

**CORPORATE CASH HOLDINGS AND FIRM VALUE – EVIDENCE FROM  
CHINESE INDUSTRIAL MARKET**

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PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF SCIENCE IN FINANCE

In the Master of Science in Finance Program  
of the  
Faculty  
of  
Business Administration

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SIMON FRASER UNIVERSITY

Fall 2014

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## **Abstract**

This paper studies the effect of cash holding on firm value for a sample of Chinese industrial firm during 2010-2013. The study tests the existence of a linear relationship between cash holding and firm value. Then the study tests if a quadratic relationship exists. The results show that a linear relationship exists, and a quadratic relationship is not proved to exist between cash holding and firm value for Chinese industrial companies.

**Keywords:** Cash holdings; firm value

## **Acknowledgements**

We would like to express our sincere gratitude to our senior supervisor Christina Atanasova, who gave us the opportunity to explore what we are passionate about, and for her continued support and encouragements.

Many thanks to Evan Gatev for being the second reader of our thesis and providing us with meaningful and helpful advise.

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# 1: Introduction

In finance literature, cash holding has been drawing increasing attention. While many studies focus on the factors influencing company's cash holding, there are few studies focusing on the direct relationship between cash holding and firm value.

Cash holding has both benefits and costs for the firm.

Firstly, for precautionary motives, cash holding can protect a firm from a certain level of cash shortfall since firms have liquidity risk and unexpected contingencies; Secondly, for transactional motives, cash holdings can give firms the liquidity for transactions (Keynes, 1936).

On the other hand, excess cash holding may cause agency problems since the interests of management are usually at the odds with that of shareholders. With too much cash on hand, managers may tend to manage poorly and encourage imprudent acquisition and expansion (Jensen, 1986). And also, holding cash is an opportunity cost because of the lower financial return of liquid assets.

Based on the samples from 35 countries, Pinkowitz (2006) studied the relationship between firm value and cash holding in firms. The results showed that compared with firms in countries protecting investors well, firms in countries do not protect investors well have weaker firm value and cash holding relationship, and cash values in those countries are lower.

In the Kim et al. (1998) model, a firm has an optimal cash holding level, as the outcome of the trade-off between the costs and benefits of having liquid assets. M. Sola, G. Teruel and M. Solano (2010) tested the model empirically using a sample of 472 listed US industrial companies during 2001-2007 and found the existence of optimal cash holding levels.

The relationship between firm value and cash holding is influenced by how well the firm is protected in the country it performs, and cases in developed and developing countries may differ. Therefore, our study intends to cover the lag in the literature and provide insights into the relationship between the firm value and cash holding in developing countries with less investor protection, such as China.

This paper contributes to the literature by testing empirically if firms have an optimum cash level at which to maximize their value in China. The study first adapted the model to

China's situation by adding factors that may influence firm value (Yanmei SUN , Changyun WANG). Then we used regression analysis to explore the relationship between firm value and cash holding using a sample of 2,261 listed Chinese industrial companies during the period from 2010 to 2013. The result shows that a linear relationship, instead of a non-linear (concave) one, between cash holdings and firm value exists. We also looked into the relationship and explained the differences between the relationships in US and Chinese firms.

The paper continues as follows. Section 2 reviews corporate finance literature, focusing on cash and firm value literature. Section 3 gives a general description of the sample and variables employed. Section 4 describes the linear model linking cash holding and firm value and reports the results. The main conclusions and implications of the study conclude the paper.



## 2: Literature Review

According to the traditional corporate finance (Stiglitz 1974), firms could get enough external finance and invest based on the projects' NPVs in the perfect market. Keeping cash would have no influence on firm value because of the absence of a premium for liquidity and taxes. So, keeping liquid financial assets would be irrelevant and decisions about investment in liquid assets would not affect shareholders' wealth (Opler, Pinkowitz, Stulz and Williamson, 2001). However, since the market is imperfect, the irrelevance does not hold.

