# DO ACCRUAL COMPONENTS AND CASH FLOW COMPONENTS HAVE BETTER PREDICTIVE POWERS IN FORECASTING FIRM'S FUTURE CASH FLOW? – CASE OF VIETNAMESE LISTED FIRMS

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**Abstract**

This paper aims at examining whether earnings accrual components and cash flows components can improve predictability of earnings for forecasting firm's future operating cash flows. This research was implemented on *actual* data of financial statements of 220 Vietnamese firms listed on Ho Chi Minh City Securities Exchange (HOSE) and Hanoi Securities Exchange (HNX) for the period of from 2008 to 2012, making a sample of a 1,100 firm-year observations. OLS regression on a balanced panel and relevant tests was employed to find out the best fitted model for forecasting future cash flows for Vietnamese firms. The research found evidence that cash flow components together with accrual components had superior predictive powers than aggregate cash flows; cash flow and total accruals; or cash flow and accrual components in forecasting future operating cash flows in Vietnam.

Key words: *operating cash flow, earnings, accrual accounting data, future cash flow forecast, Vietnam.*

## 1. Introduction

The IMF World Economic Perspective Report forecasted that annual global economic growth for 2014 was just at 3.6%, implying that the fight against recession would be more severe in the world and governments should quickly have relevant actions, such as to launch their demand stimulation packages. More than ever, businesses must clearly identify the global changes for making appropriate development policies, as well as promoting the role of financial management in which cash flow is one of important focuses. In the context of the economic difficulty where Vietnamese enterprises are currently facing with the instability and potential risks, improving predictability of earnings for forecasting future cash flows for Vietnamese enterprises is becoming a topic attracting special attention of business managers. In particular, during the period from 2008 to 2012, the fact that many Vietnamese enterprises had to stop their production, to close down or fallen into distress raised big question about the effectiveness of the financial strategies in facing with economic challenges. How to forecast future cash flows effectively for making financial plans in the current economic conditions remains problematic for enterprises, especially small and medium-sized enterprises.

Many studies have shown that cash flow was an important element for the valuation of securities and making firm's financial decisions. The prediction of firm's bankrupt possibility will be significantly improved if basing on operating cash flow and cash-related financial indicators (Gentry et al - 1984) because operating cash flow directly provides information on the ability to meet firm's financial obligations such as paying of interest and principal to creditors. Not only has the role of bankruptcy prediction, operating cash flow also serves as forecasting factor of profitability and deciding factor of the viability of the business. A business can only exist when the cash flow is primarily generated from operating activities and the cash flows can meet necessary needs of the business. In addition, operating cash flow has the ability to better explain the relationship between net income and dividend in a stock return valuation model of service sector companies as well as a better explanation of abnormal return from stock price compared to net income (Agnes Cheng, Joseph Johnston - 2003). Because of the

important reasons, it is crucially important to correctly predict the firm's future operating cash flows based on its earnings.

*Firstly,* forecasting future operating cash flow is a required activity among many other financial decisions of a firm (Neil et al - 1991) because cash flow is a basic element for paying dividends, interest and other payables (Staubus, G.J_1989).

- *For investment decision,* investors and equity analysts need to estimate rate of return earned from their investments. The rate of return includes cash dividends and capital gain, so in the investment decision making process, the issuing company's future cash flows forecast is one of the main tasks of estimating ability to pay future dividends in the investment horizon (Frigo and Graziano - 2003; Neil et al. - 1991).
- *For financing decision,* prediction of bankruptcy probability of the borrowers will help lender prevent losses from bad debt and non-performance loan. There are early signs indicating that a borrowing company is facing with the financial problems and earning is one of the above-mentioned important indicators (Zwaig and Pickett - 2001). A negative income may be an indicator for the risk of default and lead to bankruptcy (Epstein and Pava - 1992; Zwaig and Pickett - 2001).
- *For corporate governance decision*s, forecasting future operating cash flows can help managers to detect diseases related to cash and financial problems which the company is currently facing with (Kelly and O'Connor - 1997). Forecasting future cash flows also helps managers determine the amount of cash holdings as well as an amount needed to meet the company's obligations such as payment for payables, fixed assets purchase and other expenses (Plewa and Friedlob - 1995). As cash flow is considered as lifeblood of business (Schaeffer - 2002) it is crucial for the firm's viability and development that how well the managers manage the firm's cash flow (Sharma, R. and Jones - 2000).
- *For internal investment decisions,* analyzing and planning source and use of source are also related to forecasting cash flow from earnings (Foster - 1986). Both expansion and replacement investment projects (Bierman - 1988) which are assessed by different methods such as Net Present Value - NPV or Internal Rate of Return - IRR (Brigham and Gapenski - 1999) also require accuracy in forecasting project's future net cash flow (Giaccotto - 1990). The analysts also assess the firm performance based on the cash flow beside the bottom line on income statement (Boyd and Cortese - Danile - 2000/2001, Kremer and Rizzuto - 2000), because net income cannot cover all information while cash flow can (Cheng, Yang and Clubb - 2003). Investors also consider cash flow as a measure of effectiveness of firm performance.

