Attachment ES-5

Expected Market Cost Rate of Equity
Using Data for the Barometer Group of Water Companies
5 Year Forecasted Growth Rates

	Time Period	Adjusted Dividend Yield(1) (1)	Growth Rate (2)	Expected Rate of Return (3=1+2)
(1)	52 Week Average Ending:	1.86%	7.52%	9.38%
(2)	Spot Price Ending:	1.63%	7.52%	9.15%
(3)	Average:	1.75%	7.52%	9.26%

Sources: Value Line August 30, 2019
Barron's August 26, 2019

Attachment ES-6

Dividend Yields of Company Barometer Group

	Average	American States Water Co	American Water Works	California Water Service Group	Middlesex Water	York Water
Symbol		AWR	AWK	CWT	MSEX	YORW
Div		1.22	2.10	0.82	1 00	0.73
52 wk low		58.26	85.55	40 10	43.12	29.10
52 wk high		91.08	126.79	56.50	63.68	39.20
Spot Price		90.56	125.10	55.45	59 78	37.35
Spot Div Yield	1 63%	1 35	1.68	1 48	1 67	1 95
52 wk Div Yield	1.86%	1 63	1.98	1 70	1 87	2 14
Average	1.75%	1.49%	1 83%	1 59%	1.77%	2 05%

Source. Barron's August 26, 2019
Value Line August 30, 2019

Attachment ES-7

Five Year Growth Estimate Forecast for Company Barometer Group

Company	Symbol	Yahoo! Finance	Zacks	Morning star	Value Line	Average
				Source		
American States Water Co	AWR	6 00%	8.00%	N/A	8.00%	7.33%
American Water Works	AWK	8 20%	8.08%	9 00%	9 50%	8.70%
California Water Service Group	CWT	9 80%	10 00%	N/A	8 00%	9 27%
Middlesex Water	MSEX	2 70%	N/A	N/A	7 50%	5 10%
York Water	YORW	4.90%	N/A	N/A	9 50%	7.20%
						7.52%

Source:
Internet
August 26, 2019

Attachment ES-8

Company	Beta
American States Water Co	0 70
American Water Works	0 60
California Water Service Group	0 70
Middlesex Water	0 75
York Water	0 75
Average beta for CAPM	0 70

Source:
Value Line
August 30, 2019

Attachment ES-9

Future Risk Free Rate Treasury note 10-yr Note	Yield
2Q 2019	2.33
3Q 2019	2.10
4Q 2019	2.10
1Q 2020	2.10
2Q 2020	2.20
3Q 2020	2.20
4Q 2020	2.30
2021-2025	3.20
Average	2.32

Source:
Blue Chip
June 1, 2019
August 1, 2019

Attachment ES-10

Required Rate of Return on Market as a Whole Forecasted

	Dividend Yield	+	Growth Rate	=	Expected Market Return
Value Line Estimate	2.30%		12.47% [(a)]		14.77%
S&P 500	2.14% [(b)]		8.00%		10.14%
Average Expected Market Return				=	12.46%

(a) ((1+0.60)^.25) -1) Value Line forecast for the 3 to 5 year index appreciation is 60%
(b) (0.0206*(1+(0.08/2))) S&P 500 dividend yield multiplied by half the growth rate

Attachment ES-11
Page 1 of 2

CAPM with forecasted return

	Re	Required return on individual equity security
	Rf	Risk-free rate
	Rm	Required return on the market as a whole
	Be	Beta on individual equity security
	Re =	Rf+Be(Rm-Rf)
	Rf =	2.3163
	Rm =	12.4553
	Be =	0.7000
	Re =	9.41
Sources:	Value Line	August 30, 2019
	Blue Chip	August 1, 2019
Attachments:		
	ES-8	Beta
	ES-9	Risk free rate

CAPM with historical return

Re		Required return on individual equity security
Rf		Risk-free rate
Rm		Required return on the market as a whole
Be		Beta on individual equity security
Re	=	Rf+Be(Rm-Rf)
Rf	=	5.0600
Rm	=	9.9900
Be	=	0.7000
Re	=	8.51

Sources:	Value Line	August 30, 2019
	Blue Chip	August 1, 2019
Attachments:		
	ES-8	Beta

INVESTMENTS

SEVENTH EDITION

ZVI BODIE
Boston University

ALEX KANE
University of California, San Diego

ALAN J. MARCUS
Boston College

McGraw-Hill Irwin

Boston Burr Ridge, IL Dubuque, IA Madison, WI New York San Francisco St. Louis
Bangkok Bogotá Caracas Kuala Lumpur Lisbon London Madrid Mexico City
Milan Montreal New Delhi Santiago Seoul Singapore Sydney Taipei Toronto

(a) Calculate the price of a firm with a plowback ratio of 0.60 if its ROE is 20%. Current earnings, E_1, will be $5 per share, and $k = 12.5\%$.

(b) What if ROE is 10%, which is less than the market capitalization rate? Compare the firm's price in this instance to that of a firm with the same ROE and E_1, but a plowback ratio of $b = 0$.

Life Cycles and Multistage Growth Models

As useful as the constant-growth DDM formula is, you need to remember that it is based on a simplifying assumption, namely, that the dividend growth rate will be constant forever. In fact, firms typically pass through life cycles with very different dividend profiles in different phases. In early years, there are ample opportunities for profitable reinvestment in the company. Payout ratios are low, and growth is correspondingly rapid. In later years, the firm matures, production capacity is sufficient to meet market demand, competitors enter the market, and attractive opportunities for reinvestment may become harder to find. In this mature phase, the firm may choose to increase the dividend payout ratio, rather than retain earnings. The dividend level increases, but thereafter it grows at a slower rate because the company has fewer growth opportunities.

Table 18.2 illustrates this pattern. It gives Value Line's forecasts of return on assets, dividend payout ratio, and 3-year growth rate in earnings per share for a sample of the

TABLE 18.2

Financial ratios in two industries

	Return on Assets	Payout Ratio	Growth Rate 2005–2008
Computer Software			
Adobe Systems	21.5%	1.0%	8.2%
Cognizant	19.0	0.0	22.8
Compuware	10.5	0.0	17.6
Intuit	19.0	0.0	8.0
Microsoft	31.5	35.0	15.4
Novell	8.5	0.0	51.8
Oracle	33.0	0.0	18.6
Red Hat	17.0	0.0	17.6
Parametric Tech	20.0	0.0	33.9
SAP	22.5	18.0	13.8
Median	19.5%	0.0	17.6%
Electric Utilities			
Central Hudson G&E	6.0%	78.0%	5.1%
Central Vermont	7.5	60.0	8.0
Consolidated Edison	5.0	75.0	1.0
Duquesne Light	8.0	85.0	7.7
Energy East	6.0	74.0	4.1
Northeast Utilities	5.0	59.0	14.0
Nstar	8.5	61.0	3.2
Pennsylvania Power	11.0	52.0	9.3
Public Services Enter.	7.0	62.0	1.7
United Illuminating	5.0	113.0	1.3
Median	6.5%	68.0%	4.6%

Source: *Value Line Investment Survey*, 2006, Reprinted with permission of Value Line Investment Survey. © 2006 Value Line Publishing, Inc. All rights reserved.

firms included in the computer software industry versus those of East Coast electric utilities. (We compare return on assets rather than return on equity because the latter is affected by leverage, which tends to be far greater in the electric utility industry than in the software industry. Return on assets measures operating income per dollar of total assets, regardless of whether the source of the capital supplied is debt or equity. We will return to this issue in the next chapter.)

By and large, the software firms have attractive investment opportunities. The median return on assets of these firms is forecast to be 19.5%, and the firms have responded with high plowback ratios. Most of these firms pay no dividends at all. The high return on assets and high plowback result in rapid growth. The median growth rate of earnings per share in this group is projected at 17.6%.

In contrast, the electric utilities are more representative of mature firms. Their median return on assets is lower, 6.5%; dividend payout is higher, 68%; and median growth is lower, 4.6%.

We conclude that the higher payouts of the electric utilities reflect their more limited opportunities to reinvest earnings at attractive rates of return. Consistent with this view, Microsoft's announcement in 2004 that it would sharply increase its dividend and initiate multi-billion-dollar stock buybacks was widely seen as an indication that the firm was maturing into a lower-growth stage. It was generating far more cash than it had the opportunity to invest attractively, and so was paying out that cash to its shareholders.

To value companies with temporarily high growth, analysts use a multistage version of the dividend discount model. Dividends in the early high-growth period are forecast and their combined present value is calculated. Then, once the firm is projected to settle down to a steady-growth phase, the constant-growth DDM is applied to value the remaining stream of dividends.

We can illustrate this with a real-life example. Figure 18.2 is a Value Line Investment Survey report on Hewlett-Packard. Some of the relevant information at the end of 2005 is highlighted.

HP's beta appears at the circled A, its recent stock price at the B, the per-share dividend payments at the C, the ROE (referred to as "return on shareholder equity") at the D, and the dividend payout ratio (referred to as "all dividends to net profits") at the E. The rows ending at C, D, and E are historical time series. The boldfaced, italicized entries under 2006 are estimates for that year. Similarly, the entries in the far right column (labeled 08–10) are forecasts for some time between 2008 and 2010, which we will take to be 2009.

Value Line projects rapid growth in the near term, with dividends rising from $.32 in 2006 to .50 in 2009. This rapid growth rate cannot be sustained indefinitely. We can obtain dividend inputs for this initial period by using the explicit forecasts for 2006 and 2009 and linear interpolation for the years between:

2006	$.32	2008	$.44
2007	$.38	2009	$.50

Now let us assume the dividend growth rate levels off in 2009. What is a good guess for that steady-state growth rate? Value Line forecasts a dividend payout ratio of 0.19 and an ROE of 16.0%, implying long-term growth will be

$$g = \text{ROE} \times b = 16.0\% \times (1 - 0.19) = 13.0\%$$

Title:	Evaluating Common Stocks Using Value Line's Projected Cash Flows and Implied Growth Rate.
Authors:	Christofi, Andreas C. Christofi, Petros C. Lori, Marcus Moliver, Donald M.
Source:	Journal of Investing; Spring99, Vol. 8 Issue 1, p38, 8p
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Notes:	Check Horn Library's Full Text Finder for other online locations.

Anglais/Franais | Translate

* * *

EVALUATING COMMON STOCKS USING VALUE LINE'S PROJECTED CASH FLOWS AND IMPLIED GROWTH RATE

A well-known principle in finance is that the value of a firm must reflect its long-run growth opportunities. In an extensive study, Rappaport [1986] finds that over 60% of the firm's market value is attributable to earnings occurring beyond the immediate five-year horizon. When a firm does not meet analysts' expectations for a given quarter, its long-run potential is often discredited by the investment community. The basic reason for this overreaction is primarily that capital is scarce and, at least for the time being, the opportunity cost is higher somewhere else.

In practice, financial analysts evaluate a firm's growth opportunities by equating its P/E ratio to the growth rate of its earnings.(n1) Thus, the price of the firm's stock follows the volatility of its earnings.

If a firm's earnings are temporarily lower, whether due to seasonality in its business or some other transitory event, but the firm's long-run potential is not impaired, its stock may be called underpriced. This phenomenon is particularly common among semiconductor and other capital equipment companies, which demonstrate fairly frequent boom and bust cycles. In such cases, it is difficult to determine the true growth rate of the firm's earnings, or cash flows, by looking at its historical data.

A preferred way to estimate the firm's long-run growth rate is to deduce it from publicly available data that incorporate expectations concerning the firm's future cash flows. The most widely known source of such data is "Value Line's Investment Survey." Some empirical studies have shown that stock prices react swiftly to Value Line's recommendations.(n2)

The purpose of this article is to demonstrate how investors can use the information from Value Line to assess the long-term, or expected, value of a firm's equity. We follow a simple methodology that is well known in finance and is found in many, basic textbooks. Briefly, we apply the discounted cash flow (DCF) approach to the data supplied by Value Line and compute the price of the firm's common stock, using some reasonable assumptions.

In addition, the study solves for the long-term growth rate implied by the firm's equity cash flows. This rate may be contrasted to various subjective expected rates, or the growth rate for the entire industry, in the form of a sensitivity analysis. If the current price of the stock does not reflect the true long-run rate implied by the firm's cash flows, the stock may be underpriced. Conversely, if the implied rate is greater than the expected growth rate, the stock may be overpriced.

The strategy has several advantages over other security analysis and portfolio selection strategies. It considers forward-looking cash flows, rather than historical information, and concentrates on the firm's long-term rather than short-term performance.

The methodology is applied to the pricing of MCI's common stock as an example. The results of this simple application are intriguing and promising for investors and analysts, as well as academicians and students of corporate finance.

DISCOUNTED CASH FLOW APPROACH

The discounted cash flow approach (DCF) is the most familiar theoretical method of estimating the firm's value. According to this approach, the value of a firm is the present value of the firm's stream of future expected cash flows discounted at a rate that reflects the riskiness of these cash flows. This approach is widely used by security analysts and financial managers and is consistent with the maximization of shareholder wealth, which is the goal of the management of every corporation. In exploratory research, Copeland, Koller, and Murrin [1996] find a correlation between the market value (actual price per share) and the DCF-based value, using forecasts from the Value, of 0.97.

Although in practice there may be a variety of approaches to valuation of the firm's prospects, the discounted cash flow technique is the most commonly used practical approach to determining a company's value. It is used in capital budgeting decisions to evaluate investment projects or to price entire corporate entities that may be targets for acquisition.

The DCF is expressed as:

(1) [Multiple line equation(s) cannot be represented in ASCII text]

where PV is the present value, n is the number of periods, CF_t are the cash flows that occur in time period t, and r is the relevant discount rate.

If these cash flows were to grow at an annual rate of g%, beginning at year 6, expression (1) becomes:

(2) [Multiple line equation(s) cannot be represented in ASCII text]

The discount factor $1/(1 + r)^5$ is used to discount the collective value of the cash flows at year 6 back to year zero, the present time. The term [(1 + g)/(r - g)] is called the terminal value multiple. It expresses the ratio of the value of the cash flows beyond year 6 to the value of the cash flow of year 5. The price of the firm's stock, P, can then be found by dividing the value of its equity by the number of shares outstanding, N, or P = (PV/N). Of course, if PV represents the present value of the firm's equity and debt, then the value of the firm's debt is first subtracted, and the remaining value is divided by the number of common shares outstanding to obtain the price per share.

Assuming reliable estimates of the cash flows of the first five years and the discount rate, r, Equation (2) can be applied in conjunction with the firm's value of equity to solve for the implied average growth rate, g, in its distant equity cash flows. This implied growth rate can then be contrasted with various subjective expected rates in the form of a sensitivity analysis. A reasonable choice for the expected growth rate of a firm's equity cash flows would be the one implied by its industry peers, adjusted for opportunities unique to the firm.

In any event, if the implied growth rate is lower than what an investor would have expected, the stock may be underpriced. Conversely, if the implied rate is greater than the expected growth rate, the stock may be overpriced.

CASH FLOWS TO EQUITYHOLDERS

Shareholders' cash flows can be summarized by:

(3) CF_E = EBIT(1- t) - I(1- t) + NCE - Delta WC - CE

where CF_E is cash flow to equity; EBIT is earnings before interest and taxes; T is the corporate tax rate; NCE is non-cash expenses; Delta WC is changes in working capital; and CE is capital expenditures. The cash flows to the debtholders, I_{AT} = I(1- T), imply a tax shield to the common stockholders equal to the firm's marginal tax rate times the interest expense, since I(1- T)= I- IT. This tax shield reduces the firm's cost of debt capital that is used to discount the cash flows to debt in Equation (3). Thus, by discounting the firm's after-tax interest expense by the corresponding after-tax cost of debt, we obtain the value of the firm's debt.

Some authors, including Copeland, Koller, and Murrin [1996], find the present value of the free cash flows to both debt and equity using a weighted average cost of capital and subtract the firm's debt to obtain the market value of its equity. Since the book value of the firm's debt may not be equal to its market value, the preferred approach is to consider only the firm's cash flows to equityholders and discount them by the corresponding cost of equity capital.

Equation (3) can be further simplified as:

(4) CF_E = NI + NCE - Delta WC - CE

where:

(5) NI = EBIT(1- T) - I(1- T)

In order to completely define the variables used in Equation (3), a definition of earnings before interest and taxes is necessary. In general, earnings before interest and taxes is defined as total revenues minus costs and depreciation, or

(6) EBIT = (S + NOI) - (COGS + SGA + R&D) - (Depr)

where S are revenues from the firm's sales; NOI is non-operating income; COGS is cost of goods sold; SGA is selling, general, and administrative expenses; R&D is research and development expenses; and Depr is depreciation. Finally, by substituting Equation (6) into (5) and subsequently into (4) and adjusting for dividend payments to preferred shareholders, denoted by D_p, we obtain Equation (7):

(7) CF_C = (S + NOI - COGS - SGA - R & D - Depr) x (1- T) - I(1-T) + NCE - Delta WC - CE - D_p

where the subscript C denotes cash flows to common equityholders.

VALUE LINE CASH FLOWS

Because of its consistency and broad coverage of stocks, "Value Line Investment Survey" serves as a unique source of information and is widely used by both academicians and practitioners.(n3) This service follows 1,700 companies in over ninety-five industries that represent 94% of the trading volume on all U.S. stock exchanges. It provides subscribers with a detailed one-page overview of each company's past, current, and expected performance for the next four to five years.

In fact, Value Line is the only investment service that provides detailed information for a company's expected short-term performance. Each page offers financial data, trend line growth rates, graphical price history patterns, quarterly sales figures, earnings and dividends, some key financial ratios, and balance sheet information. Value Line also rates companies for timeliness and safety. Furthermore, investors learn, through a summarized text, about the general business and analyst expectations for each company. All data are updated every thirteen weeks on a weekly sequence.

Using the Value Line definition of variables, Equation (7) becomes:

(8) $CF_{C,t} = (S_t m_t - Depr_t - I)(1 - T_t) + Depr_t - Delta\ WC_t - CE_t - D_{p,t}$

where m_t is the operating margin as a percent of sales at year t. Equation 8 constitutes the basis for estimating the cash flows to common equity. Note that if a firm decides to either obtain additional debt or repay part or all of its existing debt, Equation (8) must be modified to reflect this change in leverage.

Exhibit 1 shows the variables in Equation (7) and the corresponding entries from Value Line expressed in (8).

Value Line's projections refer to the range of the three-year period following the year subsequent to the date of the survey. For example, if the survey's date is October 1997, the projections refer to the period 2000-2002, hence covering a five-year window. We assign the projections for the three-year range to the middle year, which is labeled as year 4. The figures for the years 2 and 3 are geometrically interpolated, while the figures for year 5 are extrapolated using the implied growth rate of the previous four years. For an October 1997 survey date, 1998 is the first year, and 2001, the midpoint of the range 2000-2002, represents the fourth year. The data for the fifth year, 2002, are extrapolated on the basis of the growth rate implied between the years 1998 and 2001. Following this practice, we are able to calculate successive cash flows for the ensuing five years.

Following Equation (2), we then assume that the cash flows for years 6 and beyond will grow at an average constant rate g. If we further assume that the firm's cost of equity capital is given by r, we can then solve for either the PV_0, if we know g, or vice versa.

THE COST OF EQUITY CAPITAL

The rate used to discount the firm's cash flows to its equityholders, also termed the cost of capital, is obtained from the capital asset pricing model (CAPM). According to this model, the expected rate of return for a common stock required by investors, $E(R_{C,i})$, equals the sum of two components: namely, the riskless rate of return, R_f, and a risk premium, $Beta_i[E(R_M) - R_f]$. This relationship is expressed by the equation:

(9) $E(R_{c,i}) = R_f + Beta_i\ [E(R_M) - R_f]$

where $Beta_i$ is the beta of company i, which reflects its operating and financial risks. Generally, companies in specific industries with cyclical demand, such as real property and electronics, are associated with higher betas. Companies in the utility industry, like telephone and energy, tend to be less sensitive to market movements, and consequently they exhibit lower betas.

The risk-free rate is approximated by the three-month U.S. Treasury bill rate, and the risk premium represents the reward for bearing risk. The term $E(R_M)$ is the expected return on the market portfolio. In theory, the market portfolio incorporates all risky assets. In practice, however, it is unobservable and it is usually represented by a well-diversified index, such as the Chicago Center for Research in Security Prices (CRSP) value-weighted index. Possible alternatives are the NYSE composite index or the Wilshire 5000 equity index.

A common practice in estimating the market risk premium [$E(R_M)$ -R_f], is to assume that it approximates the difference between the historical rate of return on stocks and Treasury bills. According to Stocks, Bonds, Bills, and Inflation, the difference is 8.6% (12.3%-3.7%). Thus, even if both equities and Treasury securities drift away from their historical levels, it is assumed that their difference remains constant through time, or at least reverts to its long-term historical average. Following this approach, a stock with a beta of 1.2 would command a cost of equity capital of approximately 14%.

EXAMPLE: VALUATION OF MCI

Beginning in November 1996, MCI has been considering different consolidation proposals from three competitors in the telecommunications industry: British Telecom, GTE, and WorldCom. The offer by WorldCom prevailed over the other two offers, and the shareholders of both firms have approved the proposed merger at an exchange ratio that amounts to $51.00 per MCI share. (n4) This represents a 60% to 100% premium over the 1996 range of prices for MCI shareholders.

The rationale for such a premium may be justified by the synergistic effect of the MCI/ WorldCom merger. In principle, such a synergistic premium exists for many companies, and shareholders need a simple technique to assess it. It is hoped that our methodology will provide such a means and enable investors to take full advantage of the information supplied by Value Line.(n5)

Application of the analysis to MCI is summarized in the four worksheets in Exhibits 2-5.(n6) Exhibit 2 presents the pertinent inputs for the other exhibits. The projected figures refer to a range of two to four years. Exhibit 3 assumes that these figures correspond to the mid-range year, i.e., 2001. The figures for the years 1999 and 2000 are found by interpolation, assuming a geometric growth between the first and the fourth years, i.e., 1998 and 2001. These growth rates are subsequently used to find the 2002 figures, by extrapolating the data of the year 2001. Following this approach we are able to obtain the estimated cash flows to equityholders for the subsequent five years.

