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Cash and Financial Constraints: An Empirical Analysis of Non-Financial Firms Listed in Indonesian Stock Exchange 2005-2014

Sigit S. Wibowo[a]* and Stefany Lolyta[a]

[a]Faculty of Economics and Business Universitas Indonesia, Depok, Jawa Barat 16424
*Corresponding author: sigit.sw@ui.ac.id

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ABSTRACT

This study examines corporate motives to hold cash and its equivalents as forms of financing, by using non-financial public firms listed in Indonesian Stock Exchange (IDX) between 2005 and 2014. Three criteria are employed to distinguish constrained and non-constrained firms namely: KZ index, dividend payment, and firm size. Based on the results of PLS, this study finds that the amount of cash holding is increasing along with the increase of cash flows. This result is consistent for both firm categories based on the previous criteria. However, based on the 2SLS method, cash flow does not affect the cash holdings of the firms with financial constraints. The result of this research shows that firms with financial constraints have strong motivation to hold cash due to lack of access to external financing.

INTRODUCTION

Cash and its equivalents are crucial assets to determine the sustainability of a firm to improve its performance in accordance with its objectives. Therefore, an optimal amount of cash is required for a firm. Theoretically, managers who are responsible to maximize shareholders' wealth, should ensure that the marginal benefit is equal with the marginal cost of the cash they hold. The advantage of the availability of cash and its

equivalent is to minimize transaction costs when there is a need for additional funds, and it does not have to sell its assets to make payments. Furthermore, the availability of current assets such as cash can be used to finance its operational and investing activities.

Studies on the optimum level of cash can be divided into two categories. First, Miller and Orr (1966) argue that investment inefficiency is caused by inadequate liquidity. This is because managers and owners have different opinions on the cost and benefit of holding the current assets, therefore it creates agency problems. Managers tend to hold a considerable amount of cash in order to reduce liquidity risk, while owners want to earn sufficient dividend payment as a compensation of their investment. This theory argue that the determination of optimum level of cash is a trade-off between managers' interest and owners' interest.

As an alternative, another theory argues cash holding as irrelevant because there is no optimum level of cash holding. This theory holds that the internal changes within firm are the main factor that leads to the change in cash flows. Firms with no constraints in their investment policy may use their cash flow in order to increase the position of cash holdings, unless there are debts that should be paid (see Opler *et al.,* 1999)

The second theory is provided by Myers and Majluf (1984) that is known as pecking-order theory. This theory explains that the existance of cash holdings is based on a financial hierarchy. Any firms can implement any financing plans accordingly based on a specific hierarchy. The hierarchy mainly consists of: retained earnings, debts, and equity. As long as there are some costs for holding cash, firms tend to accumulate cash up to certain level when the amount of cash is considered to be excessive and shareholders are in a good condition before the firms use this cash to pay dividend or to buy shares. Furthermore, Jensen (1986) argues when the aforementioned conditions do not exist, the presence of excessive cash will provide discretion for managers to make a decision on the investment that they can take without considering shareholders' interests.

Related to these studies, Opler *et al.* (1999) show that most of public firms in the US tend to accumulate cash, especially in firms with high growth potential, firms with high operational risk, and small firms. Opler *et al.* (1999) also argue that firms, which have an access to capital market and have a good credit rank, tend to hold lower cash amount. This argument is in line with another theory that states, firms will hold cash or current assets if their cash flow is low and the cost to get capital from outside party is considered to be expensive. They also find out that the determinants of cash level are similar with the determinant of debt level.

Furthermore, the study by Almeida *et al.* (2004) explains that the determinants of cash flow are affected by liquidity requirement and financial constraints in a firm's policy respectively. The need to hold cash is measured by firm's tendency to hold cash from the firm's cash flow, which is known as *cash flow sensitivity of cash* (CFSC). Firms with financial constraints tend to have a positive CFSC, while firms without financial constraints do not have any relationship with its cash flow.

Based on the data of public firms in Indonesia obtained from Bloomberg, up to the year of 2014, the amount of cash hold by managers are 1,078 trillion rupiah (equal to 40% of total GDP). The ratio of cash to current assets between 2006 and 2014 has an increasing trend with an average value of 13.2 % annually. Based on these facts, we are interested to provide an explanation about the determinants of the decision to hold cash

in Indonesian listed firms. Furthermore, this study seeks to understand how financial constraints affect the decision to hold cash and its implication toward CFSC. The contribution of this research is to provide an empricial development of the research conducted by Almeida *et al.* (2004) and Riddick & Whited (2009) on the effect of cash flow towards cash holdings with respect to Indonesian non-financial firms. The hypotheses of this research are:

H_1: Cash flows do not affect the cash holding in the firms without financial constraints.
H_2: Cash flows have negative effects toward the cash holding for financially constrained firms.

