10-2007

Do Direct Cash Flow Disclosures Help Predict Future Operating Cash Flows and Earnings?

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August 1, 2007

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We acknowledge and appreciate the financial support of the Office of Research, Singapore Management University. We thank Chul Park, Stan Markov, Lee-Seok Hwang, Gilles Hillary, Holly Ashbaugh-Skaife, Jiwei Wang, Jong-Hag Choi, two anonymous reviewers as well as seminar participants at Seoul National University and Singapore Management University for helpful comments. We also appreciate the research assistance of Wilson Chieh Shun Yeo and Nelly Wen Min Yong.

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Abstract

Motivated by recent FASB, IASB and CFA Institute comments, we extend the scant literature on direct method cash flow disclosures by exploring their predictive ability. A primary stated purpose of the direct method is to better forecast future operating performance. To test this purpose, we use a FERC (future ERC) methodology, finding that firms voluntarily producing direct method statements reflect more information about future earnings in their current stock returns than other firms. Supporting our FERC analysis, we document that substantial articulation errors exist when direct method cash flow components are estimated from either indirect method cash flow statements or balance sheets, indicating that the direct method is not redundant. These estimation errors are statistically significant when predicting future operating cash flows. After conducting several tests for self selection concerns, we conclude that the direct method is valuable to investors when predicting future cash flows and earnings.

Keywords: *Statement of cash flows; direct method; future earnings response coefficient (FERC); stock price informativeness, cash flow forecast, articulation error.*

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1. Introduction

This study investigates whether direct method (DM) cash flow statements enable more accurate predictions of future operating cash flows and future earnings than indirect method (IM) cash flow statements. A firm's ability to generate operating cash flows (CFO hereafter) and operating earnings is closely linked to firm value, and thus a primary objective of financial reporting is to provide information to help accounting users assess the amount and timing of prospective cash flows and earnings.[1] While proponents of DM statements claim that DM information is beneficial for forecasting future cash flows and earnings, the usefulness of DM statements in predicting future performance is largely unknown despite prolonged regulatory debates on the format of the statement of cash flows. Our objective in this study is to investigate this claim by asking whether DM cash flow statements enable better predictions of future performance incremental to the more popular IM cash flow statements.

We are motivated to pursue this study because there is ongoing discussion about the benefits of DM presentation while only limited empirical evidence exists (especially in the U.S.) relevant to this issue. Both FASB standards and IASB standards allow either the DM or IM format, but both encourage DM presentation.[2] A joint IASB and FASB research initiative in 2005 identified DM statements of cash flows as a pertinent, timely research topic important to standard setters.[3] Further, a CFA Institute monograph on financial reporting for investors (CFA Institute 2005) lists DM statements of cash flows as one of twelve significant reforms needed to improve

[1] See Statement of Financial Accounting Concepts No. 1 (FASB 1978).
[2] See International Accounting Standard No. 7 (IASB 1992) and Statement of Financial Accounting Standards No. 95 (SFAS 95).
[3] The Reporting Financial Performance (RFP) Research Program promotes research to inform the IASB's decision process. RFP is a joint project of the IASB, the U.S. FASB and several of the IASB's liaison national standard setting partners. They asked, "Is the direct method for the statement of cash flows preferable to the indirect method, and if so why?"

financial reporting. It emphasizes that DM cash flow components are needed by investors to forecast a company's future cash flows.[4] The CFA Institute monograph notes that most companies provide insufficient information for even a skilled analyst to reconstruct DM components and states that estimating gross DM components "greatly reduces the reliability and usefulness of the information generated" (page 27). Despite CFA Institute, IASB and FASB stated preferences for DM statements, over 97% of U.S. public firms present IM statements of cash flows.

Current knowledge about DM disclosures is supported by only a few studies including Krishnan and Largay (2000), Cheng and Hollie (2005) and Clinch, Sidhu and Sin (2002). While all conclude the DM is useful, taken as a whole these studies offer limited empirical evidence applicable to U.S. firms due to various research design choices and issues. We discuss and address these points in our study.

We pursue three interrelated, corroborative research questions that, taken together, aim to extend our understanding of the usefulness of DM disclosures. First, we demonstrate that DM components cannot be accurately estimated from line disclosures on income statements and IM cash flow statements (the IM_SCF approach hereafter). Specifically we document the size and prevalence of "articulation errors" from the IM_SCF approach by comparing estimated DM component amounts to actual disclosed component amounts. Obviously if DM components could be derived from the IM cash flow statement and other disclosures then the debate would be essentially mute.

Krishnan and Largay (2000) provide evidence of articulation errors when estimating DM component amounts with combined balance sheet and income statement information (IM_BS approach hereafter). Prior research suggests that the IM_SCF approach should yield less severe

[4] The report states that cash collected from customers is the single most important direct cash flow number investors require for analysis, a primary indicator of a company's cash-generating ability (page 27) and that a primary purpose for this information is forecasting future cash flows (page 6).

and fewer articulation errors.[5] However, our evidence shows that extensive articulation errors exist in our U.S. sample even when DM components are estimated by the IM_SCF approach. The CFA Institute monograph concludes that "it is impossible to relate the adjustments in the indirect method cash flow statement to any single income statement line item" (see page 27 of the monograph).

Our second research question asks whether DM disclosure is incrementally useful for forecasting future CFO.[6] More specifically, we examine whether articulation errors resulting from IM_SCF estimates of DM components provide incremental explanatory power when forecasting future CFO. Investigating this research question is important because forecasting future CFO is an integral part of the widely used discounted cash flow valuation process. For this reason, SFAS 95 (paragraph 107) and the CFA Institute's monograph (page 6) point out the role of the statement of cash flows for forecasting future cash flows and cash generating ability. If articulation errors are too small or too infrequent to provide incremental predictive value for future CFO, the CFA Institute's claim may be overstated. Using firms that disclose DM statements, we find that DM disclosures are incrementally informative beyond IM disclosures when predicting future CFO. In particular, when either IM_SCF or IM_BS articulation errors for the two largest DM components, cash received from customers and cash paid to employees and

[5] Bahnson, Miller and Budge (1996) and Hribar and Collins (2002) document that changes in balance sheet operating accounts do not reconcile with changes shown on the IM statement of cash flows. This finding implies that estimates of DM components from the changes shown on the IM statement of cash flows (i.e., the IM_SCF approach) will potentially yield fewer and smaller articulation errors. Conclusions favoring DM disclosures could be premature to the extent that more accurate DM components can be estimated by the IM_SCF approach.

[6] While Krishnan and Largay (2000) and Cheng and Hollie (2005) ask similar research questions, our question has an important distinction from their studies. We ask whether the DM statement is "incrementally" useful for predicting future CFO. Krishnan and Largay (2000) run a "horserace" between an IM prediction model and a DM prediction model to see which model produces lower percentage errors in forecasting one period ahead CFO, ignoring the fact that DM components can be estimated from IM statements. Cheng and Hollie (2005) find that estimated DM components improve prediction of future CFO relative to aggregate CFO. Since they use "estimated" DM components for their tests, not actual DM components or articulation errors, it is ambiguous to conclude that DM disclosures are necessarily needed to enhance prediction of future CFO. Please see section 2.2 for details.

suppliers, are included in our prediction models, we find that coefficients on articulation errors are significant and the explanatory power of the models improve.

After finding that IM_SCF articulation errors are widespread and useful for predicting future cash flows, as a third corroborative research question, we investigate whether firms voluntarily producing DM statements of cash flows reflect more information about future earnings in their current stock returns than firms producing only IM statements. Clinch, Sidhu and Sin (2002) investigate a contemporaneous relation between DM disclosure and returns using an Australian sample. We employ a FERC (future earnings response coefficient) methodology to provide evidence on whether DM disclosures are helpful when forecasting future operational performance. If any important incremental information is revealed by DM disclosures, as indicated by our tests predicting future cash flows, the information should "bring the future forward" as Lundholm and Myers (2002) characterize, yielding a positive interaction between DM disclosure and future measures of operating performance. As hypothesized, we find that more information about future earnings is reflected in current stock returns for firms disclosing DM statements of cash flows. The improved stock price informativeness via DM statements suggests that disclosed DM components provide investors with a useful basis for estimating future earnings, incremental to information of IM statements. However, we find no evidence of an improved or declined contemporaneous association between returns and current earnings for DM disclosures. The influence of DM disclosure on returns appears primarily through greater predictive ability with respect to future fundamentals, without decline in the relevance of current earnings. Further, we find that when firms disclose DM statements of cash flows, articulation errors no longer are associated with current returns. We interpret this finding as evidence that the market pays attention to DM disclosures, when available.

Self selection is an important concern with our FERC results since SFAS 95 allows a firm to choose between producing only an IM statement or a DM statement (which must be supplemented with IM disclosures). If DM disclosing firms are fundamentally different from IM

disclosers, our results may be driven by other differences and not the DM disclosures themselves. Our univariate comparisons indicate that our DM sample firms are smaller but have similar levels of stock returns, profitability, and growth when compared to our matched IM sample firms. Our FERC results are robust to a battery of sensitivity checks controlling for sample firm characteristics and self-selection. Specifically addressing self selection, we find no meaningful difference in FERC during the pre-adoption period between firms that chose either the DM or IM upon adoption of SFAS 95. Further, using a sub-sample of firms that did not produce DM statements in every year of our sample period, we find that DM disclosure is associated with higher FERC only when firms disclose DM statements for the fiscal year. We conclude that self selection issues are unlikely to explain our results.

Our findings contribute to the extant literature in several ways. First, extending prior studies, we document that estimating DM components from IM statements of cash flows (or balance sheets) produce non-trivial articulation errors. This result confirms the view of the CFA Institute that conversion from indirect to direct components is not a simple mechanical exercise. Second, we find that identifying articulation errors is important for accounting users because such errors are incrementally useful for predicting future operating cash flows in addition to estimated DM components. Our results suggest that DM cash flow components from various operating activities persist differently into future cash flows and that knowing accurate amounts of each component can enhance prediction model performance.

Our main contribution to the literature is documenting the predictive value (ability) of DM disclosures for future operations. This is the primary reason why SFAS 95 states a preference for DM cash flow statements over IM cash flow statements. After addressing this issue, we conclude that DM disclosures are valuable to investors because they help predict future cash flows and are associated with higher FERC after controlling for other FERC determinants and

testing for self selection concerns.[7] These findings indicate that the FASB and IASB might fruitfully reassess current disclosure requirements pertaining to DM statements of cash flows. Since we do not consider costs or cost-benefit tradeoffs associated with DM disclosures we stop short of recommending that the FASB require DM disclosures. Cost-benefit tradeoffs can be more suitably deliberated by accounting standard setters. We note, however, that Australia, New Zealand and China have addressed these tradeoffs and require the DM format.

The remainder of the paper is structured as follows: In section 2, we review prior literature and discuss hypotheses. Section 3 presents our research design and sections 4 and 5 describe our sample and empirical findings. Section 6 concludes.

