IAS 7 Alternative Methods of Disclosing Cash Flow from Operations: Evidence on the Usefulness of Direct Method Cash Flow Disclosures

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Although IAS 7 allows two methods of disclosing cash flow from operating activities (CFO), Australian accounting standards require the disclosure of both CFO calculated using the direct method on the face of the cash flow statement and CFO calculated using the indirect method as a footnote disclosure. Prior research has established that direct method disclosure provides more value relevant information to investors for the purpose of calculating future CFO. Due to data limitations, prior research estimates components of CFO using 'indirect method' disclosures and concludes that models incorporating estimates of components of CFO are superior to models including only net CFO in predicting future CFO. This study investigates the relevance of the actual components of CFO in predicting future CFO for a sample of Australian firms.

We find evidence that disaggregating net interest paid (or received) into gross interest received and paid provides incremental information for cash flow prediction compared to net interest paid (or received) used in prior research. These results for cash components remain robust after controlling for accruals information. Interestingly, further tests show variation in company's operating cycles affects the predictive ability of cash flow components and also substantially enhance the explanatory power of the model when current CFO alone performs poorly as a predictor for future cash flow. These results have relevance to investors' concerned with estimates of future CFO and regulators deliberations on cash flow disclosure.

Keywords: Cash flow; Accounting Choice; Disclosure

1. Introduction

Although earnings are known to be a critical factor in determining a firm's financial performance, companies ultimately rely on CFO to maintain their continuous operations and business cash flows reflect a firm's ability to generate cash from their underlying operating activities. Various stakeholders such as debtholders, shareholders and employees are concerned about a firm's financial viability and returns and seek information in relation to the level of operating cash flow for a company. Also, due to various accounting treatments used to adjust or "manage" earnings, some argue that compared with earnings prediction, cash flow prediction may be a good or better proxy for measuring a firm's underlying value (and changes thereto).

Detailed statements of cash flow were introduced to partly address the need for users to better forecast a firm's cash flow status. IAS 7 (paragraph 4) states that:

"A cash flow statement, when used in conjunction with the rest of the financial report provides information that enables users to evaluate changes in net assets of an entity, its financial structure …. and its ability to affect the amounts and timing of cash flows in order to adapt to changing circumstances and opportunities." IAS 7 (paragraph 4) further asserts that "… cash flow information is useful in assessing the ability of the entity to generate cash and cash equivalents and enables users to develop models to assess and compare the present value of cash flows of different entities. This assertion is generally consistent with extant evidence in relation to the relevance of cash flow information which indicates that cash flow is associated with distress prediction[1], creditability[2] and equity valuation[3].

Unlike net cash flow from investing and financing activities, net cash flow from operating activities can be calculated and presented using either the direct or indirect method. Using the direct method, there is disclosure of the major cash inflows and outflows from operating activities (e.g. receipts from customers, payments to suppliers and employees, and tax paid) which sums to CFO.[4] Alternatively, using the "indirect method", CFO can be obtained by reconciling the reported operating profits with adjustments, including non-cash items (e.g. depreciation and amortisation expense), profits or losses relating to non-operating activities (i.e. investing and financing activities) and the effects of in accruals (e.g. net changes in accounts receivable and accounts payable). (*Refer illustration 1 in the Appendix*.) Evidence suggests that given a choice, managers generally prefer to report using the indirect

[1] For example, Casey, and Bartczak (1985); Rujoub, Cook, and Hay (1995); Ward, and Foster (1998).
[2] For example, Khumawala, Polhemus, and Liao (1981); Stancill (1987)).
[3] For example, Page, and Hooper (1979); Penman, and Sougiannis (1998); Barth *et al.* (1999).
[4] Depending on the jurisdiction, certain cash flow components are required to be separately disclosed. For example the international accounting standard (IAS 7) requires separate disclosure of income tax paid (or refund received), interest received and dividends received.

method (Krishnan, and Largay (2000)) but users express a preference for the direct method (Jones, and Widjaja (1998)).

IAS 7 defines cash flow from operating activities as the main revenue-producing activities of the enterprise that are not investing or financing activities, so CFO include cash received from customers and cash paid to suppliers and employees [*IAS 7.14*]. However, *IAS 7* only encourages the disclosure of CFO using the direct method and allows managers the choice between the direct method and the indirect methods of disclosure. As information about cash received from customers and cash paid to suppliers and employees is not explicitly presented in indirect method disclosure, this poses a question as to whether the indirect method disclosure provides enough information for financial statement users to understand a company's business and help predict core income and core cash flows.

Although the same disclosure option applies in many countries, such as the United States (*SFAS 95*), UK and Canada, debates about whether firms should disclose CFO components continue. There is support by analysts for a change in disclosure requirements. For example, a November 1993 AIMR[5] report noted a significant deficiency in financial reporting - failure of companies to present their CFO using the encouraged direct method. However a December 1994 AICPA[6] Special Committee report concluded against a proposal to mandate the use of the direct method based on three reasons. First, a substantial minority of users believes that the indirect method disclosure is acceptable or preferable. Second, the Committee's recommendations should provide enough supplementary information for users who support the direct method. Third, the implementation of a change to the direct method was expected to be costly.

However, researchers have provided empirical evidence contradictory to basis for the AICPA recommendations. It has been generally established that direct method disclosure is superior to indirect method disclosure for valuation purposes (Krishnan *et al.* (2000); Clinch, Sidhu, and Sin (2002)) and financial statement users (financial analysts and loan officers) showed relatively greater support for the direct method, compared with the indirect method (Jones *et al.* (1998)). The issue was again revisited more recently (2004) at a joint meeting of the IASB and the FASB where board members directed staff to evaluate the costs and benefits of using the direct method in addition to the indirect method. Although the staff recommended against a change to *IAS 7* (suggesting the costs might outweigh the benefits), the inferences drawn from the results will be open to question since direct method has not been never mandated and accordingly only limited data is available.

[5] The Association for Investment Management and Research.
[6] The American Institute of Certified Public Accountants.

In Australia, which has adopted the Standards of the IASB, the Australian Accounting Standards Board has decided to use the IASB Standards as the 'foundation' Standards but make adjustments that are applicable to Australian environment. Unlike *IAS 7, AASB 107* (the Australian version of IAS 7) mandates the direct method disclosure for cash flows from operating activities on the face of Statement of Cash Flow accompanied by a reconciliation disclosure in a footnote. This reconciliation disclosure takes the form of the indirect method of presenting and calculating CFO. As an extension of prior research on the arguments between direct and indirect method disclosures, we provide further evidence to unravel the predictive power of each cash flow component. The Australian accounting environment arguably provides a more complete data set that allows us to assess whether direct method disclosures of cash flow components provides additional information to financial statement users relative to net cash flows from operations.

Two major research questions will be addressed by the availability of Australian data: (i) whether components of operating cash flow disclosed using the direct method is superior to the net CFO in predicting future cash flow and (ii) which cash flow components are associated with future operating cash flow.

Our research findings contribute to the existing cash flow literature since the completeness of data available in Australia creates the possibility for superior research findings vis-à-vis the generally limited data availability. As highlighted in the following literature review, various issues have hampered United States research. Australian data is not subject to estimation error and selection bias that results from disclosure choice in the context that allows the alternative of the direct and indirect methods. In addition, our research aims to provide the initial groundwork that provides the practical ability to accurately forecast cash flow by identifying statistically significant and important cash flow components. This will facilitate creditors, investors and even managers in making their scarce resource allocation decisions.

The remainder of the paper is organized as follows. Section 2 reviews prior research. Section 3 describes the details of our research design, Section 4 contains a discussion of the results and Section 5 contains conclusions.

2. Prior Research

There has been a long debate over the superiority of current period earnings, cash flows and accruals information in predicting future operating cash flows. Some research

indicates that earnings are a better predictor of future cash flow than current cash flows[7] , while other research shows otherwise or finds no significant evidence[8]. Centred on United States data, many of these studies are subject to various limitations such as limited sample size or incompleteness of data.

