The Information Content of Ohlson and Aier's Modified Cash Flows: An Empirical Test

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Structured Abstract:

Purpose:
To empirically test the Information Content of measures based on Ohlson and Aier's Modified Cash Accounting.

Design/methodology/approach:
This study empirically examines both the relative and incremental information content of cash earnings measured using Modified Cash Accounting (MCA) compared with cash flows from operations (CFO) and GAAP earnings per share (EPS) using stock returns as the benchmark for firms during 2001 - 2011.

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Findings:

MCA cash earnings provides greater information content than cash flows from operations (CFO)and GAAP earnings per share (EPS) alone, and provides incremental information content beyond CFO and EPS.

Research Limitations:

This research is subject to limitations as in most capital market research.

Practical implications:

The accounting profession has long been trying to find a reliable and relevant measures of firm performance as information for investors' decisions for proper allocation of resources. So far, cash flows from operations (CFO) and GAAP earnings per share (EPS) have found to have their respective limitations in information content for investors' decision making. Ohlson and Aier (2009) propose a model of modified cash accounting (MCA) as an attempt to mitigate the limitations. Therefore, the results of our study have important practical implications.

Social implications:

It is vital for the accounting profession to find proper measures of firm performance for investor's decisions so that the social resources can be effectively and efficiently allocated. Ohlson and Aier's (2009) proposal of a model of modified cash accounting (MCA) attempts to find a proper measure of firm performance. Therefore, the results of our study also have important social implications.

Originality/Value:

This study is the first to empirically examine both the relative and incremental information content of MCA cash earnings.

Key words: Cash flows from operations; earnings quality; incremental information content;
Modified cash earnings; relative information content

1. Introduction

For decades, researchers have examined the empirical relation between stock returns and alternative summary performance measures to provide a basis for assessing the use, or proposed use, of these measures in accounting standards (Holthausen and Watts 2001). A recent study by Hribar et al. (2018) finds that earnings are better than cash flows in explaining contemporaneous returns.

Ohlson and Aier (2009) proposed a model of modified cash accounting (MCA). A hypothetical constructs of this model is the statement of modified cash flows (CCE) that can help users to assess a firm's quality of earnings without the bias due to accruals. To date, this construct has not been empirically tested. The purpose of this study is to empirically test the relative and incremental information content of the statement of CCE using stock returns as the benchmark. This is the first study to investigate whether Ohlson and Aier's model of MCA.

The objective of financial reporting is to provide financial information to help users make decisions about providing resources to the reporting entity (FASB 2010). Such decisions depend on investors' or creditors' expected returns that in turn rely on their assessment of the prospects for future net cash inflows to an entity. In the past two decades, researchers have examined the information content of different components in financial statements for forecasting future cash flows (e.g., Livnat and Zarowin 1990; Dechow et al. 1998; Subramanyam and Venkatachalam 2007). In particular, recent studies have focused on the predictive ability of the aggregate cash flows from operations and the accrual components of earnings in the forecast of future cash flows (e.g. Barth et al. 2001; Cheng and Hollie 2008; Frarshadfar and Monem 2012). However, despite the estimative nature of accruals, most of the GAAP cash flow statements are prepared by the indirect method. Therefore both the cash flow and accruals components in the financial statements prepared according to GAAP are subject to significant measurement errors (Krishnan and Largay 2000; Orpurt and Zang 2009). More importantly, Ohlson and Aier (2009) make the following observations regarding accruals and cash flow: Due to the frequent occurrence of non-recurring items and the ambiguities in accruals, analysts undertaking to the measure of firm performance are forced to focus on cash flow. However, the statement of cash flow in GAAP has several shortcomings. First, the GAAP's narrow concept of cash can lead to confusion. For example, some economically equivalent transactions may be treated differently in the cash flow statement. Second, GAAP's method of assigning transactions to the three main classifications (operating, investing and financing) lacks consistency. For example, an increase in accounts payable may be viewed as a financing or an operating activity. Finally, the statement of cash flow lacks a clear "bottom-line", directly comparable to that of the GAAP statement of net income. This especially affects the equity analyst who, without a clear bottom-line on the cash-flow statement, has no basis for making a proper analysis. In summary, the arbitrary distinction between cash flow from operating and

financing activities and the lack of a bottom line in the cash flow statement make it difficult for users to assess a firm's quality of earnings and forecast its net cash inflows (Ohlson and Aier 2009). To alleviate these problems, Ohlson and Aier (2009) proposed a "cash-based" income statement based on a broad concept of cash that includes cash and other assets/liabilities judged to approximate cash (or the negative thereof). In other words, this statement of cash earnings permits an income statement to be prepared without accruals.

As accruals have long been regarded as a major problem, Ohlson and Aier's CCE appears to offer a promising solution. However, this must be evaluated by empirical research. The question of whether MCA provides incremental value-relevant firm-specific information is of interest for at least two additional reasons. First, the Financial Accounting Standards Board (FASB) is obligated to consider the costs and benefits of its standards or proposed standards. In fact, we observe a problem in Ohlson and Aier's claim that the CCE allows the preparation of an income statement without reliance on accruals. Although the CCE is prepared from the balance sheet (BS), the current year's BS is derived from the previous year's balanced sheet and the current year's income statement, which still relies on accruals. Thus, whether there is incremental value-relevance to the CCE is an open question. Empirical evidence is necessary in order to determine whether the CCE disclosures are relevant so that the FASB can decide whether to require them to be reported in a firm's primary financial statement. Second, the objective of accounting policy decisions is to produce information that is relevant and reliable (FASB 2010, SFAC No. 8). This study evaluates whether the CCE statement provides value-relevant, firm-specific information.

