

Appendix A
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 co-authored 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 35 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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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*.

Attachment JRW-2

EnergyNorth Natural Gas Company
Recommended Rate of Return

| Capital Source | Capitalization Ratios | Cost Rate | Weighted Cost Rate |
|-----------------------|------------------------------|---------------------|---------------------------|
| Total Debt | 50.79% | 4.42% | 2.24% |
| Common Equity | <u>49.21%</u> | <u>9.00%</u> | <u>4.43%</u> |
| Total Capital | 100.00% | | 6.67% |

* Capital Structure Ratios are developed in Attachment JRW-4.

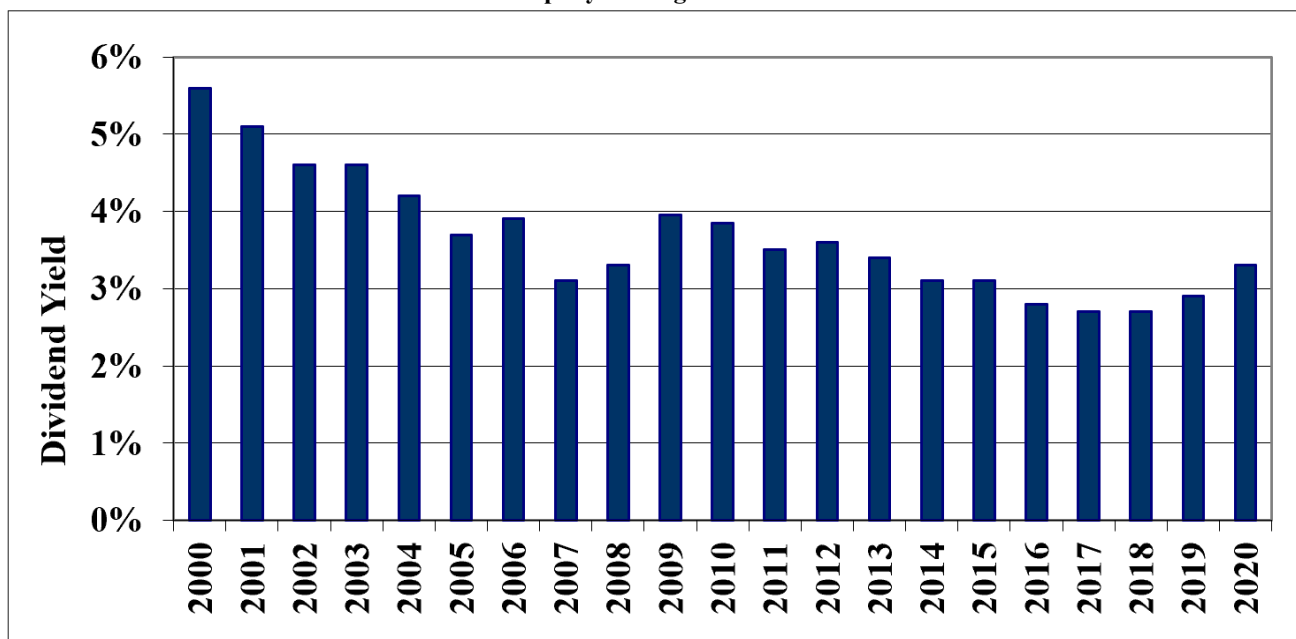
Attachment JRW-3
Long-Term 'A' Rated Public Utility Bonds



Data Source: Mergent Bond Record

Attachment JRW-3

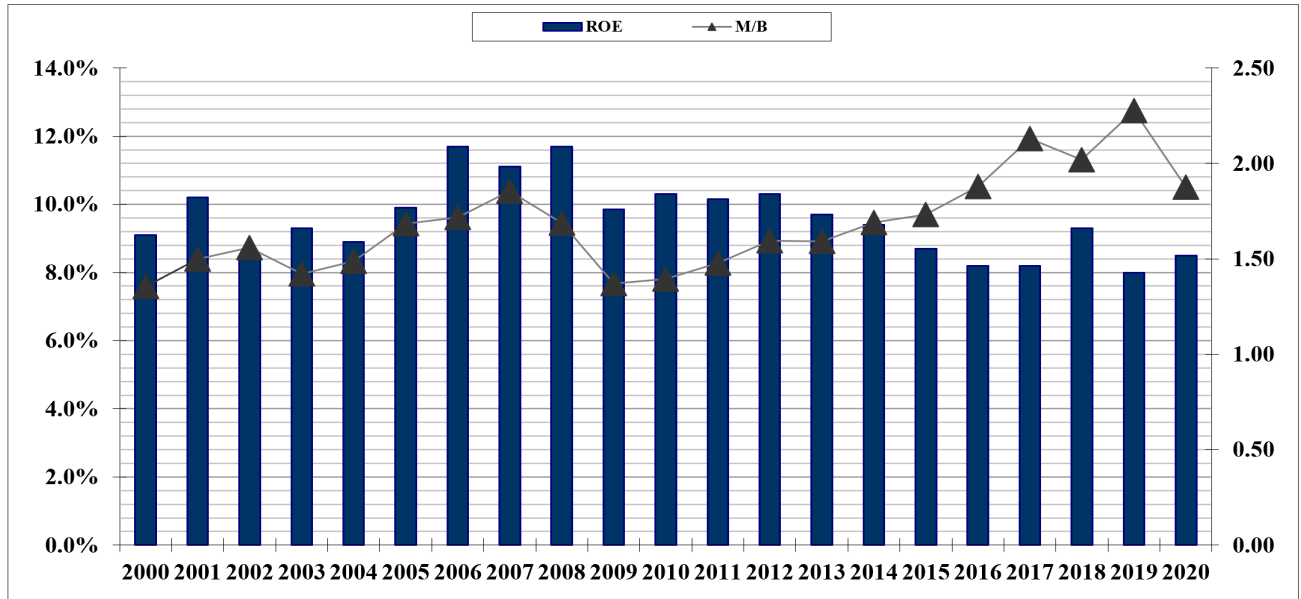
Gas Company Average Dividend Yield



Data Source: *Value Line Investment Survey*.

Attachment JRW-3

Gas Company Average Return on Equity and Market-to-Book Ratios



Data Source: Value Line Investment Survey.

Attachment JRW-4
EnergyNorth Natural Gas Company

Gas Proxy Group

| Company | Operating Revenue (\$mil) | Percent Gas Revenue | Percent Elec Revenue | Net Plant (\$mil) | Market Cap (\$mil) | S&P Issuer Credit Rating | Moody's Issuer Credit Rating | Pre-Tax Interest Coverage | Primary Service Area | Common Equity Ratio | Return on Equity | Market to Book Ratio |
|--|---------------------------------|------------------------|----------------------------|----------------------|-----------------------|-----------------------------|---------------------------------|---------------------------------|----------------------|---------------------------|---------------------|-------------------------|
| Atmos Energy Company (NYSE-ATO) | \$2,901.8 | 95% | 0% | \$11,787.67 | \$13,191.3 | A- | NR | 7.26x | TX,LA,MS,CO,KS,KY | 59.0% | 9.7% | 2.29 |
| Chesapeake Utilities (NYSE-CPK) | \$479.6 | 45% | 16% | \$1,475.36 | \$1,498.6 | NR | NR | 4.66x | DE,MD,FL | 43.0% | 11.3% | 2.67 |
| New Jersey Resources Corp. (NYSE-NJR) | \$2,592.0 | 27% | 0% | \$3,041.17 | \$3,595.4 | NR | NR | 3.10x | NJ | 49.5% | 11.4% | 2.32 |
| Nisource Inc (NYSE-NI) | \$5,208.9 | 68% | 33% | \$16,976.40 | \$10,917.4 | BBB+ | Baa2 | 3.33x | IN,OH,PA,KY,VA,MD,MA | 38.0% | 6.6% | 1.82 |
| Northwest Natural Holdings (NYSE-NWN) | \$746.4 | 97% | 0% | \$2,441.85 | \$2,017.0 | A+ | NR | 3.36x | OR,WA | 45.6% | 8.0% | 2.33 |
| ONE Gas, Inc.(NYSE-OGS) | \$1,652.7 | 100% | 0% | \$4,599.43 | \$4,569.7 | BBB+ | A2 | 4.62x | OK,KS,TX | 53.7% | 9.0% | 2.15 |
| South Jersey Industries, Inc. (NYSE-SJI) | \$1,628.6 | 55% | 5% | \$4,075.44 | \$2,653.0 | BBB | NR | 1.81x | NJ | 29.5% | 5.7% | 1.86 |
| Southwest Gas Company (NYSE-SWX) | \$3,119.92 | 46% | 0% | \$6,337.30 | \$3,215.9 | BBB+ | Baa2 | 3.47 | AZ,NV,CA | 46.7% | 9.0% | 1.50 |
| Spire (NYSE-SR) | \$1,952.4 | 95% | 0% | \$4,829.80 | \$4,060.9 | A- | Baa2 | 2.97x | MO | 47.0% | 7.9% | 1.60 |
| Mean | \$2,253.6 | 70% | 6% | \$6,173.8 | \$5,079.9 | BBB+ | Baa1 | 3.84 | | 45.8% | 8.7% | 2.06 |
| Median | \$1,952.4 | 68% | 0% | \$4,599.4 | \$3,595.4 | BBB+ | Baa1 | 3.36 | | 46.7% | 9.0% | 2.15 |

