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Free Cash Flow and Performance Predictability in Electric Utilities

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This study investigates the ability of Free Cash Flow to predict performance in Electric Utilities. This study provides empirical evidence on Free Cash Flow versus other traditional performance indicators. An industry-specific sample of 86 electric utility firms for 2001-2010 and an association study context is used. We test whether Free Cash Flow better summarizes firm performance as reflected in stock prices. Our results indicate that Free Cash Flow is significantly different from Operating Cash Flow and Net Income, but there are no significant differences in the relative explanatory power. There is moderate support for the link between Free Cash Flow and customer satisfaction.

JEL codes: M41

1. Introduction

An important objective of financial reporting is to provide information to investors, creditors and others, about an enterprise's financial performance (SFAC No. 1). Contemporary finance texts suggest a focus on Free Cash Flow for measuring a firm's financial performance. However, virtually none of the existing research has considered Free Cash Flow for measuring firm performance. Prior cash flow studies have focused on operating cash flows. This study builds on the existing research by formally considering Free Cash Flow as a superior measure of firm performance. The objective of this study is to examine whether Free Cash Flow or more traditional financial measures better predict performance in the electric utility industry. U.S. GAAP does not require firms to disclose Free Cash Flow. As a result, Free Cash Flow definitions vary widely. The International Accounting Standards Board provides some guidance with International Accounting Standard (IAS) 7, which recommends that Free Cash Flow should be recognized as "cash from operations less the amount of capital expenditures required to maintain the firm's present productive capacity".

Prior cash flow studies do not consider Free Cash Flow, instead they focus on using operating cash flows versus earnings, to explain performance as measured by abnormal stock returns (Dechow 1994; Bowen, Burgstahler & Daley 1987; Livnat & Zarowin 1990). This study uses an industry-specific sample—the Electric Utility Industry because Free Cash Flow is generally thought to better capture the industry's capital intensity. This study makes four important contributions. First, Free Cash Flow, a more contemporary cash flow measure is considered. Second, the predictability of Free Cash Flow is compared to the predictability of more traditional performance measures

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(operating cash flows and earnings). Third, this paper extends the research on customer satisfaction data by examining the rarely tested link between cash flows and customer satisfaction. Finally, this paper extends the prior research by using an industry-specific analysis to investigate claims about the predictability of Free Cash Flow. The electric utility industry is one of few industries that regularly reports Free Cash Flow. Moreover, several industry analysts have suggested that Free Cash Flow is a better measure of performance than more traditional measures. However, there is no empirical evidence in the prior research to support these claims.

Empirical findings in this study indicate that there are significant differences between Free Cash Flow, Operating Cash Flow and Net Income, but there are no significant differences in the relative explanatory power between the variables. Hence, analyst's claims of the superiority of Free Cash Flow are not empirically supported. However, there is moderate support for the link between Free Cash Flow and customer satisfaction scores.

The remainder of this paper is organized as follows. Section 2 contains background and a literature review, section 3 develops the research questions and research methodology, section 4 reviews the data used in this study and the descriptive characteristics. Section 5 presents empirical tests of the research questions. Section 6 contains concluding remarks.

2. Background and Literature Review

The term Free Cash Flow is widely used in literature and in the investment world, however, U. S. GAAP does not require firms to disclose Free Cash Flow, although some firms voluntarily report it. Adhikari and Duru (2006) document that Free Cash Flow definitions are not uniform and there is little theoretical and conceptual guidance on how to calculate Free Cash Flow. They find that most firms reporting Free Cash Flow either use a Cash flow from operations-based method, or an Income-based method to calculate Free Cash Flow. Only a small percentage of firms (14.2%) use an Income-based method which starts with earnings before interest, taxes, depreciation and amortization as a proxy for Cash flow from operating activities, and then make various adjustments. Over half of the Free Cash Flow reporting firms use a Cash flow from operations-based method where Free Cash Flow is calculated one of two ways: (1) Cash flow from operating activities less capital expenditures necessary to maintain the productive capacity of the firm (a capital maintenance perspective), and (2) Cash flow from operating activities less capital expenditures, plus proceeds from fixed asset sales and changes in long-term investments (an all-inclusive perspective). Over 50% of the firms using a Cash flow from operating activities method rely on the capital maintenance perspective. Moreover, guidance provided by The International Accounting Standards Board (IAS 7), is consistent with the capital maintenance perspective.