To test whether CCE provides a better measure of earnings quality compared with GAAP's earnings per share (EPS) and cash flows from operations (CFO), we examine the association of stock returns with these alternative measures of firm performance for firm-year observations during 2001–2011 that have the COMPUSTAT and CRSP data necessary to calculate the measures. We find that CCE provides greater information content than CFO and EPS alone and also provides incremental information content beyond CFO and EPS. We expect these findings to have important implications for policy makers as they attempt to formulate improved measures of firm performance in financial accounting standards.

2. Ohlson and Aier's Modified Cash Earnings

According to Ohlson and Aier (2009), the concept of cash, in addition to the GAAP cash and other equivalents, is extended to include a variety of assets and liabilities as if they were cash or the negative thereof. The assets that potentially qualify as approximate cash equivalents include accounts receivable, financial receivable, equity method investments and pension assets. For the liabilities, the

items that qualify are accounts payable, interest payable and those interest-bearing debts such as loans, bonds payable, and leases payable. In summary, the MCA cash earnings (CCE) is calculated as follows:

CCE = ΔCash equivalent assets - ΔCash equivalent liabilities + Cash dividend - Stock issuances for cash or other assets +Treasury stock purchase - Treasury stock reissue

Where

ΔCash equivalent assets = cash and short-term investment + accounts receivable + investment and advances-equity method

ΔCash equivalent liabilities = loans ＋ accounts payable ＋ interest payable ＋current bonds payable ＋ current leases payable

3. Sample

The data for this study are obtained from Compustat's Annual PST file covering 2001-2012. Security price, security return, and the factor to adjust for stock splits and stock dividends are obtained from CRSP Daily Returns file. The sample period starts from 2001 to avoid the adjustment required for th "pooling of interest" accounting for acquisitions under MCA framework.

The earnings variables are scaled by the book value of total assets at the beginning-of-period. If an independent variable is not between -4.50 and +4., the observation is deleted.[1] Earnings and price variables are adjusted for stock splits and stock dividends.

4. Tests of association with stock returns

4.1 Single-independent-variable regression models

To determine the more effective measure of firm performance, following Easton and Harris (1991), Dhaliwal et al. (1999), and Vincent (1999), we compare the information content of CCE per share with CFO per share and the GAAP EPS using the following models:

Model (1): $R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2}\,\Delta CCE_{it}/A_{it-1}+ \varepsilon_{it}$

Model (2): $R_{it}= \alpha_{i0} + \beta_{i1}CFO_{it}/A_{it-1}+ \beta_{i2}\,\Delta CFO_{it}/A_{it-1}+ \varepsilon_{it}$

Model (3): $R_{it}= \alpha_{i0} + \gamma_{i1}EPS_{it}/A_{it-1}+ \gamma_{i2}\,\Delta EPS_{it}/A_{it-1}+ \varepsilon_{it}$

[1] The truncation rule is placed to ensure that the regression results are not inordinately affected by outlying observations; however the truncation does not change the substance of the results.

Where

R_{it} is the return on a share of firm i over the 12 months extending from 9 months prior to the fiscal year-end to three months after the fiscal year-end;

CFO_{jt} is cash from operations per share of firm i for period t;

CCE_{it} is modified cash flows (CCE_{it}) per share (derived from the model of modified cash accounting (MCA) proposed by Ohlson and Aier (2009); CCE_{jt} is computed according to the manner described in Section 2;

A_{it-1} is the book value of total assets of firm i at time t-1; and

$EPSFI_{it}$ is earnings per share (diluted) -- including extraordinary item-- of firm i for period t;

EPSFX is earnings per share (diluted) -- excluding extraordinary item-- of firm i for period t;

EPSPI is earnings per share (basic) -- including extraordinary item-- of firm i for period t; and

EPSFX is earnings per share (basic) -- excluding extraordinary item-- of firm i for period t;.

When estimating the regression models, we do not suppress the constant term because suppressing the intercept term will cause a violation of the Classical Assumptions that are necessary for OLS estimator to be the best available. The Classical Assumption that the error term has an expected value of zero can be met only if the constant term absorbs any nonzero mean that the observations of the error might have in a given sample. If the constant term is omitted, then the constant effect of omitted variables, nonlinearities and so forth is forced into the estimates of the other coefficients, resulting in potential bias ((see, e.g., Judge, et al. 1985; Maddala 2001; Studenmund 2007).

4.2 Tests of incremental information with multivariate regression models

An important issue from an informational perspective (see Beaver 1981) is: Do modified cash flow data provide "information" (e.g., in this context additional explanatory power) over and above that provide by CFO or EPS? The following models are used for such tests:

Model (4): $$R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2}\,\Delta CCE_{it}/A_{it-1}+ \beta_{i1}CFO_{it}/A_{it-1}+ \beta_{i2}\,\Delta CFO_{it}/A_{it-1} + \varepsilon_{it}$$

Model (5): $$R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2}\,\Delta CCE_{it}/A_{it-1}+ \gamma_{i1}EPS_{it}/A_{it-1}+ \gamma_{i2}\,\Delta EPS_{it}/A_{it-1}+ \varepsilon_{it}$$

