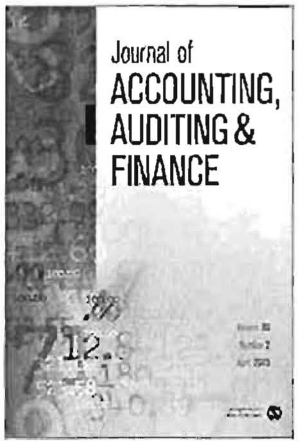
Ranking: 2013 SJR (SCimago Journal Rank) Score: 0.641 | 45/122 Accounting | 46/236 Economics, Econometrics and Finance (Miscellaneous) | 77/208 Finance (Scopus®)



Sign up for email alerts!

Journal of Accounting, Auditing & Finance

The Journal of Accounting, Auditing, and Finance (JAAF) peer-reviewed and published quarterly, is an indispensable resource for accounting and auditing researchers, faculty and students. Along with the exploratory and innovative works in TRACKS, *JAAF* offers valuable insights into developments in accounting and related fields, such as finance, economics and operations.

OnlineFirst
(Forthcoming articles published ahead of print)

Current Issue: April 2015

All Issues
January 1986 - April 2015

- Submit a Manuscript
- Free Sample Copy
- Email Alerts
- RSS feed
- More about this journal

Most Read **Most Cited**

- The Joint China Accounting and Finance Review (CAFR) and Journal of Accounting, Auditing and Finance (JAAF) Conference
- Auditor Independence and Audit Quality: A Literature Review
- Dedication
- The Effect of Audit Experience on Audit Fees and Audit Quality
- The Impact of CFO Gender on Bank Loan Contracting

» View all Most Read articles

For an alternate route to Journal of Accounting, Auditing & Finance Online use this URL: http://intl-jaf.sagepub.com [More information]

Print ISSN: 0148-558X

Full Text (PDF)

A Note on the Relationship between Firm Size and Return in the Electric Utility Industry

Journal of Accounting, Auditing & Finance
July 1993 8: 193-202.

A Note on the Relationship Between Firm Size and Return in the Electric Utility Industry

WALLACE DAVIDSON, III*
KENNETH FERRIS**
WILLIAM REICHENSTEIN***

Prior research has argued that given the well-documented inverse relationship between firm size and market returns, smaller utilities should be allowed to earn higher accounting rates of return than larger utilities. To test the validity of this argument, this study investigated the relationship between firm size and market returns in the electric utility industry for the period 1962 through 1985 and found no evidence of either a positive or negative size effect. Moreover, although market returns on utility stocks were found to be higher in January than in non-January months, this January effect was found to be unrelated to firm size. In short, this study found no evidence that allowable accounting rates of return should be adjusted by regulatory authorities to reflect a firm's size.

1. Introduction

The accounting rate of return (ARR) earned by firms operating in a regulated environment is generally established by regulatory authorities on the basis of measures produced under regulatory accounting principles. In some cases, the allowable ARR is based on the level of invested assets (e.g., ROA or ROE), whereas in others it is set as a percentage of costs incurred (e.g., cost plus *X* percent). In all cases, however, the allowable ARR is relatively unaffected by the size of the regulated firm in that standardized indices are used.[1]

*Southern Illinois University
**American Graduate School of International Management
***Baylor University

This paper has benefited from the constructive comments of an anonymous reviewer. All errors remain the responsibility of the authors.

1. Size arguments are frequently made in the context of rate determination hearings; hence, although size may be implicitly considered by regulatory authorities in establishing the allowable rate base, it is normally not an explicit consideration in the rate determination process.

Bolton and Besley [6] argue, however, that given the consistent higher market returns earned by small firms' stocks, a utility's cost of capital and therefore its allowable ARR should reflect its size. That is, smaller utilities should be allowed to earn a higher ARR than larger utilities.

Although there is substantial empirical support for the existence of a size effect [1,2,3,8,9,11,14,16,20,21,25, among others],[2] the presence of this stock market anomaly is not well documented in the utility industry, and what evidence there is suggests that there may be a *large* firm utility effect. Moreover, Schwert [24] questions the appropriateness of adjusting a firm's cost of capital, and by extension the allowable ARR, for the size effect.

Thus, this paper investigates the long-run relationship between firm size and market return for electric utility stocks. If regulatory authorities are to consider the adjustment of allowable ARR by firm size, then the existence of a size effect in the utility industry must first be clearly demonstrated.