Exhibit 4 shows the estimation of the firm's cost of equity capital, using the capital asset pricing model given by Equation (9). These estimates use two variations of the proxy for the risk-free rate: a historical estimate of 3.7%, as calculated by Ibbotson Associates, and the prevailing rate of interest on three-month T-bills. Exhibit 4 provides a series of estimated costs of capital corresponding to a sequence of betas, ranging from 30% below to 30% above the Value Line beta, in increments of 10.%. The worksheet allows the user to input an estimate for the continuing growth rate of the cash flows to equityholders and the increment for higher and lower growth rates.

Finally, Exhibit 5 presents the sensitivity analysis for various expected continuing growth rates and various costs of equity, corresponding to the series of betas considered in Exhibit 4. Assuming that the middle rates represent the investor's best estimates for continuing growth rate and cost of equity, the center cell of the price matrix represents the most likely price for the firm's stock. Given the market price of the stock, the worksheet in Exhibit 5 also calculates the implied continuing growth rate for the firm's cash flows and the "terminal value multiple." For a price of $60.50, the implied continuing growth rate for MCI's cash flows to equity is 5.4%, and the terminal value multiple is 16.

The $51.00 price offered by WorldCom implies a continuing growth rate of 4%. All in all, given that the MCI/WorldCom merger will result in substantial synergistic savings, the $51.00 offer for each MCI share by WorldCom appears to be fair.

CONCLUSIONS AND RECOMMENDATIONS

We have developed a simple yet practical methodology to evaluate common stocks by applying the DCF approach to the data supplied by Value Line to estimate the implied long-term growth rate of a firm's equity cash flows. Given the value of the firm's equity, its annual cash flows, and its cost of equity capital, one may solve for the implied long-term growth rate of the firm's cash flows. This rate can then be compared to various subjective expected rates using sensitivity analysis. If the implied growth rate is lower than investors' expectations, then the stock may be underpriced. Conversely, if the implied rate is greater than the expected growth rate, the stock may be overpriced.

The strategy has several advantages over current security analysis and portfolio selection strategies. It considers forward-looking cash flows, rather than historical information, and concentrates on a firm's long-term rather than short-term performance. It may thus be useful in assessing the equilibrium level of the overall market, especially when it is used in conjunction with other procedures for pinpointing value, such as the P/E ratio. An exploratory application of our methodology to MCI reveals encouraging results.

ENDNOTES

(n1) See Lynch [1989].

(n2) See, for example, Black [1973], Holloway [1981,1983], Copeland and Mayers [1982], Stickel [1985], Huberman and Kandel [1987,1990], Peterson [1987,1995], and Peterson and Peterson [1995]. Philbrick and Ricks [1991] have shown that in determining earnings surprise, Value Line is a better source for actual earnings per share data.

(n3) Lynch [1989] refers to "Value Line Investment Survey" as "the next best thing to having your own private securities analyst" (p. 165).

(n4) The exchange ratio is equal to the quotient of $51.00 divided by the average of the high and low market prices of WorldCom common stock on each of the twenty consecutive trading days ending with the third trading day immediately preceding the effective time of the MCI/ WorldCom merger.

(n5) According to the prospectus, the consultants and the management of the two companies believe that "the MCI/WorldCom merger will create a fully integrated communications company that will be well positioned to take advantage of growth opportunities in global communications."

(n6) The Excel workbook for this application is available from the first author upon request.

EXHIBIT 1 The Value Line Variables

```
Legend for Chart:

A - Parameter in Equation(7) Description
B - Represented by
C - Parameter in Value Line Description
D - Represented by

A                                              B
  C                                            D

Sales + Non-Operating Income -               S + NOI -
  Sales                                      S_t

Cost of Goods Sold -                         COGS -
  --

Selling, General, and Admin. Expenses -      SGA -

Research & Development Expenses -            R&D -
  Operating Expenses

Operating Income                             (S + NOI) -
                                             (COGS+
                                             SGA+
                                             R & D)
  Value Line expresses operating income      m_t
  as a percent of sales, called operating    (as a %
```

margin	of Sales)
Depreciation	Depr
Depreciation	$Depr_t$
Corporate Tax Rate	T
Income Tax Rate	T_t
Interest	I
Long-Term Interest	I_t
Working Capial	WC
Working Capital	WC_t
Capital Expenditures	CE
Capital Spending per Share x Number of Shares Outstanding	Ce_t
Annual Preferred Dividends	D_p
Preferred Dividend x Number of Shares of Preferred Stock Outstanding	$D_{p,\ t}$

EXHIBIT 2 Value Line MCI Data Input

Recent Stock Price:	$60.50
P/E Ratio:	NMF
Dividend Yield:	0.1%
Beta of the Company:	0.95
First Projected Year:	1998
Projection for Total Annual Return	7%
Projection for Total Annual Return	-5%
Company's LT Interests (millions):	$230.00

Preferred Dividends (millions): $60.00

Legend for Chart:

B-Year 1997
C-Year 1998
D-Projected for Years 2000-2002

A	B	C E	D F
Capital Spending per Share			$3.50 $2.70
Common Shares Outstanding (millions)			710.00 740.00
Sales (millions)			$20,945 $28,885
Operating Margin(%)			18.0% 26.5%
Depreciation (millions)			$2,300 $2,850
Income Tax Rate(%)			37.0% 38.0%
Long-Term Debt		$3,300	$3,760 $6,200
Working Capital (millions	($2,600)	($2,000)	($500)

EXHIBIT 3 Near-Future MCI Free Cash Flows to Equity (1,000s)

Legend for Chart:

B - 1998
C - 1999
D - 2000

E - 2001
F - 2002

A	B	C E	D F
Sales	$20,945,000	$22,476,894	$24,120,829
		$25,885,000	$27,778,200
--Operating Costs	$17,174,900	$17,874,329	$18,501,985
		$19,025,475	$19,404,043
Operating Margin	$3,770,100	$4,602,564	$5,618,844
		$6,859,525	$8,374,157
--Depreciation	$2,300,000	$2,470,397	$2,653,419
		$2,850,000	$3,061,144
EBIT	$1,470,100	$2,132,167	$2,965,425
		$4,009,525	$5,313,012
--Long-Term Interest	$230,000	$230,000	$230,000
		$230,000	$230,000
Earnings Before Taxes	$1,240,100	$1,902,167	$2,735,425
		$3,779,525	$5,083,012
--Income Taxes	$458,837	$722,823	$1,039,461
		$1,436,219	$1,931,544
Net Income	$781,263	$1,179,343	$1,695,963
		$2,343 305	$3,151,467
+ Depreciation	$2,300,000	$2,470,397	$2,653,419
		$2,850 000	$3,061,144
--Change in WC	$600,000	$500,000	$500,000
		$500 000	$500,000
Operating Cash Flow	$2,481,263	$3,149,741	$3,849,382
		$4,693 305	$5,712,612
--Capital Expenditures	$2,485,000	$2,310,731	$2,148,683

		$1,998 000	$1,857,883
--Preferred Dividends	60,000	60,000	60,000
		$60 000	60,000
--Change in LT Debt	$460,000	$813,333	$813,333
		$813 333	0
CF (Equity)	$396,263	$1,592,343	$2,454,032
		$3,448,638	$3,794,728

EXHIBIT 4 Estimating the MCI Cost of Equity

Beta	0.95
Beta Interval:	10%
Historical Risk-free Rate (H):	3.7%
Current Risk-free Rate (C):	5.0%
Expected Return on the Market:	12.3%
Market Risk Premium:	8.6%

To use historical risk-free rate, input 1; otherwise input 2:

Legend for Chart:

A - Beta:
B - 0.67
C - 0.76
D - 0.86
E - 0.95
F - 1.05
G - 1.14
H - 1.24

A	B	C	D	E
	F	G	H	
Cost of Equity (H):	9.4%	10.2%	11.1%	11.9%
	12.7%	13.5%	14.3%	
Cost of Equity (C):	10.7%	11.5%	12.4%	13.2%
	14.0%	14.8%	15.6%	

Expected continuing growth rate

for cash flows to equity:

5.0%

Interval length for growth rates:

1.0%

EXHIBIT 5 MCI Sensitivity Analysis

Legend for Chart:

B - BETA:
C - 0.67
D - 0.76
E - 0.86
F - 0.95
G - 1.05
H - 1.14
I - 1.24

A	B	C	D	E	F	G	H	I
	Cost of Equity:	9.40%	10.20%	11.10%	11.90%	12.70%	13.50%	14.30%
	0.00%	$48.00	$43.58	$39.83	$36.61	$33.81	$31.37	$29.21
	1.00%	$52.70	$47.41	$42.99	$39.25	$36.05	$33.28	$30.85
	2.00%	$58.67	$52.17	$46.85	$42.44	$38.70	$35.51	$32.76
	3.00%	$66.50	$58.24	$51.67	$46.33	$41.91	$38.18	$35.00

Expected	4.00%	$77.22	$66.26	$57.86	$51.22	$45.84	$41.40	$37.68
continuing	5.00%	$92.79	$77.35	$66.09	$57.53	$50.81	$45.39	$40.93
growth rate	6.00%	$117.47	$93.66	$77.58	$65.99	$57.26	$50.44	$44.97
	7.00%	$162.55	$120.07	$94.74	$77.93	$65.97	$57.03	$50.10
	8.00%	$271.18	$170.09	$123.14	$96.04	$78.41	$66.03	$56.86
	9.00%	N/A	$301.05	$179.20	$126.76	$97.59	$79.02	$66.17
	10.00%	N/A	N/A	$341.75	$190.35	$131.04	$99.42	$79.78
Implied growth rate:	5.40%			Recent Price:	$60.50			TVM: 16

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Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts

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■ One of the most widely used concepts in finance is that shareholders require a risk premium over bond yields to bear the additional risks of equity investments. While models such as the two-parameter capital asset pricing model (CAPM) or arbitrage pricing theory offer explicit methods for varying risk premia across securities, the models are invariably linked to some underlying market (or factor-specific) risk premium. Unfortunately, the theoretical models provide limited practical advice on establishing empirical estimates of such a benchmark market risk premium. As a result, the typical advice to practitioners is to estimate the market risk premium based on historical realizations of share and bond returns (see Brealey and Myers [3]).

In this paper, we present estimates of shareholder required rates of return and risk premia which are derived using forward-looking analysts' growth forecasts. We update, through 1991, earlier work which, due to data availability, was restricted to the period 1982-1984 (Harris [12]). Using stronger tests, we also reexamine the efficacy of using such an expectational approach as an alternative to the use of historical averages. Using the S&P 500 as a proxy for the market portfolio, we find an average market risk premium (1982-1991) of 6.47% above yields on long-term U.S. government bonds and 5.13% above yields on corporate bonds. We also find that required returns for individual stocks vary directly with their risk (as proxied by beta) and that the market risk premium varies over time. In particular, the equity market premium over government bond yields is higher in low interest rate environments and when there is a larger spread between corporate and government bond yields. These findings show that, in addition to fitting the theoretical requirement of being forward-looking, the utilization of analysts' forecasts in estimating return requirements provides reasonable empirical results that can be useful in practical applications.

Section I provides background on the estimation of equity required returns and a brief discussion of related

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literature on financial analysts' forecasts (FAF). In Section II, models and data are discussed. Following a comparison of the results to historical risk premia, the estimates are subjected to economic tests of both their time-series and cross-sectional characteristics in Section III. Finally, conclusions are offered in Section IV.

I. Background and Literature Review

In establishing economic criteria for resource allocation, it is often convenient to use the notion of a shareholder's required rate of return. Such a rate (k) is the minimum level of expected return necessary to compensate the investor for bearing risks and receiving dollars in the future rather than in the present. In general, k will depend on returns available on alternative investments (e.g., bonds or other equities) and the riskiness of the stock. To isolate the effects of risk, it is useful to work in terms of a risk premium (rp), defined as

$$rp = k - i, \qquad (1)$$

where i = required return for a zero risk investment.[1]

Lacking a superior alternative, investigators often use averages of historical realizations to estimate a benchmark "market" risk premium which then may be adjusted for the relative risk of individual stocks (e.g., using the CAPM or a variant). The historical studies of Ibbotson Associates [13] have been used frequently to implement this approach.[2] This historical approach requires the assumptions that past realizations are a good surrogate for future expectations and, as typically applied, that risk premia are constant over time. Carleton and Lakonishok [5] demonstrate empirically some of the problems with such historical premia when they are disaggregated for different time periods or groups of firms.

As an alternative to historical estimates, the current paper derives estimates of k, and hence, implied values of rp, using publicly available expectational data. This expectational approach employs the dividend growth model (hereafter referred to as the discounted cash flow or DCF model) in which a consensus measure of financial analysts' forecasts (FAF) of earnings is used as a proxy for investor expectations. Earlier works by Malkiel [17], Brigham, Vinson, and Shome [4], and Harris [12] have used FAF in DCF models, and this approach has been employed in regulatory settings (see Harris [12]) and suggested by consultants as an alternative to use of historical data (e.g., Ibbotson Associates [13, pp. 127, 128]). Unfortunately, the published studies use data extending to 1984 at the latest. Our paper draws on this earlier work but extends it through 1991.[3] Our work is closest to that done by Harris [12], who reviews literature showing a strong link between equity prices and FAF and supporting the use of FAF as a proxy for investor expectations. Using data from 1982 to 1984, Harris' results suggest that this expectational approach to estimating equity risk premia is an encouraging alternative to the use of historical averages. He also demonstrates that such risk premia vary both cross-sectionally with the riskiness of individual stocks and over time with financial market conditions.

II. Models and Data

A. Model for Estimation

The simplest and most commonly used version of the DCF model to estimate shareholders' required rate of return, k, is shown in Equation (2):

$$k = \left(\frac{D_1}{P_0}\right) + g, \qquad (2)$$

where D_1 = dividend per share expected to be received at time one, P_0 = current price per share (time 0), and g = expected growth rate in dividends per share. The limitations of this model are well known, and it is straightforward to derive expressions for k based on more general specifications of the DCF model.[4] The primary difficulty in using the DCF model is obtaining an estimate of g, since it should reflect market expectations of future perfor-

[1]Theoretically, i is a risk-free rate, though empirically its proxy (e.g., yield to maturity on a government bond) is only a "least risk" alternative that is itself subject to risk. In this development, the effects of tax codes on required returns are ignored.

[2]Many leading texts in financial management use such historical risk premia to estimate a market return. See, for example, Brealey and Myers [3]. Often a market risk premium is adjusted for the observed relative risk of a stock.

[3]See Harris [12] for a discussion of the earlier work and a detailed discussion of the approach employed here.

[4]As stated, Equation (2) requires expectations of either an infinite horizon of dividend growth at a rate g or a finite horizon of dividend growth at rate g and special assumptions about the price of the stock at the end of that horizon. Essentially, the assumption must ensure that the stock price grows at a compound rate of g over the finite horizon. One could alternatively estimate a nonconstant growth model, although the proxies for multistage growth rates are even more difficult to obtain than single stage growth estimates. Marston, Harris, and Crawford [19] examine publicly available data from 1982-1985 and find that plausible measures of risk are more closely related to expected returns derived from a constant growth model than to those derived from multistage growth models. These findings illustrate empirical difficulties in finding empirical proxies for multistage growth models for large samples.

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mance. Without a ready source for measuring such expectations, application of the DCF model is fraught with difficulties. This paper uses published FAF of long-run growth in earnings as a proxy for g.

B. Data

FAF for this research come from IBES (Institutional Broker's Estimate System), which is a product of Lynch, Jones, and Ryan, a major brokerage firm.[5] Representative of industry practice, IBES contains estimates of (*i*) EPS for the upcoming fiscal years (up to five separate years), and (*ii*) a five-year growth rate in EPS. Each item is available at monthly intervals.

The mean value of individual analysts' forecasts of five-year growth rate in EPS will be used as a proxy for g in the DCF model.[6] The five-year horizon is the longest horizon over which such forecasts are available from IBES and often is the longest horizon used by analysts. IBES requests "normalized" five-year growth rates from analysts in order to remove short-term distortions that might stem from using an unusually high or low earnings year as a base.

Dividend and other firm-specific information come from COMPUSTAT. Interest rates (both government and corporate) are gathered from Federal Reserve Bulletins and *Moody's Bond Record*. Exhibit 1 describes key variables used in the study. Data collected cover all dividend paying stocks in the Standard & Poor's 500 stock (S&P 500) index, plus approximately 100 additional stocks of regulated companies. Since five-year growth rates are first available from IBES beginning in 1982, the analysis covers the 113-month period from January 1982 to May 1991.

Exhibit 1. Variable Definitions

k	=	Equity required rate of return.
P_0	=	Average daily price per share.
D_1	=	Expected dividend per share measured as current indicated annual dividend from COMPUSTAT multiplied by $(1 + g)$.[a]
g	=	Average financial analysts' forecast of five-year growth rate in earnings per share (from IBES).
i_{lt}	=	Yield to maturity on long-term U.S. government obligations (source: Federal Reserve Bulletin, constant maturity series).
i_c	=	Yield to maturity on long-term corporate bonds: Moody's average.[b]
rp	=	Equity risk premium calculated as $rp = k - i$.
β	=	beta, calculated from CRSP monthly data over 60 months.

Notes:

[a]See footnote 7 for a discussion of the $(1 + g)$ adjustment.

[b]The average corporate bond yield across bond rating categories as reported by Moody's. See *Moody's Bond Survey* for a brief description and the latest published list of bonds included in the bond rating categories.

III. Risk Premia and Required Rates of Return

A. Construction of Risk Premia

For each month, a "market" required rate of return is calculated using each dividend paying stock in the S&P 500 index for which data are available. The DCF model in Equation (2) is applied to each stock and the results weighted by market value of equity to produce the market required return.[7] The return is converted to a risk premium

[5]Harris [12] provides a discussion of IBES data and its limitations. In more recent years, IBES has begun collecting forecasts for each of the next five years. Since this work was completed, the FAF used here have become available from IBES Inc., now a subsidiary of CitiBank.

[6]While the model calls for expected growth in dividends, no source of data on such projections is readily available. In addition, in the long run, dividend growth is sustainable only via growth in earnings. As long as payout ratios are not expected to change, the two growth rates will be the same.

[7]The construction of D_1 is controversial since dividends are paid quarterly and may be expected to change during the year; whereas, Equation (2), as is typical, is being applied to annual data. Both the quarterly payment of dividends (due to investors' reinvestment income before year's end, see Linke and Zumwalt [15]) and any growth during the year require an upward adjustment of the current annual rate of dividends to construct D_1. If quarterly dividends grow at a constant rate, both factors could be accommodated straightforwardly by applying Equation (2) to quarterly data with a quarterly growth rate and then annualizing the estimated quarterly required return. Unfortunately, with lumpy changes in dividends, the precise nature of the adjustment depends on both an individual company's pattern of growth during the calendar year and an individual company's required return (and hence reinvestment income in the risk class).

In this work, D_1 is calculated as $D_0 (1 + g)$. The full g adjustment is a crude approximation to adjust for both growth and reinvestment income. For example, if one expected dividends to have been raised, on average, six months ago, a "1/2 g" adjustment would allow for growth, and the remaining "1/2 g" would be justified on the basis of reinvestment income. Any precise accounting for both reinvestment income and growth would require tracking each company's dividend change history and making explicit judgments about the quarter of the next change. Since no organized "market" forecast of such a detailed nature exists, such a procedure is not possible. To get a feel for the magnitudes involved, during the sample period the dividend yield (D_1/P_0) and growth (market value weighted) for the S&P 500 were typically 4% to 6% and 11% to 13%, respectively. As a result, a "full g" adjustment on average increases the required return by 60 to 70 basis points (relative to no g adjustment).

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Exhibit 2. Bond Market Yields, Equity Required Return, and Equity Risk Premium,[a] 1982-1991

Year	Bond Market Yields[b] (1) U.S. Gov't	Bond Market Yields[b] (2) Moody's Corporates	Equity Market Required Return[c] (3) S&P 500	Equity Risk Premium U.S. Gov't (3)-(1)	Equity Risk Premium Moody's Corporates (3)-(2)
1982	12.92	14.94	20.08	7.16	5.14
1983	11.34	12.78	17.89	6.55	5.11
1984	12.48	13.49	17.26	4.78	3.77
1985	10.97	12.05	16.32	5.37	4.28
1986	7.85	9.71	15.09	7.24	5.38
1987	8.58	9.84	14.71	6.13	4.86
1988	8.96	10.18	15.37	6.41	5.19
1989	8.46	9.66	15.06	6.60	5.40
1990	8.61	9.77	15.69	7.08	5.92
1991[d]	8.21	9.41	15.61	7.40	6.20
Average[e]	9.84	11.18	16.31	6.47	5.13

Notes:
[a]Values are averages of monthly figures in percent.
[b]Yields to maturity.
[c]Required return on value weighted S&P 500 index using Equation (1).
[d]Figures for 1991 are through May.
[e]Months weighted equally.

over government bonds by subtracting i_g, the yield to maturity on long-term government bonds. A risk premium over corporate bond yields is also constructed by subtracting i_c, the yield on long-term corporate bonds. Exhibit 2 reports the results by year (averages of monthly data).

The results are quite consistent with the patterns reported earlier (i.e., Harris [12]). The estimated risk premia in Exhibit 2 are positive, consistent with equity owners demanding additional rewards over and above returns on debt securities. The average expectational risk premium (1982 to 1991) over government bonds is 6.47%, only slightly higher than the 6.16% average for 1982 to 1984 reported earlier (Harris [12]). Furthermore, Exhibit 2 shows the estimated risk premia change over time, suggesting changes in the market's perception of the incremental risk of investing in equity rather than debt securities.

For comparison purposes, Exhibit 3 contains historical returns and risk premia. The average expectational risk premium reported in Exhibit 2 falls roughly midway between the arithmetic (7.5%) and geometric (5.7%) long-term differentials between returns on stocks and long-term government bonds. Note, however, that the expectational risk premia appear to change over time. In the following sections, we examine the estimated risk premia to see if they vary cross-sectionally with the risk of individual stocks and over time with financial market conditions.