Data Source: S&P Capital IQ, 2019 Fiscal Year-end data.

Attachment JRW-4

EnergyNorth Natural Gas Company

Value Line Risk Metrics

Gas Proxy Group

| Company | Beta | Financial Strength | Safety | Earnings Predictability | Stock Price Stability |
|--|------|--------------------|--------|-------------------------|-----------------------|
| Atmos Energy Company (NYSE-ATO) | 0.80 | A+ | 1 | 100 | 95 |
| Chesapeake Utilities (NYSE-CPK) | 0.80 | A | 2 | 95 | 85 |
| New Jersey Resources Corp. (NYSE-NJR) | 0.95 | A+ | 2 | 50 | 80 |
| Nisource Inc (NYSE-NI) | 0.85 | B+ | 2 | 45 | 95 |
| Northwest Natural Gas Co. (NYSE-NWN) | 0.80 | A | 1 | 5 | 85 |
| ONE Gas, Inc. (NYSE-OGS) | 0.80 | A | 2 | 100 | 95 |
| South Jersey Industries, Inc. (NYSE-SJI) | 1.05 | A | 3 | 65 | 70 |
| Southwest Gas Company (NYSE-SWX) | 0.95 | A | 3 | 95 | 85 |
| Spire (NYSE-SR) | 0.85 | B++ | 2 | 50 | 95 |
| Mean | 0.87 | A | 2.0 | 67 | 87 |

Data Source: Value Line Investment Survey, 2021.

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

EnergyNorth Natural Gas Company
Capital Structure Ratios and Debt Cost Rate

Panel A - EnergyNorth's Proposed Capital Structure and Debt Cost Rates

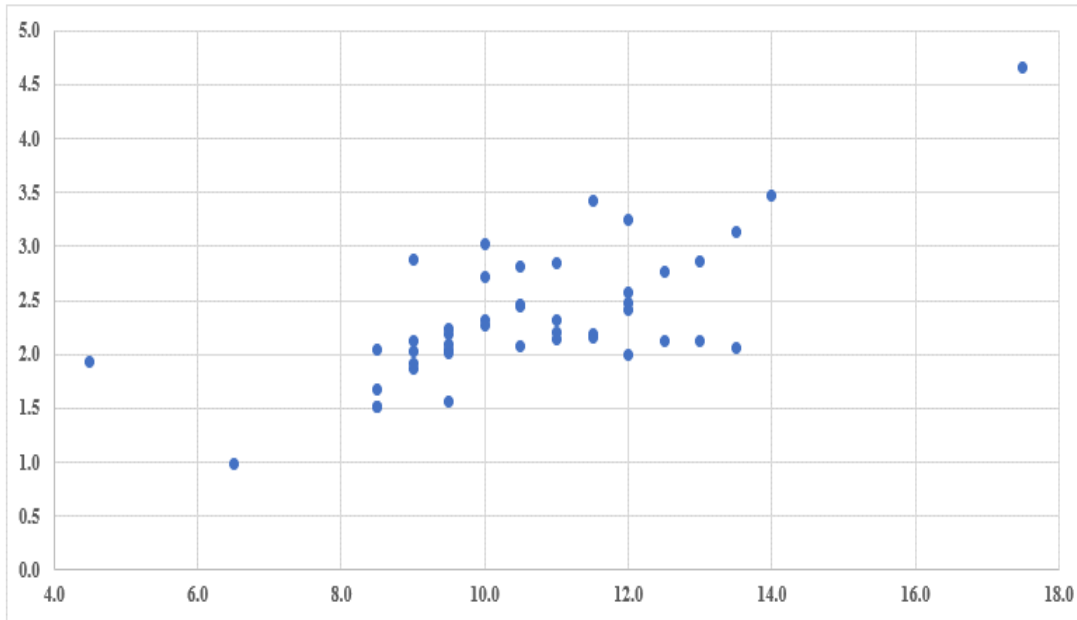
| Capital Source | Capitalization Ratios | Cost Rate |
|----------------|-----------------------|---------------|
| Long-Term Debt | 49.85% | 4.42% |
| Common Equity | <u>50.15%</u> | <u>10.51%</u> |
| Total Capital | 100.00% | |

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

| Capital Source | Capitalization Ratios | Cost Rate |
|----------------|-----------------------|-----------|
| Long-Term Debt | 50.79% | 4.42% |
| Common Equity | <u>49.21%</u> | |
| Total Capital | 100.00% | |

Attachment JRW-6
Electric Utilities and Gas Distribution Companies

Market-to-Book



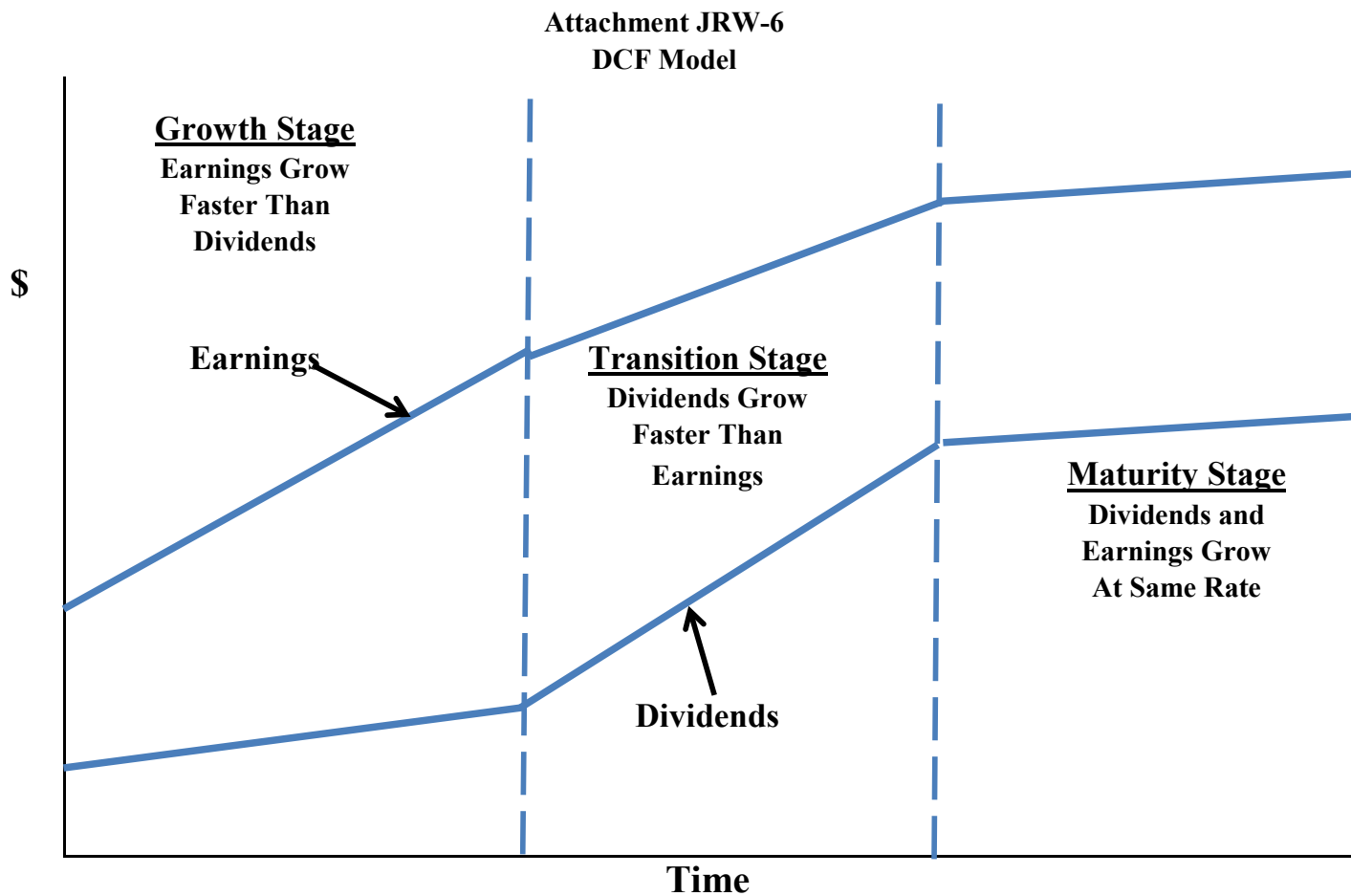
Expected Return on Equity
R-Square = .50, N=43

