Is Warren Buffett's Commentary on Accounting, Governance, and Investing Practices Reflected in the Investment Decisions and Subsequent Influence of Berkshire Hathaway?

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ABSTRACT: We examine (1) whether the accounting, governance, and investing practices of Berkshire Hathaway investees are consistent with Warren Buffett's public statements on what constitutes good accounting, governance, and investing practices and (2) whether these practices are associated with Berkshire's initial "selection" or Buffett's subsequent "influence." Compared to control firms, we find that Berkshire investees are highly likely to follow Buffett's investment philosophy, somewhat likely to follow his preferred accounting, disclosure, and compensation policies, but unlikely to follow the board-related governance practices that we can measure. Second, we find some evidence that the business practices of future Berkshire investees are more aligned with Buffett's beliefs in the pre-investment period compared to control firms. Third, we find relatively modest evidence that investees improve a few of their business practices subsequent to Berkshire's initial investment. However, and overall, Buffett does not appear to be especially influential in the subsequent accounting, governance, and investing decisions of Berkshire investees, likely because he has already taken into account the attributes he cares most about in the initial investment decision.

I. INTRODUCTION

Warren Buffett is the Chairman and CEO of Berkshire Hathaway Inc. (Berkshire), one of the
largest investment funds in the United States.[1] In this paper, we examine (1) whether the
accounting, governance, and investing practices of Berkshire's investees are consistent with
Buffett's public statements on what constitutes good accounting, governance, and investing principles,
(2) whether investees were more aligned on these dimensions *prior* to Berkshire's initial investment, and
(3) whether these practices improved in ways preferred by Buffett *subsequent* to Berkshire's investment.

We believe it is interesting to study Buffett and Berkshire for at least six reasons. First, Buffett is a
powerful investor with a long investment horizon.[2] His speeches and writings enable us to observe his
accounting, governance, and investing philosophy. In contrast, most investors, powerful or not, tend to
be secretive about their investment strategies. Second, often described as the "oracle of Omaha," Buffett
is one of the most admired and successful investors in U.S. history. His views on accounting,
governance, and investment practices are topics that are inherently worthy of academic attention. Third,
Buffett argues that having powerful investors is one way to substantially improve corporate governance
(Berkshire Hathaway 2002, Annual Report). If an outspoken investor like Buffett is effective at
improving the accounting, governance, and decision-making of Berkshire investees, then it suggests that
other powerful investors can also influence their investees. Fourth, there is incomplete consensus on
what constitutes "good" accounting or governance practices. For example, governance scorecards
produced by commercial governance rating agencies such as RiskMetrics appear to be uninformative
and noisy (Daines, Gow, and Larcker 2010). In contrast, Buffett's model of good governance has
evolved over decades and flows from his investment philosophy and, hence, should be less "formulaic."
Fifth, despite Buffett's admirable reputation for integrity and business acumen, it is important to
investigate whether there is "truth in advertising," i.e., does Berkshire invest in firms that tend to have
accounting, governance, and investing practices that Buffett espouses or are his public statements about
how companies should be run effectively "cheap talk?" Finally, does Buffett subsequently (perhaps
indirectly) influence these practices to better align investee behavior with his public views? Although
Buffett is a vocal proponent of conservative, transparent accounting, and governance policies, there is
anecdotal evidence that Berkshire and its investees are not always admired on these dimensions.[3] Thus, it

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[1] Berkshire had a market value in June 2013 of more than $280 billion, including a common stock portfolio of almost
$88 billion at year-end 2012 (Buffett 2012, 15). In comparison, the CalPERS pension funds had a total market value
of $263.9 billion, including $138.5 billion in public equities as of April 30, 2013; source: http://www.calpers.ca.gov/
[2] There are other famous and powerful investors such as George Soros and Peter Lynch, but unlike Warren Buffett,
none of them provide as detailed a commentary on their investing, accounting, and governance philosophies.
[3] For example: (1) Buffett served as a director at The Coca-Cola Company for which Berkshire is an important
investor. In 1986, Coca-Cola spun off the majority ownership of its U.S. bottling company, Coca-Cola Enterprises, to
outside shareholders and adopted equity-method accounting to allegedly manage its *reported* return of assets (ROA)
upward and leverage downward, which became known as the "49 percent solution" (Atanasov, Black, and Ciccotello
2007); (2) Buffett's heir apparent, David Sokol, was fired from Berkshire for alleged insider trading, suggesting a
governance issue at Berkshire; (3) the SEC forced Berkshire to write down investments of $938 million in which it
had large unrealized losses although there was substantial leeway in determining whether the nature of investment
impairments was other than temporary (Holm 2011); and (4) although Berkshire owned a substantial stake in
Moody's, Buffett apparently did little to influence Moody's allegedly lax credit rating practices despite claims by
some Moody's executives that they contacted Buffett privately to alert him of such practices (Segal 2009; Hall 2010).

is an empirical question as to whether Buffett "walks the talk" and deserves his generally pristine reputation.[4]

We identify and test a large number of Buffett's statements on what constitutes good accounting, compensation, governance, and investing practices. Results of our multivariate analysis on accounting and disclosure practices are mixed. As predicted, Berkshire investees tend to follow more transparent accounting and disclosure strategies as measured by (1) timely disclosure of both good and bad news, (2) better mapping of accruals to cash flows, (3) greater likelihood of voluntarily expensing stock option costs before being required to do so by FAS 123, (4) a smaller likelihood of meeting or beating targets, and (5) some evidence of using more conservative pension assumptions. However, three findings are inconsistent with Buffett's public statements: Berkshire investees are as likely as the average control firm to use earnings before taxes, depreciation, and amortization (EBITDA), issue earnings guidance, and have annual reports that are relatively difficult to read.

Consistent with Buffett's views on compensation practices, CEOs at Berkshire investees are paid less and their pay is more sensitive to performance than their counterparts in the control sample. However, inconsistent with Buffett's writings, CEO pay at Berkshire investees is not different from the average control firm with regard to (1) sensitivity of CEO pay to negative performance; (2) the effect of market-wide increases in stock prices on CEOs' compensation; (3) reliance on stock options; (4) sensitivity to earnings adjusted for the cost of capital; and (5) the tendency for the firm to boost CEO pay if that CEO's pay falls in the lower half of his industry peers in the previous year.

With respect to board structure and external monitoring, only one of the five espoused practices that we are able to test in our multivariate analysis is consistent with Buffett's statements. Board members of Berkshire investees own more of the investee's stock than do board members at control firms. However, we find no statistical difference between Berkshire investees and the average control firm in the size of the board. Further, investee boards tend to have fewer outside directors and greater ethnic and gender diversity than predicted.

With respect to Buffett's investment philosophy, most of the characteristics we test in our multivariate analysis are consistent with Buffett's statements. Relative to the average firm in the same industry and year, Berkshire investees had higher "owner earnings" (a metric used by Buffett that we define later), lower volatility of owner earnings, more persistent sales, less competition, lower financial leverage, lower pension and other post-retirement liabilities, and fewer stock splits. Berkshire investees also tended to pay dividends more often and were more likely to issue equity when their stock price was greater than their intrinsic value per share.

Next, we examine whether Buffett (1) is attracted to firms with particular accounting, governance, and investing principles, and (2) implicitly or explicitly influences his investees subsequent to Berkshire's investment. We find some evidence that multiple accounting and disclosure practices of future investees were relatively aligned with Buffett's stated preferences compared to control firms in the pre-Berkshire investment period. We find no evidence that board structure practices were more aligned with Buffett's preferences. In contrast, future investees were more aligned with Buffett's investing principles on essentially every dimension we are able to test. Overall, this is consistent with these investment practices attracting Berkshire's interest.

We find little evidence of broad changes in accounting, governance, or investment practices after Berkshire acquired stock in a company. Although investee board size and leverage decreased and the

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[4] There are several practitioner books and case studies that focus on statements Buffett has made in the press or in his letters to Berkshire shareholders (e.g., Statman and Scheid 2001; Miles 2003; Bruner and Carr 2005; Cunningham 2007; Larcker and Tayan 2009; Jain 2010; Chirkova 2012). These writings implicitly assume that Buffett "walks the talk," whereas we explicitly test that premise. In particular, none of these books or cases incorporates rigorous empirical tests of Buffett's principles. Our contribution is to bring state-of-the-art empirical proxies and tests to bear on these principles. However, we acknowledge that the academic arsenal that we employ also suffers from measurement error issues.

frequency of dividend payouts increased, consistent with Buffett's preferences, Berkshire generally appears to be relatively passive in influencing the accounting and governance practices of its investees. Such passive behavior is inconsistent with Buffett's commentary that large investors have the most potential to improve the business practices of their investees, but it is consistent with Frazzini, Kabiller, and Pedersen (2013) who find that Buffett is not active in influencing the practices of Berkshire investees. This is perhaps because Buffett had already taken into account the attributes he cared most about in Berkshire's initial investment decision.

Thus, a somewhat complex picture arises from our many tests. Buffett clearly "walks the talk" on investment practices. However, the results on accounting, compensation, and disclosure practices are less clear-cut. His investees tend to be more transparent and have higher quality earnings. However, despite Buffett's distaste for the use of EBITDA, his investees are no different than control firms in their mentions of this metric in the financial statements. Buffett's similarly strong admonitions against earnings guidance are not supported in our results. While Berkshire firms pay less "excess" compensation and pay is more sensitive to firm performance, investees do not uniformly adopt his preferred compensation policies. Further, most board-related governance practices we measure do not indicate a difference between Berkshire investees and control firms. Buffett is well known for a hands-off policy in the operating decisions of Berkshire firms. Despite Buffett's commentary suggesting that large investors can improve the business practices of their investees, his passive approach appears to extend to accounting and governance choices as well.

Next, Section II discusses prior literature and provides background information on Buffett's views on what constitutes good governance and his philosophy of identifying investment opportunities. We describe the sample in Section III. In Sections IV, V, and VI we (1) discuss the specific accounting, governance, and investing principles that Buffett espouses, (2) present our empirical proxies, and (3) report results on whether Berkshire's investees reflect these principles compared to a control group, respectively. In Section VII we provide evidence on whether Berkshire selects stocks with the business practices Buffett prefers and whether Berkshire's investment subsequently influences these investees to "improve" their accounting, governance, and investing decisions. Section VIII concludes.

II. PRIOR LITERATURE AND BUFFETT'S PHILOSOPHIES

Prior Literature

Research in finance has examined the role of large investors, such as pension funds, in the U.S. capital markets. In particular, researchers have studied the kinds of investments that CalPERS and TIAA-CREF make, the types of firms that such funds target for improvement in governance, and whether pension fund actions affect subsequent operating and stock return performance of the targeted firms (Carleton, Nelson, and Weisbach 1998; Smith 1996; Prevost and Rao 2000). However, such investor activism encounters several limitations in that pension funds themselves (1) suffer from agency problems with respect to their beneficiaries (Coffee 1991), (2) churn their portfolios too often and sell their holdings in a poorly governed firm rather than stay and fix governance problems (Porter 1992; Bhide 1993), (3) lack long-term stable relationships with their investee firms necessary to make credible governance changes, unlike in Japan (Kojima 1997), and (4) may have less consistent, more statistics-based investing models relative to Buffett.[5]

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[5] "Investors should be skeptical of history-based models. Constructed by a nerdy-sounding priesthood using esoteric terms such as beta, gamma, sigma and the like, these models tend to look impressive. Too often, though, investors forget to examine the assumptions behind the symbols. Our advice: Beware of geeks bearing formulas." (See Buffett's letter to Berkshire Hathaway shareholders, February 27, 2009; http:www.berkshirehathaway.com/letters/2008ltr.pdf)

Berkshire arguably suffers fewer agency problems with its investees due to Buffett's reputation as a trustworthy steward who has a long-term buy-and-hold philosophy, e.g., his investment in the Washington Post Company dates back to 1973. Buffett is forthcoming with his opinions and is generally respected as knowledgeable about accounting, governance, and investing matters. By linking Buffett's strong public statements to the accounting, governance, and investing practices of Berkshire investees, we learn about the behavior and influence of Warren Buffett, one of the most well-regarded and successful investors in history.[6]

Accounting, Governance, and Investing Principles

We compile Buffett's views on accounting, governance, and investing from his public statements, some of which have been previously summarized by Cunningham (2001, 2007). For expositional ease, we organize his views into three areas that can be empirically tested: (1) accounting and disclosure; (2) compensation and governance, and (3) investing and financing decisions. We reproduce excerpts from his speeches and writings to support each research hypothesis.

Accounting and Disclosure Practices

Buffett prefers that firms make transparent accounting and disclosure decisions.

