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PREDICTING FUTURE CASH FLOWS: DOES CASH FLOW HAVE INCREMENTAL INFORMATION OVER ACCRUAL EARNINGS?

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Financial Reporting Standard No. 107 on cash flow statements in propagating the preparation of cash flow statements as an integral part of an entity's financial statements, has asserted that 'cash flow information is useful in assessing the ability of enterprise to generate cash and cash equivalents...' This study attempts to test this claim by investigating the predictive ability of cash flow from operations versus accrual accounting based data to forecast future cash flow from operations, using multivariate regression models and panel data on a sample of 173 firms listed on Bursa Malaysia. Three predictor variables, net income before extraordinary items (NI), NI plus depreciation and amortisation (NDA) and cash flow from operations (CFO) are used to forecast future cash flows from operations for the period from 1997 to 2005.

This study has provided evidence that cash flow from operations data do have incremental predictive ability over accrual measures of NI and NDA as indicated by the significant Beta coefficients of CFOs in all the eight regression models used. The predictive ability of all the regression models improves as more years of historical data of predictors are incorporated. The results also show that the accrual predictor of NDA is superior over NI in models that use only one or two years data. However, as more than two years data are used, the superiority of NDA over NI disappears.

Keywords: *cash flow, accrual earnings, regression, Malaysian*

Introduction

Much attention has been given by researchers on the ability of accounting measures to predict future cash flows, security prices and business failures. In the United States of America in the 1980s, the focus has been on the information content of cash flows. The assertion of the Financial Accounting Standards

Board (FASB) that accounting earnings and its components provide a better indication of a firm's ability to generate future cash flows than cash flow information themselves has generated many studies researching this issue. Studies have attempted to confirm or refute FASB's contention; by examining the comparative ability of accrual earnings and cash flow data to predict future cash flows (Bowen, Burgstahler and Daley, 1986; Murdoch and Krause, 1990; Jordan and Waldron, 2001).

In the Malaysian context, the requirement for corporations to prepare cash flow statements was initiated with the adoption of IAS 7 (Revised) by Malaysian professional bodies. Cash flow statements are required as an integral part of the financial statements to be presented for periods beginning on or after 1st January 1996. IAS 7 (Revised) was subsequently superseded by the Malaysian Standard on Cash Flow Statements, MASB 5 in 1999 and the Financial Reporting Standard No. 107 (FRS 107) in 2006. FRS 107 contends that information about cash flows of an enterprise is useful in providing users of financial statements with a basis to assess the ability of an enterprise to generate cash and the timing and certainty of their generation (FRS 107, Objective p. 5).

No research has yet been conducted in the Malaysian context to investigate the usefulness of cash flow information as asserted by FRS 107. The purpose of this paper is to examine the usefulness of cash flow information as indicated by its predictive ability. More specifically, the study seeks to examine whether cash flow from operations or accrual income figures are better predictors of future cash flows from operations. This study examines directly the usefulness of cash flow information using actual cash flow data, extracted from cash flow statements of firms rather than surrogate estimates of cash flows as used in many American studies prior to the 1990s. Actual cash flow data is first available in Malaysia from cash flow statements covering the financial periods beginning on or after 1 January 1996.

The motivation for the study arises from two dimensions. Firstly, there is no published findings on the usefulness of cash flow from operations from an information content perspective using Malaysian data. It is expected findings using Malaysian data would contribute to the scarce literature on emerging markets in this region. Secondly, findings in the literature on this issue have been mixed. Using actual cash flow data in an emerging market environment would add a new dimension to the existing literature from studies in more developed markets.

From a practical perspective, this study is useful to investors and creditors. Though investors' primary objective is to assess profitability, predicting future cash flows is also their key concern as a firm's ability to generate cash will impact the firm's share price. It is expected that creditors and other providers of credit would be likely to focus on liquidity. The ability to use historical accrual and cash flow information to predict future cash flows would improve the evaluation of credit worthiness of firms (Allen and Cote, 2005).

Prior Research

Prior research on cash flow has been focused on three main areas. Firstly, many studies conducted in the United States of America, the United Kingdom and Australia investigated the ability of accrual earnings and cash flows in predicting security prices. Such studies include those by Wilson (1986), Rayburn (1986), Bowen et al. (1987), Bernard and Stober (1989), Ali (1994), Dechow (1994), Sloan (1996) and Pfeiffer, Elgers, Lo and Rees (1998). Findings of the predictive ability of cash flow from operations and accrual earnings on security prices have been weak and inconsistent. A recent study on stock returns by Anwer and Nainar (2006) found that analyst and investors have underestimated the persistence of prior period cash flow and that the effect of cash flow is distinct and of a larger magnitude than that of accruals.

