

## Research Article

# An Empirical Study on Listed Company's Value of Cash Holdings: An Information Asymmetry Perspective

Chuangxia Huang,<sup>1,2</sup> Xin Ma,<sup>3</sup> and Qiujun Lan<sup>4</sup>

<sup>1</sup> School of Mathematics and Computing Science, Changsha University of Science and Technology, Changsha 410004, China

<sup>2</sup> Academy of Mathematics and Systems Science, Chinese Academy of Science, Beijing 10090, China

<sup>3</sup> School of Economics and Management, Changsha University of Science and Technology, Changsha 410114, China

<sup>4</sup> School of Business, Hunan University, Changsha 410082, China

Correspondence should be addressed to Qiujun Lan; [lanqiujun@hnu.edu.cn](mailto:lanqiujun@hnu.edu.cn)

Received 22 January 2014; Accepted 8 April 2014; Published 13 May 2014

Academic Editor: Fenghua Wen

Copyright © 2014 Chuangxia Huang et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The value of a company's cash holdings is currently a hot issue in corporate finance research. Current studies have not reached a unified conclusion. Moreover, no one has ever studied that from the perspective of information asymmetry. However, there still exist disputes about the measurement of the degree of information asymmetry. Previous studies mostly adopt single index to analysis this issue, and the economic meaning it represents only reflects some information of asymmetric information, so it was one-sided and the conclusion also differ. Drawing on the market microstructure and the index of information asymmetry of managers and investors, this paper constructs a new proxy for information asymmetry based on the principal component analysis. We find that a company's value of cash holdings decreases increasingly with its level of information asymmetry, and the relationship between information asymmetry and the value of cash holdings is nonlinear.

## 1. Introduction

As early as 1970, Fama [1] proposed an efficient market hypothesis in his research on resource allocation, which implied that investors, without involving additional cost, can easily get the equal amount of information of equal quality as the management of the company. But in the real market environment, the information is asymmetric, and the company management has a better understanding of the company's development and risk and other information than external investors. Jensen and Meckling [2] proposed an agency theory, insisting that, because of information asymmetry and bounded rationality, the agency problem arises between shareholders and the company management, and the information asymmetry may have an effect on corporate cash holdings. Due to the fact that its managers have more information than external investor, so Myers and Majluf [3] proposed investment information asymmetry theory that when the capital market is not perfect enough, where information asymmetry exists between the company's

external investors and insiders, investors would require the company to pay a premium for external funds, which makes external financing more expensive than internal financing. Jensen [4] proposed free cash flow theory to explain the management's motivation to hold cash from the perspective of the agency costs and maintained that the management may possibly make some low-value investments out of self-interest motivation, leading to a decrease in the value of cash holdings. Later, many scholars began to engage in research in this field, which makes the study of cash holdings values gradually become one of the mainstreams of current corporate finance research.

Researchers have not reached consensus on the relationship between the information asymmetry and the value of cash holdings. On one hand, Jensen and Meckling [2] put forward the principal-agent theory based on the information asymmetry between shareholders and the management and their bounded rationality. Because of the information asymmetry and lack of adequate supervision, managers may not always act in accordance with the clients' goal which is the

maximizing interest. And that is where the agency costs come from. Jensen [4] believes that problems caused by the agent moral hazard will become very serious cash flow problems because the company's cash assets are most likely to be abused by the management, and they may use it for their own self-serving through some wasteful investment or the so-called empire building. By doing so, the value of cash held by the company will be reduced. Harford [5] suggests that cash-rich companies are more inclined to engage in acquisitions, but these irrational acquisitions tend to decrease the value of the company, which supports Jensen [4]. By directly calculating the value of cash held by a company, Faulkender and Wang [6] and Pinkowitz et al. [7] proved that the marginal value of each \$1 increase in a company is less than \$1, and this loss can partly be attributed to agency costs. Thereafter, increasingly more scholars [8–10] involve themselves in this discussion. On the other hand, Myers' information asymmetry theory, which is based on the pecking order model of corporate financing, believes the large cash assets a company holds can help avoid the increase of external financing costs due to the information asymmetry, which in turn increase the company's value as a result. Later, a large number of scholars have drawn a similar conclusion [10–12]. Mikkelsen and Partch [13] find that a large sum of cash can lead to better performance due to lower external financing costs and that a company that constantly holds a large amount of cash does not necessarily cause the conflict of interests between the management and shareholders. Dennis and Sibilkov [10] find that cash holdings allow the company to carry out meaningfully value-adding investment and those companies facing financing constraints will forfeit such investment opportunities due to information asymmetry. Despite that the academic debate of the theory of information asymmetry and the principal-agent theory sparked scholars' enthusiasm about studying cash holdings value, the conclusions of empirical studies of the cash holding value varied, and no consensus has been reached.