Attachment JRW-6
Industry Average Betas*
Value Line Investment Survey Betas**
28-Jan-21

| Rank | Industry | Beta | Rank | Industry | Beta | Rank | Industry | Beta |
|------|------------------------|------|------|------------------------|------|------|--------------------------|------|
| 1 | Oilfield Svcs/Equip. | 1.49 | 34 | Bank (Midwest) | 1.20 | 67 | Investment Co. | 1.01 |
| 2 | Homebuilding | 1.47 | 35 | Restaurant | 1.19 | 68 | Med Supp Non-Invasive | 1.00 |
| 3 | Insurance (Life) | 1.47 | 36 | Machinery | 1.19 | 69 | Environmental | 1.00 |
| 4 | Petroleum (Integrated) | 1.42 | 37 | Electrical Equipment | 1.18 | 70 | Telecom. Equipment | 1.00 |
| 5 | Hotel/Gaming | 1.42 | 38 | Bank | 1.18 | 71 | Investment Co.(Foreign) | 1.00 |
| 6 | Petroleum (Producing) | 1.41 | 39 | Medical Services | 1.17 | 72 | E-Commerce | 0.99 |
| 7 | Apparel | 1.39 | 40 | Electronics | 1.17 | 73 | Retail Store | 0.98 |
| 8 | Air Transport | 1.37 | 41 | Maritime | 1.17 | 74 | Cable TV | 0.96 |
| 9 | Shoe | 1.37 | 42 | Heavy Truck & Equip | 1.15 | 75 | Drug | 0.96 |
| 10 | Retail (Hardlines) | 1.36 | 43 | Toiletries/Cosmetics | 1.15 | 76 | Telecom. Services | 0.95 |
| 11 | Building Materials | 1.33 | 44 | R.E.I.T. | 1.15 | 77 | Healthcare Information | 0.94 |
| 12 | Office Equip/Supplies | 1.33 | 45 | Automotive | 1.15 | 78 | Computer Software | 0.94 |
| 13 | Aerospace/Defense | 1.31 | 46 | Reinsurance | 1.14 | 79 | Tobacco | 0.94 |
| 14 | Metals & Mining (Div.) | 1.30 | 47 | Publishing | 1.11 | 80 | Trucking | 0.94 |
| 15 | Metal Fabricating | 1.30 | 48 | Computers/Peripherals | 1.10 | 81 | Telecom. Utility | 0.93 |
| 16 | Pipeline MLPs | 1.30 | 49 | Semiconductor Equip | 1.10 | 82 | Electric Utility (West) | 0.90 |
| 17 | Auto Parts | 1.29 | 50 | Industrial Services | 1.09 | 83 | Foreign Electronics | 0.90 |
| 18 | Steel | 1.28 | 51 | Precision Instrument | 1.09 | 84 | Biotechnology | 0.90 |
| 19 | Retail Automotive | 1.27 | 52 | Packaging & Container | 1.09 | 85 | Beverage | 0.89 |
| 20 | Oil/Gas Distribution | 1.26 | 53 | Railroad | 1.08 | 86 | Electric Utility (East) | 0.89 |
| 21 | Paper/Forest Products | 1.25 | 54 | Power | 1.07 | 87 | Natural Gas Utility | 0.89 |
| 22 | Furn/Home Furnishings | 1.25 | 55 | Wireless Networking | 1.07 | 88 | Electric Util. (Central) | 0.89 |
| 23 | Public/Private Equity | 1.24 | 56 | Med Supp Invasive | 1.06 | 89 | Household Products | 0.81 |
| 24 | Natural Gas (Div.) | 1.24 | 57 | Retail Building Supply | 1.06 | 90 | Retail/Wholesale Food | 0.81 |
| 25 | Advertising | 1.23 | 58 | Educational Services | 1.06 | 91 | Water Utility | 0.79 |
| 26 | Financial Svcs. (Div.) | 1.22 | 59 | Semiconductor | 1.06 | 92 | Entertainment Tech | 0.79 |
| 27 | Recreation | 1.21 | 60 | Internet | 1.05 | 93 | Food Processing | 0.77 |
| 28 | Engineering & Const | 1.21 | 61 | Insurance (Prop/Cas.) | 1.05 | 94 | Precious Metals | 0.68 |
| 29 | Retail (Softlines) | 1.21 | 62 | Human Resources | 1.04 | | | |
| 30 | Chemical (Specialty) | 1.21 | 63 | Information Services | 1.03 | | | |
| 31 | Chemical (Diversified) | 1.21 | 64 | Entertainment | 1.03 | | | |
| 32 | Diversified Co. | 1.20 | 65 | Thrift | 1.02 | | | |
| 33 | Chemical (Basic) | 1.20 | 66 | IT Services | 1.01 | | Mean | 1.12 |

* Industry averages for 94 industries using Value Line's database of 1,704 companies - Updated 1-28-21.

** 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: $V_L \text{ Beta} = \{[(2/3) * \text{Regressed Beta}] + [(1/3) * (1.0)]\}$ 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-7

EnergyNorth Natural Gas Company
Discounted Cash Flow Analysis

Gas Proxy Group

| | |
|--------------------------------|-----------------------|
| Dividend Yield* | 3.65% |
| Adjustment Factor | <u>1.02625</u> |
| Adjusted Dividend Yield | 3.75% |
| Growth Rate** | <u>5.25%</u> |
| Equity Cost Rate | 9.00% |

* Page 2 of Attachment JRW-7

** Based on data provided on pages 3, 4, 5, and
6 of Attachment JRW-7

Attachment JRW-7

EnergyNorth Natural Gas Company
Monthly Dividend Yields

Gas Proxy Group

| Company | Annual Dividend | Dividend Yield 30 Day | Dividend Yield 90 Day | Dividend Yield 180 Day |
|---|----------------------------|--------------------------------------|--------------------------------------|---------------------------------------|
| Atmos Energy Corporation (NYSE-AWR) | \$2.50 | 2.8% | 2.7% | 2.6% |
| Chesapeake Utilities Corp. (NYSE-CPK) | \$1.76 | 1.6% | 1.7% | 1.9% |
| New Jersey Resources Corp. (NYSE-NJR) | \$1.33 | 3.4% | 3.7% | 4.0% |
| NiSource Inc. (NYSE-NI) | \$0.88 | 3.9% | 3.9% | 3.8% |
| Northwest Natural Gas Co. (NYSE-NWN) | \$1.92 | 4.0% | 4.1% | 3.9% |
| One Gas, Inc. (NYSE-OGS) | \$2.32 | 3.2% | 3.1% | 3.1% |
| South Jersey Industries, Inc. (NYSE-SJI) | \$1.21 | 4.8% | 5.2% | 5.4% |
| Southwest Gas Corporation (NYSE-SWX) | \$2.38 | 3.7% | 3.7% | 3.6% |
| Spire (NYSE-SR) | \$2.60 | 3.9% | 4.0% | 4.2% |
| Mean | | 3.5% | 3.6% | 3.6% |
| Median | | 3.7% | 3.7% | 3.8% |

Data Sources: S&P Capital IQ, March, 2021.