The second group of studies are related to the role of cash flow information in predicting business failures, starting with the pioneering work of Beaver in 1966. Most of the studies in this group are conducted in the USA, and include Blum (1974), Largay and Stickney (1980), Gombola, Haskins and Williams (1987), Dambolena and Shulmen (1988), Aziz and Lawson (1989) and Gilbert, Menon and Schwartz (1990). Sharma (2001) in his analysis on the literature examining the value of cash flow information for predicting business failures concluded that the findings of studies conducted have been inconsistent and inconclusive. In 2003, Divesh and Iseline reported further support for the relevance of cash flow information. They concluded that cash flow information provided additional information content over accrual information in assessing firm solvency.

The third group of studies, which are more directly related to this study, examined the comparative ability of accrual earnings and cash flow from operations (CFO). These studies used bivariate and multivariate regression models to study the predictive ability of accrual earning and cash flow models to predict future cash flows. Greenburg, Johnson and Ramesh (1986) using univariate models net income models and CFO models to predict one year ahead CFO; net income models used past net income and CFO models used past CFO as independent variables to predict future CFO. They compared the predictive ability of the models by examining the coefficient of determination (R^2s) of the regression models. The results showed that accrual earnings models indicate significantly higher R^2s than the cash flow models.

Bowen et al. (1986) also compared the ability of accrual earnings and cash flow measures to predict cash flow from operations by using a range of predictor variables, both traditional measures and alternative cash flow measures that incorporate extensive adjustments to the accrual earnings figures. They found that their results are not consistent with FASB's assertion of the superiority of accrual earnings as predictors of future cash flow. In fact, they reported that the traditional measures of cash flow appear to be the better predictors of cash flow from operations.

Murdoch and Krause (1989) using a range of predictors in their bivariate regression models concluded that accrual measures are better predictors of operating cash flow than operating cash flow itself. Among the accrual measures used, models that incorporate net sales as predictors yielded the greatest R^2 among the firms studied. Murdoch and Krause (1990) also found that accrual earnings was a better predictor for operating cash flow and that incorporating more previous years data into the prediction models improves the predictive ability of the models.

McBeth (1993) using actual cash flow data in his simple regression models in a pooled cross-sectional and limited intertemporal setting, concluded that neither past accrual accounting earnings or past cash flow was superior in predicting future cash flows. Specifically, he reported that while past net income was a better predictor for 1989 CFO, past cash flow was a better predictor for CFO of 1990. But he also found that multivariate models utilising predictors of two previous years improves the adjusted R^2 over the bivariate models using only the previous data.

Wertheim and Robinson (1993) examined the relationship between changes in three accounting measures and company liquidity as represented by the current ratio and the quick ratio. They found that most of the three accounting measures were significant individually in explaining the quick ratio and the current ratio. They also reported that though some of the accounting measures have significant incremental explanatory power in explaining changes in the current ratio, they were not significant in predicting cash flow from operations.

Quirin, O'Bryan, Wilcox and Berry (1999) evaluated predictive ability using a continuum of predictors from accrual earnings to CFO. Using Vuong's test (1989) to statistically compare the predictive ability of the models, they found that the best predictors of CFO were past CFO. However, they concluded that their results support the use of a random walk model to estimate actual cash flow from operations.

Jordan and Waldon (2001) developed five bivariate prediction models using ten years of quarterly data for thirty firms in the petroleum industry. To predict operating cash flow one period ahead, a continuum of predictor variables, ranging from net income before extraordinary items to net change in cash and cash equivalents were analysed. Their findings showed that net earnings plus depreciation and amortisation, consistently achieved superior results over the other variables used in comparing predictive ability. In their study, the results also showed that accrual earnings models yielded higher R^2 values than cash flow models.

Barth, Crem and Nelson (2002) examined the predictive ability of earnings and cash flow from operations. They found that disaggregating the cash and accrual components of earnings provided better predictions of future cash flows than that of current cash flows. However, when aggregate earnings was used, cash flows is the better predictor of future cash flows. Similarly, a United Kingdom study by Al-Attar and Hussain (2004) reported that when earnings numbers were disaggregated into cash flows and accruals components,

the predictive ability of their ordinary least square models improved in the prediction of future cash flows.

The findings in the literature on the predictive ability of accrual earnings and cash flow models are not conclusive. While many studies reported the superiority of the accrual accounting earnings models (Greenberg et al., 1986; Murdoch and Krause, 1989, 1990; McBeth 1993; Jordan and Waldron 2001), others have indicated that cash flow models are better (McBeth, 1993; Quirin et al., 1999) and some found the random walk models best explains variations in future cash flow from operations (Quirin et al., 1999).

