

STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION

In the matter of

Public Service of New Hampshire (Eversource Energy)

Docket No. DE 19-057

Petition for Permanent Rate Increase

DIRECT TESTIMONY

OF

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I. INTRODUCTION

Q. Please state your name, business address and occupation.

A. My name is Pradip K. Chattopadhyay. My business address is 21 South Fruit Street, Suite 18, Concord, New Hampshire. I am employed as the Assistant Consumer Advocate/Rate and Market Policy Director with the New Hampshire Office of Consumer Advocate (OCA).

Q. Please describe your formal education and professional experience.

A. I have a Ph.D. in Economics from the University of Washington, Seattle, which I earned in 1997. I have also taken courses in City and Regional Planning with applications to Energy Planning from Ohio State University, Columbus OH, in 2001-02. I have taught several courses in economics at the University of Washington as an instructor and adjunct faculty at its Business School. I am also associated with the Southern New Hampshire University (SNHU) as an adjunct faculty, where I teach several courses in economics.

From March 1998 to October 1999, I was a consultant with the National Council of Applied Economic Research, New Delhi, India. From November 1999 to August 2001, I was the Economist at the Uttar Pradesh Electricity Regulatory Commission (UPERC) in India, and advised UPERC on tariff issues. From September 2001 to June 2002, I worked at the National Regulatory Research Institute, Columbus, Ohio, as a graduate research associate while pursuing advanced courses in Energy Planning in the City and Regional Planning Program at Ohio State University. From June 2002 to July 2002, I worked at the World Bank, Washington D.C. as a short-term consultant/intern with its Energy and Water Division.

1 I worked at the New Hampshire Public Utilities Commission (Commission) from August
2 2002 to January 2007 in the capacity of a Utility Analyst. My responsibilities at the Commission
3 as an analyst were in electric utility issues including analyzing and advising the Commission on
4 rate design, cost of capital issues, wholesale market issues, and other regional matters. I briefly
5 worked at the Massachusetts Department of Telecommunications and Energy (later reorganized
6 into Department of Public Utilities (MA-DPU)) starting in January 2007 as an Economist. At
7 MA-DPU, I represented the staff and examined gas demand estimation and forecasting,
8 decoupling issues, and environmental remediation matters.

9 I returned to the Commission in June 2007 to join its Telecom Division as its Assistant
10 Director, and continued in that position until December 2010. I was also helping other divisions
11 as an expert witness in economics-related issues as well as advising the Commission on regional
12 electric matters including FERC jurisdictional issues. I joined the Commission's Regional
13 Energy Division in January 2010 as the Regional Energy Analyst, and was advising the
14 Commission in that capacity until I joined the Antitrust and Utilities Division, Office of the
15 Minnesota Attorney General, in August 2013.

16 I came back to New Hampshire in March 2014 and worked as an independent consultant
17 until the end of August, 2014, representing the Minnesota Attorney General. I joined Liberty
18 Utilities at the end of August, 2014 as a Forecasting Analyst for its Energy Procurement
19 Department. I worked with Liberty Utilities for about three months, before starting my own
20 consultancy firm. In December 2014, I joined the OCA as its Rate and Market Policy Director.
21 I was later appointed the Assistant Consumer Advocate at the OCA.

22 **Q. Have you previously provided testimony before this Commission?**

1 A. Yes.

2 **Q. In which dockets did you testify?**

3 A. I provided testimony before the Commission in the following dockets:

- 4 • DE 03-200 – Rate Design Testimony which was about delivery rates for retail
5 ratepayers of Public Service of New Hampshire (PSNH);
- 6 • DE 06-028 – Cost of Capital Testimony which was also about PSNH’s delivery rates;
- 7 • DT 07-027 – Status of competition in retail telephony under TDS;
- 8 • DG 08-009 – Cost of Equity Testimony related to gas delivery rates of National Grid
9 NH;
- 10 • DE 09-035 – Cost of Equity Testimony in the matter of electric distribution rates
11 (PSNH);
- 12 • DG 14-380 – Testimony in Petition of Liberty Utilities (EnergyNorth Natural Gas)
13 requesting approval of firm transportation contract (North East Direct (NED));
- 14 • DG 15-155 – Testimony in Petition of Valley Green, LLC requesting franchise in
15 City of Lebanon and Town of Hanover, New Hampshire;
- 16 • DG 15-289 – Testimony in Petition of Liberty Utilities (EnergyNorth Natural Gas)
17 requesting franchise in City of Lebanon and Town of Hanover, New Hampshire;
- 18 • DG 15-494 – Testimony in Petition of Liberty Utilities (EnergyNorth Natural Gas)
19 requesting approval of firm transportation contract (NED);
- 20 • DE 16-383 – Testimony in Petition of Liberty Utilities (Granite State Electric) for
21 Permanent Rate Increase;
- 22 • DE 16-384 – Testimony in Petition of Unitil for Permanent Rate Increase;

- 1 • DG 16-852 – Testimony in EnergyNorth’s Petition for Lebanon-Hanover Franchise
- 2 Approval;
- 3 • DG 17-048 – Testimony in EnergyNorth’s Gas Distribution Service Rate Case;
- 4 • DG 17-070 – Testimony in Northern Utilities’ Gas Distribution Service Rate Case;
- 5 • DW 18-165 – Abenaki-Rosebrook Rate Case; Oral Testimony on Return on Equity
- 6 • DW 18 –118 – HAWC Rate Case; Oral Testimony on Return on Equity
- 7 • DG 18-140 – Testimony in Liberty Utilities’ Petition for Approval of RNG Supply
- 8 and Transportation Contract.
- 9 • DG 17-198 – Testimony in Liberty Utilities’ Petition for Approval of Natural Gas
- 10 Supply Strategy
- 11 • DG 19-064 – Testimony in Granite State Electric Distribution Rate Case

12 **Q. Have you ever provided testimony and affidavits before other Commissions?**

13 A. Yes. I have testified on cost of capital before the Minnesota Public Utilities Commission
14 in dockets G008/GR-13-316 and GR 13-617. I have also provided an affidavit before the
15 Federal Energy Regulatory Commission in a FERC Docket ER 09-14-000 on NSTAR’s petition
16 for ROE incentive adders on behalf of the New England Conference of Public Utilities
17 Commissioners (NECPUC).

18 **Q. What is the purpose of your testimony?**

19 A. The purpose of my testimony is to recommend, for Public Service of New Hampshire
20 (PSNH), doing business as Eversource Energy, the rate of return on equity in accordance with
21 standards set forth in *Bluefield Water Works v. Public Service Comm’n*, 262 U.S. 679, 692-93
22 (1923) (*Bluefield*), and *Federal Power Comm’n v. Hope Natural Gas Co.*, 320 U.S. 591, 605

(1944) (*Hope*). On advice of counsel, I understand that the standard set forth by the U.S. Supreme Court is that a public utility may be allowed to earn a return comparable to a return on investments in other enterprises having similar risks in order to allow the utility the opportunity to attract capital and to maintain its credit. "The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties." *Bluefield*, 262 U.S. at 693. I also state my views on PSNH's recommendations on cost of equity, and articulate reasons why I agree or disagree with those recommendations.

Q. What Rate of Return on Equity (ROE) and Rate of Return on Capital are the Company requesting in this case?

A. The Company is requesting a return on common equity of 10.40 percent. Based on the actual net cost of debt, and the requested capital structure, the Company is seeking approval of 7.62 percent return on capital.

Q. What do you recommend as the allowed ROE for the company?

A. I am recommending a return of 8.27 percent as a point estimate. Based on my analysis, I am also recommending a range of returns on equity that I consider reasonable for the company, i.e., 8.15 percent to 8.35 percent.

Q. Please discuss how your testimony is organized.

A. As for what follows, Section II briefly reports my analysis of implications of observed market-to-book ratios in the electric utility industry. In Section III, which has three subsections, I use several approaches to derive estimates of the cost of equity and I conclude by stating my

1 recommendation on the cost of equity. Finally, Section IV includes the schedules that inform the
2 OCA's analysis.

3
4 **II. MARKET-TO-BOOK RATIO, EXPECTED RETURN ON EQUITY AND**
5 **REQUIRED RETURN ON EQUITY**

6 **Q. Why is it important to analyze observed market-to-book ratios of the electric utility**
7 **industry and PSNH's proxy group?**

8 A. It is important to investigate market-to-book ratios essentially for three reasons. First, the
9 current level of market-to-book ratio for a regulated company (which, of course, compares the
10 market value of its common stock to the value of its assets as reflected on the company's books)
11 is very telling with respect to the divergence between the expected return on equity and the
12 opportunity cost of equity with respect to the regulated company's common stock. (I explain
13 why this divergence is an important factor in the discussion that immediately follows.) Second,
14 whether or not the market-to-book ratio is significantly higher than one has implications for the
15 application of the Discounted Cash Flow (DCF) approach to estimating the opportunity cost of
16 equity. Finally, one of the DCF approaches that I have relied on uses market-to-book ratios as an
17 input. What follows in this section is predominantly the discussion of the first two reasons
18 mentioned. The need for tracking the market-to-book ratios of the constituent companies in the
19 proxy group is primarily taken up in detail in Section IIIA.

20 **Q. What is the relevance of the market-to-book ratio in the determination of the cost of**
21 **equity?**

1 A. When the market-to-book ratio of a utility is significantly higher than one, it indicates
2 that the return on equity that is *expected* by investors, which is greatly influenced by the allowed
3 rate of return for a regulated entity, exceeds the true opportunity cost of equity. In other words,
4 in the prevailing economic environment, the return that investors *expect* to receive is greater than
5 the return they would *require* in order to invest in the stock.

6 This has another important implication. While the DCF construct is predicated on using
7 long-term expectations, in practice, the DCF method relies on investors' expectations over the
8 medium term. Analysts' projections about investors' sentiments on relevant variables are not
9 available beyond three to five years into the future. The DCF method in practice therefore
10 captures investors' medium-term expectations that the market-to-book ratio would continue to
11 remain substantially higher than one, assuming the ratio is already at that level. I delve into this
12 issue in greater detail (pages 16-18 of my testimony) in my discussion of the characteristics of
13 the DCF approach, especially as it is practically implemented. The methods in the current
14 environment, therefore, will tend to produce estimates for ROE that reasonably exceed the "true"
15 cost of equity.¹

16 **Q. Please explain why the expected return on equity exceeds the cost of equity when the**
17 **market-to-book ratio is significantly greater than one.**

18 A. This fundamental result stems from the seminal Discounted Cash Flow (DCF) analysis,
19 which succinctly translates into the equation

¹ I use the phrase "true cost of equity" interchangeably with "cost of equity." I use both to refer to the opportunity cost associated with purchasing equity, i.e., the minimum return necessary to attract sufficient capital.

1
$$\frac{P}{B} = \frac{r_e - b_e r_e}{K - b_e r_e} \dots\dots\dots \text{Equation (1)}$$

2 where r_e is the expected return on equity, B is the book value of stock, b_e is the expected
 3 retention ratio,² P is the market stock price, and K is the cost of equity, i.e., the required return
 4 on equity.³

5 The DCF approach is based on the premise that the market price of a particular stock
 6 equilibrates to the sum of the stream of returns expected in the future from the stock by investors,
 7 discounted by the market cost of equity. This is an explicit way of modeling investor behavior,
 8 and is a well-accepted way of explaining observed investor behavior. Heuristically speaking, if
 9 the stock price is lower than the market-equilibrium price, the demand for the stock would be
 10 greater than the supply, and stock sellers would raise their price to take advantage of the
 11 situation. Likewise, if the price of the stock was higher than the market-equilibrium price, the
 12 demand would be less than the supply of stocks, putting pressure on the sellers to lower their
 13 price to reduce excess supply. It follows that when the expected return on equity is greater
 14 (smaller) than the cost of equity, the market-to-book ratio would be greater (smaller) than one.

15 **Q. Can you explain Equation (1) in greater detail?**

16 A. Yes. If the expected return on equity exceeds the market cost of equity, the price of the
 17 stock would have to be higher relative to the book value to ensure that the expected dividend, i.e.

² Retention ratio is the percentage of earnings that is retained to grow a business.

³ See Roger Morin's *Regulatory Finance*, Utilities' Cost of Capital, Public Utilities Report, Inc. (1994), page 248. The result holds even if we model new equity financing, as long as the growth in the number of outstanding stocks is reasonably low *ceteris paribus*, which in practice is generally true. Retention ratio is the proportion of earnings that is kept back as retained earnings; i.e., (net income *less* dividends)/net income.

1 $B(r_e - b_e r_e)$, on the stock equals the minimum required dividend, i.e. $P(K - b_e r_e)$. A look at
 2 comparative statics is helpful.⁴ Everything else being equal, if the expected return on equity
 3 increases (decreases), the expected dividend would momentarily be higher (lower) than
 4 $P(K - b_e r_e)$. *Ceteris paribus*, this would trigger a greater (lower) demand for the stock than the
 5 supply, which would consequently lead to a higher (lower) market price for the stock. The
 6 adjustments would continue until Equation (1) holds, i.e. until there is equilibrium.

7 A simple numerical example would be helpful. Suppose the expected return on equity, r ,
 8 is 10 percent, and the expected retention ratio, b , is 30 percent. Based on these numbers,
 9 $r_e - b_e r_e$ is 7 percent.⁵ However, if the cost of equity for the same stock, K , is 8 percent, then
 10 $(K - b_e r_e)$ must be 5 percent.⁶ To ensure that 7 percent of the book value, i.e., the expected
 11 dividend, is exactly equal to 5 percent of the stock price, i.e. the minimum required dividend, the
 12 only way that equation (1) can hold is through an adjustment to the price of the stock until it is
 13 40 percent higher than the book value of the stock, i.e. the market-to-book ratio is exactly equal
 14 to 1.4.

15 **Q. Please explain the difference between the cost of equity and the expected return on**
 16 **equity in greater detail.**

17 A. While the expected rate of return on equity for a regulated utility is an accounting return,
 18 i.e., it depends on the return allowed by the regulator as well as how the utility performs

⁴ Comparative statics is a comparison of two economic outcomes when a pertinent variable is changed from one level to another.

⁵ $(r_e - b_e r_e) = 10 - 0.30 \cdot 10 = 10 - 3 = 7$.

⁶ $(K - b_e r_e) = 8 - 0.30 \cdot 10 = 8 - 3 = 5$.

1 operationally, the cost of equity is the opportunity cost of equity, which is the minimum return
2 required to attract investment by investors.⁷

3 Ideally, a fair and reasonable return on equity for a regulated utility would equal the
4 opportunity cost of equity. A look at a group of regulated utilities of comparable risk is
5 instructive in estimating the opportunity cost of equity. Intrinsic to the determination of the
6 allowed return at any point in time is the need to avoid unnecessary wealth transfer from
7 ratepayers to shareholders, given the prevailing economic environment. To balance the interests
8 of ratepayers and the financial viability of the utility properly, any approach to determine the cost
9 of equity must reasonably target the need to encourage investment in the utility's equity at the
10 least cost to its ratepayers.

11 The expected return on equity for investment in a regulated utility at any point in time is
12 influenced by the return currently allowed on such investment, as authorized by the regulator in
13 the previous determination of such return. It is also influenced by investors' expectations about
14 possible changes in the future, especially with respect to operating efficiency and income
15 opportunities. The expected return on equity for a regulated utility can be greater, lesser or the
16 same as the cost of equity at any point in time.

17 **Q. Have you analyzed the electric utility industry's market-to-book ratios?**

18 A. Yes, I have. In order to recommend the rate of return on PSNH's equity, I have analyzed
19 the market-to-book for the electric utility industry, PSNH's witness Ms. Bulkley's recommended
20 proxy group, and OCA's recommended proxy group. These are depicted in Figure 1 below. As

⁷ "A rate of return may be reasonable at one time and become too high or too low by changes affecting opportunities for investment, the money market and business conditions in general." *Bluefield*, 262 U.S. at 693.

1 for the electric industry's situation, I have used SNL's Index, SNL Electric Company, which
2 includes all publicly traded (NYSE, NYSE MKT, NASDAQ, OTC) Electric Utilities and
3 Transmission companies in SNL's coverage universe.

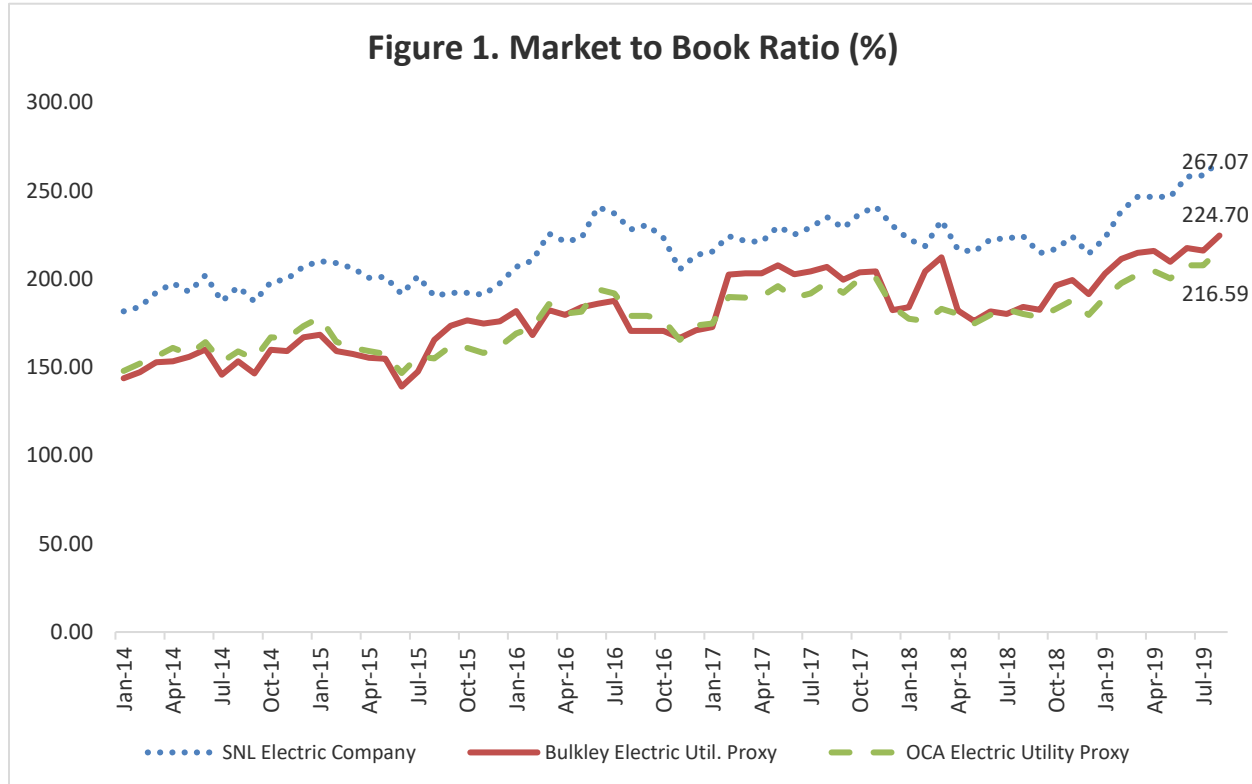
4 **Q. What do the electric utilities' market-to-book ratios indicate about the relationship**
5 **between the investors' expected return on equity and the cost of equity in the current**
6 **environment?**

7 A. Figure 1 shows that the average market-to-book-ratio of SNL electric companies as well
8 Ms. Bulkley's proxy have remained persistently well above one over the past six years; the
9 average market-to-book ratios for SNL electric utilities and Ms. Bulkley's proxy over the last six
10 years have been 2.17 and 1.81, respectively.⁸ As for the OCA's proxy, the average market-to-
11 book ratio for the corresponding period has been 1.78.

12 More importantly, as for the more current market-to-book ratios (August, 2019), they are
13 2.67, 2.25 and 2.17 for SNL electric companies, Ms. Bulkley's proxy and the OCA's proxy,
14 respectively. This indicates that the true cost of equity currently is comfortably less than the
15 return on equity expected by investors in electric utilities. In view of that, it is plain that if the
16 cost of equity is estimated based on existing expected return on common equity, the resulting

⁸ Data downloaded from SNL on October 28th, 2019.

1 return would unreasonably benefit shareholders at the expense of ratepayers.



2

3 **Q. In view of the observed market-to-book ratio being considerably higher than one, do**
 4 **you have any recommendation on your preferred approach on estimating the cost of**
 5 **equity?**

6 A. Yes, I do. I recommend relying predominantly on the DCF approach in determining the
 7 allowed return on equity for PSNH.

8 One of the methods that Ms. Bulkley used to estimate her recommended cost of equity,
 9 the Capital Asset Pricing Model (CAPM), predominantly uses historical stock-price appreciation
 10 as the basis for measuring the expected return on common equity. Even when attempting to look
 11 at forward-looking estimates, the method relies considerably on the historical trends in stock

1 prices. Not trivially, the betas,⁹ under the CAPM approach, are generally based on historical
2 stock prices. In a climate of market-to-book ratios being significantly greater than one, if
3 historically prices have tended to appreciate significantly because allowed returns (that are to
4 begin with higher than the true cost of equity) have moved further away from the true cost of
5 equity, the method will tend to produce estimates that will be further away from the true cost of
6 equity.

7 As for the Risk Premium Method (RPM), Ms. Bulkley uses historically allowed returns
8 on equity to calculate the risk premiums. Using historical data on allowed returns and Treasury
9 yields to inform cost of equity (which is inherently a forward-looking concept) is inappropriate.
10 Even setting that issue aside, to the extent allowed returns have captured the impact of price
11 appreciation resulting from greater divergence between allowed returns and the true cost of
12 equity, the method is susceptible to producing estimates that will have the same problem that the
13 CAPM approach has.

14 In contrast, the forward-looking DCF approach tends to correct somewhat for the
15 deviation between stock prices and book values. While the growth component is influenced
16 positively by price appreciation, the dividend yield component is negatively influenced by price
17 appreciation, thus producing a cost of equity estimate that relative to the other methods is more
18 in line with the true market cost of equity. It is true that investors' medium-term expectation
19 about ongoing sales in shares and the persistence in a greater-than-one market-to-book ratio, and
20 our reliance in practice on expectations of growth over the medium-term, tend to produce a
21 higher DCF estimate of cost of equity than the true cost of equity. However, investors

⁹ Beta is a measure of a stock's volatility relative to the market volatility.

1 understand that a continuing divergence in the stock price and the book value is unsustainable in
2 the long-run. That understanding gets somewhat reflected in the forward-looking DCF method,
3 even as it is usually implemented. In view of that, I recommend reliance on methods that are
4 based on the DCF approach.

5 **Q. Do you have any additional observations on the application of DCF in estimating the**
6 **cost of equity?**

7 A. Yes. Myron J. Gordon, who popularized the use of the DCF method for estimating ROE,
8 states that “the perfect capital markets cost of capital can be measured without bias only in the
9 special and uninteresting case where the allowed rate of return already is equal to the cost of
10 capital. When the allowed rate of return is above (below) the “true” cost of capital, the measured
11 cost of capital is biased up (down).”¹⁰ In the traditional model (wherein debt is valued at embedded
12 cost, not at the market cost of debt), the conclusion that the allowed rate of return is above (below)
13 the cost of capital when the market-to-book value ratio is above (below) one remains true.¹¹ The
14 traditional estimate of the cost of capital is however not too problematic as long as the inputs to
15 that estimation are reflected reasonably accurately. There are compelling reasons to conclude,
16 however, that the company’s implementation of the DCF approach leads to an upward-biased
17 estimate of the cost of equity, precisely due to the reliance on inaccurate inputs.

18 First, the standard DCF model is based on the premise that all key variables like the stock
19 price, book value, earnings, and dividends grow at the same rate in the long-run, and in the absence
20 of external financing, market price converges to the book value. Theoretically, a market-to-book
21 ratio that is significantly greater than one at any point in time implies that investors in general

¹⁰ See “The Cost of Capital to a Public Utility”, Myron J. Gordon, 1974, pages 9-10.