More importantly, Adhikari and Duru (2006) document that Free Cash Flow reporting firms are more likely to report Free Cash Flow when it portrays the financial position of the firm in a more positive light than Earnings. This is consistent with prior research (Bhattacharya et al. 2004 and Lougee & Marquardt 2004), which finds that non-GAAP measures are more likely to be disclosed when firms experience bad performance. This is also consistent with the cash flow literature (Barth, Beaver & Landsman 1998 and Ohlson 1980), which suggests that cash flows become more important for valuation as the probability of financial distress increases, and current earnings become less informative.

The Electric Utility industry is categorized as a capital-intensive industry and firms often undertake large-scale construction programs. Construction programs are generally necessary to update aging infrastructures, to add capacity and to comply with environmental regulations. Significant capital expenditures lead to substantial non-cash charges--depreciation expense. As a result of substantial depreciation expense, utilities generally have net operating cash flows that significantly exceed net income. Tole, McCord, and Pugh (1992) suggest that cash flows are a better measure of performance than net income for the Electric Utility industry, because the substantial non-cash charges have a distortional effect on net income. Moreover, Free Cash Flow is thought to be a better measure of wealth than operating cash flow in the Electric Utility Industry (Tole, McCord & Pugh, 1992), because it better captures the capital intensity in the industry. Hence, the electric utility industry generally reports Free Cash Flow with a capital maintenance perspective, and defines Free Cash Flow as operating cash flow minus capital expenditures (Tole, McCord & Pugh 1992 and Bilicic & Connor 2004]. Further, Tole, McCord & Pugh (1992), recommend Free Cash Flow to equity investors, but provide no empirical support for their recommendation.

The seminal cash flow studies (Dechow 1994; Bowen, Burgstahler & Daley 1987; Livnat & Zarowin 1990] focus on operating cash flows versus earnings, to explain performance as measured by abnormal stock returns. Taken together, these studies generally demonstrate that cash flows and earnings both provide incremental information, but do not directly address the relative superiority of one over the other. Burgstahler, Jiambalvo and Pyo (1998) find that cash flow has more predictive ability than earnings, but Finger (1994) finds mixed results. A more current study, Barth, Cram and Nelson (2001) finds cash flows have more predictive ability than earnings. None of the prior studies focus on Free Cash Flow or the Electric Utility industry. One possible explanation for the mixed results of prior research is the failure to focus on a more relevant measure like Free Cash Flow, or on an industry-specific sample like the Electric Utility industry.

Cash flows are increasingly becoming important in measuring performance of electric utility firms. In fact, credit rating agencies have begun linking ratings (upgrades and downgrades) to cash flows (Agnew 2008). Further, in today's difficult economic environment, there is intense pressure on utilities to continue to distribute dividends. Electric Utilities have a higher dividend payout ratio than any other industry (Agnew, 2009). Because of high dividend expectations, some analysts include dividends in their calculation of Free Cash Flow. This 'Post-Dividend' Free Cash Flow measure is defined as operating cash flows minus both capital expenditures and common dividends (Agnew 2009 and Value Line 2012).

Prior Research demonstrates a positive association between electric utility customer satisfaction data and current profitability (Branson, Nunez and Pagach 2005). Prior research demonstrates that customer satisfaction leads to greater customer loyalty (Anderson and Sullivan 1993; Boulding et al. 1993). The positive effects of greater customer loyalty include reduced future transaction costs (Reichheld and Sasser 1990), and enhanced reputation (Anderson 1998; Fornell 1992). Branson, Nunez and Pagach (2005) examined the link between customer satisfaction data and financial measures of firm performance. Their study produced mixed results. They found a significant positive relation between current profitability and customer satisfaction, but no association between future profitability and customer satisfaction, or between efficiency and customer satisfaction.