Theoretical Arguments

Current accounting practice requires that financial statements be prepared under the accrual basis of accounting so as to be useful to a wide range of users in making economic decisions. It is argued that earnings should predict future operating cash flow better than operating cash flow itself. This is because the accrual process accounts for the cash effects of operating transactions and events before the actual receipt or disbursement of cash. Receivables and payables recorded at the end of a financial period are normally collected or paid during the subsequent financial period and thus enhances accrual earnings as a cash flow predictor. This study includes accrual earnings as represented by the net income before extraordinary items figure (NI) in evaluating its predictive ability in forecasting future cash flow.

However, it is argued (Murdoch and Krause, 1989) that effects of transactions such as depreciation and amortisation that represent major charges against earnings that do not relate to outflows of cash, actually detracts from earnings as a predictor of future cash flow. This paper also seeks to investigate the predictive ability of the measure, NDA represented by accrual earnings before extraordinary items with non-current accrual such as depreciation and amortizations added back to it. The NDA is a surrogate measure of cash flow that still maintains a strong base in accrual earnings (Jordan and Waldron, 2001).

While the accounting community propagates the usefulness of accrual earnings, the investment community, on the other hand, appears to prefer cash flow to earnings information in making decisions (Murdoch, et al., 1989). Cash flow proponents argued that the relationship between earnings and cash flow is distorted by rules that govern financial reporting, hence making earnings less useful in predicting cash flow. Additionally, the accounting practice of capitalising and allocation of expenses and the existence of alternative methods of accounting treatment of the same types of transactions, have been looked upon as further reducing the predictive ability of the earnings numbers. To investigate the usefulness of cash flow information, this study uses actual cash flow from operations (CFO) which will be included as a predictor of future cash flow from operations.

There is, at present, no theory to specify the form of cash flow prediction models. One pertinent question is whether the prediction of future operating cash flows can be enhanced by using a multi-year model. Findings by McBeth (1993), Murdoch and Krause (1990) and Jordan and Waldron (2001) indicate that models using more years data perform better than the bivariate models with one single previous year data for predicting the actual cash flow from operations. As such, this study explores the utilisation of previous years data in the prediction models.

Methodology

As there is no previous evidence on the superior predictive ability of cash flow or accrual earning of Malaysian companies, this study explores the following questions:

1. Do actual cash flows from operations provide incremental predictive ability over accruals in the prediction of future actual cash flow from operations?
2. Are prediction models incorporating two or more previous years data better able to predict future actual cash flow from operations than prediction models with only one previous year data?

To investigate the first research question, Beta coefficients of the cash flow from operations predictors in the regression equations will be examined. The Beta coefficient represents a standardized coefficient that allows for direct comparison between coefficients as to its relative explanatory power of the dependent variable. A significant coefficient indicates that the predictor variable increases the explanatory power of the regression equation (Hair, Anderson, Tatham and Black, 1998). The second research question is investigated by examining the adjusted R^2 values of the regression models – the higher the value of the adjusted R^2, the greater the explanatory power of the regression equation, and therefore, the better the prediction of the dependent variable (Hair et al., 1998).

The following three predictor variables are used in the regression models:

NI: net income before extraordinary items
NDA: net income before extraordinary items plus depreciation and amortization
CFO: actual cash flow from operations

Data for the variables NI, NDA and CFO are extracted from the income statements of the sample firms. CFO is the sub-total for the operating section of a firm's cash flow statement. Data for ten years from 1996 to 2005 is collected from company files in Bursa Malaysia. All firms listed on the Main Board and Second Board of Bursa were examined to see if they fulfil the required criteria of data availability. Finally, a sample of 173 companies with financial year end at 31 December and the availability of ten years cash flow data were selected for the study.

The ordinary least square regression procedure was used to construct the models using the three variables. Due to the limited number of data points available (only ten years),

panel data of the 173 companies are used in the regression models. This procedure is consistent with that adopted by McBeth (1993) and Jordan and Waldron (2001).

The performance of models in predicting future actual cash flow from operations is examined using one year to four years past data of the predictor variables. However, due to the limited availability of data, 1996 being the first year in which actual cash flow from operations is available from published financial statements, the number of years the CFO is predicted is based on the availability of past years data. CFOs based on one year past data are predicted for CFOs of 1997 to 2005, and CFOs based on six years past data are only predicted for CFOs of 2000 to 2005.

It is pertinent to provide the economic backdrop of the period of study from 1996 to 2005 which coincided with an economically volatile period in the Malaysian economy. In the 1990s, the Malaysian economy has been enjoying high economic growth with gross national product (GNP) growth of more than 8% per year. The financial crisis hit Asian countries in late 1997 and the Malaysian economy was similarly affected and growth in GNP dropped from 8.4% in 1996 to a negative growth of 5.4% in 1998. However, the economy bounced back in 1999, enjoying a growth of 3.7%, increasing to 6.6% in 2000 but falling back to 1.2% in 2001. Subsequently, the Malaysian economy enjoyed positive growth from 2002 to 2005.