Model (6): $$R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2}\,\Delta CCE_{it}/A_{it-1}+ \beta_{i1}CFO_{it}/A_{it-1}+ \beta_{i2}\,\Delta CFO_{it}/A_{it-1}+ \varepsilon_{it}$$

$$\gamma_{i1}EPS_{it}/A_{it-1}+ \gamma_{i2}\,\Delta EPS_{it}/A_{it-1} + \varepsilon_{it}$$

Model (7): $R_{it}= \alpha_{i0} + \alpha_{i1}(CCE_{it} \_ CFO_{it})/A_{it-1}+ \alpha_{i2}\,(\Delta CCE_{it}\_\Delta CFO_{it})/A_{it-1}+\varepsilon_{it}$

Model (8): $R_{it}= \alpha_{i0} + \alpha_{i1}(CCE_{it} \_ EPS_{it})/A_{it-1}+ \alpha_{i2}\,(\Delta CCE_{it}\_\Delta EPS_{it})/A_{it-1}+\varepsilon_{it}$

Where

$CCE_{it} \_ CFO_{it} = CCE_{it} - CFO_{it}$;

$\Delta CCE_{it}\_\Delta CF_{it}= \Delta CCE_{it}\_ - \Delta CF_{it}$;

$CCE_{it} \_ EPS_{it} = CCE_{it} - EPS_{it}$; and

$\Delta CCE_{it} \_\Delta EPS_{it} = \Delta CCE_{it} - \Delta EPS_{it}$.

All of the above regression models are estimated for each year (t) as well as for the pooled cross-section and time-series sample during the sample period, 2001-2011.

5. Empirical Results

Table 1 presents the descriptive statistics for the dependent and independent variables. The mean of return is 0.015, while the median return is -0.007. The mean (median) changes in cash flows from operations is 0.010 (0.003), while the mean (median) cash flows from operations is 0.017 (-0.006). The mean (median) changes in modified cash flow is 0.173 (0.074), with a standard deviation of 0.380. The mean (median) modified cash flow is 0.158 (0.142), with a standard deviation of 0.544. The mean (median) changes in earning per share is 0.000 (0.000), with a standard deviation of 0.008. The mean of earnings per share is 0.000 with a standard deviation of 0.009.

Table 2 presents the correlations among the dependent and independent variables. Since the main focus of this paper is on the information content of modified cash flow, that is, whether and how modified cash flow is related to returns, we mainly focus on the correlation of returns, modified cash flows and other variables.

Returns are found to be positively correlated with changes in operating cash flow, operating cash flow, changes in modified cash flow, modified cash flow, changes in earnings per share, and earnings per share. These correlations show that each of the aforementioned variables have information content.

5.1 Annual Tests of the association of modified cash flows (CCE) with returns

Table 3 presents the annual cross-sectional regression results of estimating model (1), model (2) and model (4). For each year, we present three sets of regression results: the first set linking returns with modified cash flows, the second set linking returns with cash flows from operations, and the third set linking returns with both modified cash flows and cash flows from operations. The number of observations used in each year ranges from 3128 in 2011 to 3667 in 2001. This decrease in the number of observations is consistent with firms delisting from the stock exchanges in the US due to high regulatory compliance cost associated with public listing, such as compliance cost associated with the Sarbanes-Oxley Act and the Sarbanes-Oxley Act Section 404 requirement of internal control audit for accelerated filers.

The first regression relates modified cash flow (CCE) and changes in modified cash flow (ΔCCE) to stock returns. The modified cash flow is significantly positive in 8 out of 11 years, while the changes in modified cash flow are significantly positive in 5 out of 11 years. The average Adjusted R-squares for these regressions are 2.57%. These results indicate that modified cash flow is informative in explaining firms' returns, while the results for changes in modified cash flows are not as strong as the results for modified cash flows. The second regression links cash flows from operations (CFO) and changes in cash flows from operations (ΔCFO) with stock returns. The coefficient on cash flows from operations is mostly significantly positive (significantly positive in 8 out of 11 annual regressions). The results on changes in cash flows from operations are even better; the coefficient on changes in cash flows from operations is significantly positive in every single year from 2001 to 2011. The average Adjusted R-squares for these regressions are 4.14%. These results clearly indicate that cash flows from operations and changes in cash flows from operations are informative in explaining firms' returns.

For each year, we also present the regression results by adding two more variables to the earnings-return regressions: modified cash flow and changes in modified cash flow. The purpose of these regressions is to see whether modified cash flow and changes in modified cash flow provides incremental information content beyond cash flows from operations and changes in cash flows from operations. The regression results show that the coefficient on modified cash flow is significantly positive in 9 out of the 11 annual regressions, which clearly shows that modified cash flow has incremental information content over cash flows from operations and changes in cash flows from operations. The regression results on changes in modified cash flows are mixed. The coefficient is significantly positive in 4 out of the 11 annual regressions, but it is also significantly negative in 4 out

of the 11 annual regressions. The regression results for cash flows from operations and changes in cash flows from operations are significantly positive in 8 and 11 out of the 11 annul regressions. The average adjusted R-squares are 6.65%.

In summary, Table 3 clearly shows that modified cash flow has incremental explanatory power over cash flows from operations and changes in cash flows from operations in explaining annual returns. The average adjusted R-square increases from 4.14% using only CFO and ΔCFO to 6.65% by adding CCE and ΔCCE. The average adjusted R-square has experienced a jump of 60.66% due to the addition of CCE and ΔCCE.