RESEARCH METHODS

Sampling Method

The data are obtained from the annual report of public firms in Indonesia that listed on Indonesian Stock Exchange (IDX) and available in Thomson Datastream. The criteria used to determine the samples are: (1) the firms are listed on IDX between 2005 and 2014; (2) the firms have published complete annual reports during the period of 2005 to 2014; and (3) the firms are not categorized in financial industry (bank, insurance and other financial institutions) to ensure the validity of the carried out analysis. There are 306 firms used in this study. Next, we divide these firms into two categories: constrained firms and non-constrained firms, in accordance with the criteria established by Almeida *et al.* (2004), namely:

1. Kaplan and Zingales (1997) index (KZ index) that is computed as follows:

$$\mathrm{KZ} = -1{,}002CF + 0{,}283\mathrm{Q} + 3.139LEV - 39{,}368DIV - 1{,}315\Delta CASH$$

   where CF denotes cash flow; Q denotes Tobin's q value that is the ratio of market value of firm's assets in a certain timeline; LEV denotes the amount of total debt divided by total assets; DIV denotes the amount of dividends paid; and $\Delta CASH$ denotes the amount of cash change divided by total assets. Firms with KZ value that is located in the first three deciles position are categorized as constrained firms and those which value is located in the three lowest deciles are categorized as non-constrained firms.
2. Dividend payment. The selected firms are ranked based on dividend payout ratio, and then the three lowest deciles are chosen to be categorized as constrained firms.
3. Firm size. The selected firms are ranked based on the amount of total assets, and the top three deciles are categorized as non-constrained firms, while the three lowest deciles are classified as constrained firms.

Changes in cash holdings are used as the dependent variable in this study. Cash holdings is defined as the ratio of cash and its equivalent with total assets owned by a firm during a certain period. Therefore, a change in firm's cash holdings in firm *i* at date *t* namely $\Delta CASH_{i,t}$ can be defined as following:

$$\frac{Cash_{i,t} - Cash_{i,t-1}}{Asset_{i,t}}$$

where $Cash_{i,t}$ denotes the amount of cash holdings and its equivalents of firm *i* at date *t,* $Cash_{i,t-1}$ denotes the amount of cash and its equivalents of firm *i* at date *t*-1, and $Asset_{i,t}$ denotes the total asset of firm *i* at date *t.*

Empirical Specifications

Firms with external financial constraints tend to hold cash to finance its investment, while firms with no financial constraints do not have such incentives to hold cash. Consequently, the tendency to hold cash from cash flows is higher for the firms with financial constraint (see Almeida et al., 2004). This condition is indicated by a positive effect of the amount of cash held towards cash flows. Therefore, when cash flow is increasing, firms will decrease its cash holding amount, *vice versa*. Other studies that support Almeida et al. (2004) such as Khurana *et al.* (2006) and Han & Qiu (2007) show that constrained firms with cash flow sensitivity of cash are likely to occur in: small firms, firms with low dividend payout, and firms with less or no debts, compare to unconstrained firms.

However, Riddick & Whited (2009) show different results. They find that there is a negative relationship between changes in cash availability or cash holdings and cash flow. The underlying argument is firms tend to decrease the level of cash holdings when cash flow is increasing, *vice versa*. Furthermore, they argue firms with positive cash flows tend use their cash for investment purpose because this action will indicate a higher productivity. This is also affected by the firm revenue. CFSC tends to increase along with the increase in revenue, *vice versa*.

The empirical model employed in this study is adopted from Almeida *et al.* (2004) as follows:

$$\Delta CASH_{it} = \beta_0 + \beta_1 CF_{it} + \beta_2 Q_{it} + \beta_3 SIZE_{it} + \beta_4 SALESG_{it} + \beta_5 LEV_{it} + \beta_6 TAN_{it} + \varepsilon_{it}$$

with $\Delta CASH_{i,t}$ denotes the change in cash of firm *i* in the period of *t* and *t-1* towards total assets at date *t*, and $CF_{i,t}$ denotes the EBITDA ratio towards total assets of firm *i* in the period of *t.* We use several control variables such as: (1) the ratio of market value of assets towards assets book value, denoted by *Q,* (2) the total value of assets in the form of natural logarithm, denoted by *SIZE,* (3) sales growth in percent, which is denoted by *SALESG,* (4) the ratio of total debt (short term and long term debt) towards total assets, denoted by *LEV,* and (5) the ratio of net assets value towards total assets, which denoted by *TAN* and ε_{it} is the error term of the regression*.* All variables are indexed according to firm *i* at date *t*.