The size of cash holdings is an important financial decision. Different motives for cash holdings will generate disparate efficiency of utilizing the cash. Various scholars put forward different theories for the value of cash holdings from different theoretical perspectives, among which some draw on the agency theory, while some others derived from the information asymmetry theory. It is still not conclusive as to whether cash holdings can enhance or impair the cash value. Previous studies mostly studied and analyzed corporate governance [12], diversification [14, 15], capital market [16], market competition [17], and so forth. For example, Pinkowitz and Williamson [16] showed that there were negative correlations between the financing leverage, the size of cash holdings, and the value of cash holdings. Up to now, few studies about the value of cash holdings are made from the perspective of information asymmetry, and there is no consensus regarding a measure for information asymmetry. It is not applicable to directly borrow foreign indicators for the Chinese market. It is believed that the information asymmetry causes higher financing costs and high agency costs, but they used the scale of a company as the proxy for information asymmetry, which is not a typical practice, and obviously not a direct measure of information

asymmetry [18, 19]. Korajczyk et al. [20] built a time-varying information asymmetry model and proposed that the adverse selection caused by information asymmetry has an important effect on corporate financing. This conclusion has been supported by many scholars [21–24]. However, Fama and French [25] and Leary and Roberts [26] found that the pecking order theory cannot find a clue to the company's financing decision problems in the case of a high level of information asymmetry. Chung [27] showed that for a company with high level of information asymmetry cash holdings cannot lift the company's value. Obviously, adverse selection and moral hazard caused by the information asymmetry make the company experience higher financing costs and constraints in the capital markets, and different financing constraints lead to different values of cash holdings. Therefore, information asymmetry becomes an important factor in studying the value of cash holdings.

However, it is rather difficult to quantify information asymmetry. Researchers have made much exploratory research and testing on proxy variables of information asymmetry. Different indexes for measuring information asymmetry generated disparate study results; meanwhile, they also left space and opportunity for further studies. Previous studies mostly adopt single index to analysis, so the problem is whether we can measure the level of information asymmetry and the agency costs of the company from multiple angles and then analyze the value of cash holdings. In order to solve this problem, we take listed companies in China as samples and try to explore the effect of information asymmetry on the value of cash holdings with a couple of theories. The basic approach is to explain the effect of information asymmetry on the value of cash holdings from the perspective of the marginal value of cash holdings: on the one hand, a relatively high level of information asymmetry implies a relatively high degree of financing constraints. When the company is faced with a high degree of financing constraints, the management may have held a large amount of cash in the previous period for self-serving purposes, which contributes to decreasing in the value of cash holdings. On the other hand, the higher the level of information asymmetry a company keeps, the higher financing cost the company encounters with or faces, and the smaller available cash flow is, so it is reasonable to consider that the cash held in firm has a positive effect on the company.