2. Investigation

For purposes of this study, we assume the capital markets to be informationally efficient in a semistrong form. Thus, in spite of the presence of artificially controlled ARRs, risk and market return differentials may emerge in response to perceived variability in earnings and cash flows associated with firm size [7,11,12,22,23].

Prior research involving utilities has observed a *positive* relation between a utility's size and market return. For the period 1967–1972, Melicher [18] found a positive relationship between ex post beta and the log of total assets. Similarly, Reichenstein and Davidson [19] observed a significant positive relation between the market value of utilities' common stock and ex ante measures of stock price premiums for the period 1986–1987. Thus, contrary to the findings of the industrial-based size literature, available evidence involving utilities suggests the presence of a positive size effect.

2.1 Sample

The sample for the current study consists of all electric utilities listed on the Center for Research in Security Prices (daily) tapes for pairs of consecutive years, with not more than 10 days of missing data in either year. The only firms eliminated by this restriction are those whose stock was delisted during a two-year period. The study period is 1962 through

2. Recent evidence [12,13] suggests that the size effect may be smaller than previously thought.

1985; however, because one additional year is needed to generate market model parameters, results are reported for only 1963–1985. The sample varies by year from 90 to 103 firms.

2.2 Analysis

At the end of each year ($t - 1$), the market value of equity for each firm was computed and then used to assign the firm to one of four portfolios based on a ranking of relative market value. Firms assigned to MV_1 represent the lowest quartile of relative market value for a given year, whereas those assigned to MV_4 represent the highest quartile of relative market value. Using parameter estimates obtained for year $t - 1$, daily abnormal returns were computed for year t. These returns were then summed for each company to yield a cumulative abnormal return (CAR_t), and grouped by firm size to produce a portfolio CAR. Cumulative abnormal returns for each of the four equally weighted portfolios were calculated using two separate return-generating models. The first model was the market model, with parameter estimates for year $t - 1$ obtained by regressing daily returns against the returns on the value-weighted market index. The second model was the aggregate beta model proposed by Dimson [13] to minimize measurement problems associated with infrequently traded stocks. The results for the aggregate beta model are not specifically discussed here in that it yielded qualitatively similar results and supported similar conclusions to those of the market model.[3]

3. Empirical Results

3.1 Annual Results

Table 1 summarizes the average annual abnormal returns for the four portfolios generated by the market model. The average CARs do not differ significantly over the investigated period 1963 to 1985 ($F_{3,15} = 0.0394$). The range of values is small (i.e., -0.0474 [MV_3] to -0.0290 [MV_4]), and they neither increase nor decrease monotonically with size. In short, the data provide no evidence of *either* a negative or a positive annual size effect.

Moreover, Table 2 shows the distributions of average raw returns and average betas across the four portfolios. Neither raw returns nor betas

3. The Dimson model [13] is appropriate when stocks trade infrequently, which is primarily a small firm phenomenon. We reach the same conclusions with the market model and the Dimson aggregate beta model. The results for the aggregate beta model are presented in Table 1, but are not discussed.

TABLE 1

Tests for an Annual Firm Size Effect

Average Annual Abnormal Returns	MV_1	MV_2	MV_3	MV_4
Market Model $F_{3,15}$ = 0.0394	−0.0313	−0.0343	−0.0474	−0.0290
Aggregate Beta Model $F_{3,15}$ = 0.0700	0.0458	0.0449	0.0383	0.0301

vary systematically with firm size, which implies that there are no risk differences between small and large utilities.

3.2 January Effect

A January effect is closely associated with the size effect [4,26]. It appears in two distinct ways. First, average returns for all size categories are larger in January than in non-January months (referred to as the "seasonal returns effect"). And second, the difference between annual returns on smaller and larger firms is concentrated in January (referred to as the "January small firm effect").

The seasonal returns effect is a stock market anomaly, possibly indicating that stocks in general represent a riskier investment in January than in other months. The existence of such an effect among utility stocks neither suggests nor justifies an adjustment to a firm's cost of capital or allowable ARR. A January small firm effect, on the other hand, would suggest that the riskiness of stocks varies systematically with firm size, and thus if present, might imply that allowable ARRs should be adjusted to reflect firm size.