Attachment JRW-7

EnergyNorth Natural Gas Company
DCF Equity Cost Growth Rate Measures
Value Line Historic Growth Rates

| Company | Gas Proxy Group | | | | | |
|--|-------------------------------------|-----------|------------|--------------|-----------|------------|
| | <i>Value Line</i> Historical Growth | | | | | |
| | Past 10 Years | | | Past 5 Years | | |
| | Earnings | Dividends | Book Value | Earnings | Dividends | Book Value |
| Atmos Energy Company (NYSE-ATO) | 8.0 | 5.0 | 7.5 | 9.0 | 7.5 | 10.0 |
| Chesapeake Utilities (NYSE-CPK) | 9.0 | 5.5 | 9.5 | 8.0 | 6.5 | 10.5 |
| New Jersey Resources Corp. (NYSE-NJR) | 7.0 | 7.0 | 7.0 | 6.0 | 6.5 | 8.5 |
| Nisource Inc (NYSE-NI) | -1.0 | -2.0 | -3.0 | -8.0 | -5.0 | -7.0 |
| Northwest Natural Gas Co. (NYSE-NWN) | -11.0 | 2.0 | 1.5 | -17.0 | 0.5 | -0.5 |
| ONE Gas, Inc. (NYSE-OGS)* | | | | 9.5 | 17.0 | 2.5 |
| South Jersey Industries, Inc. (NYSE-SJI) | 1.0 | 7.5 | 5.5 | -4.0 | 5.0 | 3.5 |
| Southwest Gas Company (NYSE-SWX) | 8.0 | 8.5 | 6.0 | 4.5 | 9.5 | 6.5 |
| Spire (NYSE-SR) | 1.5 | 4.5 | 7.0 | 4.5 | 6.0 | 5.5 |
| Mean | 2.8 | 4.8 | 5.1 | 1.4 | 5.9 | 4.4 |
| Median | 4.3 | 5.3 | 6.5 | 4.5 | 6.5 | 5.5 |
| Average of Median Figures = | | | | 5.4 | | |

Data Source: *Value Line* Investment Survey.

Attachment JRW-7

EnergyNorth Natural Gas Company
DCF Equity Cost Growth Rate Measures
Value Line Projected Growth Rates

| Company | Gas Proxy Group | | | Value Line | | |
|--|---|-----------|------------|---------------------|-------------------|--------------------|
| | Value Line | | | Value Line | | |
| | Projected Growth Est'd. '18-'20 to '24-'26 | | | Sustainable Growth | | |
| | Earnings | Dividends | Book Value | Return on Equity | Retention Rate | Internal Growth |
| Atmos Energy Company (NYSE-ATO) | 7.0 | 7.5 | 10.5 | 7.5% | 49.0% | 3.7% |
| Chesapeake Utilities (NYSE-CPK) | 8.5 | 8.0 | 7.0 | 11.0% | 57.0% | 6.3% |
| New Jersey Resources Corp. (NYSE-NJR) | 1.5 | 5.5 | 5.0 | 10.5% | 33.0% | 3.5% |
| Nisource Inc (NYSE-NI) | 10.0 | 4.5 | 4.5 | 11.5% | 51.0% | 5.9% |
| Northwest Natural Gas Co. (NYSE-NWN) | 5.5 | 0.5 | 8.0 | 7.0% | 36.0% | 2.5% |
| ONE Gas, Inc. (NYSE-OGS) | 6.5 | 7.0 | 4.5 | 9.5% | 41.0% | 3.9% |
| South Jersey Industries, Inc. (NYSE-SJI) | 10.5 | 4.0 | 5.0 | 11.5% | 38.0% | 4.4% |
| Southwest Gas Company (NYSE-SWX) | 8.0 | 4.5 | 6.0 | 9.5% | 54.0% | 5.1% |
| Spire (NYSE-SR) | 9.0 | 4.5 | 8.5 | 7.0% | 35.0% | 2.5% |
| Mean | 7.4 | 5.1 | 6.6 | 9.4% | 43.8% | 4.2% |
| Median | 8.0 | 4.5 | 6.0 | 9.5% | 41.0% | 3.9% |
| Average of Median Figures = | | 6.2 | | | Median = | 3.9% |

* 'Est'd. '18-'20 to '24-'26' is the estimated growth rate from the base period 2018 to 2020 until the future period 2024 to 2026.

Data Source: Value Line Investment Survey, 2021.

Attachment JRW-7

EnergyNorth Natural Gas Company
DCF Equity Cost Growth Rate Measures
Analysts Projected EPS Growth Rate Estimates

Gas Proxy Group

| Company | Yahoo | Zacks | S&P Cap IQ | Mean |
|--|-------|-------|------------|-------|
| Atmos Energy Company (NYSE-ATO) | 7.0% | 7.3% | 7.0% | 7.1% |
| Chesapeake Utilities (NYSE-CPK) | 4.7% | na | 8.5% | 6.6% |
| New Jersey Resources Corp. (NYSE-NJR) | 6.0% | 6.0% | 7.1% | 6.4% |
| Nisource Inc (NYSE-NI) | 4.4% | 6.2% | 5.0% | 5.2% |
| Northwest Natural Gas Co. (NYSE-NWN) | 3.1% | NA | 2.5% | 2.8% |
| ONE Gas, Inc. (NYSE-OGS) | 5.0% | 5.5% | 5.5% | 5.3% |
| South Jersey Industries, Inc. (NYSE-SJI) | 24.5% | 24.5% | 6.5% | 18.5% |
| Southwest Gas Company (NYSE-SWX) | 4.0% | 5.0% | 5.0% | 4.7% |
| Spire (NYSE-SR) | 5.7% | 5.0% | 5.1% | 5.3% |
| Mean | 7.2% | 8.5% | 5.8% | 6.9% |
| Median | 5.0% | 6.0% | 5.5% | 5.3% |

Data Sources: www.zacks.com, <http://quote.yahoo.com>, S&P Capital IQ, March, 2021.

