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DISAGGREGATED ACCRUALS AND PREDICTION OF FUTURE CASH FLOWS: AN EFFECT OF GLOBAL FINANCIAL CRISIS 2008-09

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A B S T R A C T

The objective of the study was to find out the relationship among further extended disaggregated accruals and forecast of imminent cash flows in the developing market of Pakistan during the global financial crisis 2008-09 and pre and post-global financial crisis. Panel data of 8154 firms-years observations were analyzed through panel least square. Hausman and redundant fixed effect tests suggested a fixed-effects model. The stationary of variables was tested and correlation and regression analysis were conducted. The association of variables during the financial crisis and pre and post-financial crisis was controlled through dummy variables. The study finds that disaggregated accruals as extended components of disaggregated accruals regressed the estimate of imminent cash flows significantly except financial assets. Additionally, results were not affected throughout the global financial crisis 2008-09 for emerging markets of Pakistan but the prediction of future cash flows was affected pre and post-financial crisis 2008-09. Furthermore, the association between the pre-financial crisis and forecast of imminent cash flows was negative but found positive in the post-financial crisis.

Disciplinary: Economics and Management Sciences (Finance).

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1. INTRODUCTION

Cash flows prediction plays a vital role in the investment decision. The objective of this research is to see the future cash inflows and outflows in advance to make a better decision for both investment and optimum use of funds (Nallareddy et al., 2018). On the other side, it also minimizes the cost of capital borrowings (Rajendra, 2016) as the business knows the future inflows. Previously financial

statements such as income statements or earnings were determined as sole indicators for an investment decision. Nowadays, cash flows are deemed more essential for decision making as earnings are easily manipulated through creative accounting theory (Kim & Yoon, 2016).

Cash flows always remained information for investors and the discounted value of future cash flows is an investment. Cash flows provide signals to investors for investment in signaling theory. Prior studies (such as Khansalar & Namazi, 2017; Farshadfar & Monem, 2019; Agana et al., 2015; Khansalar, 2012; Chong, 2012; Ebaid, 2011; Toan, 2020; Chotkunakitti, 2005) had predicted forthcoming cash flows through financial ratios, current cash flows, past earnings, EBIT and accruals. Two approaches are used to record financial information in the books of accounts i.e., accruals-based accounting and cash-based accounting. The results are contradictory and inconsistent in the forecast of future cash flows, whereas, FASB (1978) and IASB (2010) preferred accrual-based accounting over cash-based accounting. Some researchers (Efayena, 2015; Agana et al., 2015; Penham & Yehuda, 2009; Farshadfar et al., 2008; Finger, 1994) found cash-based accounting had better predictive abilities over accruals-based accounting for forecast of future cash flows, whereas, other researchers (Ebaid, 2011; Pae, 2005; Kim & Kross, 2005; Greenberg et al., 1986) found contradicted findings than the later.

Aggregated accruals and disaggregated accruals were regressed to estimate imminent cash flows in the previous studies of Farshadfar & Monem, (2019) and Khansalar, (2012). Disaggregated accruals were used in many studies but underlying components of disaggregated accruals were not commonly used in the prior studies. Previous studies were directed in established countries like United States, United Kingdom, Australia but not conducted in developing/emerging countries like Pakistan.

This research purviews to analyze the underlying components of disaggregated accruals' role in the forecast of imminent cash flows in firms listed at Pakistan stock exchange in consideration of the effect of the global financial crisis 2008-09. Moreover, the study also analyses the association of underlying components of disaggregated accruals and forecast of imminent cash flows during the financial crisis and Pre and Post-financial crisis.

2. LITERATURE REVIEW

Accruals-based accounting found a better predictor than cash-based accounting in many prior studies (Kim & Kross, 2005; Dechow et al., 1998; FASB, 1978). The recent debate is to find out which accrual has better predictive abilities in the prediction of imminent cash flows. Barth et al. (2001) decomposed accruals into several key elements that were also used in the studies of Dechow et al. (1998). The theory on the forecast of cash flows was further enhanced in the studies of Farshadfar & Brimble (2008). The researchers used earnings plus depreciation and amortization and working capital from operations in the forecast of imminent cash flows for Australian companies. The inclusion of firm size as an intervening variable made studies more interesting and effective. The results were the same as Chotkunakitti (2005) that cash flows are a better predictor of future cash flows and predictability enhanced with the increase of firm size (Farshadfar & Brimble, 2008).