*Second*ly, the difference between earnings and operating cash flow can be used as a signal to identify fraud in the financial statements that the auditors and other analysts should consider, in addition to factors such as financial leverage, retained earnings and market value (Lee, Ingram and Howard - 1999). Excess amount of earnings in comparison with cash flow may indicate the risk of fraud in the following years because of the fraudulent companies often have lower financial performance except exceptional earning report.

*Thirdly,* operating cash flow is often used to define free cash flow. This suggests that the firm can generate free cash flow from business operations after using cash for capital expenditures (Chang - 2002). It is hard for a company to pursue new opportunities, to acquire other businesses or to pay dividends without availability of free cash flow. Free cash flow analysis helps managers determine the available funds for reinvestment, thereby, strengthen the development opportunity. Moreover, the analysis can help classify companies with the different development potentials.

Finally, the importance of the forecasting cash flows is also supported by the accounting professional associations. In the world many accounting associations as well as Vietnamese Accounting Association (VAA) offers a basic guideline for the preparation and establishment of financial statements in order to provide necessary financial information to different groups of users who will predict the amount, timing and uncertainty of future cash flows.

There have been a number of researches investigating the usefulness of earnings, operating cash flow, accrual components and cash flow components in forecasting firm's future cash flows in the world. Most of researches have been done in developed countries like the United State of America (Barth et al. _ 2001; Dechow et al. 1998; Krishnan and Largay- 2000; Orpurt and Zang_2009) or Australia (Austin et al. _1989; Shadi Farshadfar and Reza Monem_ 2012). To date none has done in Vietnam yet. Vietnam is a developing country where financial market is still young and small. Accounting standards of Vietnam is a bit different with International Accounting Standards – IAS, for example interest receipt and dividend receipt are classified as investment cash flow while as operating cash flow as by IAS. Therefore, this study was conducted to verify as well as to identify the best fitted model of forecasting firm's future cash flow in Vietnam on the basis of world's prior researches.

The remainder of this research is organized as follows. Section 2 is literature review. Section 3 presents research methodology. Section 4 reports research results and Section 5 concludes the research.

## 2. Literature review

There have been many empirical evidences around the world showing that the accrual components, earnings and operating cash flows have predictive powers for forecasting future operating cash flows for the business. However, the results of these studies have not shown the consistency: some researchers claimed that the pattern of future operating cash flows could be predicted by earnings or current operating cash but some other studies had conclusion that the accrual components and operating cash flow showed their usefulness of the forecast. Bowen, Burgstahler and Daley (1986); Greenberg, Johnson and Ramesh (1986); Murdoch and Krause (1990); Finger, C.A. (1994); Dechow, P.M. (1994) agreed the current earnings have surpassed current operating cash flows in forecast ability of future cash flows for the business. Some other researches showed contrary evidences which is the superiority of current operating cash flow in the forecasting future cash flows of the business. Representatives of these researches were Quirin et al (1999); Subramanyam and Venkatachalam (2007). They evidenced that the actual current operating cash flows had better predictability of future operating cash flows in comparison with earnings.