2. Literature and Hypotheses

2.1. Articulation Errors

We first examine whether articulation errors exist when DM components are estimated by the IM_SCF approach, and if they do, how prevalent and how large they are. Articulation errors can only occur at the level of DM components, not in total, because the total amount of operating cash flows is the same under either method. A prior study by Krishnan and Largay (2000) established that articulation errors exist for U.S. firms when the components are estimated from balance sheet and income statement information (i.e., the IM_BS approach), but this result is not surprising as some current assets/liabilities on balance sheets reflect non-operating transactions and thus introduce noise into the estimation. Specifically, Hribar and Collins (2002) provide evidence implying that non-operating transactions such as mergers and acquisitions, reclassifications, divestitures, accounting changes and foreign currency translations introduce systematic errors into the estimation of DM components when the IM_BS approach is used. Their

[7] This result is important because more efficient (informative) prices likely lead to more efficient resource allocation in the economy. Tobin (1982) describes the stock market as functionally efficient if stock prices direct capital to its highest value uses. He points out that a necessary condition for functional stock market efficiency is that share prices track firm fundamentals closely. Durnev, Morck, Yeung, and Zarowin (2003) link informational efficiency and functional efficiency.

evidence also implies that articulation errors still exist after removing the effects of mergers and acquisitions, discontinued operations (a proxy for divestitures) and foreign currency translations (see their Table 1 Panel D).

To our knowledge, prior studies have not examined possible articulation errors from IM_SCF approach for U.S. firms.[8] If IM_SCF articulation errors do not exist then IM disclosures can be used to build accurate DM statements of cash flows. SFAS 95 alludes to this perspective in paragraphs 116-118 and 121, while acknowledging possible (presumably innocuous) estimation errors. Further, the fact that both the IM and the DM by definition reconcile to the same CFO number lends support to the idea that converting from an IM to DM statement of cash flows is largely a mechanical exercise.

Offsetting the view that the IM_SCF approach generates reasonably accurate DM component amounts is the CFA Institute monograph (page 27) which claims that skilled analysts cannot create accurate DM statements of cash flows because it is impossible to relate IM reconciling amounts to particular income statement line items. Netting and reclassifying transactions on the IM statement could cause IM_SCF estimation errors at the component level. Exploring the CFA Institute's comments we developed Appendix A offering anecdotal evidence illustrating the CFA Institute's viewpoint for two large U.S. companies that voluntarily produced DM statements of cash flows. Based on our anecdotal evidence in Appendix A and conclusions reached in the CFA Institute monograph, we state our first hypothesis:

> *H1: Line items from income statement and IM cash flow statements (the IM_SCF approach) cannot yield error-free estimates of line items on DM cash flow statement.*

2.2. Forecasting Future Cash Flows

[8] One exception is Clinch et al. (2002) who study Australian firms. They report correlations between estimated DM components (using the IM_SCF approach) and reported DM components that are less than 100%, as well as differences in means, medians and standard deviations. The Australian Accounting Standards Board (AASB) 107 "Cash Flow Statements" requires Australian firms to present DM statements of cash flows. However, since the specifics of DM statements and income statements in Australia differ from those in the U.S. to some extent, their results may not readily extrapolate to the U.S. firms.

As a second research question we ask whether DM disclosures improve forecasts of future cash flows. In particular, we examine whether actual IM_SCF articulation errors are incrementally useful beyond estimates of DM components when forecasting future CFO. Both SFAS 95 (paragraph 107) and the CFA Institute monograph (page 6) advocate DM disclosures over IM disclosures because they believe the DM enhances predictability of future CFO. However, if DM components can be estimated from IM disclosures without resultant articulation errors, DM disclosures would be redundant information. We hypothesize that the DM format improves predictability of future cash flows because of the existence of articulation errors. This leads to the following hypothesis:

> *H2: Articulation errors incorporate information useful to enhance predictions for future cash flows from operations.*

A few prior studies are related to this research hypothesis. Barth, Cram and Nelson (2001) find that disaggregating earnings into accrual components and CFO improves predictability of future cash flows. Their finding shows that each accrual component reflects different information relating to future cash flows and aggregating earnings masks this information. They suggest that disaggregating CFO into DM components could further improve predictive ability of their models. If DM components, including cash received from customers, cash paid to suppliers and employees, cash paid for interest and cash paid for taxes, have different levels of persistence for future CFO, including individual DM components in forecasts may substantially improve future cash flow predictions. Consistent with the Barth et al. (2001) suggestion, Cheng and Hollie (2005) find that estimated cash flow components from various operating activities persist differentially; cash related to sales, cost of goods sold, operating expenses and interest persist more than cash related to taxes and others, and that the persistence of cash flow components are generally higher than those of accruals. An important note in their findings is that since Cheng and Hollie (2005) use “estimated” cash flow components for predicting future CFO, one cannot conclude that DM statements are incrementally useful information beyond estimated DM components to predict

future cash flows before investigating the role of articulation errors identified from actual DM statements.[9]

Similar in spirit to our study, Krishnan and Largay (2000) investigate whether components of DM statements better predict future cash flows than components of IM statements. Krishnan and Largay develop a time-series model to predict one-year ahead operating cash flows. Their IM model predicts CFO using items similar to IM components while their DM model uses either disclosed (for DM disclosure firms) or estimated (for IM disclosure firms using the IM_BS approach) DM components to predict CFO. Comparing the predictive abilities of the two models based on mean absolute percentage forecast errors they find that the DM model yields lower errors, regardless of whether disclosed or estimated DM components are used in the model. Implicitly, Krishnan and Largay's test design assumes that users have either IM or DM information, but not both. However, SFAS 95 requires firms producing a DM statement of cash flows to provide an IM reconciliation. Thus a pertinent issue we address is whether the DM disclosure is incrementally informative to indirect model information where DM components can be estimated based on either the IM_BS or IM_SCF approaches. Another improvement in our testing procedure can be seen with respect to cash paid for taxes and cash paid for interest. Krishnan and Largay (2000) exclude these required disclosures from their IM prediction model but include them in their DM prediction model, where they are generally statistically significant. However, these items are required disclosures even when the IM is presented (SFAS 95, paragraph 121). Their research design choices in this regard bias in favor of their conclusions favoring DM disclosures.

2.3. Information Reflected in Stock Prices

[9] We also estimate the DM components as recommended by SFAS 95. Cheng and Hollie (2005) create their own DM component scheme. All of our sample DM firms follow the SFAS 95 categorization scheme.

Our third research question helps corroborate our previous two research questions by asking whether information revealed by DM disclosures is reflected in stock returns. If IM_SCF (and IM_BS) articulation errors are incrementally helpful in predicting future performance of firms, then such information should be reflected in stock returns. Alternatively, if the information is too trivial to be detected in returns or perhaps firms selecting the IM produce detailed DM footnote disclosures, DM disclosures may not reveal incremental information about future performance to the market.

We utilize a FERC framework for these tests. The Collins, Kothari, Shanken and Sloan (1994) FERC framework is particularly relevant with regard to this research question as both the CFA Institute monograph and SFAS 95 (paragraph 5) state that forecasting operating performance is a primary purpose of the cash flows statement and disclosure of DM components provides a more useful basis for estimating future operating performance. One can see this advantage intuitively with the following example: Suppose an accounting user predicts product selling prices of a firm to increase by 6% in the following year and inventory purchase costs by 4%. The DM disclosure of cash received from customers or cash paid to suppliers can be multiplied by 106% and 104%, respectively, to construct the next year's cash forecasts, however, no similar easy way to forecast is available with IM disclosures. IM_SCF articulation errors only enhance the potential value of DM disclosures beyond this intuitive example. When DM components are expected to persist differently for future time horizons, a decomposed cash flow analysis may better allow investors to infer the permanence of future earnings. Such cash flow analyses for future performances are widely used for credit analysis, assigning loan terms, earnings quality assessments, solvency forecasts, and setting dividend and expansion policies.

Collins et al. (1994) argue that lack of timeliness implies that future earnings should be included in the price-earnings relation. Gelb and Zarowin (2002) extend the argument of Collins et al., noting that an objective of disclosure is to help investors predict future earnings and cash flows. Lundholm and Myers (2002) also show that disclosure activity can "bring the future

forward." In these studies, the coefficient on future earnings in the return-earnings regression is called the future earnings response coefficient (FERC) which is argued to measure stock price efficiency or informativeness, i.e., the amount of future earnings information reflected in current returns.[10] [11] Consistent with the FERC framework, if DM disclosure reveals to the market incrementally useful information relevant to firms' future performance, then more information about future earnings will be reflected in current returns. This leads to the following hypothesis in alternative form:

> *H3: The DM presentation of the operating section of cash flow statements increases the market's ability to predict future earnings. This increased ability is reflected in current returns.*

A previous study relating DM disclosures to stock returns is Clinch et al. (2002). Utilizing an ERC (Earnings Response Coefficient) framework, they explore whether disclosed DM components provide incremental contemporaneous explanatory power for returns beyond aggregate (net) CFO based on a sample of 146 Australian firms. Initially they do not find evidence that DM disclosure enhances the contemporaneous returns-earnings relation for their full sample of manufacturing firms while they find such evidence for mining firms. When they partition observations based on the ability of cash flow components to predict future CFO, manufacturing firms with a higher predictive ability have components that significantly explain current returns. They then document that disclosed DM components incrementally explain current returns for firms with large differences between disclosed and estimated CFO components.

[10] Two recent papers document other factors that are associated with firms' FERC. Tucker and Zarowin (2006) find that current annual stock returns of higher income-smoothing firms contain more information about their future earnings than do the returns of lower income-smoothing firms. They interpret this result as managers' using financial reporting discretion via income-smoothing to convey information about future earnings. Ettredge, Kwon, Smith, and Zarowin (2005) investigate the effect of firms' adoption of *SFAS 131* segment disclosure rules on the stock market's ability to predict firms' future earnings. They find that sample firms, other than single-segment firms that were unaffected by *SFAS 131*, experienced a significant increase in FERC after adopting *SFAS 131*, as the standard setters suggested.

[11] The interpretation of the results of these studies as well as our study relies on the assumption that the stock market is efficient. To the extent that market mispricing exists, alternative explanations are possible.

Our test design differs from Clinch et al. (2002) in several directions. First, we argue that their results may not readily extrapolate to U.S. firms as there are differences in disclosure practices between U.S. and Australian firms. For example, while U.S. firms are required to disclose cash paid for taxes and cash paid for interest when they present the IM statement of cash flows, these supplemental disclosures to the IM were not considered in the Clinch et al. (2002) Australian tests.[12] Second, we utilize a FERC framework which we believe more relevant to our research questions on predictive value of DM disclosures and more directly aligned with the arguments of the CFA Institute monograph and SFAS 95.

3. Research Design

3.1. Articulation Errors

Articulated estimates of DM components are calculated using the IM_BS approach following Krishnan and Largay (2000) and Livnat and Zarowin (1990) as well as the IM_SCF approach.[13] These two types of articulated estimates are then compared with actual amounts reported in the DM statement of cash flows. Firms that disclose DM components follow SFAS 95 guidance and include cash received from customers and cash paid to suppliers and employees. For most firms these are the largest DM components. $abs(C\_sales\_err_t)$ [$abs(C\_supem\_err_t)$] represents the absolute difference between actual cash received from customers [actual cash paid to suppliers and employees] as disclosed in the DM statement of cash flows and the articulated estimate calculated under either the IM_BS or IM_SCF approach. These amounts are deflated by market value of equity three months after t-1 fiscal year-end or average

[12] Instead their study estimates cash paid for taxes and cash paid for interest and includes differences between these estimates and actual reported amounts when testing for equality of DM components. Indeed, while Clinch et al. (2002) cite U.S. DM accounting disclosure policies and issues as motivation for their study, they are silent about the importance of their conclusions for U.S. firms.

