_f)</i>	<i>R_f (%)</i>	<i>Duff & Phelps Recommended ERP (%)</i>	<i>What Changed</i>
Current Guidance: December 31, 2018 – UNTIL FURTHER NOTICE	Normalized 20-year U.S. Treasury yield	3.50	5.50	ERP
September 5, 2017 – December 30, 2018	Normalized 20-year U.S. Treasury yield	3.50	5.00	ERP
November 15, 2016 – September 4, 2017	Normalized 20-year U.S. Treasury yield	3.50	5.50	R_f
January 31, 2016 – November 14, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
December 31, 2015	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2014	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.00	
February 28, 2013 – January 30, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.00	ERP
December 31, 2012	Normalized 20-year U.S. Treasury yield	4.00	5.50	
January 15, 2012 – February 27, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
December 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	6.00	
September 30, 2011 – January 14, 2012	Normalized 20-year U.S. Treasury yield	4.00	6.00	ERP
July 1 2011 – September 29, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
June 1, 2011 – June 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
May 1, 2011 – May 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2010 – April 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
June 1, 2010 – November 30, 2010	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2009	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2009 – May 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	ERP
June 1, 2009 – November 30, 2009	Spot 20-year U.S. Treasury yield	Spot	6.00	R_f
December 31, 2008	Normalized 20-year U.S. Treasury yield	4.50	6.00	
November 1, 2008 – May 31, 2009	Normalized 20-year U.S. Treasury yield	4.50	6.00	R_f
October 27, 2008 – October 31, 2008	Spot 20-year U.S. Treasury yield	Spot	6.00	ERP
January 1, 2008 – October 26, 2008	Spot 20-year U.S. Treasury yield	Spot	5.00	Initialized

Normalized in this context means that in months where the risk-free rate is deemed to be abnormally low, a proxy for a longer-term sustainable risk-free rate is used.

Source: <https://www.duffandphelps.com/-/media/assets/pdfs/publications/valuation/coc/erp-risk-free-rates-jan-2008-present.ashx?la=en>

Panel A
KPMG Market Risk Premium Recommendation



Please find an overview of the historic MRP estimates by KPMG in the graph below.



Source: <https://assets.kpmg/content/dam/kpmg/nl/pdf/2019/advisory/equity-market-risk-premium-research-summary-31032019.pdf>

Panel B
Market-Risk-Premia.com Implied Market Risk Premium
31-Jul-19

Implied Market-risk-premia (IMRP): USA
 Equity market



Source: <http://www.market-risk-premia.com/us.html>

Public Service of New Hampshire d/b/a Eversource Energy Rate of Return Recommendation

Capital Source	Capitalization Ratios	Cost Rate	Weighted Cost Rate
Short-Term Debt	3.17%	2.45%	0.08%
Long-Term Debt	41.98%	4.37%	1.83%
Common Equity	<u>54.85%</u>	<u>10.40%</u>	<u>5.70%</u>
Total Capitalization	100.00%		7.62%

Constant Growth DCF using Earnings Growth Rates			
	Mean Low	Mean	Mean High
30-Day Average Price	9.37%	9.65%	10.82%
90-Day Average Price	9.42%	9.70%	10.86%
180-Day Average Price	9.09%	9.76%	10.93%
Constant Growth DCF using Earnings and Retention Growth Rates			
30-Day Average Price	8.75%	9.49%	11.82%
90-Day Average Price	8.83%	9.53%	11.86%
180-Day Average Price	8.47%	9.60%	11.33%
Projected DCF			
2021-2023 Projection	9.22%	10.25%	10.89%
Capital Asset Pricing Model			
	Current Risk-Free Rate (3.04%)	Q2 2019 – Q2 2020 Projected Risk-Free Rate (3.28%)	2020-2024 Projected Risk-Free Rate (3.90%)
Bloomberg Beta	10.18%	10.26%	10.47%
Value Line Beta	9.41%	9.51%	9.76%
Bond Yield Plus Risk Premium			
	Current Risk-Free Rate (3.04%)	Q2 2019 – Q2 2020 Projected Risk-Free Rate (3.28%)	2020-2024 Projected Risk-Free Rate (3.90%)
Bond Yield Plus Risk Premium	9.82%	9.93%	10.21%

