Effect of Earning Quality on the Cash Holdings: Case Study of Enterprises Listed on the Vietnam Stock Market

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Abstract

This paper investigates the relationship between earning quality and cash holdings. The study uses the multivariate regression method FGLS to handle the phenomenon of self-correlation and variance change. The study sample consisted of 403 non-financial companies listed on Ho Chi Minh City Stock Exchange and Hanoi Stock Exchange between 2014-2019 with 2418 observations. Research results indicate that companies.

with low earning quality hold higher cash. Overall, the author's evidence shows not only that cash balances are positively affected by the presence of greater information asymmetry but also by the existence of low levels of management oversight and the occurrence of losses, both of which reduce the importance of earning quality as a factor determining cash levels.

Keywords: *Cash holdings, earning quality, listed company*

1. Introduction

Previous studies have shown that companies can establish cash holdings by comparing transaction costs and opportunity costs of holding cash (Miller & Orr, 1966). Costs identified when holding a lot of cash include tax disadvantages and the loss of investment opportunities (Bigelli & Sánchez-Vidal, 2012) while the benefits of holding cash are identified as reducing transaction costs in the event of new capital raising, reducing the likelihood of default, avoiding the use of external funding options (Kim, Mauer, & Sherman, 1998; Opler, Pinkowitz, Stulz, & Williamson, 1999).

In addition to cash, income is an important factor for the company. Investors often rely on the information in their financial statements to make investment decisions. The quality of income and the amount of cash held are two quantities that have a relationship with each other. Income will reflect the company's cash flow from sales and service provision, but some companies fall into the case of book profits but do not have actual profits to meet their payment obligations in the short term. This shows that earnings quality has a relationship to a company's cash holdings. In previous studies in the US, the negative impact of earning quality on the company's cash holdings (Sun, Yung, & Rahman, 2012). In another study that companies in the industry with a greater degree of information asymmetry should hold less cash, this result is consistent with the shareholder oversight hypothesis when managers are restricted to holding cash reserves for personal reasons Chung, Kim, Kim, & Zhang (2015).

Previous studies suggest that as the quality of companies' earnings decreases, managers can act to counteract the possible negative influence from investors by holding larger cash reserves. This can be explained by the presence of lower earning quality, stronger information asymmetry, and the mobilization of external financing that will become costly than available financing (Sun et al., 2012). This will make it a priority for managers to use internal funds and create a cash buffer to prevent any funding shortfall for future investments.

In Vietnam, there are few studies on the relationship between the quality of income and cash reserves of enterprises. In the context of the economy being affected by the Covid - 19 pandemic, there are many businesses increasing the level of cash reserves at the fund. The increase in cash holdings in this case by enterprises can help them increase their flexibility in terms of paying for financial obligations to creditors, meeting the payment needs of the supplier of raw materials; At the same time, it also ensures the production and operating costs to be able to maintain the operation of the enterprise and create opportunities for enterprises to capture and implement potential investment projects with high profitability, contributing to

increasing the quality of income for the company. Therefore, the authors conducted the study with the desire to recognize the importance of earning quality as well as financial factors affecting cash holdings.

2. Objectives

The objectives of this study include:
- Identify the patterns in the relationship between income quality and cash holdings.
- Discovering the influential characteristics of business entities (scale, operational efficiency, debt ratio, growth potential) on the relationship between profit quality and the cash-holding behavior of publicly listed companies in the stock market in Vietnam.
- Point out whether the research results show differences or consensus compared to previous studies.

3. Materials and Methods

3.1. Research Overview

The relationship between cash holdings and earning quality is very interesting and important from the point of view of both cash quality and income. The cash reserves held by US companies have increased significantly over the past two decades. According to Bates, Kahle, & Stulz(2009) the average cash-to-asset ratio of 13,237 U.S. industrial companies increased from 5.5% to 14.73% in 1980 and 2004. This reduced cash flow is likely to exacerbate the regulator's problem as excess cash can be diverted much more easily into private interests and corporate managers' projects than into other assets (Myers & Rajan, 1998); Lie, 2000). Since investors discount the value of a business's cash holdings based on their expectations of how cash is used, increased representation costs can harm the value of the business. The issue of representation is exacerbated, and the erosion of corporate values is exacerbated by information asymmetry. The main determinant of information asymmetry is the accuracy of a company's financial statements.