¹¹ *Id.* at 8.

1 expect the price over earnings ratio to decrease in the long-run. This translates into a growth
2 projection for stock price that lags the growth projection for earnings growth. Under the standard
3 DCF construct, since in the long-run both the stock price and earnings are premised to grow at the
4 same rate, the long-term equilibrium growth lies somewhere between the expected earnings growth
5 and the expected growth in price. In the current environment, the exclusive use of earnings growth
6 projections, theoretically, leads to an upward-biased estimate of the DCF growth component, and
7 consequently produces an upward-biased estimate of the opportunity cost of equity.¹²

8 Second, very importantly, analysts' growth estimates have been shown to be overly
9 optimistic and overstate the actual reported earnings. It is instructive to look at "The Cost of Capital
10 - A Practitioner's Guide," by David C. Parcell, prepared for the Society of Utility and Regulatory
11 Financial Analysts (2010 edition), pages 142-43, specifically for the insight that follows:

12 A study by Dreman and Berry concluded that consensus estimates of EPS
13 differ significantly from actual reported earnings. They also concluded that
14 the average error appears to be increasing over time and that analysts are
15 optimistic on average. They conclude "These findings question the use of
16 finely calibrated earnings forecasts that are integral to the most common
17 valuation/models and indirectly question the valuation methods
18 themselves" (Dreman and Berry, 1995, 30). A similar study by Clayman
19 and Schwartz compared Zacks Investment Research EPS projections with

¹² It is instructive to see Roger Morin's *Regulatory Finance*, Utilities' Cost of Capital, Public Utilities Report, Inc. (1994), page 123. Dr. Morin states that the "[a]pplication of the standard DCF model would result in a downward-biased estimate of the cost of equity to a public utility whose current market-to-book ratio is less than 1 and that is expected to converge toward 1 by investors." This is because investors recognize that a continuous divergence away from a market-to-book ratio equal to one is unsustainable. Investors' expectation about increase or decrease in the market-to-book ratio affects the growth component of the DCF model, biasing its result positively or negatively. When the market-to-book ratio is less than one, it is reasonable to assume that the investors expect the ratio to increase. The expected growth increase in market-to-book ratio results in price appreciation that exceeds the growth in earnings and application of the standard DCF approach will lead to a downward-biased estimate of the cost of equity. In contrast, when the market-to-book ratio is significantly greater than one, it is reasonable to assume that the investors expect the ratio to decrease. In that case, the expected decrease in the market-to-book ratio results in price appreciation that lags the growth in earnings and the application of the standard DCF approach will produce an upward-biased estimate of the cost of equity (k).

1 actual EPS for 399 companies for the period 1982-1992. They concluded
2 that analysts' forecasts of EPS overstated actual EPS by as much as fifty
3 percent. They conclude "...market participants should take analysts' innate
4 overestimation biases into account when making stock valuation
5 judgments" (Clayman and Schwartz, 1994, 68). Still another study by
6 Chopra (1998) concluded 'Analysts' forecasts of EPS and growth in EPS
7 tend to be overly optimistic. He concluded that analysts' forecasts of EPS
8 over the past 13 years have been more than twice actual growth rate.¹³
9

10 To prevent reliance on overly optimistic and overstated growth earnings, it is important
11 that at the minimum the DCF growth variable input should not be solely based on earnings
12 growth projections or any other solitary variable's growth projections; I discuss this issue in
13 greater detail in Section IIIA to further support this conclusion.
14

15 **III. ESTIMATING COST OF EQUITY USING SEVERAL APPROACHES**

16 **Q. Which approaches have you used to estimate the cost of equity?**

17 A. While I have relied primarily on the DCF construct to estimate the cost of equity for the
18 utility, I have also estimated the cost of equity using the CAPM construct. As for the DCF
19 construct, I have used the standard DCF approach (Subsection III.A), where the cost of equity is
20 estimated as the sum of the dividend yield and a measure of the growth component. As for the
21 CAPM approach (Subsection III.B), while I have derived an estimate of the cost of equity, for
22 reasons I discuss later, I do not base my point-estimate recommendation much on that method.
23 The CAPM estimation is somewhat useful however as a check on the reasonableness of the DCF
24 estimates. In each of these subsections I comment on Ms. Bulkley's analysis to the extent it is

¹³ Not surprisingly, one research thread on investors' projection of earnings growth has been to explain the "optimistic bias in earnings forecasts by security analysts". The explanations include strategic reporting bias, selection bias, cognitive bias, and bias due to skewed distribution of earnings and analysts' efforts to produce more accurate forecast. See "Earnings skewness and analyst forecast bias", Zhaoyang Gu & Joanna Shuang Wu, Journal of Accounting & Economics 35(2003) 5-29, Page 6.

1 relevant to my recommendation. I should also add that unlike Ms. Bulkley, I did not use the RPM
2 to derive an estimate of the cost of equity. While I have discussed briefly why previously, I
3 discuss the reasons a little bit more in what follows. Finally, I conclude this section with my
4 recommendation on the cost of equity for PSNH.

5 **Q. Apart from your preference for the DCF approach due to market-to-book ratio**
6 **consideration, are there other reasons why you rely primarily on the DCF construct to**
7 **estimate the cost of equity?**

8 A. Of the methods that Ms. Bulkley used to estimate her recommended cost of equity, CAPM
9 and RPM largely use historical data as the basis for measuring the expected return on common
10 equity. Even with attempts at forward-looking estimations, CAPM relies to a great extent on the
11 historical trends in stock prices, for example, to measure the betas required for the CAPM analysis.
12 This may provide insight into what returns investors expect based on past experience, but it has
13 limited value in assessing what returns are necessary to attract needed capital going forward.
14 While the CAPM model relies on betas that are based on historical stock prices, Ms. Bulkley's
15 RPM approach relies on regressing risk premiums on 30-year Treasury yields using historic data
16 for the period 1992 to February, 2019. Of course, Ms. Bulkley also relies on historically allowed
17 returns on equity to calculate historical risk premiums. By contrast, the DCF approach is
18 fundamentally forward looking. Also, the underlying construct behind the DCF analysis, i.e. the
19 current value of a common stock equates to the sum of the discounted stream of future income
20 from that stock, is widely accepted. Further, regarding the techniques that are used to estimate the
21 cost of equity for regulated utilities, the DCF model is the most commonly used model for

1 estimating the cost of common equity for public utilities.¹⁴ In fact, the Commission in New
2 Hampshire has predominantly relied on the DCF construct previously.

3 4 **III.A Discounted Cash Flow Approach**

5 **Q. Which DCF model do you use to estimate the cost of equity?**

6 A. I use a single-stage DCF model to derive estimates for the cost of equity for a group of
7 companies that forms a reasonable proxy for PSNH. The two essential elements of this method
8 are the dividend yield and the growth component. While I discuss the estimation of both elements
9 later in detail, it is important to point out that the growth component of the DCF equation tends to
10 be the most critical element in the use of the DCF methodology. A couple of things render the
11 estimation of the growth component somewhat challenging. First, while the growth component of
12 the single-stage DCF model is in principle meant to be based on long-term projections, in practice,
13 it is based at most on three-to-five-years' projections, since long-term projections are seldom
14 available. Second, "it is reasonable to believe that investors, as a group, do not utilize a single
15 growth estimate when they price a utility's stock."¹⁵ While growth projections by equity analysts
16 are available on variables like earnings, dividends, book value per share, among other things, what
17 weight one should give to different projections is often a matter of contention. Unlike Ms.
18 Bulkley's approach, which relies only on earnings growth to estimate the growth component, I
19 have relied on three estimates for the growth component: (1) the average of the growth rates in

¹⁴ See *"The Cost of Capital - A Practitioner's Guide,"* by David C. Parcell, prepared for the Society of Utility and Regulatory Financial Analysts (2010 edition), Page 124.

¹⁵ *The Cost of Capital - A Practitioner's Guide,* by David C. Parcell, prepared for the Society of Utility and Regulatory Financial Analysts (2010 edition), Page 146.

1 earnings per share (EPS), book value per share (BVPS), and dividends per share (DPS); (2)
2 earnings growth only; and (3) sum of internal growth rate, br , and the external growth component,
3 sv .¹⁶ Of course, I strongly disagree with Ms. Bulkley's sole reliance on earnings growth
4 projections for reasons discussed previously, but also I do not believe that investors rely only on
5 earnings growth rates when they price a utility's stock. I discuss this in greater detail later.

6 **Q. Briefly describe the Single-Stage DCF Method.**

7 A. The single-stage DCF model is typically represented by the equation, $K = \frac{D_1}{P} + g$ where
8 K is the estimate of the cost of equity, $\frac{D_1}{P}$ is the next period's dividend yield, i.e., the next period's
9 dividend divided by the stock price, and g is the expected (constant) growth rate in dividends. The
10 model is based on the premise that since cash dividends are the only income from a share of stock
11 held in perpetuity, the value of that stock is the present value of its stream of cash dividends, where
12 the discount rate is the market's required return, K . Expected future dividends are represented by
13 applying a constant growth rate to the current observable dividend, to obtain the functionally
14 elegant expression for K .

15 **Q. What criteria did you use to select the DCF proxy group?**

16 A. When choosing my recommended sample, I effectively began with Value Line's universe
17 of electric companies (Value Line Electric Universe) that Ms. Bulkley subjected to her proxy
18 screening analysis. I do not find that the fourth, fifth, and the sixth criteria used by Ms. Bulkley
19 are reasonable.¹⁷ Also, for the seventh criterion, while I do not have an issue with screening out

¹⁶ The alternative is based on the formula, $br + sv$, where b is the retention ratio, r is the expected return on equity, s is the expected funds raised from the sale of stock as a fraction of existing equity, and v is $(1-(B/P))$, where B is the book value of the share and P is the price of the share.

¹⁷ See Ms. Bulkley's Testimony, Bates page 0623, lines 12 through 17.

1 companies that are parties to a merger or a transformative transaction, I believe only developments
2 over the last year or so should dictate the screening. To ensure that the companies selected for
3 PSNH's proxy are predominantly regulated electric utilities, I only included them in the proxy if
4 at least 70 percent of the revenues over 2015 are attributable to regulated electric business and at
5 least 80 percent of the assets are attributable to regulated business over 2016-2018.

6 **Q. Why do your criteria differ from that of Ms. Bulkley's criteria?**

7 A. In creating a reasonably "pure play" proxy that is comparable to PSNH it is important that
8 these companies exhibit a fairly high percentage of regulated assets in total assets and have the
9 majority of their revenue coming from electric regulated operations. A sufficiently high cut-off
10 for share of regulated operating income as a percentage of total net operating income may seem
11 like an appropriate screen at first glance, but such a metric is prone to exaggerate the role of
12 regulated operations when the non-regulated segment of a company is reporting significant losses
13 on operating income. For such a company, measuring the regulated share in total operating income
14 would tend to overstate its importance and may incorrectly allow the company's inclusion in the
15 proxy, even as that company may be fundamentally different from a regulated company since it is
16 exposed to significant market risks given a substantial presence in the non-regulated arena or a
17 non-gas activity. In contrast, if the non-regulated segment of the company is reporting significant
18 income, such an analysis may eliminate the company from the proxy, even though that company
19 may otherwise consist predominantly of its regulated business. Such a company's foray into a
20 non-regulated arena may be so insignificant that the company's risk profile actually matches that
21 of a regulated company better than the one included erroneously by relying on an income variable
22 like operating income.

1 As for Ms. Bulkley's criterion to exclude companies that have more than 60 percent of an
2 utility's MWh sales coming from owned generation, the Company has not demonstrated why a
3 regulated utility faces significantly different risk whether it procures its electric sales from own
4 generation or procures electricity from other generating companies. The criterion unnecessarily
5 restricts the size of the proxy group. If Ms. Bulkley had not applied the "own generation"
6 screening, her proxy group would have included eighteen companies as opposed to only eight per
7 her approach. Also, given how she relied on a band that is between the mean ROE and high ROE
8 to inform her recommended ROE for PSNH, I am very concerned that this screening leads to a
9 proxy that is unrepresentative of PSNH's business. To better assess whether a company should be
10 included in a proxy for PSNH, I believe we should strive to have it sufficiently reflective of a "pure
11 play" regulated electric utility. I find that cut-offs of at least 80 percent for regulated assets and at
12 least 70 percent for regulated electric revenues are reasonable, given the dearth of standalone
13 companies that are publicly traded and consist solely of regulated electric business. Also, I have
14 only relied on mergers or transformative transactional developments over the last year in applying
15 Ms. Bulkley's seventh criterion; see Ms. Bulkley's Testimony, Bates page 000623, lines 2-17.

16 **Q. What is your recommended DCF proxy?**

17 A. Using information provided by the Company in response to data requests about Value Line
18 electric companies and additional research of 10-K forms and SNL data, and applying the
19 mentioned cut-offs of 70 percent for electric revenue in total revenue and 80 percent for regulated
20 assets in total assets, I preliminarily determined the list of companies that exceed those cutoffs. I
21 then, based on the latest information, applied Ms. Bulkley's other screening criteria to determine
22 that the appropriate proxy group consists of Alliant Energy Corporation (LNT), Ameren
23 Corporation (AEE), American Electric Power Inc. (AEP), Avista Corporation (AVA),

1 Consolidated Edison (ED), Duke Energy Corporation (DUK), Edison International (EIX), Evergy
2 Inc. (EVRG), Entergy Corporation (ETR), IDACORP, Inc. (IDA), NorthWestern Corporation
3 (NWE), OGE Energy Corporation (OGE), Pinnacle West Capital Corporation (PNW), PNM
4 Resources Inc. (PNM), Portland General Electric Company (POR), PPL Corporation (PPL),
5 Southern Company (SO), and XCEL Energy Inc. (XEL).¹⁸ I have eliminated El Paso Electric
6 Company from the proxy group as it is in the process of being acquired by Infrastructure Investments
7 Fund (IIF). The transaction will require approvals from Public Utilities of Texas, New Mexico
8 Public Regulation Commission and Federal Energy Regulatory Commission. That creates some
9 uncertainty as to whether the transaction will materialize. I would also consider such a transaction
10 transformative enough that it is reasonable to exclude the Company from the proxy group. I have
11 also, in agreement with Ms. Bulkley, eliminated PSNH's parent Eversource from the proxy group
12 to avoid circular logic.

13 **Q. Do you believe that the proxy group listed is a reasonable proxy for PSNH?**

14 A. Yes, I do. The screening criteria go a long way in ensuring that my proxy group
15 reasonably reflects the risk profile of PSNH's electric utility business. For example, the proxy
16 group's average percentage of assets subject to electric utility regulation is 94.9 percent and the
17 average percentage of revenue subject to regulated electric business is 91.1 percent in 2015,
18 which are reasonably close to complete regulation as is the case for the distribution business of
19 PSNH in New Hampshire. Also, a check (see Schedule PKC-1) reveals that the S&P credit-
20 ratings for the group range between BBB to A-. The rating associated with Eversource is A-. As
21 for the capital structure, the company has proposed a common equity ratio of 54.85 percent. A
22 look at the proxy group indicates that over 2016 to 2018 the average equity ratio has been 46.7

¹⁸ The abbreviations represent the ticker symbols.

1 percent. (Schedule PKC-2 for Value Line data). PSNH's parent has a rating that is higher than
2 the average credit rating of the proxy group. Also, the company's proposed capital structure is
3 less leveraged than that of the proxy group's capital structure. It is reasonable to conclude that
4 the proxy group's cost of equity estimate would reasonably inform what the allowed returns on
5 equity and capital should be for the company.

6 **Q. Did you consider any additional check on the reasonableness of your DCF proxy?**

7 A. Yes. As a rough check to examine the reasonableness of the OCA proxy group, I also
8 briefly looked at the economic conditions characterizing New Hampshire (NH) relative to the
9 nation based on state coincident index data provided by the Federal Reserve Bank of Philadelphia
10 . As for August 2019 year-to-year growth in the index, while New Hampshire grew by 3.5 percent,
11 the U.S. economy grew by only 2.85 percent. Also, as for the states served by the companies
12 included in the proxy, the corresponding growth rates varied between -0.3 percent and 4.35
13 percent. Only 5 of the relevant 39 states registered higher growth compared to New Hampshire.¹⁹

14 **Q. What bearing do the economic conditions have on the reasonableness of the DCF**
15 **proxy group?**

16 A. Investors are assumed to be aware of current regional and national economic conditions.
17 Investors in PSNH's distribution business are expected to know that the local economy has been
18 outperforming the national economy as well as states in which the proxy group's businesses
19 operate. An investor's opportunity cost of equity, i.e., investor's required return, is expected to be

¹⁹ "The coincident indexes combine four state-level indicators to summarize current economic conditions in a single statistic. The four state-level variables in each coincident index are nonfarm payroll employment, average hours worked in manufacturing by production workers, the unemployment rate, and wage and salary disbursements deflated by the consumer price index (U.S. city average). The trend for each state's index is set to the trend of its gross domestic product (GDP), so long-term growth in the state's index matches long-term growth in its GDP." See <https://www.philadelphiafed.org/research-and-data/regional-economy/indexes/coincident>.

1 lower for investing in an economic activity in New Hampshire when compared to investing in a
2 comparable activity operating in an environment that is relatively less robust, all else equal. In
3 view of all of these considerations, it is my conclusion that the proxy group as chosen is rather
4 conservative and reasonable.

5 **Q. Please explain why you used pricing data from November 7, 2019 to December 6, 2019**
6 **to measure the dividend yields for the proxy's constituent companies.**

7 A. Investors' expectations about how companies will fare in the future are captured in the
8 most recently observed market price and dividend data. Data from fairly long historical periods
9 are unlikely to reflect investors' current expectations. That said, it is also true that some smoothing
10 of the price trend is useful as it filters possible transitory and temporary changes that characterize
11 daily movements in prices. I have, therefore, as of preparing this testimony, used daily pricing
12 data from the most recent month to calculate the average price (Schedule PKC-3), which in
13 conjunction with the annualized dividend helps measure the dividend yield (Schedule PKC-4)
14 component of the DCF based cost of equity.

15 **Q. Ms. Bulkley exclusively uses expected earnings growth rates for the growth**
16 **component in her single-stage DCF analysis. Do you agree with her approach?**

17 A. No. It is unreasonable to assume that investors use a single growth estimate when pricing
18 a utility's stock. Ms. Bulkley asserts in her testimony that "the use of dividend and book value
19 growth rates ignores the academic research demonstrating that earnings growth rates are most
20 relevant in stock price valuation." In support of this assertion she provides several academic
21 references. It is helpful to go over those references in greater detail.

22 Starting with the article by Carleton and Vander Weide, the fact is that the paper only looks
23 at historical growth rate in dividends (see page 79). As for analysts' growth forecasts, earnings

1 growth is the only variable that the article investigates. The paper does provide evidence that it is
2 better to use growth expectations rather than historical data to measure the growth component. It
3 does not, however, at all investigate whether analysts' earnings growth forecasts are better than
4 their dividends growth forecasts in capturing investors' expectations. It also does not, more
5 importantly, even remotely demonstrate that investors use only earnings and not dividends in
6 forming their investment decisions. The articles by the Advanced Research Center is essentially
7 based on the same approach as that adopted by Carleton and Vander Weide, and exhibits the same
8 deficiencies associated with the article by Carleton and Vander Weide. The articles by Harris and
9 Marston did not even investigate how dividends growth expectations perform. For example, the
10 article by Harris relies solely on EPS growth expectations to measure the growth component of
11 DCF (Page 65) by noting in footnote 6 that "[while] the model calls for expected growth in
12 dividends, no source of data on such projections is readily available." Most importantly again, the
13 articles have nothing to offer on whether investors form their investment decisions based *only* on
14 earnings and *not* dividends. The other citation, an article by Brigham, Shome, and Vinson, also
15 does not delve into the issue of whether investors form their investment decisions based *only* on
16 earnings. All it does is that it provides evidence that *ex ante* growth expectations are superior to
17 *ex post* growth estimates when estimating return on equity for utilities.

18 As for the reference to Dr. Morin's book, it opines that "[s]urveys of analytical techniques
19 actually used by analysts reveal the dominance of earnings and conclude that earnings are
20 considered far more important than dividends," and that "Value Line's principal investment rating
21 assigned to individual stocks, Timelines Rank, is based primarily on earnings, accounting for 65%
22 of the ranking." That assertion, if anything, indicates that investors do not rely *solely* on earnings
23 to reflect future long-term growth. Also, with respect to utilities, Value Line stresses quite often

1 that the investors are attracted towards utility stocks as they are high dividend paying stocks. I
2 discuss below more specifically why dividends matter to investors. I conclude the references in
3 Ms. Bulkley's testimony are not useful if they are meant to show that investors demonstrably form
4 their investment decisions based solely on expectations of growth in earnings, not dividends.

5 **Q. Please discuss the evidence from research and market realities?**

6 A. Both market realities and research indicate that not all investors are alike and they do not
7 only care about earnings growth. While providing a review of dividend policy theories and
8 evidence, Malkawi, Rafferty and Pillai (2010) survey academic research that argues why dividends
9 matter to investors.²⁰ Different researchers have provided empirical support for different theories.
10 To note just a couple of them, some have argued that dividends are sought as investors prefer "bird
11 in the hand" dividends rather than "two in the bush" future capital gains. Others have argued that
12 investors care about after-tax return and the differential tax treatment of capital gains and dividends
13 influences their demand for shares. In informing why dividends matter, some of the theories and
14 empirical analysis directly stress how different investors may view dividends differently. For
15 example, investors whose dividends are taxed higher than their capital gains may prefer earnings
16 driven stocks rather than dividends paying stocks, or how institutional investors as opposed to
17 individual investors are more attracted towards dividend-paying stocks, etc. It also remains true
18 that companies pay out dividends in billions of dollars in the marketplace suggesting that

²⁰ See "Dividend Policy: A Review of Theories and Empirical Evidence", Malkawi, Rafferty, and Pillai, International Bulletin of Business Administration, ISSN: 1451-243X Issue 9 (2010). Even managers need to carefully consider dividends policy because investors not only view dividends as being a return to shareholders but also watch movements in dividends to infer about the health of the firm. See "Topics in Finance Part VII – Dividend Policy" Judy Laux, American Journal of Business Education – November 2011, Volume 4, Number 11.

1 companies recognize that investors value them. I believe it is inappropriate to assume that only
2 earnings growth expectations matter to investors.²¹

3 **Q. What measures of the growth component do you consider?**

4 A. Since the DCF estimate is derived from the concept that cash dividends are the only income
5 from a share of stock held to infinity, in principle, it is the growth in dividends that should be used
6 for the growth component. Investors, however, have different expectations about growth and no
7 single indicator captures the expectations of all investors. Also, whether growth in dividends per
8 share (DPS) is sustainable or not is pertinent and its sustainability is affected by how both earnings
9 per share (EPS) and book value per share (BVPS) perform in the future. Sustainability of growth
10 in dividends under the DCF construct assumes that EPS, DPS and BVPS are all expected to grow
11 at the same rate in the future. Value Line five-year projections for the growth rates in earnings,
12 dividends and book value, however, reveal that these financial variables are expected to grow at
13 significantly different rates over the next three to five years.

14 In view of that, sole reliance on either dividends growth rate, book value growth rate or
15 earnings growth rate is unlikely to produce a reliable measure of the DCF growth component. I
16 instead use the average of the three expected growth rates as one of the measures for the growth
17 component to represent the growth component in the DCF analysis. One may reasonably assume
18 that the sustainable long-run growth rate to which earnings, dividends and book value growth rates
19 may converge in the future is represented by their average, rather than just one of those variables.
20 I have used the average of the Value Line five-year projections for growth in DPS and BVPS and
21 the average of the Value Line, Zacks and SNL median long-term projections for EPS growth rates

²¹ See also *The Cost of Capital - A Practitioner's Guide*, by David C. Parcell, prepared for the Society of Utility and Regulatory Financial Analysts (2010 edition), Page 146

1 to calculate the growth component. While in principle the single-stage DCF model is meant to be
2 based on long-term projections, its application however is based on at most five-year projections,
3 as truly long-term projections are seldom available.