Table 3 summarizes the tests for a seasonal returns effect. The tests are based on abnormal returns cumulated monthly for each of the four portfolios and for the aggregate portfolio of all utility stocks. The monthly returns permit tests of significant difference between the abnormal returns in January

TABLE 2

Average Beta and Raw Returns by Portfolio

	MV_1	MV_2	MV_3	MV_4
Average Beta $F_{3,15}$ = 1.171	.481	.532	.522	.539
Average Raw Return $F_{3,15}$ = 0.890	.078	.079	.065	.084

TABLE 3

Summary of Tests for a Seasonal Returns Effect: Differences Between Abnormal Returns in January and Other Months

Market Model	MV_1		MV_2		MV_3		MV_4		*All Firms*	
Month	*Mean*	*Other Tests*	*Mean*	*Other Tests*	*Mean*	*Other Tests*	*Mean*	*Other Tests*	*Mean*	*Other Tests*
February	−.0084	T,D,S	−.0165	T,D,S	−.0190	T,D,S	−.0112	T,D,S	−.0138	T,D,S
	(5.33*)		(8.51**)		(6.53*)		(4.92*)		(25.65**)	
March	−.0162	T,D,S	−.0097	T,D,S	−.0139	T,D,S	−.0111	T,D,S	−.0127	T,D,S
	(10.05**)		(6.81*)		(5.66*)		(6.66*)		(29.67**)	
April	−.0050		−.0108	T,D,S	−.0174	T,D,S	−.0135	T,D,S	−.0117	T,D,S
	(3.01)		(4.71*)		(4.43*)		(4.16*)		(16.60**)	
May	−.0151	T,D,S	−.0057	T,D,S	−.0043		−.0013		−.0066	T,D,S
	(5.65)		(4.62*)		(1.99)		(1.67)		(15.09**)	
June	.0023		.0001		.0009		.0005		.0009	T,D,S
	(1.85)		(2.17)		(0.66)		(1.50)		(6.17*)	
July	−.0018		−.0049	T,D,S	.0053		.0002		−.0003	T,D,S
	(3.59)		(4.77*)		(0.31)		(2.23)		(9.86**)	
August	−.0069	T,D,S	−.0092	T,D,S	−.0093		−.0057		−.0078	T,D,S
	(4.95*)		(5.54*)		(3.03)		(3.65)		(17.53**)	
September	−.0054		−.0031		−.0048		−.0001		−.0033	T,D,S
	(4.68*)		(3.95)		(2.01)		(2.16)		(12.82**)	

TABLE 3 (*cont.*)

Market Model	MV_1		MV_2		MV_3		MV_4		*All Firms*	
Month	*Mean*	*Other Tests*	*Mean*	*Other Tests*	*Mean*	*Other Tests*	*Mean*	*Other Tests*	*Mean*	*Other Tests*
October	.0066		.0048		.0037		.0078		.0057	
	(1.21)		(1.47)		(0.38)		(0.50)		(3.45)	
November	.0037		.0027		−.0014		.0027		.0019	T,D,S
	(1.47)		(1.85)		(0.99)		(1.14)		(5.56*)	
December	−.0015		−.0052	T,D,S	−.0058		.0074		−.0013	T,D,S
	(2.89*)		(4.32**)		(2.11)		(0.66)		(9.56**)	
Eleven Months	.0043	T,D,S	.0052	T,D,S	.0059	T,D,S	.0022	T,D,S	.0044	T,D,S
	(9.25**)		(11.07**)		(4.65*)		(5.15*)		(29.18**)	

Note: In the mean column, the F statistic from a general linear model appears in parentheses below the mean. In the column labeled "Other Tests," significance is indicated by T, D, and/or S if the month's abnormal return is significantly different from January's according to Tukey's, Dunn's, and/or Scheffe's tests, respectively. Significance for the F test is noted with a ** or * for significance at the 0.01 and 0.05 levels, respectively.

TABLE 4

Summary of Tests for a January Firm Size Effect

Market Model	MV_1	MV_2	MV_3	MV_4
Average January Abnormal Return	0.0164	0.0232	0.0186	0.0109
$F_{3,15} = 0.349$				

and in the other individual months (rows 1 through 11), and between the abnormal returns in January and the other months in aggregate (row 12). The statistical significance of the differences was evaluated using an F statistic from a general linear model and with the Tukey, Dunn, and Scheffe tests; significant differences at the .05 level for these tests are labeled T, D, or S, respectively.

The results in Table 3 indicate that (1) the abnormal returns in January were significantly higher than the average of the non-January months for all four size portfolios and for the aggregate sample; (2) the abnormal returns in January were significantly higher than the returns for the other months in 8 of the 11 tests for the aggregate sample; and (3) for the four portfolios, the abnormal returns in January were significantly greater than the returns in individual months in 17 of the 44 comparisons. Thus, the data provide some evidence of a seasonal returns effect.[4]

Table 4 compares the January returns for MV_1 through MV_4 to investigate for the presence of a January small firm effect for the sample of utilities. The F statistic comparing the mean returns was 0.349 and is statistically insignificant. Even the nominal size of the returns indicates the absence of a relationship with firm size.