3. Research Questions and Methodology

This study examines whether Free Cash Flow is a better measure of performance than net income and operating cash flows, for the electric utility industry. Tole, McCord and Pugh (1992) recommend Free Cash Flow as a better measure of performance than net income for electric utilities, and Free Cash Flow is better than operating cash flow. While there are no empirical studies testing the predictive ability of Free Cash Flow, Tole, McCord and Pugh (1992) present a good argument supporting the greater performance predictability of Free Cash Flow, in a capital-intensive industry like the Electric Utility industry. Hence, we expect Free Cash Flow to have greater performance predictability than Operating Cash Flow and Net Income.

To examine the claim that Free Cash Flow is a better measure of performance than operating cash flows or net income, we test whether Free Cash Flow better summarizes firm performance as reflected in stock returns using the following models:

$$R_t = b_0 + b_1 FCF_t + e_t, \quad \textbf{(1a)}$$

$$R_t = b_0 + b_1 OCF_t + e_t, \quad \textbf{(1b)}$$

$$R_t = b_0 + b_1 NI_t + e_t, \quad \textbf{(1c)}$$

Where (Compustat descriptions are in parentheses), *R* is raw annual returns; *FCF* is Free Cash Flow, calculated as Operating Activities Net Cash Flow minus Capital Expenditures (OANCF-CAPX), *OCF* is Operating Cash Flow, Operating Activities Net Cash Flow (OANCF); *NI* is net income after extraordinary items and discontinued operations (NI). All variables except *R,* are deflated by market value of common equity at the previous fiscal year-end. Our models are based on Dhaliwal, Subramanyam and Trezevant (1999). Kim and Kross (2005) use a similar model to test the explanatory power of earnings and cash flows.

Due to potential econometric and theoretical problems with returns models, we also use price models as suggested Kothari and Zimmerman (1995) to draw more definitive inferences.

$$P_t = b_0 + b_1 FCF_t + e_t, \qquad \text{(2a)}$$

$$P_t = b_0 + b_1 OCF_t + e_t, \qquad \text{(2b)}$$

$$P_t = b_0 + b_1 NI_t + e_t, \qquad \text{(2c)}$$

Where, *P* is market value of common equity (PRCC) at fiscal year-end. All variables are deflated by the number of shares of common stock outstanding (CSHO) at fiscal year-end, adjusted for stock splits and stock dividends (AJEX).

This study also examines the link between Free Cash Flow and customer satisfaction. First, we examine whether current period Free Cash Flow is more strongly associated with current period customer satisfaction measures than other measures of profitability. We test the link between Free Cash Flow and customer satisfaction data by linking current period measures of performance to current period customer satisfaction data using the following models:

$$FCF_t = b_0 + b_1 Satisfaction_t + \sum_2^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t, \qquad \text{(3a)}$$

$$OCF_t = b_0 + b_1 Satisfaction_t + \sum_2^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t, \qquad \text{(3b)}$$

$$NI_t = b_0 + b_1 Satisfaction_t + \sum_2^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t, \qquad \text{(3c)}$$

Where, *FCF* is Free Cash Flow, calculated as Operating Activities Net Cash Flow minus Capital Expenditures (OANCF-CAPX), *OCF* is Operating Cash Flow, Operating Activities Net Cash Flow (OANCF); *NI* is net income after extraordinary items and discontinued operations (NI); Satisfaction is customer satisfaction scores from the American Customer Satisfaction Index (ACSI) Survey; Year Dummy is a dummy variable for each included year of the ACSI survey; Firm Dummy is a dummy variable for each firm included in the ACSI survey. *FCF*, *OCF* and *NI* are deflated by market value of common equity at the previous fiscal year-end. To minimize bias in the regression coefficients, we include dummy variables to control for both fixed-year effects and fixed-firm effects. Fixed-year effects include such things as the effects of macroeconomic factors on stock prices. Our models are based on Branson, Nunez and Pagach (2005). Given the capital-intensive nature of the electric utility industry and that utilities generally have net Operating Cash Flow that significantly exceeds Net Income, we expect Operating Cash Flow will be positively related to customer satisfaction. However, because Free Cash Flow captures the electric utility industry's significant capital investments, we expect that lower measures of Free Cash Flow will be associated with higher measures of customer satisfaction.

Next, we explore Free Cash Flow as a leading indicator for customer satisfaction. Electric Utility firms undertake large-scale construction programs to upgrade and improve their competitive position. Therefore we expect that lower measures of Free Cash Flow should be associated with higher future measures of customer satisfaction.