To test the first research question on the predictive ability of cash flow from operations conditional on other accrual variables, cash flow from operations data were incorporated into the models to examine if cash flow data will improve the predictive ability of the models together with accrual data. For example in Model 1 below, if the BETA coefficient (b_2) of the cash flow variable (CFO) is statistically significant, it indicates that cash flow from operations has incremental predictive ability of over net income before extraordinary items (NI).

To examine the second research question on whether more years of historical data will improve the predictive ability of the models, Models 1 and 2 were extended to include 2 to 4 years additional data on the three predictor variables as indicated in Models 3 to 8 below.

The following regression models are formulated using three predictors variables of NI, NDA and CFO.

Models using one year past data: (where t is from 1997 to 2005)

Model

(1) $CFO_t = \beta_0 + \beta_1 NI_{t-1} + \beta_2 CFO_{t-1} + \epsilon_t$

(2) $CFO_t = \beta_0 + \beta_1 NDA_{t-1} + \beta_2 CFO_{t-1} + \epsilon_t$

Models using two years past data: (where t is from 1998 to 2005)

Model

(3) $CFO_t = \beta_0 + \beta_1 NI_{t-1} + \beta_2 NI_{t-2} + \beta_3 CFO_{t-1} + \beta_4 CFO_{t-2} + \epsilon_t$

(4) $CFO_t = \beta_0 + \beta_1 NDA_{t-1} + \beta_2 NDA_{t-2} + \beta_3 CFO_{t-1} + \beta_4 CFO_{t-2} + \epsilon_t$

Models using three years past data: (where t is from 1999 to 2005)

Model

(5) $CFO_t = \beta_0 + \beta_1 NI_{t-1} + \beta_2 NI_{t-2} + \beta_3 NI_{t-3} + \beta_4 CFO_{t-1} + \beta_5 CFO_{t-2} + \beta_6 CFO_{t-3} + \epsilon_t$

(6) $CFO_t = \beta_0 + \beta_1 NDA_{t-1} + \beta_2 NDA_{t-2} + \beta_3 NDA_{t-3} + \beta_4 CFO_{t-1} + \beta_5 CFO_{t-2} + \beta_6 CFO_{t-3} + \epsilon_t$

Models using four years past data: (where t is from 2000 to 2005)

Model

(7) $CFO_t = \beta_0 + \beta_1 NI_{t-1} + \beta_2 NI_{t-2} + \beta_3 NI_{t-3} + \beta_4 NI_{t-4} + \beta_5 CFO_{t-1} + \beta_6 CFO_{t-2} + \beta_7 CFO_{t-3} + \beta_8 CFO_{t-4} + \epsilon_t$

(8) $CFO_t = \beta_0 + \beta_1 NDA_{t-1} + \beta_2 NDA_{t-2} + \beta_3 NDA_{t-3} + \beta_4 NDA_{t-4} + \beta_5 CFO_{t-1} + \beta_6 CFO_{t-2} + \beta_7 CFO_{t-3} + \beta_8 CFO_{t-4} + \epsilon_t$

where,

CFO	=	Actual Cash flow from operations
NI	=	Net income before extraordinary items
NDA	=	NI plus depreciation and amortisation
$\beta 0$	=	Intercept term
$\beta 1$ to $\beta 4$	=	Coefficient of the independent variables
ϵ	=	Error term

Measures of NI, NDA and CFO in lagged periods of period t-1 to t-4 are the independent or predictor variables. CFO in period t is the dependent or predicted variable. Each of the eight regression models (Models 1 to 8) generates a coefficient of multiple determination (R^2) for each year of forecast. The coefficient of determination is a measure of the proportion of variation in the CFO explained by predictors included in that regression. Tests of the predictive ability of the models involve comparisons of the adjusted coefficient of determination of each of the models. The higher the adjusted coefficient of determination, the better the predictor variables explain variations in the CFO.

Results of the Study

The distribution of the selected sample of 173 firms classified according to Bursa Malaysia classifications are presented in Table 1.

Table 1: Distribution of Sample Firms by Industry According to Bursa Malaysia Classifications

Industry	Number of firms in sample	%
Construction	11	6.4
Consumer Products	21	12.1
Finance	13	7.5
Industrial Products	72	41.6
Plantation	15	8.7
Properties	18	10.4
Trading and Services	23	13.3
Total	173	100.0

Table 2 summarises the correlations of all the variables of interest from 1996 to 2005. Most of the coefficients are found to be significant. All the predictor variables in the regression equations have been checked for multicollinearity using the variance inflation factor (VIF). Most of the variables have VIF statistics ranging between 1.2 to 2, and none of them have a VIF of more than 5, which are acceptable in the control of potential multicollinearity problems. As suggested in (Neter, Wasserman and Kutner, 1985) a VIF greater than 10 is taken as a sign of multicollinearity problems.