[13] For example, Krishnan and Largay (2000) estimate cash collected from customers as sales minus change in account receivable. Since they use the IM_BS approach, change in account receivable is indirectly obtained from comparative balance sheets. The IM_SCF approach derives change in account receivable directly from IM statement of cash flows.

book value of total assets. Different deflators are used in order to compare results with prior studies. $abs(C\_err_t)$ is the sum of $abs(C\_sales\_err_t)$ and $abs(C\_supem\_err_t)$.

As mentioned earlier, we do not calculate articulation errors for either income tax paid or interest paid because these DM components are required disclosures when IM statements of cash flow are used. We also do not calculate articulation errors for miscellaneous cash receipts and payments. The definitions of miscellaneous receipts and payments vary from firm to firm, and year to year, and are thus difficult to estimate mechanically using IM disclosures. For many firms this line item is small relative to cash received from customers and cash paid to suppliers and employees.

3.2. Forecasting Future Cash Flows

Our base CFO forecasting model is (firm subscripts omitted):

$$CFO_t = a_t + b_1 CFO_{t-1} + \varepsilon_t \tag{1}$$

where we constrain the coefficients of the CFO components to be equal as in Barth et al. (2001) and Cheng and Hollie (2005). These studies use large samples of firms producing IM statements of cash flows while our sample is much smaller, including only firms producing DM cash flows. We deflate variables by average book value of total assets for comparability with prior studies.

We expand our base model creating a benchmark DM forecasting model using IM data. Our benchmark forecasting model is (firm subscripts omitted):

$$\begin{aligned} CFO_t = {} & a_t + b_1 C\_sales_{t-1} + b_2 C\_supem_{t-1} + b_3 D\_tax_{t-1} \\ & + b_4 D\_int_{t-1} + b_5 C\_other_{t-1} + \varepsilon_t \end{aligned} \tag{2}$$

Variables beginning with "*C_*" are calculated (i.e. estimated) employing both the IM_BS and IM_SCF methodologies. Variables beginning with "*D_*" are disclosed. We use disclosed tax and interest payments (D_tax_{t-1} and D_int_{t-1}) rather than calculate them because SFAS 95 paragraph 121 requires disclosure of these cash amounts whether the IM or DM is presented.

C_sales_{t-1} is estimated cash received from customers. C_supem_{t-1} is estimated cash paid to suppliers and employees. These amounts are estimated by the IM_BS or IM_SCF approach. C_other_{t-1} is a plug figure, taking disclosed CFO_{t-1} less the sum of C_sales_{t-1}, C_supem_{t-1}, D_tax_{t-1} and D_int_{t-1}.[14]

Model (2) is a likely forecasting model when only IM statement of cash flows information is presented. The included independent variables match those listed in SFAS 95 Illustrative Examples and paragraph 27. They are: cash received from customers, cash paid to suppliers and employees, interest received, interest paid and income taxes paid. Often interest received is netted against interest paid. Generally, firms then have another line item entitled "other" which may be a net amount.

We expand benchmark model (2) to test for the statistical significance of articulation errors, expecting model (3) to improve upon model (2) performance because it includes the extra information available from DM disclosures (firm subscripts omitted).

$$\begin{aligned} CFO_t = a_t + b_1 C\_sales_{t-1} + b_2 C\_supem_{t-1} + b_3 D\_tax_{t-1} + b_4 D\_int_{t-1} \\ + b_5 D\_other_{t-1} + b_6 C\_sales\_err_{t-1} + b_7 C\_supem\_err_{t-1} + \varepsilon_t \end{aligned} \quad (3)$$

Our interest is in statistical significance of $C\_sales\_err_{t-1}$ and $C\_supem\_err_{t-1}$. These variables represent the incremental information available from the DM format. $C\_sales\_err_{t-1}$ is the IM_SCF (or IM_BS) articulation error when C_sales_{t-1} is calculated using the IM_SCF (or IM_BS) approach. Calculations follow the same logic for $C\_supem\_err_{t-1}$. Model (3) includes the actual disclosed other amount, D_other_{t-1} (known when the DM

[14] Our specification differs from that used by Cheng and Hollie (2005) for the cash paid to suppliers and employees line item. They instead estimate cash flows for cost of goods sold (by adjusting cost of goods sold by the change in inventory and change in accounts payable) and cash flows for operating and administrative expenses sold. We choose not to pursue the same categories as Cheng and Hollie (2005) because their categorization scheme does not reflect the information firms provide when disclosing DM statements of cash flows. Our models also differ from Clinch et al. (2002) because they estimate cash paid for taxes and cash paid for interest for Australian firms whereas we included the required actual disclosed amounts for our U.S. firm sample.

components are disclosed) in place of C_other_{t-1} used in model (2). C_other_{t-1} is a plugged amount reconciling IM disclosures to CFO in the benchmark model when actual DM components are not known and by definition would incorporate $C\_sales\_err_{t-1}$ and $C\_supem\_err_{t-1}$.

3.3. Returns Tests

We employ several versions of the basic FERC model of Collins et al. (1994), Lundholm and Myers (2002), and particularly Tucker and Zarowin (2006) to explore whether firms producing DM statements of cash flows exhibit higher FERC than firms only producing IM statements of cash flows. Our primary model is (firm subscripts omitted):

$$\begin{aligned} R_t = {} & b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} \\ & + b_5 DM_t + b_6 DM_t * X_{t-1} + b_7 DM_t * X_t \\ & + b_8 DM_t * X_{t3} + b_9 DM_t * R_{t3} + b_{10+} controls + \varepsilon_t \end{aligned} \quad (4)$$

where R_t is annual common stock return starting from three months after *t*-1 fiscal year end; X_{t-1} and X_t are annual earnings for fiscal year *t*-1 and *t*, respectively. Often ΔX_t is used in the price-earnings relation under the assumption that earnings follow a random walk. Rather than restrict the specification by this assumption, we follow Lundholm and Myers (2002) and include X_{t-1} and X_t in the model. A random walk is a special case in this specification when $b_1 = -b_2$. In (4), based on prior studies, we expect b_1 to be negative and b_2 and b_3 to be positive. X_{t3} is the sum of earnings for fiscal years $t+1$ through $t+3$. The more that current return incorporates information about future earnings, the higher the expected coefficient on X_{t3}. Earnings are defined as income available to common shareholders before extraordinary items, and are deflated by market value of equity three months after $t-1$ fiscal year end; R_{t3} is common stock return for the three year period starting from three months *after t* fiscal year-end. In the return measures, we incorporate a three months lag to ensure that the financial statements have been released.

Following Lundholm and Myers (2002) and Tucker and Zarowin (2006), we combine the three future years' earnings into X_{t3} and future three years' returns into R_{t3} to increase the power of the test.

Collins et al. (1994) assert that the theoretically correct independent variable is expected future earnings not actual earnings. An errors-in-variables situation results whereby X_{t3} reflects events occurring in *t+1* through $t+3$ but not anticipated in period *t.* Collins et al. (1994) argue that including future returns, represented by R_{t3}, acts as a control variable for this measurement error, and they hypothesize a negative coefficient because future returns are correlated with the unexpected component of future earnings. The result is a better approximation to changes in expectations of future earnings occurring during period *t.* To test hypothesis H3, we include a dummy variable, DM_t, set equal to 1 if a firm uses the DM format during period *t*, 0 otherwise, and we interact DM_t with the earnings variables and future return variable.

Our coefficient of interest is b_8. This coefficient captures the effect on FERC of DM disclosures. We predict b_8 to be positive if DM statements enhance the market's ability to predict future earnings as hypothesized.[15] We add an interaction variable, $DM_t * R_{t3}$, to control for possible differential effect of measurement errors for DM firms. We include various robustness tests and control variables. Following Lundholm and Myers (2002), Ettridge, Kwon, Smith and Zarowin (2005), Tucker and Zarowin (2006), Freeman (1987), and Ayres and Freeman (2003) we introduce the following control variables:

[15] Coefficient b_7 is also of interest, measuring any incremental contemporaneous earnings response from DM disclosure. If DM disclosure strengthens the relation between current returns and current earnings by providing additional information for the analysis of current earnings, coefficient b_7 would be positive. If DM disclosure causes a substitution away from current earnings towards future earnings, allowing current returns to depend more heavily on future earnings, current earnings may become less relevant (See Gelb and Zarowin (2002) page 43 for further discussion). Since the direction is not clear, we do not provide a prediction for this coefficient.

$SIZE_t$ = natural log of the market value of equity at the beginning of fiscal year t (in $ millions);

$LOSS_t$ = 1 if $X_{t+1} < 0$; 0 otherwise;

$GROWTH_t$ = percentage growth in total assets from fiscal year t-1 to fiscal year t+1;

$EARNSTD_t$ = standard deviation of X for fiscal year t+1 through t+3;

$ANAL_t$ = natural log of one plus the number of analysts following a firm in the latest month prior to earnings announcement for fiscal year t from the IBES database.

We add $SIZE_t$ and the number of analysts following a firm ($ANAL_t$) to control for differences in information environments across sample firms. Large firms tend to have richer information environments and are followed by more analysts. We control for differences in earnings persistence using a dummy variable, $LOSS_t$. Negative future earnings would be more difficult to predict than positive earnings which are more likely to be normal and persistent. We include a firm growth variable ($GROWTH_t$) because high-growth firms tend to have more of their value from future earnings (i.e., a higher FERC). Lastly, we include a proxy of the volatility of future earnings ($EARNSTD_t$) as volatile earnings are more difficult to predict.

An important concern with this specification is that, even with controls, DM firms might be substantially different from IM firms and the DM disclosures themselves not responsible for a higher FERC. To address this possibility, we perform two self selection tests. We discuss these tests in section 5.4.

4. Data and Descriptive Statistics

4.1. Data and Sample Selection

The initial sample of firms publishing DM statements of cash flows was drawn from LexisNexis™.[16] Table 1 Panel A documents that initially there were 503 firms that had produced 1,999 DM statements of cash flows over the fiscal years 1989 through 2000 sample period. The

[16] The search algorithm is available upon request.

sample starts from 1989 because fiscal year 1988 was the first year firms were required by SFAS 95 to produce a statement of cash flows and our specification requires previous year cash flow data. The sample ends in 2000 because we require three years subsequent earnings and returns information. Financial firms producing DM statements were eliminated because many were banks and subject to regulatory disclosures beyond SFAS 95. Numerous firms and observations were eliminated due to data constraints on the COMPUSTAT and CRSP databases. To minimize the effect of outliers, we follow Tucker and Zarowin (2006) and delete observations that are in the top or bottom 1% of the distributions of the following variables from the available full sample (described below): past, current, and future three years' earnings, operating cash flows, and accruals as well as those for current and future three years' returns.