4 I have also considered a second measure of the growth component, which is based on
5 estimates for the internal and external components for growth, retention ratio, expected return on
6 common equity, market-to-book ratio, and growth in the number of outstanding shares (called
7 retention growth). Finally, even though I have reservations about Ms. Bulkley's sole reliance on
8 earnings growth as a measure of the growth component, I considered and applied that approach to
9 my proxy to derive another DCF estimate for the cost of equity (*see* Schedule PKC-5 for the
10 calculation of the growth components; *see also* Schedules PKC-6 and PKC-7 for the inputs for
11 external and internal growth components).

12 **Q. Please explain how you estimate the growth component based on the retention ratio,**
13 **expected return on common equity, market-to-book ratio, and growth in the number of**
14 **outstanding stocks.**

15 A. I have used Value Line's expectation regarding retention ratios and returns on equity for
16 five years into the future to derive estimates for b and r and have used them to calculate the
17 expected internal growth component, br . To account for growth expectations from external
18 financing and derive estimates of the external growth component, I have also used the latest
19 market-to-book ratios from Yahoo Finance and the average of Value Line's five-year projections
20 for the number of outstanding shares. That is helpful in calculating the external growth component,
21 $s_e v$, where s_e = expected funds raised from sale of stock as a fraction of existing equity, and

1 $v = \left(1 - \frac{B}{P}\right)$.²² The revised formulation for the growth component can be alternatively expressed
2 as $b_e r_e + g_e \left(\frac{P}{B} - 1\right)$, where g_e is the expected growth rate in the number of outstanding shares. In
3 short, the growth component can be viewed as the sum of the “internal” growth rate, i.e. $b_e r_e$, and
4 the “external” growth rate, i.e. $g_e \left(\frac{P}{B} - 1\right)$.

5 **Q. Do you employ any outlier-determination approach?**

6 A. Yes.

7 **Q. Please describe your outlier-determination approach.**

8 A. I have employed the statistical outlier-determination approach that cost of equity estimates
9 lying outside the bandwidth of the mean plus or minus two times the variance are not statistically
10 representative of the proxy. In terms of probabilistic distribution terminology, this selection
11 criterion effectively mimics the widely-used statistical confidence interval of 95 percent. I have
12 also eliminated ROE estimates that are less than or equal to the recent yield on Utility A preferred
13 stocks, i.e. 5.99 percent *plus* 50 basis points (see Value Line’s Selection & Opinion, November
14 29, 2019).

15 **Q. Ms. Bulkley uses a screening that eliminates any ROE estimate that is below 7**
16 **percent. Why did you not apply a similar screening?**

17 A. First, I do not believe it is appropriate to solely use a lower-end ad hoc cut-off, as a proper
18 statistical outlier determination would recognize outliers not only at the lower-end, but also at the
19 higher-end. The OCA’s statistical selection-criterion, as mentioned previously, appropriately
20 applies a screening that eliminates outliers at both ends. Second, the OCA has applied an

²² See “*The Cost of Capital to a Public Utility*,” Myron Gordon, MSU Public Utilities Studies (1974), Page 30.

1 additional lower-end cut-off that conservatively recognizes that ROEs on common stocks are
2 expected to sufficiently exceed the yields on preferred stocks. The use of the recent yield on
3 Utility A preferred stocks *plus* 50 basis points as a lower-end feasible estimate on ROE is to capture
4 that spirit. The OCA does not agree that it is appropriate to rely on an ad hoc lower-end cut-off
5 that is not informed by market fundamentals. The OCA's approach, unlike the one used by Ms.
6 Bulkley, is better informed by current market realities.

7 **Q. What are the DCF estimates for your proxy?**

8 A. The single-stage DCF estimate, based on the average expected growth rates in earnings,
9 dividends and book value, is 8.09 percent. Schedule PKC-8 provides the calculations. When only
10 the EPS growth rate is used for the growth component, the single-stage DCF method produces an
11 estimate of 8.48 percent. When the "internal-plus-external" growth approach is used, the DCF
12 method produces an estimate of 8.24 percent. I have applied my recommended outlier-
13 determination criteria in deriving these estimates.

14 **Q. While Ms. Bulkley provides DCF estimates using the projected DCF approach, you**
15 **have not done so. Why?**

16 A. The DCF approach informing the ROE is based on the premise that a currently observed
17 market-determined stock price equates the sum of the discounted stream of future income from
18 that stock. Also, as for the dividend yield, the DCF approach relies on the projected dividend yield
19 emanating strictly from just the next year. To rely on pricing projections as to what some
20 investment analyst expects them to be in the future and applying a dividend yield projected well
21 beyond a year is inconsistent with the essence of DCF theory that builds upon the notion of
22 observed market-equilibrium price. Needless to say, I have not employed this approach, and would
23 strongly recommend that the Commission reject such an application.

1 **Q. Ms. Bulkley recommends an implicit adjustment for flotation costs in her estimates**
2 **of the cost of equity. Do you agree with that adjustment?**

3 A. No. As I have noted already, the DCF approach, informed by equity analysts' projections,
4 in practice relies on investors' expectations about earnings and dividends and other relevant
5 variables over three to five years. Even with reasonable treatment of the DCF growth component,
6 the approach tends to internalize the medium term expectation that the market-to-book ratio will
7 persist at levels relatively close to what is currently being observed. Given the reliance at best on
8 medium term expectations, we tend to derive estimates of the ROE that are sufficiently above the
9 true cost of equity in a setting where the stock prices are significantly above the book value.
10 Flotation cost is effectively small enough that my recommended return on equity, that relies on
11 investors' expectations of persistence in the market-to-book ratio being significantly greater than
12 one, already accounts for such costs adequately. Any further adjustment would simply
13 unnecessarily transfer wealth from ratepayers to shareholders.

14
15 **III.B Capital Asset Pricing Model (CAPM)**

16 **Q. Briefly describe the CAPM method.**

17 A. The CAPM method recognizes that common equity capital is more risky than debt from an
18 investor's standpoint, and that investors require higher returns on stocks than on bonds to be
19 compensated for the additional risk. The cost of common equity under CAPM is represented by
20 the following equation: $K = R_f + \beta_s * (R_M - R_f)$ where K is the cost of equity, R_f is the yield on
21 risk free securities, R_M is the expected return on the overall market and $(R_M - R_f)$ is the equity risk
22 premium demanded by shareholders to accept equity relative to debt. β_s is the average beta of a

group of comparable-risk companies that is used to adjust the risk premium to measure risks specific to the regulated utility in question.

Q. What is Ms. Bulkley's estimate of the cost of equity based on the CAPM method?

A. Essentially, Ms. Bulkley derives two CAPM estimates of ROE using information from SP 500 stocks by applying the DCF construct to those to estimate the expected return on equity and the yield on 30-year Treasury Bond. Her CAPM-based ROE estimate is 10.31 percent when she uses Bloomberg beta. When she uses Value Line beta, her estimate is 9.56 percent.

Q. Do you agree with Ms. Bulkley's CAPM approach? Please explain.

A. No. I do not agree with her approach to measure market risk premium. The disagreement is both with respect to how she measures risk-free return and how she calculates market returns. I discuss these considerations below.

Q. Why do you disagree with Ms. Bulkley's specification of the risk-free rate?

A. I do not agree that the yield on 30-year Treasury bond is a reasonable proxy for the risk-free rate. Strictly speaking, the risk-free return is best captured by short-term Treasury bills, but in recognition that utility rates are usually set for longer periods and interested investors typically have relative long investment time horizons, longer-term bonds are used to capture the risk-free rate when applying CAPM to estimate the cost of equity.

It should be understood that long-term bonds are not risk-free for two main reasons: default (credit) risk and interest rate risk. As for the interest rate risk, the longer termed a default-free bond is, the greater is its interest rate risk. The 10-year Treasury long-term bond is my preferred metric for the risk-free rate when conducting CAPM analysis for regulated companies. It strikes a reasonable balance between choosing a truly interest rate risk-free instrument (like the shortest of

1 short term Treasury bills) and a consideration that investors have relatively long investment
2 horizons and that regulated utility rates are usually set for longer terms than just a few months.²³

3 Also, as for relying on projected Treasury bond yields to measure the risk-free rate, since
4 the observed market-based yield at any point in time is inherently based on future expectations of
5 market participants about the economy, I do not find it appropriate to use any information about
6 what analysts think the yields are going to be in the future either near-term or long-term. Yields
7 observable at any point in time in the market place is akin to price being observable in a
8 competitive market at any point in time. In a competitive environment, the observed market-
9 equilibrium bond yield, which represents the interplay of demand and supply realities, contains all
10 the information about what economic agents expect will happen in the future. Such a yield
11 therefore is the best indicator for a forward looking measure like the “risk-free” return.

12 **Q. You stated that you do not agree with Ms. Bulkley’s approach to calculate market**
13 **returns. Please explain why.**

14 A. My reservation about Ms. Bulkley’s approach stems from three reasons that are related to
15 how he employs the DCF approach in estimating the market returns.

16 First, I disagree with the sole reliance on earnings growth projections to estimate the DCF
17 growth components, as was discussed before in the section on DCF estimation of the proxy’s cost
18 of equity.

19 Second, I do not agree that information from stocks that have zero dividend yields should
20 be relied upon significantly to estimate the DCF based market returns. The DCF construct is
21 intrinsically based on modeling net present value of dividend yields that investors receive. Such
22 a construct ideally should not be applied on stocks that do not provide any dividends.

²³ For a good discussion on the determination of risk-free rate, see “*What is the Risk Free Rate? A Search for the Basic Building Block*,” Aswath Damodaran, Stern School of Business, New York University, December 2008.

1 Third, it should be recognized that the market portfolio as used by Bloomberg and Value
2 Line are very different and the betas associated with one source should not be used to derive CAPM
3 cost of equity estimates that relies on market data from the other. While Value Line betas are
4 based on a market return assumed to be that of the NYSE Composite Index, the Bloomberg betas
5 are based on the S&P 500 Index. The OCA has therefore only estimated market returns that relies
6 entirely only on Value Line data and uses only Value Line betas to derive cost of equity estimates.
7 We do recognize that such an exercise would also be appropriate if we relied entirely only on
8 Bloomberg data for both market returns and betas. The OCA however does not have access to
9 Bloomberg and did not get necessary data from the data requests propounded on the Company, to
10 fully conduct its own analysis. I have therefore relied only on Value Line data to estimate market
11 returns.²⁴

12 All of the noted considerations inform the OCA's CAPM estimation as discussed below. I
13 go through the CAPM inputs one-by-one.

14 **Q. What beta measures do you use for your sample?**

15 A. I use Value Line beta estimates for the companies in my DCF proxy group (*see* Schedule
16 PKC-9) to derive the average beta for those companies. The proxy beta is 0.58.

17 **Q. How do you calculate the equity risk premium?**

18 A. Two key elements in the determination of the equity risk premium are the risk-free rate and
19 the expected return on the market portfolio. As a proxy for the risk-free rate, as already discussed
20 earlier, the OCA relies on the average of the current yields on the 10-Year Treasury bond observed

²⁴ I did however calculate, based on the Company's response to data request OCA TS2-003, an estimate for return on equity using data *solely* on dividend-paying stocks per the Company's approach. That ROE estimate is 8.20 percent.

over the last month. The average yield over November 7, 2019 to December 6, 2019 has been 1.82 percent.

As for the expected market returns, I applied the DCF construct to the S&P 500 companies essentially using the same approach that Ms. Bulkley followed, but for the DCF growth components, I use not only earnings growth projections, but also latest Value Line dividends and book value growth projections to derive three capitalization-weighted estimates of the expected market return.

Q. How did you derive the three market return estimates?

A. First, using data for only dividend paying stocks from the S&P 500 universe, I derive an estimate of market return that relies on only earnings growth projections. Again using data from only dividend paying stocks, I derive the second estimate of market return relying on the average of the earnings, dividends, and book value growth projections. Finally, using data for all stocks in the S&P 500 universe, I derive the third market return estimate relying on only earnings growth projections (Schedule PKC-10). The calculations are reported in Table 1 below.

Table 1: CAPM Cost-of-Equity Estimates			
	CAPM1	CAPM2	CAPM3
	Dividend Paying S&P 500		All S&P 500
	<i>EPS growth projection</i>	<i>Average EPS, DPS & BVPS growth projections</i>	<i>EPS growth projection</i>
DCF Market Return (a)	12.85	12.01	14.39
Risk Free Return (b)	1.82	1.82	1.82
Market Beta (c)	1.001	1.004	1.020
Risk Premium (a)-(b)	11.03	10.19	12.57
Beta adjusted RP (d) = ((a)-(b))/(c)	11.02	10.15	12.32
Proxy group beta (e)	0.58	0.58	0.58
CAPM ROE estimate (b)+(e)* (d)	8.25	7.74	9.00

1 As for the sample of companies, while the starting group of companies is same as the S&P
2 500 companies analyzed by Ms. Bulkley, to ensure that we are consistently looking at the same
3 companies as a group in deriving the market returns for each of the samples informing the three
4 estimates, I have only considered companies for which information is available for all of the input
5 variables.

6 For the first estimate that relies on information from only dividend-paying stocks, a
7 company is dropped if Value Line does not have data on earnings growth projections, market
8 capitalization or betas. For the second estimate, a company is dropped if Value Line does not have
9 its data for any one of the growth projections (earnings per share, dividends per share or book
10 value per share), market capitalization or betas. For the third estimate, that uses information from
11 all stocks (irrespective of whether those stocks pay dividends) I ignore the companies for which I
12 did not have data for market capitalization, earnings growth projections, or betas (as downloaded
13 from Value Line).

14 **Q. Please summarize the market return estimates.**

15 A. Schedule PKC-11a and PKC-11b report the OCA analyses that rely on Value Line data
16 latest as of November 21, 2019. The resulting expected market returns for the apposite Value
17 Line samples are 12.85 percent, 12.01 percent and 14.39 percent; see Table 1. For these estimates,
18 I appropriately adjusted the market capitalization weights to ensure that the weights added up to
19 one for the different samples associated with the estimations. Also, in deriving the projected
20 dividend yields, I applied the same approach that Ms. Bulkley used in her testimony.

21 **Q. Please describe how you estimate the market risk premiums.**

22 A. To derive the market risk premium, the difference between the relevant market return and
23 the bond yield is *divided* by the market-capitalization weighted mean of Value Line betas of the

1 constituent stocks. Doing so is appropriate, as the market proxy in the derivation of the Value
2 Line betas (that would be associated with a beta of one) is expected to be different from that
3 associated with the S&P 500 universe. The betas associated with the proxy groups associated with
4 estimates CAPM1, CAPM2, and CAPM3 are 1.001, 1.004 and 1.02, respectively.

5 **Q. What are your estimates for market-risk premium?**

6 A. When only the dividend-paying subset of stocks in the S&P 500 index is considered, and
7 only EPS growth projections are relied upon to measure the market returns, the estimate of equity
8 risk premium is (12.85 percent *less* 1.82 percent) divided by 1.001, which is the market-
9 capitalization weighted mean Value Line beta for the dividend-paying subset of the sample. The
10 estimate is 11.02 percent.

11 The same approach was employed to derive the second estimate of the market risk premium
12 relying on the average of EPS, DPS, and BVPS growth projections and information from only
13 dividend-paying S&P 500 stocks. The estimate is 10.15 percent.

14 Finally, using all stocks in the S&P 500 index, when only EPS growth projections are relied upon
15 to measure the DCF based market returns, the estimate for equity risk premium, is 12.32 percent.²⁵

16 **Q. What are the estimates of the cost of equity for the PSNH proxy group based on the three**
17 **estimated market risk premiums?**

18 A. The last row of Table 1 reports the three estimates. CAPM1, CAPM2 and CAPM3 ROE
19 estimates are 8.25 percent, 7.74 percent and 9.00 percent, respectively.

20
21 **III.C Conclusion**

22 **Q. Please summarize your cost of equity estimates.**

²⁵ All numbers reported here are rounded.

- 1 A. The table below reports the cost of equity estimates based on the different methodologies
2 that the OCA relied on.

Table 2: Summary of Cost of Equity Estimates	
DCF (traditional: EPS, BVPS & DPS average)	8.09
DCF (traditional: EPS)	8.48
DCF ($g=br+sv$ Method)	8.24
CAPM1	8.25
CAPM2	7.74
CAPM3	9.00

- 3
4 **Q. What is your recommendation on the allowed rate of return on equity?**

- 5 A. Table 2 summarizes estimates of cost of equity that the OCA's analysis produced. The
6 estimates range from 7.74 percent to 9.00 percent. The OCA recommends using solely the DCF
7 approach in estimating the cost of equity, for reasons that were discussed in Sections II and IIIA.
8 As stated earlier, the CAPM based cost of equity was estimated mainly as a check. The average
9 of all of the DCF estimates is 8.27 percent. As for a specific point estimate, the OCA therefore
10 recommends an allowed return of 8.27 percent. With respect to what constitutes a reasonable
11 range of allowed return on equity, the OCA recommends 8.15 to 8.35 percent.

- 12 **Q. Does this conclude your testimony?**

- 13 A. Yes, it does.

IV. Schedules

Schedule PKC-1

Credit Ratings

Company	Ticker Symbol	Moody's	Credit Watch Outlook	S&P	Credit Watch Outlook
Alliant	LNT	Baa1	Negative	A-	Negative
Ameren Corporation	AEE	Baa1	Stable	BBB+	Stable
AEP Company	AEP	Baa1	Stable	A-	Stable
Avista	AVA	Baa2	Stable	BBB	Stable
Consolidated Edison	ED	Baa1	Stable	A-	Stable
Duke Energy Corporation	DUK	Baa1	Stable	A-	Stable
Edison International	EIX	Baa3	Stable	BBB	Stable
Evergy Inc.	EVRG	Baa2	Stable	A-	Stable
Entergy Corporation	ETR	Baa2	Stable	BBB+	Stable
First Energy Corporation	FE	Baa3	Stable	BBB	Stable
IDACORP, Inc.	IDA	Baa1	Stable	BBB	Stable
NorthWestern Corporation	NWE	Baa2	Stable	BBB	Stable
OGE Energy Corporation	OGE	(P)Baa1	Stable	BBB+	Stable
Pinnacle West Capital Corporation	PNW	A3	Stable	A-	Stable
PNM Resources, Inc.	PNM	Baa3	Stable	BBB+	Negative
Portland General Electric Company	POR	A3	Stable	BBB+	Positive
PPL Corporation	PPL	Baa2	Stable	A-	Stable
Southern Company	SO	Baa3	Stable	A-	Negative
Xcel Energy Inc.	XEL	Baa1	Stable	A-	Stable

Ratings downloaded from SNL data on August 2, 2019.

Schedule PKC-2

Common Equity Ratios

Company	2016	2017	2018	Average (2016-18)	2019	2020	2022-24	Average (2016-21)
Alliant	47.2	48.6	46.7	47.5	48	48	48	48
Ameren Corporation	51.3	49.8	48.8	49.96667	48.5	49	50	49.5
AEP Company	50	51.5	53.2	51.56667	56	55	53.5	54.3
Avista	48.8	52.8	49.5	50.36667	50	49.5	50	49.9
Consolidated Edison	49.2	51.1	48.9	49.73333	48.5	49	49	48.9
Duke Energy Corporation	47.4	46	46.2	46.53333	44.5	43.5	43.5	43.7
Edison International	49.2	45.8	38.3	44.43333	39.5	40.5	42.5	41.5
Eversource Energy			60	60	50	48.5	47.5	48.2
Entergy Corporation	35.5	35.5	35.9	35.63333	37.5	38	40.5	39.4
First Energy Corporation	25.5	15.7	27.4	22.86667	27.5	28	32	30.3
IDACORP, Inc.	55.2	56.3	56.4	55.96667	58.5	57	57	57.3
NorthWestern Corporation	48	49.8	47.8	48.53333	48.5	49.5	52	50.8
OGE Energy Corporation	58.9	58.3	58	58.4	56.5	55.5	54	54.8
Pinnacle West Capital Corporation	54.4	51.1	53	52.83333	53	54	57	55.6
PNM Resources, Inc.	44	43.6	38.6	42.06667	38	43.5	40.5	40.6
Portland General Electric Company	51.6	49.9	53.5	51.66667	50.5	53	51.5	51.6
PPL Corporation	35.7	35.2	36.7	35.86667	41	42	45.5	43.9
Southern Company	35.7	35	37.6	36.1	39.5	39.5	41.5	40.7
Xcel Energy Inc.	43.7	44.1	43.6	43.8	42.5	42	42	42.1
<i>Source: Value Line One-pagers (latest as of Aug. 5, 2019)</i>		Average	46.32	46.52				46.90

Schedule PKC-3

STOCK PRICES																					
Date	LNT	AEE	AEP	AVA	ED	DUK	EIX	EVRG	ETR	FE	IDA	NWE	OGE	PNW	PNM	POR	PPL	SO	XEL		
11/7/2019	51.5	74.63	89.34	46.31472	86.48237	91.59177	65.69	62.32112	114.73	46.72	103.22	69.59	42.95	87.82	48.11	54.85	32.85094	60.1067	60.33		
11/8/2019	51.68	73.81	89.07	46.37423	87.17645	88.98984	66.3	62.55921	114.9	46.59	102.85	68.97	42.83	86.39	47.85	54.74	33.3153	60.65123	60.08		
11/11/2019	51.6	74.09	88.77	45.85852	86.76	86.66493	66.31	62.1227	114.09	46.03	102.07	68.11	42.68	85.13	47.44	54.37	33.22638	59.86908	60.07		
11/12/2019	51.68	74.2	88.5	45.9081	86.42	86.65503	66.84	62.56913	114.86	46.3	102.33	68.23	42.91	85.61	47.88	54.67	33.32518	60.0869	60.17		
11/13/2019	52.63	75.58	89.86	46.63208	87.5	87.585	68.11	63.39254	117.52	46.92	104.28	69.16	43.48	85.94	48.53	55.53	33.40422	61.29477	61.64		
11/14/2019	53.06	76.53	89.6	46.62216	87.24	88.25	69.68	64.0969	116.89	46.74	104.29	69.35	43.55	86.99	48.9	55.77	33.2165	61.77	61.3		
11/15/2019	52.88	76.62	89.56	46.57258	87.73	88.58	70.1	64.23579	116.71	47.04	104.34	69.35	43.37	87.61	48.41	55.49	33.50302	62.2	60.87		
11/18/2019	52.85	75.73	90.15	46.642	87.47	88.65	69.5	64.49373	116.89	46.77	103.38	69.3	43.06	86.8	48.45	55.27	33.24614	62.48	60.88		
11/19/2019	52.58	75.45	90.67	46.642	86.88	87.03	68.86	64.25563	116.19	46.43	103.75	69.35	42.74	86.75	48.43	55.16	33.1671	62.21	61.32		
11/20/2019	53.14	75.47	91.46	46.92	87.31	87.13	70.92	64.46397	117.06	46.87	105.74	69.93	42.66	87.28	48.84	55.71	33.37458	62.78	61.69		
11/21/2019	53.38	75.19	91.07	46.65	86.82	86.66	71.01	64.21595	115.9	46.64	104.57	70.86	42.22	87.27	48.93	55.53	33.2659	62.68	61.7		
11/22/2019	53.39	74.95	91.54	46.41	86.19	87.14	71.25	63.92825	115.72	47.34	105.65	71.15	41.99	87.2	48.45	55.48	33.4141	62.89	61.26		
11/25/2019	52.75	74.17	90.89	46.8	86.04	87.6	70.28	63.085	115.38	47.72	104.65	71.6	42	86.6	48.35	55.31	33.45362	62.18	60.8		
11/26/2019	52.97	74.13	91.5	46.91	86.44	88.2	69	63.5	116.47	47.77	105.25	71.75	42.11	87.5	48.19	55.63	33.69074	62.25	61.18		
11/27/2019	53.05	74.18	91.59	47.27	86.73	88.56	69.83	63.29	116.92	47.79	106.16	71.82	42.2	87.39	48.61	55.64	33.88834	62.31	61.56		
11/29/2019	53	74.33	91.35	47.28	86.89	88.17	69.1	63.27	116.39	47.69	105.05	71.57	42.06	87.39	48.45	55.51	33.62158	61.99	61.49		
12/2/2019	52.43	73.68	90.28	46.73	85.55	87.29	71.56	62.38	115.98	47.52	103.94	71.02	41.96	85.75	48	55.03	33.77966	61.6	61.2		
12/3/2019	52.7	73.81	90.88	46.83	86.29	87.86	71.74	62.56	116.92	47.74	104.1	70.92	42.11	86.08	48.63	55.04	33.77966	62.37	61.46		
12/4/2019	53.17	74.36	92.03	47.23	86.78	88.95	71	63.26	118.11	48.19	104.48	71.68	42.6	86.94	49.2	55.35	34.14522	62.69	62.01		
12/5/2019	53.17	75.09	92.46	47.24	86.69	89.29	71.34	63.53	118.42	48.41	104.7	71.93	42.76	86.59	48.83	55.49	33.9081	62.76	62.14		
12/6/2019	53.11	75.19	92.39	47.34	86.79	89.76	71.37	63.07	118.09	48.38	104.61	71.7	43.01	86.2	48.78	55.33	33.9575	62.14	62		
Average		52.70	74.82	90.62	46.72	86.77	88.12	69.51	63.36	116.39	47.22	104.26	70.35	42.63	86.73	48.44	55.28	33.50	61.87	61.20	