Attachment JRW-7

EnergyNorth Natural Gas Company
DCF Growth Rate Indicators

Gas Proxy Group

| Growth Rate Indicator | Gas Proxy Group |
|---|-----------------|
| Historic <i>Value Line</i> Growth in EPS, DPS, and BVPS | 5.4% |
| Projected <i>Value Line</i> Growth in EPS, DPS, and BVPS | 6.2% |
| Sustainable Growth ROE * Retention Rate | 3.9% |
| Projected EPS Growth from Yahoo, Zacks, and Reuters - Median | 5.3% |

Attachment JRW-8

EnergyNorth Natural Gas Company
Capital Asset Pricing Model

Gas Proxy Group

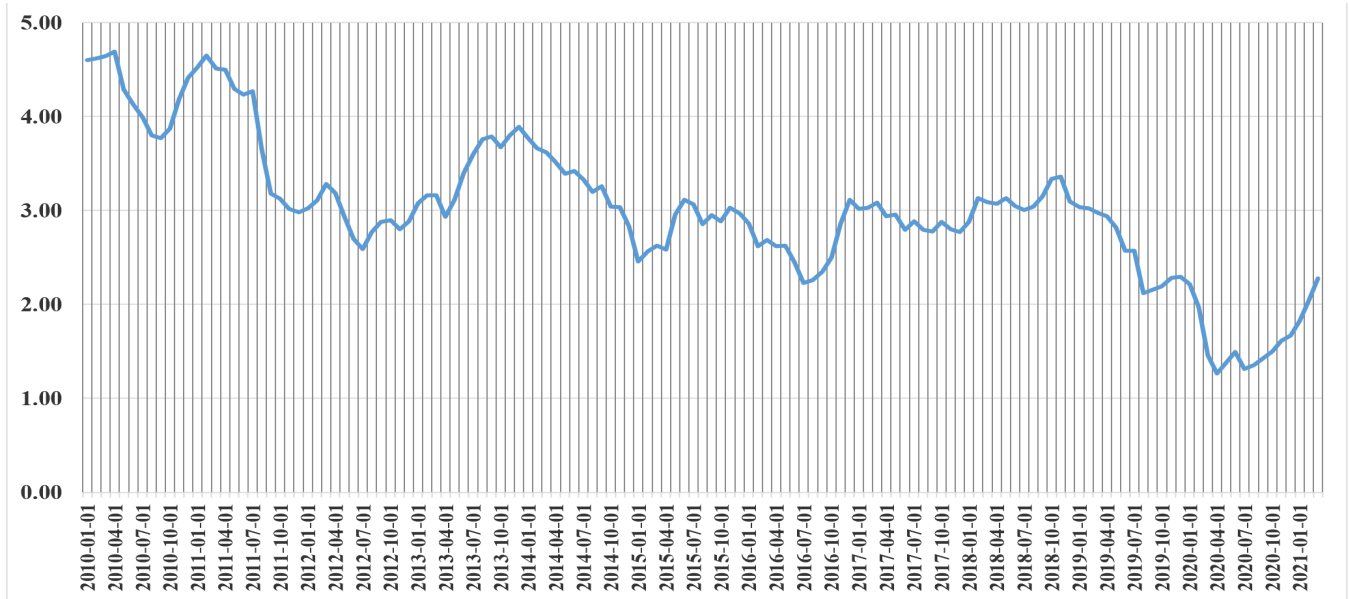
| | |
|---|---------------------|
| Risk-Free Interest Rate | 2.50% |
| Beta* | 0.85 |
| <u>Ex Ante Equity Risk Premium**</u> | <u>6.00%</u> |
| CAPM Cost of Equity | 7.6% |

* See page 3 of Attachment JRW-8

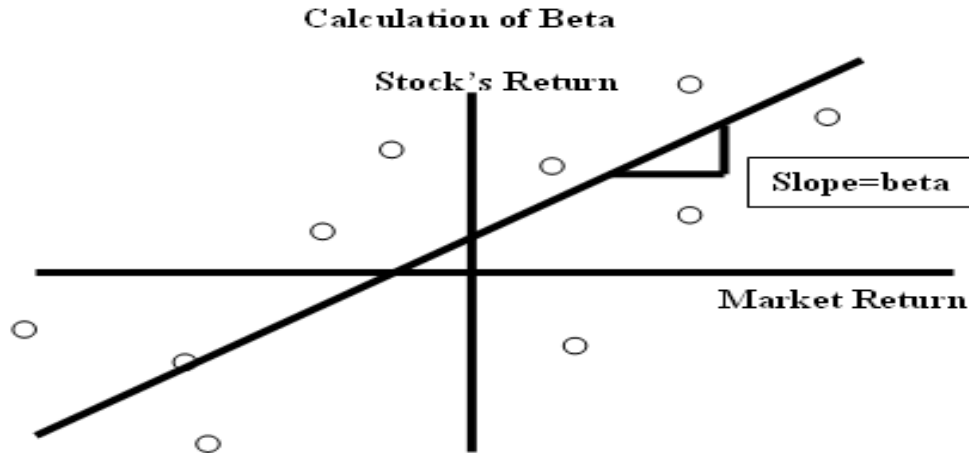
** See pages 5 and 6 of Attachment JRW-8

Attachment JRW-8

Thirty-Year U.S. Treasury Yields
2010-2021



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



Gas Proxy Group

| | |
|---|-------------|
| Atmos Energy Company (NYSE-ATO) | 0.80 |
| Chesapeake Utilities (NYSE-CPK) | 0.80 |
| New Jersey Resources Corp. (NYSE-NJR) | 0.95 |
| Nisource Inc (NYSE-NI) | 0.85 |
| Northwest Natural Gas Co. (NYSE-NWN) | 0.80 |
| ONE Gas, Inc. (NYSE-OGS) | 0.80 |
| South Jersey Industries, Inc. (NYSE-SJI) | 1.05 |
| Southwest Gas Company (NYSE-SWX) | 0.95 |
| Spire (NYSE-SR) | 0.85 |
| Mean | 0.87 |
| Median | 0.85 |

Data Source: *Value Line Investment Survey*, 2021.

**Attachment JRW-8
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-8

Capital Asset Pricing Model
Market Risk Premium

| Category | Study Authors | Publication Date | Time Period Of Study | Methodology | Return Measure | Range Low | Range High | Midpoint of Range | Mean | Median |
|---|---|------------------|------------------------|---|----------------|-----------|------------|-------------------|-------|--------------|
| Historical Risk Premium | | | | | | | | | | |
| | Ibbotson | 2016 | 1928-2015 | Historical Stock Returns - Bond Returns | Arithmetic | | | | 6.00% | |
| | | | | | Geometric | | | | 4.40% | |
| | Damodaran | 2021 | 1928-2020 | Historical Stock Returns - Bond Returns | Arithmetic | | | | 6.44% | |
| | | | | | Geometric | | | | 4.83% | |
| | Dimson, Marsh, Staunton _Credit Suisse Report | 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 | | | | | 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 | 2021 | 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 | 2020 | Projection | Fundamental Economic and Market Factors | | | | | 5.24% | |
| | KPMG | 2021 | Projection | Fundamental Economic and Market Factors | | | | | 6.25% | |
| | Damodaran -3-31 | 2021 | Projection | Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout) | | | | | 4.63% | |
| 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 | | | | | | | | | 4.50% |
| Surveys | | | | | | | | | | |
| | New York Fed | 2015 | Five-Year | Survey of Wall Street Firms | | | | | 5.70% | |
| | Survey of Financial Forecasters | 2020 | 10-Year Projection | About 20 Financial Forecasters | | | | | 3.36% | |
| | Duke - CFO Magazine Survey | 2020 | 10-Year Projection | Approximately 200 CFOs | | | | | 4.05% | |
| | Welch - Academics | 2008 | 30-Year Projection | Random Academics | | 5.00% | 5.74% | 5.37% | 5.37% | |
| | Fernandez - Academics, Analysts, and Companie | 2020 | 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 | | | | | | | | | | 4.86% |
| Median | | | | | | | | | | 4.83% |