Besides forecasting model merely based on current aggregate earnings or current aggregate operating cash flows, some studies also examine firm's future operating cash flow predictability of accrual components together with aggregate operating cash flow. Dechow; Kothari and Watts (1998) - the first authors launched a model of earnings, cash flow and accrual components which were developed based on the assumption of a random walk of sales, variable operating costs , fixed operating costs, and accrual components including accounts receivable, accounts payable and inventory to forecast future cash flows for the firm. This model implies that current earnings was superior to forecast future cash flow than the current operating cash flow and this difference varied with the cycle of operating cash flow. Based on the research of Dechow, Kothari and Watts (1998); Barth et al. (2001) focused on examining role of the accrual components in forecasting future cash flows. The research showed that each accrual component reflected different information of firm's future cash flows. As expected, decomposing total accruals to different accrual components such as change in accounts receivable, changes in accounts payable, changes in inventories, depreciation, accrued expenses, and others, has

greatly enhanced the forecast ability of firm's future operating cash flows. The most recent study of Shadi Farshadfar and Reza Monem (2012) in Australia provided the evidence that the components of operating cash flow such as cash receipt, cash paid, net interest paid, tax paid, and other cash together with the accrual components could significantly improve the forecast ability of firm's future operating cash flow.

## 3. Research methodology

### 3.1 Research models

Shadi Farshadfar and Reza Monem (2012) evidences that both accrual components and cash flow components improve predictability of earnings for predicting firm's future cash flow. However, this research was done in Australia where its accounting standards are somewhat different with Vietnamese accounting standards and development level of financial market is different as well. Therefore, we re-investigate the usefulness of earnings, aggregate cash flow and total accruals, aggregate cash flow and accrual components, and aggregate cash flow together with aggregate accruals to forecast firm's future operating cash flow in Vietnamese context by using actual cash flow data from direct method cash flow statements (Shadi Farshadfar and Reza Monem_2012). Actual data were used instead of estimated data because Krishnan and Largay (2000) and Orpurt and Zang (2009) evidenced measure errors in associated with estimated data.

First we examine if aggregate earnings is a good predictive factor for firm's future operating cash flow by following model:

$$\boldsymbol{OCF_{it}} = \propto_{\mathbf{0}} + \propto_{\mathbf{1}} \boldsymbol{NOPAT_{it-1}} + \boldsymbol{\varepsilon_{it}} \qquad (1)$$

Where i and t denote firm and year respectively.

- OCF*:* operating cash flow.
- NOPAT: net operating income after tax, which is considered as continuing and before extraordinary earnings in Vietnam.

From this model, earnings will be decomposed into cash flow and total accrual items to see if lagged cash flow and total accruals items can improve predictability of firm's future operating cash flow:

$$\boldsymbol{OCF_{it}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1 OCF_{it-1}} + \boldsymbol{\beta_2 TAC_{it-1}} + \boldsymbol{\varepsilon_{it}} \qquad (2)$$

Where i and t denote firm and year respectively.

- OCF: operating cash flow
- TAC: total aggregate accruals which is the difference between NOPAT and OCF. (TAC = NOPAT – OCF).

Then we continue decompose TAC into acrual components to check whether cash flow and accrual componts are better predictive factors to firm's future operating cash flow, as follows:

$$\boldsymbol{OCF_{it}} = \boldsymbol{\delta_0} + \boldsymbol{\delta_1 OCF_{it-1}} + \boldsymbol{\delta_2 DAR_{it-1}}\ \boldsymbol{\delta_3 DINV_{it-1}} + \boldsymbol{\delta_4 DAP_{it-1}} + \boldsymbol{\delta_5 DEP_{it-1}} + \boldsymbol{\delta_6 TXAC_{it-1}} + \boldsymbol{\delta_7 OTHAC_{it-1}} + \boldsymbol{\varepsilon_{it}} \qquad (3)$$

Where i and t denote firm and year respectively.

- OCF: operating cash flow.
- DAR: the change in account receivable during the year, (DAR = Account receivable year t - Account receivable year t–1).

- DINV: change in inventory during the year (DINV = Inventory year t - Inventory year t–1).
- DAP: is change in account payable during the year (DAP = account payable year t – account payable year t–1).
- DEP: deprecation and amortization expense .
- TXAC: Tax accruals which are accruals in relation to income tax expense, calculated as income tax expense minus tax paid.
- OTHAC: other accruals which calculated as OTHAC = NOPAT – OCF – (DAR + DINV – DAP – $DEP - TXAC$).