As for positive aspects of holding cash, there are three motives mainly (Keynes, 1936). Transaction motive refers to the need to hold cash for activities associated with a firm's ongoing operation. A firm use cash for the purchase of goods, payment of salary, wages, rent, interest, tax, insurance, dividend and so on. In the meantime, it receives cash in terms of sales revenue, interest on loan, return on investments made outside the firm and so on. If these receipts and payments were perfectly synchronized, a firm would not have to hold cash for transaction motive. However, cash inflows and outflows cannot be matched exactly in reality. Precautionary motive refers to the need to hold cash as a safety margin as a financial reserve. A firm should hold some cash for the payment of unpredictable or unanticipated events such as strikes and lock-up from employees increase in cost of raw materials, funds and labour, fall in market demand and so on. The speculative motive refers to the need to hold cash in order to be able to take advantage of bargain purchases that might arise, attractive interest rates and favourable exchange rate fluctuations. Some firms hold cash other than transaction and precautionary needs for speculative motive. Speculative needs require a firm to have possible profitable opportunities to exploit, which are out of the normal course of business. These opportunities arise in conditions, when price of raw material is expected to fall, when interest rate on borrowed funds are expected to decline and purchase of inventory occurs at reduced price on immediate cash payment.

As for negative aspects of holding cash, there are two major costs. According to Dittmar, Mahrt-Smith and Servaes (2003), holding liquid assets implies an opportunity cost because of the lower return compared with other investments. In addition, because of the lack of monitoring by capital market, the benefit of corporate liquidity in investing in projects without rising outside funds may cause a cost. According to Jensen and Meckling (1976), large cash reserves can increase agency conflicts between managers and shareholders because managers can waste funds

on inefficient investment that offers non-pecuniary benefits but destroys shareholder value or on their own pet projects.

Firms' cash holdings are influenced by many kinds of factors such as the country's economic and lawful environment, the companies' financial management strategies, the companies' financial situations and governance structures.

According to the studies on China's listed companies, the cash holdings characteristics are quite different from those of US companies. The average cash holding in 1998-2007 was 24% in China (Zhu Jigao, Lu Zhengfei, 2009), which is much higher than that of US companies. In addition, the government is the controlling shareholder in a large number of Chinese firms in China. According to Shleifer and Vishny (1994), state-assigned managers may act in the interest of the politicians who control them rather than the interests of the firms. Therefore, conflicts often arise between firms and politicians in China and there are many agency problems.

However, Chinese companies have higher ownership concentration than US companies (Wang, 2001). Han and Song (2004) studied the relationship between ownership concentration and agency costs in 1080 listed Chinese firms, and the result shows a negative relationship. So it is hard to decide if Chinese companies have higher agency costs than US companies.

From what discussed before, we can see the trade-off to determine a firm's optimal cash holding between the costs and benefits of having liquid assets in China could be different from that in the US.

In order to fill the gap in the literature, this paper studies how the firm's cash holdings influence its value. The study tends to find the relationship between firm value and cash holdings in Chinese listed companies and explain the reason of the difference between the relationships in US and Chinese companies.

## 3: Data and Variables

### 3.1 Data

We used a sample of Chinese publically traded firms from 2010 to 2013 to explore the relationship between cash holding and firm value. Considering the differences in regulations and reporting standards, all financial services companies are excluded. The study used accounting data from annual financial reports and daily share prices. All data is from COMPUSTAT database.

We have eliminated observations with errors or lost values from the sample and observations with negative equity or negative cash. To minimize the influence of extreme outliers, we also deleted the highest and lowest 1 percent of key variable observations. The result is 2,261 companies representing 7,258 firm-year observations. We did not use a sample of balanced panel data in order to avoid surveillance bias.

### 3.2 Variables

We used firm value as the dependent variable. Tobin's Q is a widely used proxy for firm value in previous studies (reference here). As the Tobin's Q data for Chinese companies is not included in COMPUSTAT database, we used a simple approximation of Tobin's Q suggested by Chung and Pruitt (1994), calculated as follow:

$$Q = \frac{\textit{Book value of liabilities} + \textit{Market value of equity}}{\textit{Book value of asset}}$$

To test the robustness of the results, we also used another proxy for firm value, the market-to-book ratio, calculated as follow:

$$MBR = \frac{\textit{Market value of equity}}{\textit{Book value of equity}}$$

Key independent variable is CASH. CASH is cash and cash equivalents at the beginning of the year divided by total assets. The study also include control variables including change in

cash holding, earnings before interests and taxes, total cash flow, leverage, firm size and intangible assets. Descriptions of variables are included in Table 1.

Notice that we used the intangible asset divided by total assets as an approximation of the growth opportunity of firms. In previous studies, R&D expense is usually used (Fama and French, 1998). However, for Chinese companies, data of R&D expense is hard to obtain. We found that over 90% of the firms do not have the data. So we used the intangible asset as a proxy as suggested by M. Sola, G. Teruel and M. Solano (2010).