Bulkley Proxy Group DCF Growth Rates

Panel A
February 28, 2019

Company	Value Line	Yahoo	Zacks	Average
ALLETE, Inc. (NYSE-ALE)	3.50%	6.00%	n/a	4.75%
Alliant Energy Corporation (NYSE-LNT)	6.50%	7.25%	6.00%	6.58%
Avangrid (NYSE-AVG)	12.00%	9.20%	8.40%	9.87%
FirstEnergy Corporation (ASE-FE)	6.50%	Negative	6.00%	6.25%
Hawaiian Electric Industries (NYSE-HE)	3.50%	7.80%	6.20%	5.83%
NorthWestern Corporation (NYSE-NWE)	2.50%	2.59%	3.10%	2.73%
Portland General Electric Company (NYSE-POR)	4.00%	4.90%	4.00%	4.30%
PPL Corporation (NYSE-PPL)	3.00%	3.59%	5.00%	3.86%
Average				5.52%

Panel B
December 6, 2019

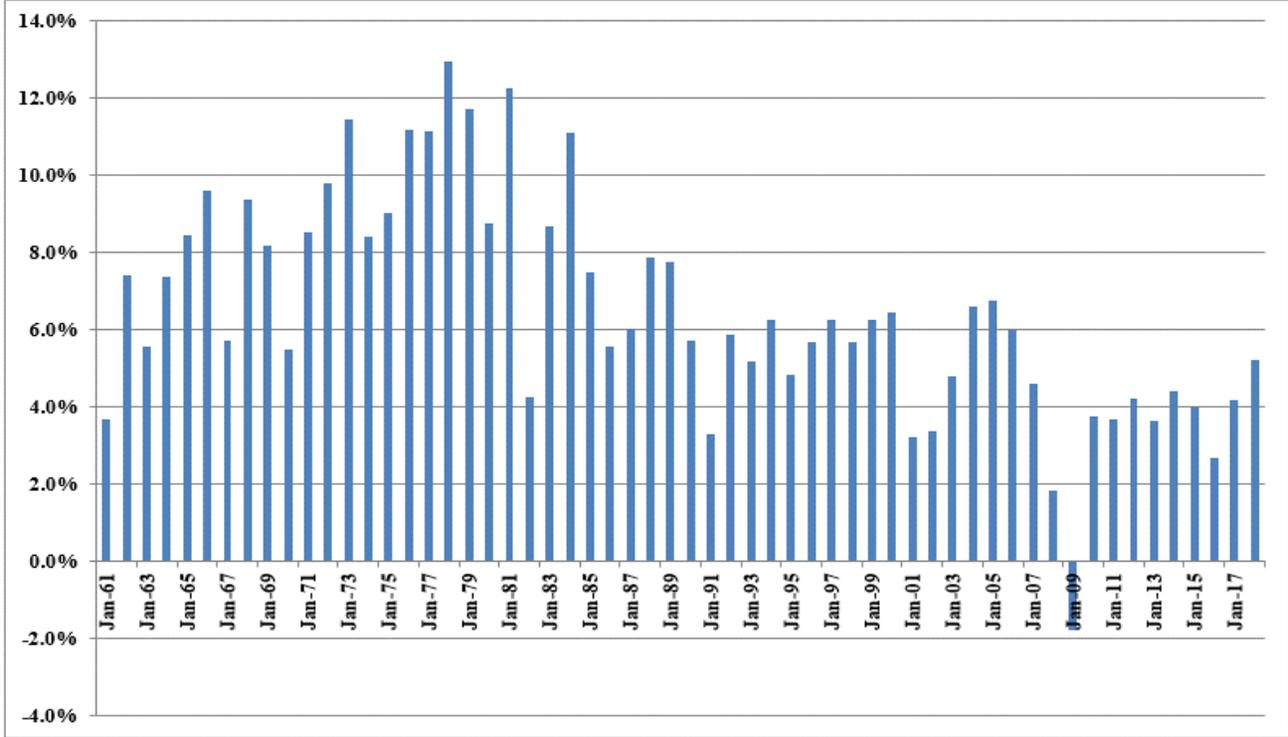
Company	Value Line	Yahoo	Zacks	Average
ALLETE, Inc. (NYSE-ALE)	6.00%	7.00%	7.20%	6.73%
Alliant Energy Corporation (NYSE-LNT)	6.50%	5.40%	5.49%	5.80%
Avangrid (NYSE-AVG)	8.50%	6.20%	7.39%	7.36%
FirstEnergy Corporation (ASE-FE)	6.50%	Negative	6.00%	6.25%
Hawaiian Electric Industries (NYSE-HE)	2.50%	3.40%	4.22%	3.37%
NorthWestern Corporation (NYSE-NWE)	3.00%	3.20%	2.73%	2.98%
Portland General Electric Company (NYSE-POR)	4.50%	4.10%	4.54%	4.38%
PPL Corporation (NYSE-PPL)	1.50%	0.50%	N/A	1.00%
Average				4.73%