B. Cross-Sectional Tests

Earlier, Harris [12] conducted crude tests of whether expectational equity risk premia varied with risk proxied by bond ratings and the dispersion of analysts' forecasts and found that required returns increased with higher risk. Here we examine the link between these premia and beta, perhaps the most commonly used measure of risk for equities.[8] In keeping with traditional work in this area, we adopt the methodology introduced by Fama and Macbeth [9] but replace realized returns with expected returns from Equation (2) as the variable to be explained. For this portion of our tests, we restrict our sample to 1982-1987

[8]For other efforts using expectational data in the context of the two-parameter CAPM, see Friend, Westerfield, and Granito [10], Cragg and Malkiel [7], Marston, Crawford, and Harris [19], Marston and Harris [20], and Linke, Kannan, Whitford, and Zumwalt [16]. For a more complete treatment of the subject, see Marston and Harris [20] from which we draw some of these results. Marston and Harris also investigate the role of unsystematic risk and the difference in estimates found when using expected versus realized returns.

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Exhibit 3. Average Historical Returns on Bonds, Stocks, Bills, and Inflation in the U.S., 1926-1989

Historical Return Realizations	Geometric	Arithmetic
Common stock	10.3%	12.4%
Long-term government bonds	4.6%	4.9%
Long-term corporate bonds	5.2%	5.5%
Treasury bills	3.6%	3.7%
Inflation rate	3.1%	3.2%

Source: Ibbotson Associates, Inc., *1990 Stocks, Bonds, Bills and Inflation*, 1990 Yearbook.

and in any month include firms that have at least three forecasts of earnings growth to reduce measurement error associated with individual forecasts.[9] This restricted sample still consists of, on average, 399 firms for each of the 72 months (or 28,744 company months).

For a given company in a given month, beta is estimated via the market model (using ordinary least squares) on the prior 60 months of return data taken from CRSP. Beta estimates are updated monthly and are calculated against an equally weighted index of all NYSE securities. For each month, we aggregate firms into 20 portfolios (consisting of approximately 20 securities each). The advantage of grouped data is the reduction in potential measurement error inherent in independent variables at the company level. Portfolios are formed based on a ranking of beta estimated from a prior time period (t = -61 to t = -120). Portfolio expected returns and beta are calculated as the simple averages for the individual securities.

Using these data, we estimate the following model for each of the 72 months:

$$R_p = \alpha_0 + \alpha_1 \beta_p + u_p, \quad p = 1...20, \qquad (3)$$

where:

- R_p = Expected return for portfolio p in the given month,
- β_p = Portfolio beta, estimated over 60 prior months, and
- u_p = A random error term with mean zero.

As a result of estimating regression (3) for each month, 72 estimates of each coefficient (α_0 and α_1) are obtained. Using realized returns as the dependent variable, the traditional approach (e.g., Fama and Macbeth [9]) is to assume that realized returns are a fair game. Given this assumption, the mean of the 72 values of each coefficient is an unbiased estimate of the mean over that same time period if one could have actually used expected returns as the dependent variable. Note that if expected returns are used as the dependent variable the fair-game assumption is not required. Making the additional assumption that the true value of the coefficient is constant over the 72 months, a test of whether the mean coefficient is different from zero is performed using a t-statistic where the denominator is the standard error of the 72 values of the coefficient. This is the technique employed by Fama and Macbeth [9]. If one assumes the CAPM is correct, the coefficient α_1 is an empirical estimate of the market risk premium, which should be positive.

To test the sensitivity of the results, we also repeat our procedures using individual security returns rather than portfolios. To account, at least in part, for differences in precision of coefficient estimates in different months we also report results in which monthly parameter estimates are weighted inversely by the standard error of the coefficient estimate rather than being weighted equally (following Chan, Hamao, and Lakonishok [6]).

Exhibit 4 shows that there is a significant positive link between expectational required returns and beta. For instance, in Panel A, the mean coefficient of 2.78 on beta is significantly different from zero at better than the 0.001 level (t = 35.31), and each of the 72 monthly coefficients going into this average is positive (as shown by that 100% positive figure). Using individual stock returns, the significant positive link between beta and expected return remains, though it is smaller in magnitude than for portfolios.[10] Comparison of Panels A and B shows that the results are not sensitive to the weighting of monthly coefficients.

While the findings in Exhibit 4 suggest a strong positive link between beta and risk premia (a result often not supported when realized returns are used as a proxy for expectations; e.g., see Tinic and West [22]), the results do not support the predictions of a simple CAPM. In particular, the intercept is higher than a proxy for the risk-free rate over the sample period and the coefficient of beta is well below estimates of a market risk premium obtained from either expectational (Exhibit 2) or historical data (Exhibit

[9] Firms for which the standard deviation of individual FAF exceeded 20 in any month were excluded since we suspect some of these involve errors in data entry. This screen eliminated very few companies in any month. The 1982-1987 period was chosen due to the availability of data on betas.

[10] The smaller coefficients on beta using individual stock portfolio returns are likely due in part to the higher measurement error in measuring individual stock versus portfolio betas.

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Exhibit 4. Mean Values of Monthly Parameter Estimates for the Relationship Between Required Returns and Beta for Both Portfolios and Individual Securities (Figures in Parentheses are *t* Values and Percent Positive), 1982-1987

	Intercept	B	Adjusted R^2 [c]	F[c]
Panel A. Equal Weighting[a]				
Portfolio returns	14.06 (54.02, 100)	2.78 (35.31, 100)	0.503	25.4
Security returns	14.77 (58.10, 100)	1.91 (16.50, 99)	0.080	39.0
Panel B. Weighted by Standard Errors[b]				
Portfolio returns	13.86 (215.6, 100)	2.67 (35.80, 100)	0.503	25.4
Security returns	14.63 (398.9, 100)	1.92 (47.3, 99)	0.080	39.0

[a]Equally weighted average of monthly parameters estimated using cross-sectional data for each of the 72 months, January 1982 - December 1987.
[b]In obtaining the reported means, estimates of the monthly intercept and slope coefficients are weighted inversely by the standard error of the estimate from the cross-sectional regression for that month.
[c]Values are averages for the 72 monthly regressions.

3).[11] Nonetheless, the results show that the estimated risk premia conform to the general theoretical relationship between risk and required return that is expected when investors are risk-averse.

C. Time Series Tests — Changes in Market Risk Premia

A potential benefit of using ex ante risk premia is the estimation of changes in market risk premia over time. With changes in the economy and financial markets, equity investments may be perceived to change in risk. For instance, investor sentiment about future business conditions likely affects attitudes about the riskiness of equity investments compared to investments in the bond markets. Moreover, since bonds are risky investments themselves, equity risk premia (relative to bonds) could change due to changes in perceived riskiness of bonds, even if equities displayed no shifts in risk. For example, during the high interest rate period of the early 1980s, the high level of interest rate volatility made fixed income investments more risky holdings than they were in a world of relatively stable rates.

Studying changes in risk premia for utility stocks, Brigham, et al [4] conclude that, prior to 1980, utility risk premia increased with the level of interest rates, but that this pattern reversed thereafter, resulting in an inverse correlation between risk premia and interest rates. Studying risk premia for both utilities and the equity market generally, Harris [12] also reports that risk premia appear to change over time. Specifically, he finds that equity risk premia decreased with the level of government interest rates, increased with the increases in the spread between corporate and government bond yields, and increased with increases in the dispersion of analysts' forecasts. Harris' study is, however, restricted to the 36-month period, 1982 to 1984.

Exhibit 5 reports results of analyzing the relationship between equity risk premia, interest rates, and yield spreads between corporate and government bonds. Following Harris [12], these bond yield spreads are used as a time series proxy for equity risk. As the perceived riskiness of corporate activity increases, the difference between yields on corporate bonds and government bonds should increase. One would expect the sources of increased riskiness to corporate bonds to also increase risks to shareholders. All regressions in Exhibit 5 are corrected for serial correlation.[12]

[11]Estimation difficulties confound precise interpretation of the intercept as the risk-free rate and the coefficient on beta as the market risk premium (see Miller and Scholes [21], and Black, Jensen, and Scholes [2]). The higher than expected intercept and lower than expected slope coefficient on beta are consistent with the prior studies of Black, Jensen, and Scholes [2], and Fama and MacBeth [9] using historical returns. Such results are consistent with Black's [1] zero beta model, although alternative explanations for these findings exist as well (as noted by Black, Jensen, and Scholes [2]).

[12]Ordinary least squares regressions showed severe positive autocorrelation in many cases, with Durbin Watson statistics typically below one. Estimation used the Prais Winsten method. See Johnston [14, pp. 321-325].

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Exhibit 5. Changes in Equity Risk Premia Over Time — Entries are Coefficient (t-value); Dependent Variable is Equity Risk Premium

Time period	Intercept	i_B	$i_c - i_B$	R^2
A. May 1991 1992	0.131	-0.651		0.53
	(19.82)	(-11.16)		
	0.092	-0.363	0.666	0.54
	(14.26)	(-6.74)	(5.48)	
B. 1982-1984	0.140	-0.637		0.43
	(8.15)	(-5.00)		
	0.064	-0.203	1.549	0.60
	(3.25)	(-1.63)	(4.84)	
C. 1985-1987	0.131	-0.739		0.74
	(7.73)	(-9.67)		
	0.110	-0.561	0.317	0.77
	(12.53)	(-7.30)	(1.87)	
D. 1988-1991	0.136	-0.793		0.68
	(16.23)	(-8.29)		
	0.130	-0.738	0.098	0.68
	(8.71)	(-4.96)	(0.40)	

Note: All variables are defined in Exhibit 1. Regressions were estimated using monthly data and were corrected for serial correlation using the Prais-Winsten method. For purposes of this regression, variables are expressed in decimal form, e.g., 14% = 0.14.

For the entire sample period, Panel A shows that risk premia are negatively related to the level of interest rates — as proxied by yields on government bonds, i_B. This negative relationship is also true for each of the subperiods displayed in Panels B through D. Such a negative relationship may result from increases in the perceived riskiness of investment in government debt at high levels of interest rates. A direct measure of uncertainty about investments in government bonds would be necessary to test this hypothesis directly.

For the entire 1982 to 1991 period, the addition of the yield spread risk proxy to the regressions dramatically lowers the magnitude of the coefficient on government bond yields, as can be seen by comparing Equations 1 and 2 of Panel A. Furthermore, the coefficient of the yield spread (0.666) is itself significantly positive. This pattern suggests that a reduction in the risk differential between investment in government bonds and in corporate activity is translated into a lower equity market risk premium. Further examination of Panels B through D, however, suggests that the yield spread variable is much more important in explaining changes in equity risk premia in the early portion of the 1980s than in the 1988 to 1991 period.

In summary, market equity risk premia change over time and appear inversely related to the level of government interest rates but positively related to the bond yield spread, which proxies for the incremental risk of investing in equities as opposed to government bonds.

IV. Conclusions

Shareholder required rates of return and risk premia are based on theories about investors' expectations for the future. In practice, however, risk premia are often estimated using averages of historical returns. This paper applies an alternate approach to estimating risk premia that employs publicly available expectational data. At least for the decade studied (1982 to 1991), the resultant average market equity risk premium over government bonds is comparable in magnitude to long-term differences (1926 to 1989) in historical returns between stocks and bonds. There is strong evidence, however, that market risk premia change over time and, as a result, use of a constant historical average risk premium is not likely to mirror changes in investor return requirements. The results also show that the expectational risk premia vary cross-sectionally with the relative risk (beta) of individual stocks.

The approach offers a straightforward and powerful aid in establishing required rates of return either for corporate investment decisions or in the regulatory arena. Since data are readily available on a wide range of equities, an investigator can analyze various proxy groups (e.g., portfolios of utility stocks) appropriate for a particular decision as well as analyze changes in equity return requirements over time.

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Investor growth expectations: Analysts vs. history

Analysts' growth forecasts dominate past trends in predicting stock prices.

James H. Vander Weide and Willard T. Carleton

For the purposes of implementing the Discounted Cash Flow (DCF) cost of equity model, the analyst must know which growth estimate is embodied in the firm's stock price. A study by Cragg and Malkiel (1982) suggests that the stock valuation process embodies analysts' forecasts rather than historically based growth figures such as the ten-year historical growth in dividends per share or the five-year growth in book value per share. The Cragg and Malkiel study is based on data for the 1960s, however, a decade that was considerably more stable than the recent past.

As the issue of which growth rate to use in implementing the DCF model is so important to applications of the model, we decided to investigate whether the Cragg and Malkiel conclusions continue to hold in more recent periods. This paper describes the results of our study.

STATISTICAL MODEL

The DCF model suggests that the firm's stock price is equal to the present value of the stream of dividends that investors expect to receive from owning the firm's shares. Under the assumption that investors expect dividends to grow at a constant rate, g, in perpetuity, the stock price is given by the following simple expression:

$$P_S = \frac{D(1+g)}{k-g} \qquad (1)$$

where:

P_S = current price per share of the firm's stock;

D = current annual dividend per share;

g = expected constant dividend growth rate; and

k = required return on the firm's stock.

Dividing both sides of Equation (1) by the firm's current earnings, E, we obtain:

$$\frac{P_S}{E} = \frac{D}{E} \cdot \frac{(1+g)}{k-g} \qquad (2)$$

Thus, the firm's price/earnings (P/E) ratio is a nonlinear function of the firm's dividend payout ratio (D/E), the expected growth in dividends (g), and the required rate of return.

To investigate what growth expectation is embodied in the firm's current stock price, it is more convenient to work with a linear approximation to Equation (2). Thus, we will assume that:

$$P/E = a_0(D/E) + a_1 g + a_2 k. \qquad (3)$$

(Cragg and Malkiel found this assumption to be reasonable throughout their investigation.)

Furthermore, we will assume that the required

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rate of return, k, in Equation (3) depends on the values of the risk variables B, Cov, Rsq, and Sa, where B is the firm's Value Line beta; Cov is the firm's pretax interest coverage ratio; Rsq is a measure of the stability of the firm's five-year historical EPS; and Sa is the standard deviation of the consensus analysts' five-year EPS growth forecast for the firm. Finally, as the linear form of the P/E equation is only an approximation to the true P/E equation, and B, Cov, Rsq, and Sa are only proxies for k, we will add an error term, e, that represents the degree of approximation to the true relationship.

With these assumptions, the final form of our P/E equation is as follows:

$$P/E = a_0(D/E) + a_1 g + a_2 B + a_3 Cov + a_4 Rsq + a_5 Sa + e. \quad (4)$$

The purpose of our study is to use more recent data to determine which of the popular approaches for estimating future growth in the Discounted Cash Flow model is embodied in the market price of the firm's shares.

We estimated Equation (4) to determine which estimate of future growth, g, when combined with the payout ratio, D/E, and risk variables B, Cov, Rsq, and Sa, provides the best predictor of the firm's P/E ratio. To paraphrase Cragg and Malkiel, we would expect that growth estimates found in the best-fitting equation more closely approximate the expectation used by investors than those found in poorer-fitting equations.

DESCRIPTION OF DATA

Our data sets include both historically based measures of future growth and the consensus analysts' forecasts of five-year earnings growth supplied by the Institutional Brokers Estimate System of Lynch, Jones & Ryan (IBES). The data also include the firm's dividend payout ratio and various measures of the firm's risk. We include the latter items in the regression, along with earnings growth, to account for other variables that may affect the firm's stock price.

The data include:

Earnings Per Share. Because our goal is to determine which earnings variable is embodied in the firm's market price, we need to define this variable with care. Financial analysts who study a firm's financial results in detail generally prefer to "normalize" the firm's reported earnings for the effect of extraordinary items, such as write-offs of discontinued operations, or mergers and acquisitions. They also attempt, to the extent possible, to state earnings for different firms using a common set of accounting conventions.

We have defined "earnings" as the consensus analyst estimate (as reported by IBES) of the firm's earnings for the forthcoming year.[1] This definition approximates the normalized earnings that investors most likely have in mind when they make stock purchase and sell decisions. It implicitly incorporates the analysts' adjustments for differences in accounting treatment among firms and the effects of the business cycle on each firm's results of operations. Although we thought at first that this earnings estimate might be highly correlated with the analysts' five-year earnings growth forecasts, that was not the case. Thus, we avoided a potential spurious correlation problem.

Price/Earnings Ratio. Corresponding to our definition of "earnings," the price/earnings ratio (P/E) is calculated as the closing stock price for the year divided by the consensus analyst earnings forecast for the forthcoming fiscal year.

Dividends. Dividends per share represent the common dividends declared per share during the calendar year, after adjustment for all stock splits and stock dividends). The firm's dividend payout ratio is then defined as common dividends per share divided by the consensus analyst estimate of the earnings per share for the forthcoming calendar year (D/E). Although this definition has the deficiency that it is obviously biased downward — it divides this year's dividend by next year's earnings — it has the advantage that it implicitly uses a "normalized" figure for earnings. We believe that this advantage outweighs the deficiency, especially when one considers the flaws of the apparent alternatives. Furthermore, we have verified that the results are insensitive to reasonable alternative definitions (see footnote 1).

Growth. In comparing historically based and consensus analysts' forecasts, we calculated forty-one different historical growth measures. These included the following: 1) the past growth rate in EPS as determined by a log-linear least squares regression for the latest year,[2] two years, three years, . . ., and ten years; 2) the past growth rate in DPS for the latest year, two years, three years, . . ., and ten years; 3) the past growth rate in book value per share (computed as the ratio of common equity to the outstanding common equity shares) for the latest year, two years, three years, . . ., and ten years; 4) the past growth rate in cash flow per share (computed as the ratio of pretax income, depreciation, and deferred taxes to the outstanding common equity shares) for the latest year, two years, three years, . . ., and ten years; and 5) plowback growth (computed as the firm's retention ratio for the current year times the firm's latest annual return on common equity).

We also used the five-year forecast of earnings

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per share growth compiled by IBES and reported in mid-January of each year. This number represents the consensus (i.e., mean) forecast produced by analysts from the research departments of leading Wall Street and regional brokerage firms over the preceding three months. IBES selects the contributing brokers "because of the superior quality of their research, professional reputation, and client demand" (IBES *Monthly Summary Book*).

Risk Variables. Although many risk factors could potentially affect the firm's stock price, most of these factors are highly correlated with one another. As shown above in Equation (4), we decided to restrict our attention to four risk measures that have intuitive appeal and are followed by many financial analysts: 1) B, the firm's beta as published by Value Line; 2) Cov, the firm's pretax interest coverage ratio (obtained from Standard & Poor's Compustat); 3) Rsq, the stability of the firm's five-year historical EPS (measured by the R^2 from a log-linear least squares regression); and 4) Sa, the standard deviation of the consensus analysts' five-year EPS growth forecast (mean forecast) as computed by IBES.

After careful analysis of the data used in our study, we felt that we could obtain more meaningful results by imposing six restrictions on the companies included in our study:

1. Because of the need to calculate ten-year historical growth rates, and because we studied three different time periods, 1981, 1982, and 1983, our study requires data for the thirteen-year period 1971-1983. We included only companies with at least a thirteen-year operating history in our study.
2. As our historical growth rate calculations were based on log-linear regressions, and the logarithm of a negative number is not defined, we excluded all companies that experienced negative EPS during any of the years 1971-1983.
3. For similar reasons, we also eliminated companies that did not pay a dividend during any one of the years 1971-1983.
4. To insure comparability of time periods covered by each consensus earnings figure in the P/E ratios, we eliminated all companies that did not have a December 31 fiscal year-end.
5. To eliminate distortions caused by highly unusual events that distort current earnings but not expected future earnings, and thus the firm's price/earnings ratio, we eliminated any firm with a price/earnings ratio greater than 50.
6. As the evaluation of analysts' forecasts is a major part of this study, we eliminated all firms that IBES did not follow.

Our final sample consisted of approximately sixty-five utility firms.[3]

RESULTS

To keep the number of calculations in our study to a reasonable level, we performed the study in two stages. In Stage 1, all forty-one historically oriented approaches for estimating future growth were correlated with each firm's P/E ratio. In Stage 2, the historical growth rate with the highest correlation to the P/E ratio was compared to the consensus analyst growth rate in the multiple regression model described by Equation (4) above. We performed our regressions for each of three recent time periods, because we felt the results of our study might vary over time.

First-Stage Correlation Study

Table 1 gives the results of our first-stage correlation study for each group of companies in each of the years 1981, 1982, and 1983. The values in this table measure the correlation between the historically oriented growth rates for the various time periods and the firm's end-of-year P/E ratio.

The four variables for which historical growth rates were calculated are shown in the left-hand column: EPS indicates historical earnings per share growth, DPS indicates historical dividend per share growth, BVPS indicates historical book value per share growth, and CFPS indicates historical cash flow per share growth. The term "plowback" refers to the product of the firm's retention ratio in the current year and its return on book equity for that year. In all, we calculated forty-one historically oriented growth rates for each group of firms in each study period.

The goal of the first-stage correlation analysis was to determine which historically oriented growth rate is most highly correlated with each group's year-end P/E ratio. Eight-year growth in CFPS has the highest correlation with P/E in 1981 and 1982, and ten-year growth in CFPS has the highest correlation with year-end P/E in 1983. In all cases, the plowback estimate of future growth performed poorly, indicating that — contrary to generally held views — plowback is not a factor in investor expectations of future growth.