[INSERT TABLE 1 ABOUT HERE]

The final DM sample consists of 119 firms producing 573 DM statements of cash flows. Panel B Table 1 documents the sample distribution by year. DM observations have generally been decreasing on a year by year basis from 206 observations in 1989 to 135 observations in 2000.[17] We also create a full sample (n=33,193) which includes all firm-year observations, whether producing a DM statement of cash flows or not, that are not financial firms and have available COMPUSTAT and CRSP data items, excluding outliers. Once data requirements and financial industry membership are considered, approximately 2-3% of firm-year observations in the full sample include a DM disclosure with the percentage decreasing through time to 0.73% in 2000. These percentages are in line with the 2-3% reported in Krishnan and Largay (2000). We were not readily able to determine why the number of firms producing DM statements of cash flows has been decreasing. Tabulations (not reported) indicate that DM firms represent a variety of industries and are not concentrated in a single or small number of industries.

[17] A few firms in our DM sample switched either to or from the DM during our sample period. We attempted, unsuccessfully, to identify underlying reasons for the switch as they offered no explicit explanation.

4.2. Descriptive Statistics

Table 2 Panel A compares the DM firm sample (n=573) to non-DM firms in the full sample (n=32,620) (full sample of 33,193 less 573 DM observations). The primary difference between DM firms and non-DM firms is size. A Wilcoxon rank-sum test and *t*-test on $SIZE_t$ are both significant at less than 1%, indicating that overall DM firms are smaller than non-DM firms. The difference in number of analysts following a firm, $ANAL_t$, is also significant at less than 1% as the number increases with firm size in general. Other variables are statistically similar across the two samples.

[INSERT TABLE 2 ABOUT HERE]

Panel B of Table 2 compares DM sample means and medians with a non-DM matched sample of firms. Matching was made by fiscal year, two-digit SIC code and size. Matching on industry (two-digit SIC code) helps control for earnings timeliness (important for our FERC tests) since firms in the same industry are typically homogenous in their real activities and employ similar accounting disclosure methods (Gelb and Zarowin 2002). Matching on size was made because it is the most significant difference in the full sample comparisons (Table 2 Panel A). The matched sample includes 567 DM observations, slightly fewer than the DM firm sample (n=573), because no suitable non-DM firm was available for matching. Comparison with the matched sample shows that only the mean standard deviation of earnings, $EARNSTD_t$, is significantly higher for non-DM matched firms. We control for $EARNSTD_t$ in our FERC tests.

Overall, univariate comparisons of the DM and non-DM firms indicate that our DM firms do not follow typical characteristics of high-disclosure firms documented in prior literature. While Lang and Lundholm (1993) find that high-disclosure firms are larger in size, more profitable, faster growing and have higher stock returns than low-disclosure firms, our DM sample firms are smaller, and have similar levels of stock returns, profitability, and growth when compared to our matched non-DM sample.

Pairwise Pearson correlations between our regression variables in the full sample are presented in Table 2, Panel C. Returns, R_t, are positively correlated with current and future earnings (X_t and X_{t3}), as expected. Returns are negatively correlated with past earnings, X_{t-1}, in line with Lundholm and Myers (2002) and the mean-reverting nature of earnings. As expected, future returns, R_{t3}, are positively correlated with future earnings, X_{t3}. However, one concern is the statistically significant negative correlation between current returns, R_t, and future returns, R_{t3}, at -0.127 with a p-value of 0.001. Ideally R_{t3} would have no correlation with R_t since its role is to mitigate measurement error introduced when actual future earnings are used as an observable proxy for unobservable expected earnings. This Pearson correlation result does not appear to be an artifact of the large sample size (n=33,193). The correlation of R_t with R_{t3} for our smaller matched sample (n=1,134) was similar (-0.133 with a p-value of < 0.001). As a result, future returns may influence our regression results beyond their role as a measurement error proxy. Tucker and Zarowin (2006) also show a negative correlation between these variables in their Table 2 Panel B. Other correlation results are as expected.

5. Empirical Results

5.1. Articulation Errors

The number of observations in our original DM sample is 573. Observations in Table 3, Panels A and B are slightly lower due to missing data items in COMPUSTAT needed to calculate articulation errors.

[INSERT TABLE 3 ABOUT HERE]

Panel A of Table 3 reports that the median (mean) IM_SCF articulation error for $abs(C\_sales\_err_t)$ is 0.0041 (0.0514). The median (mean) articulation error for $abs(C\_supem\_err_t)$ is 0.0214 (0.0890), and the median (mean) for $abs(C\_err_t)$ is 0.0344

(0.1336). These error amounts are scaled by beginning market capitalization. The evidence suggests that there is a substantial aggregation of, and reclassifications between, components that cause IM_SCF approach articulation errors. Untabulated results indicate that the IM_SCF approach articulation errors are pervasive. About 63% of the sample generates an absolute difference between actual cash received from customers (disclosed in the DM statement) and the articulated estimate higher than $100,000. About 90% of the sample generates an absolute difference between actual cash paid to suppliers and employees (disclosed in the DM statement) and the articulated estimate higher than $100,000. We conclude that IM_SCF articulation errors exist, in support of hypothesis H1.[18] [19]

Panel B of Table 3 reports higher articulation errors from the IM_BS approach. The median (mean) articulation error for $abs(C\_sales\_err_t)$ is 0.0118 (0.0631). The median (mean) articulation error for $abs(C\_supem\_err_t)$ is 0.0228 (0.0921) and the median (mean) for $abs(C\_err_t)$ is 0.0412 (0.1459).[20] These errors are not directly comparable to those reported in Krishnan and Largay (2000) because they deflate by actual cash received from customers (or cash paid to suppliers and employees) and we deflate by market value of equity.[21] The median articulation errors are smaller than the mean in general, as in Krishnan and Largay (2000), indicating that there are firms with large articulation errors relative to the samples.

[18] We offer no formal statistical test since the alternative is zero error with no inherent error rate or randomness. That is, the existence of IM_SCF articulation errors is a factual statement with no probability or chance associated with it.

[19] Clinch et al. (2002) Table 6 tabulates univariate statistics for reported and estimated cash component amounts using the IM_SCF approach for their Australian sample. Our US sample shows smaller mean differences for cash received from customers and larger differences for cash paid to suppliers and employees.

[20] When we examine the articulation errors ($abs(C\_err_t)$) using the IM_BS approach (IM_SCF approach) year by year, the median annual value is highest, 0.0569, in 1999 and lowest, 0.0331, in 1993 (highest, 0.0493, in 1991 and lowest, 0.0282, in 2000). We could not find any increasing or decreasing trend over the sample years of 1989-2000.

[21] When we deflate the articulation errors by actual cash received from customers or actual cash paid to suppliers and employees as in Krishnan and Largay (2000), instead of market value of equity, our median articulation errors are comparable to those in Krishnan and Largay (2000), but our mean errors are much larger. This difference appears attributable to small deflators in some of the DM observations.

Comparing Table 3 Panels A and B, we find that articulation errors calculated with the IM_SCF approach are smaller than the IM_BS approach. When we perform a t-test for a difference in mean values of $abs(C\_sales\_err_t)$ from Panel A and Panel B, the difference is significant (t-value = 4.82 and p-value < 0.001). For $abs(C\_supem\_err_t)$ and $abs(C\_err_t)$ a t-value of the difference is 1.78 (p-value = 0.076) and 5.20 (p-value < 0.001) respectively. The Wilcoxon rank-sum test of the differences also yields all significant differences with p-values < 0.001. These results indicate that the IM_SCF approach yields significantly lower articulation errors than the IM_BS approach as expected. More importantly, however, we find that articulation errors still extensively exist for the IM_SCF approach. This implies that DM format is not redundant, confirming the view of the CFA Institute.

5.2. Forecasting Future Cash Flows

Table 4 documents results for our CFO prediction models using IM_SCF and IM_BS estimates. The sample used is the DM sample (n=573) less observations missing data. This leaves a DM adjusted sample of n=403 (n=440) for the IM_SCF (IM_BS) methods. We report results scaling all variables by average total assets to compare with Cheng and Hollie (2005) and Barth et al. (2001).

Our models exhibit higher adjusted R^2 than prior studies. The higher adjusted R^2 of 0.4254 to 0.5265 for our models compare to an adjusted R^2 of 0.2869 for Cheng and Hollie (2005) and 0.2400 for Barth et al. (2001). We also report higher coefficients on CFO_{t-1} (0.7480 and 0.7504) compared to 0.529 reported by Cheng and Hollie (2005). Our higher reported coefficients and R^2 statistics may be due to our outlier truncation procedure (see section 4.1). When we run base model (1) for the full sample (match sample), the adjusted R^2 is 0.5477 (0.5140) with coefficients on CFO_{t-1} of 0.7797 (0.6772).

[INSERT TABLE 4 ABOUT HERE]

Table 4 also documents results for models (2) and (3). Since results are quantitatively and qualitatively similar whether the IM_SCF or IM_BS methodologies are employed, we only discuss the IM_SCF results for brevity.

Benchmark model (2) predicts one-year-ahead CFO with information available in IM statements of cash flows. Coefficients on estimated cash received from customers and estimated cash paid to suppliers are 0.7281 and 0.7277. Both are significant (p-values < 0.001). Cheng and Hollie (2005) do not define a variable for cash paid to suppliers and employees, and Krishnan and Largay (2000) do not report coefficients so we cannot compare our coefficients to these prior studies. Decomposing CFO into estimated DM components improves explanatory power from .4254 to .4453. A chi-square test of equality of estimated DM components is rejected (p value = 0.001), implying that the decomposition improves informativeness. Using much different samples, this result is similar to Cheng and Hollie (2005).

Model (3) includes articulation errors representing additional information provided by DM disclosure beyond estimates using IM_SCF information. Coefficients on the articulation error terms, $C\_sales\_err_{t-1}$ and $C\_supem\_err_{t-1}$, are both significant (p values < 0.001). The coefficients values of 0.5936 and 0.5422, respectively, are not as large as those for C_sales_{t-1} and C_supem_{t-1} but, given their magnitude, are probably economically significant, nonetheless.[22] Importantly, a chi-square test of coefficient equality for D_other_{t-1}, $C\_sales\_err_{t-1}$ and $C\_supem\_err_{t-1}$ is rejected (p-value = 0.063). We also conducted Vuong (1989) Z-tests to examine whether differences in the explanatory power between models (1) and (2) and between models (2) and (3) are significant. Differences in these models are all significant at one percent or less. Taken together, these results indicate that DM components persist differently into future

[22] When we performed F-tests of coefficient equality between C_sales_{t-1} and $C\_sales\_err_{t-1}$ (C_supem_{t-1} and $C\_supem\_err_{t-1}$) coefficient differences were significant at five percent or less. This may be because error items related to netting or reclassifications have lower persistence when forecasting future CFO.

cash flows. Forecasting with actual DM components yields better predictions than forecasting with estimated DM components due to extensive articulation errors. This finding supports hypothesis H2 that DM statement of cash flows disclosures enhance predictability of CFO as SFAS 95 and the CFA Institute monograph suggest.

5.3. Returns Tests

Table 5 reports the results of our FERC models. Panel A reports results for model (4) without controls. Panel B includes controls. Panel C reports Fama-MacBeth regression results. Results are reported for the full sample (n=33,193), matched sample (n=1,134) and an articulable sample (n=27,865). As mentioned earlier, the matched sample was obtained by matching fiscal year, two-digit SIC code and size. The articulable sample includes only full sample observations that have COMPUSTAT information needed to estimate DM items cash received from customers and cash paid to suppliers and employees using either the IM_BS approach or the IM_SCF approach. Some corresponding data items are missing or combined into other data items in COMPUSTAT for a non-trivial number of firms. We exclude those observations from the articulable sample.