- "As a corollary, we tell them [the CEOs] that they should not let any of their decisions be affected even slightly by accounting considerations. We want our managers to think about what counts, not how it will be counted." (Berkshire Hathaway 1998, Annual Report)

In addition, Buffett supported former SEC Chairman Levitt's efforts to crack down on selective disclosure (Berkshire Hathaway 2000, Annual Report). We assume that Buffett's views remain consistent across time, e.g., past statements apply to more recent Berkshire investment decisions and *vice versa,* which leads to our first main cross-sectional hypothesis, H1a.[7]

H1a: Berkshire investees make accounting and disclosure decisions that are relatively aligned with Buffett's public commentary, compared to control firms.

Governance Practices

Buffett advocates good corporate governance in executive compensation, board of director composition, and monitoring by outside investors. Examples of his writings in these areas include:

- On executive compensation: "It has become fashionable at public companies to describe almost every compensation plan as aligning the interests of management with those of shareholders. In our book, alignment means being a partner in both directions, not just on the

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[6] Martin and Puthenpurackal (2008) report abnormal returns of 4 percent soon after Berkshire invests in a stock, consistent with Buffett having unusually good insights in his investment decisions and being important to the economy in his own right. In contemporaneous work, Frazzini et al. (2013) construct a mimicking portfolio whose return is 75 percent correlated with Berkshire's portfolio return using two new investment styles. Hughes, Liu, and Zhang (2010) document that sophisticated market participants under-react to Buffett's investment decisions and suggest overconfidence as one explanation for this under-reaction. Unlike these papers, our focus is on synthesizing Buffett's philosophy on accounting, compensation, governance and investing via his quotes and testing whether he "walks the talk."

[7] To assess this assumption, we analyze our data separately for several time windows (pre- and post-Sarbanes-Oxley Act, the 1995 Private Securities Litigation Reform Act (PSLRA), Regulation FD, and for three arbitrary but equal intervals, 1980–1988, 1989–1996, and 1997–2006). Acknowledging data limitations, especially in earlier periods, we were unable to detect meaningful interpretable differences in our results across these time periods.

upside. Many 'alignment' plans flunk this basic test, being artful forms of 'heads I win, tails you lose.'" (Berkshire Hathaway 1994, Letter to Shareholders)

- On directors' responsibilities to monitor executive pay and their failings to act independently in representing the shareholders: "This costly charade should cease. Directors should not serve on compensation committees unless they are themselves capable of negotiating on behalf of owners. They should explain both how they think about pay and how they measure performance. Dealing with shareholders' money, moreover, they should behave as they would were it their own." (Berkshire Hathaway 2002, Annual Report)
- On the ability of powerful outside investors to improve corporate governance: "Twenty, or even fewer, of the largest institutions, acting together, could effectively reform corporate governance at a given company, simply by withholding their votes for directors who were tolerating odious behavior. In my view, this kind of concerted action is the only way that corporate stewardship can be meaningfully improved." (Berkshire Hathaway 2002, Annual Report)

These statements suggest the following hypothesis:

H1b: Berkshire investees exhibit relatively good corporate governance (as specified by Buffett) compared to control firms.

Investing and Financing Practices

We also examine Buffett's views on what constitutes good corporate investing and financing practices. An example of his perspectives on investing practices is as follows:

- "The primary test of managerial economic performance is the achievement of a high earnings rate on equity capital employed (without undue leverage, accounting gimmickry, etc.) and not the achievement of consistent gains in earnings per share." (Berkshire Hathaway 1979, Letter to Shareholders)

This leads to the following hypothesis:

H1c: Berkshire investees make relatively good investing and financing decisions (as specified by Buffett) compared to control firms.

III. SAMPLE

We obtain a list of Berkshire's holdings every calendar quarter during the period 1980 to 2006 from the CDA/Spectrum Institutional Money Manager Holdings database, which is based on Form 13F filings with the SEC. Institutional investment managers are required to file a 13F if their aggregate investments (publicly traded equity in our case) at the end of a calendar month exceed $100 million. The reporting requirement mandates that all securities with 10,000 shares or an aggregate fair market value of $200,000 be filed with the SEC.[8]

We initially identify a sample of 624 firm-year observations (and 206 unique firms) representing Berkshire Holdings between 1980 and 2006. Untabulated data reveal that the average number of

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[8] However, institutional investment managers may request confidential treatment of certain securities ordinarily reported on Form 13F and Berkshire is known to have asked for such privilege. The CDA/Spectrum database does not backfill data on delayed investment disclosure due to the confidentiality treatment. If delayed disclosure is more typical for Berkshire's acquisition of well-publicized companies, then our sample would be skewed in favor of less publicized Berkshire holdings.

Berkshire holdings per year is 23, while the median holding is 14 stocks. The discrepancy between the average and median holding is influenced by 1980 when Berkshire held 112 stocks. However, when we restrict our attention to investments in which Berkshire held at least 5 percent of the target firm's equity, the number of 1980 holdings falls to 13, suggesting that most of the 112 stocks in 1980 represented small investments. We report results in the paper for the complete sample. We have replicated the regressions reported in the paper for holdings representing 5 percent or more of the target firm's equity and our inferences from untabulated results are unchanged.[9]

Our control sample is comprised of all available firms in the Compustat universe during the same time period. To be clear, proxies for the accounting, governance, and investing principles for Berkshire investees are examined for all available years during the period for which Berkshire invests or retains its investment in the target firm. We have also deleted the holding company Berkshire Hathaway from the sample. We discuss cross-sectional evidence on accounting, governance, and investing practices related to H1a, H1b, and H1c in Sections IV, V, and VI, respectively.

IV. EMPIRICAL TESTS—ACCOUNTING AND DISCLOSURE PRACTICES

In this section, we begin with an overall test of whether Berkshire tends to invest in firms with relatively transparent high-quality earnings. Next we elaborate on Buffett's specific statements on accounting and disclosure practices. In each case, we describe our empirical measurement of these practices and report results comparing Berkshire investees to a control group. We summarize our findings in Table 1.

Buffett's statements taken as a whole suggest that he values conservative, transparent, high-quality accounting and disclosure choices. To capture this broad perspective, we compare Berkshire investees' (1) timely disclosure of news and (2) earnings quality relative to a control group.

Timely Reporting (A1; First Overall Test of H1a)

One way to examine the overall transparency of accounting and disclosure practices is to test for the timely disclosure of good news and bad news. Our empirical proxies for reporting timeliness are: (1) the firm-specific measure of the timeliness of reporting bad news relative to good news (*CSCORE*); (2) timeliness of good news (*GSCORE*) proposed by Khan and Watts (2009), and (3) *BCOEFF,* which is the sample-specific conditional conservatism coefficient comparing Berkshire investees and control firms as specified in Basu (1997). Our first measure of earnings quality modifies the Basu (1997) model described in Appendix A such that firm-year conservatism is captured by $\beta_{4,i,t}$ (labeled *BCOEFF*). We estimate *BCOEFF* for Berkshire and non-Berkshire firms separately by using interaction terms for each of the variables in Equation (E5) as detailed in Appendix A. We expect Berkshire investees to (1) be more conservative (higher *CSCORE*), (2) be more timely in recognizing good news (higher *GSCORE*) and (3) have a higher *BCOEFF* coefficient.

Throughout the paper, we present univariate and multivariate comparisons between Berkshire investees and control firms of business practices that Buffett favors. While the univariate comparisons are straightforward, the multivariate comparisons incorporate (1) a combined analysis of all business practices within a category such as accounting in one regression, and (2) standard control variables such as book-to-market, standard deviation of returns, size, leverage, and ROA. There are two advantages of the multivariate analysis. First, the multivariate analysis avoids treating each of the business principles as independent. Second, it helps evaluate which of the business practices dominate when comparing Berkshire's investees and their control counterparts.

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[9] We considered restricting the sample to stocks for which Buffett owns 20 percent or more of the investee's equity. However, we found only four such investees on average. Hence, meaningful empirical analysis for such stocks is difficult.

TABLE 1

Accounting Practices of Berkshire Hathaway Investees

Panel A: Univariate Data on Accounting Practices of Berkshire Investees

Dependent Variables	Pred. Sign for Diff.	Mean Berkshire Firms	Mean Control Sample	t-statistic for Difference	n Berkshire Sample	n Control Sample
CSCORE (A1)	+	0.601	0.372	16.44***	602	139,424
GSCORE (A1)	+	0.051	0.029	12.47***	602	139,424
BCOEFF (A1)	+	0.171	0.297	−1.29	602	139,285
DD (A1)	−	0.024	0.048	−11.24***	457	87,898
EBITDA_FOCUS (A2)	−	1.500	1.833	−0.66	263	64,769
GUIDANCE (A3)	−	3.993	2.645	6.55	144	21,561
MEET_BEAT (A4)	−	0.707	0.632	4.15	303	52,968
SMALL_BEAT (A4)	−	0.190	0.172	1.36	303	52,968
EXPENSER (A5)	+	0.433	0.313	2.43***	90	4,562
PENSENS (A6)	−	0.119	0.222	−6.11***	185	20,438
FOG INDEX (A7)	−	19.419	18.241	7.11	260	53,067
SIZE	+	7.829	4.810	33.29***	602	139,986
STDRET	−	0.017	0.037	−18.74***	602	139,986
BLEV	−	0.203	0.227	−2.98***	602	139,986
BM	+	0.621	0.750	−4.77	602	139,986
ROA	+	0.066	−0.009	9.75***	602	139,986

Panel B: Multivariate Analysis of all the Accounting Practices of Berkshire Hathaway Investees: $BERK = f$(Intercept, Accounting Practices, Control Variables)

Independent Variables	Pred. Sign	Coefficient	Z-statistic
CSCORE (A1)	+	1.118	5.07***
GSCORE (A1)	+	2.110	1.66**
DD (A1)	−	−5.775	−2.39***
EBITDA_FOCUS (A2)	−	0.002	0.20
GUIDANCE (A3)	−	0.002	0.00
MEET_BEAT (A4)	−	−0.551	−4.31***
EXPENSER (A5)	+	0.603	2.09**
PENSENS (A6)	−	−0.492	−1.12
FOG INDEX (A7)	−	0.015	0.85
(n = 110,644)			

*, **, *** Represents statistical significance at 10 percent, 5 percent, and 1 percent, respectively, based on one-tailed p-values for variables with directional predictions and two-tailed otherwise.

This table compares the mean levels for various proxies for underlying accounting practices espoused by Warren Buffett for Berkshire Hathaway investees compared to a control sample.

The number of observations, reported in the last two columns of Panel A and relevant to Panel B, underlying these analyses varies depending on the availability of data.

Panel B presents the logistic regression of an indicator variable for treatment and control firms on various proxies for Buffett's accounting principles. Because data are not available across time for all variables, we introduce indicator variables that capture missing observations using the zero order regression approach suggested in Greene (1993). Additional controls in the regression include book-to-market, standard deviation of returns, size, leverage, and ROA, but are not reported. The coefficients on the indicator variables, intercept, and control variables are suppressed for convenience.

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TABLE 1 (continued)

Variable Definitions:

CSCORE and *GSCORE* = the timeliness with which bad news and good news, respectively, is disclosed by the firm to the market as specified in Khan and Watts (2009);

BCOEFF = the sample specific conservatism coefficient comparing Berkshire and control firms as specified in Basu (1997) and as described in Appendix A;

DD = a proxy for the quality of earnings; *DD* is the standard deviation of the residual from a regression of current accruals for a year on operating cash flows for the last year, current year, and the next year and control variables as per Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2006) and described more in Appendix A;

EBITDA_FOCUS = the number of times *EBITDA* is mentioned in a firm's 10-K;

GUIDANCE = the number of times per year that a firm provides an earnings forecast as per the First Call database;

MEET_BEAT = proportion of quarters in a year that a firm meets or beats the analyst consensus forecast obtained just before the earnings announcement;

SMALL_BEAT = the proportion of quarters in which firms manage to exactly meet the analyst consensus forecast or beat it by a penny per share;

EXPENSER = 1 if a firm is identified as voluntarily expensing the fair value of stock as per SFAS 123 in the Bear Stearns report dated December 14, 2004;

PENSENS = the ratio of assumed rate of return on pension plan assets multiplied by pension assets to operating earnings;

FOG INDEX = the (words per sentence + percent of complex words) * 0.4 per Li (2008) in the MD&A;

SIZE = the natural logarithm of market value of equity;

STDRET = the standard deviation of returns;

BLEV = total long-term liabilities divided by total assets;

BM = book-to-market ratio; and

ROA = return on assets.

Univariate data in Panel A of Table 1 report statistically higher *CSCORE* and *GSCORE* measures (0.601 and 0.051, respectively) for Berkshire investees relative to our control sample (0.372 and 0.029, respectively), suggesting that Berkshire investees report both good and bad news earlier than the average firm (t-statistics of 16.44 and 12.47, respectively). However, the *BCOEFF* estimates between the treatment sample and the control sample are not statistically different in the predicted direction (t-statistic for the difference is −1.29). Multivariate results in Panel B show that the coefficients on both *CSCORE* and *GSCORE* are positive and significant (Z-statistic = 5.07 and 1.66, respectively).[10] On balance, we find that Berkshire investees are more timely in their financial reporting.