Khansalar (2012) had researched the reliability of accruals and the prediction of future cash flows in the United Kingdom. Three categories of accruals were introduced in the study to confirm which accrual is a better predictor of future cash flows. Financial accruals were found with higher

reliability and found with higher predictabilities for future cash flows and non-trading accruals were on the other extreme side. Farshadfar & Monem, (2019) investigated the predictive abilities of accruals – working, non-current operating accruals and financial accruals and future operating cash flows using Australian firms. The findings of the study were contradicted with many prior studies (such as Khansalar, 2012) as working capital and non-current operating accruals were found better predictor than financial accruals. Moreover, the asset component had better predictive ability than a liability. The current study sees the underlying components of disaggregated accruals (trading assets (TA), non-trading assets (NTA) and financial asset (FA)).

2.1 FURTHER EXTENDED ACCRUALS OF TRADING ACCRUALS

Trading accruals are often known as working capital accruals (Healy, 1985; Dechow et al., 2008; Khansalar, 2012; Farshadfar & Monem, 2019). Trading accruals were decomposed into receivables, inventories, payables, depreciation, amortization and others (Dechow et al., 1998; Barth et al., 2001; Thomas & Zhang, 2002; Dechow et al., 2002; Dechow et al., 2008; Ebaid, 2011; Farshadfar & Monem, 2019) and found with the ability to increase predictive ability about future cash flows. Farshadfar & Monem, (2019) and Khansalar (2012) calculated these accruals as the difference between trading assets and trading liabilities whereas Sloan et al. (2004) and Penman & Yehuda (2009) termed it as a change in operating assets and change in operating liabilities. The trading accruals used in the present study were based on the model developed by Sloan (1996), Sloan et al. (2004), Richardson et al. (2005), Khansalar (2012), and Farshadfar & Monem, (2019). Accruals were considered as current operating assets changes, net cash, and short-term investment fewer current liabilities, net short-term investment (Sloan, 1996; Dechow et al., 2008). Sloan et al. (2004) further decomposed working capital (WC) into a change in current operating assets (ΔCOA) and current operating liabilities (ΔCOL).

$$\Delta WC = \Delta COA - \Delta COL \qquad (1).$$
$$\Delta TA = \Delta CA - \Delta CL \qquad (2),$$

where ΔTA, ΔCA, and ΔCL refer to trading assets, current asset, and current liability.

Trading accruals are considered a mostly better predictor of future cash flows. Trading accruals are based on working capital accruals and mostly represents a change in accounts receivable, change in accounts payable, change in inventory, plus depreciation, amortization and other accruals (Barth et al., 2001; Richardson et al., 2005; Khansalar, 2012; Farshadfar & Monem, 2019) and recorded as a change in current operating assets and change in current operating liabilities (Richardson et al., 2005; Khansalar, 2012). Trading accruals were found better predictors in prior literature (such as Richardson et al., 2005; Khansalar, 2012; Farshadfar & Monem, 2019).

H1: *Trading assets were deemed better predictor than other underlying components of accruals in the forecast of imminent operating cash flows in companies listed at PSX Pakistan.*

H2: *Trading liabilities are deemed better predictor than other components of accruals in the forecast of imminent operating cash flows in companies listed at PSX Pakistan.*

2.2 FURTHER EXTENDED ACCRUALS OF NON-TRADING ACCRUALS

These accruals are associated with non-current assets of the firm that are not frequently bought and sold, for example, property, plant, and equipment, intangibles, and investments (Guay & Sidhu,

2001; Dechow et al., 2008; Farshadfar & Monem, 2019). These accruals are aligned with non-trading assets (also called non-current operating assets) and non-trading liabilities (also called non-current operating liabilities) and found from the difference of non-trading assets (ΔNTA) and non-trading liabilities (ΔNTL). Sloan et al., (2004) and Farshadfar and Monem, (2019) called these accruals as non-current operating accruals (ΔNCO). These accruals are measured from the change in non-current assets, net of long-term investment and advances, less change in non-current liabilities, net of long-term debt. These accruals were ignored in previous studies. These accruals are based on management's subjectivity and discretion; therefore, non-trading accruals are assigned with a low level of reliability (Dechow et al., 2008; Khansalar, 2012).