Using a large samples based on United States data, Quirin *et al.* (1999)[9] and Barth, Cram, and Nelson (2001)[10] document that current cash flow is superior to current earnings in predicting future cash flows. Upon disaggregation of earnings into cash flow and accrual components (e.g., accounts receivable, accounts payable and inventory), Barth *et al.* (2001) find that components of accruals provide incremental information in addition to the use of net cash flow data for cash flow prediction[11]. This lends support to our model which uses current cash flow from Australian firms to predict future cash flows and the addition of accrual accounting data as extra components in our analysis.

Prior research has also compared (i) direct versus indirect method disclosures in predicting future operating cash flow (Krishnan *et al.* (2000); Cheng, and Hollie (2005)), and (ii) the net (aggregate) amount and components of operating cash flow. Based on a comparison of the prediction errors of direct and indirect method models Krishnan *et al.* (2000) find that direct method disclosures have better predictive ability than indirect method disclosures for one year ahead operating cash flows[12].

Research evidence also shows that disaggregating net CFO into its components significantly enhances cash flows prediction whether or not accruals information is controlled for (Krishnan *et al.* (2000); Cheng *et al.* (2005)). These papers obtain accruals data from the firms' balance sheet, but unlike Cheng *et al.* (2005), Krishnan *et al.* (2000) do not use changes in accruals from prior to current year but use levels of accruals for current year instead. Using changes in accruals helps capture the growth prospects for firms and therefore may be more relevant to future cash flows than levels of accruals.

As stated previously, *IAS 7* and *SFAS 95* permit firms a choice of using the direct or indirect method of disclosing CFO. However, where the direct method is used, the indirect method disclosures must also be provided. Therefore, research undertaken under the United States jurisdiction tends to be subject to data limitations and self-selection bias problems, which will affect the generalisability of the results. For example, the text search method used

[7] Greenberg, Johnson, and Ramesh (1986); Dechow, Kothari, and Watts (1998).
[8] Bowen, Burgstahler, and Daley (1986).
[9] Quirin *et al.* (1999) used 1,142 firms with data available for 1989-1996.
[10] The sample spans 1987-1996 and contains 10,164 firm-year observations.
[11] Bowen, Burgstahler, and Daley (1987); Murdoch, and Krause (1990) and Lorek, and Willinger (1996) also documented similar findings.
[12] They generate one-step-ahead cash flow predictions (the fourth year) for direct and indirect method models using three years of data and compare the prediction errors of different models based on the Friedman test.

to identify direct method firms is inherent with data omission problems[13]. In addition, the sample of Krishnan *et al.* (2000) which is limited to the firms using both direct and indirect methods represents only 2-3% in the population. Further, firms contained in the pooled data do not always use the same accounting method during the 6-year sample period.[14] As United States firms have the option between direct and indirect methods, it is likely that firms choosing direct method share certain characteristics (Healy, and Palepu (1993)). Managers of direct method firms may use the direct method disclosures to better represent the results of the firms' operations. On the other hand, if there are proprietary costs of disclosure, managers may use of the indirect method to conceal the aspects of the firms operations. Together, these factors may affect comparison of the predictive ability of the two methods.

To address the self-selection problem, researchers have estimated cash received from customers and cash paid to suppliers and employees for firms reporting using the indirect method (e.g. Livnat, and Zarowin (1990)). This technique is based on adjusting income statement items for the movement in the relevant balance sheet account(s) [15]. A much larger sample was obtained using this approach (a sample size of 13,224 estimated data from indirect method firms compared with 183 reported data from direct method firms). Although the results appear robust, the predictive power of the model using estimated data is lower than the model that uses the firm's own reported direct cash flow data only. This also suggests that disclosure choice might be a function of firm specific variables. If this is the case, the method is likely to suffer from another serious econometric problem, since the estimation of almost the entire data set will inherently be plagued by the distinct possibility of an errors-in-sample problem.

To test the errors-in-sample problem, Krishnan *et al.* (2000) found that the median absolute percentage errors between estimated data and actual data range from 0.50% to 4.77%, which is considered to be significant enough to materially bias the results[16]. Not surprisingly, estimated cash paid to suppliers and employees suffers from much higher measurement errors (3.99% to 4.77%) than cash received from customers because knowledge

[13] Text search method may not catch all firms using direct method during the sample period.
[14] Firms that use both direct and indirect methods.
[15] Livnat *et al.* (1990) proxy cash collected from customers and cash paid to suppliers and employees using data from Balance Sheet and Income Statements:
Cash received from customers = sales – change in accounts receivable
Cash paid to suppliers and employees = cost of goods sold – depreciation + selling and general administrative expenses + change in inventory – change in accounts payable + change in other current assets – change in other current liabilities
[16] Clinch *et al.* (2002) documented the differential effects of reported and estimated data in predicting stock returns.

of many more variables is needed to estimate the former[17]. A possible cause of measurement error is the acquisition and disposal of subsidiaries during a reporting period. The balances of working capital accounts of subsidiaries acquired or disposed of during the period need to be incorporated into the calculation of cash flows for the period. Notably, existing research using the reconstruction approach do not make these adjustments. As a consequence the cash received from customers and payments to suppliers will be understated (overstated) if there has been the acquisition (disposal) of a subsidiary during the account period.

The methodology employed by Cheng *et al.* (2005) is subject to similar measurement errors although they provide highly significant evidence for almost all variables in their models. While the sample period of 1988-2002 provides a much larger sample size (20,828), it also increases the possibility of adverse effects caused by structural changes and autocorrelation within data. Like most of other research that uses pooled data, Krishnan *et al.* (2000) and Cheng *et al.* (2005) build their models upon the assumption of stationarity of data across time, which is most unlikely in reality.

Since *AASB 107: Statement of Cash Flows* requires all companies to disclose cash from operations using both the direct and indirect method, Australian data is not subject to the limitations faced by United States data. Components of CFO and reconciling items (non-cash items, non-operating items and changes in accruals) can be taken directly from the financial statements instead of being estimated. Clinch *et al.* (2002), who examine the relevance of direct and indirect method disclosures is one of the few Australian papers to take advantage of this data.[18] They provide evidence supporting the proposition that the cash flow components disclosed using the direct method are superior to the net (or aggregate) CFO figure in explaining stock returns. Consistent with the United States research, accrual information provided via the indirect method also adds explanatory power to their model. In addition to cash flow and accrual information, the length of the firm's operating cycle (measured using current asset turnover ratios) was also found to be associated with stock returns.

Other research also uses stock returns as a proxy for changes in a firm's value in tests of the relevance of cash flow data, earnings numbers and accrual information[19]. However, whether stock returns perfectly reflect changes in a firm's value is doubtful because all sorts of information available to market participant is impounded in stock prices and the level of

[17] As set out in Note 8, only 2 variables are needed to estimate cash received from customers but 7 variables are needed to estimate cash paid to suppliers and employees. As a result, the more complicated the estimation, the larger the bias.

[18] Another paper using Australian data is Jones *et al.* (1998), who conducted a survey on 159 financial statement users and documented strong support for the mandatory requirement for direct method disclosures for decision making.

[19] Wilson (1986); Bowen *et al.* (1987); Wilson (1987); Livnat *et al.* (1990); Ali (1994); Dechow (1994); Pfeiffer *et al.* (1998)

market efficiency is still unsettled.[20] Dechow (1994) and others point out that stock prices may deviate from fundamentals. The noise in data problem is mitigated if stock returns are replaced with future operating cash flows.

This paper seeks to overcome the limitations inherent in prior research in (i) addressing the research question of the relative superiority of the net CFO and components of CFO in predicting CFO and (ii) identifying the important cash flow variables to facilitate managers, creditors and investors to make optimal scarce resources allocation decisions.