The method used in this research is panel data approach and two-stage least squares (2SLS) with Instrumental Variable (IV) approach. The second method is employed because the data in the study is may suffer from endogeneity problem. This

problem arises when the independent variables are correlated with the regression error based on the result of the first method. To solve this problem, an instrument which is related to the independent variables with endogeneity but is not correlated to its regression error, is needed. All estimations in this study are carried out using Stata v.12.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 shows descriptive statistics from both firm categories used in this study. The categorization is based on the KZ index, dividend payout, and firm's size. The data is trimmed by excluding the outlier value that is 1% value above the highest value and 1% below the lowest value. Based on the KZ index, constrained firms tend to have higher value on the *Tobin's q,* sales, leverage, and tangibility compared to non-constrained firms. However, constrained firms have lower value for the change in cash holdings, the EBITDA ratio divided by total assets, and firm size. Therefore, based on KZ index it can be concluded that constrained firms will hold more cash.

Table 1 Descriptive Statistics

	Constrained Firms					Non-Constrained Firms				
	N	Avrg	Std. Dev.	Min.	Max.	*N*	Avrg	Std. Dev.	Min.	Max.
KZ Index										
ΔCASH	1088	0.01	0.09	-0.29	0.35	578	0.02	0.06	-0.14	0.29
CF	1088	0.12	0.15	-0.54	0.58	578	0.11	0.08	-0.08	0.38
Q	1099	1.99	4.22	-12.24	31.12	546	2.11	1.59	-0.12	8.26
SIZE	1088	12.43	3.32	2.68	18.40	578	15.39	1.13	12.24	17.83
SALESG	1134	23.77	96.01	-82.82	794.13	570	26.49	44.28	-48.51	287.99
LEV	1088	0.22	0.35	0.00	2.36	578	0.32	0.20	0.00	1.09
TAN	1088	0.10	0.36	-0.52	1.84	578	0.22	0.22	-0.28	0.91
Dividend Payment										
ΔCASH	1489	0.01	0.07	-0.24	0.32	563	0.02	0.08	-0.22	0.26
CF	1489	0.06	0.11	-0.54	0.34	563	0.19	0.11	0.00	0.60
Q	1457	1.55	3.23	-9.27	21.30	545	2.53	2.02	0.24	10.33
SIZE	1489	11.50	3.56	2.01	16.73	563	13.33	3.77	4.02	18.67
SALESG	1524	27.51	116.33	-83.07	946.43	566	16.03	27.19	-47.60	141.64
LEV	1489	0.33	0.41	0.00	2.56	563	0.16	0.16	0.00	0.60
TAN	1489	0.24	0.39	-0.57	2.09	563	0.01	0.27	-0.69	0.61
Firm size										
ΔCASH	1058	0.01	0.07	-0.32	0.34	588	0.02	0.07	-0.17	0.29
CF	1058	0.07	0.12	-0.61	0.35	588	0.14	0.11	-0.08	0.57
Q	1077	1.13	2.31	-10.98	11.56	563	2.91	3.80	-1.15	31.12
SIZE	1058	10.48	3.85	2.10	15.49	588	15.78	1.24	9.95	18.67
SALESG	1120	23.42	96.96	-76.65	766.02	581	23.04	34.54	-43.10	210.55
LEV	1058	0.32	0.46	0.00	3.47	588	0.25	0.20	0.00	1.05
TAN	1058	0.21	0.37	-0.56	2.01	588	0.14	0.25	-0.47	0.87

Notes: N is the number of observation (firms), Δ*CASH* is the ratio of cash change divided by total assets, Q is the market-to-book ratio, SIZE is the natural logarithm of total assets, SALESG is the percentage of sales growth, LEV is the ratio of total debt divided by total assets, and TAN is the ratio of Net PPE divided by total assets . *Source*: authors' calculations.

Whereas Almeida *et al.* (2004) use US firms that regularly pay dividend in their study, Indonesian public firms do not always pay dividend annually. In this study, we show that dividends can be used as an indicator of constrained firms. Based on the dividend payment, firms that do not pay dividend tends to have lower cash compare to firms that pay dividend as indicated by the average value of cash changes. Based on the firm size, constrained firms have higher value of the *Tobin's q,* sales growth, leverage, and tangibility, and lower value for cash holdings and available cash, than non-constrained firms.