Table 2: Correlation Coefficients of Variables

PANEL A

	CFO96	**CFO97**	**CFO98**	**CFO99**	**CFO00**	**CFO01**	**CFO02**	**CFO03**	**CFO04**	**CFO05**
CFO96										
CFO97	-									
CFO98	0.43	0.46								
CFO99	0.52	0.30	0.38							
CFO00	0.49	0.24	0.65	0.23						
CFO01	0.38	-	-	0.47	0.35					
CFO02	0.42	0.19	0.61	0.29	0.74	0.16				
CFO03	0.47	0.30	0.30	0.78	0.22	0.42	0.54			
CFO04	-	0.57	0.58	-	0.32	-0.26	-	-0.18		
CFO05	0.55	-	-	0.48	0.51	0.80	0.53	0.67	-0.37	
NI96	0.62	0.27	0.63	0.55	0.74	0.40	0.74	0.58	0.26	0.57
NI97	0.47	0.51	0.56	0.46	0.67	0.34	0.62	0.53	0.24	0.50
NI98	-	0.38	-	-	0.16	-	0.19	0.17	-	-
NI99	0.24	0.16	0.23	0.27	0.47	0.26	0.52	0.28	-	0.26
NI00	-	0.27	-	0.16	-	-	0.32	0.15	-	-
NI01	-	0.34	0.28	0.26	0.38	0.26	0.49	0.34	0.15	0.31
NI02	-	0.26	0.16	-	0.31	-	0.53	0.33	0.20	0.27
NI03	0.26	0.57	0.59	0.40	0.45	-	0.45	0.40	0.60	0.19
NI04	0.26	0.59	0.58	0.37	0.44	-	0.39	0.37	0.68	0.18
NI05	0.21	0.61	0.54	0.35	0.48	-	0.40	0.36	0.67	0.22
NDA96	0.71	0.37	0.70	0.60	0.69	0.37	0.62	0.60	0.27	0.56
NDA97	0.60	0.56	0.66	0.55	0.67	0.36	0.58	0.59	0.26	0.54
NDA98	0.18	0.47	0.22	0.20	0.26	-	0.24	0.29	0.16	0.20
NDA99	0.54	0.40	0.55	0.50	0.64	0.35	0.60	0.49	0.25	0.42
NDA00	0.41	0.49	0.42	0.41	0.30	-	0.40	0.37	0.22	0.20
NDA01	0.40	0.54	0.55	0.49	0.55	0.36	0.57	0.54	0.25	0.47
NDA02	0.40	0.49	0.47	0.35	0.54	0.28	0.66	0.56	0.29	0.48
NDA03	0.37	0.65	0.62	0.64	0.42	0.21	0.48	0.64	0.51	0.32
NDA04	0.39	0.66	0.62	0.64	0.37	0.17	0.40	0.65	0.55	0.30
NDA05	0.28	0.64	0.53	0.60	0.37	0.20	0.41	0.61	0.54	0.31

All Correlation Coefficients displayed are significant at $p \leq .05$ except for boxes marked with "-".

Cont'd

Cont'd Table 2: Correlation Coefficients of Variables

PANEL B

	NI96	NI97	NI98	NI99	NI00	NI01	NI02	NI03	NI04	NI05
NI96										
NI97	0.69									
NI98	-	0.57								
NI99	0.55	0.58	0.42							
NI00	0.17	0.24	0.44	0.49						
NI01	0.49	0.46	-	0.55	0.30					
NI02	0.54	0.52	0.34	0.61	0.27	0.57				
NI03	0.63	0.45	-	0.32	0.23	0.43	0.51			
NI04	0.62	0.61	0.35	0.38	0.17	0.31	0.57	0.79		
NI05	0.64	0.64	0.37	0.42	0.17	0.39	0.61	0.80	0.93	
NDA96	0.91	0.66	-	0.31	-	0.32	0.29	0.60	0.60	0.59
NDA97	0.72	0.93	0.41	0.39	0.16	0.38	0.33	0.49	0.61	0.61
NDA98	0.18	0.65	0.96	0.45	0.39	-	0.27	0.18	0.43	0.44
NDA99	0.78	0.75	0.34	0.80	0.41	0.56	0.49	0.49	0.56	0.58
NDA00	0.40	0.44	0.38	0.36	0.85	0.29	0.16	0.42	0.38	0.35
NDA01	0.67	0.64	-	0.44	0.28	0.86	0.44	0.58	0.49	0.53
NDA02	0.78	0.74	0.36	0.55	0.29	0.55	0.85	0.67	0.74	0.75
NDA03	0.70	0.54	0.13	0.30	0.24	0.42	0.44	0.93	0.79	0.78
NDA04	0.65	0.63	0.29	0.27	0.17	0.28	0.41	0.76	0.90	0.83
NDA05	0.66	0.64	0.33	0.38	0.20	0.39	0.53	0.78	0.87	0.90