Table 4 presents the annual cross-sectional regression results of estimating model (1), model (3) and model (5). For each year, we present three sets of regression results: the first set linking returns with modified cash flows, the second set linking returns with earnings per share, and the third set linking returns with both modified cash flows and earnings per share. We re-present the regression results for modified cash flows to facilitate comparison. The number of observations used in each year ranges from 3128 in 2011 to 3667 in 2001.

The first regression relates modified cash flows (CCE) and changes in modified cash flows (ΔCCE) to stock returns. The coefficient for modified cash flows is significantly positive in 8 out of 11 years, while the coefficient for changes in modified cash flows is significantly positive in 5 out of 11 years. The average Adjusted R-squares for these regressions are 2.57%. The second regression links earnings per share (EPS) and changes in earnings per share (ΔEPS) with stock returns. The coefficient on earnings per share is mostly significantly positive (significantly positive in 8 out of 11 annual regressions). The results on changes in earnings per share are even better; the coefficient on changes in earnings per share is significantly positive in every single year from 2001 to 2011. The average Adjusted R-squares for these regressions are 2.95%. These results clearly indicate that earnings per share and changes in earnings per share are informative in explaining firms' returns.

For each year, we also present the regression results by adding two more variables to the earnings-return regressions: modified cash flows and changes in modified cash flows. The purpose of these regressions is to see whether modified cash flows and changes in modified cash flows provides incremental information content beyond earnings per share and changes in earnings per share. The regression results show that the coefficient on modified cash flows is significantly positive in 9 out of the 11 annual regressions, which clearly shows that modified cash flows has incremental information

content over earnings per share and changes in earnings per share. The regression results on changes in modified cash flows are mixed. The coefficient is significantly positive in 5 out of the 11 annual regressions, but it is also significantly negative in 3 out of the 11 annual regressions. The regression results for earnings per share and changes in earnings per share are significantly positive in 9 and 11 out of the 11 annul regressions. The average adjusted R-squares are 5.30%.

In summary, Table 4 clearly shows that modified cash flows have incremental explanatory power over earnings per share and changes in earnings per share in explaining annual returns. The average adjusted R-square increases from 2.95% using only EPS and ΔEPS to 5.30% by adding CCE and ΔCCE. The adjusted R-square has experienced a jump of 79.94%.

5.2 Pooled Cross-sectional and Time Series Tests of the association of modified cash flows (CCE) with returns

Table 5 presents the cross-sectional and time-series regression for the whole sample linking returns with various measures of cash flows. There are 37,298 observations for the period of 2001-2011. The first regression relates modified cash flow (CCE) and changes in modified cash flow (ΔCCE) to stock returns. The coefficient on CCE is 0.103, highly significant at <.0001 level. The coefficient on ΔCCE is 0.090, also very significant at <.0001 level. The adjusted R-square is 1.51%. The second regression relates stock returns to cash flow (CFO) and changes in cash flow (ΔCFO) to stock returns. The coefficient on cash flow (CFO) and changes in cash flow (ΔCFO) are respectively 0.135 and 0.894, both are significant at <.0001 level. The adjusted R-square is 3.12%. The third regression includes all four variables: CCE, ΔCCE, CFO and ΔCFO. All the coefficients are positive and highly significant. The adjusted R-square is 4.65%, which is a 49.04% increase over the adjusted R-square of 3.12% of only having CFO and ΔCFO in the regression. This clearly demonstrates that modified cash flow (CCE) and changes in modified cash flow (ΔCCE) have significant explanatory power in explaining stock returns beyond operating cash flow (CFO) and changes in operating cash flow (ΔCFO).

Table 6 presents the cross-sectional and time-series regression for the whole sample linking returns with modified cash flows and earnings per share. The first regression relates modified cash flow (CCE) and changes in modified cash flow (ΔCCE) to stock returns. The coefficients on CCE and ΔCCE are significantly positive. The second regression relates stock returns to earnings per share (EPSFI) and changes in earnings per share (ΔEPSFI) to stock returns. The coefficient on earnings per share (EPSFI) and changes in earnings per share (ΔEPSFI) are respectively 3.511 and 11.465, both are significant at <.0001 level. The adjusted R-square is 2.27%. The third regression includes all four variables: CCE,

ΔCCE, EPSFI and Δ EPSFI. All the coefficients are positive and highly significant. The adjusted R-square is 3.73%, which is a 64.32% increase over the adjusted R-square of 2.27% of only having EPSFI and ΔEPSFI in the regression. This clearly demonstrates that modified cash flow (CCE) and changes in modified cash flow (ΔCCE) have significant explanatory power in explaining stock returns beyond earnings per share (EPSFI) and changes in earnings per share (ΔEPSFI).

5.3 Sensitivity analyses

The earnings per share results in the main regression rely on the definition of EPSFI. EPSFI is defined as earnings per share (diluted) including extraordinary items. We also use alternative definition of EPS to see whether our results are robust to the alternative definition of earnings per share. Specifically we define earnings per share as follows: earnings per share (diluted) excluding extraordinary items, earnings per share (basic) including extraordinary items, earnings per share (basic) excluding extraordinary items. The untabulated results show that our results are robust to the alternative definition of earnings per share.