We test the link between current period measures of performance and future measures of customer satisfaction using the following models:

$$FCF_t = b_0 + b_1 Satisfaction_t + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t, \quad \text{(4a)}$$

$$OCF_t = b_0 + b_1 Satisfaction_t + \sum_{2}^{10} bj YearDummy + \sum_{11}^{37} bj FirmDummy + e_t, \quad \text{(4b)}$$

$$NI_t = b_0 + b_1 Satisfaction_t + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t, \quad \text{(4c)}$$

Our tests are conducted using one-, two- and three-year-ahead customer satisfaction measures.

The number of firms and the time periods available for study is small, therefore, pooling the observations across time increases the number of observations and the power of the regression models. Pooling the data raises the issue of cross-sectional and time series dependencies in the sample data, which understate the standard errors of the regression coefficients and inflates the t-statistics. Endogeneity causes Ordinary Least Squares (OLS) regressions to be biased and inconsistent (Wooldridge 2002). To control for heteroscedasticity and autocorrelation, none of the models in this study used standard OLS procedures. Instead all models use a mixed linear model approach. The mixed model is advantageous because it can model random and mixed effect data, and data with autocorrelated observations and heterogeneous variances. The mixed model approach used in this study should alleviate the endogeneity bias caused by firm-specific heterogeneity and omitted variables. The mixed model is a generalization of the standard linear model, and the data are permitted to exhibit correlation and non-constant variability. Accordingly, all the regression models used in this study utilize Huber-White (1967) standard errors for the construction of the t-statistics.[1] The full maximum likelihood procedure for estimating the parameters of the regressions is used, as maximum-likelihood estimates are generally preferable to ANOVA and OLS estimates (Searle 1988; Harville 1988; Searle, Casella and McCulloch 1992). The models also include firm-specific and time-specific intercepts.

4. Data and Descriptive Statistics

The initial sample of 122 firms consists of all electric utility firms in the Compustat Database for the time period 2001 to 2010. The sample was narrowed to 86 firms because complete Compustat data needed to calculate Free Cash Flow, operating cash flow, net income and returns could only be obtained for 86 firms. The final sample of 86 firms resulted in 495 firm-years. Customer Satisfaction data was obtained from The American Customer Satisfaction Index (ACSI) which produces scores on four levels:

national, sector, industry, and company/agency. ACSI is an economic indicator based on modeling of customer evaluations of the quality of goods and services purchased. ACSI uses customer interviews as input to a multi-equation econometric model developed at the University of Michigan's Ross School of Business. The Index was developed to provide information on satisfaction with the quality of products and services available to consumers. Within each industry companies are selected on the basis of total sales and the measured companies represent a significant proportion of the overall market share of the industry. Individual companies are added or deleted from ACSI as their market position changes or as a result of mergers and acquisitions. The ACSI reports scores on a scale of 0 (lowest) to 100 (highest). ACSI data for the utility industry was first made publicly available in 1995 and published during the first quarter of each subsequent year, through 2011. The ACSI provides customer satisfaction scores for 38 investor-owned electric utility companies, 21 of which have complete Compustat data for the time period of 2001 to 2010. Table 1 provides a list of firms with ACSI data used in this study.

Table 2 reports descriptive statistics for variables used to estimate the models, and for key firm size variables used to gain additional insight about firm characteristics. Net Income, a traditional measure of profitability and performance is substantial with a mean of $304.729 and ROE, a more relative measure of profitability, has a mean of 10.9%. Given significant capital expenditures (mean of $744.444), leading to substantial depreciation expense, Operating Cash Flow is 280% of Net Income (significantly different at the 1% level). Free Cash Flow is 26% of Net Income (not significantly different) but only 9% of Operating Cash Flow (significantly different at the 1% level). These results suggest that mean Operating Cash Flow is significantly different from mean Net Income and mean Free Cash Flow is significantly different from mean Operating Cash Flow.