Source: Yahoo Finance. Downloads on Dec. 9, 2019

Schedule PKC-4

Dividend Yield Estimate for the Next Period			
Company	Average Stock Price	2020 Dividend	Div. Yield(1)
Alliant Energy Corporation	52.70	1.5	2.85%
Ameren Corporation	74.82	2.06	2.75%
AEP Company	90.62	2.88	3.18%
Avista	46.72	1.61	3.45%
Consolidated Edison	86.77	3.06	3.53%
Duke Energy Corporation	88.12	3.82	4.33%
Edison International	69.51	2.49	3.58%
Evergy, Inc.	63.36	2.08	3.28%
Entergy Corporation	116.39	3.74	3.21%
First Energy Corporation	47.22	1.6	3.39%
IDACORP, Inc.	104.26	2.73	2.62%
NorthWestern Corporation	70.35	2.4	3.41%
OGE Energy Corporation	42.63	1.62	3.80%
Pinnacle West Capital Corporation	86.73	3.22	3.71%
PNM Resources, Inc.	48.44	1.24	2.56%
Portland General Electric Company	55.28	1.62	2.93%
PPL Corporation	33.50	1.66	4.95%
Southern Company	61.87	2.54	4.11%
Xcel Energy Inc.	61.20	1.72	2.81%
Average			3.39%

DY data from Value Line (latest one-pagers as of Nov. 14, 2019)

Schedule PKC-5

Growth Components											
Company		Value Line 5-yearly projections			Zacks EPS	SNL Median	Average EPS	Average of Average EPS, DPS and BPS	Internal growth	External Growth	Internal plus External growth
		EPS growth rate	DPS growth rate	BPS growth rate							
Alliant Energy Corporation	LNT	6.5	5.50	7.50	5.50	6.00	6.00	6.33%	3.82%	1.70%	5.52%
Ameren Corporation	AEE	6.5	6.00	5.00	6.20	4.83	5.84	5.61%	4.18%	0.77%	4.95%
AEP Company	AEP	4	5.50	4.00	5.60	5.97	5.19	4.90%	3.43%	1.91%	5.34%
Avista	AVA	3.5	4.00	3.50	3.40	3.51	3.47	3.66%	2.15%	0.96%	3.10%
Consolidated Edison	ED	3	3.50	3.50	2.00	3.00	2.67	3.22%	2.65%	0.18%	2.82%
Duke Energy Corporation	DUK	6	2.50	2.50	4.80	5.00	5.27	3.42%	2.41%	0.33%	2.74%
Edison International	EIX		3.50	5.50	5.30	5.81	5.56	4.85%	5.78%	1.25%	7.03%
Evergy, Inc.	EVRG				6.40	6.36	6.38	6.38%	2.57%	0.00%	2.57%
Entergy Corporation	ETR	0.5	4.00	4.00	7.00	2.17	3.22	3.74%	3.27%	2.20%	5.47%
First Energy Corporation	FE	6.5	3.50	7.00	6.00	6.00	6.17	5.56%	5.98%	1.10%	7.09%
IDACORP, Inc.	IDA	3.5	7.00	4.00	3.80	3.50	3.60	4.87%	3.50%	0.00%	3.50%
NorthWestern Corporation	NWE	3	4.50	3.50	2.70	3.75	3.15	3.72%	2.94%	0.24%	3.18%
OGE Energy Corporation	OGE	6.5	7.00	3.50	4.50	5.26	5.42	5.31%	3.40%	0.00%	3.40%
Pinnacle West Capital Corporation	PNW	5	6.00	3.50	4.90	5.00	4.97	4.82%	3.58%	0.33%	3.91%
PNM Resources, Inc.	PNM	7	7.00	4.00	5.60	6.00	6.20	5.73%	3.97%	2.14%	6.11%
Portland General Electric Company	POR	4.5	6.50	3.00	4.50	4.60	4.53	4.68%	3.14%	0.15%	3.29%
PPL Corporation	PPL	1.5	2.00	5.50		4.00	2.75	3.42%	4.59%	0.32%	4.91%
Southern Company	SO	3.5	3.00	3.50	4.50	4.00	4.00	3.50%	3.04%	1.28%	4.32%
Xcel Energy Inc.	XEL	5.5	6.00	5.00	5.40	6.00	5.63	5.54%	4.03%	0.37%	4.40%
Average		4.50	4.83	4.33	4.89	4.78	4.72	4.70%	3.60%	0.80%	4.40%

Value Line One-pagers' data latest per Nov.18, 2019. Zacks and SNL data latest as of November 27, 2019.

Schedule PKC-6

"External Component" of COE						
		current market to book ratio	# of shares 2020	# of shares 2023	growth rate in # of shares	sv
Alliant Energy Corporation	LNT	2.56	242	250	1.09%	1.70%
Ameren Corporation	AEE	2.29	250.5	255	0.60%	0.77%
AEP Company	AEP	2.31	496	518	1.46%	1.91%
Avista	AVA	1.66	68	71	1.45%	0.96%
Consolidated Edison	ED	1.6	341	344	0.29%	0.18%
Duke Energy Corporation	DUK	1.47	754	770	0.70%	0.33%
Edison International	EIX	1.94	370	385	1.33%	1.25%
Evergy, Inc.	EVERG	1.66	212	212	0.00%	0.00%
Entergy Corporation	ETR	2.34	200	210	1.64%	2.20%
First Energy Corporation	FE	3.58	543	550	0.43%	1.10%
IDACORP, Inc.	IDA	2.13	50.4	50.4	0.00%	0.00%
NorthWestern Corporation	NWE	1.8	50.65	51.1	0.30%	0.24%
OGE Energy Corporation	OGE	2.04	200	200	0.00%	0.00%
Pinnacle West Capital Corporation	PNW	1.74	112.5	114	0.44%	0.33%
PNM Resources, Inc.	PNM	2.32	81	85	1.62%	2.14%
Portland General Electric Company	POR	1.92	89.55	90	0.17%	0.15%
PPL Corporation	PPL	2.06	773	780	0.30%	0.32%
Southern Company	SO	2.36	1050	1080	0.94%	1.28%
Xcel Energy Inc.	XEL	2.46	526	530	0.25%	0.37%

Source: Value Line (data as of Nov. 18, 2019)

Market to book ratio (mrq) based on yahoo finance data from Dec. 9, 2019.

Schedule PKC-7

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Expected Return on Equity				
EXPECTED ROE		2020	2022-2024	2017-21
Alliant Energy Corporation	LNT	10.50%	10.00%	10.13%
Ameren Corporation	AEE	10.00%	10.50%	10.38%
AEP Company	AEP	10.50%	10.50%	10.50%
Avista	AVA	7.50%	8.00%	7.88%
Consolidated Edison	ED	8.00%	8.50%	8.38%
Duke Energy Corporation	DUK	8.00%	8.50%	8.38%
Edison International	EIX	13.00%	11.50%	11.88%
El Paso Electric Company	EE	8.00%	8.50%	8.38%
Evergy, Inc.	EVRG	8.50%	8.50%	8.50%
Entergy Corporation	ETR	11.00%	11.00%	11.00%
First Energy Corporation	FE	17.00%	16.00%	16.25%
IDACORP, Inc.	IDA	9.00%	9.50%	9.38%
NorthWestern Corporation	NWE	9.00%	9.00%	9.00%
OGE Energy Corporation	OGE	10.50%	11.50%	11.25%
Pinnacle West Capital Corp	PNW	10.00%	10.50%	10.38%
PNM Resources, Inc.	PNM	10.00%	9.50%	9.63%
Portland General Electric Co	POR	8.50%	9.00%	8.88%
PPL Corporation	PPL	14.00%	13.00%	13.25%
Southern Company	SO	12.00%	12.50%	12.38%
Xcel Energy Inc.	XEL	10.50%	11.00%	10.88%
Average				10.33%

Schedule PKC-7

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Retention Ratio (b)								
		2020			2022-24			Average
		earnings	dividends	b	earnings	dividends	b	Retention
		pershare	pershare		pershare	pershare		ratio (b)
Alliant Energy Corporation	LNT	2.40	1.50	0.38	2.80	1.74	0.38	0.38
Ameren Corporation	AEE	3.50	2.06	0.41	4.25	2.55	0.40	0.40
AEP Company	AEP	4.40	2.88	0.35	5.00	3.40	0.32	0.33
Avista	AVA	2.15	1.61	0.25	2.50	1.80	0.28	0.27
Consolidated Edison	ED	4.40	3.06	0.30	5.00	3.40	0.32	0.32
Duke Energy Corporation	DUK	5.20	3.82	0.27	5.75	4.05	0.30	0.29
Edison International	EIX	4.50	2.49	0.45	5.50	2.75	0.50	0.49
Evergy, Inc.	EVRG	3.20	2.08	0.35	3.50	2.50	0.29	0.30
Energy Corporation	ETR	5.55	3.74	0.33	6.25	4.45	0.29	0.30
First Energy Corporation	FE	2.55	1.60	0.37	3.00	1.90	0.37	0.37
IDACORP, Inc.	IDA	4.60	2.73	0.41	5.25	3.35	0.36	0.37
NorthWestern Corporation	NWE	3.60	2.40	0.33	4.00	2.70	0.33	0.33
OGE Energy Corporation	OGE	2.25	1.62	0.28	2.75	1.90	0.31	0.30
Pinnacle West Capital Corp	PNW	5.05	3.22	0.36	5.75	3.80	0.34	0.34
PNM Resources, Inc.	PNM	2.25	1.24	0.45	2.50	1.50	0.40	0.41
Portland General Electric Co	POR	2.55	1.62	0.36	3.00	1.95	0.35	0.35
PPL Corporation	PPL	2.55	1.66	0.35	2.75	1.80	0.35	0.35
Southern Company	SO	3.20	2.54	0.21	3.75	2.78	0.26	0.25
Xcel Energy Inc.	XEL	2.75	1.72	0.37	3.25	2.05	0.37	0.37

Source: Value Line one-pagers (latest data as of Nov. 14, 2019)

Schedule PKC-8

DCF ROE Estimates				
Company		Average of EPS, DPS, and BVPS growth rates	br and sv	EPS growth rates
Alliant Energy Corporation	LNT	9.18%	8.37%	8.85%
Ameren Corporation	AEE	8.37%	7.70%	8.60%
AEP Company	AEP	8.07%	8.51%	8.37%
Avista	AVA	7.10%	6.55%	6.92%
Consolidated Edison	ED	6.75%	6.35%	6.19%
Duke Energy Corporation	DUK	7.76%	7.08%	9.60%
Edison International	EIX	8.43%	10.61%	9.14%
Evergy, Inc.	EVRG	9.66%	5.85%	9.66%
Entergy Corporation	ETR	6.95%	8.68%	6.44%
First Energy Corporation	FE	8.94%	10.47%	9.56%
IDACORP, Inc.	IDA	7.49%	6.12%	6.22%
NorthWestern Corporation	NWE	7.13%	6.59%	6.56%
OGE Energy Corporation	OGE	9.11%	7.20%	9.22%
Pinnacle West Capital Corporation	PNW	8.54%	7.62%	8.68%
PNM Resources, Inc.	PNM	8.29%	8.67%	8.76%
Portland General Electric Company	POR	7.61%	6.22%	7.46%
PPL Corporation	PPL	8.37%	9.86%	7.70%
Southern Company	SO	7.61%	8.43%	8.11%
Xcel Energy Inc.	XEL	8.36%	7.21%	8.44%
Average		8.09%	7.79%	8.13%
Average plus 2*SD		9.72%	10.69%	10.49%
Average minus 2*SD		6.46%	4.90%	5.77%
Cost of Equity estimate		8.09%	8.24%	8.48%

The cells that are statistically outliers, if there are any, are shaded grey.

8.27%

Schedule PKC-9

PROXY BETA

Company		VL Betas
Alliant Energy Corporation	LNT	0.60
Ameren Corporation	AEE	0.55
AEP Company	AEP	0.55
Avista	AVA	0.60
Consolidated Edison	ED	0.45
Duke Energy Corporation	DUK	0.50
Edison International	EIX	0.60
Evergy, Inc.	EVERG	
Entergy Corporation	ETR	0.60
First Energy Corporation	FE	0.65
IDACORP, Inc.	IDA	0.55
NorthWestern Corporation	NWE	0.60
OGE Energy Corporation	OGE	0.80
Pinnacle West Capital Corporation	PNW	0.55
PNM Resources, Inc.	PNM	0.60
Portland General Electric Company	POR	0.60
PPL Corporation	PPL	0.70
Southern Company	SO	0.50
Xcel Energy Inc.	XEL	0.50
Proxy Average		0.58

Source: Value Line betas latest as of Nov. 18, 2019

Schedule PKC-10

Pricing Date	10y US T-Note
11/7/2019	1.926
11/8/2019	1.933
11/11/2019	1.943
11/12/2019	1.909
11/13/2019	1.87
11/14/2019	1.815
11/15/2019	1.834
11/18/2019	1.808
11/19/2019	1.786
11/20/2019	1.738
11/21/2019	1.772
11/22/2019	1.774
11/25/2019	1.764
11/26/2019	1.74
11/27/2019	1.767
12/2/2019	1.836
12/3/2019	1.709
12/4/2019	1.781
12/5/2019	1.797
12/6/2019	1.842
12/9/2019	1.821
Average	1.82

Data source for yields is SNL

CAPM Cost of Equity Estimates			
	CAPM1	CAPM2	CAPM3
	Dividend-Paying S&P 500 Stocks		All S&P 500 Stocks
	EPS growth projection	Average EPS, DPS & BVPS growth projections	EPS growth projection
DCF Market Return (a)	12.85	12.01	14.39
Risk Free Return (b)	1.82	1.82	1.82
Market Beta (c)	1.001	1.004	1.020
Risk Premium (a)-(b)	11.03	10.19	12.57
Beta adjusted RP (d) = ((a)-(b))/(c)	11.02	10.15	12.32
Proxy group beta (e)	0.58	0.58	0.58
CAPM ROE estimate (b)+(e)* (d)	8.25	7.74	9.00

Growth projections downloaded from Value Line on November 21, 2019.

Schedule PKC-11a

Value Line Latest Data

(downloaded on Nov.21, 2019)

Name	Mkt-Cap	Current Dyild	Beta	3-5 years Growth Projections					All Stocks Weighted DCF	
				EPS Gr. Proj.	DPS Gr. Proj.	BVPS Gr. Proj.	Average Gr. Proj.	EPS Weighted	Beta Weighted	
LyondellBasell Industries NV	30750496530	0.04554	1.40	5.5	5	10	6.833333	0.000122653	0.001687	
American Express Co	97619730300	0.01442	1.05	10	9	8.5	9.166667	0.000440433	0.004016	
Verizon Communications Inc	245996432320	0.04136	0.75	4.5	2	5.5	4	0.000841411	0.007229	
Broadcom Inc	123630450570	0.03401	1.10	33.5	22	6	20.5	0.001815218	0.005329	
Boeing Co/The	208744809810	0.02216	1.15	15.5	16.5	16		0.00146313	0.009406	
Caterpillar Inc	78212160160	0.02911	1.35	12	6	11	9.666667	0.000462328	0.004137	
JPMorgan Chase & Co	406582550550	0.02777	1.15	6	11.5	7.5	8.333333	0.001411593	0.018321	
Chevron Corp	221874920480	0.04057	1.25	16.5	3.5	3.5	7.833333	0.001816326	0.010868	
Coca-Cola Co/The	228020611020	0.03006	0.70	6.5	5	2.5	4.666667	0.000858073	0.006254	
AbbVie Inc	128953191200	0.05413	1.10	10.5	9		9.75	0.000818434	0.005558	
Walt Disney Co/The	264676616470	0.01198	0.90	6.5	4.5	22.5	11.16667	0.00080241	0.009334	
FleetCor Technologies Inc	26121081000	0	1.20	12.5	0	7	6.5	0.000127942	0.001228	
Extra Space Storage Inc	13853791670	0.03365	0.65	4	5.5	7	5.5	4.03463E-05	0.000353	
Exxon Mobil Corp	287842141180	0.05115	1.10	14	4	3.5	7.166667	0.002196343	0.012407	
Phillips 66	51572189480	0.03102	1.25	10	11	5	8.666667	0.000267902	0.002526	
General Electric Co	99475123110	0.00351	1.15	2.5	-9	1	-1.833333	0.000111299	0.004483	
HP Inc	29193705800	0.03578	1.50	8	7		7.5	0.000134082	0.001716	
Home Depot Inc/The	241919297700	0.02463	1.05	9	14.5		11.75	0.001097134	0.009953	
International Business Machines Corp	117966848400	0.04865	1.10	1.5	3.5	19	8	0.000295905	0.005085	
Concho Resources Inc	14480118870	0.00694	1.70	19.5		11	15.25	0.000114963	0.000965	
Johnson & Johnson	357776679680	0.02795	0.80	12	7	10	9.666667	0.002097654	0.011215	
McDonald's Corp	146197944090	0.02576	0.75	8.5	8.5		8.5	0.000640778	0.004296	
Merck & Co Inc	217096055680	0.02861	0.90	9	6.5	2.5	6	0.001019938	0.007656	
3M Co	96476306270	0.03433	1.00	6	6.5	6	6.166667	0.000360494	0.00378	
American Water Works Co Inc	21796162320	0.01659	0.55	9.5	9	5	7.833333	9.59784E-05	0.00047	
Bank of America Corp	294050047830	0.02203	1.30	10.5	18.5	7	12	0.001476984	0.014979	
Pfizer Inc	205039220100	0.03887	0.90	10	5.5	2.5	6	0.00113134	0.007231	
Procter & Gamble Co/The	304968269480	0.0244	0.70	9	4.5	8	7.166667	0.001380197	0.008365	
AT&T Inc	271599900000	0.05487	0.75	5.5	4.5	5.5	5.166667	0.001185344	0.007982	
Travelers Cos Inc/The	34956243590	0.02422	0.85	9	2.5	7	6.166667	0.000157944	0.001164	
United Technologies Corp	126598398850	0.02005	1.05	9	6.5	12	9.166667	0.000550397	0.005209	
Analog Devices Inc	40110103480	0.01989	1.20	10	5.5	10	8.5	0.000189992	0.001886	
Walmart Inc	338839552920	0.0178	0.75	7.5	4	3.5	5	0.001240985	0.009958	
Cisco Systems Inc	191241216040	0.03106	1.15	8	11.5		9.75	0.000841555	0.008618	
Intel Corp	251865000000	0.02176	1.10	10.5	5	7	7.5	0.001262288	0.010856	
General Motors Co	50407499520	0.04308	1.25	2	3	9	4.666667	0.000125445	0.002469	
Microsoft Corp	1141421953720	0.01363	1.10	14	11.5	12.5	12.66667	0.006913897	0.049198	
Dollar General Corp	41375094600	0.00795	0.80	12	8	8.5	9.5	0.000208213	0.001297	
Cigna Corp	74651391750	0.0002	1.00	14.5	4	18.5	12.333333	0.000424776	0.002925	
Kinder Morgan Inc/DE	45435197900	0.04985	1.35	35.5	17.5	4	19	0.000736526	0.002403	
Citigroup Inc	161359868540	0.0276	1.35	10	25.5	5	13.5	0.000815511	0.008536	
American International Group Inc	46046559360	0.02418	1.05		6	3	4.5	0	0	
Honeywell International Inc	126629538260	0.02031	1.05	8.5	9	8	8.5	0.000526819	0.00521	
Altria Group Inc	90510753150	0.06935	0.70	8.5	9	5.5	7.666667	0.000557871	0.002483	
HCA Healthcare Inc	47403517280	0.01145	0.95	12	31.5		21.75	0.000245441	0.001765	
Under Armour Inc	3782857480	0	1.30	19		7.5	13.25	2.81634E-05	0.000193	
International Paper Co	17739327840	0.04531	1.30	10.5	5.5	10.5	8.833333	0.000106134	0.000904	
Hewlett Packard Enterprise Co	22351889120	0.02804	1.50	6.5	14.5	3	8	8.22866E-05	0.001314	
Abbott Laboratories	148355773840	0.01526	1.05	10	7	6	7.666667	0.000674467	0.006104	
Aflac Inc	39732394340	0.01995	0.95	7.5	7.5	11	8.666667	0.000148991	0.001479	
Air Products & Chemicals Inc	52422454500	0.0195	1.00	10.5	6.5	10.5	9.166667	0.000257843	0.002054	
Royal Caribbean Cruises Ltd	24526827000	0.02667	1.15	12.5	11	8	10.5	0.000147367	0.001105	
American Electric Power Co Inc	45176849920	0.03061	0.55	4	5.5	4	4.5	0.000126079	0.000974	
Hess Corp	20454913780	0.0149	1.80		0	1.5	0.75	0	0	
Aon PLC	47185629610	0.00873	0.90	11	5	16	10.66667	0.000220412	0.001664	
Apache Corp	8599943320	0.04373	1.70		6	6	6	0	0	
Archer-Daniels-Midland Co	23659155000	0.03294	1.05	9.5	5.5	6	7	0.000120059	0.000973	
Automatic Data Processing Inc	73809624840	0.02134	1.00	13.5	12.5	14	13.33333	0.000456329	0.002892	
Verisk Analytics Inc	23652995800	0.00693	0.85	9.5	0	13.5	7.666667	9.47764E-05	0.000788	
AutoZone Inc	27630980550	0	0.80	13.5	0		6.75	0.000146165	0.000866	
Avery Dennison Corp	11003190310	0.01761	1.00	11	8.5	7	8.833333	5.54369E-05	0.000431	
MSCI Inc	21716333590	0.01061	1.00	18.5	16	31	21.83333	0.000167287	0.000851	
Ball Corp	22061647200	0.0089	1.00	25	13	10.5	16.16667	0.000224773	0.000864	
Bank of New York Mellon Corp/The	45077087120	0.02537	1.10	7	15.5	5	9.166667	0.000170022	0.001943	
Baxter International Inc	41865592000	0.01073	0.85	10.5	11.5	8.5	10.16667	0.000190776	0.001394	
Becton Dickinson and Co	66619248120	0.01248	0.90	9.5	6	8	7.833333	0.000282116	0.002349	
Best Buy Co Inc	19543937950	0.02697	1.15	8.5	14.5	4	9	8.66261E-05	0.000881	
H&R Block Inc	4915632800	0.04247	0.80	7	6	22	11.66667	2.19498E-05	0.000154	
Boston Scientific Corp	59390840640	0	0.90	16	0	8.5	8.166667	0.00037235	0.002094	
Bristol-Myers Squibb Co	91907966850	0.02907	0.80	9	1.5	7	5.833333	0.000433524	0.002881	
Fortune Brands Home & Security Inc	8620404450	0.01421	1.20	11.5	6	9.5	9	4.39211E-05	0.000405	
Cabot Oil & Gas Corp	6685890750	0.02441	1.15		25	9	17	0	0	
Campbell Soup Co	14541308360	0.029	0.65	1	2	12.5	5.166667	2.23045E-05	0.00037	
Kansas City Southern	15066240000	0.01053	1.10	12	8	8	9.333333	7.74326E-05	0.000649	
Hilton Worldwide Holdings Inc	28007499380	0.00604	1.15		0		0	0	0	
Carnival Corp	23016491850	0.0458	1.05	10	9.5	9.5	9.666667	0.00013356	0.000947	
Corvo Inc	11836968860	0	1.15	55.5	0	3.5	19.66667	0.000257422	0.000533	
CenturyLink Inc	16211705230	0.06725	1.10	1	-12.5	-2.5	-4.66667	4.92862E-05	0.000699	