6. Conclusion

Ohlson and Aier (2009) propose a model of modified cash accounting (MCA) for analyzing and evaluating a firm's cash flow. They suggest that MCA cash earnings provide a better measure of earnings as compared to the GAAP's earnings and the MCA bottom line is more informative as it identifies earnings due to operations on a cash and approximate cash-equivalent basis. However, there is no empirical test on the information content of MCA cash earnings proposed by Ohlson and Aier (2009). This study empirically examines both the relative and incremental information content of MCA cash earnings compared to cash flows from operations (CFO) and GAAP net income (EPS) using stock returns as the benchmark for firms during 2001 - 2011. We find that MCA cash earnings provides greater information content than CFO and EPS alone and also provides incremental information content beyond CFO and EPS.

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References

[1] Beaver, W. H. 1981. *Financial Accounting: An Accounting Revolution*. Englewood Cliffs, NJ: Prentice Hall.er, W., 1981a, Fin

[2] Beaver, W. H., P. A. Griffin, and W.R. Landsman. 1982. The incremental information content of replacement cost earnings. *Journal of Accounting and Economics* 4: 15-39. s, June, 3--28.

[3] Beaver, W.H. and W. R. Landsman. 1983. *Incremental information content of Statement 33 disclosures*. Stamford, CT: Financial Accounting Standards Board of the Financial Accounting Foundation.

[4] Beaver, W.H., and W. R. Landsman. 1984. Testing of incremental information content in the presence of collinearity. *Journal of Accounting and Economics* 6: 219-223.

[5] Bhattacharya, N., E. L. Black, T.E. Christensen, and C. R. Larson. 2003. Assessing the relative informativeness and permanence of pro forma earnings and GAAP operating earnings. *Journal of Accounting and Economics* 36 (December): 285-319.

[6] Christie, A. A. 1987. On cross-sectional analysis in accounting research. *Journal of Accounting and Economics* 9 (December): 231-258.

[7] Dechow, P. M. 1994. Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics* 18 (July): 3–42.

[8] Dechow, P. M., S.P. Kothari, and R. L. Watts. 1998. The relation between earnings and cash flows. *Journal of Accounting and Economics* 25 (May): 133–168.

[9] Dhaliwal, D., K.R. Subramanyam, and R.Trezevant. 1999. Is comprehensive income superior to net income as a measure of firm performance? *Journal of Accounting and Economics* 26 (January): 43-67.

[10] Farshadfar, S. and R. Monem. 2012. The usefulness of operating cash flow and accrual components in improving the predictive ability of earnings: a re-examination and extension. *Accounting and Finance* 1-22.

[11] Financial Accounting Standards Board (FASB). 2010. *Conceptual Framework for Financial Reporting*. Statement of Financial Accounting Concepts No. 8. Norwalk, CT: FASB.

[12] Holthausen, R.W. and R.L. Watts. 2001. The relevance of value-relevance literature for financial accounting standard setting. *Journal of Accounting and Economics* 31(September): 3–75.

[13] Hribar, Paul and Melessa, Sam and Mergenthaler, Richard and Small, R. Christopher, "An Examination of the Relative Abilities of Earnings and Cash Flows to Explain Returns and Market Values" (January 1, 2018). Rotman School of Management Working Paper No. 3107145. Available at
SSRN: *https://ssrn.com/abstract=3107145* or *http://dx.doi.org/10.2139/ssrn.3107145*.

[14] Hribar, Paul and Melessa, Sam and Mergenthaler, Richard and Small, R. Christopher. 2018. "An Examination of the Relative Abilities of Earnings and Cash Flows to Explain Returns and Market Values" (January 1, 2018). Rotman School of Management Working Paper No. 3107145. Available at SRN: https://ssrn.com/abstract=3107145 or http://dx.doi.org/10.2139/ssrn.3107145.

[15] Judge, G. G., W. E. Griffiths, R. C. Hill, H. Lütkepohl, and T.C. Lee.1985. *The Theory and Practice of Econometrics,* (2nd edition.), New York: John Wiley & Sons.

[16] Krishnan, G.V., and J. A. Largay III, 2000. The predictive ability of direct cash flow information. *Journal of Business Finance and Accounting* 27: 215-245.

[17] Ohlson, J.A. and J.K. Aier. 2009. On the analysis of firms' cash flows. *Contemporary Accounting Research* 26 (Winter): 1091-114.

[18] Orpurt, S. F. and Y. Zang. 2009. Do direct cash flow disclosures help predict future operating cash flows and earnings? *The Accounting Review* 84: 893-935.

[19] Studenmund, A.H. 2007. *Using Econometrics: A Practical Guide*, 6th edition, Boston: Pearson Education, Inc.

[20] Thomas, A. L. 1969. *The Allocation Problem in Financial Accounting Theory*. Studies in Accounting Research #3. Sarasota, FL: AAA.

[21] Thomas, A. L. 1974. *The Allocation Problem: Part Two*. Studies in Accounting Research #9. Sarasota, FL: AAA.

[22] Vincent, L. 1999. The information content of funds from operations (FFO) for real estate investment trusts (REITs). *Journal of Accounting and Economics* 26 (January): 69-104.

[23] Vuong, Q.H. 1989. Likelihood ratio tests for model selection and non-nested hypotheses. *Econometrica* 57 (March): 307-333.