PANEL C

	NDA96	NDA97	NDA98	NDA99	NDA00	NDA01	NDA02	NDA03	NDA04	NDA05
NDA96										
NDA97	0.82									
NDA98	0.24	0.58								
NDA99	0.72	0.74	0.43							
NDA00	0.49	0.52	0.48	0.58						
NDA01	0.68	0.71	-	0.71	0.53					
NDA02	0.70	0.71	0.43	0.71	0.46	0.69				
NDA03	0.73	0.63	0.27	0.57	0.52	0.66	0.72			
NDA04	0.74	0.72	0.45	0.60	0.50	0.59	0.73	0.90		
NDA05	0.65	0.66	0.43	0.60	0.44	0.59	0.74	0.87	0.92	

All Correlation Coefficients displayed are significant at $p \leq .05$ except for boxes marked with "-".

Using One Year Past Data to Forecast CFO

Table 3 displays the results of the ordinary least square regression Models 1 and 2 using NI, NDA and CFO as predictors based on one year past data to forecast CFO. Adjusted R^2s obtained for Model 1 with NI and CFO as predictors range from 12% (for year of forecast 2001) to 56% (2004). For Model 2 the adjusted R^2s range from 12% (2001) to 68% (2004). These results are comparable to those calculated by McBeth (1993).

Table 3: Forecasts of Actual Cash Flow from Operations
Using Previous 1 Year Data (BETA Coefficients of NI, NDA and CFO)

	1997	1998	1999	2000	2001	2002	2003	2004	2005
Model 1									
NI_{t-1}	0.50	0.43	-	0.47	-	0.50	-	0.80	0.79
CFO_{t-1}	-0.37	0.24	0.38	-	0.35	-	0.54	-0.50	-0.90
Adj r^2	0.15	0.35	0.14	0.22	0.12	0.24	0.29	0.56	0.46
Model 2									
NDA_{t-1}	0.84	0.66	-	0.64	-	0.57	0.37	1.05	0.70
CFO_{t-1}	-0.66	-	0.38	-	0.35	-	0.30	-0.85	-0.74
Adj r^2	0.35	0.43	0.14	0.41	0.12	0.32	0.36	0.68	0.48

All Adjusted R^2 values have F-ratios which are significant at $p \leq .05$.
All BETA values are significant at $p \leq .05$ except for boxes marked with "-".

For forecast period from 1997 to 2005, the variables of CFO have significant Beta coefficients except for two years (2000, 2002) for Model 1, and three years (1998, 2000, 2002) for Model 2. It can be concluded that cash flow data do provide incremental information over the accrual measures used in the models. In fact, insignificant BETA coefficients are also observed for the NI accrual variables in three years (1999, 2001, 2003) and NDA variables in two years (1999, 2001).

Examining further the predictive ability of the models against the economic growth trends in Malaysia during the study period, the results show that when there are reversals in economic growth, companies' performance are similarly affected. In this cases, the ability of Models 1 and 2 to explain the variations in actual cash flow decreases dramatically. For example, when economic growth turns from a downward trend in 1998 to an upward trend in 1999, the adjusted R^2 dropped from 35% (1998) to 14% (1999) for Model 1. Similarly the adjusted R^2 for Model 2 also dropped from 43% (1998) to 14% (1999). The reversal from 2000 (an upward trend) to 2001 (a downward trend) also brought about large drops in adjusted R^2 of both the models in 2001. However, in years where the downward or upward trends of economic growth continue between two years, the adjusted R^2s improve (increased from 15% to 35%), as noted in years 1997 (upward trend) to 1998 (upward trend). The continuing downward trend from 1999 to 2000 improved the adjusted R^2 from 14% to 22% for Model 1, A similar situation is also observed for Model 2.

When the predictive ability between the accrual variables of NI and NDA are compared, it is observed that Model 2 (with NDA) records higher adjusted R^2s than Model 1 (with NI) in seven out of the eight forecast years. NDA, defined as NI plus depreciation and amortisation is a surrogate measure of cash flow with a strong base in accrual earnings, whereas NI, defined as net income is pure accrual based earnings. This finding concurs with the studies by Bowen et al. (1986) and Jordan and Waldon (2001). Their studies reported that models using net income plus depreciation and amortization consistently

achieved superior results. One possible reason for the information content of NDA, could be that depreciation and amortisation expenses are not completely irrelevant to future cash flows. Depreciation and earnings could be thought of as proxies for the size of a firm's investment in non-current assets, and to some extent they represent the change of productivity and are relevant to predict future cash flows. Hence, their ability to predict future cash flows.