Second-Stage Regression Study

In the second stage of our regression study, we ran the regression in Equation (4) using two different measures of future growth, g: 1) the best historically oriented growth rate (g_h) from the first-stage correlation study, and 2) the consensus analysts' forecast (g_a) of five-year EPS growth. The regression results, which are shown in Table 2, support at least

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TABLE 1

Correlation Coefficients of All Historically Based Growth Estimates by Group and by Year with P/E

Current Year	Historical Growth Rate Period in Years									
	1	2	3	4	5	6	7	8	9	10
1981										
EPS	-0.02	0.07	0.03	0.01	0.03	0.12	0.08	0.09	0.09	0.09
DPS	0.05	0.18	0.14	0.15	0.14	0.15	0.19	0.23	0.23	0.23
BVPS	0.01	0.11	0.13	0.13	0.16	0.18	0.15	0.15	0.15	0.15
CFPS	−0.05	0.04	0.13	0.22	0.28	0.31	0.30	0.31	−0.57	−0.54
Plowback	0.19									
1982										
EPS	−0.10	−0.13	−0.06	−0.02	−0.02	−0.01	−0.03	−0.03	0.00	0.00
DPS	−0.19	−0.10	0.03	0.05	0.07	0.08	0.09	0.11	0.13	0.13
BVPS	0.07	0.08	0.11	0.11	0.09	0.10	0.11	0.11	0.09	0.09
CFPS	−0.02	−0.08	0.00	0.10	0.16	0.19	0.23	0.25	0.24	0.07
Plowback	0.04									
1983										
EPS	−0.06	−0.25	−0.25	−0.24	−0.16	−0.11	−0.05	0.00	0.02	0.02
DPS	0.03	−0.10	−0.03	0.08	0.15	0.21	0.21	0.21	0.22	0.24
BVPS	0.03	0.10	0.04	0.09	0.15	0.16	0.19	0.21	0.22	0.21
CFPS	−0.08	0.01	0.02	0.08	0.20	0.29	0.35	0.38	0.40	0.42
Plowback	−0.08									

two general conclusions regarding the pricing of equity securities.

First, we found overwhelming evidence that the consensus analysts' forecast of future growth is superior to historically oriented growth measures in predicting the firm's stock price. In every case, the R^2 in the regression containing the consensus analysts' forecast is higher than the R^2 in the regression containing the historical growth measure. The regression coefficients in the equation containing the consensus analysts' forecast also are considerably more significant than they are in the alternative regression. These results are consistent with those found by Cragg and Malkiel for data covering the period 1961-1968. Our results also are consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy-and-sell decisions.

TABLE 2

Regression Results
Model I

Part A: *Historical*

$P/E = a_0 + a_1 D/E + a_2 g_h + a_3 B + a_4 Cov + a_5 Rsq + a_6 Sa$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	$\hat{a}_3$	$\hat{a}_4$	$\hat{a}_5$	$\hat{a}_6$	R^2	F Ratio
1981	−6.42*	10.31*	7.67*	3.24	0.54*	1.42*	57.43	0.83	46.49
	(5.50)	(14.79)	(2.20)	(2.86)	(2.50)	(2.85)	(4.07)		
1982	−2.90*	9.32*	8.49*	2.85	0.45*	−0.42	3.63	0.86	65.53
	(2.75)	(18.52)	(4.18)	(2.83)	(2.60)	(0.05)	(0.26)		
1983	−5.96*	10.20*	19.78*	4.85	0.44*	0.33	32.49	0.82	45.26
	(3.70)	(12.20)	(4.83)	(2.95)	(1.89)	(0.50)	(1.29)		

Part B: *Analysis*

$P/E = a_0 + a_1 D/E + a_2 g_a + a_3 B + a_4 Cov + a_5 Rsq + a_6 Sa$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	$\hat{a}_3$	$\hat{a}_4$	$\hat{a}_5$	$\hat{a}_6$	R^2	F Ratio
1981	−4.97*	10.62*	54.85*	−0.61	0.33*	0.63*	4.34	0.91	103.10
	(6.23)	(21.57)	(8.56)	(0.68)	(2.28)	(1.74)	(0.37)		
1982	−2.16*	9.47*	50.71*	−1.07	0.36*	−0.31	119.05*	0.90	97.62
	(2.59)	(22.46)	(9.31)	(1.14)	(2.53)	(1.09)	(1.60)		
1983	−8.47*	11.96*	79.05*	2.16	0.56*	0.20	−34.43	0.87	69.81
	(7.07)	(16.48)	(7.84)	(1.55)	(3.08)	(0.38)	(1.44)		

Notes:

* Coefficient is significant at the 5% level (using a one-tailed test) and has the correct sign. T-statistic in parentheses.

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Second, there is some evidence that investors tend to view risk in traditional terms. The interest coverage variable is statistically significant in all but one of our samples, and the stability of the operating income variable is statistically significant in six of the twelve samples we studied. On the other hand, the beta is never statistically significant, and the standard deviation of the analysts' five-year growth forecasts is statistically significant in only two of our twelve samples. This evidence is far from conclusive, however, because, as we demonstrate later, a significant degree of cross-correlation among our four risk variables makes any general inference about risk extremely hazardous.

Possible Misspecification of Risk

The stock valuation theory says nothing about which risk variables are most important to investors. Therefore, we need to consider the possibility that the risk variables of our study are only proxies for the "true" risk variables used by investors. The inclusion of proxy variables may increase the variance of the parameters of most concern, which in this case are the coefficients of the growth variables.[8]

To allow for the possibility that the use of risk proxies has caused us to draw incorrect conclusions concerning the relative importance of analysts' growth forecasts and historical growth extrapolations, we have also estimated Equation (4) with the risk variables excluded. The results of these regressions are shown in Table 3.

Again, there is overwhelming evidence that the consensus analysts' growth forecast is superior to the historically oriented growth measures in predicting the firm's stock price. The R^2 and t-statistics are higher in every case.

CONCLUSION

The relationship between growth expectations and share prices is important in several major areas of finance. The data base of analysts' growth forecasts collected by Lynch, Jones & Ryan provides a unique opportunity to test the hypothesis that investors rely more heavily on analysts' growth forecasts than on historical growth extrapolations in making security buy-and-sell decisions. With the help of this data base, our studies affirm the superiority of analysts' forecasts over simple historical growth extrapolations in the stock price formation process. Indirectly, this finding lends support to the use of valuation models whose input includes expected growth rates.

TABLE 3

Regression Results
Model II

Part A: *Historical*

$P/E = a_0 + a_1 D/E + a_2 g_h$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	R^2	F Ratio
1981	−1.05	9.59	21.20	0.73	82.95
	(1.61)	(12.13)	(7.05)		
1982	0.54	8.92	12.18	0.83	167.97
	(1.38)	(17.73)	(6.95)		
1983	−0.75	8.92	12.18	0.77	107.82
	(1.13)	(12.38)	(7.94)		

Part B: *Analysis*

$P/E + a_0 + a_1 D/E + a_2 g_a$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	R^2	F Ratio
1981	3.96	10.07	60.53	0.90	274.16
	(8.31)	(8.31)	(20.91)	(15.79)	
1982	− 1.75	9.19	44.92	0.88	246.36
	(4.00)	(4.00)	(21.35)	(11.06)	
1983	−4.97	10.95	82.02	0.83	168.25
	(6.93)	(6.93)	(15.93)	(11.02)	

Notes:
* Coefficient is significant at the 5% level (using a one-tailed test) and has the correct sign. T-statistic in parentheses.

[5] We also tried several other definitions of "earnings," including the firm's most recent primary earnings per share prior to any extraordinary items or discontinued operations. As our results were insensitive to reasonable alternative definitions of "earnings" we report only the results for the IBES consensus.

[6] For the latest year, we actually employed a point-to-point growth calculation because there were only two available observations.

[7] We use the word "approximately," because the set of available firms varied each year. In any case, the number varied only from zero to three firms on either side of the figures cited here.

[8] See Maddala (1977).

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Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return

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I. Introduction

Shareholder required rates of return play key roles in establishing economic criteria for resource allocation in many corporate and regulatory decisions. Theory dictates that such returns should be forward-looking return requirements that take into account the risk of the specific equity investment.

Estimation of such returns, however, presents numerous and difficult problems. Although theory clearly calls for a forward-looking required return, investigators, lacking a superior alternative, often resort to averages of historical realizations. One primary example is the determination of equity required return as a "least risk" rate plus a risk premium where an equity risk premium is calculated as an average of past differences between equity returns and returns on debt instruments. The historical studies of Ibbotson *et al.* [9] have been used frequently to implement this approach.[1] Use of such historical risk premia assumes that past realizations are a good surrogate for future expectations and that risk premia are roughly constant over time. Additionally, the choice of a time period over which to average data under such a procedure is essentially arbitrary. Carleton and Lakonishok [3] demonstrate empirically some of the problems with such historical premia when they are disaggregated for different time periods or groups of firms.

Recently Brigham, Shome, and Vinson [2] surveyed work on developing *ex ante* equity risk premia with particular emphasis on regulated utilities. They presented their own risk premia estimates, which make use of financial analysts' forecasts as surrogates for investor expectations.

The current paper follows an approach similar to Brigham *et al.* and derives equity required returns and risk premia using publicly available expectational

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[1]Many leading texts in financial management use such historical risk premia to estimate a market return. See for example, Brealey and Myers [1]. Often a market risk premium is adjusted for the observed relative risk of a stock.

data. The estimation makes use of dividend growth models but incorporates expected rather than historical growth rates. A consensus forecast of financial analysts is used as a proxy for investor expectations. While Brigham *et al.* focus on utility securities, this paper also provides estimates of risk premia for a broad market index. Equity risk premia for both the market and for utilities are shown to vary over time with changes in the perceived riskiness of corporate activity relative to U.S. government bonds. In addition, the estimated risk premia at any given time are shown to vary across groups of stocks. The paper also provides results using the dispersion of analysts' forecasts as an *ex ante* proxy for equity risk.

Section II discusses related literature on financial analysts' forecasts (FAF) and the estimation of required returns using such forecasts. In Section III models and data are discussed. Following a comparison of the results to those of earlier studies (including historical risk premia), the estimates are subjected to economic tests of both their time-series and their cross-sectional characteristics in Section V. Finally, conclusions are offered.

II. Background and Literature Review

In finance, it is often convenient to use the notion of a shareholder's required rate of return. Such a rate (k) is the minimum level of expected return necessary to compensate the investor for bearing risks and receiving dollars in the future rather than in the present. In general, k will depend on returns available on alternative investments (*e.g.*, bonds or other equities) and the riskiness of the stock. To isolate the effects of risk it is often useful (both theoretically and empirically) to work in terms of a risk premium (rp), defined as

$$rp = k - i, \qquad (1)$$

where i = required return for a zero risk investment. Theoretically, i is a risk free rate, though empirically its proxy (*e.g.*, yield to maturity on a government bond) is only a "least risk" alternative that is itself subject to risk.[2] While models such as the capital asset pricing model offer explicit methods for varying risk premia across securities, they provide little practical advice on establishing some benchmark market risk premium. Other models, such as the dividend growth model (hereafter referred to as the discounted cash flow, or DCF, model), can be used to provide direct estimates of k, and hence implied values of rp, but are silent on how rp ought to vary across firms. In this paper DCF models are used to establish risk premia both for the market and for utility stocks. Since the DCF analysis uses a consensus measure of FAF of earnings as a proxy for investor expectations, a brief review of research on FAF is appropriate.

A. Literature on FAF

Much of the burgeoning literature on properties of FAF is surveyed by Givoly and Lakonishok [8]. Of primary importance for this work is the relationship between FAF and investor expectations that determine stock prices. Such forecast data are readily available. That they are used by investors is evidenced by the commercial viability of services that provide such forecasts and by the results of studies of investors' behavior (Touche, Ross and Company [16], Stanley, Lewellen and Schlarbaum [15]). Moreover, a growing body of knowledge shows that analysts' earnings forecasts are indeed reflected in stock prices. Such studies typically employ a consensus measure of FAF calculated as a simple average[3] of forecasts by individual analysts. Elton, Gruber, and Gultekin [5] show that stock prices react more to changes in analysts' forecasts of earnings than they do to changes in earnings themselves, suggesting the usefulness of FAF as a surrogate for market expectations. In an extensive NBER study using analysts' earnings forecasts, Cragg and Malkiel [4, p. 165] conclude "the expectations formed by Wall Street professionals get quickly and thoroughly impounded into the prices of securities. Implicitly, we have found that the evaluations of companies that analysts make are the sorts of ones on which market valuation is based." Updating Cragg and Malkiel's work, Vander Weide and Carleton [17] recently compare consensus FAF of earnings growth to 41 different historical growth measures.[4] They con-

[2]In this development the effects of tax codes and inflation on required returns are ignored.

[3]Mayshar [14] discusses the problems of explaining equilibrium prices of securities when there is divergence of opinion among investors. One issue is whether it is the expectation of the marginal investor or the average investor that determines security prices. Mayshar shows that, in general given divergence of opinion and trading costs, not all investors trade in all assets and that equilibrium prices and the identity of investors trading in each asset are jointly determined. In this sense, equilibrium prices can be considered as "determined simultaneously by the average and marginal investors."

[4]Both Cragg and Malkiel [4] and Vander Weide and Carleton [17] show that an average measure of analysts' forecasts of growth in earnings is powerful in explaining cross-sectional variation in price earnings ratios of stocks.

clude that "there is overwhelming evidence that the consensus analysts' forecast of future growth is superior to historically-oriented growth measures in predicting the firm's stock price . . . consistent with the hypothesis that investors use analysts' forecasts, rather than historically-oriented growth calculations, in making stock buy and sell decisions." [17, p. 15].

B. Use of FAF to Estimate Equity Required Returns

Given the demonstrated relationship of FAF to equity prices and the direct theoretical appeal of expectational data, it is no surprise that FAF have been used in conjunction with DCF models to estimate equity return requirements. Typically such approaches have estimated an *ex ante* risk premium (rp) calculated as the difference between required return and a least risk rate as shown in Equation (1).

Malkiel [13] estimated such risk premia for the Dow Jones Industrial Index using a nonconstant growth version of the DCF model. Initial years of growth were based on Value Line's five-year earnings growth forecasts with subsequent growth approaching a long-run real national growth rate of 4%. More recently, Brigham, Vinson, and Shome [2] used a two stage DCF growth model to estimate *ex ante* risk premia for electric utilities and the Dow Jones Industrial Index. For the period 1966–1984, they report annual risk premia for both Dow Jones Industrial and Electric Indices using Value Line's forecasts. Beginning in 1980 they report monthly risk premia for electric utilities with the source of FAF varying over time; starting with Value Line, adding Merrill Lynch and Salomon Brothers in 1981 and finally, in mid-1983, adding IBES data. IBES (Institutional Broker's Estimate System) is a collection of analysts' forecasts and is discussed in the next section. The resultant risk premia vary over time. In addition, Brigham *et al.* present evidence that their estimated risk premia vary cross-sectionally with a stock's risk (as proxied by bond rating) and over time with the level of interest rates. FAF also have been used in conjunction with DCF models by a number of expert witnesses in rate of return determination for regulated utilities. Recently, the Federal Communications Commission [6] tentatively endorsed the use of consensus FAF in DCF determinations of required return on equity.[5]

This paper adds to earlier work in a number of important respects. First, while Malkiel and Brigham *et al.* focus on electric utilities or the Dow Jones Industrial Index, this paper estimates risk premia for a broadly defined market index — the Standard and Poor's 500. Thus, the results are directly comparable to historical "market" risk premia typically estimated on a similar sample of stocks. Second, the study uses a large sample of FAF (beginning in 1982 when the necessary data first became available). This provides the ability to use a consensus measure of expectations as would be suggested by financial theory. Third, the results show that the derived risk premia change over time and that these changes are related to proxies for risk, which would be expected to be associated with equity risk premia. Although such changes have been noted by earlier studies (*e.g.*, Brigham *et al.*), there is little work explaining the patterns of change. Finally, the paper shows the usefulness of the dispersion of FAF as a proxy for risk. Such a measure is a direct expectational measure of risk and does not rely on assumptions of risk stability over time as do most operational methods of deriving risk surrogates.

III. Models and Data

A. Model for Estimation

The DCF model states that the current market price is the present value of expected future cash flows from ownership. The simplest and most commonly used version estimates shareholders' required rate of return, k, as the sum of dividend yield and expected growth in dividends, or

$$k = (D_1/P_0) + g, \tag{2}$$

where D_1 = dividend per share expected to be received at time one, P_0 = current price per share (time 0), and g = expected growth rate in dividends per share. The limitations of this model are well known, and it is straightforward to derive expressions for k based on more general specifications of the DCF model.[6] The primary difficulty in using the DCF model is obtaining an estimate of g, since it should reflect market expecta-

[5]In response to the FCC's *Notice of Proposed Rulemaking* [6] to determine authorized rates of return, AT&T used an approach driven by FAF growth estimates from IBES. Also see, for example, W.T. Carleton, *Testimony before the Vermont Public Service Board*, Docket No. 4865 (January 1984) and R.S. Harris, *Testimony filed with the Delaware Public Service Commission*, Docket 84-33 (November 1984). In its *Supplemental Notice* [6], the FCC tentatively endorsed substantial reliance on FAF for use in DCF determination of cost of equity.

[6]As stated, Equation (2) requires expectations of either an infinite horizon of dividend growth at rate g or a finite horizon of dividend growth at rate g and special assumptions about the price of the stock at the end of that horizon. Essentially, the assumption must ensure that the stock price grows at a compound rate of g over the finite horizon.

tions of future performance. Without a ready source for measuring such expectations, application of the DCF model is fraught with difficulties even if the simple version shown in Equation (2) fits the equity investment in question. This paper uses published FAF of long-run growth in earnings as a proxy for g.

B. Data

Many analysts publish forecasts of corporate earnings. Such forecasts are widely disseminated and are the subject of considerable interest both to investors and researchers (see Givoly and Lakonishok [8]). In recent years, this interest has led to a viable market for services that collect and disseminate such FAF. FAF for this research come from IBES (Institutional Broker's Estimate System), which is a product of Lynch, Jones, and Ryan, a major brokerage firm. Data in IBES represent a compilation of earnings per share (EPS) estimates of about 2000 individual analysts from 100 brokerage firms on over 2000 corporations. IBES data are provided to clients in a number of forms, including on-line data bases provided by vendors. The client base, which currently numbers more than 300, includes most large institutional investors such as pension funds, banks, and insurance companies. Representative of industry practice, IBES contains estimates of (i) EPS for the upcoming fiscal year, (ii) EPS for the subsequent year, and (iii) a projected five-year growth rate in EPS. Each item is available at monthly intervals.

IBES collection procedures are designed to obtain timely forecasts made on a consistent basis. IBES requests "normalized" five-year growth rates from analysts. Such normalization is designed to remove short-term distortions that might stem from using an unusually high or low earnings year as a base. These growth and other earnings forecasts are updated when analysts formally change their stated predictions. IBES does, however, verify prior forecasts monthly to make sure that analysts still hold to them. Despite these procedures, there remain potential difficulties in using IBES data to the extent that some analysts fail to normalize growth projections or fail to continually review and revise their earnings estimates. To control for some of these potential difficulties, this analysis uses averages of analysts' forecasts for a wide range of companies over an extended number of months.

In this research, the mean value of individual analyst's forecasts of five-year growth rate in EPS will be used as a proxy for g in the DCF model.[7] The five-year horizon is the longest horizon over which such forecasts are available from IBES and often is the longest horizon used by analysts. One could make alternate assumptions about growth after five years and use a more general version of a DCF model, but unfortunately, there is no source for obtaining market estimates of this expected growth. As a result, the current analysis applies the five-year growth rate as a proxy for g in Equation (2). Given no objective basis for predicting a change in growth (see Footnote 6), this avoids the introduction of *ad hoc* assumptions about future growth. Importantly, however, the approach is applied to portfolios of stocks rather than to individual securities, since future growth patterns may be expected to have drastic changes for some specific securities. Stock prices were obtained from Chase Econometrics and dividend and other firm-specific information from COMPUSTAT. Interest rates (both government and corporate) were gathered from Federal Reserve Bulletins and from Moody's Bond Record. Exhibit 1 describes key variables used in the study. Data collected cover all dividend paying stocks in the Standard and Poor's 500 stock (SP500) index plus approximately

Exhibit 1. Variable Definitions

k	=	equity required rate of return
P_0	=	average daily price per share*
D_1	=	expected dividend per share measured as current indicated annual dividend from COMPUSTAT multiplied by $(1+g)$†
g	=	average financial analysts' forecasts of five-year growth rate in earnings per share (from IBES)
σ_g	=	cross-sectional standard deviation of analysts' forecasts of growth in earnings per share (from IBES)
N_g	=	number of analysts' forecasts of g (from IBES)
i_{20}	=	yield to maturity on 20-year U.S. government obligations. Source: Federal Reserve Bulletin, constant maturity series
i_c	=	yield to maturity on long-term corporate bonds: Moody's average
i_u	=	yield to maturity on long-term public utility bonds: Moody's average
rp	=	equity risk premium calculated as $rp = k - i_{20}$

*In results reported P_0 is the average daily price for a stock from the beginning of the month up to and including the date of publication of monthly IBES data (typically half a month). Almost identical results were found using the average price for the entire month.
†See Footnote 8 at the end of the paper for a discussion of the $(1+g)$ adjustment.

[7]While the model calls for expected growth in dividends, no source of data on such projections is readily available. In addition, in the long run, dividend growth is sustainable only via growth in earnings. As long as payout ratios are not expected to change, the two growth rates will be the same. Vander Weide and Carleton [17] also use the IBES growth rate in earnings per share.

150 additional stocks of regulated companies. Since five-year growth rates were first available from IBES in January 1982, the analysis covers the 36-month period 1982–1984. On average, each company in SP500 had approximately nine individual forecasts of g per month, with some companies having 20 or more forecasts of g. As a result, well over 100,000 FAF (company-months) were employed in the analysis.

IV. Construction of Risk Premia and Required Rates of Return

For each month, a "market" required rate of return was calculated using each dividend paying stock in the SP500 index for which data were available. The DCF model in Equation (2) was applied to each stock and the results weighted by market value of equity to produce the market required return.[8] The return was converted to a risk premium by subtracting i_{20}, the yield to maturity on 20-year U.S. government bonds.[9] The procedure was repeated for the Standard and Poor's Utility Index (SPUT) of 40 stocks. Exhibit 2 reports the results by quarter.

The results appear quite plausible. The estimated risk premia are positive, consistent with equity owners demanding a risk premium over and above returns available on debt securities. Also, as would be expected for less risky stocks, the utility risk premia consistently fall below those estimated for stocks in general. Exhibit 2 shows that estimated risk premia change over time, suggesting changes in the market's perception of the incremental risk of investing in equity rather than debt securities. Such changes will be examined in a subsequent section.