Appendix

Variable Definitions

Modified cash flow (CCE) =

[ΔCash equivalent assets - ΔCash equivalent liabilities ＋Cash dividend－Stock issuances for cash or other assets ＋Treasury stock purchase－Treasury stock reissue] / Outstanding shares at beginning-of-period price;

ΔCash equivalent assets= CHE(cash and short-term investment) ＋ RECCH (accounts receivable)

＋IVAEQ (investment and advances-equity method)

ΔCash equivalent liabilities = LN(loans) ＋AP (accounts payable) ＋IP (interest payable) ＋ CB (current bonds payable) ＋CL (current leases payable)

CFO: cash flows from operations / Outstanding shares at beginning-of-period price;

ΔCFO: changes in CFO, more specifically, changes in cash flows from operations / Outstanding shares at beginning-of-period price;

RET: stock returns

ΔCCE: changes in modified cash flow

Δepsfi: changes in epsfi

Epsfi:

Δepsfx:

Epsfx:

Δepspi:

Epspi:

Δepspx:

Epspx:

EPSFI EPSFI -- Earnings Per Share (Diluted) Including Extraordinary Items

EPSFX EPSFX -- Earnings Per Share (Diluted) Excluding Extraordinary Items

EPSPI EPSPI -- Earnings Per Share (Basic) Including Extraordinary Items

EPSPX EPSPX -- Earnings Per Share (Basic) Excluding Extraordinary Items

TABLE 1

Descriptive Statistics (n=37298)

Variable	Mean	Std Dev	Minimum	P25	median	P75	Maximum
Δcfo	0.010	0.124	-0.952	-0.017	0.003	0.031	1.511
Cfo	-0.006	0.165	-1.603	-0.013	0.017	0.065	0.626
Ret	0.015	0.675	-3.012	-0.300	-0.007	0.271	6.594
ΔCCE	0.173	0.380	-1.156	0.001	0.074	0.240	5.950
CCE	0.158	0.544	-1.151	0.004	0.142	0.377	5.950
Δepsfi	0.000	0.008	-0.077	-0.001	0.000	0.001	0.115
Epsfi	0.000	0.009	-0.137	-0.000	0.000	0.002	0.056

Note: Please refer to the Appendix for variable definitions.

TABLE 2

Correlation Table

	Δcfo	**cfo**	**ret**	**ΔCCE**	**CCE**	**Δepsfi**	**epsfi**
Δcfo	1	0.28892 <.0001	0.17404 <.0001	0.11272 <.0001	0.05 <.0001	0.58787 <.0001	0.19521 <.0001
cfo	0.28892 <.0001	1	0.08067 <.0001	-0.2004 <.0001	-0.2266 <.0001	0.07507 <.0001	0.69196 <.0001
ret	0.17404 <.0001	0.08067 <.0001	1	0.10766 <.0001	0.11771 <.0001	0.14397 <.0001	0.076 <.0001
ΔCCE	0.11272 <.0001	-0.2004 <.0001	0.10766 <.0001	1	0.68929 <.0001	0.10109 <.0001	-0.123 <.0001
CCE	0.05 <.0001	-0.2266 <.0001	0.11771 <.0001	0.68929 <.0001	1	0.08671 <.0001	-0.1517 <.0001
Δepsfi	0.58787 <.0001	0.07507 <.0001	0.14397 <.0001	0.10109 <.0001	0.08671 <.0001	1	0.22144 <.0001
epsfi	0.19521 <.0001	0.69196 <.0001	0.076 <.0001	-0.123 <.0001	-0.1517 <.0001	0.22144 <.0001	1

Note: Please refer to the Appendix for variable definitions.

TABLE 3 Returns and Cash Flows: The Incremental Role of Modified Cash Flows (Yearly Results)

Model (1): $R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2} \Delta CCE_{it}/A_{it-1}+ \varepsilon_{it}$

Model (2): $R_{it}= \alpha_{i0} + \beta_{i1}CFO_{it}/A_{it-1}+ \beta_{i2} \Delta CFO_{it}/A_{it-1}+ \varepsilon_{it}$

Model (4): $R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2} \Delta CCE_{it}/A_{it-1}+ \beta_{i1}CFO_{it}/A_{it-1}+ \beta_{i2} \Delta CFO_{it}/A_{it-1} + \varepsilon_{it}$

	Intercept	CCE	ΔCCE	CFO	ΔCFO	Adj R-square
2001 (n=3667)	-0.058 (<.0001)	0.039 (0.143)	0.186 (<.0001)			0.008
2001 (n=3667)	-0.006 (0.609)			0.334 (<.0001)	0.841 (<.0001)	0.041
2001 (n=3667)	-0.024 (0.056)	0.108 (<.0001)	0.096 (0.015)	0.386 (<.0001)	0.816 (<.0001)	0.049
2002 (n=3529)	-0.327 (<.0001)	-0.021 (0.377)	0.079 (0.038)			0.001
2002 (n=3529)	-0.316 (<.0001)			0.456 (<.0001)	0.266 (<.0001)	0.024
2002 (n=3529)	-0.329 (<.0001)	-0.018 (0.432)	0.115 (0.003)	0.500 (<.0001)	0.230 (<.0001)	0.026
2003 (n=3468)	0.448 (<.0001)	0.430 (<.0001)	0.089 (0.177)			0.067
2003 (n=3468)	0.471 (<.0001)			-1.045 (<.0001)	2.141 (<.0001)	0.081
2003 (n=3468)	0.449 (<.0001)	0.440 (<.0001)	-0.169 (0.013)	-0.812 (<.0001)	1.861 (<.0001)	0.116
2004 (n=3423)	0.030 (0.001)	0.171 (<.0001)	-0.219 (<.0001)			0.018
2004 (n=3423)	0.011 (0.171)			0.519 (<.0001)	0.295 (0.001)	0.042
2004 (n=3423)	0.012 (0.199)	0.206 (<.0001)	-0.198 (<.0001)	0.603 (<.0001)	0.294 (0.001)	0.069
2005 (n=3437)	0.178 (<.0001)	0.192 (<.0001)	0.072 (0.054)			0.047