Earnings Quality (A1; Second Overall Test of H1a)

Our measure of earnings quality is based on an approach proposed by Dechow and Dichev (2002), whose main idea is that earnings quality is higher when accruals capture more of the variation in current, past, and future cash flows. In other words, earnings quality is captured as the residual variation of accruals (*DD*) after accounting for the variation due to current, past and future cash flows. Following the spirit of Ball and Shivakumar (2006), we modify the Dechow and Dichev model to allow for nonlinearities in the cash flow coefficient as explained in Appendix A. We interpret larger (smaller) *DD* as an indication of poor (good) earnings quality. As predicted, the multivariate analysis in Panel B of Table 1 indicates that Berkshire investees have a *DD* measure that is smaller than the control sample (Z-statistic = −2.39).

In summary, results from our overall tests are consistent with Buffett investing in firms with relatively timely, conservative, high-quality earnings. We next turn to tests of specific Buffett statements on accounting and disclosure practices.

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[10] When we consider multivariate analysis (Panel B) we do not include *BCOEFF* because, unlike other accounting variables, estimating *BCOEFF* at the firm-year level reduces sample sizes considerably.

Buffett's Specific Statements on Accounting and Disclosure Practices

We next link each of Buffett's principles to at least one quote. We then present proxy variables and results on whether Buffett's statements are aligned with the actions of Berkshire's investees.

A2: Firms Should Place Less Emphasis on EBITDA

- "References to EBITDA make us shudder. Why exclude depreciation from earnings? These are real costs that a company incurs." (Berkshire Hathaway 2000, Annual Report)
- "Trumpeting EBITDA is a particularly pernicious practice. Doing so implies that depreciation is not truly an expense, given that it is a 'non-cash' charge. That's nonsense. In truth, depreciation is a particularly unattractive expense because the cash outlay it represents is paid up front, before the asset acquired has delivered any benefits to the business." (Berkshire Hathaway 2002, Annual Report)

Buffett is clearly not fond of EBITDA. We provide direct evidence on the use of EBITDA by Berkshire investees by counting the number of mentions of EBITDA in each investee's 10-K. We expect Berkshire firms to be less frequent users of EBITDA compared to control firms.

While the mean number of EBITDA mentions in Panel A of Table 1 for Berkshire firms (1.5) is less than for control firms (1.833), the difference is not statistically significant in either the univariate analysis in Panel A or in the multivariate analysis in Panel B.[11] However, the fact that even some investees mention EBITDA is arguably surprising given Buffett's strong statements, and is consistent with Buffett being relatively passive about influencing Berkshire investees.[12]

A3: Firms Should Abstain from Making Earnings and Growth Forecasts

- "... be suspicious of companies that trumpet earnings projections and growth expectations. Businesses seldom operate in a tranquil, no-surprise environment, and earnings simply don't advance smoothly (except, of course, in the offering books of investment bankers)." (Berkshire Hathaway 2002, Annual Report)
- "Charlie and I think it is both deceptive and dangerous for CEOs to predict growth rates for their companies . . . Charlie and I tend to be leery of companies run by CEOs who woo investors with fancy predictions. A few of these managers will prove prophetic—but others will turn out to be congenital optimists, or even charlatans." (Berkshire Hathaway 2000, Annual Report)[13,14]

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[11] Notably, in results reported in Section VII, we find modest evidence suggesting that (1) future Berkshire investees had fewer mentions of EBITDA before Berkshire's investment compared to control firms and (2) Berkshire investees tended to reduce their use of EBITDA post-investment.

[12] Of course, references to EBITDA could be prompted by the demand for its use in debt covenants or by financial analysts. We cannot rule out this explanation without an onerous analysis of these sources.

[13] On the surface, Buffett's statements about guidance appear contradictory to his own statements about Berkshire's earnings power, e.g., "I can estimate that the normal earning power of the assets we currently own is about $17 billion pre-tax" (Berkshire Hathaway 2010, Annual Report, 3). Our interpretation is that Buffett does not want managers to provide public guidance on short-term earnings as such guidance can promote dysfunctional earnings management or expectations management with analysts. Buffett's statement about Berkshire's earning power does not seem refer to short-term earnings guidance.

[14] Charlie Munger is Vice Chairman of Berkshire Hathaway and Chairman of Wesco Financial Corporation, a majority-owned subsidiary of Berkshire Hathaway. Munger serves on numerous boards representing Berkshire (e.g., Wesco International, Wesco Financial, Blue Chip Stamps, and Costco). Buffett characterizes Munger as his business partner. We considered investigating quotes from Munger, but our reading of his book *Poor Charlie's Almanack* (Munger 2007) did not yield quotes that were materially different from those attributed to Buffett. This is not a surprise as Buffett, in his Foreword to Munger's book, remarks that they had been partners for 45 years when the book was written in 2008. On a similar note, a few investments by Berkshire are known to have been made by Lou Simpson and other managers. However, we have assumed that such investments are consistent with Buffett's stated principles.

We use the First Call database to provide direct evidence on earnings guidance. We code *GUIDANCE* as the number of times per year that a firm provides a quarterly earnings forecast. We predict that Berkshire investees will be less frequent users of *GUIDANCE* compared to control firms.

Inconsistent with Buffett's public statements, univariate data in Panel A of Table 1 indicate that Berkshire investees provide guidance more often than the average control firm, approximately four times a year for Berkshire firms versus 2.6 times a year for the control firms (t-statistic = 6.55). However, this difference becomes insignificant in the multivariate analysis in Panel B. It is noteworthy that, despite Buffett's clear distaste for earnings guidance, his investees appear to guide at least as often as control firms.[15]

A4: Firms Should Abstain from Trying to Meet/Beat Earnings Forecasts

- "We are suspicious of those CEOs who regularly claim they do know the future—and we become downright incredulous if they consistently reach their declared targets. Managers that always promise to 'make the numbers' will at some point be tempted to make up the numbers." (Berkshire Hathaway 2002, Annual Report)

To measure the manager's propensity to meet or beat forecasts, we use the proportion of quarters in a year that a firm meets or beats the analyst consensus forecast obtained just before the earnings announcement (*MEET_BEAT*). Because it is difficult to disentangle superior performance from expectations management or earnings management, we conduct additional analysis where we determine manager's propensity to meet or beat expectations by a very small margin, a penny per share. That is, we compute the proportion of quarters in which firms manage to exactly meet the analyst consensus forecast or beat it by a penny per share (*SMALL_BEAT*). To ensure reliable measurement, we restrict the sample to firms that have available data for at least three quarters during a year. We expect Berkshire firms to have smaller coefficients on *MEET_BEAT*, and *SMALL_BEAT*.[16]

Univariate data in Panel A of Table 1 indicate the proportion of *MEET_BEAT* and *SMALL_BEAT* are greater for Berkshire investees (70.7 percent versus 63.2 percent and 19 percent versus 17.2 percent, respectively), but this difference could be attributable to superior performance. Moreover, consistent with Buffett's statements, in the multivariate analysis Berkshire investees are less likely to meet or beat analyst forecasts as can be seen from the negative and significant coefficient on *MEET_BEAT* in Panel B (Z-statistic = −4.31). *SMALL_BEAT* is not added as an independent variable in the multivariate analysis due to its high correlation with *MEET_BEAT*.

A5: Firms Should Expense Stock Option Costs before FAS 123-R was Enacted

In his 1998 letter to Berkshire shareholders, but too long to quote here, Buffett strongly opposes (1) earnings management and (2) the failure of many companies to expense stock option costs. As an example, Buffett makes a downward adjustment to reported earnings for option expense before making any investment decision.

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[15] These results could potentially reflect incomplete coverage on the First Call database until 1998 as suggested by Chuk, Matsumoto, and Miller (2012). To address this issue, we compared the difference in the following attributes between the treatment and the control sample that are known to influence guidance, such as analyst coverage, institutional ownership, and poor performance. Untabulated results suggest that Berkshire investees are better-performing firms and experience more analyst coverage and institutional ownership relative to their control counterparts. However, controlling for these variables does not affect the tenor of our conclusions.

[16] There has been criticism of the meet-or-beat tests in prior research, including Durtschi and Easton (2005, 2009). However, a recent working paper by Burgstahler and Chuk (2012) rebuts Durtschi and Easton's (2005, 2009) comments. Moreover, survey work by Graham, Harvey, and Rajgopal (2005) finds evidence consistent with the importance of benchmark beating without relying on the econometric and research design issues that Durtschi and Easton (2005, 2009) raise.

We provide direct evidence on whether a firm voluntarily expenses the fair value of stock options as per FAS 123 by looking for the inclusion of the firm's name in a December 14, 2004 Bear Stearns report identifying such firms (*EXPENSER*). We expect Berkshire firms to have a larger coefficient on *EXPENSER*. The univariate data in Panel A of Table 1 indicate that Berkshire investees are more likely to voluntarily expense options (43.3 percent versus 31.3 percent, t-statistic = 2.43). This is also consistent with the multivariate results reported in Panel B, where the coefficient on *EXPENSER* is 0.603 (Z-statistic = 2.09).

A6: Firms Should Use Relatively Conservative Pension Assumptions

- "... if its pension assumptions are fanciful, watch out. When managements take the low road in aspects that are visible, it is likely they are following a similar path behind the scenes. There is seldom just one cockroach in the kitchen." (Berkshire Hathaway 2002, Annual Report)

A manager of a firm with relatively large pension assets has an opportunity to manipulate reported earnings. Accordingly, our first proxy for pension sensitivity is the ratio of the income statement effect of pension assets (i.e., assumed rate of return on pension plan assets multiplied by pension assets) to operating earnings (*PENSENS*). This measure implicitly captures the extent to which managements' assumption about the expected rate of return on pension plan assets can be used to manage earnings.

Univariate results presented in Panel A Table 1 indicate that pension sensitivity (*PENSENS*) is significantly lower for Berkshire investees (11.9 percent versus 22.2 percent for control firms, t-statistic = −6.11). However, in the multivariate regression reported in Panel B, the coefficient on *PENSENS* remains negative but is not significant at conventional levels (Z-statistic = −1.12, one-tailed p-value = 0.13).

An alternative way to measure the extent to which managers are aggressive with the assumed rate of return on pension assets is to perform a regression analysis suggested by Bergstresser, Desai, and Rauh (2006). Specifically, we estimate a regression of the assumed rate of return on pension assets on the natural logarithm of the ratio of pension assets to operating income (*Ln* (*Pension assets/operating income*)), *BERK*, and an interaction term (*BERK* ∗ *Ln* (*Pension assets/operating income*)). *Ln* (*Pension assets/operating income*) captures the extent to which the pension rate of return assumption influences reported earnings. Consistent with Bergstresser et al. (2006), a positive coefficient on this variable indicates a greater likelihood that the pension rate of return assumption is opportunistic. If Berkshire investees use more conservative pension rate of return assumptions, then the coefficient on the interaction term should be negative. Untabulated results suggest that the coefficient on the interaction term is indeed negative (coefficient = −0.159) and significant (t-statistic = −1.67). Overall, we conclude that the findings, with respect to pension assumptions, are weakly consistent with Berkshire investees following the relatively more conservative pension practices preferred by Buffett.

A7: Firms Should Use Relatively Clear and Simple Explanations in Their Footnotes

- "Same unintelligible footnotes usually indicate untrustworthy management. If you can't understand a footnote or other managerial explanation, it's usually because the CEO doesn't want you to." (Berkshire Hathaway 2002, Annual Report)

To evaluate the readability of Berkshire investees' financial statements, we follow Li (2008) and compute the *FOG INDEX* for the text that appears in the MD&A section of the annual report of a firm, calculated as (words per sentence + percentage of complex words) ∗ 0.4.[17] The intuition from

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[17] We focus on the MD&A and not the entire annual report or the footnotes because the Fog Index discounts the clarity provided by numbers and their breakdown in tables, as well as the role of figures and illustrations in illuminating the annual report (Preston, Wright, and Young 1996). Much of the lack of readability in annual reports and their footnotes can be blamed on the accounting jargon and legalese needed to defend firms against perceived unwarranted lawsuits. Hence, we choose the MD&A section to test for differences in readability because it should be less encumbered by accounting and legal jargon.

computational linguistics is that more syllables per word or more words per sentence make it more difficult to read and interpret the financial statements. Relative to the average control firm, we expect Berkshire investees' financial statements to be easier to read and thus to have a lower coefficient on the *FOG INDEX*.

In terms of linguistic transparency in financial statements, univariate results in Panel A of Table 1 suggest that, contrary to our prediction, Berkshire investee annual reports are less readable than the average control firm as measured by the *FOG INDEX*, but the multivariate results suggest that the difference is insignificant (Z-statistic of 0.85 in Panel B).