3. Methodology

3.1. Research Method

In assessing whether components of CFO calculated using the direct method is useful for predicting future cash flows, we construct equation [1a] and [1b] by modifying the model used by Cheng *et al.* (2005). We add the dividend receipts variable and disaggregate net cash interest payments into interest receipts and interest payments. While Cheng *et al.* (2005) represented all other cash transactions not attributable to the major classification using one variable (C_OTHER), we distinguish the cash inflow and outflow in relation to other cash transactions from operations. The modified model will unravel the information that could have been masked in prior research (Krishnan *et al.* (2000); Clinch *et al.* (2002); Cheng *et al.* (2005)). The results may highlight the appropriateness of dividend revenues, interest receipts and interest paid being classified as CFO, and the differential effects of cash inflows and outflows in relation to the cash transactions from operations. The important cash flow components can be identified from [1b]:

$$CFO_{t+1} = \beta_0 + \beta_1 CFO_t + \varepsilon_t \quad [1a]$$

$$CFO_{t+1} = \beta_0 + \beta_1 C\_REC_t + \beta_2 C\_PAY_t + \beta_3 C\_DIV_t + \beta_4 C\_INT\_R_t + \beta_5 C\_INT\_P_t + \beta_6 C\_TAX_t + \beta_7 C\_IN\_OTHER_t + \beta_8 C\_OUT\_OTHER_t + \varepsilon_t \quad [1b]$$

Also written as: $CFO_{t+1} = \alpha + \beta \Sigma CFO_t + \varepsilon_t$

Where the seven components from the direct method disclosures are defined as:

C_REC = are cash receipts from customers for firm i in year t
C_PAY = cash payments to suppliers for firm i in year t
C_DIV = dividends received for firm i in year t
C_INT_R = interest received for firm i in year t
C_INT_P = interest paid for firm i in year t

[20] Malkiel (2003) provides a review of evidence relating to market efficiency.

C_TAX = taxes paid for firm i in year t
C_IN_OTHER = other cash flow from operations for firm i in year t, if the amount is positive (zero if the amount is zero or negative)
C_OUT_OTHER = other cash flow from operations for firm i in year t, if the amount is negative (zero if the amount is zero or positive)

Prior research also documents that accrual information adds incremental information beyond cash flow information in predicting future cash flows [Barth *et al.* (2001)]. Accordingly, model [2] regresses future operating cash flow with seven cash flow components taken from the direct method and six components from accruals calculated from the balance sheet and income statements. The rationale for including accrual variables is to avoid the omitted variable problem resulting from the accounting issues of timing and matching of cash flow measures. The model works to test the robustness of results from [1b]:

$$CFO_{t+1} = \beta_0 + \beta_1 C\_REC_t + \beta_2 C\_PAY_t + \beta_3 C\_DIV_t + \beta_4 C\_INT\_R_t + \beta_5 C\_INT\_P_t + \beta_6 C\_TAX_t + \beta_7 C\_IN\_OTHER_t + \beta_8 C\_OUT\_OTHER_t + \beta_9 \Delta AR_t + \beta_{10} \Delta AP + \beta_{11} \Delta INV_t + \beta_{12} DEPR_t + \beta_{13} AMORT_t + \beta_{14} OTHER_t + \varepsilon_t \quad [2]$$

Also written as $CFO_{t+1} = \alpha + \beta \Sigma CFO_t + \beta \Sigma ACC_t + \varepsilon_t$

Where the six accrual components from the balance sheet and profit/loss statements are defined as:

ΔAR = change in accounts receivable for firm i in year t
ΔAP = change in accounts payable and accrued liabilities for firm i in year t
ΔINV = change in inventory for firm i in year t
DEPR = depreciation expense for firm i in year t
AMORT = amortization expense for firm i in year t
OTHER = net of all other accruals for firm i in year t, calculated as NPAT before abnormal – Net Capital Gains – (CF + ΔAR + ΔINV - ΔAP – DEPR – AMORT), where NPAT before abnormal = Reported net profit after tax before abnormals after tax and less minority interests and preference dividends

As discussed in section 2, the components of CFO are expected to enhance the predictive ability of net CFO for future operating cash flows[22], so we predict a higher explanatory power for equation [1b] than [1a] because some information may be masked in the aggregate cash flow model. The AICPA and financial analysts recommend that the financial effects of a company's core and non-core cash flows should be distinguished. The core cash flows include cash flows from sales, cost of goods sold, and operating expenses. Notably, the AICPA classifies financing costs, cash flows from taxes and other expenses as non-core cash flows. This is also consistent with the guideline provided in AASB 107, which

[22] For example, Barth *et al.* (2001) and Cheng *et al.* (2005).

provides this type of sub-classification in operating cash flow disclosure[23]. As our variables carry the positive and negative signs as inflows and outflows as non-core cash flows, we predict that C_REC and C_Pay are positive. Based on the distinction between core and non-core activities, we make no prediction for the sign of C_DIV, C_INT_R, C_INT_P C_TAX, C_IN_OTHER and C_OUT_OTHER. The accruals in equation [2] are control variables to test the robustness of results from equation [1b], and we do not have prediction with respect to their signs.

Dechow (1994); Dechow *et al.* (1998); Defond, and Hung (2001) provide evidence suggesting cash flows are relatively more useful in assessing firms' values when operating cycles are shorter. Therefore, we expect the firm's operating cycle[24] to be related with future CFO because it captures the age of inventory and the length of the cash cycle[25] and thus has direct effects on the realization of cash flows. To examine whether operating cycle affects the predictive ability of cash flow components, we add another three major operating cycle variables: accounts receivables turnover (T_REC), inventory turnover (T_INV) and accounts payable turnover (T_PAY), each of which will form interaction terms with C_REC, C_PAY, ΔAR and ΔAP because these four variables are most directly related to underlying operations. This methodology follows Clinch et al. (2002), but our model differs from their model in that they used dummy variables to capture the effects of the operating cycle variables, and the arbitrary cut-off[29] used to determine the dummy variable may bias the results. In our model, we use the operating cycle data in its unmodified form to more accurately capture the effects of variation in these variables. Model [3] is as follows:

$$\begin{aligned} CFO_{t+1} = {} & \beta_0 + \beta_1 C\_REC_t + \beta_2 C\_PAY_t + \beta_3 C\_DIV_t + \beta_4 C\_INT\_R_t + \beta_5 C\_INT\_P_t + \beta_6 C\_TAX_t + \beta_7 C\_IN\_OTHER_t + \\ & \beta_8 C\_OUT\_OTHER_t + \beta_9 \Delta AR_t + \beta_{10} \Delta AP + \beta_{11} \Delta INV_t + \beta_{12} DEPR_t + \beta_{13} AMORT_t + \beta_{14} OTHER_t + \\ & \beta_{15}(T\_REC)_t(C\_REC)_t + \beta_{16}(T\_REC)_t(C\_PAY)_t + \beta_{17}(T\_REC)_t(\Delta AR)_t + \beta_{18}(T\_REC)_t(\Delta AP)_t + \\ & \beta_{19}(T\_INV)_t(C\_REC) + \beta_{20}(T\_INV)_t(C\_PAY)_t + \beta_{21}(T\_INV)_t(\Delta AR)_t + \beta_{22}(T\_INV)_t(\Delta AP)_t + \\ & \beta_{23}(T\_PAY)_t(C\_REC)_t + \beta_{24}(T\_PAY)_t(C\_PAY)_t + \beta_{25}(T\_PAY)_t(\Delta AR)_t + \beta_{26}(T\_PAY)_t(\Delta AP)_t + \varepsilon_t \end{aligned} \quad [3]$$

[23] The illustrative example in AASB 107 displays a subtotal of "Cash generated from operations" (Cash receipts from customers – Cash paid to suppliers and employees) and then deducts other CFO (Tax apid and Interest paid) before arriving at the net amount of cash flow from operating activities.
[24] Operating Cycle = Accounts receivable turnover + Inventory turnover – Accounts payable turnover
[25] Cash Cycle = Accounts receivable turnover – Accounts payable turnover
[29] They obtained values for each ratio from their firm-year observations and coded the dummy as 1 if the ratio is above the overall medians of the three ratios for industrial and mining companies.

Where:

T_REC = Accounts receivable turnover for firm i in year t, calculated as average accounts receivable / operating revenue.
I_INV = Inventory turnover for firm i in year t, calculated as average current inventory / operating revenue.
T_PAY = Account payable turnover for firm i in year t, calculated as average accounts payable / operating revenue.

As operating cycle ratios capture the efficiency of a firm's operations in terms of collecting cash from debtors and making use of inventory, these turnover ratios depict a firm's ability of transforming accruals into cash transactions. We predict that T_REC and T_INV will affect the predictive ability of a firm's cash flow components for future cash flow. Similarly, the turnover of accounts payable is indicative of the length of the firm's operating cycle and is expected to partly explain the relationship between cash flow components and future CFO.