Previous studies, such as Leuz & Verrecchia (2000), Bushman & Smith (2001), Verrecchia (2001) using the Fem regression model show that higher financial reporting quality minimizes information asymmetry that causes economic contradictions such as moral risk and adverse selection. Accounting and financial evidence often uses earning quality as a proxy for the accuracy of a company's financial statements Francis, Khurana, & Pereira (2005); Ball & Shivakumar (2008). The quality of reported earnings creates trust among stakeholders and improves the consequences of information asymmetry (Francis, LaFond, Olsson, & Schipper, 2004), Francis et al. (2005). On the other hand, the poor quality of earnings creates uncertainty about the financial health of the company and gives rise to doubts that earnings can be managed. The asymmetry essentially significantly increases the management costs of holding large cash balances, on the other hand, the studies also provide much evidence that the information asymmetry itself is the cause of the increase in the company's cash holding rate (Ferreira & Vilela (2004); Ozkan & Ozkan (2004); García-Teruel, Martínez-Solano, & Sánchez-Ballesta (2009). Studies suggest that there is a direct relationship between the level of information asymmetry and the level of cash holdings so that a company that is unclear about the information will keep cash balances higher than companies that are more transparent about the information. The reason for this is simple. Companies with a high degree of information asymmetry are subject to higher external funding costs whether due to debt, more difficult covenants, or equity, due to the agency cost discount rate applied to the company's cash flows. Such companies must rely more on internal funds and necessarily have higher cash balances for their operational and investment needs.

If, as studies show, there is a direct relationship between the level of information asymmetry and the level of cash holdings, and if the quality of income is a determinant of information asymmetry, there should be an inverse relationship between the quality of income and a company's level of cash holdings. Companies with good earnings quality will have lower cash balances than companies with poor earnings quality. Such a relationship is confirmed by the García-Teruel et al. (2009) study for a sample of Spanish companies. In this study, the study confirms such a relationship for a large sample of U.S. companies. The authenticity of a relationship found to exist in Spain in the context of the United States will not be of much interest if the information asymmetry - the driving force behind this relationship - is similar in Spain and the United States. However, it is not the case in García-Teruel et al. (2009) that Spain is a continental country characterized by weak investor protection, underdeveloped capital markets and high levels of ownership concentration. Therefore, Spanish companies are very suitable to meet the authors' research objectives because these companies have the ability to present lower accounting quality. At the same time, García-Teruel et al. (2009)

state that U.S. and Anglo-Saxon countries are characterized by higher earnings quality, strong investor protection, large capital markets, and dispersed ownership leading to lower levels of earnings management. The American accounting system probably has the most stringent disclosure requirements among the world's developed countries. Information asymmetry adversely impacts the cost of capital of the company (Easley & O'hara (2004)). However, this impact is not uniform in all companies but varies according to the degree of information asymmetry of a company and implies according to the quality of the company's income - the main determinant of information asymmetry. Since cost of capital is the discount rate used to value assets, an increase in cost of capital will reduce the value of cash held.

Research (Dittmar, Mahrt-Smith, & Servaes, 2003; Ozkan & Ozkan, 2004) has shown that cash holdings are positively related to the degree of information asymmetry. In turn, information asymmetry has been recognized as an important determinant of capital costs that can be reduced by higher earning quality (Bhattacharya, Black, Christensen, & Larson, 2003; Francis et al., 2004), with this, Easley & O'hara (2004) offer a model in which the quality of income is a risk factor that cannot be diversified, thus affecting the company's capital costs. Thus, earnings consist simultaneously of accrual and cash components, as Dechow, Ge, & Schrand (2010) observe, when earnings are mainly made up of accruals, they will be less sustainable and therefore less informative (i.e. "lower quality") than when they are composed mainly of cash flows. Therefore, to counterbalance the low level of earning quality, companies can accumulate significant cash reserves to avoid reliance from the capital market to raise capital and /or communicate an image of higher stability and lower risk compared to low quality income. Chung et al. (2015) found evidence supporting the cost hypothesis of monitoring the relationship between cash holdings and information asymmetry. Under such a hypothesis, active shareholder oversight would limit managers' access to free cash flow to avoid devaluation activities (Jensen, 1986) and this would be more likely in the face of an environment with a high level of information asymmetry. Therefore, there is a negative relationship between cash holdings and the degree of information asymmetry that the authors record in their analysis. However, Chung et al. (2015) acknowledged the possibility of a competitive hypothesis in which information asymmetry and cash holding would be positively correlated to each other along the lines discussed by Myers & Majluf (1984), known as the "cash holding investment opportunity hypothesis". Using a sample of Spanish SMEs, and a model of Dechow & Dichev (2002), García-Teruel et al. (2009) found evidence consistent with higher accounting quality that reduced the level of current assets. Sun et al. (2012) provided an analysis of the relationship between earning quality and cash holdings of U.S. companies in 1980–2005 and found evidence of a negative association consistent with the above arguments.