Non-trading accruals were often not used in the prediction of future cash flows in prior studies. Richardson et al., (2005) worked on non-current operating accruals in his studies and found it significant in the prediction of future cash flows. Khansalar (2012) used non-trading accruals in the prediction of future cash flows and also assigned non-trading liabilities with high reliability than non-trading assets.   On the other side, non-current operating accruals were not found reliable for the prediction of future cash flows in the studies of Farshadfar & Monem, (2019).

H3: *Non-trading assets are deemed better predictor than other components in the forecast of imminent operating cash flows in companies listed at PSX Pakistan.*

H4: *Non-trading liabilities are deemed better predictor than other components in the forecast of imminent operating cash flows in companies listed at PSX Pakistan.*

2.3   FURTHER EXTENDED ACCRUALS OF FINANCIAL ACCRUALS

Farshadfar & Monem (2019) represented financial accruals in terms of financial activities such as dividends, allotment of bonds and shares and debt service. Sloan et al., (2004) and Khansalar (2012) referred to financial accruals as a change in financial activities (ΔFIN). Financial accruals include the difference between long term investment, short term investment, long-term debt, short-term debt and stock (both ordinary and preferred) (Dechow et al., 2008). Prior studies did not include financial accruals in their research (like Healy, 1985; Dechow et al., 1998; Barth, Cram & Nelson, 2001; Richardson et al., 2005) but were well-addressed in studies of Sloan et al., (2004), Khansalar (2012) and Farshadfar & Monem, (2019). Financial accruals were allotted high reliability (Dechow et al., 2008; Khansalar, 2012) as these accruals fluctuate with market fair value; even sometimes considered as cash equivalents (Dechow et al., 2008). The company's shares are traded in the stock exchange that represents the current market value of the company (Dechow et al., 2008). Long term debt and short-term debt show the current cost of estimated cash flows and that is to be paid after a specific time with interest (Khansalar, 2012). Therefore, financial accruals are assigned with *high* reliability in the present study also.

Financial accruals were found more predictable in future cash flows generation (Khansalar, 2012). Khansalar (2012) used regression models to compare predictabilities of trading accruals, non-trading, and financial accruals and found the financial accruals more predictable than trading and non-trading accruals. Financial accruals were found more persistent in the prediction of future cash flows in the findings of Richardson et al., (2005). On the other hand, financial accruals were not found significant in the prediction of future cash flows in the studies of Farshadfar & Monem (2019) and Oei et al. (2008).

H5: Financial assets are deemed better predictor than other components in the forecast of imminent operating cash flows in companies listed at PSX Pakistan.

H6: Financial liabilities are deemed better predictor than components in the forecast of imminent operating cash flows in companies listed at PSX Pakistan.

2.4 GLOBAL FINANCIAL CRISIS 2008-09

The financial crisis of 2007-08 is known as the global financial crisis. The effect of the financial crisis in the emerging economy of Pakistan was seen in 2008-09. The current study examines the effect of the global financial crisis 2008-09 on the financial markets (PSX) of Pakistan. The following two hypotheses were developed to see the effect of the global financial crisis on predictive powers of components of disaggregated accruals.

H7: Disaggregated accruals have better predictive abilities than aggregated accruals in the forecast of imminent cash flows in companies listed at PSX Pakistan during the global financial crisis.

H8: Disaggregated accruals have better predictive abilities than aggregated accruals in the forecast of imminent cash flows in companies listed at PSX Pakistan at Pre and Post global financial crisis.