For comparative purposes, Exhibit 3 provides results of related studies. The long-run differential return between stocks and long-term government bonds (Panel A) has been about 6.4% per year (on a geometric basis). It is comforting to note that this is very close to the 6.16% average annual risk premia estimated in Exhibit 2. Note, however, that such risk premia appear to change over time. Panels B and C show some of Brigham *et al.*'s risk premium estimates. Unfortunate-

Exhibit 2. Required Rates of Return and Risk Premia

		SP500		SPUT	
	Bond Yield*	Required† Return	Risk‡ Premium	Required† Return	Risk‡ Premium
1982					
Quarter 1	14.27	20.81	6.54	18.83	4.56
Quarter 2	13.74	20.68	6.94	18.51	4.77
Quarter 3	12.94	20.23	7.29	18.55	5.61
Quarter 4	10.72	18.58	7.86	17.20	6.48
Average	12.92	20.08	7.16	18.28	5.36
1983					
Quarter 1	10.87	18.07	7.20	16.71	5.84
Quarter 2	10.80	17.76	6.96	16.52	5.72
Quarter 3	11.79	17.90	6.11	16.39	4.60
Quarter 4	11.90	17.81	5.91	16.00	4.10
Average	11.34	17.88	6.54	16.41	5.07
1984					
Quarter 1	12.09	17.22	5.13	16.48	4.39
Quarter 2	13.21	17.42	4.21	16.99	3.78
Quarter 3	12.83	17.34	4.51	16.62	3.79
Quarter 4	11.78	17.05	5.27	15.18	4.04
Average	12.48	17.26	4.78	16.48	4.00
Average 1982–1984	12.25	18.41	6.16	17.06	4.81

*i_{20} = Yield on U.S. Treasury obligation, 20 year constant maturity.
†Monthly required return (k) calculated as value weighted average. Quarterly values are simple averages of monthly figures.
‡Risk premium calculated as $k - i_{20}$

[8]The construction of D_1 is controversial since dividends are paid quarterly and may be expected to change during the year; whereas, Equation (2), as is typical, is being applied to annual data. Both the quarterly payment of dividends (due to investors' reinvestment income before year's end, see Linke, and Zumwalt [11]) and any growth during the year require an upward adjustment of the current annual rate of dividends to construct D_1. If quarterly dividends grew at a constant rate, both factors could be accommodated straightforwardly by applying Equation (2) to quarterly data (with a quarterly growth rate) and then annualizing the estimated quarterly required return. Unfortunately, with lumpy changes in dividends, the precise nature of the adjustment depends, on both an individual company's pattern of growth during the calendar year and an individual company's required return (and hence reinvestment income in that risk class).

In this work, D_1 is calculated as $D_0(1 + g)$. The full g adjustment is a crude approximation to adjust for both growth and reinvestment income. For example, if one expected dividends to have been raised, on average, six months ago, a "½ g" adjustment would allow for growth, the remaining "½ g" would be justified on the basis of reinvestment income. Any precise accounting for both reinvestment income and growth would require tracking each company's dividend change history and making explicit judgments about the quarter of the next change. Since no organized "market" forecasts of such a detailed nature exist, such a procedure is not possible. To get a feel for the magnitudes involved, the average dividend yield (D_1/P_0) and growth (market value weighted 1982–1984) for the SP500 were 5.8% and 12.5%. Comparable figures for the SP utility index were 10.4% and 6.7%. As a result, a "full g" adjustment on average increases the required return by 60–70 basis points (relative to no g adjustment) for both indices.

[9]Brigham, Shome, and Vinson [2] also use this interest rate to create equity risk premia. The results were robust to changes in weighting. For the SP500, equal weighting (rather than value weighting) increased the 1982–1984 risk premium by two basis points while for the SPUT equal weighting resulted in a 21 basis point increase. As a further test, the SP500 stocks were ranked on g and the upper and lower deciles deleted. The resulting risk premium (1982–84 average) was 5.94%. A similar procedure used to rank dividend yield produced an SP500 risk premium of 6.18%.

Exhibit 3. Results of Related Studies: Historical Returns and Estimated Risk Premia

			Geometric	Arithmetic
A. Historical Return Realizations (1926–1980)*				
Common Stocks			9.4%	11.7%
Long Term Government Bonds			3.0%	3.1%
U.S. Treasury Bills			2.8%	2.8%
	Dow Jones Industrials		Dow Jones Electrics	
	Average	Range	Average	Range
B. DCF risk premia using one analyst†				
1966–1970	5.45	4.97–6.81	3.91	3.46–4.13
1971–1975	5.51	4.95–6.92	5.95	4.52–8.72
1976–1980	6.23	5.09–6.88	5.82	5.55–6.21
1981	5.38		5.62	
1982	5.30		3.70	
1983	5.87		5.64	
1984	3.75		4.06	
Average 1982–1984	4.97		4.47	
				Electric Utilities
C. DCF risk premia using three analysts‡				
1981				3.73
1982				4.52
1983				5.17
1984 (through June)				5.01

*Ibbotson, Sinquefield, and Siegel [9].
†Analyst is Value Line. Data are annual estimates using two-stage growth DCF model. Source: Brigham, Shome, and Vinson [2].
‡Analysts are Value Line, Merrill Lynch and Salomon Brothers. Data are averages of monthly values from Brigham, Shome, and Vinson [2].

ly, their work does not include a broad market index directly comparable to the SP500. Rather, they use the Dow Jones Industrial Index based on 30 large industrial concerns. Though the SPUT includes a broader set of utilities than the electrics covered by Brigham *et al.*, their average risk premium estimates are also in the 4 to 5% range for the early 1980s.

While the estimates in Exhibit 2 are quite plausible, the question still remains as to whether they satisfy economic criteria one would expect of risk premia. In the following section, the estimated risk premia are subjected to a series of tests to see if they vary both cross-sectionally and over time with changes in risk. The tests are ultimately joint tests of the estimates as useful risk premia, the measured proxies for risk and the validity of the economic hypothesis. Nonetheless, if the tests using the risk premia have results conforming to theoretical expectation, the comfort level in using them is increased accordingly.

Exhibit 4. Risk Premia by Moody's Bond Ratings*

	Electric Utilities: SIC's 4911 and 4931			
	Aaa	Aa	A	Baa
Risk Premia				
Risk Premium (Expectational g)	3.60	4.33	4.81	4.90
Risk Premium (Historical g†)	6.10	3.28	3.09	5.24
Financial Data				
Debt Ratio‡	0.46	0.48	0.50	0.51
Beta§	0.58	0.61	0.62	0.61
Variability¶				
Operating Cash Flow	0.009	0.016	0.022	0.059
Equity Cash Flow	0.006	0.013	0.019	0.024
Standard Deviation** of Analysts' Forecasts	1.00	1.26	1.33	1.79

*Moody's ratings as of January 1984 from *Moody's Bond Record*, February 1984. The number of companies by rating is Aaa (2), Aa (22), A (32), Baa (22). Risk premia are averages of monthly values, January 1982–September 1983.
†Historical Growth is past five year earnings growth, based on 20 quarters of past data. Source: IBES.
‡Debt Ratio = Long-Term Debt ÷ Total Capital, average 1978–1982 from COMPUSTAT.
§Beta from *Value Line*, January 29, 1982.
¶Measure of variability around trend growth: variance of residuals of regressions on quarterly COMPUSTAT data (1978–1982). Regressions are log of variable regressed on time and seasonal dummies.
**This is the average value of the standard deviation around the mean long-term growth forecast. Such standard deviations are reported for each company in each month. Note it is *not* the cross-sectional standard deviation of growth rates among companies.

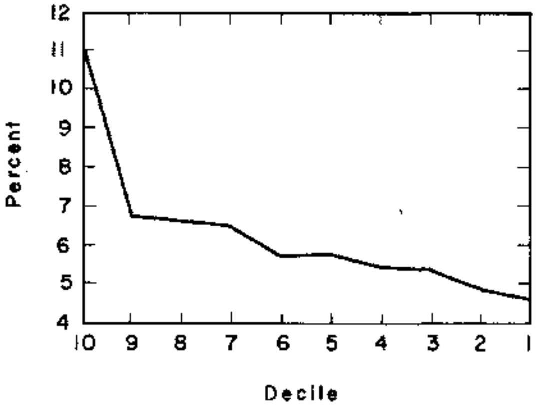
V. Characteristics of Risk Premia

A. Cross-Sectional Tests

Brigham *et al.* show that risk premia (IBES estimates for first half of 1984) for electric utilities are lower the higher the bond rating of the company, confirming the expected tradeoff between risk and return. A similar experiment for electrics, using the current data stretching back to January 1982, confirmed this relationship for a longer time period. Exhibit 4 reports selected results of that analysis. As a contrast, Exhibit 4 also shows the results of using historical growth rates (rather than FAF) in a DCF model. Risk premia derived from historical growth are actually higher for companies with very safe debt, suggesting the clear inferiority of historical to expectational growth rates. With the exception of beta, which is roughly constant across groups, other measures of risk noted in Exhibit 4 confirm the risk differentials associated with bond rating groups.

A further test of the cross-sectional variation in risk premia was performed by dividing the universe of

Exhibit 5. Equity Risk Premia: Deciles Based on Standard Deviation of Financial Analysts Forecasts* (Companies with at least three analysts)



*Risk premia were calculated as equally weighted averages for each decile (10 = highest dispersion) for each of three months: January 1982, December 1982, and September 1983 (approximately 50 companies per decile). These premia were then averaged across deciles. A similar downward pattern was evident in each month.

stocks (industrial plus utility) according to the dispersion of analysts' forecasts, σ_g. This cross-sectional measure of analysts' disagreement should be positively related to the uncertainty of future growth prospects and hence to the riskiness of equity investment. Elsewhere, Malkiel [12] has discussed the rationale and usefulness of such dispersion as an *ex ante* measure of risk. Malkiel argues that σ_g may be a proxy for systematic risk and shows that it bears a closer empirical relationship to expected return than does beta or other risk measures. Most of Malkiel's work is, however, based on data from the 1960s. Exhibit 5 reports risk premia by decile based on σ_g for companies having at least three analysts' forecasts. The three months were chosen as representative. The results show a consistent positive relationship between risk premia and dispersion of analysts' forecasts.

The results in Exhibits 4 and 5 show that the estimated risk premia conform to theoretical relationships between risk and required return that are expected when investors are risk averse. This strengthens the case for using such risk premia, and provides encouragement for further study of their structure.[10]

[10]Such *ex ante* required returns offer a useful alternative to *ex post* data typically used in tests of asset pricing models. See Friend, Westerfield, and Granito [7] for a test of the CAPM using survey data rather than *ex post* holding period returns.

B. Time Series Tests

A potential benefit of using *ex ante* risk premia is the estimation of changes in risk premia over time. Brigham *et al.* [2] note such changes for utility stocks and relate them to changes in interest rates. They conclude that prior to 1980 utility risk premia increased with the level of interest rates, but that this pattern reversed thereafter, resulting in an inverse correlation between risk premia and interest rates. They explain this turnaround as the outcome of changes in bond markets and adaptation of utilities and their regulators to an inflationary environment. Brigham *et al.* do not, however, analyze changing risk premia for stocks in general. Furthermore, they do not provide direct empirical proxies for changes in equity risks that would explain changes in equity risk premia over time.[11]

C. Changes in Risk Premia

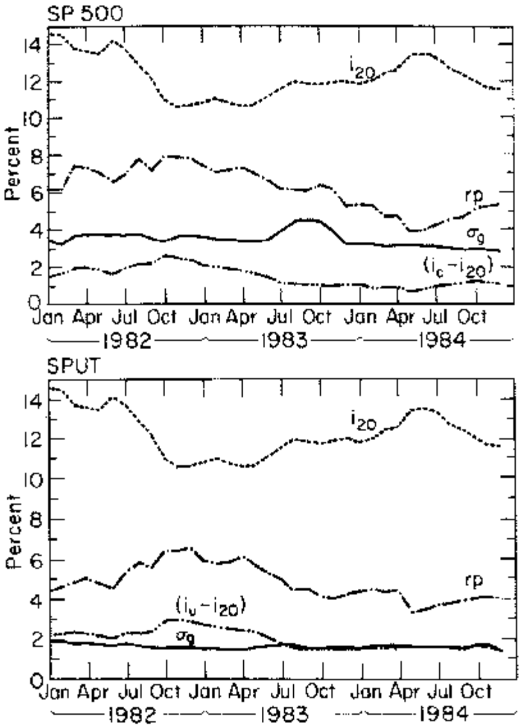
One would expect changes in measured equity risk premia to be related to changes in perceived riskiness. First, with changes in the economy and financial markets, equity investments may be perceived to change in risk. Second, since government bonds are risky investments themselves, their perceived riskiness may change. For example, the large increase in interest rate volatility in the last decade has undoubtedly made fixed income investments more risky holdings than they were in a world of relatively stable rates. Measured equity risk premia (relative to government bonds) could thus be reduced due to increases in perceived riskiness of bonds, even if equities displayed no shifts in risk.

One measure of risk, the standard deviation of FAF, σ_g, was shown previously to be related to cross-sectional differences in risk premia. To test its usefulness as a time series measure of risk, the average value of σ_g was calculated each month for the SP500 index and the SPUT index. The results are graphed in Exhibit 6.[12]

[11]In addition, Brigham *et al.* do not report on their treatment of serial correlation in reported regression results, making it more difficult to interpret their findings. As an example, monthly data are used for the 1980–1984 period in a time series regression of a risk premium on the level of interest rates. Similar regressions using data in this paper (1982–1984 monthly data) showed significant positive autocorrelation with Durbin Watson Statistics well below 1.0.

[12]The average values of σ_g are the market value weighted averages of the σ_g for individual stocks. If one looked at a direct estimate of g made by individual analysts for the index, one would expect to find a lower amount of dispersion because some of the differences on individual securities would cancel out. Such data are not available. One would suspect, however, that the calculated average would move up and down in tandem with this unobservable measure of dispersion.

Exhibit 6. Equity Risk Premia, Interest Rates and Risk



Another possible time series proxy for equity risk is the set of yield spreads between corporate and government bonds. As the perceived riskiness of corporate activity increases, the difference between yields on corporate bonds and government bonds should increase. One would expect the sources of increased riskiness to corporate bonds to also increase risks to shareholders.[13] Exhibit 6 graphs two series of yield spreads. The first is the difference between the yield on Moody's corporate average series and the yield on 20-year U.S. Treasury obligations. This series includes debt of both industrial and utility companies and thus would be appropriate as a risk proxy for a broad market index such as the SP500. The second is the spread between the yields on Moody's public utility series and 20-year U.S. Treasury bonds. This series should reflect relative risks of utility stocks as proxied by SPUT.[14]

Exhibit 7 reports results of analyzing the relationship between risk premia, interest rates, and proxies for risk for both the SP500 and SPUT. All regressions are corrected for serial correlation.[15] For stocks in general, Panel A shows that risk premia are negatively related to the level of interest rates — as proxied by i_{20}. Such a negative relationship may result from increases in the perceived riskiness of investment in government debt at high levels of interest rates. A direct measure of uncertainty about investments in government bonds would be necessary to test this hypothesis directly.

The results also show the significant positive relationship between the two proxies for risk and the estimated risk premia. For example, regression 4 of Panel A shows that the equity premium on the SP500 increases with the dispersion of FAF (σ_g) and the yield spread between corporate and government bonds ($i_c - i_{20}$). Evidently, these two risk measures capture somewhat different dimensions of risk, both of which appear important in explaining risk premia on stocks in general. The simple correlation coefficient between the two risk measures is 0.19 and is insignificantly different from zero. The addition of the yield spread risk proxy also dramatically lowers the magnitude of the coefficient on government bond yields, as can be seen by comparing Equations 1 and 3 of Panel A. Apparently, a large part of the effect of changes in government bond rates on equity risk premia may be explained through the narrowing of the yield spread between corporate and government bonds. This suggests that such increases in government yields may often be associated with a reduction in the *difference* in risk between investment in government bonds and in corporate activity.

Panel B shows that utility risk premia are also inversely related to the level of interest rates as was found by Brigham *et al.* [2]. Unlike the results for stocks in general, however, changes in the dispersion of FAF over time are not significantly related to changes in these utility risk premia. This may be be-

[13]Of course, counterexamples could be constructed but one would expect an overall positive correlation across companies. Additionally, the cross-sectional relationship between bond ratings and equity risk premia reported earlier in the paper supports the link between corporate debt risks and risks on equity.

[14]Note that these two series reflect both changes in the ratings of corporate bonds as well as yield spreads for a given bond rating. The two series proved better in explaining equity risk premia than use of two comparable series for AA-rated debt.

[15]Ordinary least squares regressions showed severe positive autocorrelation in many cases with Durbin Watson Statistics typically below one. Estimation used the Prais-Winsten method. See Johnston [10], pp. 321–325.

Exhibit 7. Changes in Equity Risk Premia Over Time — Entries are Coefficient (t-value)

Regression	Intercept	i_{20}	σ_g	$i_c - i_{20}$	R^2
A. SP500: Dependent Variable is Equity Risk Premium*					
1.	0.140	−0.632			0.43
	(8.15)†	(−4.95)†			
2.	0.118	−0.660	0.754		0.58
	(7.10)†	(−5.93)†	(3.32)†		
3.	0.069	−0.235		1.448	0.57
	(3.44)†	(−1.76)		(4.18)†	
4.	0.030	−0.177	0.855	1.645	0.79
	(2.17)†	(−2.07)†	(4.68)†	(7.63)†	
Regression	**Intercept**	i_{20}	σ_g	$i_u - i_{20}$	R^2
B. SPUT: Dependent Variable is Equity Risk Premium*					
1.	0.110	−0.510			0.37
	(7.35)†	(−4.41)†			
2.	0.101	−0.543	0.805		0.41
	(6.28)†	(−4.68)†	(1.42)		
3.	0.051	−0.259		1.432	0.80
	(5.54)†	(−4.05)†		(8.87)†	
4.	0.049	−0.287	0.387	1.391	0.80
	(5.15)†	(−3.87)†	(0.75)	(8.14)†	

*All variables are defined in Exhibit 1 and graphed in Exhibit 6. Regressions were estimated for the 36 month period January 1982–December 1984 and were corrected for serial correlation using the Prais-Winsten method. For purposes of this regression variables are expressed in decimal form, e.g., 14% = 0.14.

†Significantly different from zero at 0.05 level using two-tailed test.

cause of lower variability over time in the dispersion of FAF for utility stocks as compared to equities in general. The yield spread between utility and government bonds is significantly positively related to utility equity risk premia. And, as in the case of stocks in general, introduction of this spread substantially reduces the independent effect of interest rate levels on equity risk premia.

Given the short time series (36 months), tests for the stability of the relationships found in Exhibit 7 present difficulties. As a check, the relationships were reestimated dividing the data into two 18-month periods. For stocks in general (SP500), coefficients on σ_g and $(i_c - i_{20})$ were positive in all regressions and significantly so, except in the case of $(i_c - i_{20})$ for the second 18-month period. The coefficient of i_{20} was significantly negative in both periods. This confirms the general findings for the SP500 in Panel A of Exhibit 7. For utility stocks, results for the subperiods also matched the entire period results. The coefficients of $(i_u - i_{20})$ were significantly positive in both subperiods while those of σ_g were insignificantly different from zero. The level of interest rates (i_{20}) had a significant negative effect in both subperiods.

In summary, the estimated risk premia change over time and the patterns of such change are directly related to changes in proxies for the risks of equity investments. Risk premia for both stocks in general and utilities are inversely related to the level of government interest rates but positively related to the bond yield spreads which proxy for the incremental risk of investing in equities rather than government bonds. For stocks in general, risk premia also increase over time with increases in the general level of disagreement about future corporate performance.

VI. Conclusions

Notions of shareholder required rates of return and risk premia are based in theory on investors' expectations about the future. Research has demonstrated the usefulness of financial analysts' forecasts for such expectations. When such forecasts are used to derive equity risk premia, the results are quite encouraging. In addition to meeting the theoretical requirement of using expectational data, the procedure produces estimates of reasonable magnitude that behave as economic theory would predict. Both over time and across stocks, the risk premia vary directly with the perceived riskiness of equity investment.

The approach offers a straightforward and powerful aid in establishing required rates of return either for corporate investment decisions or in the regulatory arena. Since data are readily available on a wide range of equities, an investigator can analyze various proxy groups (*e.g.*, portfolios of utility stocks) appropriate for a particular decision. An additional advantage of the estimated risk premia is that they allow analysis of changes in equity return requirements over time. Tracking such changes is important for managers facing changing economic climates.

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reinvested into the same asset class in the subsequent months of the year. The income return is thus used in the estimation of the equity risk premium because it represents the truly riskless portion of the return.

Arithmetic vs. Geometric Mean

The equity risk premium data presented in this book are arithmetic average risk premiums as opposed to geometric average risk premiums. The arithmetic average equity risk premium can be demonstrated to be most appropriate when discounting future cash flows. For use as the expected equity risk premium in either the CAPM or the building-block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless rates is the relevant number.

This is because both the CAPM and the building-block approach are additive models, in which the cost of capital is the sum of its parts. The geometric average is more appropriate for reporting past performance because it represents the compound average return.

Appropriate Historical Period

The equity risk premium can be estimated using any historical time period. For the U.S., market data exist at least as far back as the late 1800s. Therefore, it is possible to estimate the equity risk premium using data that covers roughly the past 125 years.

Our equity risk premium covers 1926 to the present. The original data source for the time series comprising the equity risk premium is the Center for Research in Security Prices. CRSP chose to begin its analysis of market returns with 1926 for two main reasons. CRSP determined that 1926 was approximately when quality financial data became available. They also made a conscious effort to include the period of extreme market volatility from the late 1920s and early 1930s; 1926 was chosen because it includes one full business cycle of data before the market crash of 1929.