Finally, we decompose aggregate operating cash flow into cash flow components to examine if together with cash flow components and accrual components are better predictive factors for firm's future cash flow.

$$\boldsymbol{OCF_{it} = \gamma_0 + \gamma_1 CSHRD_{it-1} + \gamma_2 CSHPD_{it-1} + \gamma_3 INTPD_{it-1} + \gamma_4 TXPD_{it-1} + \gamma_5 OTHCSH_{it-1} + \gamma_6 DAR_{it-1} + \gamma_7 DINV_{it-1} + \gamma_8 DAP_{it-1} + \gamma_9 DEP_{it-1} + \gamma_{10} TXAC_{it-1} + \gamma_{11} OTHAC_{it-1} + \varepsilon_{it}} \quad (4)$$

Where i and t denote firm and year respectively.

- OCF: operating cash flow.
- CSHRD: cash receipt from customers.
- CSHPD: Cash paid to suppliers and employees
- INTPD: net interest paid which is interest paid during the year[1].
- TXPD: tax paid during the year
- OTHCSH: Other operating cash flow which is calculated as OTHCSH = OCF – (CSHRD – CSHPD – INTPD – TXPD).
- DAR: the change in account receivable during the year, (DAR = Account receivable year t - Account receivable year t–1).
- DINV: change in inventory during the year (DINV = Inventory year t - Inventory year t–1).
- DAP: is change in account payable during the year (DAP = account payable year t – account payable year t–1).
- DEP: deprecation and amortization expense .
- TXAC: Tax accruals which are accruals in relation to income tax expense, calculated as income tax expense minus tax paid.
- OTHAC: other accruals which calculated as OTHAC = NOPAT – OCF – (DAR + DINV – DAP – $DEP - TXAC$).

All of above variables were deflated with firm's outstanding number of shares. (Krishnan và Largay - 2000; Shadi Farshadfar and Reza Monem - 2012).

Just as other prior researches, especially Shadi Farshadfar and Reza Monem (2012), pooled ordinary least squares (OLS) regression with White – heteroskedasticity correction was employed to estimate the forecast models. Adjusted $R^2$ was used to assess explanatory powers of the models. We also used out-of-sample test in addition of within-sample forecasting test to examine predictability of the model because higher $R^2$ does not necessary means better forecast ability (Watts and Leftwich, 1977). Vuong's (1989) likelihood ratio test for model selection

[1] Most of definition of variable of this research, we follow Shadi Farshadfar and Reza Monem (2012) except this variable we followed Krishnan và Largay (2000). The reason is that according to Vietnam's Accounting Standards, interest income is classified as investment cash flow.

was employed to test if the two competing models have different explanatory powers (Dechow, 1994, Appendix 2). Theil's U_Statistics was also used as a forecast error measure (Kim and Kross _2005; Bandyopadhyay et al. _ 2010; Shadi Farshadfar and Reza Monem_2012). Theil's U_statistic is decomposed into 3 components: variance, covariance and bias in which a good prediction model should have covariance component greater than variance and bias component. This ratio falls between 0 and 1, which values closer to 0 meaning higher forecasting accuracy (Pindyck and Rubinfield _ 1998). Because independent variables are 1 year lagged values, so to see whether they capture different information with current year values, f-test was employed to test for equality of coefficients (Orpurt and Zang_2009; Shadi Farshadfar and Reza Monem_2012).

### 3.1 Data and sample

The sample is based on data obtained from Vietstock database as well as manual collection from financial statements of listed companies in both Ho Chi Minh City Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) for the period of 2008 - 2012. This period was chosen because of data availability, (i.e. before 2007, not many firms listed on the exchanges, and not easy to get cash flow statement data). From the list of all companies listed on the two exchanges in this research period, we first excluded all financial firms such as insurance, banking, securities companies and funds from the sample because their natures are not appropriate for our research purpose. Then only firms with direct method cash flow statement were kept because actual cash flow data from direct method statements can reduce measure errors problems (Krishnan and Largay_2009; Orpurt and Zang _2009, Bradbury_ 2011, Shadi Farshadfar and Reza Monem_2012). Companies with missing data and/or having different financial year for the research period as well as observations with illogical values as known as outliners were also removed from the sample. Our final sample consisted of 1,110 firm -year observations that include the observation of 220 firms from 2008 to 2012.