[INSERT TABLE 5 ABOUT HERE]

The results of model (4) are similar across the three samples.[23] Prior period earnings, X_{t-1}, are negative and significant, as expected, while the coefficient on current earnings, the traditional ERC, is positive. In the full sample, the coefficient on past earnings is -1.0468, and the coefficient on current earnings is 0.9904. These coefficients are of similar magnitude and opposite in sign, indicating that the market reacts to current earnings as if it closely follows a random walk.

[23] When estimating the coefficients' standard errors (and p-values) in Tables 5-7 except for Table 5C: Fama MacBeth results, we use the White (1980) procedure to correct for heteroscedasticity and a clustering procedure to account for serial dependence across years for a given firm.

Future earnings, X_{t3}, is positive and significant for the full sample and articulable sample, but negative and insignificant for the much smaller matched sample. It is significant once control variables are added (Table 5 Panel B). The positive and significant coefficient indicates that future earnings information is incorporated into current stock price, in line with prior findings of Lundholm and Myers (2002), Gelb and Zarowin (2002), and Ettredge, Kwon, Smith and Zarowin (2005). The coefficient on future returns, R_{t3}, is negative and significant for each sample, as expected given its role to control for measurement error. Adjusted R^2 results for the primary model are .0600 to .1547, lower than adjusted R^2 results of .16 to .23 reported in Lundholm and Myers (2002) and Gelb and Zarowin (2002).

Our primary variable of interest is $DM_t * X_{t3}$. The coefficient on $DM_t * X_{t3}$ is positive and significant with p-values of .008, .012 and .004 for the three samples in the primary model. We interpret this result as supporting hypothesis H3: Producing a DM statement is associated with an increase in the market's ability to predict future earnings, with the increased ability reflected in current stock returns.[24] However, we cannot rule out the possibility that the DM_t dummy variable proxies for omitted factors from our model. For example, DM disclosure is a voluntary disclosure and it may be that firms producing DM statements of cash flows also produce a plethora of other voluntary disclosures helpful in predicting future earnings. Alternatively, firms producing a DM statement of cash flows may have more predictable earnings. To alleviate this concern, we add a set of variables to control for potential omitted factors in Table 5 Panel B, which are firm size, whether a firm records a loss in period *t* or not, growth in firm assets, earnings volatility, number of analysts following a firm, number of business and geographic segments, and issuance of management earnings guidance.

[24] One may argue that our finding of higher FERC for DM firms could be due to lower value-relevance of current reported earnings (i.e. lower ERC) for DM firms. Indeed, the estimated coefficient for DM_t*X_t in Table 5 Panel A Match Sample is negative 0.3141. We note, however, that coefficients on these variables are statistically insignificantly different from zero, negating the argument. Further, when control variables are included in Table 5 Panel B, Match Sample, DM_t*X_t is positive albeit still statistically insignificant.

Overall conclusions do not change when control variables are added. The coefficients on $DM_t * X_{t3}$ in Table 5 Panel B are slightly lower than in Table 5 Panel A, ranging from 0.1937 to 0.2501 (with p-values from 0.012 to 0.031) after including control variables. The dummy variable DM_t remains insignificant as does $DM_t * X_t$. We also find that while coefficients on X_{t3} are all significant, each control variable and its interaction with future earnings, X_{t3} (e.g. $SIZE_t * X_{t3}$, $LOSS_t * X_{t3}$, etc.) are also generally significant with predicted signs. Adjusted R^2 increases substantially when these control variables are added, ranging from .1976 for the full sample to .2775 for the matched sample.

Since several control variables are highly correlated, which could cause a multi-collinearity problem, we also attempt to add control variables individually to the primary models (e.g. $SIZE_t$ and $SIZE_t * X_{t3}$ only are added to the model, then $LOSS_t$ and $LOSS_t * X_{t3}$ only are added to the model, etc.). Although not tabulated, results are qualitatively the same. When we use market-to-book value of equity in our regressions as an alternative variable for $GROWTH_t$, results are also similar.

A possible explanation for our results is that firms reporting DM statements of cash flows may have simpler operating activities. Simpler operating activities may improve earnings predictability for DM firms compared to IM firms, thus increasing the association between stock returns and future earnings. To address this possibility, we compare the number of business and geographic segments (as proxies for business complexity) and dispersion of analyst forecasts in the latest month prior to earnings announcement (as a proxy for predictability of earnings) between DM firms and IM firms. For the full and matched samples the number of geographic segments was statistically significantly higher for IM firms, while differences in business segments and analyst forecast dispersion were not significant. Untabulated results show that

adding these three variables (and their interactions with X_{t3}) into the model as additional control variables does not alter our qualitative results.

In addition, we attempted to control for the overall level and quality of a firm's disclosures using the S&P disclosure ratings and/or the AIMR disclosure ratings. There were too few DM firms covered by these ratings for meaningful tests. Alternatively, in order to capture differences in management quantitative (point or range) guidance on annual earnings, we further obtained a sub-sample that is covered by the First Call database. Using this sub-sample (20,666 observations with 264 DM observations), we compared the number of management guidance announcements pertaining to both current and future year earnings, and pertaining only to future year earnings. The mean differences in both numbers between DM firms and IM firms were not statistically significant (i.e., p-values > 0.10) for both the full and matched sample samples. Adding the logged number of management guidance announcements (and interactions with X_{t3}) into the model as additional control variables also does not alter our main results. This suggests that the issuance of management guidance for future earnings is unlikely to explain our results.

Table 5 Panel C presents Fama MacBeth (1973) regressions. Previous regression results present pooled time-series results with the White (1980) procedure to correct for heteroscedasticity and a clustering procedure that accounts for serial dependence across years for a given firm. To further mitigate potential bias in our standard errors, we estimate cross-sectional regressions for our models annually. Mean and median key coefficients from the cross-sectional regressions are reported, along with Fama MacBeth (1973) *t*-statistics. Reported results are for primary models (without control variables). Inferences are qualitatively similar to previously reported pooled results. Untabulated results including control variables are also qualitatively similar.

In sum, we conclude that improved stock price informativeness via DM disclosure suggests that the DM format provides investors with an important useful basis for estimating

future earnings, incremental to information presented by the IM approach. This conclusion is invariant with various controls.

5.4. Self Selection Tests

An important issue with voluntary disclosure is self-selection. Although our results indicate that DM disclosure is associated with an increase in FERC, self-selection concerns may limit this interpretation. To address the concerns, we conduct the following two tests.

First, we examine whether our main findings are driven by a possible case where firms with a higher FERC in the pre-SFAS 95 period self-select the DM format upon adoption of SFAS 95. The pre-SFAS 95 fund flow statement prepared under APB Opinion No. 19, *Reporting Changes in Financial Position,* does not specify different forms of statements. Therefore if self-selection concerns are not an issue, we then expect no FERC differences between DM and IM firms in the pre-adoption period. To implement this test, we code a firm as a DM or IM adopter as of fiscal year 1988 and examine FERC differences in the pre-SFAS 95 years 1985-1987. Using a total of 5,903 observations (342 matched sample observations) in the pre-SFAS 95 period that satisfy our data requirements, we estimate the parameters in (4) with and without control variables. Table 6 Panel A indicates that coefficients on $DM_t * X_{t3}$ are negative and insignificant for both the full and matched samples, while other variables have coefficients and significance levels similar to results reported in Table 5, Panels A and B. Thus, we could not find evidence that DM firms exhibited a higher FERC level before they chose the DM format upon the adoption of SFAS 95. We interpret this finding as alleviating self-selection concerns.

[INSERT TABLE 6 ABOUT HERE]

Second, we limit our sample only to firms that issued at least one DM statement of cash flows during the 1989-2000 sample period. From Table 1, Panel A there were 119 firms that issued 573 DM statements in our sample. These same 119 firms issued another 336 IM statements

for a total sample of 909. By limiting the sample only to relatively homogenous firms that issued a DM statement of cash flows, we intend to partially control for self- selection and examine if those firms exhibit a higher FERC when they disclose a DM statement rather than an IM statement. Table 6, Panel B reports results with and without control variables. The table shows that most results are qualitatively similar to previously reported results. Taken together, we interpret these findings as suggesting that self selection issues are not likely driving our results.

5.5. Articulation Error Tests

Since DM firms disclose actual amounts of operating cash flow components, the effect of articulation errors on stock price informativeness should be non-existent for these firms. To confirm this expectation, Table 7 reports results after ranking the DM sample by $abs(C\_err_t)$ ($Error = Ranked\ abs(C\_err_t)$). The $Error$ variable, and all interactions of $Error$ with earnings and future returns, are insignificant as expected. Re-defining $Error = Q4$, where $Q4$ is a dummy variable set equal to 1 if $Ranked\ abs(C\_err_t)$ is in the largest quartile (representing the largest articulation errors) and 0 otherwise, we still find that the $Error$ variable, and all interactions of $Error$ with earnings and future returns, remain insignificant. These results are consistent whether articulation errors are calculated by either the IM_BS or IM_SCF approaches. This finding suggests that investors mostly rely on actual DM cash flow components, once they are disclosed in DM statements of cash flow, to predict future earnings rather than articulated estimates. Again this evidence points towards the value of DM disclosures for financial statement users.

6. Summary and Conclusions

In this study we investigate three interrelated research questions designed to explore the predictive value (ability) of direct method (DM) statement of cash flows disclosures. We are

motivated to pursue this study by the CFA Institute's recent request for DM disclosure as well as FASB and IASB requests for more research about DM disclosures.

When we examine articulation errors using income statement and IM statement of cash flows data to estimate DM components, we find that articulation errors using IM statement of cash flows data are smaller than those using IM balance sheet data, consistent with Hribar and Collins (2002), but still large and pervasive. Next, when we include articulation errors from estimates of DM components in CFO prediction models, predictions of future CFO improve. The improvement occurs whether income statement and either IM statement of cash flows data or balance sheet data are used to estimate DM components. This finding extends research forecasting future CFO including a recent extension of Barth, Cram and Nelson (2001) by Cheng and Hollie (2005). As proponents of the DM format claim, our results suggest that while adding individual DM component estimates into prediction models significantly improves forecasts of future cash flow, such improvement is diminished by the existence of noise in estimates of DM components. Lastly, by employing a FERC (future earnings response coefficient) framework, we provide evidence that firms producing DM cash flow statements have more information on future earnings reflected in their current stock returns than firms producing only IM statements. This framework matches a primary reason the FASB, IASB and CFA Institute are interested in DM statements of cash flows: To better predict future firm performance.

Our three research questions interrelate and taken together offer evidence that firms producing DM statements mitigate articulation errors, enhance forecasts of CFO, and reflect more future operating performance in current stock returns. The return results hold across a series of robustness tests. In sum, our results support CFA Institute's call for DM statements of cash flows.