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

	GDP	S&P 500	S&P 500 EPS	S&P 500 DPS		
1	1960	542.38	58.11	3.10	1.98	
2	1961	562.21	71.55	3.37	2.04	
3	1962	603.92	63.10	3.67	2.15	
4	1963	637.45	75.02	4.13	2.35	
5	1964	684.46	84.75	4.76	2.58	
6	1965	742.29	92.43	5.30	2.83	
7	1966	813.41	80.33	5.41	2.88	
8	1967	859.96	96.47	5.46	2.98	
9	1968	940.65	103.86	5.72	3.04	
10	1969	1017.62	92.06	6.10	3.24	
11	1970	1073.30	92.15	5.51	3.19	
12	1971	1164.85	102.09	5.57	3.16	
13	1972	1279.11	118.05	6.17	3.19	
14	1973	1425.38	97.55	7.96	3.61	
15	1974	1545.24	68.56	9.35	3.72	
16	1975	1684.90	90.19	7.71	3.73	
17	1976	1873.41	107.46	9.75	4.22	
18	1977	2081.83	95.10	10.87	4.86	
19	1978	2351.60	96.11	11.64	5.18	
20	1979	2627.33	107.94	14.55	5.97	
21	1980	2857.31	135.76	14.99	6.44	
22	1981	3207.04	122.55	15.18	6.83	
23	1982	3343.79	140.64	13.82	6.93	
24	1983	3634.04	164.93	13.29	7.12	
25	1984	4037.61	167.24	16.84	7.83	
26	1985	4338.98	211.28	15.68	8.20	
27	1986	4579.63	242.17	14.43	8.19	
28	1987	4855.22	247.08	16.04	9.17	
29	1988	5236.44	277.72	24.12	10.22	
30	1989	5641.58	353.40	24.32	11.73	
31	1990	5963.14	330.22	22.65	12.35	
32	1991	6158.13	417.09	19.30	12.97	
33	1992	6520.33	435.71	20.87	12.64	
34	1993	6858.56	466.45	26.90	12.69	
35	1994	7287.24	459.27	31.75	13.36	
36	1995	7639.75	615.93	37.70	14.17	
37	1996	8073.12	740.74	40.63	14.89	
38	1997	8577.55	970.43	44.09	15.52	
39	1998	9062.82	1229.23	44.27	16.20	
40	1999	9630.66	1469.25	51.68	16.71	
41	2000	10252.35	1320.28	56.13	16.27	
42	2001	10581.82	1148.09	38.85	15.74	
43	2002	10936.42	879.82	46.04	16.08	
44	2003	11458.25	1111.91	54.69	17.88	
45	2004	12213.73	1211.92	67.68	19.41	
46	2005	13036.64	1248.29	76.45	22.38	
47	2006	13814.61	1418.30	87.72	25.05	
48	2007	14451.86	1468.36	82.54	27.73	
49	2008	14712.85	903.25	65.39	28.05	
50	2009	14448.93	1115.10	59.65	22.31	
51	2010	14992.05	1257.64	83.66	23.12	
52	2011	15542.58	1257.60	97.05	26.02	
53	2012	16197.01	1426.19	102.47	30.44	
54	2013	16784.85	1848.36	107.45	36.28	
55	2014	17521.75	2058.90	113.01	39.44	
56	2015	18219.30	2043.94	106.32	43.16	
57	2016	18707.19	2238.83	108.86	45.03	
58	2017	19485.39	2673.61	124.94	49.73	
	2018	20500.64	2506.85	148.34	53.61	
	Growth Rates	6.46	6.71	6.89	5.85	Average
						6.48