2005 (n=3437)	0.216 (<.0001)			-0.134 (0.055)	1.305 (<.0001)	0.032
2005 (n=3437)	0.171 (<.0001)	0.199 (<.0001)	0.056 (0.129)	0.093 (0.188)	1.110 (<.001)	0.076
2006 (n=3452)	-0.013 (0.103)	0.139 (<.0001)	-0.087 (0.001)			0.019
2006 (n=3452)	-0.007 (0.326)			0.147 (0.002)	0.571 (<.0001)	0.026
2006 (n=3452)	-0.024 (0.002)	0.153 (<.0001)	-0.067 (0.011)	0.269 (<.0001)	0.496 (<.0001)	0.052
2007 (n=3429)	-0.230 (<.0001)	0.060 (0.0001)	-0.047 (0.027)			0.004
2007 (n=3429)	-0.226 (<.0001)			0.434 (<.0001)	0.332 (<.0001)	0.069
2007 (n=3429)	-0.243 (<.0001)	0.089 (<.0001)	-0.006 (0.768)	0.536 (<.0001)	0.282 (<.0001)	0.088
2008 (n=3387)	-0.522 (<.0001)	0.092 (<.0001)	0.086 (<.0001)			0.028
2008 (n=3387)	-0.491 (<.0001)			0.249 (<.0001)	0.298 (<.0001)	0.046
2008 (n=3387)	-0.507 (<.0001)	0.112 (<.0001)	0.066 (0.001)	0.304 (<.0001)	0.246 (<.0001)	0.078
2009 (n=3208)	0.482 (<.0001)	0.542 (<.0001)	-0.250 (<.0001)			0.056
2009 (n=3208)	0.470 (<.0001)			-0.275 (0.008)	1.133 (<.0001)	0.035
2009 (n=3208)	0.472 (<.0001)	0.534 (<.0001)	-0.327 (<.0001)	-0.114 (0.289)	1.036 (<.0001)	0.083
2010 (n=3170)	0.096 (<.0001)	0.192 (<.0001)	0.050 (0.163)			0.031
2010 (n=3170)	0.100 (<.0001)			0.300 (<.0001)	0.529 (<.0001)	0.026

2010 (n=3170)	0.076 (<.0001)	0.198 (<.0001)	-0.037 (0.300)	0.434 (<.0001)	0.372 (<.0001)	0.059
2011 (n=3128)	-0.101 (<.0001)	-0.059 (0.001)	0.050 (0.023)			0.004
2011 (n=3128)	-0.110 (<.0001)			0.295 (<.0001)	0.111 (0.023)	0.033
2011 (n=3128)	-0.114 (<.0001)	-0.045 (0.008)	0.061 (0.005)	0.300 (<.0001)	0.103 (0.038)	0.035

Note: Please refer to the Appendix for variable definitions.

TABLE 4 Returns and Earnings: The Incremental Role of Modified Cash Flows (Yearly Results)

Model (1): $R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2} \Delta CCE_{it}/A_{it-1}+ \varepsilon_{it}$

Model (3): $R_{it}= \alpha_{i0} + \gamma_{i1}EPS_{it}/A_{it-1}+ \gamma_{i2} \Delta EPS_{it}/A_{it-1}+ \varepsilon_{it}$

Model (5): $R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2} \Delta CCE_{it}/A_{it-1} + \gamma_{i1}EPS_{it}/A_{it-1}+ \gamma_{i2} \Delta EPS_{it}/A_{it-1}+ \varepsilon_{it}$

	Intercept	CCE	ΔCCE	EPSFI	ΔEPSFI	Adj R-square
2001 (n=3667)	-0.058 (<.0001)	0.039 (0.143)	0.186 (<.0001)			0.008
2001 (n=3667)	-0.028 (0.020)			4.615 (<.0001)	7.588 (<.0001)	0.029
2001 (n=3667)	-0.045 (0.000)	0.058 (0.034)	0.171 (<.0001)	4.912 (<.0001)	7.367 (<.0001)	0.037
2002 (n=3529)	-0.327 (<.0001)	-0.021 (0.377)	0.079 (0.038)			0.001
2002 (n=3529)	-0.316 (<.0001)			4.558 (<.0001)	2.973 (0.000)	0.013
2002 (n=3529)	-0.327 (<.0001)	-0.013 (0.583)	0.088 (0.022)	4.912 (<.0001)	2.669 (0.001)	0.014
2003 (n=3468)	0.448 (<.0001)	0.430 (<.0001)	0.089 (0.177)			0.067