Attachment JRW-8

Capital Asset Pricing Model
Market Risk Premium

| Summary of 2010-20 Equity Risk Premium Studies | | | | | | | | | | |
|--|--|------------------|----------------------|---|----------------|-----------|------------|-------------------|-------|---------|
| Category | Study Authors | Publication Date | Time Period Of Study | Methodology | Return Measure | Range Low | Range High | Midpoint of Range | Mean | Average |
| Historical Risk Premium | Ibbotson | 2016 | 1928-2015 | Historical Stock Returns - Bond Returns | Arithmetic | | | | 6.00% | |
| | | | | | Geometric | | | | 4.40% | |
| | Damodaran | 2021 | 1928-2020 | Historical Stock Returns - Bond Returns | Arithmetic | | | | 6.44% | |
| | | | | | Geometric | | | | 4.83% | |
| | Dimson, Marsh, Staunton _Credit Suisse Report | 2019 | 1900-2018 | Historical Stock Returns - Bond Returns | Arithmetic | | | | 5.50% | |
| | | | | | Geometric | | | | | |
| Median | | | | | | | | | | 5.43% |
| Ex Ante Models (Puzzle Research) | Siegel - Rethink ERP | 2011 | Projection | Real Stock Returns and Components | | | | | 5.50% | |
| | Duff & Phelps | 2021 | 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 | 2020 | Projection | Fundamental Economic and Market Factors | | | | | 5.24% | |
| | KPMG | 2021 | Projection | Fundamental Economic and Market Factors | | | | | 6.25% | |
| | Damodaran -3-31 | 2021 | Projection | Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout) | | | | | 4.63% | |
| | Median | | | | | | | | | 5.50% |
| Surveys | New York Fed | 2015 | Five-Year | Survey of Wall Street Firms | | | | | 5.70% | |
| | Survey of Financial Forecasters | 2020 | 10-Year Projection | About 20 Financial Forecasters | | | | | 3.36% | |
| | Duke - CFO Magazine Survey | 2020 | 10-Year Projection | Approximately 200 CFOs | | | | | 4.05% | |
| | Fernandez - Academics, Analysts, and Companies | 2020 | Long-Term | Survey of Academics, Analysts, and Companies | | | | | 5.60% | |
| | Median | | | | | | | | | 4.83% |
| 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 | | | | | | | | | | 4.95% |
| Median | | | | | | | | | | 5.13% |

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

DUFF & PHELPS

December 9, 2020

Table: Equity Risk Premium & Risk-free Rates

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

For additional information, please visit
<https://www.duffandphelps.com/insights/publications/cost-of-capital>

| Date | Risk-free Rate (R_f) | R_f (%) | Duff & Phelps Recommended ERP (%) | What Changed |
|--|---|-------------|-----------------------------------|--------------|
| Current Guidance: | | | | |
| December 9, 2020 – UNTIL FURTHER NOTICE | Normalized 20-year U.S. Treasury yield | 2.50 | 5.50 | ERP |
| June 30, 2020 – December 8, 2020 | Normalized 20-year U.S. Treasury yield | 2.50 | 6.00 | R_f |
| March 25, 2020 – June 29, 2020 | Normalized 20-year U.S. Treasury yield | 3.00 | 6.00 | ERP |
| December 19, 2019 – March 24, 2020 | Normalized 20-year U.S. Treasury yield | 3.00 | 5.00 | ERP |
| September 30, 2019 – December 18, 2019 | Normalized 20-year U.S. Treasury yield | 3.00 | 5.50 | R_f |
| December 31, 2018 – September 29, 2019 | 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.

To learn more about cost of capital issues, and to ensure that you are using the most recent Duff & Phelps Recommended ERP, visit www.duffandphelps.com/insights/publications/cost-of-capital.

This and other related resources can also be found in the online Cost of Capital Navigator platform. To learn more about the Cost of Capital Navigator and other Duff & Phelps valuation and industry data products, visit www.DPCostofCapital.com.

<https://www.duffandphelps.com/insights/publications/cost-of-capital/duff-and-phelps-recommended-us-equity-risk-premium-decreased-december-2020>

EnergyNorth Natural Gas Company Recommended Cost of Capital

| Capital Source | Capitalization Ratios | Cost Rate | Weighted Cost Rate |
|----------------|-----------------------|---------------|--------------------|
| Long-Term Debt | 49.85% | 4.42% | 2.20% |
| Common Equity | <u>50.15%</u> | <u>10.51%</u> | <u>5.27%</u> |
| Total Capital | 100.00% | | 7.47% |

Docket No. DG 20-105
Attachment JRW-9
EnergyNorth Natural Gas Company ROE Results
Page 2 of 4

SUMMARY OF COCHRAN'S ROE ANALYSES RESULTS

| Constant Growth DCF - Earnings Growth | | | |
|--|----------------|----------------|-----------------|
| Mean | Low ROE | Mid ROE | High ROE |
| 30-Day Average | 8.99% | 10.40% | 12.03% |
| 90-Day Average | 8.95% | 10.35% | 11.98% |
| 180-Day Average | 8.70% | 10.10% | 11.74% |
| Average | 8.88% | 10.28% | 11.92% |

| Multi-Stage Growth DCF | | | |
|-------------------------------|----------------|----------------|-----------------|
| Mean | Low ROE | Mid ROE | High ROE |
| 30-Day Average | 8.97% | 9.30% | 9.75% |
| 90-Day Average | 8.91% | 9.23% | 9.68% |
| 180-Day Average | 8.64% | 8.94% | 9.36% |
| Average | 8.84% | 9.16% | 9.59% |

| CAPM | |
|--------------------------------|-------------|
| Current 30-Day Treasury | CAPM |
| 30-Day Average | 11.75% |
| 90-Day Average | 11.74% |
| 180-Day Average | 11.80% |
| Average | 11.76% |

| | |
|----------------------------------|--------------|
| Flotation Cost Adjustment | 0.11% |
|----------------------------------|--------------|

| Zone of Reasonableness | | | |
|-------------------------------|----------------|----------------|-----------------|
| Method | Low ROE | Mid ROE | High ROE |
| Constant Growth DCF | 8.88% | 10.28% | 11.92% |
| Multi-Stage DCF | 8.84% | 9.16% | 9.59% |
| CAPM | 11.76% | 11.76% | 11.76% |
| Mean | 9.83% | 10.40% | 11.09% |
| With Flotation Costs | 9.94% | 10.51% | 11.20% |

Docket No. DG 20-105
Attachment JRW-9
EnergyNorth Natural Gas Company ROE Results
Page 3 of 4

| Company | <i>Value Line</i> | <i>Zacks</i> | <i>Yahoo</i> |
|----------------------|-------------------|--------------|--------------|
| Atmos Energy | 7.00% | 7.20% | 7.15% |
| Chesapeake Utilities | 9.00% | NA | 4.74% |
| NiSource Inc. | 13.50% | 5.30% | 4.89% |
| New Jersey Resources | 2.00% | 6.00% | 6.00% |
| ONE Gas Inc. | 6.50% | 5.50% | 5.00% |
| South Jersey Inds. | 12.50% | 10.20% | 10.20% |
| Spire Inc. | 5.50% | 4.70% | 4.67% |
| Southwest Gas | 8.00% | 6.00% | 8.20% |
| Mean | 8.00% | 6.41% | 6.36% |

NiSource's *Value Line* Projected EPS Growth Rate

| ANNUAL RATES of change (per sh) | Past 10 Yrs. | Past 5 Yrs. | Est'd '17-'19 to '23-'25 |
|------------------------------------|-----------------|----------------|-----------------------------|
| Revenues | -7.0% | -5.5% | 4.0% |
| "Cash Flow" | -2.0% | -5.0% | 8.0% |
| Earnings | -1.0% | -8.0% | 13.5% |
| Dividends | -2.0% | -5.0% | 7.5% |
| Book Value | -3.0% | -7.0% | 5.0% |