3.2. Sample Data

The database used for our sample is obtained from Aspect Huntley, and all data carries its original sign. The sample spans 2000-2004, from which three consecutive sample periods were constructed and examined separately because one-year-ahead cash flow information is used to proxy for future cash flows, but prior year accruals information is also required to calculate the changes of accruals. Therefore, at least three years of data are required to run all models. For the purposes of our sample, we use firm data taken from the members of the S&P/ASX300. We excluded financial sector institutions due to their unique position in the economy and their significantly different financial statements structure from other sectors[31]. We also excluded mining companies because they tend to be affected by highly volatile commodity prices compared with ordinary industrial companies and thus may not fit our model. The residuals distribution from the regression with all firms (not reported) also demonstrates a relatively larger deviation from the fitted line for the 29 mining companies, which further supports our exclusion of mining companies. For a more consistent sample across all years, firms with any omitted yearly reporting are removed. The final sample size for each period is balanced to 163 observations.

Our models attempt to avoid the structural change and data stationarity problems by examining the three sample periods separately instead of pooling them all. This is in contrast to prior research where observations from multiple years and from many different companies

[31] Financial institutions have much higher percentage of cash balance sitting on their accounts and have different application for disclosure and presentation in relation to statements of cash flow.

were all combined and analysed as one single large sample. Because both residual plot and White's test show serious heteroscedasticity in regression on raw data, all variables were scaled by total assets to eliminate size effects. White's test indicates that scaling effectively corrects the heteroscedasticity problem for our model, so the same measure is applied to the whole data set. We also corrected for unknown heteroscedasticity errors[32] for all estimation to ensure the most efficient estimation available. As the variables are expected to be linear in nature, we do not expect serious functional problems for our models. This assumption has also been verified by a Ramsey RESET test[33] for all models.

Although correlation matrix reports very high Spearman correlation between cash receipts from customers and cash paid for suppliers (-99%), multicollinearity does not seem to plague our regression results since we believe we have specified the correct functional form that contains all relevant and necessary accounting variables. The reasonable adjusted R^2 and the presence of significant coefficients also indicates that multicollinearity might not be a problem. In addition, large sample size and scaled data are two possible econometric measures to mitigate multicollinearity (Gujarrati (2006)), and our sample data meets both requirements. We also attempt to address the multicollinearity concern by combining the two highly correlated variables (C_REC and C_PAY) and find it does not change the conclusion drawn from the regression results. Due to the endogenous nature of most financial data, we can never disregard the possibility of omitted variable problem, but our models have included most relevant variables from financial statements. Furthermore, as all predictors are lagged variables (predetermined), our models are also free from endogeneity problems.

[32] Heteroscedasticity Consistent Coefficient Covariance is used to correct for unknown heteroscedasticity errors.
[33] A Ramsey RESET test detects model mis-specification, including heteroscedasticity, functional form and omitted variable problems.

4. Data Analysis

4.1. Descriptive Statistics

Table 1 presents the industry breakdowns of the sample firms. It reveals that no single sector dominates the sample size. The larger fraction of sample firms comes from Consumer Discretionary (20.25%), Industrials (20.25%), and Health Care sector (16.56%).

Table 1

Sectors	Obs.	Percentage
Consumer Discretionary	33	20.25%
Consumer Staples	13	7.98%
Energy	18	11.04%
Health Care	27	16.56%
Industrials	33	20.25%
Information Technology	16	9.82%
Materials	15	9.20%
Telecommunication services	3	1.84%
Utilities	5	3.07%
Total Obs.	163	100.00%

According to the forecasts made by Thomas Financial[34] (Table 2), the growth rate for Consumer Discretionary and Industrials sectors are forecast to be marginally lower than the market average while Consumer Staples, Energy and Health Care sectors are predicted to outperform the market[35]. In total, the underperforming sectors comprise 40.5% of our sample and another 35.48% of the 163 firms come from the outperforming sectors. As a result, we believe our data set is sourced from a broad representation of the population and therefore has general applicability to most ordinary firms.

[34] http://www.aspecthuntley.com.au.ezproxy.library.usyd.edu.au/af/sectoranalysis?xtm-licensee=finanalysis
[35] Although Materials sectors are forecast to have the highest growth rate (61.78%), our sample is not comparable with the Thomas forecast because mining firms are included in their forecast for materials sector.

Table 2

SECTOR ANALYSIS			
	EPS Growth(%)	Price/Earnings(x)	Dividend Yield(%)
Total Markets	34.9	16.06	3.74
Consumer Discretionary	29.39	22.70	2.69
Consumer Staples	43.41	20.69	3.32
Energy	41.48	26.47	1.92
Financials	18.23	16.40	4.06
Health Care	57.26	47.05	1.6
Industrials	24.49	15.87	5.63
Information Technology	25.37	39.38	2.64
Materials	61.78	11.65	2.28
Telecommunication Services	10.31	12.21	6.44
Utilities	-0.48	22.99	3.11

- Source: Forecasts figures are supplied by Thomson Financial, which show the latest annual accounts.
- The forecast for Materials sector include mining firms, so it is not comparable with our sample.

Table 3 provides descriptive statistics for all variables (after scaling by total assets) used in our models and the total assets for all sample years. Jarque-Bera statistics (not tabulated) show that no variables are normally distributed, but the sample size is large enough to avoid serious econometric problem in the regression results. An increasing trend is observed for total assets from 2001 to 2003, which is consistent with the economic expansion over this period. After the scaling, the mean and median values for all variables generally remain consistent from period to period. However, greater volatility is found in the core cash flows (C_REC and C_PAY) and OTHER (accruals). For example, C_REC increases from a median of 0.74 in 2001 to 0.83 in 2002 and declines to 0.82 in 2003. OTHER also shows a noticeable variation in medians (-0.09, -0.12 and -0.10), which may be due to the fact that it accommodates all other changes in accruals, including assets and liabilities and thus has less persistence. The means of all 2003 variables show a much greater magnitude than other years. Upon closer examination, one outlier in our data sample is the cause of this situation. As part of our sensitivity tests we omitted this observation but found that this particular data point does not affect our regression results.

Table 3

SCALED VARIABLES	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
AMORT_01	-0.02	-0.01	0.00	-0.20	0.03	-3.72	19.64
AMORT_02	-0.02	-0.01	0.00	-0.34	0.04	-5.74	43.57
AMORT_03	-0.02	-0.01	0.00	-0.33	0.03	-5.65	44.47
ΔAP_01	0.02	0.02	0.25	-0.13	0.05	0.89	7.04
ΔAP_02	0.01	0.01	0.26	-0.83	0.08	-6.21	67.15
ΔAP03	0.02	0.01	0.21	-0.18	0.05	0.56	6.57
ΔAR_01	0.03	0.01	0.79	-0.13	0.08	5.00	42.85
ΔAR_02	0.01	0.01	0.37	-0.97	0.11	-5.07	49.65
ΔAR_03	0.00	0.00	0.24	-0.47	0.06	-2.25	21.31
C_DIV_01	0.00	0.00	0.10	0.00	0.01	9.14	99.72
C_DIV_02	0.00	0.00	0.06	0.00	0.01	6.77	54.38
C_DIV_03	0.00	0.00	0.07	0.00	0.01	6.21	46.96
C_INT_P_01	-0.02	-0.01	0.00	-0.12	0.02	-2.29	13.59
C_INT_P_02	-0.01	-0.01	0.00	-0.07	0.01	-1.20	5.00
C_INT_P_03	-0.01	-0.01	0.00	-0.07	0.01	-1.49	5.96
C_INT_R_01	0.01	0.00	0.08	0.00	0.01	2.70	11.01
C_INT_R_02	0.01	0.00	0.05	0.00	0.01	2.29	8.63
C_INT_R_03	0.01	0.00	0.07	0.00	0.01	2.90	12.96
C_OTHER_01	0.00	0.00	0.16	-0.21	0.04	0.20	14.71
C_OTHER_02	0.00	0.00	0.17	-0.25	0.04	-2.63	20.97
C_OTHER_03	0.00	0.00	0.44	-0.54	0.06	-2.02	49.75
C_PAY_01	-1.04	-0.65	0.00	-13.07	1.39	-4.66	36.96
C_PAY_02	-1.09	-0.64	0.00	-10.96	1.31	-3.43	22.02
C_PAY_03	-1.14	-0.68	0.00	-13.53	1.42	-4.66	37.62
C_REC_01	1.12	0.74	13.44	0.00	1.43	4.55	35.89
C_REC_02	1.19	0.83	11.28	0.00	1.37	3.23	20.50
C_REC_03	1.25	0.82	13.92	0.00	1.47	4.43	35.31
C_TAX_01	-0.03	-0.01	0.02	-0.26	0.04	-3.27	17.14
C_TAX_02	-0.02	-0.01	0.03	-0.26	0.03	-3.79	24.92
C_TAX_03	-0.02	-0.02	0.02	-0.17	0.03	-1.87	8.79
CFO_02	0.08	0.10	0.85	-1.01	0.19	-1.27	12.37
CFO_03	0.11	0.10	1.01	-0.83	0.20	-0.20	10.01
CFO_04	0.09	0.10	0.97	-1.19	0.22	-1.91	15.65
DEPR_01	-0.03	-0.02	0.00	-0.16	0.03	-1.76	7.20
DEPR_02	-0.03	-0.03	0.00	-0.34	0.04	-4.57	36.14
DEPR_03	-0.03	-0.03	0.00	-0.16	0.03	-1.79	7.04
INV_01	0.01	0.00	0.26	-0.17	0.05	1.17	11.20
INV_02	0.01	0.00	0.22	-0.31	0.04	-0.45	22.76
INV_03	0.01	0.00	0.20	-0.17	0.03	-0.06	16.23
OTHER_01	-0.11	-0.09	0.61	-0.94	0.16	-1.09	12.32
OTHER_02	-0.12	-0.12	0.96	-1.19	0.20	0.26	17.35
OTHER_03	-0.12	-0.10	0.25	-0.77	0.13	-1.24	7.37
Total Assets ($000,000)		**($000,000)**	**($000,000)**	**($000,000)**	**($000,000)**		
TOTALASSET_01	2,010	383	85,000	0	7,420	9.37	100.43
TOTALASSET_02	2,090	446	71,400	6	6,590	8.26	81.46
TOTALASSET_03	2,010	383	85,000	0	7,420	9.85	110.60