We cannot readily recommend that firms producing only IM statements start producing DM statements because we have not directly considered costs. One of the reasons SFAS 95 does not require DM statements is that constituents claimed that costs to produce it were high (paragraphs 109 and 113). However, Miller and Bahnson (2002) propose a low cost, simple

methodology whereby firms record individual DM component amounts in temporary separate cash accounts to quantify totals. Trout, Tanner and Nicholas (1993) discuss detailed issues a large firm faced when implementing DM statements for internal reporting. While their case study indicates that implementing the DM approach was more difficult than the Miller and Bahnson (2002) proposal indicates, the firm credits the DM format with helping to solve a liquidity crisis and keeping operations on track. One internal benefit was simply that operating personnel could understand the DM format better. Further, DM statements of cash flows are required in Australia, New Zealand and China, direct evidence that they can be produced, presumably at reasonable costs. While there may be proprietary costs we are unaware of, it appears that DM statements of cash flows can be produced cost-effectively. We believe it worthwhile for standard setters to re-address the merits of DM disclosures.

References

Australian Accounting Standards Board (AASB). 2004. Cash Flow Statements. *Accounting Standard AASB 107*. (July).

Australian Accounting Standards Board (AASB). 1991, 1997. Statement of Cash Flows. *Accounting Standard AASB 1026.*

Ayers, B.C. and R. Freeman. 2003. Evidence that Analyst Following and Institutional Ownership Accelerate the Pricing of Future Earnings. *Working paper.* University of Georgia and University of Texas.

Bahnson, P. R., P. B. W. Miller and B. P. Budge. 1996. Nonarticulation in Cash Flow Statements and Implications for Education, Research and Practice. *Accounting Horizons* 10 (4) (December): 1-15.

Barth. M., D.P. Cram and K.K. Nelson. 2001. Accruals and the Prediction of Future Cash Flows. *The Accounting Review* 76 (1) (January): 27-58.

CFA Institute. 2005. A Comprehensive Business Reporting Model: Financial Reporting for Investors. *CFA Institute* (October).

Cheng, C. S. Agnes and D. Hollie. 2005. The Persistence of Cash Flow Components into Future Cash Flows. *Working paper.* University of Houston.

Clinch, G., B. Sidhu and S. Sin. 2002. The Usefulness of Direct and Indirect Cash Flow Disclosures. *Review of Accounting Studies,* 7: 383-404.

Collins, D. W., S. P. Kothari, J. Shanken and R. G. Sloan. 1994. Lack of timeliness and noise as explanations for the low contemporaneous return-earnings association. *Journal of Accounting and Economics* 18: 289-324.

Durnev, A., R. Morck, B. Yeung and P. Zarowin. 2003. Does Greater Firm-Specific Return Variation Mean More or Less Informed Stock Pricing? *Journal of Accounting Research* 41 (5): 797-836.

Ettredge, M. L., S. Y. Kwon, D. B. Smith and P. A. Zarowin. 2005. The Impact of SFAS No. 131 Business Segment Data on the Market's Ability to Anticipate Future Earnings. *The Accounting Review* 80 (3): 773-804.

Fama, E. F. and J. D. MacBeth. 1973. Risk, return and equilibrium: Empirical Tests. *The Journal of Political Economy* 81: 607-636.

Financial Accounting Standards Board (FASB). 1978. Objectives of Financial Reporting by Business Enterprises. *Statement of Financial Accounting Concepts No. 1*. Stamford, CT

Financial Accounting Standards Board (FASB). 1987. Statement of Cash Flows. *Statement of Financial Accounting Standards No. 95.* Stamford, CT

Freeman, R. 1987. The Association between Accounting Earnings and Security Returns for Large and Small Firms. *Journal of Accounting and Economics* 9: 195-228.

Gelb, D. S. and P. Zarowin. 2002. Corporate Disclosure Policy and the Informativeness of Stock Prices. *Review of Accounting Studies* 7: 33-52.

Hribar, P. and D. W. Collins. 2002. Errors in Estimating Accruals: Implications for Empirical Research. *Journal of Accounting Research* 40 (1): 105-134.

International Accounting Standards Board (IASB). 1992. IAS 7: Cash Flow Statements. *International Accounting Standards Board* (Revised).

Krishnan, G. V. and J. A. Largay. 2000. The Predictive Ability of Direct Method Cash Flow Information. *Journal of Business Finance & Accounting* 27 (1) and (2) (January/March): 215-245.

Lang, M. and R. Lundholm. 1993. Cross-Sectional Determinants of Analyst Ratings of Corporate Disclosures. *Journal of Accounting Research* 31 (2) (Autumn): 246-271.

Livnat, J. and P. Zarowin. 1990. The Incremental Information Content of Cash-Flow Components. *Journal of Accounting and Economics* 13: 25-46.

Lundholm, R. and L.A. Myers. 2002. Bringing the Future Forward: The Effect of Disclosure on the Returns-Earnings Relation. *Journal of Accounting Research* 40 (3) (June): 809-839.

Miller, P. B. W. and P. R. Bahnson, CPA. 2002. Fast track to direct cash flow reporting It's easier than you think to provide the information financial statement users want. *Strategic Finance* (February): 51-57.

Tobin, J. 1982. On the efficiency of the financial system. *Lloyd's Banking Review* 153: 1-15.

Trout, R. K., M. M. Tanner and L. Nicholas. 1993. On track with direct cash flow. (Chicago Central Pacific Railroad usage of direct cash flow statement). *Management Accounting (USA)* 75 (1) (July): 23.

Tucker, J. W. and P. A. Zarowin. 2006. Does Income Smoothing Improve Earnings Informativeness? *The Accounting Review* 81 (1) (January): 251-270.

Vuong, Q. H. 1989. Likelihood Ratio Tests for Model Selection and Non-nested Hypotheses. Econometrica 57: 307-333.

White, H. 1980. A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. *Econometrica* 48 (4): 817-838.

Appendix A
Examples of Articulation Errors

This example illustrates articulation errors for two large, public U.S. companies. Cash received from customers is estimated using both income statement and balance sheet information and income statement and indirect method statement of cash flows information. Both approaches exhibit articulation errors, yet are (were) firms with relatively simple businesses and relatively simple financial statements. Notice particularly that Office Depot aggregates provisions for inventories and receivables into one line item in its cash flows statement, obfuscating a detailed analysis of these different operating activities. IM (DM) refers to Indirect Method (Direct Method). "IM reconciliation" refers to the required supplemental IM reconciliation of earnings to Cash from Operations that is required when firms present DM statements of cash flows.

Compaq Computer (Selected financial statement information)		
Year ended December 31, in millions	**1996**	
Sales	18,109	
Gross increase in Accounts Receivable per Balance Sheet	154	
Net increase in Accounts Receivable per Balance Sheet	27	
(Increase) in A/R per IM reconciliation	(210)	
Provision for bad debts (from IM reconciliation)	155	
Net income	1,313	
Cash from operations	3,408	
Cash received from customers (from DM statement)	**17,939**	
Articulation error (based on gross A/R per B/S)		
Sales	18,109	
Less gross increase in A/R per B/S	(154)	
Estimated Cash received from customers	17,955	
Articulation error		16
Articulation error (based on net A/R per B/S)		
Sales	18,109	
Less net increase in A/R per B/S	(27)	
Estimated Cash received from customers	18,082	
Articulation error		143
Articulation error (based on A/R per IM reconciliation)		
Sales	18,109	
Less increase in A/R per IM reconciliation	(210)	
Estimated Cash received from customers	17,899	
Articulation error		(40)
Articulation error (based on A/R and Provision for bad debts from IM reconciliation)		
Sales	18,109	
Less increase in A/R per IM reconciliation	(210)	
Plus Provision for bad debts (from IM reconciliation)	155	
Estimated Cash received from customers	18,054	
Articulation error		115

Appendix A (continued)
Examples of Articulation Errors

Office Depot (Selected financial statement information) Year ended, in '000's.	**December 25,1999**	
Sales	$10,263,280	
Gross increase in Receivable per Balance Sheet	129,841	
Net increase in Receivable per Balance Sheet	128,032	
(Increase) in Receivables per IM reconciliation	(152,523)	
Provision for losses on inventories and receivables per IM reconciliation	111,510	
Net income	257,638	
Cash from operations	373,152	
Cash received from customers (from DM statement)	**10,205,532**	
Articulation error (based on gross A/R per B/S)		
Sales	10,263,280	
Less gross increase in Receivables per B/S	(129,841)	
Estimated Cash received from customers	10,133,439	
Articulation error		(72,093)
Articulation error (based on net A/R per B/S)		
Sales	10,263,280	
Less net increase in Receivables per B/S	(128,032)	
Estimated Cash received from customers	10,135,248	
Articulation error		(70,284)
Articulation error (based on A/R per IM reconciliation)		
Sales	10,263,280	
Less increase in Receivables per IM reconciliation	(152,523)	
Estimated Cash received from customers	10,110,757	
Articulation error		(94,775)
Articulation error (based on A/R and Provision per IM reconciliation)		
Sales	10,263,280	
Less increase in Receivables per IM reconciliation	(152,523)	
Plus Provision for losses on inventories and receivables per IM reconciliation	111,510	
Estimated Cash received from customers	10,222,267	
Articulation error		16,735

Table 1
Sample selection and distribution

Panel A: Sampling process

	Number of firms	Number of observations
Initial DM sample identified from LexisNexis™ for fiscal years from 1989 to 2000	503	1,999
Less: Financial industry	(142)	(477)
COMPUSTAT data requirements	(143)	(397)
CRSP data requirements	(88)	(534)
Outliers	(11)	(18)
Final DM sample	119	573

Panel B: Sample distribution by year

Fiscal year	Number in initial DM sample	Number of final DM sample in full sample	Number in full sample	Percent of final DM sample in full sample
1989	206	59	2,067	2.85%
1990	169	56	2,164	2.59%
1991	167	59	2,185	2.70%
1992	166	59	2,391	2.47%
1993	160	61	2,852	2.14%
1994	152	56	3,087	1.81%
1995	182	48	3,009	1.60%
1996	212	50	3,039	1.65%
1997	176	39	3,110	1.25%
1998	143	38	3,167	1.20%
1999	131	25	2,986	0.84%
2000	135	23	3,136	0.73%
Total	1,999	573	33,193	1.73%

The full sample consists of all non-financial industry firm year observations that satisfy all CRSP and COMPUSTAT data requirements, exclusive of outliers.

Table 2
Sample statistics

Panel A: Full sample comparisons

Variable	DM firm-year obs (n=573)		Non DM firm-year obs (n=32,620)		Difference	
	Mean	Median	Mean	Median	t-test p-value	Wilcoxon test p-value
R_t	0.1693	0.0449	0.1600	0.0455	0.7164	0.9670
X_{t-1}	0.0205	0.0464	0.0241	0.0445	0.4683	0.5833
X_t	0.0258	0.0490	0.0266	0.0498	0.8834	0.8337
X_{t3}	0.1161	0.1540	0.0888	0.1386	0.1261	0.1641
R_{t3}	0.5543	0.2189	0.4357	0.1591	0.0331	0.1400
$SIZE_t$	4.5078	4.3859	5.3393	5.1477	0.0001	0.0001
ROA_t	0.0210	0.0422	0.0074	0.0438	0.0258	0.3766
LEV_t	0.1851	0.1054	0.1756	0.1337	0.3296	0.0047
$LOSS_t$	0.2443	0.0000	0.2731	0.0000	0.1258	0.1258
$GROWTH_t$	31.9231	18.1094	47.9026	18.6184	0.0812	0.7050
$EARNSTD_t$	0.0811	0.0513	0.0896	0.0468	0.1572	0.1400
$ANAL_t$	1.0865	1.0986	1.3908	1.3863	0.0001	0.0001

The p-values for differences in means (t-test) and medians (Wilcoxon Rank-sum test) are based on two-tailed tests. The non DM firm-year observation sample (n=32,620) is the full sample (n=33,193) less DM sample (n=573).