Summary of Findings on Accounting and Disclosure Practices

We find the overall evidence consistent with our broad prediction that Berkshire investees have more timely, transparent, high-quality financial information. However, when we drill down to test specific Buffett comments, we find less consistent evidence. As predicted, the multivariate analysis shows that Berkshire investees (1) are more likely to expense options, (2) are less likely to meet or beat earnings targets, and (3) show some evidence of using more conservative pension assumptions relative to the control sample. However, inconsistent with Buffett's statements, we find that Berkshire investees are no different from the control group in their tendency to (1) mention EBITDA, (2) issue guidance, and (3) generate more readable annual reports. While our evidence suggests that Berkshire investees often make relatively transparent and conservative disclosures as Buffett would prefer, there are notable exceptions.

V. EMPIRICAL TESTS—COMPENSATION AND BOARD COMPOSITION PRACTICES

In this section, we identify Buffett's public statements on senior executive compensation and governance practices embodied in board structure choices, describe our empirical measurement of these practices, and report our empirical findings.

Senior Management Compensation

We identify six principles that Buffett advocates for compensation of senior executives and employ the following specification to investigate compensation-related propositions:[18]

$$
\begin{aligned}
Ln(annual\ compensation)_{it} = {} & \beta_0 + \beta_1 Returns\text{-}firm_{it} + \beta_2 Returns\text{-}market_{it} + \beta_3 BERK_{it} \\
& + \beta_4 Returns\text{-}firm_{it}*BERK_{it} + \beta_5 Returns\text{-}market_{it}*BERK_{it} \\
& + \beta_6 NegReturns\text{-}firm_{it} + \beta_7 NegReturns\text{-}firm_{it}*BERK_{it} \\
& + \beta_8 Ln\ Market\ Cap_{it} + \beta_9 ROA_{it} + \beta_{10} Market\text{-}to\text{-}book_{it} \\
& + \beta_{11} Risk_{it} + \beta_{12} Leverage_{it} + \beta_{13} CEO\ age_{it} + \beta_{14} CEO\ tenure_{it} \\
& + \beta_{15} New\ CEO_{it} + \beta_{16} Ln(CEO's\ stock\ and\ option\ portfolio)_{it} \\
& + \kappa\ Industry_j + \lambda\ Year_t + error_{it}.
\end{aligned}
$$

(1)

The variables are defined in Table 2, and, *i, j,* and *t* are firm, industry, and time subscripts, respectively. An indicator variable, *BERK,* is set to 1 if the firm is a Berkshire investee in that firm-year, and 0 otherwise.

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[18] In untabulated work, we controlled for lagged managerial performance in this specification (Banker, Darrough, Huang, and Plehn-Dujowich 2013) and find that the reported inferences are broadly unaffected. Ideally, we would also have liked to control for the new CEO's performance at the prior firm, but several of the CEOs in our treatment sample come from private companies.

TABLE 2

Compensation Practices of Berkshire Hathaway Investees

The table presents results from estimating the following equation:

$$
\begin{aligned}
Ln(annual\ compensation)_{it} = {} & \beta_0 + \beta_1 Returns\text{-}firm_{it} + \beta_2 Returns\text{-}market_t + \beta_3 BERK_{it} \\
& + \beta_4 Returns\text{-}firm_{it}*BERK_{it} + \beta_5 Returns\text{-}market_{it}*BERK_{it} \\
& + \beta_6 NegReturns\text{-}firm_{it} + \beta_7 NegReturns\text{-}firm_{it}*BERK_{it} \\
& + \beta_8 Ln\ Market\ Cap_{it} + \beta_9 ROA_{it} + \beta_{10} Market\text{-}to\text{-}book_{it} \\
& + \beta_{11} Risk_{it} + \beta_{12} Leverage_{it} + \beta_{13} CEO\ age_{it} +_{14} CEO\ tenure_{it} \\
& + \beta_{15} New\ CEO_{it} + \beta_{16} Ln(CEO's\ stock\ and\ option\ portfolio)_{it} \\
& + \kappa Industry_j + \lambda Year_t + error_{it}.
\end{aligned}
$$

(1)

	Pred. Sign	Coefficient	t-statistic
Dependent Variables			
Returns-firm	+	0.168	7.72***
Returns-market	−	−0.056	−0.53
BERK (B1: excess pay hypothesis)	−	−0.280	−2.29**
*Returns-firm * BERK* (B2: PPS)	+	0.513	2.66***
*Returns-market * BERK* (B4: Lake Wobegon)	0/−	−0.097	−0.30
NegReturns-firm	+	0.511	7.45***
*NegReturns-firm * BERK* (B3: negative PPS)	+	−0.958	−1.40
Control Variables			
Ln Market Cap	+	0.463	39.89***
ROA	+	−0.138	−1.20
Market-to-book	+	−0.000	−1.51
Risk	+	0.288	6.97***
Leverage	+	0.018	1.51*
CEO age	+	−0.000	−0.12
CEO tenure	+	−0.005	−1.86
New CEO	+	0.092	3.28***
Ln (CEO's stock and option portfolio)	?	0.011	1.17

n = 20,799

*, **, *** Represent statistical significance at 10 percent, 5 percent, and 1 percent, respectively, based on one-tailed p-values for variables with directional predictions and two-tailed otherwise.
Robust standard errors clustered at the firm level have been used to compute t-statistics.
Coefficients on the intercept, industry, and year fixed effects have not been tabulated.

Variable Definitions:
annual compensation = the sum of salary, actual bonus, target long-term incentive plan payments, pension contributions and other perquisites, the Black-Scholes value of stock option grants, and the market value of restricted and unrestricted stock grants;
Returns-firm = stock return performance of the firm;
Returns-market = the overall market index;
Ln Market Cap = the natural logarithm of the market value of outstanding common shares.
ROA = measures operating performance;
Market-to-book = the investment opportunity set;

(continued on next page)

TABLE 2 (continued)

Risk = the natural logarithm of the standard deviation of returns;
Leverage = book value of debt divided by market value of equity;
CEO-specific factors = captured by *CEO age, CEO tenure* with the firm, *New CEO* indicator variable, and the *CEO's stock and option portfolio* measured as the natural logarithm of 1 plus the intrinsic value of the CEO's equity portfolio of stock, restricted stock, and option holdings (both vested and unvested);
BERK = 1 if the firm is a Berkshire investee during a year;
NegReturns-firm = returns when the *Returns-firm* is negative in that year, and set to 0 otherwise.

B1: Senior Executives Should Not be "Excessively" Compensated

- "If able but greedy managers over-reach and try to dip too deeply into shareholders' pockets, directors must slap their hand." (Berkshire Hathaway 2002, Annual Report)

We measure "excess" or abnormal compensation after controlling for several economic determinants of compensation in Equation (1). In particular, a negative coefficient on *BERK*, β_3, would suggest that CEOs at Berkshire investees draw relatively less "excessive" compensation after accounting for economic factors and executive-specific variables known to affect annual compensation. To estimate regression model (1), we obtain data from the ExecuComp database.

We find that, although overall annual compensation levels are higher at Berkshire investees on a univariate basis ($9.5 million versus $4.5 million; results not tabled), multivariate results of estimating Equation (1) reported in Table 2 show that the coefficient on *BERK* is negative and significant (−0.280, t-statistic = −2.29). That is, consistent with Buffett's statements, CEOs of Berkshire investees are paid less than the average control firm after controlling for several factors known to affect compensation.

B2: Pay for Executives Ought to be Characterized by Greater Pay-for-Performance Sensitivity

- "Directors should stop such piracy. There's nothing wrong with paying well for truly exceptional business performance. But, for anything short of that, it's time for directors to shout 'Less!' It would be a travesty if the bloated pay of recent years became a baseline for future compensation. Compensation committees should go back to the drawing boards." (Berkshire Hathaway 2002, Annual Report)

In Equation (1) above, β_2 captures pay-for-performance sensitivity for the sample as a whole, whereas the coefficient on the interaction term *Returns-firm * BERK*, β_4, represents pay-for-performance sensitivity for the Berkshire investee sample. We expect β_4 to be positive, consistent with CEO compensation for Berkshire firms being relatively more sensitive to firm performance. We find that, consistent with Buffett's statements, Berkshire investees have significantly higher pay-for-performance sensitivity, as evidenced by the positive and significant coefficient of 0.513 (t-statistic = 2.66) on *Returns-firm * BERK* in Table 2.[19]

B3: Pay for Executives Ought to be More Sensitive to Negative Performance

- "It has become fashionable at public companies to describe almost every compensation plan as aligning the interests of management with those of shareholders. In our book, alignment

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[19] In untabulated results, we control for other forces that potentially influence the pay-for-performance sensitivity by interacting returns with firm size and variability of returns in Equation (1), consistent with Baker and Hall (2004) and Aggarwal and Samwick (1999). Our inferences remain unchanged.

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means being a partner in both directions, not just on the upside. Many 'alignment' plans flunk this basic test, being artful forms of 'heads I win, tails you lose.'" (Berkshire Hathaway 2002, Annual Report)

To explore the sensitivity of compensation to negative stock market performance, we include a continuous variable, *NegReturns-firm,* in Equation (1) to identify cases where firms' stock returns are negative. The coefficient on this variable, β_6, captures the sensitivity of compensation to negative stock returns and is predicted to be positive because the underlying variable is negative. The coefficient on the interaction of *NegReturns-firm* $*$ *BERK,* β_7, captures the incremental sensitivity of negative returns for Berkshire firms (Leone, Wu, and Zimmerman 2006). Based on Buffett's statements, we expect β_7 to be positive, consistent with Berkshire investees being more sensitive than control firms to negative stock market performance.

The positive coefficient of 0.511 (t-statistic = 7.45) on *NegReturns-firm* in Table 2 is consistent with managers being penalized for poor performance more than they are compensated for good performance. However, contrary to our prediction, the coefficient of -0.958 (t-statistic = -1.40) on *NegReturns-firm* $*$ *BERK* in Table 2 indicates that Berkshire firms are not incrementally sensitive to negative stock market performance. If anything, Berkshire firms are less sensitive than control firms as determined by the sum of coefficients β_5 and β_7, which is negative $(0.513 + (-0.958) = -0.455)$.

B4: Pay for Executives Should be Less Subject to Overall Upward Creep (Lake Wobegon Effect)[20]

- "The deck is stacked against investors when it comes to the CEO's pay. Outlandish 'goodies' are showered upon CEOs simply because of a corporate version of the argument we all used when children: 'But, Mom, all the other kids have one.' ... The upshot is that a mediocre-or-worse CEO—aided by his handpicked VP of human relations and a consultant from the ever-accommodating firm of Ratchet, Ratchet, and Bingo—all too often receives gobs of money from an ill-designed compensation arrangement." (Berkshire Hathaway 2006, Annual Report)

We test for the Lake Wobegon effect whereby firms increase CEO compensation to compensate for below-average salary, in two ways. First, we use Equation (1) to evaluate the coefficient β_5 on *Returns-market* $*$ *BERK,* which captures the sensitivity of annual compensation to overall market-wide performance for Berkshire investees. A non-positive coefficient on *Returns-market* $*$ *BERK* is consistent with Berkshire investees not incrementally rewarding CEOs for a market-wide increase in stock prices. Coefficients in Table 2 on *Returns-market* and *Returns-market* $*$ *BERK* are non-positive (negative and insignificant) indicating that neither control firms nor Berkshire investees respond to market-wide increases in stock prices by increasing their CEOs' compensation.

In untabulated work, we adapt the specification in Bizjak, Lemmon, and Naveen (2008) and regress change in annual compensation on several control variables and a treatment variable, *LOWCOMP,* that reflects the gap between CEO compensation and that of the median CEO for the previous year, and an interaction term *LOWCOMP* $*$ *BERK*. Bizjak et al. (2008) find that CEOs whose compensation falls below their peer group in the previous year receive a pay hike relative to

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[20] Lake Wobegon is the fictional Minnesota town in the radio series *A Prairie Home Companion* by Garrison Keillor, where "all the women are strong, all the men are good-looking, and all the children are above average." Applied in this context, escalation in executive compensation occurs when executives are consistently evaluated as being "above-average"—even when they are not.

their counterparts whose pay is above the peer group median, consistent with the Lake Wobegon effect. Inconsistent with Buffett's statements, Berkshire firms are not less likely than control firms to experience a Lake Wobegon effect because the coefficient on *LOWCOMP* * *BERK* is insignificant (t-statistic $= -0.18$).