In addition, it is conceivable that, in the absence of adequate oversight mechanisms, the quality of earnings may be low due to issues involving managers and shareholders and that, in that case, managers will also engage in cash accumulation to insulate from outside oversight of the capital markets (Easterbrook, 1984)) or for other personal benefits. In that case, one would expect a negative relationship between cash holdings and earning quality. Koo, Ramalingegowda, & Yu (2017) suggest that higher quality reporting is associated with higher dividend payments, thus also showing the possibility that earnings quality may have a negative impact on cash holdings. Finally, Greiner, Kohlbeck, & Smith (2017) points out that the actual operational management of positive earnings growth is associated with greater cash holdings, again indicating the existence of a relationship between earnings quality and cash holdings. The authors also suggest that such a relationship may be related to Jensen (1986) free cash flow hypothesis because the observed relationship is stronger for poorly managed companies. Verrecchia (2001) shows that higher financial reporting quality minimizes information asymmetry. Subsequent empirical evidence suggests that information asymmetry has significantly increased the company's cash ratio (Ozkan & Ozkan, 2004; Ferreira & Vilela, 2004).

Many authors have used earnings quality as a proxy of the level of information asymmetry and considered its effect on the company's cash holding behavior. García-Teruel et al. (2009) from a sample of Spanish companies found evidence that higher accounting earning quality reduced the level of short-term assets. Sun et al. (2012) on the sample of companies listed in the US in 1980-2005 found evidence of a negative relationship between the quality of earnings and the company's cash. Shin, Kim, Shin, & Lee (2018) when researching the sample of Korean companies in the period 2000-2014 provided evidence of the negative effect of earning quality on the company's outstanding cash quality. Recently, Farinha, Mateus, & Soares (2018) confirmed the above research results from the sample of listed companies in the UK in the period 1988-2015.

In Vietnam, there have not been many studies on the relationship between the quality of profits and the amount of cash held by enterprises, this is the reason that prompted the authors to choose this research topic.

3.2. Background theory and research hypothesis

Theory of trade-offs

Modigliani & Miller (1958) introduced the trade-off theory, which was further expanded by Miller & Orr (1966), Kraus & Litzenberger (1973) and Kim (1978). They believe businesses choose their optimal form of cash holdings by weighing between marginal costs and the advantages of cash holdings. The fact that companies hold cash reduces the likelihood of financial trouble, so this is considered a small benefit of holding cash. Meanwhile, the opportunity cost of retaining capital while the company offers a high return on alternative investments is included in the marginal cost. In this opinion, the need to keep cash is negatively affected by the size of the business due to economies of scale. Meanwhile, the opportunity cost of holding capital while the company offers a high return on alternative investments is included in the marginal cost. The size of the enterprise, according to this hypothesis, has a negative impact on the cash retention requirement due to economies of scale. Due to the higher level of risk in these organizations, small-sized businesses are often thought to have stronger growth potential, and therefore cash storage in these locations is also higher to avoid the cost of raising money from outside (Ferreira & Vilela, 2004; Faulkender, 2002) and Kim et al. (1998) for the US market, and Opler, Pinkowitz, Stulz, & Williamson (2001) for the United States market all corroborate this conclusion.