The changes in all turnover ratios for our sample periods are summarised in Table 4 below. Accounts receivable turnover and inventory turnover are found to be the lowest in 2003, which means on average firms are more efficient in collecting cash from customers and managing inventories in this modelling year compared with the other two. Accounts payable ratios remain at 0.13, except it is slightly higher in 2001. Hence, operating cycle is also found to be the lowest for 2003. This means sample firms are most efficient in generating cash in 2003 and their cash flow information alone may provide reasonably good predictive ability for future cash flow.

Table 4

Non-Mining	Mean	Median	Maximum	Minimum	Std.Dev.	Skewness	Kurtosis	SumSq. Dev.
T_INV_01	0.09	0.07	0.57	0.00	0.10	1.68	7.30	1.40
T_INV_02	0.10	0.07	1.38	0.00	0.14	5.39	44.36	3.21
T_INV_03	0.13	0.06	4.62	0.00	0.44	8.80	84.26	29.29
T_PAY_01	0.54	0.14	35.29	0.01	3.06	10.13	111.19	1442.82
T_PAY_02	0.26	0.13	6.35	0.01	0.62	7.22	64.66	59.00
T_PAY_03	0.24	0.13	4.27	0.01	0.50	5.82	39.64	38.12
T_REC_01	0.36	0.17	17.04	0.01	1.42	10.76	126.02	308.62
T_REC_02	0.27	0.17	8.56	0.00	0.72	10.17	115.99	79.58
T_REC_03	0.20	0.15	3.63	0.00	0.32	8.31	84.04	16.18
C_CYCLE_01	-0.18	0.02	16.23	-32.76	3.10	-6.89	85.71	1482.32
C_CYCLE_02	0.01	0.01	8.08	-4.73	0.81	4.89	71.92	101.56
C_CYCLE_03	-0.03	0.01	0.71	-2.27	0.31	-4.51	29.52	14.56
OP_CYCLE_01	-0.09	0.10	16.24	-32.76	3.11	-6.92	85.60	1490.38
OP_CYCLE_02	0.10	0.09	8.12	-4.73	0.83	4.36	64.09	107.04
OP_CYCLE_03	0.09	0.08	3.29	-2.27	0.44	1.65	31.43	29.29

The correlation matrix in table 5 provides the correlation between all cash components and accruals variables for each sample year. It shows very high Spearman correlation between C_REC and C_PAY (-0.99), which is consistent with economic fundamentals and prior evidence (Clinch *et al.* (2002)). All other correlations are below 0.8, the benchmark advocated by Gujarrati (2003). As mentioned in section 3.2, we believe our regression results are not plagued by multicollinearity after examining the adjusted R^2 and transforming the variables.

Table 5

Correlation coefficient table for the variables used in the regression where the dependent variable was CFO_{t+1} = 2004 (Pearson correlation is shown at the top and Spearman correlation at the bottom of the table).

Non-Mining	AMORT_03	ΔAP_03	ΔAR_03	C_DIV_03	C_INT_P_03	C_INT_R_03	C_IN_OTHER_03	C_OUT_OTHER_03	C_PAY_03	C_REC_03	C_TAX_03	DEPR_03	INV_03	OTHER_03
AMORT_03	1.00	0.09	0.18*	0.07	-0.09	0.02	0.03	-0.05	-0.01	-0.01	0.13	-0.02	0.08	0.35**
ΔAP_03	0.15	1.00	0.38**	-0.15	0.09	0.11	0.08	-0.06	-0.01	0.00	0.02	0.23**	0.27**	0.16*
ΔAR_03	0.11	0.48**	1.00	-0.09	0.16*	-0.14	-0.54**	0.02	0.01	-0.02	0.06	0.18*	0.25**	0.00
C_DIV_03	0.12	-0.15	0.02	1.00	0.07	-0.06	-0.02	0.03	0.05	-0.05	0.04	0.02	-0.14	0.07
C_INT_P_03	-0.06	0.07	0.09	-0.21**	1.00	0.25**	-0.04	-0.03	-0.06	0.04	-0.14	0.09	0.07	-0.10
C_INT_R_03	-0.02	0.04	-0.12	-0.09	0.31**	1.00	0.26**	-0.02	0.09	-0.17*	0.11	0.11	-0.13	0.13
C_IN_OTHER_03	0.05	0.00	-0.09	-0.12	0.00	0.06	1.00	0.04	0.06	-0.07	0.09	0.04	0.04	0.03
C_OUT_OTHER_03	0.00	-0.06	0.05	-0.19*	0.09	0.00	0.29**	1.00	-0.04	0.03	-0.06	0.01	-0.04	-0.23**
C_PAY_03	0.18*	-0.03	0.02	-0.03	0.04	0.09	0.17*	-0.09	1.00	-0.99**	0.32**	0.20*	-0.07	0.14
C_REC_03	-0.22**	0.03	-0.01	0.05	-0.13	-0.16*	-0.25**	0.05	-0.94**	1.00	-0.39**	-0.24**	0.07	-0.20**
C_TAX_03	0.13	0.04	0.02	-0.02	0.06	0.16*	0.30**	-0.02	0.47**	-0.60**	1.00	0.34**	0.00	0.55**
DEPR_03	0.03	0.13	0.11	-0.03	0.16*	0.09	0.14	0.00	0.43**	-0.45**	0.32**	1.00	0.11	0.49**
INV_03	0.02	0.31**	0.35**	-0.08	0.00	-0.19*	-0.14	-0.03	-0.24**	0.23**	-0.10	-0.03	1.00	-0.03
OTHER_03	0.40**	0.05	-0.07	0.04	-0.08	0.07	0.07	-0.11	0.30**	-0.38**	0.36**	0.39**	-0.16*	1.00

Correlation coefficient table for the variables used in the regression where the dependent variable was CFO_{t+1} = 2003 (Pearson correlation is shown at the top and Spearman correlation at the bottom of the table).