5. Empirical Tests

To examine whether Free Cash Flow is a better measure of performance than Operating Cash Flow and Net Income, we estimate models (1a) – (1c). Summary model statistics are reported in Table 3. A coefficient significantly different from zero on Free Cash Flow, Operating Cash Flow and Net Income indicates the variable provides significant explanatory power. Free Cash Flow, Operating Cash Flow and Net Income are all significant at the 5%, 1% and 1% levels, respectively. However, all three models have low explanatory power, with pseudo R^2 (Cox & Snell 1981) measures less than 10%, and are all insignificant using the null model likelihood ratio test (not reported in Table 3). The maximum likelihood procedure does not produce a formal R^2 statistic, so we report pseudo R^2 (Cox & Snell 1981). As suggested in Kothari and Zimmerman (1995), we estimate price models (2a) – (2c) to minimize the potential econometric and theoretical problems associated with the returns models used in (1a) – (1c). Summary model statistics are reported in Table 4 for price models (2a) – (2c). Only the coefficient on Operating Cash Flow is significant (10%), however, all three models are significant at the 1% level using the null model likelihood ratio test (not reported in Table 4).

Table 1: List of ACSI Firms

	Company Name
1	Ameren
2	American Electric Power
3	CMS Energy
4	Consolidated Edison
5	Dominion Resources
6	DTE Energy
7	Duke Energy
8	Edison International
9	Entergy
10	Exelon
11	FirstEnergy
12	NextEra Energy
13	NiSource
14	Northeast Utilities
15	PG&E
16	PPL
17	Progress Energy
18	Public Service Enterprise Group
19	Sempra Energy
20	Southern Company
21	Xcel Energy

Table 2: Descriptive Statistics

VARIABLE	Mean	Standard Deviation	Median	99th Percentile	1st Percentile
FCF	78.595	543.032	32.508	2,084.000	(1,416.000)
CAPX	774.444	897.120	447.325	4,086.000	4.583
OCF	853.040	1,029.555	437.464	4,398.000	(251.000)
NI	304.729	771.110	168.400	2,552.000	(2,217.991)
R	0.081	0.268	0.097	0.915	(0.705)
ROE	0.109	0.348	0.103	1.140	(0.818)
LTD	4,511.151	4,910.450	2,879.000	20,622.000	29.230
TOTASS	13,432.926	13,632.444	8,275.200	55,470.000	138.138
TOTSALE	5,689.262	6,170.238	3,431.100	27,927.000	51.498
MVE	5,347.850	6,187.036	2,770.689	27,310.638	43.109
BE	3,104.977	3,383.699	1,890.000	14,878.000	(456.076)
No. of Obs.	495	495	495	495	495

Where,

FCF= Free Cash Flow=Operating Cash Flow minus Capital Expenditures (OANCF-CAPX)
CAPX= Capital Expenditures (CAPX)
OCF= Operating Cash Flow=Operating Activities Net Cash Flow (OANCF)
NI=Net Income after extraordinary items and discontinued operations (NI)
R= Raw annual percentage returns
ROE=Return on equity, NI (NI) divided by Book Value of Equity (CEQ)
LTD=Long term debt (DLTT)
TOTASS=Total assets (AT)
TOTSALE=Total sales (SALE)
MVE=Market value of equity= price times common shares outstanding (PRCC x CSHO)
BVE=Book value of equity (CEQ)

**Compustat item description in parentheses.*

Notes: The sample consists of all 2001-2010 observations that have Compustat data needed to calculate Free Cash Flow, Operating Cash Flow, Net Income, and Returns. Observations for which the test variable falls in the top and bottom percentile of the test-variable distribution are eliminated from the sample.

Table 3: Results of the estimation of models that test whether Free Cash Flow is a better measure of performance than Operating Cash Flow and Net Income

MODEL[a]	INT		FCF		OCF		NI		Pseudo-R^2
(1a)	0.1587		0.1657						9.5%
	(2.87)	***	*(2.32)*	**					
(1b)	0.1131				0.2846				9.9%
	(1.95)	**			*2.69*	***			
(1c)	0.1559						0.0686		9.8%
	(2.82)	***					*(2.73)*	***	
N	495		495		495		495		

*Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

[a]**Models**:

(1a) $R_t = b_0 + b_1 FCF_t + e_t,$

(1b) $R_t = b_0 + b_1 OCF_t + e_t,$

(1c) $R_t = b_0 + b_1 NI_t + e_t,$

Where,

R= Raw annual percentage returns
FCF=Free Cash Flow
OCF=Operating Cash Flow
NI=Net Income

Notes: The sample consists of all 2001-2010 observations that have Compustat data needed to calculate Free Cash Flow, Operating Cash Flow, Net Income, Market value of Common Equity, and Returns. Observations for which the test variable falls in the top and bottom percentile of the test-variable distribution are eliminated from the sample. All variables except R are deflated by market value of common equity at the previous fiscal year-end.