Implicit in using history to forecast the future is the assumption that investors' expectations for future outcomes conform to past results. This method assumes that the price of taking on risk changes only slowly, if at all, over time. This "future equals the past" assumption is most applicable to a random time-series variable. A time-series variable is random if its value in one period is independent of its value in other periods.

Choosing an Appropriate Historical Period

The estimate of the equity risk premium depends on the length of the data series studied. A proper estimate of the equity risk premium requires a data series long enough to give a reliable average without being unduly influenced by very good and very poor short-term returns. When calculated using a long data series, the historical equity risk premium is relatively stable. Furthermore, because an average of the realized equity risk premium is quite volatile when calculated using a short history, using a long series makes it less likely that the analyst can justify any number he or she wants. The magnitude of how shorter periods can affect the result will be explored later in this chapter.

Some analysts estimate the expected equity risk premium using a shorter, more recent period on the basis that recent events are more likely to be repeated in the near future; furthermore, they believe that the 1920s, 1930s, and 1940s contain too many unusual events. This view is suspect because all periods contain unusual events. Some of the most unusual events of the last 100 years took place quite recently, including the inflation of the late 1970s and early 1980s, the October 1987 stock market crash, the collapse of the high-yield bond market, the major contraction and consolidation of the thrift industry, the collapse of the Soviet Union, the development of the European Economic Community, the attacks of Sept. 11, 2001, the global financial crisis of 2008–2009, and most recently, the market crash in the first quarter of 2020 that was precipitated by the spread of the COVID-19 virus.

It is even difficult for economists to predict the economic environment of the future. For example, if one were analyzing the stock market in 1987 before the crash, it would be statistically improbable to predict the impending short-term volatility without considering the stock market crash and market volatility of the 1929–1931 period.

Without an appreciation of the 1920s and 1930s, no one would believe that such events could happen. The 97-year period starting with 1926 represents what can happen: It includes high and low returns, volatile and quiet markets, war and peace, inflation and deflation, and prosperity and depression. Restricting attention to a shorter historical period underestimates the amount of change that could occur in a long future period. Finally, because historical event-types (not specific events) tend to repeat themselves, long-run capital market return studies can reveal a great deal about the future. Investors probably expect unusual events to occur from time to time, and their return expectations reflect this.

A Look at the Historical Results

It is interesting to look at the realized returns and realized equity risk premium in the context of the above discussion. Exhibit 10.10 shows the average stock market return and the average (arithmetic mean) realized long-horizon equity risk premium over various historical periods. The exhibit shows that using a longer historical period provides a more stable estimate of the equity risk premium. The reason is that any unique period will not be weighted heavily in an average covering a longer historical period. It better represents the probability of these unique events occurring over a long period of time.

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Short communication

Utility stocks and the size effect—revisited

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Abstract

Wong concluded there is weak empirical support that firm size is a missing factor from the capital asset pricing model for industrial stocks but not for utility stocks. Her weak results, however, do not rule out the possibility of a small firm effect for utilities. The issue she addressed has important financial implications in regulated proceedings that set rates of return for utilities. New studies based on different size water utilities are presented that do support a small firm effect in the utility industry.
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Keywords: Utility stocks; Beta risk; Firm size

Annie Wong concludes there is some weak evidence that firm size is a missing factor from the capital asset pricing model ("CAPM") for industrial stocks but not for utility stocks (Wong, 1993, p. 98). This "firm size effect" is an observation that small firms tend to earn higher returns than larger firms after controlling for differences in estimates of beta risk in the CAPM. Wong notes that if the size effect exists, it has important implications and should be considered by regulators when they determine fair rates of return for public utilities. This paper re-examines the basis for her conclusions and presents new information that indicates there is a small firm effect in the utility sector.

1. Reconsideration of the evidence provided by Wong

Wong relies on Barry and Brown (1984) and Brauer (1986) to suggest the small firm effect may be explained by differences in information available to investors of small and large firms.

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She states that requirements to file reports and information generated during regulatory proceedings indicate the same amount of information is available for large and small utilities and thus, if the differential information hypothesis explains the small firm effect, then the uniformity of information available among utility firms would suggest the size effect should not be observed in the utility industry. But contrary to the facts she assumes, there are differences in information available for large and small utilities. More parties participate in proceedings for large utilities and thus generate more information. Also, in some jurisdictions smaller utilities are not required to file all of the information that is required of larger firms. Thus, if the small firm effect is explained by differential information, contrary to Wong's hypothesis, differences in available information suggests there is a small firm effect in the utility industry. Wong did not discuss other potential explanations of the small firm effect for utilities.[2]

Wong's empirical results are not strong enough to conclude that beta risks of utilities are unrelated to size. In the period 1963–1967, when monthly data were used to estimate betas, her estimates of utility betas as well as industrial betas increased as the size of the firms decreased, but she did not find the same inverse relationship between size and beta risk for utilities in other periods. Being unable to demonstrate a relationship between size and beta in other periods may be the result of Wong using monthly, weekly and daily data to make those beta estimates. Roll (1980) concluded trading infrequency seems to be a powerful cause of bias in beta risk estimates when time intervals of a month or less are used to estimate betas for small stocks. When a small stock is thinly traded, its stock price does not reflect the movement of the market, which drives down the apparent covariance with the market and creates an artificially low beta estimate.

Ibbotson Associates (2002) found that when annual data are used to estimate betas, beta estimates for the smaller firms increase more than beta estimates for larger firms. Table 1 compares Value Line (2000) beta estimates for three relatively small water utilities that are made with weekly data and an adjusted beta estimated with pooled annual data for the utilities for the 5-year period ending in December 2000. In making the latter estimate, it is assumed that the underlying beta for each of water utilities is the same. The t-statistics for the unadjusted beta

Table 1
Beta estimates reported by Value Line and estimated with pooled annual returns for relatively small water utilities

	Value Line[a]	Estimated with annual data[b]
Connecticut Water Service	0.45	
Middlesex Water	0.45	
SJW Corporation	0.50	
Average	0.47	0.78
t-statistic		2.72[c,d]

[a] As reported in Value Line (2000). Betas estimated with 5 years of weekly data.

[b] Estimated with pooled annual return premiums for the 5-year period ending December 2000. Proxy market returns are total returns for the S&P 500 index. Dummy variable in 1999 to reflect the proposed acquisition of SJW Corporation included in analysis.

[c] Significant at the 95% level.

[d] The t-statistic for the null hypothesis that the true beta is 0.18 (the derived unadjusted Value Line beta) when the estimated betas is 0.65 (the unadjusted estimated beta) is 1.97. It is significant at the 95% level.

estimate is reported in parentheses. As was found by Ibbotson Associates (2002) for stocks in general, when annual data are used to estimate betas for small utility stocks, the beta estimate increases.

Wong used the Fama and MacBeth (1973) approach to estimate how well firm size and beta explain future returns in four periods. She reports weak empirical results for both the industrial and utility sectors. In every one of the statistical results reported for utilities, the coefficient for the size effect has a negative sign as would be expected if there is a size effect in the utility industry but only one of the results was found to be statistically significant at the 5% level. With the industrial sector, though she found two cases to have a significant size effect, a negative sign for the size coefficient occurred only 75% of the time. What is puzzling is that with these weak results, Wong concludes the analysis provides support for the small firm effect for the industrial industry but no support for a small firm effect for the utility industry.

2. New evidence on risk premiums required by small utilities

Two other studies support a conclusion that small utilities are more risky than larger ones. A study made by Staff of the Water Utilities Branch of the California Public Utilities Commission Advisory and Compliance Division (CPUC Staff, 1991) used proxies for beta risk and determined small water utilities were more risky than larger water utilities. Part of the difficulty with examining the question of relative risk of utilities is that the very small utilities are not publicly-traded. This CPUC Staff study addressed that concern by computing proxies for beta risk estimated with accounting data for the period 1981–1991 for 58 water utilities. Based on that analysis, CPUC Staff concluded that smaller water utilities were more risky and required higher equity returns than larger water utilities. Following 8 days of hearings and testimony by 21 witnesses regarding this study, it was adopted by the California Public Utilities Commission in CPUC Decision 92-03-093, dated March 31, 1992.

Table 2 provides the results of another study of differences in required returns estimated from discounted cash flow ("DCF") model estimates of the costs of equity for water utilities of different sizes. The study compares average estimates of equity costs for two smaller water utilities, Dominguez Water Company and SJW Corporation, with equity cost estimates for two larger companies, California Water Service and American States Water, for the period 1987–1997. All four utilities operated primarily in the same regulatory jurisdiction during that period. Estimates of future growth are required to make DCF estimates. Gordon, Gordon, and Gould (1989) found that a consensus of analysts' forecasts of earnings per share for the next 5 years provides a more accurate estimate of growth required in the DCF model than three different historical measures of growth. Unfortunately, such analysts' forecasts are not generally available for small utilities and thus this study assumes, as was assumed by staff at the regulatory commission, that investors relied upon past measures of growth to forecast the future. The results in Table 2 show that the smaller water utilities had a cost of equity that, on average, was 99 basis points higher than the average cost of equity for the larger water utilities. This result is statistically significant at the 90% level. In terms of the issues being addressed by Wong, the 99 basis points could be the result of differences in beta risk, the small firm effect or some combination of the two.

Table 2

Small firm equity cost differential: case study based on a comparison of DCF equity cost estimates for larger and smaller California water utilities (1987–1997)

	Larger water utilities[a]			Smaller water utilities[b]			Smaller utilities minus larger utilities
	D_0/P_0 (%)	Estimated growth (%)[c]	Equity cost estimate (%)[d]	D_0/P_0 (%)	Estimated growth (%)[c]	Equity cost estimate (%)[d]	
1987	6.60	7.17	14.24	5.38	10.06	15.98	1.74
1988	6.75	6.30	13.48	5.81	9.08	15.42	1.94
1989	7.10	6.30	13.84	6.47	7.00	13.93	0.09
1990	7.24	6.19	13.87	6.96	7.51	14.99	1.11
1991	6.94	6.29	13.67	6.64	6.24	13.30	−0.36
1992	6.18	5.96	12.50	6.50	6.71	13.65	1.14
1993	5.32	5.68	11.30	5.49	6.31	12.15	0.85
1994	6.03	4.40	10.70	5.80	4.86	10.94	0.25
1995	6.44	3.86	10.55	6.44	4.88	11.64	1.09
1996	5.60	4.06	9.88	5.77	5.58	11.67	1.79
1997	4.93	3.31	8.40	4.52	4.89	9.64	1.23
Averarage difference							0.99
t-statistic							1.405[e]

Limited to period for which Dominguez Water Company data were available. 1998 excluded due to pending buyout.

[a] American States Water and California Water Service.

[b] Dominguez Water Company and SJW Corporation.

[c] Average of 5- and 10-year dividends per share growth, 10-year earnings per share growth and estimates of sustainable growth from internal and external sources for the most recent 10-year period when data are available (1991–1997), otherwise most recent 5-year period (1987–1990).

[d] DCF equity cost as computed by California PUC staff: $k = (D_0/P_0) \times (1 + g) + g$.

[e] Significant at the 90% level.

3. Concluding remarks

Wong's concluding remarks should be re-examined and placed in perspective. She noted that industrial betas tend to decrease with increases in firm size but the same relationship is not found in every period for utilities. Had longer time intervals been used to estimated betas, as was done in Table 1, she may have found the same inverse relationship between size and beta risk for utilities in other periods. She also concludes "there is some weak evidence that firm size is a missing factor from the CAPM for the industrial but not the utility stocks" (Wong, 1993, p. 98), but the weak evidence provides little support for a small firm effect existing or not existing in either the industrial or utility sector. Two other studies discussed here support a conclusion that smaller water utility stocks are more risky than larger ones. To the extent that water utilities are representative of all utilities, there is support for smaller utilities being more risky than larger ones.

Notes

1. Vice President.
2. The small firm effect could also be a proxy for numerous other omitted risk differences between large and small utilities. An obvious candidate is differentials in access to financial markets created by size. Some very small utilities are unable to borrow money without backing of the owner. Other small utilities are limited to private placements of debt and have no access to the more liquid financial markets available to larger utilities.

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State Office of Administrative Hearings

Kristofer S. Monson
Chief Administrative Law Judge

November 28, 2023

Shelah Cisneros, Commission Counsel
Commission Advising and Docketing Management
William B. Travis State Office Building
1701 N. Congress, 7th Floor
Austin, Texas 78701

VIA EFILE TEXAS

RE: SOAH Docket No. 473-23-18885.WS; PUC Docket No. 54565; *Application of CSWR-Texas Utility Operating Company, LLC for Authority to Change Rates*

Dear Ms. Cisneros:

Please find attached a Proposal for Decision (PFD) in this case. By copy of this letter, the parties to this proceeding are being served with the PFD.

Please place this case on an open meeting agenda for the Commissioners' consideration. Please notify the Administrative Law Judges and the parties of the open meeting date, as well as the deadlines for filing exceptions to the PFD, replies to the exceptions, and requests for oral argument.

Enclosure

CC: Service List

SOAH Docket No. 473-23-18885 Suffix: WS
PUC Docket No. 54565

BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

APPLICATION OF CSWR-TEXAS UTILITY OPERATING COMPANY, LLC FOR AUTHORITY TO CHANGE RATES

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LIST OF ACRONYMS AND DEFINED TERMS

TERM	DEFINITION
APA	Administrative Procedure Act
ALJs	Administrative Law Judges
Application	CSWR-Texas's Application Class B Water and Sewer Rate Filing Package seeking authority to change rates
ARTNA	Artesian Water
BVBSUD	Buena Vista Bethel Special Utility District
CAPM	Capital Asset Pricing Model
CCN	Certificate of Convenience and Necessity
CoL	Conclusion of Law
Commission	Public Utility Commission of Texas
Company	CSWR-Texas Operating Utility, LLC
CSWR-Texas	CSWR-Texas Operating Utility, LLC
DCF	Discounted Cash Flow
FMV	Fair Market Value
FoF	Finding of Fact
GCD	Groundwater Conservation District
GDP	Gross Domestic Product
GWR	Global Water Resources, Inc
H.B.	House Bill
M/B	Market-to-Book
MERs	Meter Equivalent Ratios
MHI	Median Household Income
Movants	CSWR-Texas, Staff, and OPUC
MSEX	Middlesex Water Company
OPUC	Office of Public Utility Counsel
PFD	Proposal For Decision
RFP	Rate Filing Package
ROE	Return on Equity
RPM	Risk Premium Model
Rule	Texas Administrative Code Section
RWA	Regional Water Authority
SOAH	State Office of Administrative Hearings

TERM	DEFINITION
APA	Administrative Procedure Act
Staff	Staff of the Commission
Staff Proxy Group	Companies that Staff witness Emily Sears determined were of relatively similar risk to CSWR-Texas.
STM	Sale, Transfer, Merger
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TWC	Texas Water Code
Water Code	Texas Water Code
WSC	Water Supply Corporation
Utility Proxy Group	Companies that CSWR-Texas witness Dylan D'Ascendis determined were of relatively similar risk to CSWR-Texas.
YORW	York Water

SOAH Docket No. 473-23-18885 Suffix: WS
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BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

APPLICATION OF CSWR-TEXAS UTILITY OPERATING COMPANY, LLC FOR AUTHORITY TO CHANGE RATES

PROPOSAL FOR DECISION

CSWR-Texas Utility Operating Company, LLC (CSWR-Texas or Company) filed a Class B Water and Sewer Rate Filing Package (Application) with the Public Utility Commission of Texas (Commission) seeking authority to change rates.[1] The Application requests approval to raise rates and consolidate the tariffs of 62 water systems and 12 wastewater systems. For water operations, the Company seeks an annual revenue requirement of approximately $7.4 million, an increase of

[1] CSWR-Texas Ex. 1 (Application).

$3.6 million over the systems' current revenues.[2] For wastewater operations, the Company seeks an annual revenue requirement of approximately $2.3 million, an increase of $1.2 million over the systems' current revenues.[3]

The Office of Public Utility Counsel (OPUC), Commission staff (Staff), and Bob Hill, the designated representative of Quiet Village II, participated in the hearing on the merits and their positions on the Application are summarized as follows: (1) OPUC supports CSWR-Texas's requested consolidation of systems *only if* the new, approved rates are gradually phased in to mitigate rate shock amongst customers and reductions are made to the Company's proposed Return on Equity (ROE);[4] (2) Staff supports consolidation of only 32 water systems[5] and only 3 wastewater systems[6] identified in the Application and recommends various

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[2] A utility's revenue requirement or cost of service comprises the utility's allowable expenses and its return on rate base that it is allowed to recover through rates on an annual basis. *See* 16 Tex. Admin. Code § 24.41(a). The ALJs use the terms cost of service and revenue requirement synonymously throughout the PFD because a utility's revenue requirement should equal its cost of service to make the utility whole.

[3] CSWR-Texas Ex. 3 (Cox Direct Testimony (Dir.)) at 20. The ALJs reference the Bates numbered pages throughout the Proposal for Decision (PFD) for the Company's exhibits.

[4] In its initial brief, OPUC states that it recommends consolidation of all the systems identified in the Application "except for the systems using purchased water who are also subject to pass-through rates." OPUC Initial Brief at 3, 15. However, OPUC does not elaborate or cite to any record evidence as support for this position and does not reiterate or address this position in its reply brief. Instead, in its reply brief, OPUC "recommends the consolidation of *all* the Company's systems should be approved *only* in conjunction with a phased-in rate plan and a reasonable (not enhanced) ROE." OPUC Reply Brief at 18 (emphasis added). Therefore, for purposes of the PFD the ALJs address OPUC's position as stated in its reply brief.

[5] The 30 water systems that Staff recommends be excluded from consolidation are: Amberwood, Aransas Bay, Emerald Forest, Grande Casa, Ranchitos, Lakeview Ranchettes Estates, Spanish Grant, Red Oak, Chapparal, Copano Cove, Copano Heights, Country Squire Water, Longford Place, El Pinion, La Playa, Timberlane, Vista Verde, Franklin 1, Franklin 3, Fremont, S. Silver Creek, Lake Limestones Cove, RJR (Mountain River), Pelican Isle, Quiet Village II, Goode City, Texas Landing, Deerwood, TCP Water System 2, TCP Water System 3, and TCP Water System 4. Staff Ex. 3 (Eiland Dir.) at 4, 11-12. The ALJs reference the Bates numbered pages for Staff's exhibits.

[6] The nine wastewater systems that Staff recommends be excluded from consolidation are: Aransas Bay WTP, Bridgewood WWTF, Country Squire, Franklin Water System 1, Longford Place, Shady Grove Addition, Pelican Isle, Texas Landing, and TCP Water System. Staff Ex. 3 (Eiland Dir.) at 4, 12.

adjustments to the Company's requested revenue requirements; and (3) Mr. Hill requests that Quiet Village II be excluded from the Company's requested consolidation and that it not be subject to water or sewer rate increases.[7]

The State Office of Administrative Hearings (SOAH) Administrative Law Judges (ALJs) (hereafter referred to solely as ALJs) recommend consolidating the water and wastewater systems as set forth in the Application and approval of the requested rate increases as modified to reflect various adjustments to the Company's proposed rate of return components, pass-through provisions, rate case expenses, and rate design. All of the ALJs' recommendations are addressed in detail below.

I. NOTICE, JURISDICTION, AND PROCEDURAL HISTORY

Notice and jurisdiction were uncontested and are therefore addressed solely in the findings of fact (FoFs) and conclusions of law (CoLs).

Within the Application, CSWR-Texas proposed a March 10, 2023 effective date for its requested rate change. On March 30, 2023, the Commission ALJ suspended the effective date "through the pendency of this proceeding, or until an interim rate is requested and approved," pursuant to Texas Water Code (Water Code) section 13.1871(g).[8] Because that section authorizes the Commission to suspend the effective date of the rate change "for not more than 265 days from the proposed effective date," the ALJs construed the Commission ALJ's effective-date

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[7] *See* Quiet Village Ex. 2. Mr. Hill's admitted exhibits shall be identified as Quiet Village II Exhibits 1 and 2, respectively. Quiet Village Exhibit 1 is redacted as ordered in SOAH Order No. 6 (Aug. 17, 2023).

[8] PUC Order No. 3 (Mar. 30, 2023).

suspension to mean the earlier of 265 days or until interim rates are approved. Therefore, in SOAH Order No. 1, the ALJs confirmed the Company's November 30, 2023 suspended effective date.[9]

On June 15, 2023, ALJs Meaghan Bailey and Christiaan Siano convened a prehearing conference and aligned the intervenors into groups and required a designated representative be assigned to each aligned group to act as the spokesperson and service contact for each group.[10] The aligned groups were based on the specific water or wastewater system from which the intervenors receive service from CSWR-Texas. In total, 316 intervenors representing approximately 50 individual water or wastewater systems were granted intervention and a designated representative was either assigned by the intervenors or the ALJs for each group.[11] Ultimately, all but 16 intervenors were dismissed as parties for failure to participate in the proceeding.[12]

On September 7, 2023, ALJs Meaghan Bailey and Robert Pemberton convened the hearing on the merits and it concluded the same day.[13] The following

[9] SOAH Order No. 1 at 3-4 (May 17, 2023).

[10] SOAH Order No. 3 (June 27, 2023); SOAH Order No. 4 at 4-5 (July 12, 2023).

[11] PUC Order No. 2 (granted 29 interventions, including OPUC) (Feb. 24, 2023); PUC Order Nos. 4 and 5 (granted 136 interventions) (Apr. 11 and 12, 2023); PUC Order No. 6 (granted 88 interventions) (Apr. 13, 2023); SOAH Order No. 1 (granted 3 interventions) (May 17, 2023); SOAH Order No. 3 (granted 60 interventions) (June 27, 2023); SOAH Order No. 4 (granted 1 intervention) at 3-4 (July 12, 2023).

[12] SOAH Order No. 5 (Aug. 1, 2023). A list of each dismissed intervenor is included as Attachment A to the Order.