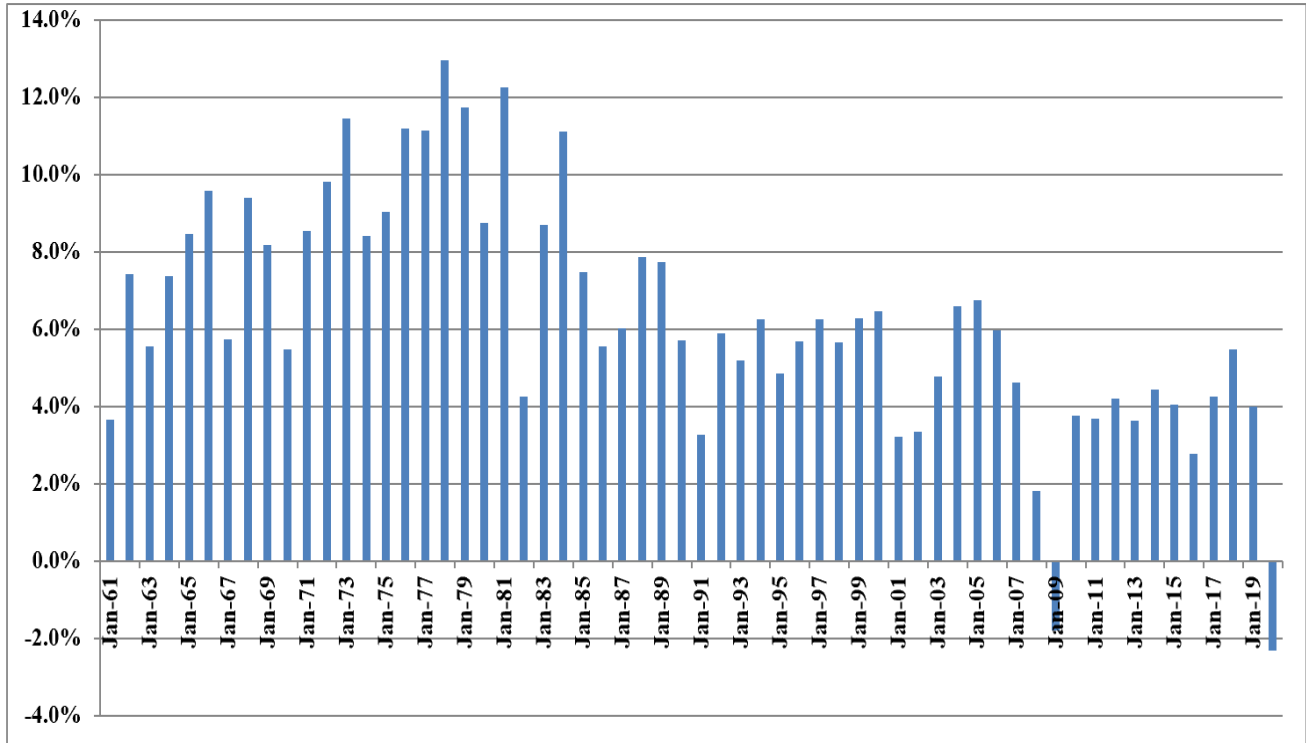
| | | | | | | |
|---|----------------|------|-------|------|------|----------------|
| NiSource | 2017 | 2018 | 2019 | 2020 | 2021 | 2023-25 |
| Earnings Per Share | 0.39 | 1.30 | 1.32 | 1.30 | 1.45 | 2.15 |
| 3 Year Base and Projected Periods | <u>2017-19</u> | | | | | <u>2023-25</u> |
| Base and Projected EPS Figures | 1.00 | | | | | 2.15 |
| Base Period to Projected Period Growth Rate | | | 13.5% | | | |

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

| | | GDP | S&P 500 | S&P 500 EPS | S&P 500 DPS | |
|----|---------------------|-------------|-------------|-------------|-------------|-------------|
| 1 | 1960 | 542.382 | 58.11 | 3.10 | 1.98 | |
| 2 | 1961 | 562.210 | 71.55 | 3.37 | 2.04 | |
| 3 | 1962 | 603.921 | 63.1 | 3.67 | 2.15 | |
| 4 | 1963 | 637.451 | 75.02 | 4.13 | 2.35 | |
| 5 | 1964 | 684.460 | 84.75 | 4.76 | 2.58 | |
| 6 | 1965 | 742.289 | 92.43 | 5.30 | 2.83 | |
| 7 | 1966 | 813.414 | 80.33 | 5.41 | 2.88 | |
| 8 | 1967 | 859.958 | 96.47 | 5.46 | 2.98 | |
| 9 | 1968 | 940.651 | 103.86 | 5.72 | 3.04 | |
| 10 | 1969 | 1017.615 | 92.06 | 6.10 | 3.24 | |
| 11 | 1970 | 1073.303 | 92.15 | 5.51 | 3.19 | |
| 12 | 1971 | 1164.850 | 102.09 | 5.57 | 3.16 | |
| 13 | 1972 | 1279.110 | 118.05 | 6.17 | 3.19 | |
| 14 | 1973 | 1425.376 | 97.55 | 7.96 | 3.61 | |
| 15 | 1974 | 1545.243 | 68.56 | 9.35 | 3.72 | |
| 16 | 1975 | 1684.904 | 90.19 | 7.71 | 3.73 | |
| 17 | 1976 | 1873.412 | 107.46 | 9.75 | 4.22 | |
| 18 | 1977 | 2081.826 | 95.1 | 10.87 | 4.86 | |
| 19 | 1978 | 2351.599 | 96.11 | 11.64 | 5.18 | |
| 20 | 1979 | 2627.334 | 107.94 | 14.55 | 5.97 | |
| 21 | 1980 | 2857.307 | 135.76 | 14.99 | 6.44 | |
| 22 | 1981 | 3207.042 | 122.55 | 15.18 | 6.83 | |
| 23 | 1982 | 3343.789 | 140.64 | 13.82 | 6.93 | |
| 24 | 1983 | 3634.038 | 164.93 | 13.29 | 7.12 | |
| 25 | 1984 | 4037.613 | 167.24 | 16.84 | 7.83 | |
| 26 | 1985 | 4338.979 | 211.28 | 15.68 | 8.20 | |
| 27 | 1986 | 4579.631 | 242.17 | 14.43 | 8.19 | |
| 28 | 1987 | 4855.215 | 247.08 | 16.04 | 9.17 | |
| 29 | 1988 | 5236.438 | 277.72 | 24.12 | 10.22 | |
| 30 | 1989 | 5641.580 | 353.4 | 24.32 | 11.73 | |
| 31 | 1990 | 5963.144 | 330.22 | 22.65 | 12.35 | |
| 32 | 1991 | 6158.129 | 417.09 | 19.30 | 12.97 | |
| 33 | 1992 | 6520.327 | 435.71 | 20.87 | 12.64 | |
| 34 | 1993 | 6858.559 | 466.45 | 26.90 | 12.69 | |
| 35 | 1994 | 7287.236 | 459.27 | 31.75 | 13.36 | |
| 36 | 1995 | 7639.749 | 615.93 | 37.70 | 14.17 | |
| 37 | 1996 | 8073.122 | 740.74 | 40.63 | 14.89 | |
| 38 | 1997 | 8577.552 | 970.43 | 44.09 | 15.52 | |
| 39 | 1998 | 9062.817 | 1229.23 | 44.27 | 16.20 | |
| 40 | 1999 | 9630.663 | 1469.25 | 51.68 | 16.71 | |
| 41 | 2000 | 10252.347 | 1320.28 | 56.13 | 16.27 | |
| 42 | 2001 | 10581.822 | 1148.09 | 38.85 | 15.74 | |
| 43 | 2002 | 10936.418 | 879.82 | 46.04 | 16.08 | |
| 44 | 2003 | 11458.246 | 1111.91 | 54.69 | 17.88 | |
| 45 | 2004 | 12213.730 | 1211.92 | 67.68 | 19.407 | |
| 46 | 2005 | 13036.637 | 1248.29 | 76.45 | 22.38 | |
| 47 | 2006 | 13814.609 | 1418.3 | 87.72 | 25.05 | |
| 48 | 2007 | 14451.860 | 1468.36 | 82.54 | 27.73 | |
| 49 | 2008 | 14712.845 | 903.25 | 65.39 | 28.05 | |
| 50 | 2009 | 14448.932 | 1115.10 | 59.65 | 22.31 | |
| 51 | 2010 | 14992.052 | 1257.64 | 83.66 | 23.12 | |
| 52 | 2011 | 15542.582 | 1257.60 | 97.05 | 26.02 | |
| 53 | 2012 | 16197.007 | 1426.19 | 102.47 | 30.44 | |
| 54 | 2013 | 16784.851 | 1848.36 | 107.45 | 36.28 | |
| 55 | 2014 | 17527.258 | 2058.90 | 113.01 | 39.44 | |
| 56 | 2015 | 18238.301 | 2043.94 | 106.32 | 43.16 | |
| 57 | 2016 | 18745.075 | 2238.83 | 108.86 | 45.03 | |
| 58 | 2017 | 19542.980 | 2673.61 | 124.94 | 49.73 | |
| | 2018 | 20611.861 | 2506.85 | 148.34 | 53.61 | Average |
| | 2019 | 21433.226 | 3230.78 | 162.35 | 58.80 | |
| | 2020 | 20934.850 | 3756.07 | 138.12 | 56.70 | |
| | Growth Rates | 6.28 | 7.20 | 6.53 | 5.75 | 6.44 |