*Table 1. Descriptions of variables*

<b>Variable</b>	<b>Description</b>
Q	Tobin's Q approximation.
MBR	Market-to-book ratio.
CASH	Cash and cash equivalents at beginning of the year divided by total assets.
DCASH	Change in cash and cash equivalents divided by total assets
EBIT	Earnings before interests and taxes divided by total assets.
CFLOW	Total cash flow divided by total assets.
LEV	Total debt divided by total equity.
SIZE	Natural logarithm of total assets.
INT	Intangible assets divided by total assets.

Table 2 presents the descriptive statistics of variables. We can see that the mean and median of cash holding is 17.7% and 13.0% for Chinese industrial companies, which is in line with the values in previous studies (16.1% and 13.2%, Sun and Wang, 2011). However, they are much larger compared to the values in the U.S. market, 7.9% and 4.4% according to studies in M. Sola, G. Teruel and M. Solano (2010). This indicates that Chinese companies have more financing constraints, and they tend to hold more cash.

*Table 2. Descriptive Statistics of Variables*

Variable	Observation	Means	Std. Dev.	Median	10 percentile	90 percentile
Q	7258	2.101	1.209	1.762	1.010	3.651
MBR	7258	2.918	2.149	2.383	1.027	5.344
CASH	7258	0.177	0.142	0.130	0.042	0.394
DCASH	7258	0.017	0.128	0.001	-0.104	0.137
EBIT	7258	0.047	0.046	0.045	-0.005	0.105
CFLOW	7258	0.065	0.042	0.061	0.022	0.117
LEV	7258	1.138	1.121	0.785	0.185	2.555
SIZE	7258	8.088	1.269	7.877	6.707	9.802
INT	7258	0.020	0.040	0.004	0.000	0.060

Table 3 presents the correlation matrix for variables. There is no significant correlation between the independent variables.

*Table 3. Correlation matrix for variables.*

	Q	MBR	CASH	DCASH	EBIT	CFLOW	LEV	SIZE	INT
Q	1.00								
MBR	0.86	1.00							
CASH	0.22	0.06	1.00						
DCASH	0.12	0.08	-0.43	1.00					
EBIT	0.27	0.16	0.11	0.13	1.00				
CFLOW	0.33	0.18	0.13	0.09	0.37	1.00			
LEV	-0.32	-0.03	-0.35	-0.05	-0.24	-0.38	1.00		
SIZE	-0.46	-0.38	-0.28	-0.03	0.04	-0.04	0.48	1.00	
INT	0.00	0.00	-0.04	-0.06	0.00	0.04	0.01	0.11	1.00

## 4: Model Design and Results of Regression

### 4.1 Model Design

We built the following model to explore the relationship between cash holding and firm value.

#### Model 1:

$$V_{it} = \beta_0 + \beta_1 CASH_{it} + \beta_2 DCASH_{it} + \beta_3 CFLOW_{it} + \beta_4 LEV_{it} + \beta_5 SIZE_{it} + \beta_6 INT_{it} + \varepsilon_{it}$$

The dependent variable ( $V_{it}$ ) is the firm value for firm  $i$  at time  $t$ . Independent variables include CASH, which measures the cash holding level of the firm in the previous year. DCASH is the change in cash holding between the previous year and current year. CFLOW is the total cash flow of the firm. LEV is the leverage. SIZE is the size of the firm. DIV is the cash dividend and INT measures the growth opportunity of the firm.

We also built another model to see if firm value is related with CASH squared. As some previous studies show that there is a concave relationship between cash holding and firm value. (M. Sola, G. Teruel and M. Solano, 2010)

#### Model 2:

$$V_{it} = \beta_0 + \beta_1 CASH_{it}^2 + \beta_2 CASH_{it} + \beta_3 DCASH_{it} + \beta_4 CFLOW_{it} + \beta_5 LEV_{it} + \beta_6 SIZE_{it} + \beta_7 INT_{it} + \varepsilon_{it}$$

Model 2 only differs from Model 1 by adding a variable  $CASH_{it}^2$ , which is CASH squared.

We used fitlm function in Matlab 2014\_b, which uses OLS method, to do the regression. We also used robust regression to minimize the influence of outliers. We fit the data in model 1 first and then in model 2 to see if the result is better using a quadratic regression.