Table 4: Results of the estimation of models that test whether Free Cash Flow is a better measure of performance than Operating Cash Flow and Net Income

MODEL[a]	INT		FCF		OCF		NI		Pseudo-R^2
(2a)	29.5951		0.2957						15.7%
	(10.60)	***	*(1.57)*						
(2b)	30.0442				-3.2889				15.5%
	(10.65)	***			*(1.76)*	*			
(2c)	29.4459						0.3913		15.2%
	(10.72)	***					*(0.73)*		
N	495		495		495		495		

*Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

[a]**Models**:

(2a) $P_t = b_0 + b_1 FCF_t + e_t$,

(2b) $P_t = b_0 + b_1 OCF_t + e_t$,

(2c) $P_t = b_0 + b_1 NI_t + e_t$,

Where,

P= Market value of common equity at fiscal year end, Price (PRCC)

FCF=Free Cash Flow

OCF=Operating Cash Flow

NI=Net Income

Notes: The sample consists of all 2001-2010 observations that have Compustat data needed to calculate Free Cash Flow, Operating Cash Flow, Net Income, and Price. Observations for which the test variable falls in the top and bottom percentile of the test-variable distribution are eliminated from the sample. All variables except P are deflated by the number of shares of common stock outstanding (CSHO) at fiscal year-end.

Additionally, all the price models have high explanatory power, and pseudo R^2 values greater than 15%. To make comparisons across measures, the likelihood ratio tests and pseudo-R^2 measures are limited in use, and cannot be used to compare non-nested models (Burnham & Anderson 2002). To compare the three measures of performance, we use an approach suggested by Biddle, Seow and Siegel (1995). Their approach is based on the Wald statistic. Intuitively, the Wald statistic tests the equality of the coefficients across regression equations. It will test the null hypothesis that the parameter estimates from the Free Cash Flow Model (1a) are equal to the Operating Cash Flow Model (1b), or equal to the Net Income Model (1c). The test statistic is formed using vectors of estimated coefficients and the variance-covariance matrices. A necessary condition for this application of the Wald test is that the regression equations being compared must have the same size coefficient vectors, and the same size variance-covariance matrices.

The Wald statistic used in this study is based on a comparison of model (1a) to model (1b) and a comparison of model (1a) to model (1c). For testing the null hypothesis, the Wald statistic (Liao 2004) is

$$W= (\hat{\beta}_g - \hat{\beta}_{g*})' \, [\mathrm{var}\,(\hat{\beta}_g) + \mathrm{var}\,(\hat{\beta}_{g*})]^{-} \, (\hat{\beta}_g - \hat{\beta}_{g*}) \, ,$$

Where β is the coefficient vector containing all parameter estimates for the regression equation, var (·) is the estimated variance-covariance matrix for the coefficients, the operator on the first term (·)′ is the transpose, and the operator on the middle term $[\cdot]^{-}$ is the generalized inverse. The probability of this equality approaches one asymptotically. The degrees of freedom for the test equals the number of rows in the first or the third matrix. The Wald statistic is χ^2 distributed for large samples. The Wald statistic constructed for comparing model (1a) and model (1b) is W = 4.6228. This statistic is not statistically significant at any conventional levels and suggests that there is no relative difference between the ability of Free Cash Flow and Operating Cash Flow to predict performance as reflected in stock returns. The Wald statistic constructed for comparing model (1a) and model (1c) is W = 2.1956. This statistic is not statistically significant at any conventional levels and suggests that there is no relative difference between the ability of Free Cash Flow and Net Income to predict performance. Similar tests were conducted to compare the price models (2a) – (2c), with similar results. The Wald statistic suggests there is no relative difference between the ability of Free Cash Flow and Operating Cash Flow to predict performance, or between Free Cash Flow and Net Income to predict performance as reflected in stock prices. We also compared the Operating Cash Flow model (1b) to the Net Income model (1c) and determined there is no relative difference in the ability of Operating Cash Flow vs. Net Income to predict performance. These results provide new empirical evidence that Free Cash Flow is not a superior measure in the Electric Utility industry.