Before the hypotheses testing are conducted, the model is estimated using pooled least square (PLS) method and the assumptions of classical econometrics are examined. All models using constrained and non-constrained firms, either categorized by KZ index, dividend payment, and firm size, have heterocedasticity problem. Moreover, the subsample of non-constrained firms has autocorrelation problems. To solve this problem, the robust standard error method is employed. Furthermore, to solve the endogeneity problem, we examine the models using Instrumental Variable (IV) using two-stage least square (2SLS) approach with the Sargan-Hansen test.

Table 2 Estimation Results: All Samples

Var. Dependent	Independent Variable							
ΔCASH	**CF**	Q	SIZE	SALESG	LEV	TAN	R^2	*F-stat*
OLS	0.0366 **	-0.0003	0.0002	0.0002 *	0.0477 *	-0.0793 *	0.089	0.000
	(0.0163)	(0.0005)	(0.0004)	(0.0003)	(0.0081)	(0.0092)		
IV	0.0485	-0.0585	-0.0079 **	0.0002 *	0.045 *	-0.1105	0.041	0.000
	(0.0562)	(0.0085)	(0.0034)	(0.0001)	(0.0136)	(0.0148)		

Notes: * significant at 1%, ** significant at 5%, and *** significant at 10%. The numbers in bracket are the standard of error, Δ*CASH* is the ratio of cash change divided by total assets, Q is the market-to-book ratio, SIZE is the natural logarithm of total assets, SALESG is the percentage of sales growth, LEV is the ratio of total debt divided by total assets, and TAN is the ratio of Net PPE divided by total assets. *Source*: authors' calculations.

Using PLS method, cash flows is appeared to affect the amount of cash holding in most of public firms (Table 2). However, the endogeneity problem in this estimation requires further analysis. We use the previous period information on the sales growth ($SALESG_{t-1}$), the ratio of fixed assets towards total assets (TAN_{t-1}), and leverage ratio (LEV_{t-1}) as instrumental variables. Therefore, for all firms, the cash flow does not affect the amount of cash held. This result does not support the findings by Riddick & Whited (2009) who argue that cash flows have a negative effect towards the amount of cash holding in the firms.

The First Hypothesis Testing

Further analysis is carried out by dividing the sample into two categories: constrained and non-constrained firms. The classification is based on three indicators: KZ index, dividend payment, and firm size. For the non-constrained firms, both estimation methods (by PLS and 2SLS with IV) show consistent results. Cash flows in the non-constrained firms do not affect the amount of cash held (Table 3).

This result is in line with Almeida *et al.* (2004). The results in this study explain that firms consider to hold more cash when they face financial constraints. When there

is no financial constraint, changes in cash is no longer relevant to determine the decision to hold cash. The result is also in line with Opler *et al.* (1999) who argue that big firms with an access to external funding tend to have no incentive to hold cash whenever their cash flow is increasing.

Table 3 Estimation Results for Non-Constrained Firms

Var. Dependent	Independent Variable							
ΔCASH	**CF**	Q	SIZE	SALESG	LEV	TAN	R^2	F-stat
1. KZ index								
OLS	0.0154	0.0038 *	-0.004 *	0.0002 *	0.0919 *	-0.124 *	0.125	0.000
	(0.0279)	(0.0014)	(0.0013)	(0.0001)	(0.0278)	(0.0213)		
IV	-0.8552	0.1462	-0.0364	-0.0001	0.0092	-0.1155	-6.707	0.173
	(0.5869)	(0.0904)	(0.0262)	(0.0003)	(0.1088)	(0.0745)		
2. Dividend Payment								
OLS	-0.0288	0.0025	0.0002	0.0006 *	0.1057 *	-0.1231 *	0.122	0.000
	(0.0347)	(0.0018)	(0.0005)	(0.0001)	(0.0286)	(0.021)		
IV	0.0661	-0.0228 ***	-0.0162	0.0007 *	0.1152	-0.2185 *	-0.068	0.000
	(0.0913)	(0.0125)	(0.0124)	(0.0002)	(0.0785)	(0.0404)		
3. Firm size								
OLS	0.0239	-0.00001	-0.0015	0.0003 *	0.1331 *	-0.1466 *	0.132	0.000
	(0.0318)	(0.0009)	(0.0022)	(0.0001)	(0.0268)	(0.0212)		
IV	-0.3689	0.0666	-0.0201	0.0003	0.1832 ***	-0.1515 **	-3.458	0.001
	(0.4133)	(0.0509)	(0.017)	(0.0003)	(0.0949)	(0.0618)		

Notes: * significant at 1%, ** significant at 5%, and *** significant at 10%. The numbers in brackets are the standard of error), $\Delta CASH$ is the ratio of cash change divided by total assets, Q is the market-to-book ratio, SIZE is the natural logarithm of total assets, SALESG is the percentage of sales growth, LEV is the ratio of total debt divided by total assets, and TAN is the ratio of Net PPE divided by total assets. *Source*: authors' calculations.