Leverage has an effect on cash holdings, although the exact nature of this influence is unknown. When a company's debt utilization is high, it means it has easy access to the loan market (Ferreira & Vilela, 2004) and therefore does not need to have a lot of cash. Moreover, it can be argued that the cost of retaining cash is higher for companies that use high leverage (Ozkan & Ozkan, 2004). On the other hand, companies with significant financial leverage are said to have more financial risks. Therefore, the business must retain more cash to minimize risk, indicating that leverage and cash holdings are positively linked. The study predicts a negative link between cash flow and cash holding as cash flow is an available source of liquidity (Kim et al., 1998). Cash flow fluctuations: Companies with more volatile cash flows are more likely to suffer from cash shortages due to unforeseen decreases in cash flows. As a result, a positive association between cash flow volatility and cash holdings is predicted (Ozkan & Ozkan, 2004) and Bigelli & Sánchez-Vidal (2012). To increase your chances of survival in times of crisis, it is advisable to keep a larger amount of cash as a hedge for a company with extremely variable cash flows. Several studies have found a link between cash flow volatility and cash holding (Bigelli & Sánchez-Vidal, 2012; Ferreira & Vilela, 2004; and Opler et al. 1999). Liquidity: The presence of non-cash liquid assets and marketable securities may also affect an enterprise's optimal cash holdings, as they may substitute for cash. Therefore, we expect that a highly liquid company will hold less cash. The theory also predicts that companies with better investment opportunities will keep cash higher to avoid the problem of financial exhaustion. Dividend payments are also expected to have a negative effect on cash holdings. This prediction is supported by evidence provided by Ozkan & Ozkan (2004), Ferreira & Vilela (2004), and Pinkowitz, Sturgess, & Williamson (2011). Opler et al. (1999) found that a company's cash holdings were positively linked to growth prospects, risks, and unfavourable relationships with the size of the organization in the previous study. They also found that businesses with better access to financial markets had less cash.

On the other hand, the size, growth opportunities, risks, profitability, debt level, debt maturity structure and R&D intensity are expected to have a potential effect on the level of cash holdings.

Representation cost theory

Representative cost theory (Jensen & Meckling, 1976; Jensen, 1986) describes how owners and managers (who represent owners) interact. The costs incurred due to disagreements between the company manager and shareholders are called agency costs. Shareholders expect management to make decisions in their favor, so these tensions develop. But on the contrary, managers are willing to make decisions that benefit them or expand their business. As a result, the shareholders in the company are often burdened with an existential charge to control the management. In addition, the shareholders in the company have few conditions to monitor all decisions of the management, leading to the information asymmetry between managers and shareholders in the company. On the other hand, the cost of representation between managers and shareholders can also cause managers to refuse to pay dividends, reduce net debt and financial risks to a

level below that desired by shareholders (Easterbrook, 1984). In agreement with this assertion, Opler et al. (1999) has shown evidence of the existence of excess cash which may be due to issues between shareholders and managers. However, evidence of conflicts of interest between managers and shareholders leads to higher levels of cash holdings in companies. On the one hand, Ferreira & Vilela (2004) report that companies in countries with better investor protection and centralized ownership hold less cash. Based on the representation cost theory, García-Teruel & Martínez-Solano (2008) found that manager ownership can also have an impact on a company's cash reserves. On the other hand, the results of Ozkan & Ozkan (2004) observe that the relationship is not merely between cash holdings and the ownership of managers. According to their results, the level of cash increases after the important level of ownership, in contrast to the usual expected shareholder engagement effect held by the larger managers.

Based on the theoretical background and literature review, the proposed research hypotheses include:

H_1: There is an inverse relationship between earning quality and cash holding behavior of non-financial listed enterprises in Vietnam.

H_2: Characteristics of enterprises (size, operating efficiency, debt ratio, growth capacity) affect the relationship between earning quality and cash holding behavior of enterprises in Vietnam.

3.3. Research Methods

Research model

On that basis, the regression model is proposed: CASH holding ratio (cash), earning quality (EQ), operating cash flow (CF), enterprise size (SIZE), market value to book value (MB), liquidity (LIQUIDITY), short-term debt ratio (STDEBT), long-term debt ratio (LTDEBT), expenditure on research and development, probability of default (Z-SCORE) and dividend expenses are among the variables tested (DIVIDEND).

$$CASH_{i,t} = \alpha + \beta_1 EQ_{i,t} + \beta_2 CF_{i,t} + \beta_3 SIZE_{i,t} + MB_{i,t} + \beta_5 LQ_{i,t} + \beta_6 STDEBT_{i,t} + \beta_7 LTDEBT_{i,t} + \beta_8 R\&D_{i,t} + \beta_9 div_{i,t} + \beta_{10} ZSCORE_{i,t} + \varepsilon_{i,t} \ (1)$$

Where:

Cash	Amount of Cash held
EQ	Quality of Earnings
CF	Working Cash flow
SIZE	Scale of the Company
MB	Ratio of market value to book value of total assets
LQ	Liquidity
STDEBT	Short-term debt ratio
LTDEBT	Long-term debt ratio
RD	Research and development cost
ZSCORE	Probability of default
DIV	Dividends

Measuring variables: The measurement of all the variables is shown in Table 1.