### 4.2 Results of regression

Table 4 presents the result of estimation of model 1 and model 2. The first two columns are results from Model 1 and the last two columns are results from Model 2. In the first and the

third column, Tobin's Q is used as dependent variable. In the second and the fourth column, market-to-book ratio is used as dependent variable. Values of t-statistics are in brackets. “\*\*\*”, “\*\*” and “\*” mean that the efficiency is significant at 1%, 5% and 10% level respectively.

Table 4. Results of estimation

	Model 1		Model 2	
	Q	MBR	Q	MBR
CASH	0.778*** (11.288)	0.343*** (2.668)	0.672*** (3.4408)	1.435*** (3.942)
DCASH	1.200*** (16.679)	1.089*** (8.106)	1.194*** (16.4189)	1.155*** (8.524)
EBIT	2.253*** (8.241)	4.609*** (9.025)	2.259*** (8.247)	4.527*** (8.872)
CFLOW	3.455*** (11.012)	5.440*** (9.285)	3.442*** (10.958)	5.495*** (9.391)
LEV	0.023** (2.478)	0.314*** (18.514)	0.022** (2.423)	0.318*** (18.685)
SIZE	-0.320*** (-43.485)	-0.625*** (-45.417)	-0.320*** (-43.404)	-0.624*** (-45.413)
INT	0.876*** (4.389)	1.367*** (3.666)	0.874*** (4.375)	1.370*** (3.682)
CASH^2			0.190 (0.588)	-1.930*** (-3.201)
R-squared	0.411	0.318	0.410	0.319



As can be seen from the results of Model 1, a positive relationship exists between cash holding and firm value. The coefficient of CASH is positive and is significant at 1% level. This shows that firms holding more cash in the previous year have higher value in the current year. The stability of the estimated coefficients among different proxies of firm value demonstrates the robustness of results of our study. The result shows that advantages of holding more cash outweigh the disadvantages. Firms holding more cash could take the chance of profitable investments and build firm value. Also, a higher cash holding level in the previous year may be a sign of the need of future capital investments, which would also add to the firm value.

As to the control variables, DCASH has a positive coefficient, which is significant at 1% level. This indicates that firms that are increasing cash holding have higher firm value. This further put more robustness on our study. EBIT, CFLOW and INT are all positively related to firm value. LEV has a positive but quite small coefficient, which is also significant at 1% level. Size is negatively related to firm value and is significant at 1% level.

For Model 2, we can see that the results are very different for the two proxies of firm value. When Tobin's Q is used, the result indicates a convex relationship. However, when MBR is used, the result indicates a concave relationship. Furthermore, the coefficient of CASH<sup>2</sup> for Tobin's Q model is not significant. Thus, we cannot conclude that a concave relationship exists for the sample data.

Overall, the result of estimation shows that a linear relationship exists between cash holding and firm value for Chinese industrial companies. Cash holding is positively related to firm value. Increasing cash holding will constantly increase firm value and an optimal level does not exist for Chinese industrial companies.

## 5: Conclusion

The aim of this paper was to explore the relationship between corporate cash holding and firm value. The paper studied a sample of 2,261 Chinese industrial public companies for the period from 2010 to 2013.

The result of the study shows that, for Chinese market:

1. Cash holding is positively related to firm value.
2. For the sample used in this paper, the existence of an optimal level of cash holding cannot be verified.

This result is different with studies in US market, which shows that an optimal level of cash holding exists and the relationship between cash holding and firm value is concave (M. Sola, G. Teruel and M. Solano, 2010).

The main reason for the difference may be the inefficiency of Chinese financing market. Compared with US companies, Chinese companies have more financing constraints; hence they may not always be able to finance projects with positive NPVs. This makes cash more valuable for Chinese companies than for US companies, and this is also the reason why Chinese companies tend to hold more cash than US companies do.

Furthermore, as ownership of Chinese companies is more concentrated, majority shareholders can impose more control on the company. In this way, the agency problem caused by a high level of cash holding will have less influence on the firm value.

As stated above, for Chinese companies, advantages of holding cash outweigh disadvantages at all cash levels, and a linear positive relationship exists between cash holding and firm value.

We have also tried including data of year 2008 and 2009 to explore the effect of financial crisis on relationship between cash holding and firm value. We added a dummy variable whose value is 1 for year 2008 and 2009 and is 0 for other years. The result shows that the coefficient of the dummy variable is insignificant. This indicates that the financial crisis did not have much influence on Chinese industrial market. This is because Chinese market is to some extent isolated from the global market and therefore is not severely influenced by the crisis.

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