## 4. Results

### 4.1 Descriptive statistics

**Table 1: Descriptive statistics**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| NOPAT | 1,100 | 2.7295 | 11.9973 | -33.8416 | 243.7013 |
| OCF | 1,100 | 2.2926 | 11.8220 | -30.8989 | 211.6242 |
| TAC | 1,100 | 0.4364 | 7.0993 | -69.6470 | 66.3622 |
| DAR | 1,100 | 0.4070 | 4.5403 | -115.4630 | 36.3689 |
| DINV | 1,100 | 0.6405 | 6.3619 | -128.2880 | 53.9782 |
| DAP | 1,100 | 1.0931 | 11.7488 | -312.4960 | 105.7396 |
| DEP | 1,100 | 0.9912 | 2.6562 | 0.0005 | 3.8614 |
| TXAC | 1,100 | 0.0432 | 1.6079 | -19.7410 | 30.0611 |
| OTHAC | 1,100 | 1.4972 | 8.2058 | -77.8970 | 1.2855 |
| CSHRD | 1,100 | 33.082 | 78.1665 | -62.6009 | 1049.1470 |
| CSHPD | 1,100 | 27.6556 | 63.2735 | -180.8650 | 787.7706 |
| INTPD | 1,100 | 0.3522 | 2.0994 | -21.9686 | 30.4521 |
| TXPD | 1,100 | 0.4585 | 1.4092 | -0.2199 | 19.7410 |
| OTHCSH | 1,100 | -2.3224 | 17.0881 | -205.6120 | 126.6916 |

Table 1 reports descriptive statistics of the sample. Average NOPAT per share is 2,729 dong with standard deviation of 11,997 dong while operating cash flow per share (OCF) ranged from – 30,899 dong to 221.624 dong, averaged at 2,299 dong. The positive difference between NOPAT and OCF implies accrual components (DAR, DINV, DAP, TXAC, OTHAC) have a considerable impact on the OCF. Besides, the fact that standard deviation value of OCF is less than that of NOPAT also shows a decreasing impact of accruals on volatility of OCF. Averaged TAC was a positive number means that total accruals increased earnings. Larger mean of DEP than that of DAR and DINV expressed a higher variability of current accrual components. Means (standard deviation) of CSHRD and CSHPD are 33,082 (78,166) and 27,655 (63,273) respectively, which are all much greater than those of INTPD, TXPD and OTHCSH, implying that CSHRD and CSHPD have remarkable impacts on predictability of OCF.

### 4.2 Pearson Correlation Analysis

Table 2 reports Pearson Correlation matrix. Coefficients between OCF with NOPAT and TAC are 0.8224 and -0.2754. Both are at 1% significant level. OCF has high significant positive correlations with most of accrual components, i.e. DAR (0.0940), DAP (0.2343), DEP (0.5589), TXAC (0.6103), OTHAC (0.3843) and negative but insignificant with DINV (-0.0514). OCF are also positively correlated with CSHRD (0.6275), CSHPD ().5567), TXPD (0.4506) but negatively with INTD (-0.2226) and OTHCSH (-0.1075). All of these correlations are significant at 1%. Accrual components as well as OCF components are also positively correlated at 1% significant level except insignificance of correlation between CSHRD and INPD.

**Table 2: Pearson correlation**

| | NOPAT | OCF | TAC | DAR | DINV | DAP | DEP | TXAC | OTHAC | CSHRD | CSHPD | INTPD | TXPD | OTHCSH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCF | 0.8224*** | | | | | | | | | | | | | |
| TAC | 0.3204*** | -0.2754*** | | | | | | | | | | | | |
| DAR | 0.2361*** | 0.0940* | 0.2425* | | | | | | | | | | | |
| DINV | 0.2092*** | -0.0514 | 0.4391* | 0.6346*** | | | | | | | | | | |
| DAP | 0.2568*** | 0.2343*** | 0.0438 | 0.7605*** | 0.7179*** | | | | | | | | | |
| DEP | 0.5226*** | 0.5589*** | -0.0475 | 0.1296*** | 0.0839*** | 0.1263*** | | | | | | | | |
| TXAC | 0.7115*** | 0.6013*** | 0.2011* | 0.2712*** | 0.2290*** | 0.2812*** | 0.3054*** | | | | | | | |
| OTHAC | 0.6590*** | 0.3843*** | 0.4737* | 0.3471*** | 0.3528*** | 0.5849*** | 0.3681*** | 0.5412*** | | | | | | |
| CSHRD | 0.7680*** | 0.6275*** | 0.2530* | 0.2603*** | 0.1992*** | 0.2830*** | 0.5296*** | 0.4723*** | 0.5894*** | | | | | |
| CSHPD | 0.6634*** | 0.5567*** | 0.1942* | 0.3154*** | 0.2134*** | 0.3567*** | 0.4734*** | 0.4165*** | 0.5730*** | 0.9733*** | | | | |
| INPD | -0.3568*** | -0.2226*** | -0.2322* | 0.0426 | -0.0503* | 0.1040*** | 0.1263*** | -0.3377*** | -0.0594** | 0.0211 | 0.1064*** | | | |
| TXPD | 0.5808*** | 0.4506*** | 0.2311* | 0.0042 | 0.0044 | 0.0168 | 0.3303*** | -0.0954*** | 0.3038*** | 0.5633*** | 0.4816*** | -0.1035*** | | |
| OTHCSH | -0.4835*** | -0.1075*** | -0.6380* | 0.0477 | -0.1626*** | 0.2026*** | -0.2406*** | -0.2513*** | -0.2906*** | -0.4874*** | -0.3113*** | 0.2579*** | -0.4118*** | |