B5: Pay Ought to be More Sensitive to Earnings Net of Cost of Capital

- "A common form of misalignment occurs in the typical stock option arrangement, which does not periodically increase the option price to compensate for the fact that retained earnings are building up the wealth of the company. Indeed, the combination of a ten-year option, a low dividend payout, and compound interest can provide lush gains to a manager who has done no more than tread water in his job. A cynic might even note that when payments to owners are held down, the profit to the option-holding manager increases." (Berkshire Hathaway 1994, Annual Report)
- "As Buffett explains, however, simply by retaining and reinvesting earnings, managers can report annual earnings increases without so much as lifting a finger to improve real returns on capital. Buffett emphasizes that performance should be the basis for executive pay decisions. Executive performance should be measured by profitability, after profits are reduced by a charge for the capital employed in the relevant business or earnings retained by it." (Cunningham 2007, p. 6)

Following Frankel and Lee (1998), we measure earnings net of the cost of capital, i.e., "abnormal" earnings, as the difference between earnings per share scaled by the opening book value of equity (eps/bv_{t-1}) and the cost of capital defined as the two-digit industry-based discount rates computed by Fama and French (1997). We insert abnormal earnings as an additional independent variable in Equation (1) and use the coefficient on this variable as a measure of the sensitivity of senior managers' pay to earnings that build wealth in excess of the cost of capital. We expect the coefficient to be positive for control firms and incrementally positive for Berkshire investees. Inconsistent with Buffett's statements, untabulated results indicate that compensation is not sensitive to abnormal earnings in the entire sample or for Berkshire firms.[21]

B6: Firms Ought to Rely Less on Stock Options to Pay Executives

- "Though options, if properly structured, can be an appropriate, and even ideal, way to compensate and motivate top managers, they are more often wildly capricious in their distribution of rewards, inefficient as motivators and inordinately expensive for shareholders." (Berkshire 1998, Letter to Shareholders)

We measure a firm's reliance on stock options in CEO compensation contracts as the ratio of the Black-Scholes value of annual option grants to annual compensation, which is measured as the sum of salary, actual bonus, target long-term incentive plan payments, pension contributions and other perquisites, the Black-Scholes value of stock option grants, and the market value of restricted and unrestricted stock grants (*%OPTIONS*), per the ExecuComp database. Based on Buffett's statements, we expect the *%OPTIONS* to be lower for Berkshire investees. However, inconsistent with his statements, untabulated results indicate that there is no statistical difference in the reliance on stock options as a proportion

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[21] However, to the extent that industry fixed effects variables capture cost of capital differences, we would not expect to observe a relation between compensation and abnormal earnings.

of the CEO's annual compensation (*%OPTIONS*) between control firms and Berkshire investees.

Governance as Embodied in Board Structure

In this section, we identify three testable principles that Buffett advocates related to composition of the Board of Directors.[22]

B7: Boards Ought to be (1) Small in Size and (2) Composed Mostly of Outside Directors

- "For the boards just discussed, I believe the directors ought to be relatively few in number—say, ten or less—and ought to come mostly from the outside." (Berkshire 1993, Letter to Shareholders)

We obtain data on board size (*BOARD SIZE*) and the proportion of directors that are outsiders (*%OUTSIDERS*) from the Directors dataset compiled by Investor Responsibility Research Center (IRRC). Based on Buffett's statements, we predict *BOARD SIZE* to be smaller and *%OUTSIDERS* to be larger for Berkshire investees.

Table 3 reports univariate tests of board composition attributes for Berkshire investees compared to control firms. Inconsistent with our prediction, Berkshire firms on average have 11.4 board members relative to 9.5 members for control firms (Panel A, t-statistic = 9.85). This difference disappears in the multivariate analysis reported in Panel B (the coefficient on *BOARD SIZE* is −0.018, Z-statistic = 0.61).[23] While the percentage of outsiders on Berkshire firm boards (67.4 percent, Panel A) was larger as predicted compared to control firms (64.3 percent, t-statistic = 2.61), this difference reverses in our multivariate analysis with the coefficient on *%OUTSIDERS* in Panel B becoming −1.442 (Z-statistic = −3.06), suggesting that Berkshire investees actually have fewer outsiders on their boards after including other board structure and control variables.

B8: Directors Ought to Own More Stock

- "We now have eleven directors and each of them, combined with members of their families, owns more than $4 million of Berkshire stock. In addition, director fees are nominal. Thus, the upside from Berkshire for all eleven is proportionately the same as the upside for any Berkshire shareholder. And it always will be. The bottom line for our directors: You win, they win big; you lose, they lose big. Our approach might be called owner-capitalism. We know of no better way to engender true independence." (Berkshire Hathaway 2003, Annual Report)

We rely on the IRRC Directors database to compute the proportion of stock owned by directors (*%DIRECTOR_OWN*). Based on Buffett's public statements, we expect *%DIRECTOR_OWN* to be higher for Berkshire investees compared to control firms. Inconsistent with Buffett's statements, Table 3, Panel A reports that the proportion of stock owned by Berkshire firm board members, *%DIRECTOR_OWN,* (6.4 percent) was smaller than

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[22] Because data for the following are unavailable, we do not test whether Berkshire investees' (1) boards are more likely to hold executive sessions with independent directors, (2) directors' compensation is less dependent on fees, (3) directors exhibit more coordinated institutional activism in an effort to improve corporate governance, or (4) boards pick CEOs who will perform capably in the presence of weak governance.

[23] Notably, Table 6, Panel B shows that the board size of Berkshire investees becomes considerably smaller subsequent to Berkshire's investment in the firm.

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TABLE 3

Board Composition of Berkshire Hathaway Investees

Panel A: Univariate Data on Board Composition of Berkshire Investees

Dependent Variables	Pred. Sign	Mean Berkshire Firms	Mean Control Sample	t-statistic for Difference	n Berkshire Sample	n Control Sample
BOARD SIZE (B7)	−	11.442	9.519	9.85	231	16,347
%OUTSIDERS (B7)	+	0.674	0.643	2.61***	231	16,347
%DIRECTOR_OWN (B8)	+	0.064	0.068	−0.27	231	16,347
%FEMALE (B9)	−	0.131	0.088	7.13	224	15,001
%ETHNIC (B9)	−	0.085	0.036	10.48	231	16,347

Panel B: Multivariate Analysis of all the Board Composition Practices of Berkshire Investees: *BERK* = *f*(Intercept, Governance Principles, Control Variables)

Independent Variables	Pred. Sign	Coefficient	Z-statistic
Excess Compensation (B1)	−	−0.067	−1.25
BOARD SIZE (B7)	−	−0.018	−0.61
%OUTSIDERS (B7)	+	−1.442	−3.06
%DIRECTOR_OWN (B8)	+	0.626	2.08**
%FEMALE (B9)	−	1.311	1.43
%ETHNIC (B9)	−	1.816	2.08

n = 110,644

*, **, *** Represent statistical significance at 10 percent, 5 percent, and 1 percent, respectively, based on one-tailed p-values for variables with directional predictions and two-tailed otherwise.

Panel A compares the mean levels for various proxies for the composition of the board of directors for Berkshire investments compared to a control sample. Robust standard errors clustered at the firm level have been used to compute test statistics in Panel B. The number of observations underlying these analyses varies depending on the availability of data.

Panel B presents logistic regression of an indicator variable of treatment and control firms on various proxies for Buffett's governance principles. Because data are not available across time for all variables, we introduce indicator variables that capture missing observations using the zero order regression approach suggested in Greene (1993). Additional controls in the regression include book-to-market, standard deviation of returns, size, leverage, and ROA, but are not reported. The coefficients on the indicator variables, intercept, and control variables are suppressed for convenience.

Variable Definitions:
BOARD SIZE = number of members on the board;
%OUTSIDERS = the proportion of directors that are outsiders;
*%DIRECTOR*S_*OWN* = the proportion of the firm's equity owned by the firm's directors;
%FEMALE and *%ETHNIC* = the percentage of females and ethnic minorities of non-Caucasian descent, respectively, on the board. All board data are obtained from the Directors data set compiled by IRRC (Investor Responsibility Research Center); and
BERK = 1 if Berkshire holds an investment in the firm during a year.

for control firms (6.8 percent), but the difference was statistically insignificant (t-statistic = −0.27). However, multivariate comparisons suggest that directors at Berkshire investees do hold more stock after including other board structure and control variables (Panel B, Z-statistic = 2.08).

B9: Firms' Directors Ought to be Chosen for Their Business Savvy, Their Interest, and Owner-Orientation and Not Necessarily for Adding Diversity or Prominence to a Board

- "Outstanding CEOs do not need a lot of coaching from owners, although they can benefit from having a similarly outstanding board. Directors therefore must be chosen for their business savvy, their interest, and their owner-orientation. According to Buffett, one of the greatest problems among boards in corporate America is that members are selected for other reasons, such as adding diversity or prominence to a board." (Cunningham 2001, 4)

To proxy for diversity in board membership, we use the percentage of females (*%FEMALE*) and the proportion of ethnic minorities of non-Caucasian descent on the board (*%ETHNIC*). Both variables are obtained from the IRRC Directors database. Given Buffett's cautionary statements about making politically correct board appointments, we predict both variables to be lower for Berkshire investees. Prominence of board membership is costly to obtain and, hence, we do not pursue this avenue.

In Table 3, Panel A Berkshire investees have more (not less) diversity in terms of female board members (13.1 percent) and ethnic members (8.5 percent) when compared to control firms (8.8 percent and 3.6 percent, respectively). Multivariate tests in Panel B of Table 3 suggest a similar relation.

Summary of Findings on Compensation and Governance Principles

While, consistent with Buffett's statements, Berkshire investees pay less excess compensation and reward higher pay-for-performance, four of his nuanced compensation principles do not appear to be emphasized at Berkshire investees relative to control firms. Also, most of Buffett's statements on board composition that we are able to test are not supported. Thus, despite Buffett's commentary about what constitutes good compensation and governance practices, we find only modest evidence that these practices are more common at Berkshire investees compared to control firms.

VI. EMPIRICAL TESTS—INVESTING PRINCIPLES

In this section we examine Buffett's public statements about his investment philosophy. We categorize his principles into two broad categories. First, we focus on the specific financial and economic characteristics that Buffett considers important for an investment decision. Second, we consider the timing of the investment decision.[24]

In comparing Berkshire investees' investment practices to other firms, we acknowledge that our control firms may be emulating Buffett's successful strategy. To the extent that is the case, it reduces the power of our tests and potentially distorts related inferences.[25] To let the reader decide, we present (1) univariate results in Panel A of Table 4 and (2) multivariate results in Panel B for which we include all the investing practices that we can test along with industry and year indicator variables.[26]

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[24] Two limitations of the study are pertinent here. First, Berkshire engages in several non-public investments that we do not evaluate (Zeckhauser 2006). Second, during the financial crisis Buffett received attractive deals on private investments that we do not consider (Strasser 2011).

[25] We believe it is far less likely that other firms are emulating Berkshire investees' accounting and governance practices.

[26] Note that we have not controlled for the usual firm characteristics such as size, leverage, market-to-book, standard deviation of returns, and ROA. The investing propositions (C1–C11) listed in this section tautologically refer in one way or another to these standard control variables. For instance, Buffett prefers (1) less volatile businesses (C1), implying lower standard deviation of returns; (2) businesses with long-term competitive advantage (C3) implying higher ROA; (3) low leverage (C5); and (4) value firms, implying lower market-to-book ratios.

TABLE 4

Evidence on Investing Principles of Berkshire Hathaway Investees

Panel A: Univariate Data on Investing Principles of Berkshire Investees

Variables	Pred. Sign for Diff.	Mean Berkshire Firms	Mean Control Sample	t-statistic for Difference in Means	n Berkshire Sample	n Control Sample
Investing Principles						
VOL_OWNER_RET (C1)	−	0.118	0.329	−5.54***	486	117,952
OWNER_RET (C2)	+	0.280	0.037	14.05***	506	138,524
ROE (C2)	+	0.175	0.008	13.13***	597	138,755
EVA (C3)	+	0.039	−0.069	10.81***	593	127,119
RUN-SALES (yrs.) (C3)	+	3.056	2.711	5.22***	445	80,477
RUN-OWNERS RETURN (yrs.) (C3)	+	3.092	3.036	1.19	445	80,477
RUN-OIBD (yrs.) (C3)	+	3.034	2.794	4.36***	445	80,477
RUN-IBEX (yrs.) (C3)	+	2.966	2.819	2.89***	445	80,477
PCTCOMP (C3)	−	0.405	0.634	−4.94***	120	26,770
OWNER_RET_TANGIBLE (C4)	+	0.299	0.067	11.65***	496	124,422
MLEV (C5)	−	0.258	0.261	−0.38	609	155,164
PENS_LIAB (C7)	−	0.109	0.104	0.54	287	39,180
OPEB (C7)	−	0.020	0.029	−2.94***	57	3,087
SPLIT# (C8)	−	0.564	0.521	0.94	374	85,146
DIVPAY (C9)	+	0.919	0.432	43.32***	602	139,986
Intrinsic Value						
|V/P − 1| (C10)	−	0.478	0.757	−2.59***	474	97,652
GOOD SEO% (C11)	+	0.333	0.797	−1.68	12	5,467
V/SEOPRICE (C11)	+	1.255	0.714	2.95***	12	5,467
GOOD ACQ% (C11)	+	0.867	0.789	0.73	15	3,829
V/P before ACQ (C11)	+	0.693	0.681	0.08	15	3,829

Panel B: Multivariate Analysis of the Investing Principles of Berkshire Investments: $BERK = f(\text{Intercept, Investing Principles})$

Independent Variables	Pred. Sign	Coefficient	Z-statistic
VOL_OWNER_RET (C1)	−	−1.251	−3.85***
OWNER_RET (C2)	+	2.572	12.03***
RUN-SALES (C3)	+	0.407	2.63***
PCTCOMP (C3)	−	−0.813	−2.87***
MLEV (C5)	−	−1.698	−6.76***
PENS_LIAB (C7)	−	−0.915	−1.65**
OPEB (C7)	−	−10.190	−1.68**
SPLIT# (C8)	−	−0.158	−2.10**
|V/P − 1| (C10)	−	0.099	1.19

n = 110,644

*, **, *** Represents statistical significance at 10 percent, 5 percent, and 1 percent, respectively, based on one-tailed p-values for variables with directional predictions and two-tailed otherwise.
Panel A compares the mean levels for various proxies for the investing principles underlying Berkshire investments compared to a control sample. Robust standard errors clustered at the firm level have been used to compute test statistics in Panel B. The number of observations underlying these analyses varies depending on the availability of data.