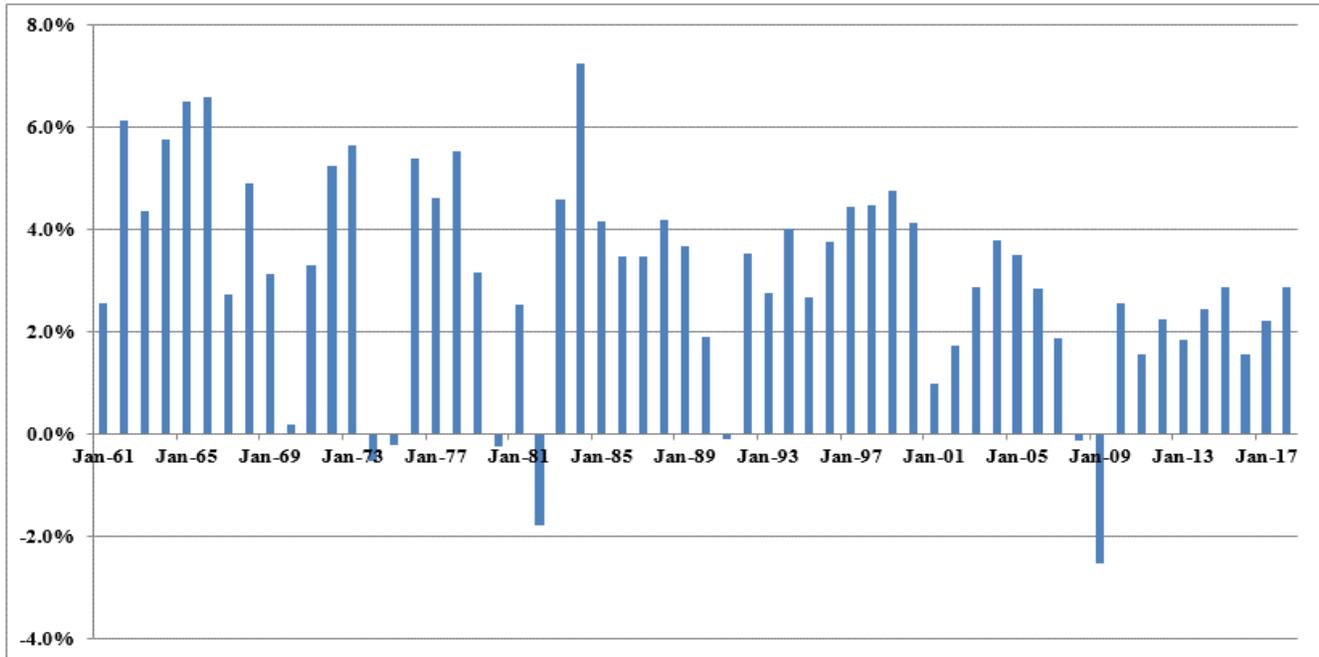
A - <http://research.stlouisfed.org/fred2/series/GDPA/downloaddata>
, EPS and DPS - <http://pages.stern.nyu.edu/~adamodar/>

Nominal GDP Growth Rates
 Annual Growth Rates - 1961-2018



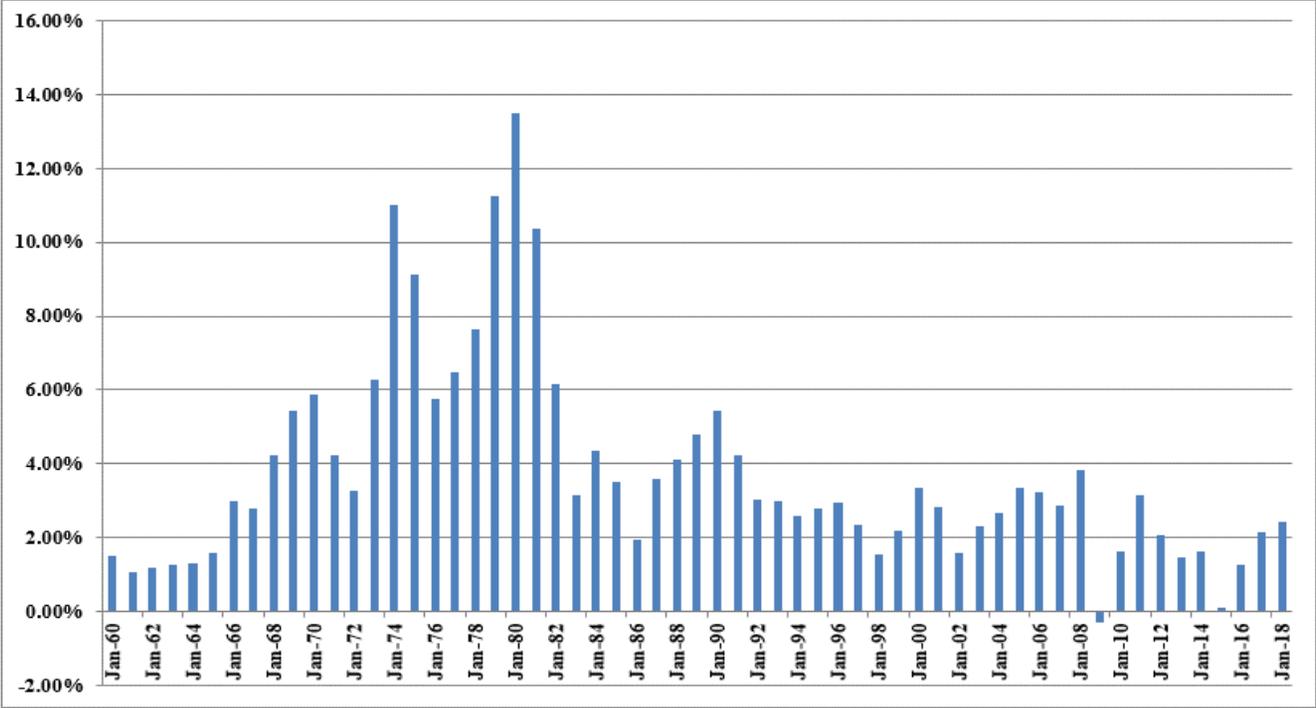
Data Sources: GDPA -<https://fred.stlouisfed.org/series/GDPA>