3.3 Analysis of Results

One explanation for the positive association between beta and firm size observed by Melicher [18] and between ex ante risk premium and size observed by Reichenstein and Davidson [19] may involve the time periods investigated.[5] Both studies examined periods when large firms generally

4. One possible explanation for the seasonal returns effect is that more information becomes available in January than in other months because of the number of companies with December 31 year-end dates. The release (or leak) of year-end information may produce a significant reduction in uncertainty, lowering of risk, and raising of stock prices across the range of firm size [1]. If the seasonal returns effect represents a predictable pattern, presumably the natural workings of self-interested investors should have eliminated it.

5. Melicher [18] used data for the period 1967 to 1971. For this same time period, the average CAR for MV_1 through MV_4 for the current sample of utilities was −.0569, −.0824, −.0783, and −.0682, respectively. The F-statistic for these values is insignificant, suggesting that an explanation based on time period differences can be rejected.

outperformed small firms. Brown, Kleidon, and Marsh [8] report that the size effect is unstable over time; thus, it is possible that the direction and strength of the size effect may vary as a function of the time period investigated. Nonetheless, over the 23-year period investigated in this study, no evidence of a material size effect was observed.

Research since Melicher also suggests that his results may have been influenced by error-in-variables or estimation problems. The error-in-variables problems include questions involving the reliability of individual betas (see [5], and [23], among others), and the use of the log of total assets as a measure of size. Brown, Kleidon, and Marsh, for instance, indicate that the size effect is best measured by the log of market value of common equity. Moreover, the presence of heteroskedasticity in the cross-sectional sample—a possibility apparently not considered in earlier research—may produce biased t statistics.

Further, the size difference between the companies in our sample may not be as large as the size difference in other studies. The equity value of the largest firms in 1985 (valued as of 31 December 1984) was $6.5 billion and in 1963 was $72.5 million. Comparable figures for the smallest firms are $40.2 million in 1985 and $5.7 million in 1963.[6] Even this range, however, should permit detection of a significant size effect if it exists, and our results do not reveal even a nominal size effect (ignoring tests of significance).

Finally, recent research [10,11,16] suggests that the small firm effect is related to the losing firm effect: smaller firms on organized exchanges consist largely of firms that have recently lost market value, and because of the leverage effect or increased financial distress, they become risky firms. The relative stability of utility stocks, and the regulatory charge to avoid possible financial distress, suggest that utility companies may be relatively exempt from the losing firm effect.[7]

4. Summary and Implications

Substantial empirical evidence indicates that small firm stocks consistently produce higher risk-adjusted returns than large firm stocks. On the

6. Basu [3] reports the median for his small firm portfolio to be $30.3 million over the period 1963 to 1979. Our small firm portfolio of utilities had a median of $49.8 million over this same time period. Hence, the utilities in our sample are not as small as the firms in Basu's small firm portfolio, but they are smaller than his second-ranked group, which had a median of $81.6 million. We believe there are sufficiently large size differences among the utilities in our sample to permit a valid test of the size effect.

7. We define a "losing firm" as one whose stock experienced negative returns in a given year. For most utilities, the largest component of return is dividend yield, so stock price decreases generally do not cause annual negative returns. For our sample, drawn from 1963 through 1985, the proportion of losing stocks in MV_1 through MV_4 was 22, 17, 22, and 24 percent, respectively. We conclude that small utility stocks are not dominated by losing stocks.

basis of this evidence, some researchers have argued that a utility's cost of capital and therefore its allowable ARR should be adjusted to reflect a firm's size.

Although the extant literature provides evidence of two within-industry studies indicating that the relation between utility size and returns is positive, we arrive at a different conclusion. On the basis of historical returns on electric utility stocks for the period 1963 through 1985, we are unable to reject the null hypothesis that annual and January-only abnormal returns are equal among utility portfolios of varying size. Further, raw returns and betas were not found to vary systematically with portfolio size.

The evidence obtained in this study indicates that abnormal returns in January exceed the average abnormal returns in the other eleven months. However, this seasonal returns effect was found to exist across *all* size portfolios, and hence we conclude that it is unrelated to firm size. Thus, our results suggest that neither large nor small utilities merit a premium because of their size.

The implications of our findings for regulatory officials and for regulatory accounting standard-setters are straightforward: we find no evidence among the electric utility industry during the period 1963 to 1985 to suggest that a utility's cost of capital or its allowable ARR should be adjusted to reflect firm size.