TABLE 4 (continued)

Panel B presents logistic regression of an indicator variable of treatment and control firms on various proxies for Buffett's investing principles. Because data are not available across time for all variables, we introduce indicator variables that capture missing observations using the zero order regression approach suggested in Greene (1993). The coefficients on the indicator variables are suppressed for convenience. We do not include control variables book-to-market, standard deviation of returns, size, leverage, and ROA because they are correlated with many of the investing principles included in the regression. (n = 110,644).

Variable Definitions:
VOL_OWNER_RET = the volatility in "owners' earnings" over the past five years;
EVA = computed as per Biddle et al. (1997);
RUN = measures the consecutive number of years for which a firm has achieved an annual growth rate above the median annual growth rate relative to firms in the same two-digit SIC code;
OIBD = operating income before interest and depreciation;
IBEX = income before extraordinary items;
OWNER_RET_TANGIBLE = *OWNER_RET* for tangible book value of equity computed as book value of equity minus intangible assets such as goodwill, patents, and trademarks;
PCTCOMP = a measure of competition as in Li et al. (2013);
MLEV = the ratio of book value of short-term debt and long-term debt to market value of assets;
OPEB and *PENS_LIAB* (pension liabilities) = obtained from Compustat and scaled by total assets;
SPLIT# = from the CRSP database and coded as the number of times a firm has split its stock in the previous five years;
DIVPAY = an indicator variable for a dividend-paying firm;
V/P = the intrinsic value of stock price where *V* is computed as described in Appendix A;
V/SEO PRICE = the ratio of intrinsic value of share computed at the beginning of the fiscal year scaled by the SEO offer price;
GOOD SEO% = the proportion of cases where the firm issued equity at a price lower than the intrinsic value per share;
V/P before ACQ = the intrinsic value of the firm by stock price of the firm at the beginning of the fiscal year; and
BERK = 1 if Berkshire holds an investment in the firm during a year.

Financial and Economic Characteristics

C1: Berkshire Investments Provide Consistent Profits from Stable Uncomplicated Businesses

- "Severe change and exceptional returns usually don't mix." (Berkshire Hathaway 1987, Letter to Shareholders)
- "Charlie and I have not learned how to solve difficult problems. What we have learned is to avoid them. To the extent that we have been successful, it is because we concentrated in identifying one-foot hurdles that we could step over rather than because we have acquired any ability to clear seven-footers." (Berkshire Hathaway 1989, Letter to Shareholders)

We use the volatility in "owners' earnings" over the past five years (*VOL_OWNER_RET*) to proxy for the stability of the business (C1). Consistent with Buffett's definition, we compute owner's earnings as reported earnings plus depreciation, depletion, and amortization minus the average annual amount of capital expenditures over three past years.

Consistent with Buffett's desire to hold firms that have a stable business (C1), the volatility of owners' return computed over a five-year period (*VOL_OWNER_RET*) is lower for Buffett's firms in Panel A of Table 4 (t-statistic = −5.54) and in the multivariate regression in Panel B (Z-statistic = −3.85).

C2: Berkshire Firms are Characterized by Higher "Owner Earnings" Relative to Comparable Companies

- "'Owner earnings' is a measure Buffett uses for firm valuation, rather than GAAP figures. Owner earnings = (reported earnings) + (depreciation, depletion, and amortization) − (average annual amount of capitalized expenditures for plant and equipment, etc. that the business needs to fully maintain its long-term competitive position and unit volume)." (Cunningham 2001, Chap. 5)

- "Thus our first lesson: businesses logically are worth far more than net tangible assets when they can be expected to produce earnings on such assets considerably in excess of market rates of return. The capitalized value of this excess return is economic goodwill." (Cunningham 2001, Chap. 5)

We would expect relatively stable businesses to deliver consistent operating profits over time (C2). Hence, we compute the annual growth and volatility in both return on equity (*ROE*) and owner earnings scaled by book value of equity (*OWNER_RET*). Consistent with C2, *OWNER_RET* and *ROE* in Table 4, Panel A are much higher for Berkshire firms than for the average control firm and the coefficient on *OWNER_RET* in Panel B is positive and strongly significant (Z-statistic = 12.03). We do not include *ROE* in Panel B to avoid collinearity problems with *OWNER_RET*.

C3: Berkshire Prefers Investments with Enduring Long-Term Competitive Advantages

- "We like stocks that generate high returns on invested capital where there is a strong likelihood that it will continue to do so." (Berkshire Hathaway 1995, Annual Report)
- "Look for the durability of a franchise. The most important thing to me is figuring out how big a moat there is around the business. What I love, of course, is a big castle and a big moat with piranhas and crocodiles." (Kilpatrick 1994)[27]

To operationalize Buffett's desire for investing in firms with a long-term competitive advantage (C3), we compute (1) residual income to capture the economic value-added construct (*EVA*); (2) multiple variables that capture superior firm performance; and (3) *PCTCOMP,* which is a proxy for competition facing a firm derived by linguistic analysis of firm's regulatory filings (Li, Lundholm, and Minnis 2013), where higher *PCTCOMP* implies greater competition. Positive *EVA* represents a firm's ability to earn economic profits, returns in excess of the firm's cost of capital (Biddle, Bowen, and Wallace 1997). Positive *EVA* is difficult to sustain in a competitive economy and suggests an enduring advantage. We measure *EVA* following Biddle et al. (1997) as net operating profit after tax net of a charge for the cost of all debt and equity employed. For the cost of debt, we use interest expense scaled by average debt, and for cost of equity, we use the market model expected return with beta estimated over a five-year estimation period. For the performance tests, we follow Brealey (1983) and Chan, Karceski, and Lakonishok (2003) and define consistency as achieving an annual growth rate above the median annual growth rate for a consecutive number of years relative to firms in the same two-digit SIC code, which we label *RUN*. We ensure that we have at least five firms in a two-digit SIC code for this test. We report run statistics for four variables: (1) *RUN-SALES*, (2) *RUN-OWNERS RETURN*, (3) operating income before interest and depreciation (*RUN-OIBD*), and (4) income before extraordinary items (*RUN-IBEX*). At the end of each sample period, we calculate how many firms achieve runs over five years in the past. The median growth rate is computed for all growth rate observations available for that year and, hence, is subject to survivorship bias. Consistent with C3, *EVA* and three of the four performance run variables in Panel A of Table 4 (*RUN-SALES, RUN-OIBD,* and *RUN-IBEX*) are significantly higher for Berkshire investees relative to the control sample. *PCTCOMP* is also lower for Berkshire investees in Panel A, suggesting that these firms face lower competition. In the multivariate

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[27] Buffett emphasizes the quality of investee's management and the concept of a moat or the "monopolistic" nature of the investee, but the quality of management and the extent of the "moat" are difficult to measure. We use the level of owner's return, *EVA,* operating earnings, runs in sales and operating earnings, and the volatility of owner's return to measure the quality of management and the "monopolistic" nature of the company.

analysis in Panel B, the coefficient on (1) *RUN-SALES* is positive and significant (Z-statistic = 2.63) and (2) *PCTCOMP* is negative and significant, as expected (Z-statistic = −2.87). We do not include the other performance run variables in the multivariate regression to avoid multi-collinearity.

C4: Berkshire Favors Companies that, ceteris paribus, Rely Less on Tangible Assets to Produce Earnings

- "Ultimately, business experience, direct and vicarious, produced my present strong preference for businesses that possess large amounts of enduring goodwill and that utilize a minimum of tangible assets." (Cunningham 2001, Chap. 5)

To assess whether Berkshire investees rely on fewer net tangible assets to produce earnings (C4), we compute a version of *OWNER_RET* for which the scale variable is tangible book of value of equity, computed as book value of equity minus intangible assets such as goodwill, patents, and trademarks (*OWNER_RET_TANGIBLE*). To deal with outliers in observations related to returns, we winsorize return observations at −100 percent and 100 percent. We predict *OWNER_RET_TANGIBLE* will be higher for Berkshire investees compared to control firms. Consistent with C4, owners' return on tangible assets is much higher for Berkshire firms than for the average control firm (Table 4, Panel A). We do not include *OWNER_RET_TAN-GIBLE* in the multivariate regression in Panel B to avoid collinearity concerns with *OWNER_RET*.

C5: Berkshire Investments are Characterized by Relatively Low Leverage

- "The primary test of managerial economic performance is the achievement of a high earnings rate on equity capital employed (without undue leverage, accounting gimmickry, etc.) and not the achievement of consistent gains in earnings per share." (Berkshire Hathaway 1979, Annual Report)

We measure leverage as the ratio of book value of short-term debt and long-term debt to market value of assets, defined as the market value of equity plus the book value of debt (*MLEV*). Consistent with C5, Berkshire firms have lower financial leverage (*MLEV*) than control firms in both the univariate and multivariate analyses (Table 4, Panels A and B).

C6: Berkshire Investments are Characterized by Consistently High Return on Equity Capital Employed after Controlling for Undue Leverage and Accounting Gimmickry

To address C6, we regress owners' return on an intercept, *BERK*, leverage, and accrual quality, as defined earlier. We expect the coefficient on *BERK* to be positive. Consistent with C6, after controlling for leverage and accrual quality, the differential in owner's return is still high at 9.05 percent (t-statistic on *BERK* is 4.58, untabulated). Similar big advantages in *ROE* and owner's return on intangible assets are seen in Berkshire firms.

C7: Berkshire Avoids Investing in Firms with High OPEB and Pension Liabilities

- "In making acquisitions, Charlie and I have tended to avoid companies with significant post-retirement liabilities. As a result, Berkshire's present liability and future costs for post-retirement health benefits—though we now have 22,000 employees—are inconsequential." (Cunningham 2001, Chap. 5)

We identify a firm's pension liabilities (*PENS_LIAB*) and other post-employment benefits liability (*OPEB*) from Compustat and scale such liabilities by total assets. Consistent with Buffett's

statements, Berkshire investees have smaller pension and *OPEB* obligations when compared to the average control firm. The coefficients on *PENS_LIAB* and *OPEB* are negative and statistically significant in Table 4, Panel B.

C8: Berkshire Firms are Characterized by Few Stock Splits

- "We often are asked why Berkshire does not split its stock. The assumption behind this question usually appears to be that a split would be a pro-shareholder action. We disagree." (Berkshire 1983, Letter to Shareholders)[28]

We use the CRSP database to identify firms that have split their stock and count the number of times a firm has split its stock in the previous five years (*SPLIT#*) for both Berkshire investees and the control group. Consistent with Buffett's statements, we find that Berkshire investees have fewer stock splits when compared to the average control firm in the multivariate analysis (Z-statistic = −2.10, Table 4, Panel B).

C9: Berkshire Likes Its Investees to Pay Dividends

- "A number of Berkshire shareholders—including some of my good friends—would like Berkshire to pay a cash dividend. It puzzles them that we relish the dividends we receive from most of the stocks that Berkshire owns, but pay out nothing ourselves." (Berkshire Hathaway 2012, Annual Report)

Berkshire has paid dividends only once since Buffett took control because he prefers to reinvest in the company.[29] At the same time, Buffett prefers that his investees pay dividends so that he has more cash to make additional investments. Thus, we expect Berkshire investees to be dividend-paying companies.

To evaluate this practice, we code an indicator variable, *DIVPAY,* equal to 1 if the firm pays a dividend during the fiscal year, and 0 otherwise. As predicted, the univariate data reveal that 91.9 percent of Berkshire investees pay dividends relative to only 43.2 percent of the control firms and this difference is highly significant (t-statistic = 43.32, Table 4, Panel A).[30]

Investment Timing

C10: Berkshire Firms Prefer Stock Prices to Trade Around Their Intrinsic Value

- "Unlike many CEOs, who desire their company's stock to trade at the highest possible prices in the market, Buffett prefers Berkshire stock to trade at or around its intrinsic value—neither materially higher nor lower. Such linkage means that business results during one period will benefit the people who owned the company during that period. Maintaining the linkage

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[28] Berkshire has steadfastly not split its stock, which makes each share by far the most expensive in the U.S. In contrast, most U.S. firms price their stocks around $35, a norm that has lasted for three-quarters of a century (Weld, Michaely, Thaler, and Benartzi 2009). While Buffett clearly has a strong belief against stock splits, it may not be sufficient to overcome an economy-wide norm. In particular, Berkshire split its Class B shares 50-to-1 in 2010 while refusing to split Class A shares that trade over $100,000.