Non-Mining	AMORT_02	ΔAP_02	ΔAR_02	C_DIV_02	C_INT_P_02	C_INT_R_02	C_IN_OTHER_02	C_OUT_OTHER_02	C_PAY_02	C_REC_02	C_TAX_02	DEPR_02	INV_02	OTHER_02
AMORT_02	1.00	0.01	0.05	0.09	0.02	-0.08	0.09	-0.03	-0.03	0.03	-0.08	0.04	0.07	0.36**
ΔAP_02	0.02	1.00	0.44**	-0.03	0.06	-0.13	0.01	0.03	0.09	-0.04	-0.03	0.06	0.18*	-0.40**
ΔAR_02	0.11	0.41**	1.00	-0.01	-0.06	-0.24**	0.00	-0.05	0.05	-0.02	-0.06	0.01	0.25**	-0.52**
C_DIV_02	0.10	-0.04	0.04	1.00	0.04	-0.08	-0.05	0.05	0.11	-0.11	0.07	0.09	-0.02	0.06
C_INT_P_02	0.00	0.08	-0.02	0.22**	1.00	0.24**	0.13	0.05	-0.01	-0.01	-0.16*	0.10	0.06	-0.03
C_INT_R_02	-0.02	0.08	-0.07	-0.16*	0.24**	1.00	0.00	-0.07	0.13	-0.19*	0.06	0.08	0.02	0.20*
C_IN_OTHER_02	0.03	-0.01	-0.06	-0.09	0.09	0.13	1.00	0.08	0.11	-0.13	0.07	0.07	0.05	0.04
C_OUT_OTHER_02	0.07	0.15	0.00	-0.11	0.11	0.08	0.30**	1.00	0.01	-0.02	-0.01	-0.03	0.09	-0.10
C_PAY_02	0.19*	-0.08	-0.01	-0.01	0.14	0.19*	0.20*	-0.10	1.00	-0.99**	0.28**	0.15	0.01	0.05
C_REC_02	-0.19*	0.09	0.02	0.05	-0.21**	-0.25**	-0.24**	0.06	-0.97**	1.00	-0.34**	-0.21**	-0.02	-0.12
C_TAX_02	0.02	-0.10	-0.21**	-0.07	0.05	0.19*	0.23**	-0.01	0.41**	-0.49**	1.00	0.47**	-0.07	0.38**
DEPR_02	0.07	-0.11	0.00	-0.10	0.26**	0.23**	0.18*	-0.03	0.47**	-0.53**	0.25**	1.00	0.06	0.47**
INV_02	0.06	0.36**	0.36**	-0.10	0.14	0.02	0.04	0.06	-0.01	-0.01	-0.13	0.09	1.00	-0.11
OTHER_02	0.41**	-0.16*	-0.23**	-0.04	-0.06	0.16*	0.09	-0.15	0.31**	-0.36**	0.24**	0.46**	-0.11	1.00

Correlation coefficient table for the variables used in the regression where the dependent variable was CFO_{t+1} = 2002 (Pearson correlation is shown at the top and Spearman correlation at the bottom of the table.)

Non-Mining	AMORT_01	ΔAP_01	ΔAR_01	C_DIV_01	C_INT_P_01	C_INT_R_01	C_IN_OTHER_01	C_OUT_OTHER_01	C_PAY_01	C_REC_01	C_TAX_01	DEPR_01	INV_01	OTHER_01
AMORT_01	1.00	0.11	0.07	0.09	-0.06	-0.01	0.08	-0.03	0.04	-0.03	0.11	0.27*	0.12	0.19*
ΔAP_01	-0.04	1.00	0.22**	-0.07	0.21**	0.04	0.09	0.21**	-0.06	0.04	-0.04	0.03	0.31**	0.15*
ΔAR_01	0.00	0.42**	1.00	-0.06	0.17*	0.10	0.03	0.08	0.06	-0.07	-0.08	0.08	0.10	-0.38**
C_DIV_01	0.07	0.02	-0.04	1.00	-0.02	-0.08	-0.05	0.06	0.10	-0.10	0.08	0.05	-0.06	0.10
C_INT_P_01	0.03	0.13	0.18*	-0.35**	1.00	-0.05	-0.04	0.04	-0.07	0.05	-0.14	0.14	0.16*	-0.07
C_INT_R_01	0.02	0.08	-0.04	-0.14	0.23**	1.00	0.18*	0.09	0.09	-0.15	-0.09	0.13	-0.07	0.12
C_IN_OTHER_01	0.13	0.15	0.09	0.02	-0.02	0.09	1.00	0.09	0.02	- 0.05	0.07	0.12	0.13	0.09
C_OUT_OTHER_01	0.02	0.16*	0.01	-0.10	0.03	0.10	0.33**	1.00	0.04	- 0.6	0.02	0.05	0.02	-0.03
C_PAY_01	0.23**	-0.17*	-0.08	-0.02	0.13	0.22**	0.13	-0.05	1.00	-0.99**	0.28**	0.30**	0.03	0.08
C_REC_01	-0.23**	0.13	0.06	0.07	-0.21**	-0.29**	-0.18*	0.00	-0.96**	1.00	-0.30**	-0.31**	-0.04	-0.15
C_TAX_01	0.07	-0.02	-0.15	-0.09	0.04	0.13	0.17*	0.07	0.42	-0.50**	1.00	0.30**	0.02	0.22**
DEPR_01	0.22**	-0.01	-0.02	-0.12	0.24**	0.20*	0.20*	0.07	0.49**	-0.52**	0.30**	1.00	0.22**	0.34**
INV_01	0.02	0.33**	0.19*	-0.04	0.02	-0.13	0.15	0.02	-0.05	0.05	-0.08	0.15	1.00	-0.03
OTHER_01	0.36**	-0.02	-0.18*	0.09	0.03	0.13	0.10	0.00	0.25**	-0.33**	0.18*	0.44**	-0.04	1.00

* 5% significant
** 1% significant

4.2. Regression Results

Tables 6, 7 and 8 provide the regression results for the three years. In comparing the aggregate model (Model 1a) against the component model (Model 1b), we find that the component model is superior to the aggregate model in two respects. Firstly, the results are better in the sense that they provide consistently higher R-square results for all years examined. The adjusted R-square goes up from 42% for model [1a] to 62% for model [1b] in 2002, from 31% to 34% in 2003, and from 61% to 67% in 2004. Secondly, due to the presence of significant independent variables in the component models, we are able to identify important component variables that will be useful to users of financial statements (i.e. users of financial statements will be able to identify which cash flow item will be useful and important in the cash flow statement).

Generally, the results from the modified components models (Model 2 and Model 3) do not change our conclusion drawn from model [1a] and model [1b]. Adding the accrual variables (Model 2) and the operating cycle variables (Model 3) to the regression substantially improves our results since R-square is always higher than the basic components model presented Model 1b. However, determining which model is better is not as clear. From looking at the R-squared results, we know that adding the accrual variables (Model 2) consistently improves our results, but adding the operating cycle variables (Model 3) produces mixed results. For example, in 2004, Model 3 has a lower adjusted R-square compared to Model 2 whereas the adjusted R-square marginally increases from 66% to 71% in 2002 and dramatically increases from 43% to 73% in 2003. We speculate that this maybe explained by factors outside our regression modelling. In particular, an analysis of the operating cycle variable shows that in 2004, the firms in our sample exhibited a shorter operating cycle (see table 4) and as discussed in section 3.1 this causes cash flow components to be much better at predicting operating cash flows. This feature of the operating cycle variable could explain the lower R-square found in 2004 since the inclusion of these extra variables in a year where the operating cycle is short will only serve to unnecessarily increase the variability of our data.

Amongst the three components models, Model 3 is preferred for various reasons. Firstly, it generally exhibits higher R-square results. This is important if we were concerned about the predictive ability of our model. Secondly, the redundant variable tests[36] do not support the hypothesis that we can remove all the operating cycle variables and lastly, our

[36] The test is for whether a subset of variables in an equation all have zero coefficients and might thus be deleted from the equation. F-statistics are used to determine whether the null hypothesis is rejected or not.

previous conclusions regarding the importance of individually significant independent variables remains the same even if we focussed our attention to Model 3.

To achieve a more parsimonious model, we started with Model 3 and have attempted to remove some seemingly insignificant variables (especially the accrual and operating cycle variables). However, we find that they could not be consistently removed across all years. In some years, some seemingly irrelevant variables could be removed, but in other years, the redundant variable test suggested otherwise. This failure to consistently remove the operating cycle variables demonstrates that the marginal effect of the cash flow components is probably not strictly scalar in form[37]. Therefore, a good predictive model will require these accrual and operating cycle variables in addition to the cash flow component variables. As a result, we suggest that for predictive purposes, it is better if we simply retain all independent variables.