3. RESEARCH METHODOLOGY

Panel data was obtained from the 485 manufacturing firms listed at Pakistan Stock Exchange (PSX) for 1999-2016. Data were directly recorded from the published financial statements of these firms. The delisted, merged or firms who changed their financial year were excluded from the analysis for consistency. Therefore, the data was obtained from 453 firms. Ordinary least square was used in most of the prior studies (such as Farshadfar & Monem, 2019; Ebaid, 2011; Khansalar, 2012, Chong, 2012) to predict future cash flows through disaggregated accruals. Accruals were divided by total assets to deflated the value and to minimize the problem of heteroskedasticity. The free cash flow (FCF) regression model is given as

$$FCF_{i,t+1} = \alpha + \beta_1 \Delta \text{Trading Assets}_{i,t} + \beta_2 \Delta \text{Trading Liabilities}_{i,t} + \beta_3 \Delta \text{Non-Trading Assets}_{i,t} + \beta_4 \Delta \text{Non-Trading Liabilities}_{i,t} + \beta_5 \Delta \text{Financial Assets}_{i,t} + \beta_6 \Delta \text{Financial Liabilities}_{i,t} + \varepsilon \qquad (3).$$

The regression coefficients β_1, β_2, β_3, β_4, β_5, β_6, are for each term, to be obtained from the regression analysis, with α is the intercept and ε is the model error term.

4. EMPIRICAL FINDINGS

4.1 DESCRIPTIVE STATISTICS

The descriptive statistics in Table 1, the maximum operating cash flow was 176.15, whereas TA was 29.12. Furthermore, trading liabilities (TL) was 20.04, NTA was 85.09 and non-trading liabilities (NTL) was 17.44. Whereas financial assets (FA) was 29.14 and financial liabilities (FL) was 49 in this equation. Meanwhile, the minimum operating cash flow was -64.96, TA was -0.51 and TL was 0.00. Moreover, NTA was 0.00 and NTL was -0.20. FA and FL were zero. Table 1 also depicted the values of mean, median, standard deviation and observations of the data. The mean of operating cash

flows was 0.14, TA was 0.50, whereas, TL was 0.55 and NTA was 0.86. The value of the mean for NTL was 0.09. The value of mean for FA was 0.06 and FL was 0.41. The total number of observations of operating cash flows, TA, TL, NTA, NTL, FA, and FL were 8154 for each.

Table 1: Descriptive Statistics (N= 8154).

Variables	Mean	Median	Maximum	Minimum	SD.	Skewness	Kurtosis
TA	0.504	0.380	29.121	-0.516	1.208	15.587	303.638
TL	0.553	0.396	20.040	0.000	1.065	10.523	148.936
NTA	0.866	0.604	85.087	0.000	3.489	19.021	408.231
NTL	0.093	0.000	17.441	-0.202	0.673	17.573	356.891
FA	0.062	0.000	29.145	0.000	0.970	24.146	607.115
FL	0.418	0.257	49.009	0.000	1.439	20.459	569.183
FCF	0.140	0.012	176.154	-64.966	4.991	29.646	1069.313

4.2 CORRELATION ANALYSIS

The correlation coefficient is presented in Table 2. Correlation among independent variables and the dependent variable is shown. The perfect correlation was found where the value of correlation was one (r = 1). The results revealed that any value of the correlation coefficient was not exceeding the benchmark of 0.9 recommended by Hair et al., (2016) and Field (2017) for multicollinearity. Therefore, it was evident that the problem of multicollinearity did not exist in this model. A positive but weak correlation was found between net operating cash flows and TA, TL, NTA, and NTL. Whereas, a negative weak correlation was found between net operating cash flows and FA and FL.

Table 2: Results of Correlation (N=8154).

Variables	1	2	3	4	5	6	7
FCF	1						
TA	0.053	1					
TL	0.005	0.800	1				
NTA	0.025	0.889	0.710	1			
NTL	0.004	0.622	0.510	0.529	1		
FL	-0.007	0.676	0.549	0.677	0.335	1	
FA	0.001	0.466	0.591	0.272	0.631	0.318	1

4.3 STATIONARITY TEST

Table 3 displays the results of the stationarity test, that all variables of interest were found stationary at 1st difference which meant series were integrated at order one and the series was i(1). These results suggested all variables were stationary and could be used for penal data analysis.