Using Two Years Past Data to Forecast CFO

Here the actual cash flow from operations (predicted CFO) of a particular year is regressed against the predictors, NI and CFO (Model 3), and NDA and CFO (Model 4) of the prior two years. For example, in Model 3, 1996 NI, 1997 NI, 1996 CFO and 1997 CFO are incorporated as predictors of the actual cash flow from operations of 1998; and data of 1997 NI, 1998 NI, 1997 CFO and 1998 CFO as predictors of CFO of 1999, and so on. The results are displayed in Table 4.

Table 4: Forecasts of Actual Cash Flow from Operations
Using Previous 2 Years Data (BETA Coefficients of NI, NDA and CFO)

	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Model 3								
NI_{t-1}	-	0.28	0.34	-0.16	0.21	-	0.80	0.41
NI_{t-2}	0.41	0.62	-	-	0.18	-	-	-
CFO_{t-1}	0.37	-	-	0.21	-0.14	0.49	-0.50	-0.57
CFO_{t-2}	0.20	-	0.57	0.42	0.69	0.35	-	0.42
Adj R^2	0.51	0.26	0.53	0.29	0.64	0.40	0.56	0.55
Model 4								
NDA_{t-1}	-	-0.19	0.48	-0.19	0.28	0.27	1.05	-
NDA_{t-2}	0.62	0.66	-	-	-	-	-	0.26
CFO_{t-1}	0.23	-	0.46	0.29	-0.17	0.32	-0.85	-0.42
CFO_{t-2}	-	-	-0.18	0.48	0.64	0.30	-	0.43
Adj R^2	0.54	0.32	0.56	0.30	0.60	0.44	0.68	0.52

All Adjusted R^2 values have F-ratios which are significant at $p \leq .05$.
All BETA values are significant at $p \leq .05$ except for boxes marked with "-".

Increasing the use of two years past data, also produced significant Beta coefficients for CFO variables except for year of forecast 1999 for both Models 3 and 4. The significant Beta coefficients confirm that CFO provides additional information over the accrual measure of NI and NDA. Table 4 also shows that the adjusted R^2s of all the models, incorporating two years data are higher than similar models with one year past data. Models 3 and 4 have higher predictive ability over Models 1 and 2 for all the eight forecast years from 1998 to 2005. These results are consistent with findings by McBeth (1993) where multivariate models using two years data perform better than the bivariate models for predicting the actual cash flow from operations of 1990. Murdoch and Krause (1990) also reported that the accuracy of the forecasts of future cash flow improved as the number of years data was increased irrespective of the predictor used.

Consistent with the results of models using one year past data, Model 4 (with NDA) is superior to Model 3 (with NI) in terms of explaining variations in future cash flows in six out of the eight years of forecast.

Though Models 3 and 4 are likewise affected by economic growth trend reversals as in Models 1 and 2, the effect of changes on the adjusted R^2 is reduced because of more years past data being used in the prediction models.

Using Three Years Past Data to Forecast CFO

In this case, the CFO of a particular year is predicted using models that incorporate previous three years data, for example to predict the CFO of 1999, the models incorporates data of 1996, 1997 and 1998 for the cash flow and accrual variables, and so on for other forecast years.

From Table 5, it is noted that the Beta coefficients for the CFO variables are significant for all the seven years of forecast from 1999 to 2005 for both Models 5 and 6, whereas Beta coefficients of NI variables are not significant for the years 2001 and 2003 (Model 5) and Beta coefficients of NDA for 2001 (Model 6), further confirming the information content of cash flow data. The results also support the premise that incorporating more historical data in the prediction models improves predictive ability. Both Models 5 and 6 are able to explain more of the variations in future cash flow than models with only two years data (Models 3 and 4).

Table 5: Forecasts of Actual Cash Flow from Operations
Using Previous 3 Years Data (BETA Coefficients of NI, NDA and CFO)

	1999	2000	2001	2002	2003	2004	2005
Model 5							
NI_{t-1}	-	0.19	-	0.19	-	0.79	0.35
NI_{t-2}	-	-0.23	-	0.16	-	-	-
NI_{t-3}	0.24	0.62	-	-	-	-	-
CFO_{t-1}	-	-0.21	0.66	-0.20	0.94	-0.42	-0.57
CFO_{t-2}	0.26	0.43	0.58	0.68	0.50	-	0.29
CFO_{t-3}	0.39	-0.15	-0.68	0.14	-0.65	-0.17	0.27
Adj R^2	0.40	0.65	0.52	0.65	0.57	0.58	0.60
Model 6							
NDA_{t-1}	-	0.32	-	0.22	0.19	1.03	-
NDA_{t-2}	-	0.12	-	-	0.22	-	-
NDA_{t-3}	0.30	0.55	-	-	-	-	0.30
CFO_{t-1}	-	-0.27	0.66	-0.21	0.74	-0.77	-0.41
CFO_{t-2}	0.21	0.35	0.58	0.66	0.42	-	0.33
CFO_{t-3}	0.32	-0.21	-0.68	0.12	-0.69	-0.15	0.18
Adj R^2	0.40	0.64	0.52	0.61	0.64	0.70	0.60

All Adjusted R^2 values have F-ratios which are significant at $p \leq .05$.
All BETA values are significant at $p \leq .05$ except for boxes marked with "-".