Annual Real GDP Growth Rates
1961-2018



Data Sources: GDPC1 - <https://fred.stlouisfed.org/series/GDPCA>

Annual Inflation Rates
1961-2018



Data Sources: CPIAUCSL - <https://fred.stlouisfed.org/series/CPIAUCSL>

Panel A
Historic GDP Growth Rates

10-Year Average		3.37%
20-Year Average		4.17%
30-Year Average		4.65%
40-Year Average		5.56%
50-Year Average		6.36%

Calculated using GDP data on Page 1 of Attachment JRW-90

Panel B
Projected GDP Growth Rates

	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	2019-2049	4.40%
Survey of Financial Forecasters	Ten Year	4.25%
Social Security Administration	2018-2095	4.35%
Energy Information Administration	2018-2050	4.20%

Sources:

Congressional Budget Office, *The 2019 Long-Term Budget Outlook*, June 15, 2019.

<https://www.cbo.gov/system/files/2019-06/55331-LTBO-2.pdf>

U.S. Energy Information Administration, *Annual Energy Outlook 2019*, Table: Macroeconomic Indicators,

<https://www.eia.gov/outlooks/aeo/pdf/appa.pdf>

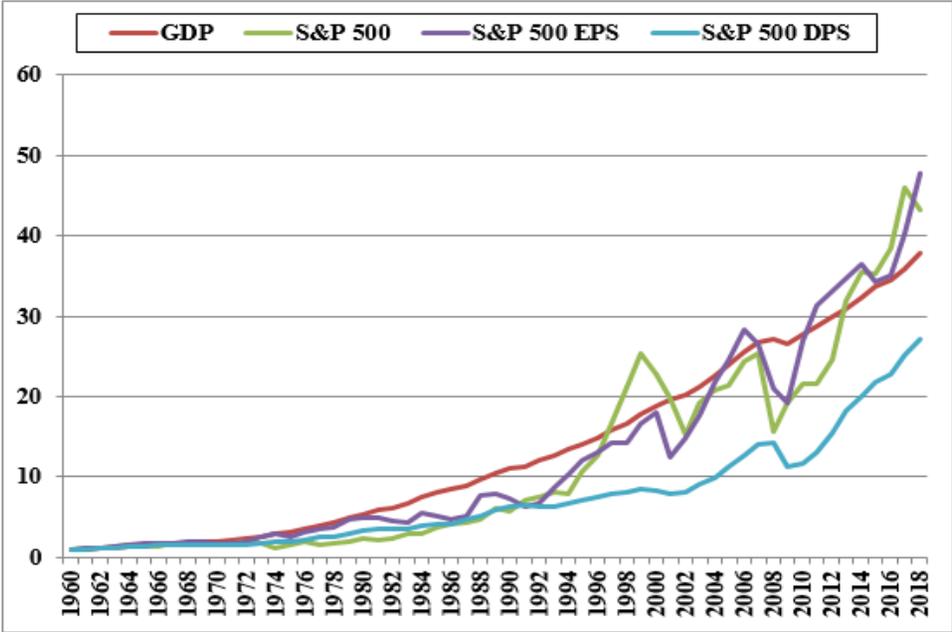
Social Security Administration, 2019 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program, Table VI.G4, p. 211 (June 15, 2019),

https://www.ssa.gov/oact/TR/2019/VI_G2_OASDI_GDP.html#200732

in projected GDP from \$21,485 trillion in 2019 to \$546,331 trillion in 2095.

<https://www.philadelphiafed.org/-/media/research-and-data/real-time-center/survey-of-professional-forecasters/2019/sj>

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	6.47	6.95	6.70	5.82