To examine the link between Free Cash Flow and customer satisfaction, we estimate models (3a) - (3c). Summary model statistics are reported in Table 5. Negative coefficients on the customer satisfaction measure are significant in the Free Cash Flow and Operating Cash Flow models, at the 5% and 1% levels respectively. The negative coefficient on the Free Cash Flow coefficient suggests that lower levels of Free Cash Flow lead to higher levels of customer satisfaction, as we expected. However, the negative coefficient on Operating Cash Flow was not expected. All three models have high explanatory and pseudo R^2 values greater than 30%, but the models are insignificant using the null model likelihood ratio test (not reported in Table 5).

We examine the link between current period measures of performance and future measures of customer satisfaction using models (4a) – (4c). Models (4a) – (4c) are tested using one-, two- and three-year ahead customer satisfaction measures. Summary model statistics are reported in Table 6. The coefficient on Free Cash Flow is negatively associated with the customer satisfaction measure as predicted. The one and two-year ahead customer satisfaction measures (Panels A and B of Table 6) have significant negative coefficients (10% significance). The coefficient on the three-year-ahead customer satisfaction measure (Panel C) is negative and directionally consistent with our prediction, however it is insignificant.

6. Conclusions

Overall, the results presented in this paper are mixed. Simple t-tests demonstrate that mean Operating Cash Flow is statistically different from mean Free Cash Flow and mean Net Income. Further, Mean Free Cash Flow is statistically different from Mean Operating Cash Flow. However, Free Cash Flow does not have more relative explanatory power than Operating Cash Flow or Net Income. Therefore our findings are that there is no relative difference between the ability of Free Cash Flow, Operating Cash Flow and Net Income to predict performance. We find no empirical support for analyst's claims that Free Cash Flow is a superior measure for Electric Utilities.

Free Cash Flow is a leading indicator for customer satisfaction in one-, and two-year-ahead models. This study extends the prior research by examining Free Cash Flow, a more contemporary measure, and by examining the link between cash flows and customer satisfaction.

Table 5: Results of the estimation of models that test the link between Free Cash Flow, Operating Cash Flow, Net Income and Customer Satisfaction Scores

MODEL[a]	INTERCEPT		SATISFACTION		N		Pseudo-R^2
(3a)	0.4972		-0.0069		178		34.5%
	(2.53)	***	*-(2.10)*	**			
(3b)	0.9853		-0.0111		178		43.5%
	(4.57)	***	*-(3.48)*	***			
(3c)	0.2019		-0.0013		178		32.1%
	(1.10)	***	*-(0.49)*				

*Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

[a]**Models**:

(3a) $FCF_t = b_0 + b_1 Satisfaction_t + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

(3b) $OCF_t = b_0 + b_1 Satisfaction_t + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

(3c) $NI_t = b_0 + b_1 Satisfaction_t + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

Where,

FCF=Free Cash Flow
OCF=Operating Cash Flow
NI=Net Income
Satisfaction= ACSI Customer Satisfaction Score

Notes: The sample consists of all 2001-2010 observations that have ACSI Customer Satisfaction Scores and Compustat data needed to calculate Free Cash Flow, Operating Cash Flow, Net Income, and Market Value of Common Equity. Observations for which the test variable falls in the top and bottom percentile of the test-variable distribution are eliminated from the sample. FCF, OCF and NI are deflated by market value of common equity at the previous fiscal year-end.