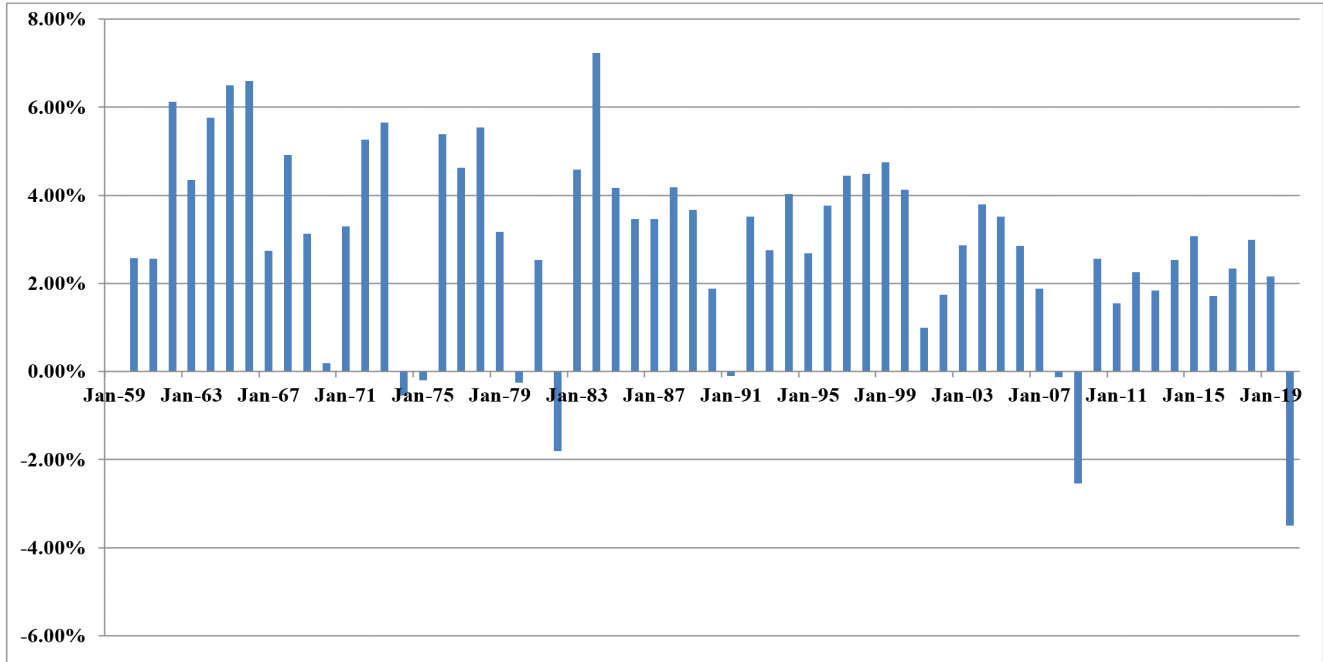
Data Sources: GDPA -<http://research.stlouisfed.org/fred2/series/GDPA/downloaddata>

Nominal GDP Growth Rates
Annual Growth Rates - 1961-2020



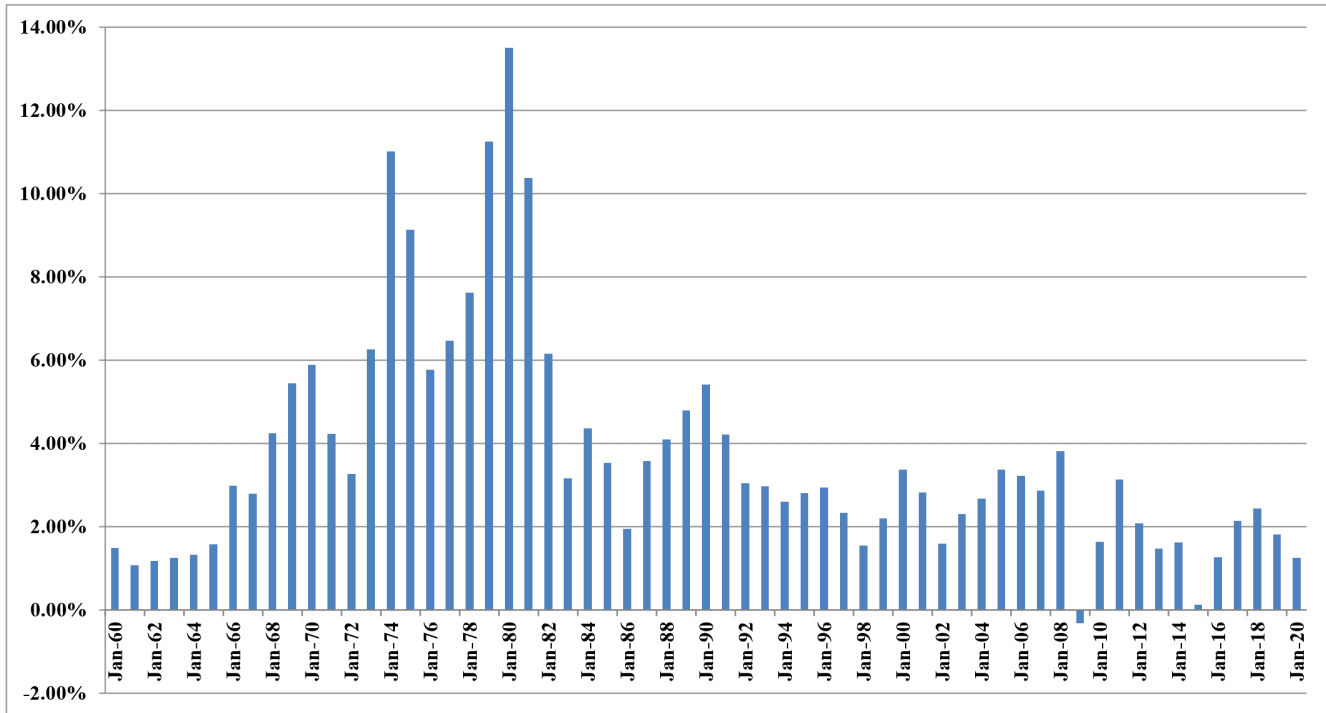
Data Sources: GDPA -<https://fred.stlouisfed.org/series/GDPA>

Annual Real GDP Growth Rates
1961-2020



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

Annual Inflation Rates
1961-2020



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

Panel A
Historic GDP Growth Rates

| | | |
|------------------------|--|--------------|
| 10-Year Average | | 3.40% |
| 20-Year Average | | 3.63% |
| 30-Year Average | | 4.27% |
| 40-Year Average | | 5.10% |
| 50-Year Average | | 6.12% |

Calculated using GDP data on Page 1 of Attachment JRW-10

Panel B
Projected GDP Growth Rates

| | Projected Nominal GDP Time Frame Growth Rate | |
|--|---|-------------|
| Congressional Budget Office | 2019-29 | 3.8% |
| Survey of Financial Forecasters | Ten Year | 4.3% |
| Social Security Administration | 2020-2095 | 4.1% |
| Energy Information Administration | 2019-2050 | 4.2% |

Sources:

Congressional Budget Office, *The 2020 Long-Term Budget Outlook*, June 25, 2020.
U.S. Energy Information Administration, *Annual Energy Outlook 2020*, Table: Macroeconomic Indicators,
Social Security Administration, 2020 Annual Report of the Board of Trustees of the Old-Age,
Survivors, and Disability Insurance (OASDI) Program, Table VI.G4, p. 211(July 15, 2020),
The 4.1% growth rate is the growth in projected GDP from \$22,341 trillion in 2020 to \$450,425 trillion in 2095.
<https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/>

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