Examining the models against the economic growth trends, reveals that Models 5 and 6 improves the prediction of future cash flow compared with models with less years past data. It is noted that though Models 5 and 6 are still affected by there trends, the changes in these models' adjusted R^2 when trends reverse between years is decreased. Furthermore, the difference in predictive ability between models using NI and NDA is smoothened out when more years data are used in the models.

Using Four Years Past Data to Forecast CFO

Table 6, shows all models incorporating four years previous data improved further and have better predictive ability than models with less historical data as can be observed from the higher R^2 values. It is also observed that every forecast year from 2000 to 2005 that CFO variables have significant Beta coefficients in both Models 7 and 8. The relatively higher R^2 values of models incorporating NDA variables as compared to NI variables is reduced as four years data are used in the models.

Table 6: Forecasts of Actual Cash Flow from Operations
Using Previous 4 Years Data (BETA Coefficients of NI, NDA and CFO)

	2000	2001	2002	2003	2004	2005
Model 7						
NI_{t-1}	-	-	0.18	0.15	0.63	0.36
NI_{t-2}	-	-	0.19	-	-	-
NI_{t-3}	0.35	-	-	-0.11	-	-0.12
NI_{t-4}	0.48	-	-	-0.11	-	-
CFO_{t-1}	-0.27	0.66	-	0.71	-	-0.45
CFO_{t-2}	0.32	0.58	0.52	0.20	-0.63	-
CFO_{t-4}	-0.13	-0.68	-	-0.51	-0.46	0.39
CFO_{t-3}	-	-	0.20	0.64	0.66	0.61
Adj R^2	0.69	0.52	0.64	0.86	0.66	0.88
Model 8						
NDA_{t-1}	0.27	-	0.22	0.22	0.90	0.26
NDA_{t-2}	-	-	-	-	-	-
NDA_{t-3}	0.35	-	-	-0.08	-	-
NDA_{t-4}	0.24	-	-	-	-	-
CFO_{t-1}	-0.30	0.66	-0.21	0.63	-0.53	-0.37
CFO_{t-2}	0.31	0.58	0.66	0.18	-0.32	-
CFO_{t-3}	-0.21	-0.68	0.12	-0.54	-0.31	0.35
CFO_{t-4}	-	-	-	0.60	0.40	0.60
Adj R^2	0.65	0.52	0.61	0.86	0.73	0.88

All Adjusted R^2 values have F-ratios which are significant at $p \leq .05$.
All BETA values are significant at $p \leq .05$ except for boxes marked with "-".

Summary and Conclusion

This preliminary study has provided evidence that cash flow from operations data do provide incremental predictive ability over accrual measures of net income (NI) and net income plus depreciation and amortisation (NDA) as indicated by the significant Beta coefficients of CFO variables in all the eight regression models used.

The evidence also shows that incorporating more years of historical data in predictor variables has improved the predictive ability of all the regression models. Generally, models that use four years data are superior to models that use three years data which are better than those that use two or one year data. This results, however, are contrary to the findings by Quirin et al. (1999) that a random walk model would perform as well as or better than models based on more years data.

In addition, as more years data are used in the prediction models, the fluctuations in a model's adjusted R^2 that characterised reversals in economic growth between years are reduced, indicating that using more historical data of the predictors would produce greater consistency in the explanatory power of the models.

Another finding is the superiority of regression models with the accrual earning based measure of NDA (where depreciation and amortisation have been added back to net income) over the pure accrual earnings measure of NI (net income) in models that use only one or two years data. However, as more data (three and four years data) are used, the superiority of NDA over NI disappears.

This study has examined relatively naive models as the true form of the expectation model is not known and many alternative forms are possible. The reader should exercise caution in interpreting the findings as it is not the intention of this study to develop successful models to forecast actual cash flow from operations. The purpose has been to examine the predictive ability of cash flow data in relation to accrual numbers. Even though the study period from 1996 to 2005 has coincided with a volatile and unusual period in the Malaysian economy from 1996 to 2001 and a relatively stable economic growth period from 2002 to 2005, the findings have confirmed the usefulness of cash flow numbers in forecasting future cash flows vis-à-vis accrual measure. The limited availability of actual cash flow data made it necessary to use panel data to calculate parameters for the sample firms as a whole, limiting the analysis of firm specific variables. Future studies using longitudinal analysis and firm specific variables for individual firms would further increase understanding of the usefulness of accrual and cash flow measures in forecasting future cash flows.

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