REFERENCES

1. Banz, R. W. 1981. "The Relationship Between Return and Market Value of Common Stocks." *Journal of Financial Economics* 9 (March): 3–18.
2. Barry, C. and S. Brown. 1984. "Differentiated Information and the Small Firm Effect." *Journal of Financial Economics* 13 (June): 283–294.
3. Basu, S. 1983. "The Relationship Between Earnings' Yield, Market Value and Return for NYSE Common Stocks: Further Evidence." *Journal of Financial Economics* 12 (June): 129–156.
4. Bauer, R. J., Jr., and R. G. Wirick. 1986. "Investment Strategies to Exploit the Small-Firm and January Anomalies." The University of Western Ontario Working Paper Series, October.
5. Blume, M. E. 1975. "Betas and Their Regression Tendencies." *Journal of Finance* 34 (June): 785–796.
6. Bolton, S. E., and S. Besley. 1985. "Are Small Utilities Undercompensated by Regulators?" *Public Utility Fortnightly* 114 (May 2): 37–38.
7. Booth, J. R., and R. L. Smith. 1987. "An Examination of the Small-Firm Effect on the Basis of Skewness Preference." *Journal of Financial Research* 10 (Spring): 77–86.
8. Brown, P., A. W. Kleidon, and T. A. Marsh. 1983. "New Evidence on the Nature of Size-Related Anomalies in Stock Prices." *Journal of Financial Economics* 12 (June): 33–56.
9. Chan, K. C., and N. Chen. 1988. "An Unconditional Asset-Pricing Test and the Role of Firm Size as an Instrumental Variable for Risk." *Journal of Finance* 43 (June): 309–326.
10. Chan, K. C. 1988. "On the Contrarian Investment Strategy." *Journal of Business* 61 (April): 147–163.
11. Chan, K. C., and N. Chen. 1990. "Business Cycles and the Returns of Small and Large Firms." The Ohio State University Working Paper Series.
12. Chan, K. C., N. Chen, and D. A. Hsieh. 1985. "An Exploratory Investigation of the Firm Size Effect." *Journal of Financial Economics* 14 (September): 451–471.
13. Dimson, E. 1979. "Risk Measurement When Shares are Subject to Infrequent Trading." *Journal of Financial Economics* 7 (June): 197–226.

14. Keim, D. B. 1983. "Size-Related Anomalies and Stock Return Seasonality: Further Empirical Evidence." *Journal of Financial Economics* 12 (June): 13–32.
15. Keim, D. B. 1985. "Dividend Yields and Stock Returns." *Journal of Financial Economics* 14 (September): 473–489.
16. Lamoureux, C., and G. Sanger. 1989. "Firm Size and Turn-of-the-Year Effects in the OTC/NASDAQ Market." *Journal of Finance* 44 (December): 1219–1245.
17. Levy, R. A. 1971. "On the Short-Term Stationarity of Beta Coefficients." *Financial Analysts Journal* 27 (November/December): 55–62.
18. Melicher, R. W. 1974. "Financial Factors Which Influence Beta Variations Within an Homogeneous Industry Environment." *Journal of Financial and Quantitative Analysis* 9 (March): 231–241.
19. Reichenstein, W. R., and W. N. Davidson, III. 1987. "A Study of Ex Ante Utility Risk Premiums: A Multidimensional Approach." Working Paper, The University of North Texas.
20. Reinganum, M. R. 1981. "Misspecifications of Capital Asset Pricing: Empirical Anomalies Based on Earnings Yields and Market Values." *Journal of Financial Economics* 9 (March): 19–46.
21. Reinganum, M. R. 1983. "The Anomalous Stock Market Behavior of Small Firms in January: Empirical Tests for Tax-Loss Selling Effects." *Journal of Financial Economics* 12 (June): 89–104.
22. Roll, R. 1981. "A Possible Explanation of the Small Firm Effect." *Journal of Finance* 36 (September): 879–888.
23. Roll, R. 1983. "On Computing Mean Returns and the Small Firm Premium." *Journal of Financial Economics* 12 (November): 371–386.
24. Schwert, G. W. 1983. "Size and Stock Returns and Other Empirical Regularities." *Journal of Financial Economics* 12 (June): 3–12.
25. Stoll, H. R., and R. E. Whaley. 1983. "Transaction Costs and the Small Firm Effect." *Journal of Financial Economics* 12 (June): 57–79.
26. Tinic, S. M., and R. R. West. 1984. "Risk and Return: January vs. the Rest of the Year." *Journal of Financial Economics* 13 (December): 561–574.