Table 3: ADF Unit Root Test Results.

Variables	I (0) (means at level)	Prob.**
TA	-7.222	<0.001
TL	-6.321	<0.001
NTA	-9.014	<0.001
NTL	-9.793	<0.001
FA	-9.892	<0.001
FL	-7.252	<0.001
FCF	-29.129	<0.001

4.4 THE DECISION OF THE FIXED EFFECT METHOD VERSUS COMMON CONSTANT METHOD

To decide whether to go with a common constant method or fixed effects method of the panel regression model, redundant fixed effects tests were run. The results showed that the value of Chi-square was significant which suggested that the fixed effect model was appropriate.

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Table 4: Redundant Fixed Effects Tests

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.383	(452,7697)	<0.001
Cross-section Chi-square	636.737	452	<0.001

4.5 THE DECISION OF THE RANDOM EFFECT METHOD VERSUS FIXED EFFECT METHOD

Hausman Test was used to decide whether to go with a random effect method or fixed effects method of a panel regression model. The results reported in Table 5 suggested that the fixed effect model is appropriate.

Table 5: Correlated Random Effects - Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	37.293	4	<0.001

4.6 PANEL REGRESSION ANALYSIS

The results of the regression analysis were presented in Table 6. The hypotheses were developed in section 2 of this study that disaggregated accruals had better predictive abilities in the forecast of imminent operating cash flows than aggregated accruals in companies listed at PSX (Pakistan). Panel Regression analysis was conduction to test these predictions. Operating cash flows were regressed on underlying components of accruals i.e. TA, TL, NTA, NTL, FA, and FL. The results reported in Table 6 showed that trading assets (β = 1.1575, p = 0.0000) were a significant predictor of future operating cash flows, therefore, H1 was accepted. TL (β = -0.353510, p = 0.0029) was a significant predictor of future operating cash flows, providing support for H2. NTA (β = -0.119805, p = 0.0171) was a significant predictor of future operating cash flows, providing support for H3. NTL (β = -0.431583, p = 0.0021) was a significant predictor of imminent operating cash flows, providing support for H4. FA (β = -0.33568, p = 0.7621) was an insignificant forecaster of imminent operating cash flows, rejecting H5. Similarly, a significant negative relationship with operating cash flows was found for the FL (β = -0.340590, p = 0.0000), which supports H6.

The output in Table 6 showed 3.25% of the explanatory power of the model that was represented by the adjusted R-square. It means a 3.25% dependent variable was being explained by the independent variables in this model. The value of F-statistic was significant that identify the model as best fits the population from which the data were sampled. In this equation, only one variable (FA) was insignificant and did not explain the dependent variable. All other variables were significantly different from zero and had predictive abilities to explain the dependent variable.

Table 6: Results of Regression Analysis

Variables	Net Operating Cash Flows		
	Coefficient	Std. Error	Prob.
Constant	0.041	0.074	0.578
TA	1.157	0.152	<0.001
TL	-0.353	0.118	0.002
NTA	-0.119	0.050	0.017
NTL	-0.431	0.139	0.002
FA	-0.335	0.110	0.762
FL	-0.340	0.050	<0.001
R-squared		0.086	
Adjusted R-squared		0.032	
F-statistic		1.598	
Prob (F-statistic)		<0.001	

The results reported in Table 7 showed that FL (β = -0.340, p = 0.000) had a significant negative influence on forecast of imminent cash flows. NTA (β = -0.119, p = 0.017) was found significant forecaster of imminent cash flows. A significant negative relationship was found between the NTL (β = -0.429, p = 0.0022) and FCF. The insignificant value of financial assets (β = -0.033, p = 0.7692) showed that FA had not influenced the FCF. Similarly, insignificant negative relationship was found for the financial crisis period, D1 (β = -0.042, p = 0.7735) with FCF which showed that financial crisis period had not affected the FCF.