Table 1 Variables in the model

Name	Notations	Measure
Dependent variable		
Cash holding	Cash	(Cash + Short-term Financial Investments)/Total Assets
Independent variable		
Earnings quality	EQ	$ACC_{i,t} = \alpha + \beta_1 CF_{i,t-1} + \beta_2 CF_{i,t} + \beta_3 CF_{i,t+1} + \beta_4 \Delta REV_{i,t} + \beta_5 GPPE_{i,t} + \varepsilon_{i,t}$ (2) EQ is the 5-year standard deviation of the residual determined from the above formula.
Control variables		
Working cash flow	CF	$\dfrac{EBITDA}{Total\ Assets}$

Name	Notations	Measure
Scale of the company	SIZE	Ln(revenue)
Market value to book value ratio	MB	$\dfrac{\text{Total Assets} - \text{Owner's Equity} + \text{Equity Market Capitalization}}{\text{Total Assets}}$
Liquidity	LQ	(Accounts Receivable + Inventories - Payables)/ Total Assets
Short-term debt ratio	STDEBT	Short-term Liabilities/ Total Assets
Long-term debt ratio	LTDEBT	Long-term Liabilities/ Total Assets
R&D cost	RD	Science and Technology Development Fund/Total Assets
Probability of default	ZSCORE	$=3.2+12.18*\dfrac{\text{Profit Before Tax}}{\text{Short-Term Liabilities}}+2.5*\dfrac{\text{Short-Term Assets}}{\text{Short-Term Liabilities}}-10.68*\dfrac{\text{Short-Term Liabilities}}{\text{Total Assets}}$ $+ 0.029*((\text{Short-term assets-short-term liabilities})/(\text{revenue-EBITDA}))/365$
Dividends	DIV	The variable is equal to 1 if the company pays cash dividends; otherwise, is 0

4. Results and Discussion

Table 2 presents the correlation coefficient matrix between the variables in the model. According to the results, the variables in the study model have a low level of correlation with each other and the correlations are less than 0.8 Hoàng & Chu (2008). This makes it possible to deduce that no polylinearity occurs between the variables in the study model.

Table 2: Correlation coefficient matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) cash	1										
(2) eq	0.23700	1									
	0.000										
(3) cf.	0.21900	0.03000	1								
	0.000	(0,146)									
(4) size	-0.07200	-0.14600	0.21200	1							
	0.000	0.000	0.000								
5 MB	0.35200	0.17600	0.64000	-0.06100	1.						
	0.000	0.000	0.000	-0.003							
(6) LQ	-0.30100	-0.02600	-0.31300	-0.07600	-0.25300	1					
	0.000	(0,206)	0.000	0.000	0.000						
(7) stdebt	-0.22800	-0.18900	-0.33700	0.23400	-0.59400	0.41600	1				
	0.000	0.000	0.000	0.000	0.000	0.000					
(8) ltdebt	-0.14000	0.01200	-0.06200	0.13600	-0.24600	-0.27000	-0.28600	1			
	0.000	(0,545)	-0.002	0.000	0.000	0.000	0.000				
(9) rd	0.15500	0.12900	0.41500	-0.12000	0.45300	-0.19100	-0.45400	0.19900	1		
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
(10) div	0.10700	-0.10100	0.31900	0.26300	0.14700	-0.13600	-0.05600	0.03000	0.10100	1	
	0.000	0.000	0.000	0.000	0.000	0.000	0.006	(0,146)	0.000		
(11) zscore	0.38600	0.24600	0.45200	-0.10500	0.56500	-0.31600	-0.49300	-0.00800	0.40400	0.10900	1
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	(0,710)	0.000	0.000	

Source: Compilation from results run on Stata software

Examine the quality of income and cash holdings as well as financial factors affecting the level of cash holdings of enterprises through regression equation (2) with regression models including: OLS, FEM, REM. The regression results show that EQ has a reversible relationship with the cash holding ratio. However,

EQ variable has opposite meaning to earning quality. That is, this relationship can be expressed in a different way that the reduced quality of income will increase the percentage of cash holdings.