Definitions of Variables

R_t = annual (monthly compounded) stock return for the 12-month period starting three months after t-1 fiscal year-end;

X_{t-1} = income available to common shareholders before extraordinary items in fiscal year t-1 deflated by the market value of equity three months after t-1 fiscal year-end;

X_t = income available to common shareholders before extraordinary items in fiscal year t deflated by the market value of equity three months after t-1 fiscal year-end;

X_{t3} = sum of income available to common shareholders before extraordinary items for fiscal year t+1 through t+3 deflated by the market value of equity three months after t-1 fiscal year-end;

R_{t3} = monthly compounded stock return for the three-year period starting three months after t fiscal year-end;

$SIZE_t$ = natural log of the market value of equity at the beginning of fiscal year t (in $ millions);

ROA_t = income available to common shareholders before extraordinary items in fiscal year t deflated by the average total assets of fiscal year-ends t-1 and t;

LEV_t = long-term debt deflated by total assets at fiscal year-end t;

$LOSS_t$ = 1 if $X_{t+1} < 0$; 0 otherwise;

$GROWTH_t$ = percentage growth in total assets from fiscal year t-1 to fiscal year t+1;

$EARNSTD_t$ = standard deviation of X for fiscal year t+1 through t+3;

$ANAL_t$ = natural log of one plus the number of analysts following a firm in the latest month prior to earnings announcement for fiscal year t from the IBES Database;

Table 2 (continued)
Sample statistics

Panel B: Matched sample comparisons

Variable	DM firm-year obs (n=567)		Matched firm-year obs (n=567)		Difference	
	Mean	Median	Mean	Median	t-test p-value	Wilcoxon test p-value
R_t	0.1714	0.0484	0.1892	0.0787	0.6665	0.2593
X_{t-1}	0.0202	0.0463	0.0236	0.0550	0.5099	0.7666
X_t	0.0261	0.0497	0.0403	0.0511	0.1646	0.7664
X_{t3}	0.1166	0.1570	0.1118	0.1375	0.8892	0.3129
R_{t3}	0.5608	0.2213	0.5151	0.1684	0.5686	0.4403
$SIZE_t$	4.5075	4.3822	4.5509	4.4483	0.6735	0.5931
ROA_t	0.0213	0.0422	0.0165	0.0366	0.1416	0.2125
LEV_t	0.1846	0.1041	0.1758	0.1215	0.4731	0.2121
$LOSS_t$	0.2434	0.0000	0.2769	0.0000	0.1987	0.1986
$GROWTH_t$	32.1873	18.3012	59.0215	18.9768	0.0123	0.6777
$EARNSTD_t$	0.0813	0.0513	0.1031	0.0596	0.0253	0.0377
$ANAL_t$	1.0980	1.0986	1.0677	1.0986	0.6115	0.8831

The p-values for differences in means (t-test) and medians (Wilcoxon Rank-sum test) are based on two-tailed tests. See Table 2, Panel A for the definitions of variables. Six observations in the final DM sample (n=573) were dropped due to unavailable matching observations, leaving n=567 matching observations based on firm-year, two-digit SIC, and size.

Table 2 (continued)
Sample statistics

Panel C: Pearson correlation (full sample)

Variable	R_t	X_{t-1}	X_t	X_{t3}	R_{t3}	$SIZE_t$	ROA_t	LEV_t	$LOSS_t$	$GROWTH_t$	$EARNSTD_t$	$ANAL_t$
R_t												
X_{t-1}	-0.060											
	(0.001)											
X_t	0.125	0.576										
	(0.001)	(0.001)										
X_{t3}	0.055	0.418	0.524									
	(0.001)	(0.001)	(0.001)									
R_{t3}	-0.127	-0.017	-0.030	0.235								
	(0.001)	(0.001)	(0.001)	(0.001)								
$SIZE_t$	-0.040	0.235	0.197	0.154	-0.044							
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)							
ROA_t	0.110	0.280	0.492	0.285	0.006	0.174						
	(0.001)	(0.001)	(0.001)	(0.001)	(0.266)	(0.001)						
LEV_t	-0.061	-0.018	-0.036	0.015	0.007	0.134	-0.018					
	(0.001)	(0.001)	(0.001)	(0.007)	(0.234)	(0.001)	(0.001)					
$LOSS_t$	-0.141	-0.267	-0.373	-0.461	-0.081	-0.199	-0.412	-0.026				
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)				
$GROWTH_t$	0.186	-0.011	0.018	-0.122	-0.045	-0.001	0.004	-0.028	0.011			
	(0.001)	(0.044)	(0.001)	(0.001)	(0.001)	(0.987)	(0.423)	(0.001)	(0.046)			
$EARNSTD_t$	0.164	-0.085	-0.127	-0.312	0.023	-0.199	-0.128	0.061	0.185	0.159		
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)		
$ANAL_t$	0.049	0.159	0.152	0.132	0.002	0.780	0.211	0.117	-0.223	0.023	0.023	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.738)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	

Two-tailed p-values are presented in parentheses. See Table 2, Panel A for variable definitions.

Table 3
Articulation errors in DM sample

Panel A: Articulation errors in DM sample (IM_SCF approach)

Variable	Mean	Std. dev.	5%	25%	50%	75%	95%
$abs(C\_sales\_err_t)$ (n=499)	0.0514	0.1657	0.0000	0.0004	0.0041	0.0244	0.2985
$abs(C\_supem\_err_t)$ (n=411)	0.0890	0.2599	0.0000	0.0082	0.0214	0.0715	0.3515
$abs(C\_err_t)$ (n=403)	0.1336	0.3791	0.0014	0.0114	0.0344	0.0995	0.5829

Panel B: Articulation errors in DM sample (IM_BS approach)

Variable	Mean	Std. dev.	5%	25%	50%	75%	95%
$abs(C\_sales\_err_t)$ (n=528)	0.0631	0.1693	0.0000	0.0013	0.0118	0.0474	0.3144
$abs(C\_supem\_err_t)$ (n=449)	0.0921	0.2594	0.0000	0.0074	0.0228	0.0682	0.4336
$abs(C\_err_t)$ (n=440)	0.1459	0.3765	0.0019	0.0132	0.0412	0.1179	0.6427

$abs(C\_sales\_err_t)$ is the absolute difference between actual cash received from customers in the direct method form of statement of cash flows and the articulated number, deflated by the market value of equity three months after t-1 fiscal year-end.
$abs(C\_supem\_err_t)$ is the absolute difference between actual cash paid to suppliers and employees in the direct method form of statement of cash flows and the articulated number, deflated by the market value of equity three months after t-1 fiscal year-end.
$abs(C\_err_t)$ is the sum of $abs(C\_sales\_err_t)$ and $abs(C\_supem\_err_t)$.

In panel A, when we estimate articulation errors, we refer to the indirect method statement of cash flows for the information regarding changes in accounts receivable, changes in inventory and changes in accounts payable. In panel B, articulated numbers are estimated based on the information in balance sheet and income statement only following Krishnan and Largay III (2000) and Livnat and Zarowin (1990).

Table 4
Regressions of CFO models

Variable	IM_SCF statement of cash flows approach (n = 403)			IM_BS balance sheet approach (n = 440)		
	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
Intercept	0.0204 (.001)	0.0009 (.939)	-0.0014 (.910)	0.0221 (.001)	0.0008 (.946)	-0.0002 (.989)
CFO_{t-1}	0.7480 (.001)			0.7504 (.001)		
C_sales_{t-1}		0.7281 (.001)	0.7303 (.001)		0.7269 (.001)	0.7281 (.001)
C_supem_{t-1}		0.7277 (.001)	0.7292 (.001)		0.7278 (.001)	0.7284 (.001)
D_int_{t-1}		0.1704 (.601)	0.1627 (.620)		0.1627 (.566)	0.1618 (.569)
D_tax_{t-1}		0.0493 (.834)	0.0625 (.792)		0.0107 (.960)	0.0119 (.955)
C_other_{t-1}		0.4693 (.001)			0.5137 (.001)	
D_other_{t-1}			0.4987 (.001)			0.5453 (.001)
$C\_sales\_err_{t-1}$			0.5936 (.001)			0.6073 (.001)
$C\_supem\_err_{t-1}$			0.5422 (.001)			0.6122 (.001)
Adjusted R^2	.4254	.4453	.4937	.4681	.4881	.5265

Chi-square tests of coefficient equality:

Coefficients on C_sales_{t-1}, C_supem_{t-1}, D_int_{t-1}, D_tax_{t-1}, *and* C_other_{t-1} in model (2) are equal (d.f. = 4)
18.06 (p = 0.001) 15.37 (p = 0.004)

Coefficients on D_other_{t-1}, $C\_sales\_err_{t-1}$, *and* $C\_supem\_err_{t-1}$ in model (3) are equal (d.f. = 2)
5.53 (p = 0.063) 5.38 (p = 0.068)

The IM_SCF (IM_BS) approach that uses income statement and indirect method statement of cash flows (balance sheet) information. *CFO* is net cash flow from operation; *C_sales* is the articulated estimate of cash received from customers; *C_supem* is the articulated estimate of cash paid to suppliers and employees (denoted as a negative number); *D_int* is disclosed cash interest payment (denoted as a negative number); *D_tax* is disclosed cash tax payment (denoted as a negative number); *C_other* is *CFO* minus the sum of *C_sales*, *C_supem*, *D_int*, and *D_tax*; *D_other* is *CFO* minus the sum of *D_sales*, *D_supem*, *D_int*, and *D_tax*; *C_sales_err* is the articulation error for cash received from customers; *C_supem_err* is the articulation error for cash paid to suppliers and employees. All variables are deflated by average total assets. When estimating the coefficients' standard errors, we use a White (1980) procedure to correct for heteroscedasticity and a clustering procedure that accounts for serial dependence across years for a given firm. Two-tailed p-values are presented in the parentheses. See Table 2, Panel A for variable definitions.

Table 5
Regressions of FERC models

Panel A: Primary models

Variable	(1) Full sample (n=33,193)	(2) Articulable sample (n=27,865)	(3) Matched sample (n=1,134)
Intercept	0.1863 (.001)	0.1778 (.001)	0.1956 (.001)
X_{t-1}	-1.0468 (.001)	-1.0723 (.001)	-1.8830 (.001)
X_t	0.9904 (.001)	1.0800 (.001)	1.7132 (.001)
X_{t3}	0.0877 (.001)	0.1208 (.001)	-0.0139 (.793)
R_{t3}	-0.0807 (.001)	-0.0803 (.001)	-0.0469 (.028)
DM_t	-0.0037 (.892)	0.0013 (.966)	-0.0104 (.817)
$DM_t * X_{t-1}$	-0.3869 (.216)	-0.3040 (.343)	0.4531 (.470)
$DM_t * X_t$	0.4243 (.170)	0.2370 (.470)	-0.3141 (.367)
$DM_t * X_{t3}$	0.2471 (.008)	0.2554 (.012)	0.3503 (.004)
$DM_t * R_{t3}$	-0.0263 (.235)	-0.0385 (.069)	-0.0611 (.047)
Adjusted R^2	.0600	.0680	.1547

When estimating the coefficients' standard errors, we use a White (1980) procedure to correct for heteroscedasticity and a clustering procedure that accounts for serial dependence across years for a given firm. Two-tailed p-values are presented in the parentheses. DM_t is 1 if the direct cash flows method is used for cash flow statements in fiscal year t and 0 otherwise. See Table 2, Panel A for variable definitions. See Table 1 Panel A and B, Table 2 Panel B and Table 3 Panel A for sample descriptions.