2003 (n=3468)	0.493 (<.0001)			-11.256 (<.0001)	26.062 (<.0001)	0.057
2003 (n=3468)	0.445 (<.0001)	0.423 (<.0001)	-0.045 (0.496)	-7.268 (<.0001)	21.517 (<.0001)	0.101
2004 (n=3423)	0.030 (0.001)	0.171 (<.0001)	-0.219 (<.0001)			0.018
2004 (n=3423)	0.013 (0.106)			6.532 (<.0001)	3.202 (0.002)	0.020
2004 (n=3423)	0.021 (0.025)	0.183 (<.0001)	-0.209 (<.0001)	7.242 (<.0001)	2.837 (0.007)	0.041
2005 (n=3437)	0.178 (<.0001)	0.192 (<.0001)	0.072 (0.054)			0.047
2005 (n=3437)	0.216 (<.0001)			0.886 (0.488)	16.024 (<.0001)	0.025
2005 (n=3437)	0.172 (<.0001)	0.192 (<.0001)	0.061 (0.1000)	3.573 (0.005)	13.223 (<.0001)	0.068
2006 (n=3452)	-0.013 (0.103)	0.139 (<.0001)	-0.087 (0.001)			0.019
2006 (n=3452)	-0.007 (0.339)			2.155 (0.020)	10.485 (<.0001)	0.022
2006 (n=3452)	-0.018 (0.025)	0.141 (<.0001)	-0.084 (0.001)	3.478 (0.000)	9.417 (<.0001)	0.041
2007 (n=3429)	-0.230 (<.0001)	0.060 (0.0001)	-0.047 (0.027)			0.004
2007 (n=3429)	-0.225 (<.0001)			7.577 (<.0001)	5.312 (<.0001)	0.050
2007 (n=3429)	-0.234 (<.0001)	0.073 (<.0001)	-0.027 (0.206)	8.580 (<.0001)	4.596 (<.0001)	0.060
2008 (n=3387)	-0.522 (<.0001)	0.092 (<.0001)	0.086 (<.0001)			0.028
2008 (n=3387)	-0.493 (<.0001)			5.904 (<.0001)	4.892 (<.0001)	0.039

2008 (n=3387)	-0.509 (<.0001)	0.101 (<.0001)	0.075 (0.000)	6.530 (<.0001)	4.186 (<.0001)	0.068
2009 (n=3208)	0.482 (<.0001)	0.542 (<.0001)	-0.250 (<.0001)			0.056
2009 (n=3208)	0.489 (<.0001)			-0.885 (0.711)	18.762 (<.0001)	0.019
2009 (n=3208)	0.481 (<.0001)	0.528 (<.0001)	-0.286 (<.0001)	0.099 (0.967)	15.369 (<.0001)	0.068
2010 (n=3170)	0.096 (<.0001)	0.192 (<.0001)	0.050 (0.163)			0.031
2010 (n=3170)	0.108 (<.0001)			8.025 (<.0001)	7.742 (<.0001)	0.020
2010 (n=3170)	0.085 (<.0001)	0.189 (<.0001)	-0.034 (0.355)	9.548 (<.0001)	5.989 (0.000)	0.052
2011 (n=3128)	-0.101 (<.0001)	-0.059 (0.001)	0.050 (0.023)			0.004
2011 (n=3128)	-0.107 (<.0001)			7.328 (<.0001)	2.894 (0.004)	0.030
2011 (n=3128)	-0.110 (<.0001)	-0.055 (0.001)	0.066 (0.003)	7.406 (<.0001)	2.791 (0.007)	0.033

Note: Please refer to the Appendix for variable definitions.

TABLE 5

Returns and Cash Flows: The Incremental Role of Modified Cash Flows

Model (1): $R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2}\,\Delta CCE_{it}/A_{it-1}+ \varepsilon_{it}$

Model (2): $R_{it}= \alpha_{i0} + \beta_{i1}CFO_{it}/A_{it-1}+ \beta_{i2}\,\Delta CFO_{it}/A_{it-1}+ \varepsilon_{it}$

Model (4): $R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2}\,\Delta CCE_{it}/A_{it-1}+ \beta_{i1}CFO_{it}/A_{it-1}+ \beta_{i2}\,\Delta CFO_{it}/A_{it-1} + \varepsilon_{it}$

	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)
Intercept	-0.017 (<.0001)	0.007 (0.041)	-0.022 (<.0001)
Cfo		0.135 (<.0001)	0.127 (<.0001)
Δcfo		0.894 (<.0001)	0.062 (<.0001)
CCE	0.103 (<.0001)		0.281 (<.0001)
ΔCCE	0.090 (<.0001)		0.789 (<.0001)
Adj R-sq	1.51%	3.12%	4.65%

The total number of observations is 37298 for the period of 2001-2011.

TABLE 6

Returns and Earnings: The Incremental Role of Modified Cash Flows

Model (1): $R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2}\,\Delta CCE_{it}/A_{it-1}+ \varepsilon_{it}$

Model (3): $R_{it}= \alpha_{i0} + \gamma_{i1}EPS_{it}/A_{it-1}+ \gamma_{i2}\,\Delta EPS_{it}/A_{it-1}+ \varepsilon_{it}$

Model (5): $R_{it}= \alpha_{i0} + \alpha_{i1}CCE_{it}/A_{it-1}+ \alpha_{i2}\,\Delta CCE_{it}/A_{it-1} + \gamma_{i1}EPS_{it}/A_{it-1}+ \gamma_{i2}\,\Delta EPS_{it}/A_{it-1}+ \varepsilon_{it}$

	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)
Intercept	-0.017 (<.001)	0.011 (0.002)	-0.018 (<.0001)
Epsfi		3.511 (<.0001)	5.212 (<.0001)
Δepsfi		11.465 (<.0001)	10.005 (<.0001)
CCE	0.103 (<.001)		0.109 (<.0001)
ΔCCE	0.090 (<.001)		0.078 (<.0001)
Adj R-sq	1.51%	2.27%	3.73%

The total number of observations is 37298 for the period of 2001-2011.