NOPAT is net operating income after tax, which is considered as continuing and before extraordinary earnings. TAC is total aggregate accruals which is the difference between NOPAT and OCF (TAC = NOPAT – OCF). OCF is operating cash flow. DAR is the change in account receivable during the year, (DAR = Account receivable year t - Account receivable year t–1). DINV is change in inventory during the year (DINV = Inventory year t - Inventory year t–1). DAP is change in account payable during the year (DAP = account payable year t – account payable year t–1). DEP is deprecation and amortization expense .TXAC is Tax accruals which are accruals in relation to income tax expense, calculated as income tax expense minus tax paid. OTHAC is other accruals which calculated as OTHAC = NOPAT – OCF – (DAR + DINV – DAP – $DEP - TXAC$). CSHRD is cash receipt from customers.CSHPD is cash paid to suppliers and employees. INTPD is net interest paid which is interest paid during the year. TXPD is tax paid during the year. OTHCSH is Other operating cash flow which is calculated as OTHCSH = OCF – (CSHRD – CSHPD – INTPD – TXPD).

*, **, and *** denote significance at 10%, 5% and 1% levels, respectively. Number in parentheses is t-stat.

### 4.3 Regression results

Selection of forecast models for estimating future operating cash flow in Vietnam was conducted as follows:

- *Step 1*: Conduct residual tests to find out violations of assumptions
- *Step 2*: Run pooled OLS regressions with both within-sample and out-of sample to assess the predictive power of the models (Watts and Laftwich, 1977); Theil's U statistic was employed to assess reliability and forecast accuracy of the models (Kim and Kross, 2005 and Bandyopadhyay et al., 2010);
- *Step 3*: Vuong's (1989) likelihood ratio test (Dechow, 1994) were applied to select the best fitted model. Chi square test (Clinch et al., 2002; Orpurt and Zang, 2009) was used to test coefficient restrictions.

#### 4.3.1 Assessing predictability of aggregate earnings, earnings disaggregated to cash flow and total accruals, cash flow and accrual components, and cash flow components and accrual components.

Table 3 reports summarized regression results for within sample forecasting test of the all four models: Model (1): regressing current OCF on 1-year lagged aggregate earnings; Model (2): regressing current OCF on 1-year lagged OCF and total accruals; Model (3): regressing current OCF on 1-year lagged OCF and accrual components (i.e. DAR, DINV, DAP, DEP, TXAC, OTHAC); Model (4): regressing OCF on 1-year lagged OCF components (i.e. CSHRD, CSHPD, INTPD, TXPD, OTHCSH) and accrual components (i.e. i.e. DAR, DINV, DAP, DEP, TXAC, OTHAC).