Table 5 (continued)
Regressions of FERC models

Panel B: Primary models with control variables

Variable	(1) Full sample (n=33,193)	(2) Articulable sample (n=27,865)	(3) Matched sample (n=1,134)
Intercept	0.2101 (.001)	0.1744 (.001)	0.0241 (.760)
X_{t-1}	-0.9715 (.001)	-0.9731 (.001)	-1.6566 (.004)
X_t	0.6852 (.001)	0.7744 (.001)	0.8303 (.003)
X_{t3}	0.5388 (.001)	0.5753 (.001)	0.4505 (.012)
R_{t3}	-0.1030 (.001)	-0.1069 (.001)	-0.0789 (.001)
DM_t	0.0071 (.787)	0.0130 (.635)	0.0218 (.606)
$DM_t * X_{t-1}$	-0.0936 (.756)	-0.0165 (.958)	0.5293 (.386)
$DM_t * X_t$	0.3049 (.274)	0.1507 (.585)	0.2166 (.661)
$DM_t * X_{t3}$	0.1937 (.015)	0.1971 (.031)	0.2501 (.012)
$DM_t * R_{t3}$	-0.0171 (.412)	-0.0252 (.199)	-0.0459 (.122)
$SIZE_t$	-0.0554 (.001)	-0.0554 (.001)	-0.0304 (.098)
$SIZE_t * X_{t3}$	0.0393 (.001)	0.0428 (.001)	0.0258 (.342)
$LOSS_t$	-0.2131 (.001)	-0.2024 (.001)	-0.1106 (.025)
$LOSS_t * X_{t3}$	-0.3859 (.001)	-0.3546 (.001)	-0.2331 (.036)
$GROWTH_t$	0.0012 (.001)	0.0013 (.001)	0.0006 (.001)
$GROWTH_t * X_{t3}$	0.0002 (.001)	0.0002 (.001)	0.0003 (.063)
$EARNSTD_t$	0.8769 (.001)	1.0030 (.001)	1.5786 (.001)
$EARNSTD_t * X_{t3}$	-0.1095 (.002)	-0.1611 (.005)	-0.5724 (.027)
$ANAL_t$	0.1136 (.001)	0.1170 (.001)	0.1027 (.007)
$ANAL_t * X_{t3}$	0.0188 (.048)	0.0454 (.049)	0.1179 (.079)
Adjusted R^2	.1976	.2174	.2775

When estimating the coefficients' standard errors, we use a White (1980) procedure to correct for heteroscedasticity and a clustering procedure that accounts for serial dependence across years for a given firm. Two-tailed p-values are presented in the parentheses. DM_t is 1 if the direct cash flows method is used for cash flow statements in fiscal year t and 0 otherwise. See Table 2, Panel A for variable definitions. See Table 1 Panel A and B, Table 2 Panel B and Table 3 Panel A for sample descriptions.

Table 5 (continued)
Regressions of FERC models

Panel C: Fama-MacBeth regressions

Time-series statistics	(1) Full sample		(2) Articulable sample		(3) Matched sample	
	$DM_t * X_t$	$DM_t * X_{t3}$	$DM_t * X_t$	$DM_t * X_{t3}$	$DM_t * X_t$	$DM_t * X_{t3}$
Mean	0.1928	0.2783	0.1868	0.2587	-0.0847	0.2764
Median	0.2156	0.3240	0.2058	0.2758	0.0809	0.2991
F-M t statistics (p-value)	1.78 (.103)	3.35 (.007)	1.49 (.139)	3.09 (.002)	-0.11 (.917)	2.72 (.020)

DM_t is 1 if the direct cash flows method is used for cash flow statements in fiscal year t and 0 otherwise. See Table 2, Panel A for variable definitions. See Table 1 Panel A and B, Table 2 Panel B and Table 3 Panel A for sample descriptions.

Table 6
Self-selection issues

Panel A: FERC of IM or DM adopters during a pre-FASB (1987) period (1985-1987)

Variable	Full sample (n = 5,903)		Matched sample (n = 342)	
	Without control variables	With control variables	Without control variables	With control variables
Intercept	0.0710 (.001)	-0.1014 (.001)	0.1065 (.006)	-0.0539 (.001)
X_{t-1}	-0.5257 (.001)	-0.3868 (.001)	-2.5883 (.001)	-1.8962 (.001)
X_t	0.8536 (.001)	0.8333 (.001)	1.9870 (.001)	1.7178 (.001)
X_{t3}	0.1838 (.001)	0.7072 (.001)	0.0604 (.077)	0.5047 (.025)
R_{t3}	-0.0305 (.001)	-0.0768 (.001)	0.0326 (.371)	-0.0154 (.641)
DM_t	-0.0110 (.750)	0.0223 (.492)	0.0457 (.384)	-0.0569 (.235)
$DM_t * X_{t-1}$	-0.5205 (.146)	-0.6164 (.165)	1.6311 (.234)	1.2745 (.216)
$DM_t * X_t$	0.7708 (.204)	0.6854 (.124)	0.0190 (.975)	0.4319 (.756)
$DM_t * X_{t3}$	-0.1729 (.195)	-0.1228 (.213)	-0.0559 (.714)	-0.0265 (.664)
$DM_t * R_{t3}$	0.0362 (.377)	-0.0380 (.321)	-0.0258 (.644)	-0.0728 (.149)
$SIZE_t$		-0.0172 (.001)		-0.0191 (.366)
$SIZE_t * X_{t3}$		0.0746 (.001)		0.0562 (.196)
$LOSS_t$		-0.1559 (.001)		-0.1593 (.031)
$LOSS_t * X_{t3}$		-0.2533 (.001)		-0.7397 (.001)
$GROWTH_t$		0.0001 (.001)		0.0008 (.041)
$GROWTH_t * X_{t3}$		0.0002 (.034)		0.0014 (.028)
$EARNSTD_t$		0.7854 (.001)		1.3789 (.003)
$EARNSTD_t * X_{t3}$		-0.2575 (.001)		-1.1589 (.021)
$ANAL_t$		0.0193 (.001)		0.0499 (.099)
$ANAL_t * X_{t3}$		0.0577 (.001)		0.0424 (.582)
Adjusted R^2	.0966	.2116	.2055	.3703

When estimating the coefficients' standard errors, we use a White (1980) procedure to correct for heteroscedasticity and a clustering procedure that accounts for serial dependence across years for a given firm. Two-tailed p-values are presented in the parentheses. DM_t is 1 if the firm used direct cash flows method in 1988 upon the adoption of SFAS 95 and 0 otherwise. See Table 2, Panel A for variable definitions.

Table 6 (continued)
Self-selection issues

Panel B: Analyses with sub-sample that issued at least a DM statement over the sample period (n=909)

Variable	Without control variables	With control variables
Intercept	0.1590 (.001)	-0.0291 (.777)
X_{t-1}	-2.6862 (.023)	-1.7581 (.031)
X_t	3.4202 (.007)	2.1108 (.016)
X_{t3}	-0.2058 (.244)	0.8062 (.041)
R_{t3}	-0.0689 (.070)	-0.0926 (.017)
DM_t	0.0237 (.664)	0.0228 (.628)
$DM_t * X_{t-1}$	1.2524 (.202)	0.6216 (.246)
$DM_t * X_t$	1.0055 (.191)	0.1513 (.136)
$DM_t * X_{t3}$	0.5407 (.012)	0.4309 (.021)
$DM_t * R_{t3}$	-0.0382 (.393)	-0.0432 (.304)
$SIZE_t$		-0.0505 (.010)
$SIZE_t * X_{t3}$		0.0485 (.334)
$LOSS_t$		-0.0467 (.474)
$LOSS_t * X_{t3}$		-0.3287 (.015)
$GROWTH_t$		0.0021 (.001)
$GROWTH_t * X_{t3}$		0.0010 (.061)
$EARNSTD_t$		1.9508 (.001)
$EARNSTD_t * X_{t3}$		-2.4834 (.006)
$ANAL_t$		0.1024 (.006)
$ANAL_t * X_{t3}$		0.1501 (.123)
Adjusted R^2	.1646	.4006

When estimating the coefficients' standard errors, we use a White (1980) procedure to correct for heteroscedasticity and a clustering procedure that accounts for serial dependence across years for a given firm. Two-tailed p-values are presented in the parentheses. DM_t is 1 if the direct cash flows method is used for cash flow statements in fiscal year t and 0 otherwise. See Table 2, Panel A for variable definitions.

Table 7
Effect of articulation errors on FERC

Variable	*IM_BS Approach (n=440)*		*IM_SCF Approach (n=403)*	
	(1) Error = Ranked abs(C_err$_t$)	*(2) Error = Q4*	*(3) Error = Ranked abs(C_err$_t$)*	*(4) Error = Q4*
Intercept	0.1660 (.001)	0.1589 (.001)	0.1475 (.001)	0.1502 (.001)
X_{t-1}	-2.1574 (.001)	-1.9033 (.001)	-1.9030 (.004)	-1.8687 (.001)
X_t	2.2778 (.001)	1.9845 (.001)	1.4821 (.036)	1.8664 (.001)
X_{t3}	0.5683 (.003)	0.4520 (.001)	0.8374 (.001)	0.4760 (.001)
R_{t3}	-0.2150 (.001)	-0.1424 (.001)	-0.2090 (.001)	-0.1384 (.001)
Error	0.0960 (.780)	0.0236 (.690)	0.0839 (.569)	0.0301 (.621)
Error * X_{t-1}	0.9965 (.242)	0.9070 (.290)	0.5612 (.524)	0.8643 (.123)
Error * X_t	-1.3106 (.161)	-1.3271 (.134)	-0.0345 (.972)	-0.8338 (.187)
Error * X_{t3}	-0.2182 (.403)	-0.0701 (.658)	-0.5811 (.263)	-0.1150 (.490)
Error * R_{t3}	0.1616 (.137)	0.0775 (.172)	0.1497 (.263)	0.0623 (.186)
Adjusted R^2	.1877	.1897	.2072	.2041

When estimating the coefficients' standard errors, we use a White (1980) procedure to correct for heteroscedasticity and a clustering procedure that accounts for serial dependence across years for a given firm. Two-tailed p-values are presented in the parentheses. *Ranked abs(C_err$_t$)* is ranked value of *abs(C_err$_t$)* in each fiscal year and the first digit SIC industry between 0 and 1. *Q4* is a dummy variable which is 1 if *Ranked abs(C_err$_t$)* is in the largest quartile and 0 otherwise. See Table 2, Panel A for variable definitions. The samples include observations from the final DM sample (Table 1 Panel A) excluding observations with missing data items needed to calculate articulation errors.