UDR Inc	14295125340	0.02809	0.75	5.5	5	13	7.833333	4.69751E-05	0.00042
Clorox Co/The	18371129140	0.02897	0.70	5	5	15	8.333333	5.73687E-05	0.000504
CMS Energy Corp	17513051400	0.0248	0.50	7	7	7.5	7.166667	6.56509E-05	0.000343
Newell Brands Inc	8167386000	0.04769	1.15	4	8.5	-1.5	3.666667	2.8369E-05	0.000368
Colgate-Palmolive Co	57601927240	0.02559	0.75	6	3.5		4.75	0.000194917	0.001693
Comerica Inc	9988430660	0.03868	1.30	11	15.5	6	10.833333	5.90244E-05	0.000509
IPG Photonics Corp	7278019800	0	1.30	9.5	0	14.5	8	2.70925E-05	0.000371
Conagra Brands Inc	14351426460	0.02882	0.90	4.5	2	14.5	7	4.18774E-05	0.000506
Consolidated Edison Inc	29024463300	0.0339	0.45	3	3.5	3.5	3.333333	7.3252E-05	0.000512
SL Green Realty Corp	6683577300	0.04075	1.00	5.5	4.5	3.5	4.5	2.53696E-05	0.000262
Corning Inc	22011928200	0.02795	1.20	15	11.5	5.5	10.66667	0.000155294	0.001035
Cummins Inc	27671706480	0.02903	1.15	8	5	8.5	7.166667	0.00011948	0.001247
Danaher Corp	102685451760	0.00476	0.85	14	12	7.5	11.16667	0.000583805	0.00342
Target Corp	64596753470	0.02088	0.90	8.5	5	9	7.5	0.000270247	0.002278
Deere & Co	54180197110	0.01767	1.10	13.5	7	16	12.16667	0.000326652	0.002335
Dominion Energy Inc	68234409700	0.04427	0.55	6.5	5	7	6.166667	0.000296004	0.001471
Dover Corp	15771529620	0.01805	1.30	12.5	3.5	11	9	8.91015E-05	0.000803
Alliant Energy Corp	12772305280	0.02672	0.60	6.5	5.5	7.5	6.5	4.6338E-05	0.0003
Duke Energy Corp	66025632790	0.04338	0.50	6	2.5	2.5	3.666667	0.000270828	0.001294
Regency Centers Corp	10792797240	0.03633	0.80	16	6	4	8.666667	8.42587E-05	0.000338
Eaton Corp PLC	37131588000	0.03162	1.20	9	6.5	4	6.5	0.000179024	0.001746
Ecolab Inc	53676797680	0.00988	1.00	10	9.5	11.5	10.333333	0.000232148	0.002103
PerkinElmer Inc	10056862520	0.00309	1.15	11	2.5	7.5	7	4.46325E-05	0.000453
Emerson Electric Co	44315953500	0.02749	1.20	11.5	4	8.5	8	0.000250177	0.002084
EOG Resources Inc	41921913840	0.01596	1.45	33	13	15	20.333333	0.000572627	0.002382
Entergy Corp	23306880120	0.03178	0.60	0.5	4	4	2.833333	3.36624E-05	0.000548
Equifax Inc	16939511700	0.01115	1.00	8.5	8	11.5	9.333333	6.41353E-05	0.000664
IQVIA Holdings Inc	27623249680	0	0.95	12.5		10	11.25	0.0001353	0.001028
Gartner Inc	14129101350	0	1.00	13.5	0	22.5	12	7.47412E-05	0.000554
FedEx Corp	39728765700	0.01707	1.30	7.5	10	10	9.166667	0.000144326	0.002024
Macy's Inc	4639903300	0.10053	1.05	2.5	2.5	6	3.666667	2.30512E-05	0.000191
FMC Corp	12583024200	0.01648	1.35	15	25	12	17.333333	8.26935E-05	0.000666
Ford Motor Co	34613550810	0.06873	1.20	3	4	5	4	0.000135306	0.001628
NextEra Energy Inc	114969890720	0.02126	0.55	10.5	10	7.5	9.333333	0.000573831	0.002478
Franklin Resources Inc	13612253100	0.03805	1.25	7.5	11.5	2	7	6.10604E-05	0.000667
Freeport-McMoRan Inc	16003581420	0.01813	2.15	22.5		9	15.75	0.000153743	0.001348
Gap Inc/The	6117828640	0.05958	1.00	4.5	0.5	7	4	2.53916E-05	0.00024
General Dynamics Corp	53327774980	0.02213	0.95	6	6	3	5	0.000173007	0.001985
General Mills Inc	32135628980	0.03686	0.70	4	3	12	6.333333	9.77113E-05	0.000881
Genuine Parts Co	15010219830	0.02952	0.95	8	5.5	7	6.833333	6.51103E-05	0.000559
Atmos Energy Corp	12983433760	0.02114	0.60	7.5	7	7	7.166667	4.93142E-05	0.000305
WW Grainger Inc	16825045100	0.01844	1.00	8.5	10	15	11.16667	6.87123E-05	0.000659
Halliburton Co	18021316120	0.03507	1.50	21.5	0	8.5	10	0.00017925	0.001059
Harley-Davidson Inc	5480451840	0.04223	1.15	8.5	2.5	12	7.666667	2.77078E-05	0.000247
L3Harris Technologies Inc	45276322650	0.01465	0.90	16.5		32	24.25	0.000320865	0.001597
Helmerich & Payne Inc	4163280330	0.07398	1.65		0.5	4	2.25	0	0
Fortive Corp	23539860400	0.00399	1.15	10	9.5	9	9.5	9.61036E-05	0.001061
Hershey Co/The	31154299520	0.02073	0.65	6.5	6.5	23	12	0.000105478	0.000793
Synchrony Financial	23624816080	0.02407	1.15	9.5	17	10.5	12.333333	0.000111284	0.001065
Hormel Foods Corp	22880614500	0.0196	0.65	9	9	8	8.666667	9.90538E-05	0.000583
Arthur J Gallagher & Co	17365291300	0.01847	0.90	14.5	3	11	9.5	0.000112144	0.000612
Mondelez International Inc	75461175840	0.02175	0.95	8.5	10	5	7.833333	0.000318381	0.002809
CenterPoint Energy Inc	12279816900	0.04703	0.80	12.5	2.5	13.5	9.5	8.4191E-05	0.000385
Humana Inc	44729530020	0.00651	0.90	11.5	11	13.5	12	0.000213626	0.001577
Illinois Tool Works Inc	55423250640	0.02482	1.10	9	12	2	7.666667	0.000251782	0.002389
CDW Corp/DE	19784873700	0.01104	1.05	10.5	17.5	13.5	13.833333	9.041E-05	0.000814
Ingersoll-Rand PLC	31109274480	0.01633	1.20	12.5	10	13	11.833333	0.000173525	0.001463
Interpublic Group of Cos Inc/The	8580509160	0.04248	1.05	11	9.5	8.5	9.666667	5.20525E-05	0.000353
International Flavors & Fragrances Inc	14564246400	0.02199	0.95	8.5	9	15.5	11	6.15914E-05	0.000542
Jacobs Engineering Group Inc	12772041480	0.00721	1.30	14.5	15	10.5	13.333333	7.64371E-05	0.000651
Hanesbrands Inc	5447156820	0.03984	1.10	3	4	9	5.333333	1.50344E-05	0.000235
Kellogg Co	22300725720	0.03487	0.60	4	3.5	14	7.166667	6.60337E-05	0.000524
Broadridge Financial Solutions Inc	14037256240	0.01764	0.90	11	12	8.5	10.5	7.07407E-05	0.000495
Perrigo Co PLC	6627195900	0.01725	1.25	2	10	5	5.666667	9.71795E-06	0.000325
Kimberly-Clark Corp	46141687600	0.03061	0.70	7	3.5		5.25	0.000183843	0.001266
Kimco Realty Corp	9052675520	0.05224	0.85	5	5	5	5	3.67301E-05	0.000302
Kohl's Corp	7513976940	0.05676	1.05	6.5	9.5	4	6.666667	3.63929E-05	0.000309
Oracle Corp	184608756080	0.01707	1.05	10	11	-4	5.666667	0.00085303	0.007595
Kroger Co/The	21315102390	0.02407	0.80	4	12	12	9.333333	5.39144E-05	0.000668
Leggett & Platt Inc	6892049110	0.03055	1.05	9	7	5.5	7.166667	3.2927E-05	0.000284
Lennar Corp	16717292130	0.00268	1.10	8	11	13	10.66667	5.42302E-05	0.000721
Eli Lilly & Co	110040613910	0.02251	0.70	11.5	7	6.5	8.333333	0.000598505	0.003018
L Brands Inc	4391868880	0.07552	1.05	-2.5	-11		-6.75	8.53164E-06	0.000181
Charter Communications Inc	102896802400	0	1.05	17.5	0	5.5	7.666667	0.000705589	0.004234
Lincoln National Corp	11304867000	0.02807	1.55	9	11	8.5	9.5	5.28614E-05	0.000687
Loews Corp	14976053650	0.00497	1.00	13.5	0	5.5	6.333333	8.23349E-05	0.000587
Lowe's Cos Inc	90941076170	0.01867	1.10	11.5	10.5		11	0.000480153	0.00392
Host Hotels & Resorts Inc	12084449300	0.04748	1.20	-1.5	3	0.5	0.666667	1.52113E-05	0.000568
Xerox Holdings Corp	8280000400	0.02611	1.45	9.5	0.5	13	7.666667	3.9696E-05	0.00047
IDEX Corp	12322480600	0.01234	1.10	9.5	11	12.5	11	5.21119E-05	0.000531
Marsh & McLennan Cos Inc	54080222880	0.01698	0.90	9	7.5	6.5	7.666667	0.00022832	0.001907
Masco Corp	13090700480	0.0118	1.20	9.5	9		9.25	5.50705E-05	0.000616
S&P Global Inc	65523640000	0.0085	1.05	13	13	31	19	0.000357017	0.002696
Medtronic PLC	149985177510	0.01932	0.85	8.5	6.5	3.5	6.166667	0.000617921	0.004996
CVS Health Corp	97468222880	0.0267	0.95	6.5	8	10	8.166667	0.000353537	0.003628
Micron Technology Inc	50448314070	0	1.70	12	0	22.5	11.5	0.000237214	0.003361
Motorola Solutions Inc	28503456960	0.01539	0.90	13	13		13	0.000163502	0.001005

Cboe Global Markets Inc	13671378520	0.01168	0.65	14.5	9.5	19.5	14.5	8.43876E-05	0.000348
Mylan NV	8898132920	0	1.35	3.5	0	3	2.166667	1.22033E-05	0.000471
Laboratory Corp of America Holdings	16591477000	0	0.95	8	0	9.5	5.833333	5.201E-05	0.000618
Newmont Goldcorp Corp	31539206330	0.01456	0.70	2.5	12.5	6	7	4.91148E-05	0.000865
NIKE Inc	145255888600	0.01053	1.00	17	12	5.5	11.5	0.001032626	0.005692
NiSource Inc	9734556640	0.0307	0.55	12.5	9	7.5	9.666667	6.01223E-05	0.00021
Noble Energy Inc	9604223840	0.0239	1.70	0	5.5	-0.5	1.666667	8.9944E-06	0.00064
Norfolk Southern Corp	49510640360	0.0198	1.20	15	10.5	2	9.166667	0.0003323	0.002328
Principal Financial Group Inc	15072036160	0.04053	1.35	5.5	5.5	8	6.333333	5.7077E-05	0.000797
Eversource Energy	26710282500	0.02594	0.55	5.5	5.5	4.5	5.166667	8.54603E-05	0.000576
Northrop Grumman Corp	59492149000	0.01496	0.85	9.5	8	6	7.833333	0.000257991	0.001981
Wells Fargo & Co	226439880860	0.0381	1.10	5	6	5	5.333333	0.000790152	0.00976
Nucor Corp	16403931500	0.02957	1.35	13	6.5	7.5	9	0.000103803	0.000868
PVH Corp	7252024640	0.00153	1.30	9	0	8	5.666667	2.60292E-05	0.000369
Occidental Petroleum Corp	34374838160	0.08212	1.25	33	3	7	14.33333	0.000573357	0.001684
Omnicom Group Inc	16874230000	0.03355	0.95	6.5	7	10	7.833333	6.58827E-05	0.000628
ONEOK Inc	29242287150	0.0517	1.50	17	10	10	12.33333	0.000259068	0.001719
Raymond James Financial Inc	12352861710	0.01529	1.25	10	13.5	11	11.5	5.61748E-05	0.000605
Parker-Hannifin Corp	25049390350	0.01805	1.35	9	10.5	13.5	11	0.000106853	0.001325
Rollins Inc	11977828360	0.01148	0.90	13	11	9.5	11.16667	6.67528E-05	0.000422
PPL Corp	24424054740	0.04885	0.70	1.5	2	5.5	3	6.14576E-05	0.00067
ConocoPhillips	65133887840	0.0283	1.45		6.5	3.5	5	0	0
PulteGroup Inc	10742440000	0.0111	1.05	8	9.5	13	10.16667	3.85341E-05	0.000442
Pinnacle West Capital Corp	9811232080	0.03586	0.50	5	6	3.5	4.833333	3.3532E-05	0.000192
PNC Financial Services Group Inc/The	66505442600	0.03031	1.10	8	11.5	6	8.5	0.000290624	0.002867
PPG Industries Inc	29912569500	0.01613	1.10	6	6	3.5	5.166667	8.97993E-05	0.001289
Progressive Corp/The	41233953900	0.00567	0.85	15.5	-6.5	13	7.333333	0.000260308	0.001373
Public Service Enterprise Group Inc	30955488460	0.03071	0.65	6	5	5	5.333333	0.000111146	0.000788
Raytheon Co	60449436530	0.01737	0.85	10	6	3	6.333333	0.000280068	0.002013
Robert Half International Inc	6782386740	0.02123	1.20	9	7	17	11	2.98147E-05	0.000319
Edison International	25431982920	0.03455	0.55		3.5	5.5	4.5	0	0
Schlumberger Ltd	50031818460	0.05534	1.35	16.5	0		8.25	0.000440918	0.002647
Charles Schwab Corp/The	57382388000	0.0152	1.30	12	18	10	13.33333	0.000306046	0.002923
Sherwin-Williams Co/The	53171830180	0.00785	1.05	10.5	10.5	14	11.66667	0.000235982	0.002188
JM Smucker Co/The	12026361600	0.03338	0.70	5	4.5	5	4.833333	3.96856E-05	0.00033
Snap-on Inc	8703511740	0.02722	1.10	6	6.5	3.5	5.333333	3.00241E-05	0.000375
AMETEK Inc	22514124570	0.00569	1.15	15.5	13	11	13.16667	0.00014215	0.001015
Southern Co/The	65839520520	0.0395	0.50	3.5	3	3.5	3.333333	0.000193984	0.00129
BB&T Corp	41694546230	0.03308	1.10	8	8	6.5	7.5	0.000186909	0.001797
Southwest Airlines Co	29908265080	0.01267	1.15	10.5	16.5	9	12	0.000138681	0.001348
Stanley Black & Decker Inc	23359684040	0.01796	1.20	9	6	4	6.333333	9.95591E-05	0.001098
Public Storage	37292433200	0.03747	0.65	4.5	4	6.5	5	0.000121743	0.00095
Arista Networks Inc	14824461960	0	1.15	12	0	12	8	6.97063E-05	0.000668
SunTrust Banks Inc	31269296800	0.03181	1.20	10	12.5	5	9.166667	0.000163451	0.00147
Sysco Corp	40726319140	0.02255	0.70	10.5	7	-17.5	0	0.000205438	0.001117
Texas Instruments Inc	108648898250	0.03097	1.10	6.5	10	12.5	9.666667	0.000412861	0.004683
Textron Inc	10497815370	0.00174	1.35	13	12	4	9.666667	5.42377E-05	0.000555
Thermo Fisher Scientific Inc	123236564030	0.00247	1.05	10	11.5	6.5	9.333333	0.000495417	0.00507
Tiffany & Co	14898140670	0.01881	1.15	10.5	7.5	6	8	7.28534E-05	0.000671
TJX Cos Inc/The	71713905560	0.01551	0.90	14	14	9	12.33333	0.000440043	0.002529
Globe Life Inc	10838545920	0.00689	1.00	10	7	8	8.333333	4.55426E-05	0.000425
Johnson Controls International plc	33745933870	0.02452	1.20	4.5	3	4.5	4	9.26565E-05	0.001587
Ulta Beauty Inc	13787732210	0	0.95	16	0	20	12	8.6442E-05	0.000513
Union Pacific Corp	120853278000	0.02229	1.15	14.5	10	3	9.166667	0.000799863	0.005446
Keysight Technologies Inc	20166510780	0	1.10	22	0	22	14.66667	0.000173846	0.000869
UnitedHealth Group Inc	261069677400	0.01568	1.00	14	14	11	13	0.001603808	0.01023
Unum Group	6099344760	0.03855	1.30	9	11.5	5	8.5	3.11378E-05	0.000311
Marathon Oil Corp	9351170010	0.01711	2.00		12	2.5	7.25	0	0
Varian Medical Systems Inc	11747779610	0	1.00	10.5	0	13	7.833333	4.83345E-05	0.00046
Ventas Inc	21790146560	0.05423	0.65	4	4.5	1	3.166667	8.13826E-05	0.000555
VF Corp	34146477000	0.02246	1.15	7	4	4.5	5.166667	0.000124764	0.001539
Vornado Realty Trust	12206766000	0.04128	0.95	-1.5	2	3	1.166667	1.2422E-05	0.000454
Vulcan Materials Co	18628966250	0.00881	1.15	14.5	10.5	3.5	9.5	0.000112742	0.000839
Weyerhaeuser Co	21989140420	0.04609	1.20	17.5	6	0	7.833333	0.000193972	0.001034
Whirlpool Corp	9016112000	0.03365	1.20	6.5	2.5	17	8.666667	3.52384E-05	0.000424
Williams Cos Inc/The	27125656620	0.06792	1.90	20	6	8.5	11.5	0.000291991	0.00202
WEC Energy Group Inc	27821455200	0.02676	0.50	6	6	3.5	5.166667	9.54578E-05	0.000545
Adobe Inc	145272107900	0	1.10	21	0	21	14	0.0011954	0.006262
AES Corp/VA	12348409800	0.02935	1.15		5.5	0	2.75	0	0
Amgen Inc	133994433840	0.02572	1.05	7	7	8.5	7.5	0.000507302	0.005513
Apple Inc	1169422915350	0.0117	1.05	12.5	12	12.5	12.33333	0.006297511	0.048114
Autodesk Inc	36304484040	0	1.35		0	54.5	27.25	0	0
Cintas Corp	26854110000	0.00983	1.00	15.5	16	4.5	12	0.000174245	0.001052
Comcast Corp	201145088750	0.019	0.90	13	13	10	12	0.001184111	0.007094
Molson Coors Brewing Co	10281485110	0.04352	0.95	5.5	9	4.5	6.333333	4.01732E-05	0.000383
KLA Corp	27404083980	0.01958	1.15	10	9.5	22	13.83333	0.000129457	0.001235
Marriott International Inc/MD	43387809270	0.01447	1.15	17.5	10		13.75	0.000324274	0.001955
McCormick & Co Inc/MD	20753581500	0.01358	0.70	8	6.5	13.5	9.333333	7.65423E-05	0.000569
Nordstrom Inc	5270194300	0.04359	1.05	5	6	2.5	4.5	1.95522E-05	0.000217
PACCAR Inc	27272164900	0.01623	1.20	7.5	6.5	11	8.333333	9.81424E-05	0.001282
Costco Wholesale Corp	132147704490	0.00865	0.85	9	9.5	9	9.166667	0.000512836	0.004401
First Republic Bank/CA	18272273640	0.007	1.10	10.5	6	12	9.5	8.04535E-05	0.000788
Stryker Corp	76483178100	0.01018	0.90	13	9	15	12.33333	0.000422094	0.002697
Tyson Foods Inc	33093970900	0.01854	0.75	7.5	14	11	10.83333	0.000122201	0.000973
Lamb Weston Holdings Inc	12194799870	0.00958	0.75	11	15.5		13.25	5.73924E-05	0.000358
Applied Materials Inc	55101926100	0.01408	1.30	8.5	13	14	11.83333	0.000215219	0.002807
American Airlines Group Inc	12366377340	0.01417	1.30	7.5	7	-27.5	-4.33333	4.34664E-05	0.00063