The Second Hypothesis Testing

For the constrained firms, the estimation results using two methods show different evidences (Table 4). The PLS method shows that cash flow affects the change in cash holding of the firms. This result indicates that constrained firms tend to hold greater amount of cash when the cash flow is increasing. The motivation to hold cash is increasing if the size of the firms is increasing and the dependency towards external funding, indicated by KZ index, is higher. Therefore, this result is in line with Almeida *et al.* (2004) who find that constrained firms tend to increase the amount of cash holding when the cash flow is increasing, *vice versa*.

However, based on the results of the 2SLS with IV approach, the results do not support the Almeida *et al.* (2004) and Riddick & White (2009). This study finds that there is no negative effect of cash flow towards the amount of cash holding. Furthermore, the changes in cash holding is different for each criterion. This indicates that each criterion determine the motivation of the firms with financial constraints to hold cash.

In summary, based on the test results, the second hypothesis is rejected. However using PLS method, it can be concluded that constrained firms and non-constrained firms have a significant difference. This difference is that constrained firms

have important consideration to hold cash. The consideration is that they face a constraint to get fund from the external parties. Therefore, this condition gives them a motivation to hold more cash compared with the non-constrained firms.

Table 4 Estimation Results for Constrained Firms

Var. Dependent	Independent Variable							
Δ*CASH*	**CF**	Q	SIZE	SALESG	LEV	TAN	R^2	*F-stat*
1. KZ index								
OLS	0.0396 ***	0.0001	-0.0006	0.0001 *	0.0376 *	-0.083 *	0.095	0.000
	(0.0221)	(0.0007)	(0.0004)	(0.00004)	(0.0142)	(0.0165)		
IV	0.1395	0.0285 *	-0.0017	0.0001 *	0.0202	-0.1119 *	-1.055	0.001
	(0.1157)	(0.0169)	(0.0149)	(0.0001)	(0.0319)	(0.0408)		
2. Dividend Payment								
OLS	0.0391 **	-0.0002	0.0002	0.0001 *	0.0218 *	-0.0465 *	0.065	0.000
	(0.0189)	(0.0005)	(0.0003)	(0.00003)	(0.0075)	(0.0104)		
IV	-0.03037	0.0095	-0.0013	0.0001	0.0303	-0.0895	-0.077	0.000
	(0.0663)	(0.0136)	(0.0058)	(0.00003)	(0.0127)	(0.0228)		
3. Firm size								
OLS	0.04972 ***	0.0015	0.0002	0.0002 *	0.0119 ***	-0.0457 *	0.087	0.000
	(0.2519)	(0.0011)	(0.0004)	(0.00004)	(0.0067)	(0.0126)		
IV	0.6639	-0.0392 ***	0.002	0.0002 *	-0.0099	-0.0379	-1.331	0.041
	(0.1005)	(0.0214)	(0.0099)	(0.0001)	(0.0233)	(0.0373)		

Notes: * significant at 1%, ** significant at 5%, and *** significant at 10%. The numbers in bracket are the standard of error), Δ*CASH* is the ratio of cash change divided by total assets, Q is the market-to-book ratio, SIZE is the natural logarithm of total assets, SALESG is the percentage of sales growth, LEV is the ratio of total debt divided by total assets, and TAN is the ratio of Net PPE divided by total assets. *Source*: authors' calculations.

CONCLUSIONS

Cash flow is an important factor for firms because it can serve as an internal funding mechanism. As a result, firms have motives to hold some of the cash flow in the form of cash and its equivalent. Using Indonesian public firms, an increase in cash flow affects allegedly the amount of cash holding. For constrained firms, cash flow does not affect the decision to hold cash. For non-constrained firms, the proposed hypothesis is not fully supported by statistical tests using either PLS method or 2SLS method with IV. Using PLS method, cash holding is increasing in line with the increase in cash flow. This result is consistent for the three firms categories based on: KZ index, dividend payment, and firm size. Moreover, by using 2SLS method, cash flow does not affect the amount of cash holding. Overall, it can be concluded that the difference in the results between constrained and non-constrained firms show firms' motivation to hold cash.

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