**Table 3: Summary of within sample forecasting tests (660 firm-years, 2008-2011) of the four models**

| Variable | Regression results | | | |
|---|---|---|---|---|
| | **Model (1)** | **Model (2)** | **Model (3)** | **Model (4)** |
| INTERCEPT | -0.16633 | -0.13788 | -0.62284 | -0.3096 |
| | (-0.62035) | (-0.55024) | (-2.71496) | (-1.1447) |
| NOPAT | 0.9542*** | | | |
| | (6.439491) | | | |
| OCF | | 1.017781*** | 0.743077*** | |
| | | (7.589921) | (4.8233) | |
| TAC | | 0.687515*** | | |
| | | (3.494855) | | |
| DAR | | | 0.3145 | 0.9682*** |
| | | | (1.1181) | (2.9608) |
| DINV | | | 0.7531*** | 1.2248*** |
| | | | (4.2522) | (4.8384) |
| DAP | | | -0.3853 | -0.8877*** |
| | | | (-1.4009) | (-3.0159) |
| DEP | | | 0.7224 | 0.0592 |
| | | | (1.5352) | (0.1424) |
| TXAC | | | 0.5695 | -2.7050** |
| | | | (0.6624) | (-2.0059) |

| | | | | |
|---|---|---|---|---|
| OTHAC | | | 0.2759 | 0.8636*** |
| | | | (1.3795) | (3.0936) |
| CSHRD | | | | 1.3390*** |
| | | | | (5.3643) |
| CSHPD | | | | -1.3556*** |
| | | | | (-5.4500) |
| INTPD | | | | -0.6121 |
| | | | | (-1.1176) |
| TXPD | | | | -5.2690*** |
| | | | | (-3.2962) |
| OTHCSH | | | | 1.2854*** |
| | | | | (5.1414) |
| **Adjusted $R^2$** | 0.529819 | 0.574685 | 0.679091 | 0.7178 |

**Vuong's Z Statistics**

| | |
|---|---|
| Model (1) vs. Model (2) | -1.10** |
| Model (1) vs. Model (3) | -2.40*** |
| Model (2) vs. Model (3) | -1.81** |
| Model (3) vs. Model 4 | -1,82** |

**Test of coefficient restrictions of the Model (4)**

| Null Hypothesis | $X^2$ statistic | P- value |
|---|---|---|
| $H_0$_1: $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = 0$ | 54.27 | 0.0000 |
| $H_0$_2: $\gamma_6 = \gamma_7 = \gamma_8 = \gamma_9 = \gamma_{10} = \gamma_{11} = 0$ | 134.80 | 0.0000 |
| $H_0$_3: $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5$ | 50.32 | 0.0000 |
| $H_0$_4: $\gamma_6 = \gamma_7 = \gamma_8 = \gamma_9 = \gamma_{10} = \gamma_{11}$ | 49.25 | 0.0000 |

NOPAT is net operating income after tax, which is considered as continuing and before extraordinary earnings. TAC is total aggregate accruals which is the difference between NOPAT and OCF (TAC = NOPAT – OCF). OCF is operating cash flow. DAR is the change in account receivable during the year, (DAR = Account receivable year t - Account receivable year t-1). DINV is change in inventory during the year (DINV = Inventory year t - Inventory year t-1). DAP is change in account payable during the year (DAP = account payable year t – account payable year t-1). DEP is depreciation and amortization expense .TXAC is Tax accruals which are accruals in relation to income tax expense, calculated as income tax expense minus tax paid. OTHAC is other accruals which calculated as OTHAC = NOPAT - OCF - (DAR + DINV - DAP - DEP - $TXAC$). CSHRD is cash receipt from customers. CSHPD is cash paid to suppliers and employees. INTPD is net interest paid which is interest paid during the year. TXPD is tax paid during the year. OTHCSH is other operating cash flow which is calculated as OTHCSH = OCF - (CSHRD - CSHPD - INTPD - TXPD). Vuong's Z statistics refers the Vuong's likelihood ratio test for competing model selection.

*, **, and *** denote significance at 10%, 5% and 1% levels, respectively. Number in parentheses is t-stat.

The results of the Model (1) shows that coefficient on 1-year lagged NOPAT is 0.9542 at 1% significant level. Coefficients of 1-year lagged OCF and total accruals (TAC) are both positive and at 1% significant level, which are 1.0177 and 0.6875 respectively (Model 2), implying that accruals have certain information content over OCF. The signs of variables in the Model (3) are consistent with those in researches of both Barth et al (2001) and Shadi

Farshadfar and Reza Monem (2012), which all of 1-year lagged OCF, DAR, DINV, TXAC, OTHAC have positive signs for and while negative one for DAP. However, unlike the results of the two researches, these coefficients are insignificant except OCF (0.7430) and DINV (0.7531) which are both at 1% significant level. Coefficient DINV (0.7531) is largest, followed by OCF (0.7430) and DEP (0.7224) in comparison with others indicating that past both OCF and past long-term and short-term accrual components play important roles in explaining variation of current OCF.