Cardinal Health Inc	16206760080	0.03473	1.15	11	3	5.5	6.5	9.31239E-05	0.00073
Celgene Corp	77035923360	0	1.20	9	0	6.5	5.166667	0.000271674	0.003622
Cerner Corp	21254943990	0.01064	0.95	9	0	7	5.333333	8.42178E-05	0.000791
Cincinnati Financial Corp	17632955820	0.02075	0.85	8.5	3	2.5	4.666667	7.36757E-05	0.000587
DR Horton Inc	20105279670	0.01283	1.05	7.5	11	12.5	10.33333	6.95725E-05	0.000827
Flowserve Corp	6308760600	0.01576	1.45	13.5	3	9.5	8.666667	3.75315E-05	0.000358
Electronic Arts Inc	28648979480	0	0.95	11	0	16	9	0.000123485	0.001066
Expeditors International of Washington Inc	12854319480	0.01325	1.00	9	8	7	8	5.2306E-05	0.000504
Fastenal Co	20222562020	0.02496	1.10	8.5	7	6.5	7.333333	8.79736E-05	0.000872
M&T Bank Corp	21505521200	0.027	1.05	9.5	10.5	7	9	0.000103887	0.000885
Xcel Energy Inc	33080213770	0.02626	0.50	5.5	6	5	5.5	0.000106267	0.000648
Fiserv Inc	78425888250	0	0.90	10.5	0	8.5	6.333333	0.000322671	0.002766
Fifth Third Bancorp	21119689920	0.03226	1.20	7	12.5	9	9.5	8.55607E-05	0.000993
Gilead Sciences Inc	82082672480	0.03884	0.95	-1.5	6	6.5	3.666667	7.57409E-05	0.003056
Hasbro Inc	12986820030	0.02866	0.90	7.5	6	2	5.166667	5.32973E-05	0.000458
Huntington Bancshares Inc/OH	15140188300	0.04093	1.20	11.5	13	7	10.5	9.39028E-05	0.000712
Welltower Inc	34381155480	0.04102	0.65	10.5	5	0.5	5.333333	0.00019962	0.000876
Biogen Inc	51498146800	0	1.10	8	0	7.5	5.166667	0.000161433	0.00222
Northern Trust Corp	22523056600	0.02634	1.25	8.5	10.5	6	8.333333	9.92511E-05	0.001103
Packaging Corp of America	10613054960	0.02818	1.15	6	7.5	12.5	8.666667	3.70225E-05	0.000478
Paychex Inc	30693698000	0.02892	1.00	10.5	10	7.5	9.333333	0.000162893	0.001203
People's United Financial Inc	7238066880	0.0435	1.05	9	1.5	4	4.833333	3.84182E-05	0.000298
QUALCOMM Inc	97764768900	0.02897	1.10	10.5	8	13	10.5	0.000519044	0.004214
Roper Technologies Inc	36740798640	0.00581	1.05	11.5	10	12.5	11.33333	0.000174406	0.001512
Ross Stores Inc	39949461200	0.00924	1.00	9.5	12.5	11.5	11.16667	0.000163863	0.001565
IDEXX Laboratories Inc	22346471500	0	0.90	13	0		6.5	0.000113832	0.000788
Starbucks Corp	98731600000	0.01962	0.90	13	13.5		13.25	0.000583773	0.003482
KeyCorp	18792998640	0.03878	1.25	10.5	13	7	10.16667	0.000107377	0.00092
State Street Corp	26548115230	0.02849	1.30	5	8.5	7.5	7	8.23916E-05	0.001352
Norwegian Cruise Line Holdings Ltd	11229367240	0	1.20	16	0	10.5	8.833333	7.04023E-05	0.000528
US Bancorp	92321485490	0.02842	1.05	6	9	8	7.666667	0.000322948	0.003798
AO Smith Corp	7844056080	0.01996	1.20	7.5	17.5	9	11.33333	2.94173E-05	0.000369
T Rowe Price Group Inc	28258559610	0.02514	1.15	10	9	10	9.666667	0.000139958	0.001273
Waste Management Inc	47756809370	0.01821	0.75	8.5	8	7.5	8	0.000194587	0.001403
CBS Corp	13728594250	0.01846	1.05	9.5	6	13.5	9.666667	6.15069E-05	0.000565
Allergan PLC	60718113920	0.016	1.05	3.5	9.5	2	5	0.000122005	0.002498
Constellation Brands Inc	31131178280	0.01614	0.85	8.5	10.5	8	9	0.000124213	0.001037
Xilinx Inc	22886011670	0.01626	1.15	9.5	5.5	8	7.666667	0.000100467	0.001031
DENTSPLY SIRONA Inc	12595304820	0.00706	0.90	4.5	10	0.5	5	2.5772E-05	0.000444
Zions Bancorp NA	8333132640	0.02782	1.25	9.5		6.5	8	4.05356E-05	0.000408
Alaska Air Group Inc	8429960120	0.02046	1.05	5.5	8	4.5	6	2.51119E-05	0.000347
Invesco Ltd	7802437860	0.07213	1.40	3.5	4.5	12.5	6.833333	3.31391E-05	0.000428
Intuit Inc	71125037520	0.00775	1.10	14.5	14	33	20.5	0.000427278	0.003066
Morgan Stanley	79473161800	0.02851	1.40	10	9.5	10.5	10	0.000404632	0.00436
Microchip Technology Inc	21782844700	0.01608	1.25	10.5	5.5	20	12	0.000104068	0.001067
Chubb Ltd	69117837020	0.01967	0.85	10	4	6.5	6.833333	0.00032677	0.002302
Hologic Inc	13148782140	0	1.00	25	0	13.5	12.83333	0.000128806	0.000515
Citizens Financial Group Inc	16519322000	0.03789	1.25	12	18.5	5	11.83333	0.000103673	0.000809
O'Reilly Automotive Inc	33191603300	0	0.90	12	0	29.5	13.83333	0.000156071	0.001171
Allstate Corp/The	35764742400	0.01812	0.80	10.5	7	9	8.833333	0.000173875	0.001121
FLIR Systems Inc	7144988780	0.01277	0.95	12	6.5	7.5	8.666667	3.7863E-05	0.000266
Equity Residential	32181537640	0.02619	0.75		4	3.5	3.75	0	0
BorgWarner Inc	8676835860	0.01618	1.40	8	10.5	9.5	9.333333	3.29208E-05	0.000476
Incyte Corp	19148793300	0	1.15		0	24	12	0	0
Simon Property Group Inc	45487191870	0.05667	0.85	4.5	6.5	3.5	4.833333	0.000183488	0.001515
Eastman Chemical Co	10452705730	0.03226	1.30	8	5.5	4.5	6	4.65082E-05	0.000532
Twitter Inc	22646333690	0	1.25		0	5.5	2.75	0	0
AvalonBay Communities Inc	30217270320	0.0281	0.75	2.5	6.5	3	4	6.32885E-05	0.000888
Prudential Financial Inc	37434240000	0.04296	1.35	7	9	3.5	6.5	0.000167899	0.00198
United Parcel Service Inc	102089515230	0.03227	1.00	8.5	7.5	35.5	17.16667	0.000474602	0.004
Apartment Investment & Management Co	8127632150	0.02858	0.80	-3	4	0.5	0.5	-5.88765E-07	0.000255
Walgreens Boots Alliance Inc	54748464940	0.02983	0.95	9.5	7.5	9.5	8.833333	0.000270835	0.002038
McKesson Corp	27154331600	0.01088	1.15	10.5	8.5	8.5	9.166667	0.000123907	0.001224
Lockheed Martin Corp	110769281700	0.02445	0.80	11.5	10.5		11	0.000611373	0.003472
AmerisourceBergen Corp	18028471100	0.01828	1.00	8	3.5	8	6.5	6.99447E-05	0.000706
Capital One Financial Corp	44946733710	0.01658	1.25	5.5	1.5	7.5	4.833333	0.00012687	0.002202
Waters Corp	14027926140	0	1.00	6	0	7.5	4.5	3.29804E-05	0.00055
Dollar Tree Inc	25380397500	0	0.90	12	0	14	8.666667	0.000119342	0.000895
Darden Restaurants Inc	14068579500	0.03068	0.80	11	8	10	9.666667	7.84825E-05	0.000441
NVR Inc	13420942050	0	0.80	13.5	0	10	7.833333	7.09951E-05	0.000421
NetApp Inc	14022205440	0.03125	1.30	10	16.5	1	9.166667	7.29738E-05	0.000714
Citrix Systems Inc	14704442400	0.0124	1.10	7		10	8.5	4.77275E-05	0.000634
DXC Technology Co	9187768220	0.0234	1.30	10	13.5	10	11.16667	4.48472E-05	0.000468
DaVita Inc	9403250000	0	1.05	12	0	9	7	4.42151E-05	0.000387
Hartford Financial Services Group Inc/The	22310059900	0.01939	0.90	13	5.5	6	8.166667	0.000131699	0.000787
Iron Mountain Inc	9782962010	0.07262	0.90	8.5	5	-7.5	2	6.16049E-05	0.000345
Estee Lauder Cos Inc/The	70260879780	0.00983	0.85	14	12	4	10	0.000414395	0.00234
Cadence Design Systems Inc	18996146100	0	1.05	12.5	0	22.5	11.66667	9.30438E-05	0.000782
Universal Health Services Inc	12302742000	0.00569	0.95	11	23	11	15	5.5922E-05	0.000458
E*TRADE Financial Corp	10360507760	0.01221	1.30	17.5		8.5	13	7.64352E-05	0.000528
Skyworks Solutions Inc	16362815000	0.01833	1.15	6	11	15.5	10.83333	5.0575E-05	0.000737
National Oilwell Varco Inc	8241371520	0.00936	1.35	31	-10.5	1	7.166667	0.0001036	0.000436
Quest Diagnostics Inc	14127021360	0.02021	0.95	8.5	8.5	8.5	8.5	5.87152E-05	0.000526
Activision Blizzard Inc	41551342100	0.00684	1.05	10	9	9.5	9.5	0.000174509	0.00171
Rockwell Automation Inc	22671476870	0.02079	1.25	9.5	6	6.5	7.333333	0.000103741	0.00111
Kraft Heinz Co/The	37965895490	0.05146	0.90	0	-4.5	-1	-1.83333	7.65553E-05	0.001339
American Tower Corp	96516626000	0.01744	0.75	11.5	8	8	9.166667	0.000504672	0.002836

HollyFrontier Corp	8450380400	0.02674	1.25	18	3.5	12	11.16667	6.92531E-05	0.000414
Regeneron Pharmaceuticals Inc	37159675280	0	1.10	10		8.5	9.25	0.000145608	0.001602
Amazon.com Inc	865428537410	0	1.20	39	0	37	25.33333	0.013225365	0.040693
Jack Henry & Associates Inc	11567477950	0.01064	0.85	12	9.5	9	10.16667	5.95037E-05	0.000385
Ralph Lauren Corp	7977196560	0.02572	1.25	8	5.5	0.5	4.666667	3.33676E-05	0.000391
Boston Properties Inc	21345567100	0.02753	0.90	5	7	5.5	5.833333	6.54226E-05	0.000753
Amphenol Corp	30307412240	0.00978	1.05	9.5	9	5	7.833333	0.000124986	0.001247
Pioneer Natural Resources Co	21611964090	0.01349	1.45			8	8	0	0
Valero Energy Corp	39911365070	0.03704	1.30	11.5	8	5.5	8.333333	0.000241106	0.002033
Synopsys Inc	21166421080	0	1.05	8	0	6	4.666667	6.63513E-05	0.000871
Western Union Co/The	11307334320	0.02966	0.95	6.5	13.5	39.5	19.83333	4.23681E-05	0.000421
CH Robinson Worldwide Inc	10219490000	0.02647	0.90	9	7.5	13	9.833333	4.71166E-05	0.00036
Accenture PLC	132861120000	0.01619	1.05	9	9.5	19	12.5	0.000556625	0.005466
TransDigm Group Inc	30790100000	0	0.95	11	0		5.5	0.000132714	0.001146
Yum! Brands Inc	29677571440	0.01712	0.65	12	9		10.5	0.000160651	0.000756
Prologis Inc	57836163200	0.02316	1.00	6.5	8	5	6.5	0.0002015	0.002266
FirstEnergy Corp	25324423440	0.03328	0.65	6.5	3.5	7	5.666667	9.85984E-05	0.000645
VeriSign Inc	22601232500	0	0.95	11	0		5.5	9.74174E-05	0.000841
Quanta Services Inc	6014865800	0.00379	1.40	15.5	0	8	7.833333	3.74942E-05	0.00033
Henry Schein Inc	10029679000	0	0.95	7	0	9.5	5.5	2.75104E-05	0.000373
Ameren Corp	18567884100	0.02624	0.55	6.5	6	5	5.833333	6.70039E-05	0.0004
ANSYS Inc	20667803100	0	1.05	12		13.5	12.75	9.71824E-05	0.00085
NVIDIA Corp	129242160000	0.00303	1.35	11.5	6.5	26.5	14.83333	0.000598617	0.006837
Sealed Air Corp	5788169360	0.01708	0.95	22.5	4		13.25	5.53408E-05	0.000215
Cognizant Technology Solutions Corp	34775916660	0.0126	1.15	6	17.5	11.5	11.66667	9.94449E-05	0.001567
SVB Financial Group	11777099840	0	1.60	19.5	0	10	9.833333	8.9988E-05	0.000738
Intuitive Surgical Inc	66169582220	0	1.00	14	0	17.5	10.5	0.000362993	0.002593
Affiliated Managers Group Inc	4138848000	0.01524	1.50	10	22	5.5	12.5	1.88129E-05	0.000243
Take-Two Interactive Software Inc	13987019800	0	0.90	25.5	0	21.5	15.66667	0.000139758	0.000493
Republic Services Inc	27992207950	0.01847	0.75	11.5	10	6	9.166667	0.000147562	0.000823
eBay Inc	28359481500	0.01606	1.05	10	0	1	3.666667	0.000129864	0.001167
Goldman Sachs Group Inc/The	77159098170	0.02295	1.25	10	18.5	11.5	13.33333	0.000375199	0.003779
Sempra Energy	41681142560	0.02617	0.70	11	8	6.5	8.5	0.00022475	0.001143
SBA Communications Corp	27108690750	0.00615	0.90	27			27	0.000294218	0.000956
Moody's Corp	42274208000	0.00893	1.10	11.5	11		11.25	0.000206139	0.001822
Booking Holdings Inc	77509777920	0	1.20	12	0	15.5	9.166667	0.00036446	0.003645
F5 Networks Inc	8727586640	0	1.05	12	0	12.5	8.166667	4.10381E-05	0.000359
Akamai Technologies Inc	14036662860	0	1.10	18	0	11	9.666667	9.9003E-05	0.000605
MarketAxess Holdings Inc	15280418730	0.00504	0.75	14	16	16	15.33333	8.70543E-05	0.000449
Devon Energy Corp	8430995000	0.0164	1.90	0	0	6.5	2.166667	5.41794E-06	0.000628
Teleflex Inc	16341099120	0.00385	0.95	15	2.5	10	9.166667	9.86972E-05	0.000608
Netflix Inc	133736675160	0	1.25	32	0	9	13.66667	0.00167692	0.00655
Allegion PLC	10917747500	0.00919	1.10	8.5	15	35.5	19.66667	4.0462E-05	0.000471
Agilent Technologies Inc	24299427360	0.00835	1.10	11	11	7.5	9.833333	0.000113125	0.001047
Anthem Inc	74218182800	0.01093	0.95	19.5	13	14	15.5	0.000601982	0.002763
CME Group Inc	74051717040	0.01452	0.65	3	5.5	6.5	5	0.000129814	0.001886
Juniper Networks Inc	8555110920	0.02973	1.10	6	11	-2.5	4.833333	3.03788E-05	0.000369
BlackRock Inc	75458088510	0.027	1.25	10.5	10	4	8.166667	0.000394485	0.003696
DTE Energy Co	24138070500	0.03263	0.55	5.5	6	5.5	5.666667	8.37321E-05	0.00052
Nasdaq Inc	17325815500	0.01779	0.85	8	5.5	10	7.833333	6.68727E-05	0.000577
Celanese Corp	15017385760	0.01996	1.30	8.5	13	10	10.5	6.22624E-05	0.000765
Philip Morris International Inc	129884445000	0.05606	0.85	6	4.5		5.25	0.000599238	0.004326
salesforce.com Inc	144003400000	0	1.10	30.5		8	19.25	0.001721014	0.006207
Huntington Ingalls Industries Inc	10399234000	0.0162	1.10	7	12	11.5	10.16667	3.53564E-05	0.000448
MetLife Inc	45006741140	0.03596	1.30	7.5	5.5	2	5	0.000198062	0.002293
Tapestry Inc	7210207680	0.05166	1.15	11	5.5	10.5	9	4.6476E-05	0.000325
CSX Corp	54419361720	0.0138	1.25	14.5	10	5	9.833333	0.000340756	0.002665
Edwards Lifesciences Corp	50939051100	0	0.95	16.5	0	12	9.5	0.000329342	0.001896
Ameriprise Financial Inc	20066112480	0.0245	1.40	12.5	3.5	18.5	11.5	0.000118752	0.001101
Zimmer Biomet Holdings Inc	29324367880	0.00673	0.95	4.5	4	9	5.833333	5.96146E-05	0.001092
CBRE Group Inc	18578736000	0	1.35	11	0	21.5	10.83333	8.00794E-05	0.000983
Mastercard Inc	284651995620	0.00463	1.00	19	12.5	35	22.16667	0.002175786	0.011154
CarMax Inc	16372295100	0	1.15	10.5	0	16	8.833333	6.73613E-05	0.000738
Intercontinental Exchange Inc	52611188000	0.01164	0.80	10.5	9.5	8.5	9.5	0.000241717	0.001649
Fidelity National Information Services Inc	84489062000	0.01018	0.85	7	5.5	5	5.833333	0.000266627	0.002814
Chipotle Mexican Grill Inc	21567252300	0	0.95	26.5	0	7	11.16667	0.000223951	0.000803
Wynn Resorts Ltd	12619580250	0.03403	1.70	27	9.5	46	27.5	0.000152611	0.000841
Assurant Inc	8031844560	0.01902	0.85	6.5	5	10.5	7.333333	2.66375E-05	0.000268
NRG Energy Inc	9973186160	0.00303	1.25		4	5.5	4.75	0	0
Regions Financial Corp	15829725990	0.03778	1.35	10.5	13.5	7	10.33333	8.97934E-05	0.000837
Monster Beverage Corp	31602982000	0	0.80	14.5	0	16.5	10.33333	0.000179559	0.000991
Mosaic Co/The	6866973190	0.01103	1.50	21		5	13	5.97858E-05	0.000404
Expedia Group Inc	13664198660	0.01442	1.10	24	11.5	9.5	15	0.000137148	0.000589
Discovery Inc	5063642800	0	1.15	18	0	17	11.66667	3.57147E-05	0.000228
CF Industries Holdings Inc	9806183200	0.02661	1.35		4	7.5	5.75	0	0
Viacom Inc	8244124330	0.03435	1.15	2	-2	14.5	4.833333	1.76682E-05	0.000371
Leidos Holdings Inc	12975756240	0.01484	1.00	9	3	11	7.666667	5.3645E-05	0.000508
Alphabet Inc	447664130550	0	1.05	16.5	0	18	11.5	0.00289433	0.018418
Cooper Cos Inc/The	15093795780	0.0002	0.90	14.5	0	11	8.5	8.58856E-05	0.000532
TE Connectivity Ltd	30714839250	0.02004	1.15	7.5	8	5.5	7	0.000115289	0.001384
Discover Financial Services	25973958480	0.02124	1.15	7.5	13.5	15	12	9.87609E-05	0.00117
TripAdvisor Inc	3900188160	0	1.10	19.5	0	10	9.833333	2.98011E-05	0.000168
Visa Inc	391903837680	0.00661	1.00	15	15	10.5	13.5	0.00241259	0.015356
Mid-America Apartment Communities Inc	15677231040	0.02794	0.70	1	3	8	4	2.33924E-05	0.00043
Xylem Inc/NY	13950720130	0.01239	1.10	14	8.5	11.5	11.33333	8.37779E-05	0.000601
Marathon Petroleum Corp	40128099600	0.0343	1.50	10.5	11.5	12.5	11.5	0.000221865	0.002359
Tractor Supply Co	11466867960	0.01445	1.05	11.5	10.5	4	8.666667	5.85379E-05	0.000472

Advanced Micro Devices Inc	45636475440	0	1.80	28	0	46	24.66667	0.000500705	0.003219
ResMed Inc	21516137040	0.01043	0.85	18	6	16	13.33333	0.000161342	0.000717
Mettler-Toledo International Inc	17478865800	0	1.10	10	0	26	12	6.84897E-05	0.000753
Copart Inc	19731501680	0	0.95	17.5	0	14	10.5	0.000135304	0.000735
Albemarle Corp	6897446650	0.0226	1.40	5.5	5.5	4	5	2.1141E-05	0.000378
Fortinet Inc	17522433300	0	1.10	28	0	26.5	18.16667	0.000192249	0.000755
Essex Property Trust Inc	21060994220	0.02447	0.70	-0.5	5.5	2.5	2.5	1.60173E-05	0.000578
Realty Income Corp	25418422810	0.03493	0.65	4.5	5.5	2.5	4.166667	8.03933E-05	0.000647
Seagate Technology PLC	15660202710	0.04362	1.35	4	1	24	9.666667	5.18474E-05	0.000828
Westrock Co	9990852300	0.04801	1.45	10	4	5.5	6.5	5.88834E-05	0.000568
IHS Markit Ltd	28875145880	0	1.05	18	0	3.5	7.166667	0.000203661	0.001188
Wabtec Corp	15135210720	0.00608	1.20	13.5	9	14.5	12.33333	8.39126E-05	0.000712
Western Digital Corp	14424142500	0.04124	1.45	1	3	4.5	2.833333	2.90774E-05	0.00082
PepsiCo Inc	186491736900	0.02856	0.75	6.5	5.5	9.5	7.166667	0.000690477	0.005481
Diamondback Energy Inc	12079904050	0.00996	1.40	16.5	11	11	13.75	8.32049E-05	0.000663
Nektar Therapeutics	3506125460	0	1.30	10.5	0	16	8.833333	1.44254E-05	0.000179
Maxim Integrated Products Inc	15010681230	0.03461	1.15	6	9.5	1.5	5.666667	5.62587E-05	0.000676
Church & Dwight Co Inc	17099611360	0.01306	0.65	9	6	10.5	8.5	6.94477E-05	0.000436
Duke Realty Corp	12934823490	0.02671	0.80	4.5	4.5	4.5	4.5	3.66502E-05	0.000405
Federal Realty Investment Trust	9890492080	0.03207	0.75	3	2	3	2.666667	2.42418E-05	0.000291
MGM Resorts International	16386790880	0.01634	1.55	25	0	12.5	12.5	0.00017233	0.000995
JB Hunt Transport Services Inc	12298035420	0.00901	1.05	9.5	7	15.5	10.66667	5.03276E-05	0.000506
Lam Research Corp	39770506270	0.01678	1.30	8.5	12.5	10.5	10.5	0.000159723	0.002026
Mohawk Industries Inc	10027796220	0	1.15	8.5	0	13.5	7.333333	3.33992E-05	0.000452
Pentair PLC	7258255740	0.01667	1.25	6	-3.5	-1.5	0.333333	2.19479E-05	0.000356
Vertex Pharmaceuticals Inc	55305250500	0	1.20	50	0	34	28	0.001083548	0.002601
Facebook Inc	563248549970	0	1.10	17.5	0	19	12.16667	0.003862335	0.024278
T-Mobile US Inc	66426843000	0	0.95	18	0	6	8	0.00046852	0.002473
United Rentals Inc	11162169120	0	1.70	14.5	0	23	12.5	6.34203E-05	0.000744
ABIOMED Inc	8364963750	0	1.30	12.5	0	23.5	12	4.09719E-05	0.000426
Alexandria Real Estate Equities Inc	18427614530	0.025	0.85	7	7.5	7.5	7.25	0	0
Delta Air Lines Inc	36004182810	0.02892	1.10	9.5	19	13	13.83333	0.000176764	0.001552
United Airlines Holdings Inc	23204134800	0	1.20	8.5	0	14.5	7.666667	7.72852E-05	0.001091
News Corp	2623138200	0.01522	1.20	12	15	6.5	11.16667	1.39926E-05	0.000123
Centene Corp	24604310160	0	1.05	15.5	0	16	10.5	0.000149436	0.001012
Macerich Co/The	3732221300	0.11355	0.90	3	4	1.5	2.833333	2.12425E-05	0.000132
Martin Marietta Materials Inc	16442763080	0.00836	1.10	8	6.5	8.5	7.666667	5.71456E-05	0.000709
PayPal Holdings Inc	122221645280	0	1.15	20	0	13	11	0.000957833	0.005508
Coty Inc	9056809400	0.04184	1.10	5	4.5	0.5	3.333333	3.29638E-05	0.00039
DISH Network Corp	17493697840	0	1.40	1	0	16.5	5.833333	6.85478E-06	0.00096
Alexion Pharmaceuticals Inc	24016712230	0	1.20	42	0	3.5	15.16667	0.000395253	0.001129
Everest Re Group Ltd	10917749220	0.02092	0.75	18.5	6.5	6.5	10.5	8.89213E-05	0.000321
WellCare Health Plans Inc	16029468000	0	1.05	20	0	20	13.33333	0.000125621	0.00066
News Corp	4946330610	0.01571	1.25	16.5	3.5	3.5	10	0	0
Exelon Corp	44094864240	0.03197	0.65	9	5.5	5	6.5	0.000213229	0.001123
Global Payments Inc	54251919480	0.00432	1.15	20	71	28	39.66667	0.000435266	0.002445
Crown Castle International Corp	56914481520	0.03506	0.70	12	8.5	12	10.83333	0.000350499	0.001561
Aptiv PLC	22848276000	0.00983	1.30	10	1	24	11.66667	9.87701E-05	0.001164
Advance Auto Parts Inc	11201950660	0.00148	1.00	14	16.5	8.5	13	6.21468E-05	0.000439
Capri Holdings Ltd	5336035650	0	1.15	10.5	0	21.5	10.66667	2.19543E-05	0.00024
Align Technology Inc	21182570010	0	1.10	17	0	15	10.66667	0.000141104	0.000913
Illumina Inc	46291770000	0	1.00	14	0	18.5	10.83333	0.000253947	0.001814
Alliance Data Systems Corp	4661788320	0.0249	1.20	9	14	20	14.33333	2.11933E-05	0.000219
LKQ Corp	10772139300	0	1.10	10.5	0	10	6.833333	4.43203E-05	0.000464
Nielsen Holdings PLC	7133990500	0.01197	1.00	45.5	-16.5	-1	9.333333	0.000131298	0.00028
Garmin Ltd	18416131250	0.02354	0.95	10.5	2.5	3	5.333333	9.36492E-05	0.000686
Cimarex Energy Co	4681223800	0.0174	1.50	16	15	15.5	15.5	3.27959E-05	0.000275
Zoetis Inc	56946308440	0.00549	1.00	13.5	13	25	17.16667	0.000314316	0.002231
Equinix Inc	48503284040	0.0173	0.85	22	8.5	5.5	12	0.000454621	0.001615
Digital Realty Trust Inc	25326084800	0.0356	0.80	7	7	5	6.333333	0.000106032	0.000794
	25921709167120							0.143861021	1.020196
EPS sum	25520439202370								