[13] For docket equalization purposes, ALJ Christiaan Siano replaced ALJ Pemberton. ALJ Siano has read the hearing transcripts (the public and confidential portions), the parties' post-hearing briefs, and all relevant prefiled testimony. *See* 16 Tex. Admin. Code § 22.202(e).

parties appeared at the hearing: CSWR-Texas, Staff, OPUC, Mr. Hill,[14] and Dominion Homeowners Association.[15] CSWR-Texas, Staff, OPUC, and Mr. Hill offered exhibits which were admitted.[16] The record closed on September 29, 2023, with the submission of post-hearing reply briefs from the Company, Staff, and OPUC.

II. INTERIM RATES

On September 8, 2023, CSWR-Texas, Staff, and OPUC (collectively, Movants) filed a joint motion to establish interim rates. Movants requested that interim rates be established based at a level that is consistent with the rates recommended by the ALJs in this Proposal for Decision (PFD) effective November 30, 2023 (i.e., the suspended effective date of the proposed rates) or retroactive to that date if the PFD is not issued by that date, subject to any applicable refund or surcharge upon the Commission's final rate determination.[17] The Movants' request was uncontested.

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[14] At some point during the hearing Robin Gobler took over for Mr. Hill and participated in the hearing on his behalf. Hearing Transcript (Tr.) at 127.

[15] Ron Moss appeared as counsel for Dominion Homeowners Association, and he is also the ALJ-assigned designated representative for TX-Leon Springs. Mr. Moss did not offer any exhibits into the record. Additionally, David Lagerlof, designated representative for Limestone Cove, also appeared and observed the hearings but had been previously dismissed as a party for failure to file direct testimony or a statement of position on behalf of his aligned group. *See* SOAH Order No. 5 (Aug. 1, 2023).

[16] The aligned groups representing TX-Treetop, Grande Casa, Spanish Grant, Emerald Forest Company, and Settler's Estate filed information that the ALJs deemed to be direct testimony. However, no one appeared at the hearing on behalf of these groups to offer the testimony into the evidentiary record and CSWR-Texas objected to such testimony being admitted without the parties being available for cross-examination. Accordingly, the testimony filed on behalf of these aligned groups is not part of the evidentiary record. Tr. at 30-31.

[17] Joint Motion to Establish Interim Rates and Amend Briefing Schedules (Sept. 8, 2023). Within the joint motion, CSWR-Texas noted that if the requested interim rates were approved it would agree not to begin charging customers the rates proposed in the Application on the suspended effective date of November 30, 2023.

The ALJs granted Movants' request under Water Code section 13.1871(s) and 16 Texas Administrative Code sections (Rules) 22.125 and 24.37.

Accordingly, effective November 30, 2023, the interim rates recommended in the PFD are **APPROVED ON AN INTERIM BASIS**. CSWR-Texas **SHALL**, as soon as practicable, file a copy of all updated tariff pages reflecting the rates recommended in the PFD with the Commission to be stamped as "Approved" by the Commission's Central Records Division.

III. BACKGROUND ON CSWR-TEXAS'S APPLICATION

A. UNCONTESTED FACTS

Company witness Chris Ekrut provided a helpful summary explaining some of the unique uncontested background facts that led to this proceeding.[18] Specifically, since entering the Texas market in December 2020, the Company has acquired numerous water and wastewater systems, and this case represents the Company's first ever rate filing before the Commission. Mr. Ekrut stated that most of the acquired systems represent generally smaller systems in terms of the overall number of customers[19] and have not necessarily been maintained in accordance with regulatory requirements as reflected by the distressed nature of the systems that CSWR-Texas seeks to bring into compliance. He also noted that many of the systems

[18] CSWR-Texas Ex. 8 (Ekrut Dir.) at 6-8.

[19] Mr. Ekrut's System Affordability Analysis shows that many of the systems identified in the Application have fewer than 110 meter connections. CSWR-Texas Ex. 8 (Ekrut Dir.), Exh. CDE-16.

have historically been under-capitalized and that the current rates and tariffs for these systems have, in most cases, not been regularly managed and adjusted, which has resulted in rates that do not reflect the current cost of providing service and that do not provide sufficient funds to make the necessary capital investments to support continuous and adequate service to customers. Additionally, he explained that the books and records of these systems have not been well maintained, and in some cases, historical financial or operational data is not available, or is too inaccurate to be considered reliable.[20]

Company witness Josiah Cox, President of CSWR-Texas, testified that the Company has acquired many such distressed systems at the behest of the Commission or other state agencies.[21] Specifically, the Company acquired the following 25 systems that are subject to this proceeding at the request of such agencies: Carroll Water (which includes Grande Casa, Lakeview Ranchettes, Spanish Grant Subdivision, Emerald Forest, and Red Oak), Coleto, Lakeside Estates, Meadowview Estates, Settlers Estates, Settlers Crossing, Settlers Meadows, TX-Treetop, TX-Tri County 3, TX-Tri County 4, Aero Valley, WaterCo, Franklin Water Systems 1, Franklin Water Systems 3, North Victoria, Walnut Bend, Woodlands (Rocket), Abraxas, Big Woods Springs, and Quiet Village II.[22]

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[20] CSWR-Texas Ex. 8 (Ekrut Dir.) at 6-7, 40.

[21] CSWR-Texas Ex. 11 (Cox Rebuttal Testimony (Reb.)) at 14-16.

[22] CSWR-Texas Ex. 11 (Cox Reb.) at 14-16.

B. CSWR-TEXAS'S REQUESTED SYSTEM CONSOLIDATION

CSWR-Texas argues that consolidation of the 62 water systems and 12 wastewater systems identified in the Application is necessary to mitigate the rate increases requested in this proceeding.[23] Mr. Cox opined that without consolidation, "many of these systems will experience significant rate increases based on the actual cost to serve that system on a stand-alone basis."[24] For example, he stated that without consolidation, a household receiving water service from the Walnut Bend system (which has only five customers) that uses 10,000 gallons a month would experience a monthly water bill of approximately $675, and the 446 customers of Laguna Vista would experience a monthly sewer bill of approximately $570.[25] However, with consolidation, those same Walnut Bend customers would have a monthly bill of approximately $110 for water service, and the Laguna Vista customers would have a monthly bill of approximately $70 for sewer service.[26] Mr. Cox emphasized that customers of small, distressed community-based systems like Walnut Bend and Laguna Vista should not be required to pay seven or eight times what customers of larger systems pay for essentially the same product and service.[27] If the Company's Application is approved, the 62 consolidated water systems will

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[23] CSWR-Texas Ex. 8 (Ekrut Dir.) at 40, Exh. CDE-16 (comparing rate impacts on a consolidated basis compared to a standalone basis).

[24] CSWR-Texas Ex. 11 (Cox Reb.) at 25.

[25] CSWR-Texas Ex. 11 (Cox Reb.) at 25-26; *see also* CSWR-Texas Ex. 8 (Ekrut Dir.), Exh. CDE-16 (showing Thousand Oaks's annual charge for 5,000 gallons/month is $4,109.88 without consolidation instead of $980.76 with consolidation and Aransas Bay's annual charge is $1,356.84 without consolidation compared to $980.76 with consolidation).

[26] CSWR-Texas Ex. 11 (Cox Reb.) at 26.

[27] CSWR-Texas Ex. 11 (Cox Reb.) at 27.

have an average monthly residential bill of approximately $82 for 5,000 gallons and $110 for 10,000 gallons, and the 12 consolidated sewer systems will have an average monthly residential bill of $69.[28]

Mr. Ekrut explained that the affordability of service under a singular function (e.g., water or wastewater service) can be measured by whether the average customer bill exceeds 2% to 2.5% of the Median Household Income (MHI). He noted that, generally, the cost of such service is considered affordable if it does not exceed those MHI percentages.

For purposes of this proceeding, Mr. Ekrut analyzed the impact of a monthly customer bill under a system-level, non-consolidated structure versus the Company's proposed consolidated structure and compared those rates to the MHI at the county level of where the systems are located.[29] On a standalone basis, if the Company's requested rate increases are approved, the average customer bill for 5,000 gallons of water or wastewater service would exceed 2.5% of MHI for 13 of the systems subject to this proceeding.[30] However, with consolidation, no system subject to this proceeding would experience an increase that exceeds the 2.5% MHI

[28] CSWR-Texas Ex. 1 (Application), Exh. C; CSWR-Texas Ex. 11 (Cox Reb.) at 26.

[29] CSWR-Texas Ex. 8 (Ekrut Dir.) at 34-35.

[30] Those systems are: Aransas Bay, Big Woods Springs, Copano Heights, Council Creek, La Playa, Live Oak Hills, North Victoria, Thousand Oaks, Treetop, Walnut Bend, WaterCo, Woodlands West, and Laguna. CSWR-Texas Ex. 8 (Ekrut Dir.), Exh. CDE-16.

affordability threshold.[31] If consolidated as proposed, the rates for all but six systems would be below the lower 2% MHI threshold.[32]

In addition, the Company asserts that consolidation benefits customers of systems that do not require immediate investment also benefit from consolidation.[33] Mr. Cox explained that, over time, those systems that did not need immediate rehabilitation will age and require new investment and additional rate increases to capture those costs. Mr. Ekrut expounded on this, stating that "over time, as that capital cost gets spread, you are ultimately getting lower cost impacts to all customers."[34] Mr. Ekrut acknowledged that when consolidating systems "there will be times one system is subsidizing another;" however, he testified that "over time, the goal is that those subsidies would work themselves out because they occur at different points in time. The benefit of consolidation comes over time."[35]

Finally, the Company argues that consolidation promotes conservation. Mr. Ekrut testified that the proposed water rate design employs a single-tier volumetric charge per 1,000 gallons for all use, which is intended to simplify the rate structures for all customers and more closely tie variable usage charges to variable costs.[36] CSWR-Texas argues that "[m]oving from fixed rates—or rates with very

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[31] CSWR-Texas Ex. 8 (Ekrut Dir.) at 34-35, Exh. CDE-16.

[32] CSWR-Texas Ex. 8 (Ekrut Dir.), Exh. CDE-16.

[33] CSWR-Texas Ex. 11 (Cox Reb.) at 27-28.

[34] Tr. at 94.

[35] Tr. at 94-95.

[36] CSWR-Texas Ex. 8 (Ekrut Dir.) at 38.

low usage charges—to usage charges that reflect actual variable costs will set a price signal more closely aligned with the customer's actual usage, thus encouraging conservation."[37] Staff agrees that the Company's proposed water and wastewater tariffs promote conservation.[38]

IV. THRESHOLD ISSUES

Staff opposes the Company's requested consolidation without using the now repealed substantial similarity standard and opposes the Company's proposed use of annualized system data. As such, the ALJs first address the following threshold issues: (1) whether the recently repealed Water Code section 13.145 (Section 13.145), which set forth the substantial similarity standard for the consolidation of multiple systems, applies to this proceeding (i.e., the substantial similarity issue);[39] and (2) whether the test-year requirements set forth in the Commission's rules require a full, 12 months of historical data (i.e., the annualization issue).[40]

The parties' positions on the threshold issues are summarized below:

- **CSWR-Texas:** (1) argues the repealed Section 13.145 does not apply to this proceeding;[41] and (2) argues the annualized test-year data for the systems

[37] CSWR-Texas Initial Brief at 16.

[38] Staff Ex. 4 (Euton Dir.) at 21.

[39] As noted below, Section 13.145 requires that two conditions be met for consolidation and the statute is generally referred to as the "substantial similarity standard," which is named after the first requirement set forth in subsection (a)(1). The PFD uses "Section 13.145" and the "substantial similarity standard" interchangeably.

[40] 16 Tex. Admin. Code § 24.41.

[41] In the alternative, CSWR-Texas contends its systems should be consolidated even if analyzed under the substantial similarity standard. CSWR-Texas Initial Brief at 12-13.

for which it does not have a full 12 months of historical data is adequate to calculate a revenue requirement for those systems.

- **OPUC**: (1) does not present an explicit position on the applicability of repealed Section 13.145 to this proceeding but supports consolidation of the systems identified in the Application arguing it is in the public interest;[42] and (2) argues CSWR-Texas's annualized test-year data for certain systems is adequate to calculate a revenue requirement for those systems.[43]
- **Staff**: (1) argues the repealed Section 13.145 applies to this proceeding; and (2) argues CSWR-Texas's annualized test-year data is inadequate, and a revenue requirement cannot be calculated for the systems that do not have 12 months of historical data.[44]

A. Section 13.145 Applicability

Section 13.145, and thus the substantial similarity standard, was repealed on June 2, 2023.[45] Staff argues the statute remains applicable because it was in effect at the time the Application was filed.[46] For this reason, Staff recommends that the three purchased-water systems identified in the Application should not be consolidated with the other groundwater systems because they are not substantially similar.[47]

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[42] OPUC notes that its recommendation is consistent with the Commission's objectives to expedite the acquisition, consolidation, and improvement of distressed water and sewer utilities, including the Commission's recommendation to the Legislature to repeal Section 13.145, as discussed in greater detail below. OPUC Initial Brief at 3; *see* CSWR-Texas Ex. 11 (Cox Reb.) at 290-91, Exh. JC-R-2 (Commission's Self-Evaluation Report submitted on September 1, 2021, to the Texas Sunset Advisory Commission wherein the Commission recommends repeal of Section 13.145 to eliminate the substantial similarity standard).

[43] OPUC Initial Brief at 1-8.

[44] Staff Initial Brief at 5-11.

[45] Act of May 17, 2023, 88th Leg., R.S., Ch. 327 (H.B. 2373), § 1, eff. June 2, 2023.

[46] CSWR-Texas Ex. 1 (Application); Staff Initial Brief.

[47] Staff Initial Brief at 14, 36, 38-39. The three purchased-water systems are Copano Heights, Franklin, and Quiet Village II. Staff Ex. 3 (Eiland Dir.) at 4, 10-15.

CSWR-Texas argues that Section 13.145 does not apply because its repeal was effective immediately. Prior to its repeal, Section 13.145 provided in part:[48]

> **Sec. 13.145. Multiple Systems Consolidated Under Tariff**
>
> (a) A utility may consolidate more than one system under a single tariff only if:
>
> (1) the systems under the tariff are substantially similar in terms of facilities, quality of service, and cost of service; and
>
> (2) the tariff provides for rates that promote water conservation for single-family residences and landscape irrigation.

In 2021, the Commission, as provided in its Self-Evaluation Report, asked the Texas Legislature to repeal Section 13.145 to:

> Eliminate the substantial similarity determination [sic] allow a utility to charge one rate to customers across all its water systems or sewer systems. This would eliminate confusion customers have when determining which part of a tariff applies to them. It would also treat water more like electric rate setting and encourage regionalization and consolidation. In addition, it would eliminate staff processing time required to produce multiple rates for one utility with several systems and would, in turn, eliminate testimony and rate case expenses born by a Class A utility or additional information and potential testimony

[48] Added by Acts 2001, 77th Leg., ch. 966, § 10.03, eff. Sept. 1, 2001; amended by Acts 2005, 79th Leg., ch. 871, § 2, eff. Sept. 1, 2005.

> required by a Class B, C, or D utility seeking a consolidated tariff. (Repeal TWC § 13.145).[49]

Two years later, the Legislature responded to the Commission's request with the passage of House Bill (H.B.) 2373, which repealed Section 13.145.[50] H.B. 2373 received the necessary votes for immediate effect and was signed by the Governor on June 2, 2023.[51] The Bill Analysis stated that "H.B. 2373 repeals the substantial similarity requirement found in Section 13.145, Water Code, in order to streamline ratemaking and facilitate regionalization and improvements to investor-owned water systems."[52]

1. General Savings Clause

H.B. 2373 did not include a savings clause. Generally, when a statute is repealed without a savings clause limiting the effect of the repeal, the repeal of that statute is given immediate effect.[53] Absent a specific savings clause, the effect of a repealed statute may nevertheless be continued by our state's general savings clause,

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[49] CSWR-Texas Ex. 18 at 237 (Public Utility Commission of Texas Self-Evaluation Report).

[50] H.B. 2373 provided:

> BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:
>
> SECTION 1. Section 13.145, Water Code, is repealed.
>
> SECTION 2. This Act takes effect immediately if it receives a vote of two-thirds of all members elected to each house, as provided by Section 39, Article III, Texas Constitution. If this Act does not receive the vote necessary for immediate effect, this Act takes effect September 1, 2023.

Tex. H.B. 2373, 88th Leg., R.S. (2023).

[51] Act of May 17, 2023, 88th Leg., R.S., Ch. 327 (H.B. 2373), eff. June 2, 2023.

[52] CSWR-Texas Ex. 13 (Ekrut Reb.), Exh. CDE-R-1 (H.B. 2373 Bill Analysis).

[53] *Quick v. City of Austin*, 7 S.W.3d 109, 128 (Tex. 1998).

Texas Government Code section 311.031. Texas courts "will presume that the general savings clause applies unless a contrary legislative intent is shown by clear expression or necessary implication."[54] When a statute's language is clear and unambiguous, courts may not rely on extrinsic aids to construe statutory language.[55] The ALJs conclude there is no ambiguous language in the repealing legislation. Accordingly, the ALJs did not consider the Commission's Self-Evaluation Report or the Bill Analysis discussed above, as CSWR-Texas urges. Instead, the ALJs look only to the language of H.B. 2373.

CSWR-Texas argues that by making the repeal effective immediately, the Legislature showed a clear intent that the repeal is to not be subject to the general savings clause. However, the ALJs conclude that simply stating that the repeal is to be effective immediately (instead of September 1) is not a "clear expression or necessary implication" that the general savings clause does not apply. By adopting the general savings clause, the Legislature has expressed "a general legislative policy that the repeal of any statute shall not affect the prior operation of that statute."[56] Ultimately, the ALJs find that the immediate effect of the repeal does not overcome the presumption that the general savings clause applies. Thus, the next question is what effect, if any, the general savings clause has on this proceeding.

In relevant part, the general savings clause provides:

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[54] *Quick*, 7 S.W.3d at 130.

[55] *Tex. Health Presbyterian Hosp. of Denton v. D.A.*, 569 S.W.3d 126, 135-36 (Tex. 2018); *Molinet v. Kimbrell*, 356 S.W.3d 407, 414 (Tex. 2011).

[56] *Quick*, 7 S.W.3d at 129-30.

> (a) Except as provided by Subsection (b), the reenactment, revision, amendment, or repeal of a statute does not affect:
>
> (1) the prior operation of the statute or any prior action taken under it;
>
> (2) any validation, cure, right, privilege, obligation, or liability previously acquired, accrued, accorded, or incurred under it;
>
> (3) any violation of the statute or any penalty, forfeiture, or punishment incurred under the statute before its amendment or repeal; or
>
> (4) any investigation, proceeding, or remedy concerning any privilege, obligation, liability, penalty, forfeiture, or punishment; and the investigation, proceeding, or remedy may be instituted, continued, or enforced, and the penalty, forfeiture, or punishment imposed, as if the statute had not been repealed or amended.[57]

Staff contends that subsection (a)(1) applies, arguing that the Commission's May 2023 Preliminary Order in this proceeding constitutes prior action taken under Section 13.145.[58]

The ALJs are unpersuaded. First, Staff fails to show how merely processing the Application constitutes "prior action" under Section 13.145. By its own terms, the Commission's Preliminary Order "is preliminary in nature and entered without prejudice to any party expressing views contrary to this order before the SOAH ALJ

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[57] Tex. Gov't Code § 311.031(a).

[58] Staff Initial Brief at 6-7.

at hearing."[59] Second, the ALJs conclude that any "prior operation" of Section 13.145 or "action taken under it" would be the consolidation of multiple systems under a single tariff pursuant to that statute as approved through a Commission order, which has not occurred in this proceeding.[60] Until a final order is issued and non-appealable, the Commission's action is not final.[61] Accordingly, the ALJs conclude subsection (a)(1) does not apply here. The ALJs further conclude that no other provision of the general savings clause applies.

2. Prohibition on Retroactive Laws

Generally, Staff argues that failing to apply Section 13.145 to the current proceeding would run afoul of the Texas Constitution's prohibition against retroactive laws.[62] The Texas Supreme Court has interpreted this provision to establish a strong presumption against retroactive laws that can only be overcome by a compelling public interest.[63] Staff also notes the CCA provides that "[a] statute is presumed to be prospective in its operation unless expressly made retrospective."[64] Staff contends that the Commission has followed this same principle to conclude that the standards applicable at the date of filing an application should be applied, albeit

[59] Preliminary Order at 12 (May 11, 2023).

[60] No party argues that the repeal of Section 13.145 operates to undo any prior Commission-approved consolidation under Section 13.145 or to invalidate any of the Commission's substantial similarity findings included in previously issued orders.

[61] *See also* Tex. Gov't Code § 2001.144 (when a decision or order is final).

[62] Tex. Const. art. I, § 16 ("No bill of attainder, ex post facto law, retroactive law, or any law impairing the obligation of contracts, shall be made.").

[63] *Robinson v. Crown Cork & Seal Co.*, 335 S.W.3d 126, 145 (Tex. 2010); *see also Fire Prot. Serv., Inc. v. Survitec Survival Prods., Inc.*, 649 S.W.3d 197, 201 (Tex. 2022).

[64] Tex. Gov't Code § 311.022.

where savings provisions were included.[65] The Texas Supreme Court recently concluded that "a law is not retroactive in the constitutional sense unless it disrupts or impairs settled expectations."[66] Staff argues that the "settled expectation" that Section 13.145 would apply to this proceeding is demonstrated by the Application and witnesses' testimony that specifically addresses the substantial similarity standard with respect to the systems identified in the Application.[67]

The ALJs are unpersuaded that there is any retroactive application of the repeal at issue. Because the Commission has not taken any final action on the Application, the prohibition against retroactive laws is not implicated. The presumption against retroactive laws "rests on the principle that the legal effect of conduct should ordinarily be assessed under the law that existed when the conduct took place."[68] The ALJs conclude that no conduct will have taken place regarding the Application until the Commission issues a final order. Thus, in this proceeding, the repeal of Section 13.145 would be applied prospectively as it concerns the future consolidation of systems identified in the Application, which will undisputedly occur after the repeal of the statute. In sum, there is no conduct at issue in this proceeding

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[65] *See Southwestern Bell Telephone Company's Notification to Revise the Cellular Mobile Telephone Interconnection Tariff to Introduce a New Wireless 911 Service Pursuant to P.U.C. Subst. R. 23.25*, Docket No. 20857, Supplemental Preliminary Order at 3-4 (Sept. 23, 1999); *see also Petition of Republic Business Center LLC to Amend Aqua Texas, Inc.'s Certificate of Convenience and Necessity by Expedited Release*, Docket No. 49904, Order on Certified Issue at 1-2 (Jan. 28, 2020); *Petition of Maple Heights Development LLC to Amend Porter Municipal Utility District's Sewer Certificate of Convenience and Necessity in Montgomery County by Expedited Release*, Docket No. 49924, Order at CoL No. 2 (Mar. 13, 2020).