Model (4) reports within sample regression of current OCF on 1-year lagged accrual components (DAR, DINV, DAP, DEP, TXAC, OTHAC) and cash flow components (CSHRD, CSHPD, INTPD, TXPD, OTHCSH). Coefficients of all the accrual components are significant at high level 1% and 5% except DEP insignificant. These coefficients have positive signs while DEP and TXAC have negative signs. For cash flow components, their coefficients are all significant at 1% level, with the exception of INTPD which is statistically insignificant. The signs of cash flow components are as expectation, which cash inflow variables (CSHRD, OTHCSH) have positive signs while cash outflow variables (CSHPD, INTPD, TXPD) have negative ones. This means cash flows components contain some information of the future cash flow which is concealed in the aggregate cash flow.

In order to test if coefficients of accrual components as well as cash flow components ((Model (4)) are equal and if they are all equal to zero, chi-squared test of coefficient restrictions was employed. All the 4 null hypothesis were rejected at 1% level. The results imply that both accrual components and cash flow components have significant roles in predicting future cash flow.

Model (4) has highest adjusted $R^2$ (0.7178) in comparison with 3 other models (0.5292, 0.5747, and 0.6791 respectively), implying that model (4) have better explanation than the 3 others. Vuong's *Z* statistics[2] results also tell us that Model (4) is the best model. Therefore, variations in current cash flow are better explained by both accrual components and cash flow components.

**Table 4: Summary of out-of-sample forecasting test results (220 firm-years, 2012-2012)**

| | **Model (1)** | **Model (2)** | **Model (3)** | **Model (4)** |
|---|---|---|---|---|
| Theil's U-statistics | 0.3507 | 0.3796 | 0.3896 | 0.3905 |
| *Bias proportion* | *0.0017* | *0.0028* | *0.003* | *0.0010* |
| *Variance proportion* | *0.1947* | *0.2184* | *0.2698* | *0.1998* |
| *Covariance proportion* | *0.8036* | *0.7788* | *0.7273* | *0.7992* |

Theil's U_statistics is a forecast error statistic valuing between 0 and 1 where 0 shows the best fit. In a good forecast model, value of covariance proportion is higher than its bias and variance proportions.

Table 4 reports the out-of-sample forecasting test with Theil's U-statistics[3] results. Theil's U-statistics of the four models are pretty small (0.3507, 0.3796, 0.3896 and 0.3905 respectively), in which covariance proportion all are significantly much higher than bias proportion and variance proportion. This signifies that they all are good forecasting models. Although Model (4) has highest Theil's U-statistics which causes inconsistency with within sample results, we gave more weights on Vuong'z statistic conclusion and conclude that both accrual components and cash flow components (Model (4)) have better predictive powers in forecasting future cash flows in Vietnam context.

[2] AIC and BIC results show the same conclusion.
[3] MRSE results show the same conclusion

## 5. Conclusion:

The purpose of this research is to investigate which of (i) total earnings, (ii) OCF and total accruals, (iii) OCF and accrual components, or (iv) accrual components and cash flow components has superior predictive power in forecasting Vietnamese firm's future cash flow. A sample of 220 non-financial firms listed on the Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) which have direct method cash flow statement for the period of 2008 – 2012 was selected. Direct method cash flow statements were preferred because we could have actual cash flow data which could reduce measure errors (Krishnan and Largay_2000; Orpurt and Zang_2009). We conducted within-sample regression over the period of 2008-2011 and out-of-sample test over 2012-2012. Adjusted $R^2$ of the within sample OLS regression with White's (1980) heteroskedascity correction and Vuong's likelihood ratio test were used to compare the models. Theil's U-statistics was used to compare out-of-sample forecasting accuracy. Our research results strengthens the evidence that both accrual components and cash flow components together have better predictive powers than (i) aggregate earnings; (ii) cash flow and total accruals; (iii) cash flow and accrual components in forecasting firm's future cash flow.

Several policy implications would be derived from the findings of the study that we could have better forecasting results by using accrual components and cash flow components. Therefore, firms should prepare their cash flow statement by direct method and use actual cash flow data to forecast their future cash flow. Due to lack of data, industry membership has not been included in this research, which we expect to extend it in the future.

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