Table 3 Results of regression by Pooled OLS, FEM, REM methods

Variable Name	Pool OLS	FEM	REM
EQ	0.279888***	0.131922***	0.174444***
CF	-0.121262***	-0.092884*	-0.099297**
SIZE	-0.002558	0.002022	-0.001454
MB	0.028534***	0.016693**	0.020937***
LQ	-0.146464***	-0.225444***	-0.187756***
STDEBT	0.053173	0.035797	0.063672
STDEBT2	-0.019105	-0.041534	-0.048639
LTDEBT	-0.138974***	-0.100071***	-0.125548***
RD	-0.000531	0.048784	0.022335
DIV	0.022974***	-0.009418	-0.003035
ZSCORE	0.001366***	0.001169***	0.001298***
_CONS	0.133678**	0.088674	0.152131*
N	2418	2418	2418
R2	0.265813	0.134078	
Fisher - test	0.0000		
LM-test	0.0000		
Hausman-test	0.0000		

***, **, * indicate significant levels of 1%, 5% and 10%, respectively.

Source: Compiled from results run on Stata software.

In order to perform the selection between Pooled OLS and FEM, the author performs the F-test test with the hypothesis: H_0: Pooled OLS method is suitable. Since the test results give a Prob value $> F = 0.0000 < 0.01$, so the hypothesis H_0 is rejected, and the FEM method would be more suitable than the Pooled OLS method. To choose between the Pooled OLS method and the REM method, the author performs the Breuch – Pargan Lagrange Multiplier test with the hypothesis that: H_0: Pooled OLS method is suitable. Since the test results give prob $> chibar^2 = 0.0000 < 0.01$, the hypothesis of H_0 is rejected, and therefore the REM method conclusion is more suitable than the Pooled OLS method. The Hausman-test with hypothesis H0: REM method is suitable. The test results show that P-value is less than the statistical significance level of 1%, rejecting the hypothesis H0. From this it can be concluded that the FEM regression method is suitable.

Multilinear resonance test

Table 4 VIF variance magnification factor

Variable Name	VIF	SQRT VIF	Tolerance	R-Squared
EQ	(1.11)	1.05	0.9004	0.0996
CF	2.23	1.49	0.4484	0.5516
SIZE	1.41	1.19	0.7073	0.2927
MB	3.67	1.92	0.2724	0.7276
LQ	1.37	1.17	0.7296	0.2704
STDEBT	2.83	1.68	0.3540	0.6460
LTDEBT	1.94	1.39	0.5157	0.4843
RD	1.59	1.26	0.6309	0.3691
DIV	1.18	1.09	0.8492	0.1508
ZSCORE	1.72	1.31	0.5828	0.4172
Mean VIF	1.9			

Source: Compiled from results run on Stata software.

The author tested the polylinearity between the variables in the study model by testing the numerical coefficient of magnification of VIF variance. If the VIF coefficient < 10, shows that there is no polylinearity between the variables in the study model, in contrast, if the VIF coefficient > 10, shows that there is polylinearity occurring and that the variable must be removed from the study model. Table 4 shows the results of the VIF coefficient test. Through the results of the test run, the author found that the VIF coefficients of all variables in the study data were less than 10, so the study model did not occur polylinearities between the variables.

Table 5 Self-correlation test - Autocorrelation test

Testing	P-value
F (1, 402) = 45,455	0.0000

Source: Compiled from results run on Stata software.

Self-correlation test results have a P-value of less than 1%. Dismiss the H0 hypothesis. The pattern of self-correlation occurs.

Table 6 Variance test of change error - Variable variance test

Testing	P-value
Chi^2 (403) = 8.3e+05	0.0000

Source: Compiled from results run on Stata software.

The results of variance testing have a P-value of less than 1%. Dismiss the H_0 hypothesis. The pattern of variance changes.

Regression of earnings quality and amount of cash held by GLS method.

The test results show that the research model is subject to variance change and self correlation. Therefore, the author corrects the phenomenon of self-correlation and variance by gls estimation method.

Table 7 Regression of earning quality and amount of cash held by GLS method.