[29] In his 2012 letter to investors, Buffett remarked that (1) shareholders will benefit more from Berkshire's retention and reinvestment of the funds than they would if the company paid them out; (2) dividend payouts would impose a uniform payout policy on all shareholders, although some might prefer a smaller or a higher payout; and (3) dividends are taxed when received, whereas investors pay taxes on capital gains only when they sell.

[30] We are unable to include this variable in the multivariate regression presented in Panel B of Table 4 because the logit estimates become unreliable due to quasi-complete separation. Quasi-complete separation occurs when a predictor variable or a combination of predictor variables perfectly predicts the outcome variable.

requires a shareholder group with a collective long-term, business-oriented investment philosophy, rather than a short-term, market-oriented strategy." (Cunningham 2007, 11)

We use the intrinsic value-to-stock-price ratio (V/P) to assess whether Berkshire firms trade near their intrinsic values. At the end of every fiscal year, we compute the absolute value of the difference between V/P and 1 for each year for each firm ($|V/P - 1|$).[31] We expect Berkshire firms to have smaller deviations from 1 than control firms. Consistent with Berkshire firms trading closer to their intrinsic value (C10), Berkshire investees have smaller $|V/P - 1|$ than control firms (Table 4, Panel A, t-statistic $= -2.59$) although the coefficient on $|V/P - 1|$ in the multivariate regression reported in Panel B is not significant at conventional levels (Z-statistic $= 1.19$, p-value $= 0.117$ one tailed).

C11: Berkshire Firms Issue Equity when the Intrinsic Value per Share is at Least as High as the Offer Price per Share

- Berkshire firms are involved in stock-for-stock mergers only when its stock price is greater than or equal to its intrinsic value.
- Berkshire prefers undervalued firms to repurchase shares rather than acquire companies.
- "If the worst thing to do with undervalued stock is to use it to pay for an acquisition, the best thing is to buy it back. Obviously, if a stock is selling in the market at half its intrinsic value, the company can buy $2 in value by paying $1 in cash. There would rarely be better uses of capital than that. Yet many more undervalued shares are paid to effect value-destroying stock acquisitions than are repurchased in value enhancing stock buy-backs." (Cunningham 2007, 14)

We evaluate whether the firm issues stock when its intrinsic value is above the stock price at which the firm trades before a seasoned-equity-offering (SEO) announcement (C11). We obtain all secondary offering data from the SDC database during the period 1980–2006. For each fiscal year we compute the ratio of intrinsic value per share computed at the beginning of the fiscal year to the SEO offer price ($V/SEO PRICE$) and report (1) the proportion of cases where the firm issued equity at a price lower than the intrinsic value per share ($GOOD SEO\%$), and (2) the average of the ratio of $V/SEO PRICE$. We expect $GOOD SEO\%$ and $V/SEO PRICE$ to be greater for Berkshire investees.

Inconsistent with Buffett's statements, the proportion of cases where the SEO offer price is larger than the intrinsic value computed at the beginning of the fiscal year ($GOOD SEO\%$) is smaller for Berkshire firms in Table 4, Panel A (t-statistic $= -1.68$). However, note that Berkshire firms had only 12 SEOs over the entire sample period. Consistent with predictions, $V/SEOPRICE$ is higher for Berkshire investees (t-statistic $= 2.95$).

We also attempt to identify whether Berkshire firms are more likely to acquire targets at a time when its stock price exceeds the intrinsic value of the share as of the beginning of the fiscal year. We select acquisitions from the SDC U.S. Mergers and Acquisitions Database with announcement dates between 1980 and 2006. We scale the intrinsic value of the firm by the stock price of the firm at the beginning of the fiscal year (V/P before ACQ) and report (1) the proportion of cases where the firm issued equity at a price greater than the intrinsic value per share ($GOOD ACQ\%$); and (2) the average of the ratio of (V/P). We predict that $GOOD ACQ\%$ and V/P before ACQ will be higher for Berkshire investees.

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[31] We choose the end of the fiscal year to determine the ratio because we believe that any stock price effects due to time clustering and macro-economic factors would be differenced away because such forces should affect both the treatment and control samples equally.

Inconsistent with Buffett's statements (C11), univariate results in Panel A of Table 4 suggest that Berkshire firms have almost the same proportion of *GOOD ACQ* and *V/P* ratio before acquisition as compared to the control firm. Small numbers of acquisitions preclude us from including these variables in the multivariate regression in Panel B.

Summary of Findings on Investing Principles

In summary, relying on the multivariate tests in Table 4, Panel B we find broad evidence that Berkshire investees follow most of the investing principles that Buffett prefers in his target investment candidates. Thus, Buffett appears to "walk the talk" with respect to his investment principles.

Combined Analysis

One of the limitations of the preceding approach is that we categorize various principles under broad themes such as accounting, compensation, governance, and investing, without considering interactions among these themes. However, Buffett's principles are unlikely to be independent ideas—some might be substitutes and others complements. It is difficult to know how to rank-order these ideas, especially because the number of public companies in which Berkshire invests is not large. To address this issue, we conduct a multivariate logistical regression of Buffett's decision to invest in a stock on proxies for all principles that we can measure. The regression relies on the underlying data to assign appropriate weights to individual principles instead of a researcher-imposed arrangement to rank-order the importance of the discussed attributes. Broadly speaking, it represents a combined analysis of the Panel B versions of the multivariate regressions reported in Tables 1, 3, and 4.

In estimating the combined regression specification, we do not include the control variables because of collinearity issues. As can be seen from the results reported in Table 5, the inferences are in general not materially different from the theme-specific tests discussed in the prior sections. The important differences are that coefficients on *MEET_BEAT, OWNER_RET,* and *RUN-SALES* lose significance. As concluded earlier, this combined analysis suggests that most of Buffett's investing principles are reflected in the actions of Berkshire investees. In contrast, only some of the accounting and governance principles he favors are reflected in Berkshire investees.

VII. EMPIRICAL TESTS—SELECTION OR INFLUENCE?

This section examines whether Berkshire selects stocks with the business practices Buffett prefers or whether Buffett, either alone or with his trusted Berkshire colleagues, influences investees to "improve" their accounting and governance characteristics. We conduct two sets of tests. First, we evaluate (1) whether Buffett's favored principles are found in his future investees *before* Berkshire invested in these companies, suggesting a selection story; and (2) whether investees changed their practices to converge with Buffett's favored principles *after* Berkshire invested, implying subsequent implicit or explicit influence. To give the influence hypothesis the best chance of success, at the cost of sample size, we restrict the sample to firms for which (1) Berkshire has at least a 5 percent equity ownership; and (2) at least one year of data are available before and after the ownership. Note that we do not need a control sample for the influence tests as we are only interested in time-series changes in the behavior of Berkshire investees.

The results in Table 6 generally favor the selection hypothesis. Column (3) of Table 6, Panel A reports that, during the pre-investment period, Berkshire investees (i) were more timely reporting both good and bad news (*CSCORE* and *GSCORE*), (ii) had more conservative earnings (*BCOEFF*), (iii) less frequently reported EBITDA (*EBITDA_FOCUS*), and (iv) had a lower

TABLE 5

Combined Evidence on Buffett's Principles

Independent Variables	Pred. Sign	Coefficient	Z-statistic
Accounting			
CSCORE (A1)	+	3.109	14.11***
GSCORE (A1)	+	9.001	6.40***
DD (A1)	−	−14.894	−5.36***
EBITDA_FOCUS (A2)	−	−0.001	−0.10
GUIDANCE (A3)	−	0.002	0.00
MEET_BEAT (A4)	−	0.116	0.40
EXPENSER (A5)	+	0.851	2.77***
PENSENS (A6)	−	0.021	0.00
FOG INDEX (A7)	−	0.023	1.35
Governance			
Excess Compensation (B1)	−	−0.105	−1.94**
BOARD SIZE (B7)	−	0.019	1.59
%OUTSIDERS (B7)	+	−1.044	−2.14
%DIRECTOR_OWN (B8)	+	0.696	2.12**
%FEMALE (B9)	−	2.323	2.49
%ETHNIC (B9)	−	3.522	3.95
Investing			
VOL_OWNER_RET (C1)	+	1.830	8.01***
OWNER_RET (C2)	−	−0.200	−1.09
RUN-SALES (C3)	+	0.152	0.94
PCTCOMP (C3)	−	−0.414	−1.55*
MLEV (C5)	−	−0.646	−2.17**
PENS_LIAB (C7)	−	−1.247	−1.90**
OPEB (C7)	−	−13.975	−2.11**
SPLIT# (C8)	−	−0.317	−3.71***
$|V/P - 1|$ (C10)	−	0.282	3.14

n = 110,644

*, **, *** Represents statistical significance at 10 percent, 5 percent, and 1 percent, respectively, based on one-tailed p-values for variables with directional predictions and two-tailed otherwise.

This table presents logistic regression of an indicator variable of treatment and control firms on various proxies for Buffett's principles on accounting, governance, and investing. Because data are not available across time for all variables, we introduce indicator variables that capture missing observations using the zero order regression approach suggested in Greene (1993). The coefficients on the indicator variables and intercept are suppressed for convenience. We do not include control variables book-to-market, standard deviation of returns, size, leverage, and ROA because they are correlated with many of the investing principles included in the regression. The intercept and coefficients on the indicator variables are suppressed for convenience.

propensity to meet or beat earnings forecasts (*MEET_BEAT*). Column (5) of Table 6, Panel A reports weak evidence consistent with the influence hypothesis in the form of (i) increased conservatism (t-statistic on *BCOEFF* = 1.68, p-value = 0.048), (ii) less mention of EBITDA (t-statistic = −1.27, p-value = 0.103) and (3) fewer small meet/beats of earnings targets (t-statistic = −1.33, p-value = 0.093).

Turning to board composition in Table 6, Panel B, none of the board characteristics in the pre-investment period reflected Buffett's stated preferences for Berkshire investees as compared

TABLE 6

Selection or Influence at Berkshire Hathaway Investees

Panel A: Accounting Principles

Dependent Variables (1)	Pred. Sign (2)	Coefficient on *BERK* (3)	t-statistic (4)	Coefficient on *POST* (5)	t-statistic (6)
CSCORE (A1)	+	0.198	11.55***	0.013	0.51
GSCORE (A1)	+	0.016	10.53***	−0.004	−1.58
BCOEFF (A1)	+	0.125	3.41***	0.192	1.68*
DD (A1)	−	0.001	0.56	0.010	2.54
EBITDA_FOCUS (A2)	−	−1.156	−1.54*	−2.593	−1.27
GUIDANCE (A3)	−	0.690	3.22	0.022	0.05
MEET_BEAT (A4)	−	−0.044	−2.29**	−0.043	−0.97
SMALL_BEAT (A4)	−	0.016	0.71	−0.041	−1.33*
EXPENSER (A5)	+	−0.005	−0.13	−0.168	−4.61
PENSENS (A6)	−	0.005	0.22	0.075	0.96
FOG INDEX (A7)	−	1.219	1.95	1.557	2.10

Panel B: Governance Principles

Dependent Variables (1)	Pred. Sign (2)	Coefficient on *BERK* (3)	t-statistic (4)	Coefficient on *POST* (5)	t-statistic (6)
BOARD SIZE (B7)	−	0.716	2.42	−1.089	−2.60***
%OUTSIDERS (B7)	+	−0.007	−0.23	−0.019	−0.64
%DIRECTOR_OWN (B8)	+	0.010	0.67	0.006	0.39
%FEMALE (B9)	−	0.002	0.25	−0.004	−0.40
%ETHNIC (B9)	−	0.013	1.64	0.000	0.02

Panel C: Investing Principles

Dependent Variables (1)	Pred. Sign (2)	Coefficient on *BERK* (3)	t-statistic (4)	Coefficient on *POST* (5)	t-statistic (6)
VOL_OWNER_RET (C1)	−	−0.487	−2.63***	−0.003	−0.09
OWNER_RET (C2)	+	0.239	9.51***	−0.053	−1.17
ROE (C2)	+	0.165	11.04***	−0.004	−0.17
EVA (C3)	+	0.098	7.38***	−0.003	−0.17
PCTCOMP (C3)	−	−0.087	−1.50*	0.012	0.24
OWNER_RET_TANGIBLE (C4)	+	0.239	6.22***	0.033	0.43
MLEV (C5)	−	−0.027	−1.35*	−0.090	−3.00***
PENS_LIAB (C7)	−	0.011	0.58	−0.029	−0.76
SPLIT# (C8)	−	0.198	2.30	−0.105	−0.89
DIVPAY (C9)	+	0.361	8.53***	0.057	1.94**
|V/P−1| (C10)	−	−0.433	−1.31*	−0.063	−0.54

*, **, *** Represents statistical significance at 10 percent, 5 percent, and 1 percent, respectively, based on one-tailed p-values for variables with directional predictions and two-tailed otherwise.