[66] *Fire Prot. Serv., Inc.*, 649 S.W.3d at 201.

[67] CSWR-Texas Ex. 1 (Application) at 19.

[68] *Fire Prot. Serv., Inc.*, 649 S.W.3d at 201 (internal quotations omitted).

that will not be assessed under the laws in existence at the time the Commission issues its final order regarding the Application.

Additionally, the ALJs are unpersuaded that seeking to consolidate under the law applicable at the time the Application was filed rises to the level of "settled expectations" for constitutional purposes. The Application shows, if anything, that CSWR-Texas expected to consolidate its systems. The repeal of Section 13.145 simply removed the sole qualifying hurdle to realizing that expectation.

3. Prohibition on Agency Action Prior to Effective Legislation

Finally, Staff argues that the Administrative Procedure Act[69] prohibits a state agency from taking administrative action before legislation takes effect.[70] By listing Section 13.145 in its Preliminary Order,[71] Staff argues, the Commission properly acted in accordance with this prohibition.[72] The ALJs are unpersuaded. The issuance of the Preliminary Order on May 11 addressing a then-effective Section 13.145 approximately a month before the statute was repealed has no bearing on the prohibition against an agency taking administrative action prior to legislation taking effect. Second, as noted above, the Preliminary Order is just that—preliminary.[73]

[69] Tex. Gov't Code §§ 2001.001-.903.

[70] Tex. Gov't Code § 2001.006(d).

[71] Preliminary Order at 9-10 (May 11, 2023).

[72] Staff Initial Brief at 6.

[73] Preliminary Order at 12 (May 11, 2023).

4. Summary of Parties' Positions

The Company maintains that the repealed Section 13.145 does not apply to this proceeding and thus its requested consolidation is not subject to nor contingent upon the substantial similarity standard. While OPUC does not present a position on the applicability of the repealed Section 13.145, it does stress that consolidation in this instance is in the public interest and that the Company's request to consolidate is consistent with the Commission's objectives to expedite the acquisition, consolidation, and improvement of distressed water and sewer utilities, including the Commission's recommendation to repeal Section 13.145.[74]

In contrast, Staff contends that the substantial similarity standard does apply to the Application, and as a result, recommends that the three purchased-water systems identified in the Application not be consolidated as they are not substantially similar to the remaining groundwater systems.[75] However, in what appears to be in direct conflict with its position regarding the applicability of the substantial similarity standard, Staff also recommends that the Abraxas, Laguna, and Quiet Village II sewer systems should be consolidated "even if they are not substantially similar" given the extremely high rates that would occur in Laguna without such consolidation.[76] For that reason, Staff contends it is just and reasonable to

[74] OPUC Initial Brief at 3; *see* CSWR-Texas Ex. 11 (Cox Reb.) at 290-91, Exh. JC-R-2.

[75] Staff Initial Brief at 14-15. The three purchased-water systems are Copano Height, Franklin, and Quiet Village. Staff Ex. 3 (Eiland Dir.) at 11.

[76] Staff Initial Brief at 17, 21, 41-42; Staff Ex. 4 (Euton Dir.) at 21. As Staff witness James Euton testified, without consolidation, Laguna's monthly rate would be approximately $500 per customer and the system only has seven customer connections. Because that well exceeds the normal range of reasonableness, Mr. Euton noted that Staff has no other choice but to recommend consolidating those three sewer systems.

consolidate those systems without complying with the substantial similarity standard.[77]

5. ALJs' Analysis

Staff's position in this case is inconsistent. Staff argues on the one hand that the substantial similarity standard, repealed at the Commission's behest, continues to apply to the Application and that certain systems should not be consolidated because they are not substantially similar, while arguing that other systems should be consolidated even if they are not substantially similar because they would otherwise experience "extremely high rates."[78] In short, Staff appears to advocate for consolidation for the value of subsidization while opposing it for the same reason.[79]

Additionally, while Staff argues that it would be just and reasonable to consolidate certain systems that are not substantially similar to prevent extremely high rates, it does not explain how such consolidation would be proper under the substantial similarity standard as the conditions of that standard, if they apply, are mandatory, not discretionary.[80] Thus, if the repealed standard applies to this proceeding, as Staff argues, Staff failed to prove how its recommendation that

[77] Staff Initial Brief at 41-42.

[78] Staff Ex. 4 (Euton Dir.) at 21.

[79] *See* CSWR-Texas Ex. 16 (Docket No. 50200, Direct Testimony of Kathryn Eiland) at 28:6-11 (Ms. Eiland testifies that one of the central policy concerns of the substantial similarity standard is "whether a consolidated rate [would] result in some groups of customers subsidizing others.").

[80] "A utility may consolidate more than one system under a single tariff *only if* . . ." Tex. Water Code § 13.145(a)(emphasis added).

Abraxas, Laguna, and Quiet Village be consolidated would be accomplished in conformance with the statute.

For the reasons discussed above, the ALJs conclude that the substantial similarity standard does not apply to CSWR-Texas's request to consolidate the water and wastewater systems identified in the Application. Therefore, and the ALJs do not analyze the requested consolidation under that standard.

B. ANNUALIZED TEST-YEAR DATA

The second threshold issue concerns the applicability of CSWR-Texas's annualized test-year data for some of the systems it seeks to consolidate. A change in rates must be based on a utility's test year, which the Commission defines as the most recent 12-month period beginning on the first day of a calendar- or fiscal-year quarter for which operating data for a retail public utility are available.[81] When considering a utility's allowable expenses that can be used to calculate rates, only the utility's test-year expenses, as adjusted for known and measurable changes, will be considered.[82]

1. Background

The Company used a test year ending December 31, 2022, to determine each system's revenue requirements, which informed the ultimate rates requested for the consolidated tariffs. During the test year, CSWR-Texas acquired 36 of the 62

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[81] TWC § 13.185(d)(1); 16 Tex. Admin. Code §§ 24.3(36), .41(b).

[82] 16 Tex. Admin. Code § 24.41(b).

systems identified in the Application, and therefore, it did not have a full 12 months of historical, operational data for those systems.[83] To account for the lack of test-year data and reflect a full year's worth of expenses for each system, Mr. Ekrut annualized the several months of data the Company did have for those systems' fixed and variable costs at the time the Application was filed.[84] Mr. Ekrut summarized the annualization process he performed with regard to the fixed costs for those specific systems as follows:

> Relative to these fixed cost components, we looked at those elements and we took the known cost. We either had a contract or a future contract value for these operators. We know what that is by system on a monthly basis, we took that monthly amount multiplied by twelve. We knew what the insurance bill was going to be for the year [sic] we took that amount.[85]

For variable costs, Mr. Ekrut provided an example of the calculations he made for those systems' electric and chemical expenses:

> What we've done there is we have used known data where we have it to calculate an effective cost for electricity and chemical expense. We then applied that known cost to the anticipated volumes by the system, the annualized volumes for the system. Those are the same annualized volumes that we used in coming in to annualize revenues. At the same time, we have to make sure that the period is matched.[86]

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[83] CSWR-Texas Ex. 8 (Ekrut Dir.) at 6, 13-14.

[84] CSWR-Texas Ex. 8 (Ekrut Dir.) at 8-9, 13-14, 16-18, 29-30.

[85] Tr. at 88-89.

[86] Tr. at 89.

In rebuttal, the Company updated its annualized data with an additional six months of actual operating expense data to validate the accuracy of its original test-year annualizations.[87] The updated data showed that the Company's actual costs were only 1% higher than the annualized amounts included in the Application.[88]

2. Staff's Position

Staff opposes consolidation of the 36 systems that the Company acquired during the test year because it did not have 12 months of historical test-year data for those systems.[89] Staff argues that the Water Code requires a full, 12 months of historical test-year data to calculate the components of invested capital and net income to arrive at the appropriate cost of service or revenue requirement.[90] As such, Staff asserts that because it did not have the necessary test-year data for those 36 systems, it could not produce a revenue requirement upon which to recommend a new rate for those systems, whether on a consolidated or standalone basis.[91]

Additionally, Staff contends that the Company's annualization adjustments for those systems are not known and measurable changes and therefore cannot be considered.[92] Specifically, Staff witness Kathryn Eiland testified that Mr. Ekrut's

[87] CSWR-Texas Ex. 12 (Thies Reb.) at 4-5, Exh. BT-R-1.

[88] CSWR-Texas Ex. 12 (Thies Reb.) at 5, Exh. BT-R-1; CSWR-Texas Ex. 13 (Ekrut Reb.) at 4-5.

[89] In total, Staff recommends that 39 of the 62 systems not be consolidated (i.e., the three purchased-water systems Staff argues are not substantially similar and the 27 water and nine sewer systems for which annualized data was used). Staff Initial Brief at 36; Staff Ex. 3 (Eiland Dir.) at 4; Staff Ex. 4 (Euton Dir.) at 11-12, 17-18.

[90] *See* 16 Tex. Admin. Code § 24.41(b).

[91] Staff Ex. 3 (Eiland Dir.) at 11; Tr. at 163.

[92] Staff Initial Brief at 10-11.

annualization adjustments are based on projected, estimated data, whereas a known and measurable change is based on a specific, known amount with a specific timeframe for the change to take effect.[93] Ms. Eiland further testified that the Company's annualization adjustments lead to mismatched test-year data, because they combine actual and projected (annualized) data.[94] No Commission rule or precedent, Staff argues, permits the consideration of projected test-year data, and using such to calculate water and sewer systems' costs of service could result in unreasonable and unnecessary rates.[95] For these reasons, Staff opines that approval of the Company's annualized data would create a precedent of allowing utilities to file speculative test-year data, making it difficult to determine just and reasonable rates.

3. CSWR-Texas's and OPUC's Positions

OPUC supports the Company's use of annualized test-year data.[96] Both the Company and OPUC note that Staff's position regarding annualized data in this proceeding is inconsistent with its position in prior dockets. Most notably is Docket No. 50200, wherein Ms. Eiland produced a revenue requirement despite the utility's use of annualized expenses for certain systems.[97] In that docket, the utility did not perform cost-of-service studies for each water or sewer system for which it sought

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[93] *See* Tr. at 170-72.

[94] Tr. at 172-73.

[95] *See* 16 Tex. Admin. Code § 24.41(b) (stating that only those expenses that are reasonable and necessary to provide service to the ratepayers may be included in allowable expenses).

[96] OPUC Initial Brief at 6-8.

[97] Tr. at 167-68; *see Application of Undine Texas, LLC and Undine Texas Environmental, LLC for Authority to Change Rates*, Docket No. 50200, Order (Nov. 5, 2020).

consolidated rates.[98] Instead, as Ms. Eiland testified in that docket, the utility only provided general statements regarding operations and maintenance expenses, depreciation, capital expenditures, and repairs, and the utility performed annualizations for the systems that had less than 12 months of historical test-year data.[99] Nevertheless, in that docket, Ms. Eiland was able to calculate a revenue requirement and make recommendations on the utility's proposed rates.[100]

The Company further challenges Staff's position by noting that annualization of test-year data is standard industry practice and recognized by the Commission's Class A Utility rate application.[101] The Company stresses that the annualized data it presented in the Application are based on accurate and predictable fixed and variable costs that only fluctuate marginally during the test year, as explained by Mr. Ekrut above.[102]

Additionally, the Company notes that Commission rules contemplate filing a rate application with less than 12-months of historical operating data.[103] Specifically,

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[98] Docket No. 50200, Order at FoF Nos. 45,46 (Nov. 5, 2020).

[99] CSWR-Texas Ex. 16 (Docket No. 50200, Direct Testimony of Kathryn Eiland) at 28; Tr. at 167-68. It was confirmed during the hearing that in the preliminary order for Docket No. 50200, the Commission specifically asked how the rate base and operations and maintenance expenses were determined for each system that was acquired by the utility after the beginning of the applicable test year. Tr. at 165-66.

[100] Tr. at 164-68; CSWR-Texas Ex. 16 (Docket No. 50200, Direct Testimony of Kathryn Eiland) at 7-18.

[101] Staff Ex. 12 (Class A Investor-Owned Utility Water and/or Sewer Rate Filing Package for Cost-of-Service Determination) at 9 (defining "Annualization" as an adjustment to bring a utility's accounts to a 12-month level of activity (e.g., year-end number of active connections and revenues, operating expenses, and level of investment)) (emphasis omitted).

[102] Tr. at 88-89.

[103] 16 Tex. Admin. Code 24.33(b)(2); CSWR-Texas Ex. 13 (Ekrut Reb.) at 6-7.

Rule 24.33(b)(2) states that the effective date of a change in rates may be suspended if the utility "does not have a certificate of convenience or necessity [CCN] or a completed application pending with the commission to obtain or to transfer a [CCN] until a completed application . . . is accepted by the commission." Mr. Ekrut opined that the language of that rule implies that a "utility could file both an STM [Sale, Transfer, Merger] application and a rate application for a newly acquired system at the very same time, with the effective date of the proposed rates suspended until the STM process is complete."[104] Mr. Ekrut explained that in this situation, no actual operating data under the new owner would be available at the time the rate application is filed, yet the Commission allows for the submission of the rate application regardless.[105]

Finally, CSWR-Texas asserts Staff should have raised its concerns regarding the lack of 12 months of data for the applicable 36 systems before it recommended that the Application was administratively complete.[106]

4. ALJs' Analysis

The Water Code requires the Commission to "base a utility's expenses on historic test-year information adjusted for known and measurable changes, as

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[104] CSWR-Texas Ex. 13 (Ekrut Reb.) at 9-10.

[105] CSWR-Texas Ex. 13 (Ekrut Reb.) at 10.

[106] *See* Commission Staff's Recommendation on Administrative Completeness and Notice, Motion to Suspend Proposed Rates, and Joint Proposed Procedural Schedule at 1, Exh. (March 17, 2023 Memorandum of Kathryn Eiland) (Mar. 17, 2023).

determined by utility commission rules."[107] A test year is only "the most recent 12-month period . . . *for which operating data for a retail public utility are available.*"[108] Additionally, proceeding with an incomplete 12 months of historical data is specifically contemplated by Rule 24.33(b)(2), where the effective date of a proposed rate change may be suspended "until a completed application to obtain or transfer a [CCN] is accepted by the commission," if a utility does not have pending application "to obtain or transfer a [CCN]." Moreover, it is an exception to the prohibition against filing a rate case more than once in a 12-month period "to adjust the rates of a newly acquired utility system."[109] Accordingly, the ALJs find that the unavailability of 12 months of historical operating data does not, as a matter of law, preclude further review or operate as a categorical bar to setting rates.

The terms "known and measurable" and "annualization" are defined in the Commission's Class A Investor-Owned Utilities Water and/or Sewer Rate Filing Package (RFP), but not the Class B RFP or Commission rules.[110] Identical definitions for those terms were recently deleted from the Commission's substantive water rules for the following reasons: "known and measurable" was deleted because one definition may not be "appropriate for every context in which the term could be

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[107] TWC § 13.185(d)(1); 16 Tex. Admin. Code § 24.41(b).

[108] TWC § 13.002(22); 16 Tex. Admin. Code § 24.3(36) (emphasis added).

[109] 16 Tex. Admin. Code § 24.29(b)(2).

[110] Known and measurable is defined as "[v]erifiable on the record as to amount and certainty of effectuation. Reasonably certain to occur within 12 months of the end of the test year," and the definition for annualization is provided above. Staff Ex. 12 (Class A Investor-Owned Utility Water and/or Sewer RFP for Cost-of-Service Determination) at 9, 11. The ALJs note that the Class A RFP and process, which was not used in this case, has several notable distinctions from the Class B RFP and process, including the requirement that testimony be filed with the application and shorter processing deadlines.

used;" and "annualization" was deleted because it is a "common ratemaking [term]."[111]

By deleting the definition of "known and measurable" from the substantive water rules, the Commission signaled an intent to broaden the definition to suit the context of each case, which presumably could be broader than the definition set forth in the Class A RFP relied upon by Staff. By contrast, by deleting the definition of annualization, the Commission signaled a recognition that the term is so commonly understood that a definition was unnecessary.

Regarding this proceeding, the ALJs conclude that known and measurable changes are not the narrowly interpreted changes that are "reasonably certain to occur within 12 months of the end of the test year," as defined in the Class A RFP, but rather broad enough, in this context, to include annualization of available historical operating data, for systems acquired during the test year. This conclusion is supported by Commission practice. In Docket No. 50200, the lack of a full 12 months of historical test-year data was not an impediment to Ms. Eiland producing, and the Commission approving, a revenue requirement for various systems and subsequent consolidation of rates. Additionally, in Docket No. 52828, the Commission approved a revenue requirement for an electric utility that involved annualized operating expenses.[112]

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[111] *Rulemaking Project to Amend Chapter 24 to Revise Classifications for Water and Sewer Utilities*, Project No. 49798, Order at 2-3, 5 (Apr. 17, 2020) (adopting Amendments to, *inter alia*, § 24.3).

[112] *Application of Golden Spread Electric Cooperative, Inc. to Change Wholesale Transmission Service Rates*, Docket No. 52828, Final Order at FoF Nos. 46, 108 (Mar. 9, 2023) ("Golden Spread's post-test-year adjustment for transmission operator services expenses is based on known data that is annualized to show the future cost situation with reasonable certainty.").

Here, CSWR-Texas provided robust support for its annualization: it used actual operational data, which was then spread over 12 months. No party contests this approach. CSWR-Texas then benchmarked the annualized data with an additional six months of actual data. No party challenged the accuracy of the annualized data or the Company's subsequent analysis showing that its annualization was within 1% accuracy of its actual costs. As in Docket No. 52828, CSWR-Texas's post-test-year adjustment for systems acquired during the test year is based on known data that is annualized to show the future cost situation with reasonable certainty. The ALJs therefore conclude that using such data is reasonable here.

C. ALJs' Recommendations on the Threshold Issues

As noted above, the ALJs concluded the substantial similarity standard does not apply to this proceeding and that the Company's annualized data presented for the 36 systems (27 water systems and 9 sewer systems) it acquired during the test year is reasonable and not an impediment to consolidation or setting a revenue requirement. Therefore, the ALJs reject Staff's recommendation to remove from consolidation (1) the Company's three purchased-water systems on grounds that they are not substantially similar to the remaining groundwater systems, and (2) the 36 systems that the Company did not have 12 months of historical test-year data for at the time it filed the Application.

V. Consolidation

The ALJs recommend approval of the Company's request to consolidate as set forth in the Application.

Based on the ALJs' findings on the threshold issues above, the question now turns to what standard governs the Company's requested consolidation. In 2001, well before the enactment of Section 13.145, the Commission had "long advocated system-wide rates for utilities in this state."[113] The legislative policy and purpose behind chapter 13 of the Water Code is "to protect the public interest," and to "assure rates, operations, and services that are just and reasonable to the consumers and to the retail public utilities."[114] "[R]ates may not be unreasonably preferential, prejudicial, or discriminatory but shall be sufficient, equitable, and consistent in application to each class of consumers."[115]

Company witness Ekrut, whose approach to evaluating substantial similarity was adopted by the Commission in Docket No. 50200,[116] testified that failure to consolidate "could be considered inequitable, prejudicial, and discriminatory towards customers of smaller systems, simply because of the relative size or cost structure of their specific water or wastewater system."[117] He further opined that consolidation is critical to meeting the legislative policy discussed above.[118] No party challenged those assertions.

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[113] *Application of Texas-New Mexico Power Company for a Rate Increase*, Docket No. 4240, Examiner's Report at 28 (May 4, 1982); *see also* Docket No. 4240, Order (June 2, 1982) (adopting, in relevant part, the Examiner's Report).

[114] Tex. Water Code (TWC) § 13.001(a), (c).

[115] TWC § 13.182(b).

[116] *Application of Undine Texas Environmental, LLC Authority to Change Rates*, Docket No. 50200, Order (Nov. 5, 2020).

[117] CSWR-Texas Ex. 8 (Ekrut Dir.) at 35.

[118] CSWR-Texas Ex. 8 (Ekrut Dir.) at 35.

The ALJs conclude that the current standard to be applied to a request to consolidate multiple systems under one tariff is whether the consolidated rate is just and reasonable in accordance with Water Code section 13.182. To be just and reasonable, the consolidated rates may not be unreasonably preferential, prejudicial, or discriminatory, but shall be sufficient, equitable, and consistent in application to each class of consumers.[119]

The proposed rates represent an increase to the rates for each system identified in the Application except for three water systems and one sewer system.[120] Increases to the existing rates for these systems is necessary so the Company can begin to recover the capital expenditures it has invested to bring the systems into compliance with state and federal regulations and so that the rates charged to customers accurately reflect each system's cost of service. If consolidated as requested by the Company, the 62 water systems would have an average monthly residential bill of approximately $82 for 5,000 gallons and $110 for 10,000 gallons, and the 12 consolidated sewer systems would have an average monthly residential bill of approximately $69.[121] These increases represent affordable rates as they do not exceed 2.5% of the MHI for the county in which the systems are located, and the majority of the requested rates are below 2.0% MHI.

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[119] TWC § 13.182(b).

[120] CSWR-Texas Ex. 8 (Ekrut Dir.), Exh. CDE-14.

[121] CSWR-Texas Ex. 1 (Application), Exh. C; CSWR-Texas Ex. 11 (Cox Reb.) at 26. These estimates do not account for the ALJs' recommended adjustments to the Company's requested rates as discussed later in the PFD.