Schedule PKC-11b

Value Line Latest Data

(downloaded on Nov.21, 2019)

Value Line Latest Data										Dividend Paying		
(downloaded on Nov.21, 2019)										Weighted DCF		
3-5 years Growth Projections										Average		
EPS										Beta		
DCF										DCF		
Weighted										Weighted		
Name										Beta		
Mkt-Cap										Weighted		
Current										Weighted		
Dyield										Weighted		
Beta										Weighted		
EPS										Beta		
Gr. Proj.										Weighted		
DPS										Weighted		
Gr. Proj.										Weighted		
BVPS										Beta		
Gr. Proj.										Weighted		
Average										Weighted		
Gr. Proj.										Weighted		
EPS										Beta		
DCF										Weighted		
Weighted										Weighted		
Name										Beta		
Mkt-Cap										Weighted		
Current										Weighted		
Dyield										Weighted		
Beta										Weighted		
EPS										Beta		
Gr. Proj.										Weighted		
DPS										Weighted		
Gr. Proj.										Weighted		
BVPS										Beta		
Gr. Proj.										Weighted		
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Deere & Co	54180197110	0.01767	1.10	13.5	7	16	12.16667	0.000390747	0.002794	0.000351346	0.002752
Dominion Energy Inc	68234409700	0.04427	0.55	6.5	5	7	6.166667	0.000354085	0.001759	0.000338144	0.001733
Dover Corp	15771529620	0.01805	1.30	12.5	3.5	11	9	0.000106585	0.000961	7.92945E-05	0.000947
Alliant Energy Corp	12772305280	0.02672	0.60	6.5	5.5	7.5	6.5	5.54304E-05	0.000359	5.46157E-05	0.000354
Duke Energy Corp	66025632790	0.04338	0.50	6	2.5	2.5	3.666667	0.000323969	0.001547	0.000246514	0.001525
Regency Centers Corp	10792797240	0.03633	0.80	16	6	4	8.666667	0.000100792	0.000405	6.2093E-05	0.000399
Eaton Corp PLC	37131588000	0.03162	1.20	9	6.5	4	6.5	0.000214152	0.002089	0.000167455	0.002058
Ecolab Inc	53676797680	0.00988	1.00	10	9.5	11.5	10.33333	0.0002777	0.002516	0.000281922	0.002479
PerkinElmer Inc	10056862520	0.00309	1.15	11	2.5	7.5	7	5.33901E-05	0.000542	3.39981E-05	0.000534
Emerson Electric Co	44315953500	0.02749	1.20	11.5	4	8.5	8	0.000299266	0.002493	0.000222249	0.002456
EOG Resources Inc	41921913840	0.01596	1.45	33	13	15	20.33333	0.000684987	0.0002849	0.00042772	0.002807
Entergy Corp	23306880120	0.03178	0.60	0.5	4	4	2.833333	4.02675E-05	0.000655	6.51909E-05	0.000646
Equifax Inc	16939511700	0.01115	1.00	8.5	8	11.5	9.333333	7.67198E-05	0.000794	8.2148E-05	0.000782
FedEx Corp	39728765700	0.01707	1.30	7.5	10	10	9.166667	0.000172645	0.002421	0.000200949	0.002385
Macy's Inc	4639903300	0.10053	1.05	2.5	2.5	6	3.666667	2.75743E-05	0.000228	2.97947E-05	0.000225
FMC Corp	12583024200	0.01648	1.35	15	25	12	17.33333	9.89194E-05	0.000796	0.000111137	0.000785
Ford Motor Co	34613550810	0.06873	1.20	3	4	5	4	0.000161856	0.001947	0.000176012	0.001918
NextEra Energy Inc	114969890720	0.02126	0.55	10.5	10	7.5	9.333333	0.000686427	0.002964	0.000613732	0.00292
Franklin Resources Inc	13612253100	0.03805	1.25	7.5	11.5	2	7	7.30415E-05	0.000798	6.87649E-05	0.000786
Freeport-McMoRan Inc	16003581420	0.01813	2.15	22.5	9	15.75	9	0.00018391	0.001613	0.000130865	0.001589
Gap Inc/The	6117828640	0.05958	1.00	4.5	0.5	7	4	3.03738E-05	0.000287	2.84726E-05	0.000283
General Dynamics Corp	53327774980	0.02213	0.95	6	6	3	5	0.000206954	0.002375	0.000179011	0.00234
General Mills Inc	32135628980	0.03686	0.70	4	3	12	6.333333	0.000116884	0.001054	0.000150435	0.001039
Genuine Parts Co	15010219830	0.02952	0.95	8	5.5	7	6.833333	7.7886E-05	0.000668	6.85343E-05	0.000659
Atmos Energy Corp	12983433760	0.02114	0.60	7.5	7	7	7.166667	5.89905E-05	0.000365	5.61036E-05	0.00036
WW Grainger Inc	16825045100	0.01844	1.00	8.5	10	15	11.16667	8.21948E-05	0.000789	0.000101899	0.000777
Halliburton Co	18021316120	0.03507	1.50	21.5	0	8.5	10	0.000214422	0.001267	0.000113878	0.001248
Harley-Davidson Inc	5480451840	0.04223	1.15	8.5	2.5	12	7.666667	3.31445E-05	0.000295	3.05036E-05	0.000291
L3Harris Technologies Inc	45276322650	0.01465	0.90	16.5	32	24.25	0.000383824	0.00191	0.000541426	0.001882	0.001882
Helmerich & Payne Inc	4163280330	0.07398	1.65		0.5	4	2.25	0	0	1.87109E-05	0.000317
Fortive Corp	23539860400	0.00399	1.15	10	9.5	9	9.5	0.000114961	0.001269	0.000107825	0.00125
Hershey Co/The	31154299520	0.02073	0.65	6.5	6.5	23	12	0.000126175	0.000949	0.000204276	0.000935
Synchrony Financial	23624816080	0.02407	1.15	9.5	17	10.5	12.33333	0.00013312	0.001273	0.00016245	0.001255
Hormel Foods Corp	22880614500	0.0196	0.65	9	9	8	8.666667	0.00011849	0.000697	0.000113191	0.000687
Arthur J Gallagher & Co	17365291300	0.01847	0.90	14.5	3	11	9.5	0.000134148	0.000733	9.17064E-05	0.000722
Mondelez International Inc	75461175840	0.02175	0.95	8.5	10	5	7.833333	0.000380853	0.00336	0.000351769	0.003311
CenterPoint Energy Inc	12279816900	0.04703	0.80	12.5	2.5	13.5	9.5	0.000100711	0.00046	8.18166E-05	0.000454
Humana Inc	44729530020	0.00651	0.90	11.5	11	13.5	12	0.000255543	0.001887	0.00026215	0.001859
Illinois Tool Works Inc	55423250640	0.02482	1.10	9	12	2	7.666667	0.000301187	0.002858	0.000262208	0.002816
CDW Corp/DE	19784873700	0.01104	1.05	10.5	17.5	13.5	13.83333	0.00010815	0.000974	0.000137187	0.000959
Ingersoll-Rand PLC	31109274480	0.01633	1.20	12.5	10	13	11.83333	0.000207573	0.00175	0.000194866	0.001724
Interpublic Group of Cos Inc/The	8580509160	0.04248	1.05	11	9.5	8.5	9.666667	6.22661E-05	0.000422	5.5955E-05	0.000416
International Flavors & Fragrances Inc	14564246400	0.02199	0.95	8.5	9	15.5	11	7.36767E-05	0.000649	8.95947E-05	0.000639
Jacobs Engineering Group Inc	12772041480	0.00721	1.30	14.5	15	10.5	13.33333	9.14354E-05	0.000778	8.3185E-05	0.000767
Hanesbrands Inc	5447156820	0.03984	1.10	3	4	9	5.333333	1.79844E-05	0.000281	2.3707E-05	0.000277
Kellogg Co	22300725720	0.03487	0.60	4	3.5	14	7.166667	7.89906E-05	0.000627	0.000111013	0.000618
Broadridge Financial Solutions Inc	14037256240	0.01764	0.90	11	12	8.5	10.5	8.46213E-05	0.000592	8.01075E-05	0.000583
Perrigo Co PLC	6627195900	0.01725	1.25	2	10	5	5.666667	1.16248E-05	0.000388	2.27733E-05	0.000383
Kimberly-Clark Corp	46141687600	0.03061	0.70	7	3.5	5.25	0.000219916	0.001514	0.00017882	0.001492	0.001492
Kimco Realty Corp	9052675520	0.05224	0.85	5	5	5	5	4.39372E-05	0.000361	4.32914E-05	0.000355
Kohl's Corp	7513976940	0.05676	1.05	6.5	9.5	4	6.666667	4.35338E-05	0.00037	4.34888E-05	0.000364
Oracle Corp	184608756080	0.01707	1.05	10	11	-4	5.666667	0.00102041	0.009086	0.000632801	0.008952
Kroger Co/The	21315102390	0.02407	0.80	4	12	12	9.333333	6.44934E-05	0.000799	0.00011668	0.000788
Leggett & Platt Inc	6892049110	0.03055	1.05	9	7	5.5	7.166667	3.93878E-05	0.000339	3.28843E-05	0.000334
Lennar Corp	16717292130	0.00268	1.10	8	11	13	10.66667	6.48711E-05	0.000862	8.45338E-05	0.000849
Eli Lilly & Co	110040613910	0.02251	0.70	11.5	7	6.5	8.333333	0.000715942	0.003611	0.000542675	0.003557
L Brands Inc	4391868880	0.07552	1.05	-2.5	-11	-6.75	1.02057E-05	0.000216		1.10975E-06	0.000213
Lincoln National Corp	11304867000	0.02807	1.55	9	11	8.5	9.5	6.32337E-05	0.000821	6.49515E-05	0.000809
Loews Corp	14976053650	0.00497	1.00	13.5	0	5.5	6.333333	9.84904E-05	0.000702	4.73512E-05	0.000692
Lowe's Cos Inc	90941076170	0.01867	1.10	11.5	10.5	11	0.000574367	0.0004689		0.00054473	0.000462
Host Hotels & Resorts Inc	12084449300	0.04748	1.20	-1.5	3	0.5	0.666667	1.8196E-05	0.00068	3.0308E-05	0.00067
Xerox Holdings Corp	8280000400	0.02611	1.45	9.5	0.5	13	7.666667	4.74851E-05	0.000563	3.96849E-05	0.000554
IDEX Corp	12322480600	0.01234	1.10	9.5	11	12.5	11	6.23371E-05	0.000635	7.00101E-05	0.000626
Marsh & McLennan Cos Inc	54080222880	0.01698	0.90	9	7.5	6.5	7.666667	0.00027312	0.002281	0.000235522	0.002248
Masco Corp	13090700480	0.0118	1.20	9.5	9	9.25	6.58763E-05	0.000736		6.33878E-05	0.000725
S&P Global Inc	65523640000	0.0085	1.05	13	13	31	19	0.00042707	0.003225	0.000603133	0.003177
Medtronic PLC	149985177510	0.01932	0.85	8.5	6.5	3.5	6.166667	0.000739167	0.005976	0.000565114	0.005888
CVS Health Corp	97468222880	0.0267	0.95	6.5	8	10	8.166667	0.000422907	0.00434	0.000492717	0.004276
Motorola Solutions Inc	28503456960	0.01539	0.90	13	13	13	0.000195583	0.001202	0.000192709	0.001185	0.001185
Cboe Global Markets Inc	13671378520	0.01168	0.65	14.5	9.5	19.5	14.5	0.000100946	0.000417	9.94623E-05	0.00041
Newmont Goldcorp Corp	31539206330	0.01456	0.70	2.5	12.5	6	7	5.8752E-05	0.001035	0.000123913	0.00102
NIKE Inc	145255888600	0.01053	1.00	17	12	5.5	11.5	0.001235244	0.006809	0.00084618	0.006709
NiSource Inc	9734556640	0.0307	0.55	12.5	9	7.5	9.666667	7.19194E-05	0.000251	5.79287E-05	0.000247
Noble Energy Inc	9604223840	0.0239	1.70	0	5.5	-0.5	1.666667	1.07593E-05	0.000765	1.80822E-05	0.000754
Norfolk Southern Corp	49510640360	0.0198	1.20	15	10.5	2	9.166667	0.000397502	0.002785	0.000256955	0.002744
Principal Financial Group Inc	15072036160	0.04053	1.35	5.5	5.5	8	6.333333	6.82765E-05	0.000954	7.31913E-05	0.00094
Eversource Energy	26710282500	0.02594	0.55	5.5	5.5	4.5	5.166667	0.000102229	0.000689	9.65613E-05	0.000678
Northrop Grumman Corp	59492149000	0.01496	0.85	9.5	8	6	7.833333	0.000308613	0.00237	0.000257941	0.002335
Wells Fargo & Co	226439880860	0.0381	1.10	5	6	5	5.333333	0.000945194	0.011675	0.000966826	0.011504
Nucor Corp	16403931500	0.02957	1.35	13	6.5	7.5	9	0.000124171	0.001038	9.15943E-05	0.001023
PVH Corp	7252024640	0.00153	1.30	9	0	8	5.666667	3.11366E-05	0.000442	1.95062E-05	0.000435
Occidental Petroleum Corp	34374838160	0.08212	1.25	33	3	7	14.33333	0.00068586	0.002014	0.000367266	0.001984
Omnicom Group Inc	16874230000	0.03355	0.95	6.5	7	10	7.833333	7.881E-05	0.000751	8.8217E-05	0.00074
ONEOK Inc	29242287150	0.0517	1.50	17	10	10	12.33333	0.000309901	0.002056	0.000240693	0.002026
Raymond James Financial Inc	12352861710	0.01529	1.25	10	13.5	11	11.5	6.71972E-05	0.000724	7.48326E-05	0.000713
Parker-Hannifin Corp	25049390350	0.01805	1.35	9	10.5	13.5	11	0.000127819	0.001585	0.000149287	0.001562
Rollins Inc	11977828360	0.01148	0.90	13	11	9.5	11.16667	7.98509E-05	0.000505	6.84774E-05	0.0004

Public Service Enterprise Group Inc	30955488460	0.03071	0.65	6	5	5	5.333333	0.000132955	0.000943	0.000121323	0.000929
Raytheon Co	60449436530	0.01737	0.85	10	6	3	6.333333	0.000335022	0.002408	0.000226843	0.002373
Robert Half International Inc	6782386740	0.02123	1.20	9	7	17	11	3.56649E-05	0.000381	4.1472E-05	0.000376
Edison International	25431982920	0.03455	0.55		3.5	5.5	4.5	0	0	9.43486E-05	0.000646
Schlumberger Ltd	50031818460	0.05534	1.35	16.5	0		8.25	0.000527434	0.003166	0.000323778	0.003119
Charles Schwab Corp/The	57382388000	0.0152	1.30	12	18	10	13.33333	0.000366098	0.003497	0.000396321	0.003445
Sherwin-Williams Co/The	53171830180	0.00785	1.05	10.5	10.5	14	11.66667	0.000282285	0.002617	0.000306899	0.002578
JM Smucker Co/The	12026361600	0.03338	0.70	5	4.5	5	4.833333	4.74726E-05	0.000395	4.58337E-05	0.000389
Snap-on Inc	8703511740	0.02722	1.10	6	6.5	3.5	5.333333	3.59153E-05	0.000449	3.26712E-05	0.000442
AMETEK Inc	22514124570	0.00569	1.15	15.5	13	11	13.16667	0.000170042	0.001214	0.000143212	0.001196
Southern Co/The	65839520520	0.0395	0.50	3.5	3	3.5	3.333333	0.000232047	0.001543	0.000223469	0.00152
BB&T Corp	41694546230	0.03308	1.10	8	8	6.5	7.5	0.000223583	0.00215	0.00021051	0.002118
Southwest Airlines Co	29908265080	0.01267	1.15	10.5	16.5	9	12	0.000165893	0.001612	0.000184305	0.001588
Stanley Black & Decker Inc	23359684040	0.01796	1.20	9	6	4	6.333333	0.000119094	0.001314	8.83164E-05	0.001295
Public Storage	37292433200	0.03747	0.65	4.5	4	6.5	5	0.000145632	0.001136	0.000152264	0.00112
SunTrust Banks Inc	31269296800	0.03181	1.20	10	12.5	5	9.166667	0.000195523	0.001759	0.000180423	0.001733
Sysco Corp	40726319140	0.02255	0.70	10.5	7	-17.5	0	0.000245748	0.001336	4.24144E-05	0.001317
Texas Instruments Inc	108648898250	0.03097	1.10	6.5	10	12.5	9.666667	0.000493871	0.005602	0.000647972	0.00552
Textron Inc	10497815370	0.00174	1.35	13	12	4	9.666667	6.488E-05	0.000664	4.77514E-05	0.000655
Thermo Fisher Scientific Inc	123236564030	0.00247	1.05	10	11.5	6.5	9.333333	0.000592627	0.006065	0.000545926	0.005976
Tiffany & Co	14898140670	0.01881	1.15	10.5	7.5	6	8	8.71485E-05	0.000803	6.85045E-05	0.000791
TJX Cos Inc/The	71713905560	0.01551	0.90	14	14	9	12.33333	0.000526387	0.003025	0.000463022	0.002981
Globe Life Inc	10838545920	0.00689	1.00	10	7	8	8.333333	5.44788E-05	0.000508	4.53066E-05	0.000501
Johnson Controls International plc	33745933870	0.02452	1.20	4.5	3	4.5	4	0.000110837	0.001898	0.000101032	0.00187
Union Pacific Corp	120853278000	0.02229	1.15	14.5	10	3	9.166667	0.000956809	0.006514	0.00064175	0.006419
UnitedHealth Group Inc	261069677400	0.01568	1.00	14	14	11	13	0.001918502	0.012237	0.001768789	0.012057
Unum Group	6099344760	0.03855	1.30	9	11.5	5	8.5	3.72476E-05	0.000372	3.52646E-05	0.000366
Marathon Oil Corp	9351170010	0.01711	2.00		12	2.5	7.25	0	0	3.89681E-05	0.000864
Ventas Inc	21790146560	0.05423	0.65	4	4.5	1	3.166667	9.73512E-05	0.000664	8.73068E-05	0.000654
VF Corp	34146477000	0.02246	1.15	7	4	4.5	5.166667	0.000149245	0.001841	0.000117814	0.001814
Vornado Realty Trust	12206766000	0.04128	0.95	-1.5	2	3	1.666667	1.48594E-05	0.000544	2.99848E-05	0.000536
Vulcan Materials Co	18628966250	0.00881	1.15	14.5	10.5	3.5	9.5	0.000134864	0.001004	8.96741E-05	0.000989
Weyerhaeuser Co	21989140420	0.04609	1.20	17.5	6	0	7.833333	0.000232033	0.001237	0.000128191	0.001219
Whirlpool Corp	9016112000	0.03365	1.20	6.5	2.5	17	8.666667	4.21528E-05	0.000507	5.07071E-05	0.0005
Williams Cos Inc/The	27125656620	0.06792	1.90	20	6	8.5	11.5	0.000349285	0.002416	0.00023405	0.00238
WEC Energy Group Inc	27821455200	0.02676	0.50	6	6	3.5	5.166667	0.000114188	0.000652	0.000101659	0.000642
AES Corp/VA	12348409800	0.02935	1.15		5.5	0	2.75	0	0	3.26517E-05	0.000656
Amgen Inc	133994433840	0.02572	1.05	7	7	8.5	7.5	0.000606843	0.006595	0.000629265	0.006498
Apple Inc	1169422915350	0.0117	1.05	12.5	12	12.5	12.33333	0.007533191	0.057555	0.007331935	0.056709
Cintas Corp	26854110000	0.00983	1.00	15.5	16	4.5	12	0.000208435	0.001259	0.000161751	0.00124
Comcast Corp	201145088750	0.019	0.90	13	13	10	12	0.001416454	0.008485	0.001301857	0.008361
Molson Coors Brewing Co	10281485110	0.04352	0.95	5.5	9	4.5	6.333333	4.80558E-05	0.000458	5.13927E-05	0.000451
KLA Corp	27404083980	0.01958	1.15	10	9.5	22	13.83333	0.000154859	0.001477	0.000201574	0.001455
Marriott International Inc/MD	43387809270	0.01447	1.15	17.5	10		13.75	0.000387902	0.002339	0.000306514	0.002304
McCormick & Co Inc/MD	20753581500	0.01358	0.70	8	6.5	13.5	9.333333	9.15612E-05	0.000681	0.000103082	0.000671
Nordstrom Inc	5270194300	0.04359	1.05	5	6	2.5	4.5	2.33887E-05	0.000259	2.18014E-05	0.000256
PACCAR Inc	27272164900	0.01623	1.20	7.5	6.5	11	8.333333	0.0001174	0.001534	0.000126256	0.001511
Costco Wholesale Corp	132147704490	0.00865	0.85	9	9.5	9	9.166667	0.000613464	0.005265	0.000614663	0.005188
First Republic Bank/CA	18272273640	0.007	1.10	10.5	6	12	9.5	9.62399E-05	0.000942	8.63571E-05	0.000928
Stryker Corp	76483178100	0.01018	0.90	13	9	15	12.33333	0.000504916	0.003226	0.000473827	0.003179
Tyson Foods Inc	33093970900	0.01854	0.75	7.5	14	11	10.83333	0.000146179	0.001163	0.00019545	0.001146
Lamb Weston Holdings Inc	12194799870	0.00958	0.75	11	15.5		13.25	6.86538E-05	0.000429	8.03776E-05	0.000422
Applied Materials Inc	55101926100	0.01408	1.30	8.5	13	14	11.83333	0.000257448	0.003358	0.000339089	0.003308
American Airlines Group Inc	12366377340	0.01417	1.30	7.5	7	-27.5	-4.33333	5.19952E-05	0.000754	-1.68314E-05	0.000742
Cardinal Health Inc	16206760080	0.03473	1.15	11	3	5.5	6.5	0.000111396	0.000874	7.54921E-05	0.000861
Cerner Corp	21254943990	0.01064	0.95	9	0	7	5.333333	0.000100743	0.000946	6.30772E-05	0.000933
Cincinnati Financial Corp	17632955820	0.02075	0.85	8.5	3	2.5	4.666667	8.81321E-05	0.000703	5.52958E-05	0.000692
DR Horton Inc	20105279670	0.01283	1.05	7.5	11	12.5	10.33333	8.32238E-05	0.00099	0.000108478	0.000975
Flowserve Corp	6308760600	0.01576	1.45	13.5	3	9.5	8.666667	4.48958E-05	0.000429	3.00424E-05	0.000422
Expeditors International of Washington Inc	12854319480	0.01325	1.00	9	8	7	8	6.25694E-05	0.000603	5.56738E-05	0.000594
Fastenal Co	20222562020	0.02496	1.10	8.5	7	6.5	7.333333	0.000105236	0.001043	9.26567E-05	0.001027
M&T Bank Corp	21505521200	0.027	1.05	9.5	10.5	7	9	0.000124272	0.001058	0.000117412	0.001043
Xcel Energy Inc	33080213770	0.02626	0.50	5.5	6	5	5.5	0.000127119	0.000775	0.00012525	0.000764
Fifth Third Bancorp	21119689920	0.03226	1.20	7	12.5	9	9.5	0.000102349	0.001188	0.000125623	0.00117
Gilead Sciences Inc	82082672480	0.03884	0.95	-1.5	6	6.5	3.666667	9.06025E-05	0.003655	0.000288938	0.003601
Hasbro Inc	12986820030	0.02866	0.90	7.5	6	2	5.166667	6.37552E-05	0.000548	4.86227E-05	0.00054
Huntington Bancshares Inc/OH	15140188300	0.04093	1.20	11.5	13	7	10.5	0.000112328	0.000852	0.000103542	0.000839
Welltower Inc	34381155480	0.04102	0.65	10.5	5	0.5	5.333333	0.000238788	0.001048	0.000151557	0.001032
Northern Trust Corp	22523056600	0.02634	1.25	8.5	10.5	6	8.333333	0.000118726	0.001132	0.000115224	0.0013
Packaging Corp of America	10613054960	0.02818	1.15	6	7.5	12.5	8.666667	4.4287E-05	0.000572	5.6891E-05	0.000564
Paychex Inc	30693698000	0.02892	1.00	10.5	10	7.5	9.333333	0.000194855	0.001439	0.000175214	0.001418
People's United Financial Inc	7238066880	0.0435	1.05	9	1.5	4	4.833333	4.59566E-05	0.000356	3.10497E-05	0.000351
QUALCOMM Inc	97764768900	0.02897	1.10	10.5	8	13	10.5	0.00062089	0.005041	0.000611765	0.004967
Roper Technologies Inc	36740798640	0.00581	1.05	11.5	10	12.5	11.33333	0.000208628	0.001808	0.000202726	0.001782
Ross Stores Inc	39949461200	0.00924	1.00	9.5	12.5	11.5	11.16667	0.000196016	0.001873	0.000224028	0.001845
Starbucks Corp	98731600000	0.01962	0.90	13	13.5		13.25	0.000698319	0.004165	0.000669957	0.004104
KeyCorp	18792998640	0.03878	1.25	10.5	13	7	10.16667	0.000128447	0.001101	0.00012361	0.001085
State Street Corp	26548115230	0.02849	1.30	5	8.5	7.5	7	9.85583E-05	0.001618	0.000121981	0.001594
US Bancorp	92321485490	0.02842	1.05	6	9	8	7.666667	0.000386316	0.004544	0.000452711	0.004477
AO Smith Corp	7844056080	0.01996	1.20	7.5	17.5	9	11.33333	3.51895E-05	0.000441	4.86979E-05	0.000435
T Rowe Price Group Inc	28258559610	0.02514	1.15	10	9	10	9.666667	0.000167421	0.001523	0.000160555	0.001501
Waste Management Inc	47756809370	0.01821	0.75	8.5	8	7.5	8	0.000232768	0.001679	0.000218219	0.001654
CBS Corp	13728594250	0.01846	1.05	9.5	6	13.5	9.666667	7.35757E-05	0.000676	7.35608E-05	0.000666
Allergan PLC	60718113920	0.016	1.05	3.5	9.5	2	5	0.000145945	0.002988	0.000186199	0.002944
Constellation Brands Inc	31131178280	0.01614	0.85	8.5	10.5	8	9	0.000148585	0.00124	0.000153648	0.001222
Xilinx Inc	22886011670	0.01626	1.15	9.5	5.5	8	7.666667	0.000120181	0.001234	9.88793E-05	0.001216
DENTSPLY SIRONA Inc	12595304820	0.00706	0.90	4.5	10	0.5	5	3.08289E-05	0.000531	3.32946E-05	0.000524
Zions Bancorp NA	8333132640	0.02782	1.25	9.5		6.5	8	4.84894E-05	0.000488	4.19236E-05	0.000481
Alaska Air Group Inc	8429960120	0.02046	1.05								