Cash	Coef.	St. Err.	z	P>z	[95% Conf.	Interval
EQ	.10226	.02185	4.68	.00235	.05942	.14509
CF	-.03177	.01793	-1.77	.07637	-.04692	00337
SIZE	.00122	.00095	1.28	20000	-.00064	.00308
MB	[0083]	00348	2.39	.01704	.00148	.01512
LIQ	-.11863	[0062]	-19.12	.00163	-.13078	-.10647
STDEBT	06206	.02392	2.59	.00948	.01517	.10895
STDEBT2	-.04305	.02161	-1.99	.04634	-.0854	-.00071
LTDEBT	-.11688	.01198	-9.75	.01025	-.14037	-.09339
RD	.01221	.00978	1.25	.21168	-.00695	.03137
DIV	.00306	.00181	0-1.69	.09100	-.00049	.00661
ZSCORE	.00112	.00014	7.84	.05331	.00084	.00142
_con	.04307	.02587	1.67	.09590	-.00763	.09378

Mean dependent var	0.101	SD dependent var	0.119	
Number of obs	2418	Chi-Square	594,891	

Source: Compiled from regression results on Stata section.

The GLS regression results showed that EQ had a positive correlation with the cash holding rate, at a 1% significance level. EQ is the standard deviation of the quality of income, this variable increases the quality of income decreases and, in the model, will increase the amount of cash held. This implies that companies with lower levels of income information will find it more difficult to find external financing and thus accumulate larger cash reserves to serve as steppingstones for future financing needs. This result is consistent with initial expectations and also with the studies of Farinha et al. (2018).

Fluctuations in CF operating cash flows are negatively correlated with the amount of cash held. This implies that the higher the operating cash flow companies have, the less cash holdings and this result is also consistent with the results of Ferreira & Vilela (2004).

The ratio of market value to book value (MB) has a positive correlation with the cash holding ratio. This result is consistent with the initial expectations of the MB variable, and also with the research results of Gill & Shah (2012); Zia-ul-Hannan & Asghar (2013); Tayem (2017).

Dividend payments are positively correlated with a significant 1% cash holding rate. This result implies that dividend-paying companies will hold more cash to avoid the lack of cash in paying their dividends, which is consistent with Ozkan & Ozkan (2004) argument and research.

This study also does not show the correlation between research and development (R&D) costs with the percentage of cash holdings.

The ratio of short-term loans (STDEBT) is positively correlated with cash holdings and the stdebt factor shows that there is a non-linear relationship between short-term loans and cash holdings. The result implies that there is an optimal short-term debt ratio.

The long-term loan ratio (LTDEBT) is negatively correlated with a significant 1% cash holding ratio. This result is consistent with expectations of signs of volatility and implies that companies with higher long-term debt ratios will reserve less cash.

Liquidity is negatively correlated with a significant 1% cash holding rate. This implies that highly liquid companies will have less cash holdings. This result is consistent with initial expectations and also with the research results of Shabbir, Hashmi, & Chaudhary (2016); Hofmann (2006).

The company size variable (SIZE) has a positive correlation with the cash holding rate. This implies that large companies tend to hold more cash to meet profitable investment needs. Although this result is contrary to initial expectations, it is fully consistent with the studies of Bates et al. (2009); Chung et al. (2015); Opler et al. (1999).

The probability of default is positively correlated with the cash holding rate at the level of 1% significance. This result is contrary to the initial expectation of the relationship between Z-SCORE and cash holding ratio (CASH), but it is consistent with the study of Atha Umry & Diantimala (2018) with the higher probability of default, the lower the likelihood of default and the higher the cash holding ratio.

5. Conclusion

Regression results from the gls estimation method show that earning quality is an important determinant of cash holdings, a result consistent with the argument that companies with lower levels of income information have more difficulty obtaining external financing and thus accumulate larger cash reserves as a buffer for future financial needs (Farinha et al., 2018). In addition, CF operating cash flow fluctuations are negatively correlated with cash holding ratios. This implies that the higher the operating cash flow companies have, the lower the cash holdings. The market exchange rate variable on MB books is positively correlated with the cash holding rate, this result is contrary to initial expectations, but is consistent with the study of Rizwan & Javed (2011); Zia-ul-Hannan & Asghar (2013); Tayem (2017) that the market value to book value ratio has a positive impact on cash holding. Liquidity variable LIQUIDITY is negatively correlated with cash holding ratio. This implies that highly liquid companies will have less cash holdings. This result is consistent with initial expectations and also with the research results of Shabbir et al. (2016); Hofmann (2006). The LTDEBT long-term debt ratio variable is negatively correlated with the cash holding ratio. This implies that companies with higher levels of debt will have less cash holdings. This result is consistent with the initial expectation of the sign of the LTDEBT variable. In addition, research shows that there exists a non-linear relationship between the quality of income and the amount of cash held.

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