Table 7: Results of Regression Analysis – During Financial Crisis Period 2008-09

Variables	Net Operating Cash Flows		
	Coefficient	Std. Error	Prob.
Constant	0.048	0.078	0.535
TA	1.157	0.152	<0.001
TL	-0.355	0.118	0.002
NTA	-0.119	0.050	0.017
NTL	-0.429	0.140	0.002
FA	-0.033	0.110	0.769
FL	-0.340	0.057	<0.001
D1	-0.042	0.146	0.773
R-squared		0.086	
Adjusted R-squared		0.032	
F-statistic		1.595	
Prob (F-statistic)		<0.001	

Table 8 showed a significant negative relationship with FCF for the pre and post-crisis period (β = -0.410, P = 0.002) which indicated the influence of accruals on the prediction of future cash flow significantly different in pre and post-crisis periods. The results also showed that in the pre-crisis period, accrual was negatively influencing the FCF while in the post-crisis period, it had a positive effect on the FCF.

Table 8: Results of Regression Analysis – Pre and Post Financial Crisis Period 2008-09.

Variables	Net Operating Cash Flows		
	Coefficient	Std. Error	Prob.
Constant	0.2030	0.1091	0.062
TA	1.5106	0.1853	<0.001
TL	-0.3281	0.1412	0.020
NTA	-0.2476	0.0643	<0.001
NTL	-0.4418	0.1711	0.009
FA	-0.0542	0.1343	0.686
FL	-0.3877	0.0652	<0.001
D2	-0.4106	0.1339	0.002
R-squared		0.094	
Adjusted R-squared		0.028	
F-statistic		1.440	
Prob (F-statistic)		<0.001	

*D2 = Pre and Post Financial Crisis Period Dummy

5. CONCLUSION

In this study, the researcher examined the role of components of disaggregated accruals in the prediction of future cash flows in the emerging market of Pakistan. The study answered the question that disaggregated accruals enhanced the predictive abilities of future cash flows than accruals. Furthermore, the ability of underlying components of disaggregated accruals i.e. TA, TL, NTA, NTL, FA and FL to predict imminent cash flows. The study used 8154 firm-year observation related to 453

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firms and 1999-2016 period. The panel least square regression models were calculated as we found a fixed effect method through the Hausman test.

The results of the study found that TA, TL, NTA, NTL, FA, and FL were relevant in explaining imminent cash flows but financial assets were not significant. The comparative abilities of underlying assets and liabilities components of accruals, we found that trading assets had better power to explain future cash flows than other assets and liabilities. Furthermore, the results suggested that the financial markets of Pakistan were not affected by the global financial crisis 2008-09. The results were also robust to estimate dummy variable i.e. pre and post-global financial crisis was significant.

This research surges our familiarity with the disaggregated accruals in the prediction of imminent cash flows. The decomposition of accruals into trading accruals, non-trading accruals, and financial accruals enhances our understanding of accruals. Moreover, the knowledge was further improved through the disaggregation of accruals into underlying assets and liabilities components. The results were found consistent with the prior studies of FASB (1978), IASB (2010), Khansalar (2012) and Farshadfar & Monem (2019) that disaggregation of accruals increase the predictive abilities of accruals.

The findings from the study provide guidelines to users of financial statements, such as financial analysts, creditors and future stockholders, which parts (operating, investing and financing) of financial statements, they must focus for future profits in the companies and investment decision making. Findings from this study hope to enhance the reliability, accuracy of future operating cash flows estimations and share value on the stock exchange. The stakeholders can predict future cash flows for quite a few years using prediction models while making investment decision making.

Moreover, new variables like stock prices as the dependent variable can be introduced in the model to see the predictive abilities of accruals. Stock prices largely depend on the reliability of accruals (Nallareddy et al., 2018). Secondly, the balance sheet approach is used in most of the prior studies (such as Khansalar, 2012) to measure accruals that could have the problem of mergers and acquisitions. Therefore, the study should be conducted to see the accruals on the aggregated basis, not on a deflated basis.

6. AVAILABILITY OF DATA AND MATERIAL
Data can be made available by contacting the corresponding authors

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