Returning to our research aims, our primary goal was to identify whether the aggregate or component model is better and to identify which cash flow component is significant for users of financial statements. As stated above, we find that the component models are found to be better than the aggregate models. With respect to identifying the important cash flow component variable, we find that using Model 1b is probably just as good as Model 3. Looking at Model 1b, we can draw the same conclusion that C_REC and C_PAY are still the most important and significant variable in determining future operating cash flows. The other cash flow component variables such as C_DIV, C_INT_R, C_INT_P are comparably less important. So whilst using Model 1b may be contradictory to the results obtained from the redundant variable test, our rationale for using it is that our findings remain the same whether we use Model 1b, Model 2 or Model 3. However, if we were instead concerned about the accuracy of forecasting future operating cash flows, then Model 3 is definitely preferred to Model 1b.

Consistent with prior research findings, C_REC and C_Pay are found to be significantly positive and highly corresponds with each other across three years, but looking at the results for model 1b in table 6,7 and 8 together, the coefficients are around 0.5 (t-statistic=6.29 and 6.04 respectively), 0.6 (t-statistic=2.39 and 2.33 respectively) and 0.9 (t-statistic=10.46 and 10.27) for 2002, 2003 and 2004. Other variables are also found significant but not consistent across years. For example, as shown in table 8, C_INT_P in 2003 shows a significant and positive relationship with CFO in 2004 (coefficient =1.77, t-statistic=2.63). C_INT_R and C_TAX are also found to be negatively related with future operating cash flow with t-statistics of -3.64 and -1.32 in 2002, while C_DIV does not appear to predict future

[37] For example, the marginal effect of C_REC in Model 3 is $\beta_1 + \beta_{14}$(T_REC) and this is not a simple scalar constant.

operating cash flow. Notably, C_INT_R remains the coefficient with the largest magnitude across three years.

Table 6

Dependent Variable (CFO_{t+1} = 2002)								
Model	[1a]		[1b]		[2]		[3]	
	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.
Intercept	0.05	2.44**	0.02	1.31	-0.01	-0.56	0.01	0.53
CFO_t	0.72	3.22**						
C_REC_t			0.54	6.29**	0.63	4.18**	0.35	2.26**
C_PAY_t			0.53	6.04**	0.63	4.09**	0.33	2.09**
C_DIV_t			0.78	1.86	1.08	2.25**	0.43	0.31
$C\_INT\_R_t$			-3.64	-3.85**	-3.08	-2.85**	-1.70	-2.19**
$C\_INT\_P_t$			-1.01	-1.33	-0.57	-0.70	-0.26	-0.48
C_TAX_t			-1.36	-3.58**	-1.02	-2.72**	-0.81	-2.55**
$C\_IN\_OTHER_t$			-0.17	-0.27	0.07	0.12	0.25	0.58
$C\_OUT\_OTHER_t$			0.29	0.69	0.41	0.91	0.23	0.70
$AREC_t$					0.31	1.90	-0.05	-0.14
$APAY_t$					-0.30	-1.09	0.72	1.69
INV_t					0.10	0.34	-0.04	-0.10
$DEPR_t$					-1.09	-3.08**	-0.73	-1.83
$AMORT_t$					-1.10	-2.29**	-0.79	-1.32
$OTHER_t$					0.12	0.65	-0.17	-1.09
$T\_REC*C\_REC_t$							-0.04	-0.11
$T\_REC*C\_PAY_t$							0.15	0.41
$T\_REC*AREC_t$							0.01	0.12
$T\_REC*APAY_t$							-0.68	-0.27
$T\_INV*C\_REC_t$							2.00	2.20**
$T\_INV*C\_PAY_t$							2.05	2.14**
$T\_INV*AREC_t$							5.39	2.16**
$T\_INV*APAY_t$							-8.36	-2.36**
$T\_PAY*C\_REC_t$							-0.07	-0.60
$T\_PAY*C\_PAY_t$							0.02	0.74
$T\_PAY*AREC_t$							0.03	0.02
$T\_PAY*APAY_t$							0.04	0.19
R^2	0.43		0.64		0.69		0.76	
Adjusted R^2	0.42		0.62		0.66		0.71	
F-stat	119.06		34.41		23.49		15.83	
F-prob	0.00		0.00		0.00		0.00	

* 10% significant
** 5% significant
*** 1% significant

Table 7

Dependent Variable (CFOt+1 = 2003)								
Model	[1a]		[1b]		[2]		[3]	
	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.
Intercept	0.05	1.96*	-0.01	-0.11	0.00	-0.09	-0.02	-0.67
CFO_t	0.73	3.26**						
C_REC_t			0.63	2.39**	1.08	3.62**	1.24	4.12**
C_PAY_t			0.62	2.33**	1.08	3.61**	1.24	3.94**
C_DIV_t			1.05	1.16	1.15	1.26	1.67	1.26
$C\_INT\_R_t$			2.28	0.85	4.34	1.46	2.79	1.91
$C\_INT\_P_t$			-0.99	-0.66	0.68	0.63	0.44	0.81
C_TAX_t			-0.73	-0.82	-0.10	-0.15	-0.05	-0.07
$C\_IN\_OTHER_t$			-0.24	-0.40	0.17	0.27	0.50	1.23
$C\_OUT\_OTHER_t$			0.51	0.99	1.10	2.48**	1.26	2.90**
$AREC_t$					0.57	2.85**	1.61	4.23**
$APAY_t$					-0.45	-1.07	-2.25	-4.29**
INV_t					0.66	2.30**	0.59	3.03**
$DEPR_t$					-0.94	-1.85	-0.33	-0.54
$AMORT_t$					-0.94	-2.54**	-0.51	-1.96
$OTHER_t$					0.54	3.18**	0.29	2.89**
$T\_REC*C\_REC_t$							-1.93	-2.75**
$T\_REC*C\_PAY_t$							-2.10	-3.07**
$T\_REC*AREC_t$							0.51	2.26**
$T\_REC*APAY_t$							3.00	1.57
$T\_INV*C\_REC_t$							1.16	2.50**
$T\_INV*C\_PAY_t$							1.37	2.71**
$T\_INV*AREC_t$							-8.14	-2.32**
$T\_INV*APAY_t$							5.97	1.65
$T\_PAY*C\_REC_t$							0.41	0.97
$T\_PAY*C\_PAY_t$							0.42	0.93
$T\_PAY*AREC_t$							-0.76	-0.71
$T\_PAY*APAY_t$							0.63	1.31
R^2	0.32		0.38		0.48		0.78	
Adjusted R^2	0.31		0.34		0.43		0.73	
F-stat	74.30		11.66		9.59		17.25	
F-prob	0.00		0.00		0.00		0.00	

* 10% significant
** 5% significant
*** 1% significant

Table 8

Dependent Variable (CFOt+1 = 2004)								
Model	[1a]		[1b]		[2]		[3]	
	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.
Intercept	0.01	0.90	0.07	2.93**	0.05	1.70	0.07	1.40
CFO_t	0.95	7.45***						
C_REC_t			0.91	10.46**	0.93	8.80**	0.82	3.71**
C_PAY_t			0.91	10.27**	0.92	8.66**	0.82	3.63**
C_DIV_t			-1.46	-1.12	-1.12	-1.00	-1.57	-0.91
$C\_INT\_R_t$			-1.22	-1.24	-0.40	-0.49	-0.46	-0.43
$C\_INT\_P_t$			1.77	2.63**	1.18	2.18**	0.79	1.54
C_TAX_t			1.17	2.16**	1.33	2.24**	1.15	2.11**
$C\_IN\_OTHER_t$			-0.31	-1.01	0.32	0.91	1.35	1.78
$C\_OUT\_OTHER_t$			1.51	13.16**	1.35	8.91**	1.12	2.95**
$AREC_t$					0.68	2.09**	-0.11	-0.19
$APAY_t$					-0.53	-2.16**	0.12	0.29
INV_t					-0.01	-0.02	-0.01	-0.03
$DEPR_t$					0.36	0.43	0.91	0.99
$AMORT_t$					-0.03	-0.05	0.30	0.54
$OTHER_t$					-0.14	-0.48	-0.39	-1.01
$T\_REC*C\_REC_t$							-1.06	-1.59
$T\_REC*C\_PAY_t$							-0.99	-1.47
$T\_REC*AREC_t$							1.20	0.92
$T\_REC*APAY_t$							-3.66	-1.77
$T\_INV*C\_REC_t$							1.20	1.18
$T\_INV*C\_PAY_t$							1.40	1.24
$T\_INV*AREC_t$							-1.17	-0.54
$T\_INV*APAY_t$							2.39	1.44
$T\_PAY*C\_REC_t$							0.13	0.85
$T\_PAY*C\_PAY_t$							-0.01	-0.07
$T\_PAY*AREC_t$							2.26	0.97
$T\_PAY*APAY_t$							-0.13	-0.50
R^2	0.61		0.69		0.72		0.65	
Adjusted R^2	0.61		0.67		0.69		0.58	
F-stat	251.36		42.76		26.93		9.39	
F-prob	0.00		0.00		0.00		0.00	