Table 6: Results of the estimation of models that test the link between Free Cash Flow, Operating Cash Flow, Net Income and one-, two- and three-year ahead Customer Satisfaction Scores

Panel A

MODEL[a]	INTERCEPT		$SATISFACTION_{t+1}$		N		Pseudo-R^2
(4a)	0.5139		-0.0072		155		37.2%
	(1.90)	***	-*(1.63)*	*			
(4b)	0.8077		-0.0089		155		39.9%
	(2.45)	***	-*(1.79)*	*			
(4c)	0.2384		-0.0018		155		34.9%
	(1.01)	***	-*(0.51)*				

*Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

[a]**Models**:

(4a) $FCF_t = b_0 + b_1 Satisfaction_{t+1} + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

(4b) $OCF_t = b_0 + b_1 Satisfaction_{t+1} + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

(4c) $NI_t = b_0 + b_1 Satisfaction_{t+1} + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

Where,

FCF=Free Cash Flow
OCF=Operating Cash Flow
NI=Net Income
Satisfaction= ACSI Customer Satisfaction Score

Notes: The sample consists of all 2001-2010 observations that have ACSI Customer Satisfaction Scores and Compustat data needed to calculate Free Cash Flow, Operating Cash Flow, Net Income, and Market Value of Common Equity. Observations for which the test variable falls in the top and bottom percentile of the test-variable distribution are eliminated from the sample. FCF, OCF and NI are deflated by market value of common equity at the previous fiscal year-end.

Table 6 (continued): Results of the estimation of models that test the link between Free Cash Flow, Operating Cash Flow, Net Income and one-, two- and three-year ahead Customer Satisfaction Scores

Panel B

MODEL[a]	INTERCEPT		SATISFACTION$_{t+2}$		N		Pseudo-R^2
(4a)	0.4391		-0.0068		128		40.4%
	(1.77)	***	*-(1.65)*	*			
(4b)	0.5732		-0.0059		128		38.1%
	(2.46)	***	*-(1.53)*				
(4c)	0.1020		-0.0001		128		37.8%
	(0.67)	***	*-(0.05)*				

*Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

[a]**Models**:

(4a) $FCF_t = b_0 + b_1 Satisfaction_{t+2} + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

(4b) $OCF_t = b_0 + b_1 Satisfaction_{t+2} + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

(4c) $NI_t = b_0 + b_1 Satisfaction_{t+2} + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

Where,

FCF=Free Cash Flow
OCF=Operating Cash Flow
NI=Net Income
Satisfaction= ACSI Customer Satisfaction Score

Notes: The sample consists of all 2001-2010 observations that have ACSI Customer Satisfaction Scores and Compustat data needed to calculate Free Cash Flow, Operating Cash Flow, Net Income, and Market Value of Common Equity. Observations for which the test variable falls in the top and bottom percentile of the test-variable distribution are eliminated from the sample. FCF, OCF and NI are deflated by market value of common equity at the previous fiscal year-end.

Table 6 (continued): Results of the estimation of models that test the link between Free Cash Flow, Operating Cash Flow, Net Income and one-, two- and three-year ahead Customer Satisfaction Scores

Panel C

MODEL[a]	INTERCEPT		$SATISFACTION_{t+3}$		N		Pseudo-R^2
(4a)	-0.0378		-0.0002		102		41.1%
	-(0.17)		*-(0.05)*				
(4b)	0.0008		0.0016		102		43.3%
	(0.00)		*(0.35)*				
(4c)	0.2688		-0.0029		102		46.6%
	(1.45)	***	*-(1.09)*				

*Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

[a]**Models**:

(4a) $FCF_t = b_0 + b_1 Satisfaction_{t+3} + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

(4b) $OCF_t = b_0 + b_1 Satisfaction_{t+3} + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

(4c) $NI_t = b_0 + b_1 Satisfaction_{t+3} + \sum_{2}^{10} bj\ YearDummy + \sum_{11}^{37} bj\ FirmDummy + e_t,$

Where,

FCF=Free Cash Flow
OCF=Operating Cash Flow
NI=Net Income
Satisfaction= ACSI Customer Satisfaction Score

Notes: The sample consists of all 2001-2010 observations that have ACSI Customer Satisfaction Scores and Compustat data needed to calculate Free Cash Flow, Operating Cash Flow, Net Income, and Market Value of Common Equity. Observations for which the test variable falls in the top and bottom percentile of the test-variable distribution are eliminated from the sample. FCF, OCF and NI are deflated by market value of common equity at the previous fiscal year-end.

Endnote

[1] The Huber-White robust standard error estimator produces correct standard errors even if the observations are correlated and heteroscedastic (Huber 1967; White 1980).

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