Citizens Financial Group Inc	16519322000	0.03789	1.25	12	18.5	5	11.83333	0.000124016	0.000968	0.000120898	0.000954
Allstate Corp/The	35764742400	0.01812	0.80	10.5	7	9	8.833333	0.000207993	0.001341	0.000177157	0.001321
FLIR Systems Inc	7144988780	0.01277	0.95	12	6.5	7.5	8.666667	4.47221E-05	0.000318	3.29951E-05	0.000313
Equity Residential	32181537640	0.02619	0.75		4	3.5	3.75	0	0	9.53906E-05	0.001115
BorgWarner Inc	8676835860	0.01618	1.40	8	10.5	9.5	9.333333	3.93804E-05	0.000569	4.4188E-05	0.000561
Simon Property Group Inc	45487191870	0.05667	0.85	4.5	6.5	3.5	4.833333	0.000219491	0.001812	0.000223466	0.001786
Eastman Chemical Co	10452705730	0.03226	1.30	8	5.5	4.5	6	5.56339E-05	0.000637	4.50055E-05	0.000628
AvalonBay Communities Inc	30217270320	0.0281	0.75	2.5	6.5	3	4	7.57068E-05	0.001062	9.58216E-05	0.001047
Prudential Financial Inc	37434240000	0.04296	1.35	7	9	3.5	6.5	0.000200844	0.002369	0.000189062	0.002334
United Parcel Service Inc	102089515230	0.03227	1.00	8.5	7.5	35.5	17.16667	0.000567727	0.004785	0.000974601	0.004715
Apartment Investment & Management Co	8127632150	0.02858	0.80	-3	4	0.5	0.5	-7.04291E-07	0.000305	1.26316E-05	0.0003
Walgreens Boots Alliance Inc	54748464940	0.02983	0.95	9.5	7.5	9.5	8.833333	0.000323977	0.002438	0.000302108	0.002402
McKesson Corp	27154331600	0.01088	1.15	10.5	8.5	8.5	9.166667	0.000148219	0.001464	0.000129229	0.001442
Lockheed Martin Corp	110769281700	0.02445	0.80	11.5	10.5	11		0.000731335	0.004154	0.000694695	0.004093
AmerisourceBergen Corp	18028471100	0.01828	1.00	8	3.5	8	6.5	8.36691E-05	0.000845	6.98359E-05	0.000833
Capital One Financial Corp	44946733710	0.01658	1.25	5.5	1.5	7.5	4.833333	0.000151764	0.002633	0.00013558	0.002595
Darden Restaurants Inc	14068579500	0.03068	0.80	11	8	10	9.666667	9.38821E-05	0.000528	8.37062E-05	0.00052
NetApp Inc	14022205440	0.03125	1.30	10	16.5	1	9.166667	8.72925E-05	0.000854	8.05286E-05	0.000842
Citrix Systems Inc	14704442400	0.0124	1.10	7		10	8.5	5.70925E-05	0.000758	6.65032E-05	0.000747
DXC Technology Co	9187768220	0.0234	1.30	10	13.5	10	11.16667	5.3647E-05	0.00056	5.7867E-05	0.000552
Hartford Financial Services Group Inc/The	22310059900	0.01939	0.90	13	5.5	6	8.166667	0.000157541	0.000941	0.000104941	0.000927
Iron Mountain Inc	9782962010	0.07262	0.90	8.5	5	-7.5	2	7.36928E-05	0.000413	4.21754E-05	0.000407
Estee Lauder Cos Inc/The	70260879780	0.00983	0.85	14	12	4	10	0.000495706	0.002799	0.000357986	0.002758
Universal Health Services Inc	12302742000	0.00569	0.95	11	23	11	15	6.68949E-05	0.000548	8.8704E-05	0.00054
E*TRADE Financial Corp	10360507760	0.01221	1.30	17.5		8.5	13	9.14331E-05	0.000631	6.84258E-05	0.000622
Skyworks Solutions Inc	16362815000	0.01833	1.15	6	11	15.5	10.83333	6.04987E-05	0.000882	9.64699E-05	0.000869
National Oilwell Varco Inc	8241371520	0.00936	1.35	31	-10.5	1	7.166667	0.000123928	0.000522	3.0968E-05	0.000514
Quest Diagnostics Inc	14127021360	0.02021	0.95	8.5	8.5	8.5	8.5	7.02361E-05	0.000629	6.92039E-05	0.00062
Activision Blizzard Inc	41551342100	0.00684	1.05	10	9	9.5	9.5	0.000208751	0.002045	0.000196055	0.002015
Rockwell Automation Inc	22671476870	0.02079	1.25	9.5	6	6.5	7.333333	0.000124097	0.001328	9.93509E-05	0.001309
Kraft Heinz Co/The	37965895490	0.05146	0.90	0	-4.5	-1	-1.83333	9.15768E-05	0.001602	5.72578E-05	0.001578
American Tower Corp	96516626000	0.01744	0.75	11.5	8	8	9.166667	0.000603697	0.003393	0.000489909	0.003343
HollyFrontier Corp	8450380400	0.02674	1.25	18	3.5	12	11.16667	8.28417E-05	0.000495	5.4599E-05	0.000488
Jack Henry & Associates Inc	11567477950	0.01064	0.85	12	9.5	9	10.16667	7.11793E-05	0.000461	6.02868E-05	0.000454
Ralph Lauren Corp	7977196560	0.02572	1.25	8	5.5	0.5	4.666667	3.99149E-05	0.000467	2.68897E-05	0.000461
Boston Properties Inc	21345567100	0.02753	0.90	5	7	5.5	5.833333	7.82596E-05	0.0009	8.54377E-05	0.000887
Amphenol Corp	30307412240	0.00978	1.05	9.5	9	5	7.833333	0.00014951	0.001492	0.00012387	0.00147
Pioneer Natural Resources Co	21611964090	0.01349	1.45			8	8	0	0	9.38535E-05	0.001447
Valero Energy Corp	39911365070	0.03704	1.30	11.5	8	5.5	8.333333	0.000288415	0.002432	0.000224725	0.002396
Western Union Co/The	11307334320	0.02966	0.95	6.5	13.5	39.5	19.83333	5.06814E-05	0.000504	0.000120598	0.000496
CH Robinson Worldwide Inc	10219490000	0.02647	0.90	9	7.5	13	9.833333	5.63617E-05	0.000431	5.95186E-05	0.000425
Accenture PLC	132861120000	0.01619	1.05	9	9.5	19	12.5	0.000665845	0.006539	0.000872559	0.006443
Yum! Brands Inc	29677571440	0.01712	0.65	12	9		10.5	0.000192173	0.000904	0.000168613	0.000891
Prologis Inc	57836163200	0.02316	1.00	6.5	8	5	6.5	0.000241038	0.002711	0.000237495	0.002671
FirstEnergy Corp	25324423440	0.03328	0.65	6.5	3.5	7	5.666667	0.000117945	0.000772	0.000106303	0.00076
Quanta Services Inc	6014865800	0.00379	1.40	15.5	0	8	7.833333	4.48511E-05	0.000395	2.28543E-05	0.000389
Ameren Corp	18567884100	0.02624	0.55	6.5	6	5	5.833333	8.01512E-05	0.000479	7.31813E-05	0.000472
NVIDIA Corp	129242160000	0.00303	1.35	11.5	6.5	26.5	14.83333	0.000716076	0.008178	0.000904817	0.008058
Sealed Air Corp	5788169360	0.01708	0.95	22.5	4		13.25	6.61996E-05	0.000258	4.02848E-05	0.000254
Cognizant Technology Solutions Corp	34775916660	0.0126	1.15	6	17.5	11.5	11.66667	0.000118958	0.001875	0.000208795	0.001847
Affiliated Managers Group Inc	4138848000	0.01524	1.50	10	22	5.5	12.5	2.25044E-05	0.000291	2.69888E-05	0.000287
Republic Services Inc	27992207950	0.01847	0.75	11.5	10	6	9.166667	0.000176516	0.000984	0.000143478	0.00097
eBay Inc	28359481500	0.01606	1.05	10	0	1	3.666667	0.000155345	0.001396	6.94446E-05	0.001375
Goldman Sachs Group Inc/The	77159098170	0.02295	1.25	10	18.5	11.5	13.33333	0.00044882	0.004521	0.000562371	0.004454
Sempra Energy	41681142560	0.02617	0.70	11	8	6.5	8.5	0.00026885	0.001368	0.000216144	0.001348
SBA Communications Corp	27108690750	0.00615	0.90	27			27	0.000351949	0.001144	0.000346776	0.001127
Moody's Corp	42274208000	0.00893	1.10	11.5	11		11.25	0.000246587	0.00218	0.00023806	0.002148
MarketAxess Holdings Inc	15280418730	0.00504	0.75	14	16	16	15.33333	0.000104136	0.000537	0.000112039	0.000529
Devon Energy Corp	8430995000	0.0164	1.90	0	0	6.5	2.166667	6.48104E-06	0.000751	1.48915E-05	0.00074
Teleflex Inc	16341099120	0.00385	0.95	15	2.5	10	9.166667	0.000118063	0.000728	7.22194E-05	0.000717
Allegion PLC	10917747500	0.00919	1.10	8.5	15	35.5	19.66667	4.84013E-05	0.000563	0.000104254	0.000555
Agilent Technologies Inc	24299427360	0.00835	1.10	11	11	7.5	9.833333	0.000135322	0.001253	0.000120186	0.001234
Anthem Inc	74218182800	0.01093	0.95	19.5	13	14	15.5	0.000720101	0.003305	0.000571661	0.003256
CME Group Inc	74051717040	0.01452	0.65	3	5.5	6.5	5	0.000155286	0.002256	0.0002219	0.002223
Juniper Networks Inc	8555110920	0.02973	1.10	6	11	-2.5	4.833333	3.63396E-05	0.000441	3.11274E-05	0.000435
BlackRock Inc	75458088510	0.027	1.25	10.5	10	4	8.166667	0.00047189	0.004421	0.000382541	0.004356
DTE Energy Co	24138070500	0.03263	0.55	5.5	6	5.5	5.666667	0.000100162	0.000622	0.000100578	0.000613
Nasdaq Inc	17325815500	0.01779	0.85	8	5.5	10	7.833333	7.99943E-05	0.00069	7.74731E-05	0.00068
Celanese Corp	15017385760	0.01996	1.30	8.5	13	10	10.5	7.44794E-05	0.000915	8.73944E-05	0.000902
Philip Morris International Inc	129884445000	0.05606	0.85	6	4.5		5.25	0.000716819	0.005175	0.000660034	0.005099
Huntington Ingalls Industries Inc	10399234000	0.0162	1.10	7	12	11.5	10.16667	4.22939E-05	0.000536	5.70043E-05	0.000528
MetLife Inc	45006741140	0.03596	1.30	7.5	5.5	2	5	0.000236926	0.002742	0.000180544	0.002702
Tapestry Inc	7210207680	0.05166	1.15	11	5.5	10.5	9	5.55954E-05	0.000389	4.79464E-05	0.000383
CSX Corp	54419361720	0.0138	1.25	14.5	10	5	9.833333	0.000407618	0.003188	0.000283531	0.003142
Ameriprise Financial Inc	20066112480	0.0245	1.40	12.5	3.5	18.5	11.5	0.000142053	0.001317	0.000130585	0.001297
Zimmer Biomet Holdings Inc	29324367880	0.00673	0.95	4.5	4	9	5.833333	7.1312E-05	0.001306	8.83822E-05	0.001287
Mastercard Inc	284651995620	0.00463	1.00	19	12.5	35	22.16667	0.002602713	0.013342	0.002981727	0.013146
Intercontinental Exchange Inc	52611188000	0.01164	0.80	10.5	9.5	8.5	9.5	0.000289146	0.001973	0.000260457	0.001944
Fidelity National Information Services Inc	84489062000	0.01018	0.85	7	5.5	5	5.833333	0.000318944	0.003366	0.000268501	0.003317
Wynn Resorts Ltd	12619580250	0.03403	1.70	27	9.5	46	27.5	0.000182556	0.001006	0.000182837	0.000991
Assurant Inc	8031844560	0.01902	0.85	6.5	5	10.5	7.333333	3.18642E-05	0.00032	3.45165E-05	0.000315
NRG Energy Inc	9973186160	0.00303	1.25		4	5.5	4.75	0	0	2.33074E-05	0.000576
Regions Financial Corp	15829725990	0.03778	1.35	10.5	13.5	7	10.33333	0.000107412	0.001002	0.000104592	0.000987
Mosaic Co/The	6866973190	0.01103	1.50	21		5	13	7.15168E-05	0.000483	4.49543E-05	0.000476
Expedia Group Inc	13664198660	0.01442	1.10	24	11.5	9.5	15	0.000164059	0.000705	0.000104443	0.000694
CF Industries Holdings Inc	9806183200	0.02661	1.35		4	7.5	5.75	0	0	3.8439E-05	0.000611
Viacom Inc	8244124330	0.03435	1.15	2	-2	14.5	4.833333	2.1135E-05	0.000444	3.17975E-05	0.000438
Leidos Holdings Inc	12975756240	0.01484	1.00	9	3	11	7.666667</				

Marathon Petroleum Corp	40128099600	0.0343	1.50	10.5	11.5	12.5	11.5	0.000265399	0.002821	0.000280349	0.00278
Tractor Supply Co	11466867960	0.01445	1.05	11.5	10.5	4	8.666667	7.00241E-05	0.000564	5.38816E-05	0.000556
ResMed Inc	21516137040	0.01043	0.85	18	6	16	13.33333	0.000193	0.000857	0.000143549	0.000845
Albemarle Corp	6897446650	0.0226	1.40	5.5	5.5	4	5	2.52893E-05	0.000453	2.33068E-05	0.000446
Essex Property Trust Inc	21060994220	0.02447	0.70	-0.5	5.5	2.5	2.5	1.91602E-05	0.000691	4.84161E-05	0.000681
Realty Income Corp	25418422810	0.03493	0.65	4.5	5.5	2.5	4.166667	9.61678E-05	0.000774	9.0773E-05	0.000763
Seagate Technology PLC	15660202710	0.04362	1.35	4	1	24	9.666667	6.20207E-05	0.000991	0.000102987	0.000976
Westrock Co	9990852300	0.04801	1.45	10	4	5.5	6.5	7.04373E-05	0.000679	5.28648E-05	0.000669
Wabtec Corp	15135210720	0.00608	1.20	13.5	9	14.5	12.33333	0.000100378	0.000851	9.07226E-05	0.000839
Western Digital Corp	14424142500	0.04124	1.45	1	3	4.5	2.833333	3.47829E-05	0.00098	4.67365E-05	0.000966
PepsiCo Inc	186491736900	0.02856	0.75	6.5	5.5	9.5	7.166667	0.00082596	0.006556	0.000872061	0.00646
Diamondback Energy Inc	12079904050	0.00996	1.40	16.5	11	13.75	9.95311E-05	0.000793	0.000793	8.26497E-05	0.000781
Maxim Integrated Products Inc	15010681230	0.03461	1.15	6	9.5	1.5	5.666667	6.72976E-05	0.000809	6.39577E-05	0.000797
Church & Dwight Co Inc	17099611360	0.01306	0.65	9	6	10.5	8.5	8.30745E-05	0.000521	7.78791E-05	0.000513
Duke Realty Corp	12934823490	0.02671	0.80	4.5	4.5	4.5	4.5	4.38416E-05	0.000485	4.31973E-05	0.000478
Federal Realty Investment Trust	9890492080	0.03207	0.75	3	2	3	2.666667	2.89984E-05	0.000348	2.70252E-05	0.000343
MGM Resorts International	16386790880	0.01634	1.55	25	0	12.5	12.5	0.000206144	0.001191	0.00010774	0.001173
JB Hunt Transport Services Inc	12298035420	0.00901	1.05	9.5	7	15.5	10.66667	6.02027E-05	0.000605	6.59741E-05	0.000596
Lam Research Corp	39770506270	0.01678	1.30	8.5	12.5	10.5	10.5	0.000191064	0.002423	0.000225299	0.002388
Pentair PLC	7258255740	0.01667	1.25	6	-3.5	-1.5	0.333333	2.62545E-05	0.000425	6.71474E-06	0.000419
Alexandria Real Estate Equities Inc	18427614530	0.025	0.85	7	7	7.5	7.25	0	0	8.37498E-05	0.000723
Delta Air Lines Inc	36004182810	0.02892	1.10	9.5	19	13	13.83333	0.000211448	0.001856	0.000281438	0.001829
News Corp	2623138200	0.01522	1.20	12	15	6.5	11.16667	1.67381E-05	0.000148	1.54749E-05	0.000145
Macerich Co/The	3732221300	0.11355	0.90	3	4	1.5	2.833333	2.54106E-05	0.000157	2.47336E-05	0.000155
Martin Marietta Materials Inc	16442763080	0.00836	1.10	8	6.5	8.5	7.666667	6.83586E-05	0.000848	6.4812E-05	0.000835
Coty Inc	9056809400	0.04184	1.10	5	4.5	0.5	3.333333	3.94319E-05	0.000467	3.17352E-05	0.00046
Everest Re Group Ltd	10917749220	0.02092	0.75	18.5	6.5	6.5	10.5	0.000106369	0.000384	6.40459E-05	0.000378
News Corp	4946330610	0.01571	1.25	16.5	3.5	10	0	0	0	2.66124E-05	0.000286
Exelon Corp	44094864240	0.03197	0.65	9	5.5	5	6.5	0.000255068	0.001343	0.000199593	0.001324
Global Payments Inc	54251919480	0.00432	1.15	20	71	28	39.66667	0.000520673	0.002924	0.001006848	0.002881
Crown Castle International Corp	56914481520	0.03506	0.70	12	8.5	12	10.83333	0.000419273	0.001867	0.000381907	0.00184
Aptiv PLC	22848276000	0.00983	1.30	10	1	24	11.66667	0.00011815	0.001392	0.000134088	0.001372
Advance Auto Parts Inc	11201950660	0.00148	1.00	14	16.5	8.5	13	7.4341E-05	0.000525	6.80711E-05	0.000517
Alliance Data Systems Corp	4661788320	0.0249	1.20	9	14	20	14.33333	2.53518E-05	0.000262	3.66049E-05	0.000258
Nielsen Holdings PLC	7133990500	0.01197	1.00	45.5	-16.5	-1	9.333333	0.000157061	0.000334	3.4879E-05	0.000329
Garmin Ltd	18416131250	0.02354	0.95	10.5	2.5	3	5.333333	0.000112025	0.00082	6.59171E-05	0.000808
Cimarex Energy Co	4681223800	0.0174	1.50	16	15	15.5	15.5	3.9231E-05	0.000329	3.7564E-05	0.000324
Zoetis Inc	56946308440	0.00549	1.00	13.5	13	25	17.16667	0.000375991	0.002669	0.000467163	0.00263
Equinix Inc	48503284040	0.0173	0.85	22	8.5	5.5	12	0.000543826	0.001932	0.000309888	0.001904
Digital Realty Trust Inc	25326084800	0.0356	0.80	7	7	5	6.333333	0.000126838	0.00095	0.000117037	0.000936
	21652511179810							0.12851445	1.000969	0.12006738	1.004312
EPS sum	21334287156700										