* 10% significant
** 5% significant
*** 1% significant

With respect to interest received (C_INT_R), even though the variable is sometimes significant, the results for 2002 suggest a negative relationship with the dependent variable, which is contrary to our earlier prediction but to some degree consistent with the research findings documented by Cheng *et al.* (2005) about the greater variability for net interest payments. One potential cause for the negative sign is that the relationship between interest receipts and future operating cash flow may depend on the investment opportunities available and the macroeconomic conditions for the sample period. Namely, when managers choose to leave free cash in the bank, they may forego higher return projects and have not been effective in maximising the firm's value. Following the same rationale, if a company decides to raise debt capital to fund a higher return project or invest in fixed assets, the interest payments for the current period do not necessarily reduce future cash flows, which may partly explain the insignificant results for 2002 and 2003 cash flow prediction and provides ground for the AICPA's suggestion of classifying interest as non-operating item.

The lack of consistently significant results across the years in interest paid (C_INT_P) makes it difficult to assert that this variable is a consistently useful indicator for determining future cash flows. As shown in our results, only one year (Table 8) exhibited significant C_INT_P coefficients. From this however, we can still suggest some inferences from our results obtained so far. Namely, that the positive relationship is consistent with our expectations and affirms our intuition that higher interest payments (holding all other variables constant) are an indicator of higher debt levels. Higher debt, in turn indicates a likelihood of higher future operating cash outflows. It is interesting to note that controlling for accruals and operating cycle in Table 8 reduces the statistical significance of C_INT_P. This further diminishes our confidence with respect to assertions made regarding interest paid. This result may be relevant to the ongoing arguments about whether interest received and interest paid should be classified as an operating cash flow item. Arguably, these items should be re-categorised as cash flows from financing and investment activities, because interest received and (especially) interest paid seems to have less value in explaining future operating cash flows.

For tax paid (C_TAX), we again find widely varying results across time. Coefficients range from -1.36 (highly significant) to +1.33 (highly significant). These results are found in Model 1b Table 6 and Model 2 Table 8 respectively. From these results, it is difficult to make confident conclusions with regards to the effect of taxes on a company's future operating cash flows. Cheng *et al.* (2005) for example, provides two factors that may explain the effects of tax payments. Firstly, the source of income on which taxes have been levied is not specified on the cash flow statement. Therefore, the amount of tax paid may actually carry the

information from operating and non-operating activities. This explanation is not applicable in the Australian context as taxes paid which is included in CFO relates only to taxes on operating profit (AASB 107.35). Secondly, a firm's tax strategy may affect the future payments for taxes (and hence operating cash flows), and this may explain the inconsistent signs for C_TAX across the three years. A more likely explanation is that tax paid lags (not leads) CFO.

Finally, with respect to other positive cash flow from operations (C_IN_OTHER) and other negative cash flow from operations (C_OUT_OTHER), the coefficients were only found to be positive and statistically significant for C_OUT_OTHER. In other words, only the negative amount of other cash flow from operating activities has predictive power of future operating cash flow. Further investigation of the larger items classified as other CFO led us to conclude that they are closely related with core operations. Examples of large C_OUT_OTHER were Goods and Services Tax (GST) paid, betting tax, and R&D expenditure.[38] As the relationship between GST or betting tax and turnover is essentially mechanical, it is not surprising to find a positive relationship between other negative cash flow from operations and future CFO. On the other hand, the types of items disclosed as C_IN_OTHER are more mixed. The largest C_IN_OTHER items included repayment of grower loans, net receipts from franchisees, grant received, GST refunded, and the sale of real estate (a 'senior living facility'). In other words, other positive cash flow from operations in some cases appears to be related with core and in other cases with non-core operations. This great variation in the observations of other positive cash flow from operations may explain the insignificant results in C_IN_OTHER.

5. Conclusions

This paper compares the predictive ability of models incorporating components of cash flows and the length of the firms operating cycle relative to models incorporating aggregate cash flow amounts. The main findings of this study are as follows. We find that for each of three years examined, a cash flow components model is superior to an aggregate cash flow model in predicting future CFO. Consistent with prior research which uses estimates (and not actual) cash flow components, we find that receipts from customers and payments to suppliers predict future CFO. Whilst prior research includes net interest received

[38] We sorted other positive and negative cash flow from operations by absolute value to identify the five firms with largest positive amount and the five firms with larges negative amount. The cash flow statements of the ten firms were then examined across the sample period (2001-2003) to find out the types of items classified as other cash flow form operations.

(or paid) to estimate future CFO, we separately consider the relevance of interest paid and interest received and find that when considered separately, interest received and interest paid add incremental information to net interest received (or paid). These results remain robust after controlling for accruals information and the length of the firm's operating cycle.

We also find accruals information generally adds predictive power to the model consistent with prior research which indicates that earnings are a predictor of future cash flows. Operating cycle ratios (such as receivables and inventory turnover) enhance the explanatory power of the model when current cash flow fails to be a good predictor of CFO. In particular, we find that incorporating information in relation to changes in receivables together with information able the level of receivables turnover increases the predictive ability of the model.

Interestingly, the individual components of CFO are found to have differential explanatory power. Consistent with our expectations, we find that the cash flow components that relate most closely to operating (compared to investing and financing) cash flows have the greatest explanatory power. In contrast, dividends received and interest paid which are sometimes classified as investing and financing cash flows respectively, are found to be poor predictors of CFO.

Investments in operating activities (e.g., building up levels of inventory) appear to be a better predictor of future CFO than investing in fixed interest securities or equity securities, as indicated by the negative association between interest received and future CFO and insignificant results for dividend received. High amounts of interest received for a period may also be indicative of free cash flows and lower expected returns in future periods or conservative managerial investment policy.

Taken together, our results indicate that whilst aggregate CFO may be a useful performance measure it has limited ability to predict future CFO for a firm relative to predictions of CFO using components of CFO. Importantly, our conclusion with respect to the significance of direct method cash flow components, after controlling for accruals information, also provide indirect support for regulators who encourage (e.g., IAS; FASB) or require (e.g., Australia) disclosure of the components of CFO using the direct method. They also lend support for calls by analysts for cash flow information to be disclosed using the direct method instead of (or as well as) the indirect method.

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7. Appendix

A. Direct Method Disclosures	**Year ending**
Cash flows from operating activities	**30 June 2005**
Receipts from customers	2,617.6
Payments to suppliers, employees and indirect tax authorities	(2,243.3)
Cash generated from operations	374.3
Interest paid	(164.8)
Interest received	50.0
Income taxes paid	(84.3)
Net cash from operating activities	**175.2**

B. Indirect Method Disclosures	**Year ending**
Reconciliation of net profit to Net cash from operating activities	**30 June 2005**
Net Profits	151.8
Depreciation and amortisation	85.5
(Profit) loss from sale of fixed assets	(113.0)
Write down of investments and other non-current assets	48.7
Increase in non-current provisions	9.6
Net change in tax balances	30.2
Decrease (increase) in receivables and other current assets	(50.0)
Decrease (increase) in inventories	2.0
(Decrease) increase in payables and accrued expenses	10.4
Net cash from operating activities	**175.2**