For column (3) Dependent variable = f(Intercept, *BERK,* industry and year fixed effects, Control variables) estimated for only the pre-investment period.

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TABLE 6 (continued)

For column (5) Dependent variable = *f*(Intercept, *POST,* industry and year fixed effects) estimated only for Berkshire investees.

This table presents multivariate analysis of (i) the accounting, governance, and investing practices of Berkshire Hathaway Investees during the pre-investment period compared to control firms and (ii) changes in these practices from the pre- to the post-investment period for Berkshire Investees. That is, for the selection tests we analyze the differences between treatment and control firms in the pre-investment period. For the influence tests, we restrict the sample to Berkshire investees and examine differences between the pre- and post-investment periods by introducing a *POST* indicator variable that takes the value of 1 for periods after the initial investment by Buffett. We restrict the sample to firms where (i) Berkshire has a 5 percent or more equity ownership; and (ii) Berkshire has held the stock for at least one year during the sample period. Intercept, industry and year fixed effects are included in all regressions, but are not reported.

to control firms. In contrast, *BOARD SIZE* was larger in the pre-investment period (t-statistic = 2.42). However, consistent with Buffett's statements, board size falls after Berkshire buys stock in a company; the coefficient on *POST* in the *BOARD SIZE* regression is −1.089 (t-statistic = −2.60).

Column (3) of Table 6, Panel C indicates that essentially all of the investing principles were favorable for future Berkshire investees in the pre-investment period, consistent with these investees attracting Berkshire's attention. Of the nine firm characteristics Buffett prefers in his target investment candidates that we are able to measure (C1–C10, except C6), we find evidence that future Berkshire investees were better than control firms in seven areas in the pre-investment period (C1–C5 and C9–C10). The only two exceptions are that future Berkshire investees and control firms exhibit no differences with respect to pension obligations (C7), whereas future Berkshire investees engaged in stock splits more often (C8). The only evidence of improvements in the post-investment period in Column (5) of Table 6, Panel C is (i) further reduction in financial leverage, *MLEV* (t-statistic = −3.00); and (ii) an increased number of dividends payouts, *DIVPAY* (t-statistic = 1.94).

In summary, although not mutually exclusive, the evidence in Table 6 is more consistent with the selection hypothesis than the influence hypothesis. These accounting and investment practices may have helped attract Berkshire's investment. In contrast, there is less evidence to suggest that Berkshire's involvement substantively changed investees' accounting, governance, and investing practices. This evidence is consistent with observations by Frazzini et al. (2013) that Buffett is not active, implicitly or explicitly, in influencing the practices of Berkshire investees.

VIII. CONCLUSIONS

This paper uses Warren Buffett's public statements to compile his views on "best practices" and examines whether his investment decisions through Berkshire Hathaway were consistent with his public commentary. In particular, we investigate whether investees of Berkshire Hathaway exhibited more transparent, conservative, high-quality accounting, better disclosure, stronger governance, and attractive characteristics to investors. We are among the first in the academic literature to provide evidence on Buffett's model of what constitutes a well-governed firm and a great stock pick.

We find considerable evidence that Buffett "walks the talk" with respect to his investment philosophy. In multivariate tests, Berkshire investees exhibited six out of seven characteristics that Buffett prefers (H1c: C1–C10, except C4, C6, and C9). With respect to accounting and disclosure policies, a more ambiguous picture emerges from our tests. Our *overall* tests suggest that Buffett cared about timely transparent high-quality earnings (A1) in selecting firms to invest

in, as all three proxies were significant as predicted. However, there was less support for the specific practices he advocates. In particular, Berkshire investees were similar to control firms in their mention of EBITDA and earnings guidance despite Buffett's strong distaste for both practices.

Further, only two out of six compensation practices (H1b: B1–B6) are consistent with Buffett's commentary; Berkshire investees are more likely than control firms to have (1) lower "excess" pay and (2) a stronger link between pay and performance. Even less consistent with "walking the talk" are board structure policies (H1b: B7–B9)—only the percentage of equity owned by directors was greater for Berkshire investees. The other three board principles that we can measure were not practiced by Berkshire investees. We acknowledge that our board structure metrics are arguably weaker proxies for high-quality governance than the corresponding, more direct measures in the accounting and investing categories.

Our findings on selection versus influence (H2) provide some support for the selection hypothesis, but indicate only modest evidence of investees changing their practices subsequent to Berkshire's initial investment. This suggests that Buffett either (1) picks stocks that already possess the attributes he advocates—rather than intervening to change his investees' practices after purchasing shares, or (2) is relatively passive in influencing his investees—more so than the tone and breadth of his public statements would suggest. We believe it is important to note that this apparent passive behavior is inconsistent with Buffett's commentary on the potential for large investors to improve corporate governance and the anecdotal reports of activism from other large funds such as TIAA-CREF, CalPERS, and Hermes. Our study takes an important step toward characterizing the behavior of an important influential investor and the business practices he advocates.

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APPENDIX A
Measurement of Variables

Measurement of GSCORE and CSCORE

In this section, we describe the measurement of our empirical proxies for reporting timeliness. Khan and Watts (2009) rewrite the standard Basu (1997) regression specification to allow coefficients to vary across firms and over time:

$$X_{i,t}/P_{i,t-1} = \beta_{1,t} + \beta_{2,t}D_{i,t} + \beta_{3,i,t}R_{i,t} + \beta_{4,i,t}D_{i,t}R_{i,t} + e_{i,t} \tag{E1}$$

where i and t are firm and time subscripts, respectively, X is earnings, P is market value of equity, R is returns (measuring news), D is an indicator variable equal to 1 when $R < 0$ and equal to 0 otherwise, and e is the residual. The firm-year good news timeliness measure is $\beta_{3,i,t}$. The measure of incremental timeliness for bad news relative to good news (i.e., asymmetric timeliness) or firm-year conservatism is $\beta_{4,i,t}$. To estimate the timeliness with which accounting reflects both good news and conservatism, Khan and Watts (2009) specify that both the timeliness of good news and the incremental timeliness of bad news are linear functions of time-varying firm-specific characteristics:

$$GSCORE(\beta_{3,i,t}) = \mu_{1,t} + \mu_{2,t}Size_{i,t} + \mu_{3,t}M/B_{i,t} + \mu_{4,t}Lev_{i,t} \tag{E2}$$

$$CSCORE(\beta_{4,i,t}) = \lambda_{1,t} + \lambda_{2,t}Size_{i,t} + \lambda_{3,t}M/B_{i,t} + \lambda_{4,t}Lev_{i,t} \tag{E3}$$

Empirical estimators of μ_i and λ_i, $i = 1$ to 4, are constant across firms, but vary over time. Substituting Equations (E2) and (E3) into regression Equation (E1), yields Equation (E4) below. *CSCORE* is the firm-year measure of conservatism, while *GSCORE* is the firm-year measure of good news timeliness. To compute the *CSCORE* and *GSCORE,* we first estimate the following empirical model in annual cross-sections to get coefficient estimates for μ_i and λ_i, where $i = 1$ to 4, from the following model:[32]

$$\begin{aligned} X_{it}/P_{it-1} = {} & \beta_1 + \beta_2 D_{it} + R_{it}(\mu_1 + \mu_2 Size_{it} + \mu_3 M/B_{it} + \mu_4 Lev_{it}) \\ & + D_{it}R_{it}(\lambda_1 + \lambda_2 Size_{it} + \lambda_3 M/B_{it} + \lambda_4 Lev_{it}) + e_{it} \end{aligned} \tag{E4}$$

where X is measured as net income before extraordinary items, P is market value of equity at the end of the prior fiscal year, R is annual returns obtained by cumulating monthly returns starting from the fourth month after the firm's fiscal year-end, *Size* is measured as natural logarithm of market value of equity, *M/B* is market value of equity divided by the book value of equity, and *Lev* is long-term debt and debt in current liabilities, deflated by market value of equity, all measured at the end of the year.

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[32] As in Khan and Watts (2009) we also consider an alternate measure for *CSCORE* and *GSCORE* after incorporating the main effects (i.e., *Size, M/B,* and *Lev*) in Equation (E4). Our inferences are unchanged.

Measurement of BCOEFF

BCOEFF is a measure of conditional conservatism as per Basu (1997):

$$X_{it}/P_{it-1} = \beta_{1t} + \beta_{2t}D_{it} + \beta_{3it}R_{it} + \beta_{4it}D_{it}R_{it} + e_{it} \tag{E5}$$

where D is an indicator variable equal to 1 when $R < 0$ and equal to 0 otherwise, and e is the residual. The firm-year conservatism is captured by β_{4it}. We estimate β_{4it} for the Berkshire firms and non-Berkshire firms separately by using interaction terms for each of the variables in Equation (E5). To control for the standard determinants of the earnings-return relation, we interact each of the independent variables with size, book-to-market, leverage, and proxy for risk (standard deviation of returns).

Measurement of DD

We adapt the model in Dechow and Dichev (2002) and supplement it with modifications proposed by Francis, LaFond, Olsson, and Schipper (2005), McNichols (2002), and Ball and Shivakumar (2006). Specifically, we estimate the following specification:

$$TCA_{it} = \varphi_0 + \varphi_1 CFO_{it-1} + \varphi_2 CFO_{it} + \varphi_3 CFO_{it+1} + \varphi_4 \Delta REV_{it} + \varphi_5 PPE_{it} + \varphi_6 DCF_{it} \\ + \varphi_7 DCF*CFO_{it} + v_{it} \tag{E6}$$

where all variables including the intercept are scaled by average total assets. *TCA* is total current accruals calculated as $\Delta CA - \Delta CL - \Delta Cash + \Delta STDEBT$, ΔCA is change in current assets, ΔCL is change in current liabilities, $\Delta Cash$ is change in cash, and $\Delta STDEBT$ is change in debt in current liabilities. *CFO* is cash flow from operations computed as $IBEX - TCA + DEPN$, where *IBEX* is net income before extra-ordinary items and *DEPN* is depreciation and amortization expense. For years subsequent to 1987, *CFO* is obtained from the cash flow statements reported under FAS 95 and *TCA* is computed as $IBEX - CFO + DEPN$. ΔREV is change in revenue. *PPE* is gross value of property, plant, and equipment. Subscripts i and t are firm and time subscripts, respectively. *DCF* is an indicator variable that takes the value of 1 when $CFO_t < 0$.

We estimate Equation (E6) for every firm-year in each two-digit SIC code that has at least 20 firms in year t.[33] For firms in the two-digit SIC codes without enough observations, we estimate Equation (E6) with observations in one-digit SIC codes. If there are not enough observations within a one-digit SIC code, then we use the entire sample to estimate the parameters. Under Equation (E6), higher accrual quality implies that accruals capture more of the variation in current, past, and future cash flows and, as a consequence, the firm-specific residual, v_{it}, forms the basis of the earnings quality proxy used in the study. Specifically, the earnings quality (DD_{it}) metric is defined as the standard deviation of firm i's residuals, calculated over years $t-4$ through t, i.e., $DD_{it} = \sigma(v_{it-4,t})$.

Measurement of Intrinsic Value

Following Frankel and Lee (1998), we compute intrinsic value as of the fiscal year-end date using a finite three-period valuation model, outlined in Equation (E7), that includes a terminal value estimate and uses the latest observed historical *ROE*. Essentially, the terminal value is determined by assuming that the third period forecasted *ROE* is earned by the firm in perpetuity. We do not rely on analysts' consensus earnings per share forecasts because limiting our sample to firms covered in I/B/E/S will unduly reduce our sample:

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[33] Consistent with Francis et al. (2005), we winsorize the extreme values of the distribution of the dependent and the independent variables to the 1st and 99th percentiles.

$$V(t) = B_t + \Sigma_{i=1,T}(1+r_e)^{-i}E_t(X_{t+i} - r_e*B_{t+i-1}) + \frac{(1+r_e)^{-T}}{r_e}TV \qquad (E7)$$

In Equation (E7), B_t is the book value of equity per share at beginning of year t, X_t is net income, r_e is the cost of equity capital, and T is horizon. TV is terminal value computed as the two-year average expected earnings for the last two years of the horizon (T). We use a three-year time horizon for our empirical analyses. Forecasted values of B_t are derived from the clean surplus equation, which specifies that the change in equity book value from period to period equals earnings minus dividends, i.e., $B_{t+1} = B_t + X_{t+1} - d_{t+1}$. Specifically, we use realized values of dividends to compute book values. The equity cost of capital estimate (r_e) is set to 10 percent as previous research finds that intrinsic value estimates are not sensitive to this parameter (Frankel and Lee 1998). Consistent with prior research we remove firms with stock prices less than \$1 and firms with negative intrinsic value that may be primarily due to negative book values and loss firms.