In order to reflect the degree of information asymmetry comprehensively and systematically, we take a number of influencing factors into account. We know that every factor reflects some information of the asymmetric information in different extent and have a certain correlation between these variables, so the data information can overlap to a certain extent. In order to avoid the increase of calculation and complexity of analysis due to the variable increase, we use the principal component analysis to achieve the purpose of dimension reduction. Specifically, this paper selects proxy variables for information asymmetry from the perspectives of market microstructure, earnings management, and financial characteristics and then adopts the principal component analysis to form a composite index to explore the relationship between information asymmetry, agency costs, and the value of cash holdings. Our study shows that (1) the value of a

company's cash holdings rises with the increase of cash held in firm, but the marginal value of cash will diminish due to the increase in the cash holdings; (2) information asymmetry has a negative impact on the company's cash value, and the higher the level of information asymmetry a company stays at, the lower the value of its cash holdings is. With the increase in terms of the level of information asymmetry, the marginal value of cash discounts further, and (3) the relationship between the agency costs caused by information asymmetry and the value of cash holdings is not a simple monotonous one.

This study contributes the following to the body of the existing literature: (1) this paper, from the perspective of information asymmetry, employs data of Chinese listed companies to probe into the relationship between information asymmetry and the value of cash holdings which presents meaningful conclusions. Information asymmetry and the value of cash holdings are significantly negatively correlated—the higher the level of information asymmetry the lower the value of the cash holdings; moreover, this paper has a full discussion of information asymmetry and the value of cash holdings in the context of Chinese characteristics, pointing out the deep-seated reasons for this phenomenon, which makes a marginal contribution to understanding the problem of the relationship between China's agency problem and value of cash holdings; (2) according to the particularities of China's capital market, a new and more comprehensive index for information asymmetry is proposed. Some scholars quantitatively analyzed factors which take effects on the value of cash holdings, and some others qualitatively studied the economic effects of financial characteristics and corporate governance on cash holdings, yet no one has conducted comprehensive study on the value of cash holdings based on various perspectives. However, this paper selects liquidity, earnings quality, and financial characteristics as proxy variables for information asymmetry and then chooses the first principal component as the proxy based on the principal component analysis. In comparison to previous research [28, 29], the information asymmetry proxy in this paper is more comprehensive and also closer to the essence of information asymmetry, which is capable of revealing the mechanism of the effect of information asymmetry on the value of cash holdings. This measure is an important supplement of the existing measure of information asymmetry in China, and (3) this paper enriches the cross-disciplinary research on the microstructure of market and corporate finance. O'Hara [30], Madhavan [31], and Lipson [32] point out that the market microstructure needs to be combined more with researches in other financial fields to highlight its economic significance. At present, China's scholars mainly study this problem from perspectives of corporate governance, diversification, capital market, and market competition; this paper tries from the market microstructure and corporate finance to rediscover the interactive relationship between information asymmetry and the value of cash holdings. This study will help promote the interdisciplinary research from the market microstructure and corporate governance, making up for the deficiency in the area of agency theory in developing countries.

This paper is organized as follows: the second part consists of the theoretical analysis and research hypotheses; the third part concerns the study design; the fourth part presents the empirical results and analyses; the fifth part shows the result of robustness test and finally concludes the study.

## 2. Theoretical Analysis and Research Hypotheses

Recently, scholars domestic or abroad mainly view the effect on corporate value creation which is caused by cash holding from two different angles: on the basis of the principal-agent theory, some researchers believe that corporate executives or controlling shareholders have the motivation to hold a large amount of cash for self-interest, which is detrimental to corporate value; others see it differently in terms of information asymmetry. They argue that a large amount of cash enables the company to avoid external financing costs induced by information asymmetry between the management and potential shareholders, which in turn promotes the company's value.

Jensen and Meckling [2] proposed the principal-agent theory. On the premise of information asymmetry, the corporate management, compared with external investors, has inside information. Due to information asymmetry and bounded rationality, agents may not always act for the goal of maximizing principal's interest. Agency theory holds that the decrease in format of the value of cash holdings is caused by the agency problem. The corporate management or controlling shareholders hold a large amount of free cash flow to seek their own benefits, which is detrimental to the corporate value [33]. From the perspective of agency costs which exists between shareholders and the management, Jensen [4] put forward free cash flow theory to explain the motivation of the management to hold cash. The theory proposes that holding a large amount of cash is consistent with the management's interest rather than shareholders'. That is to say, due to information asymmetry, the management is motivated to avail them of the corporate control for self-interest. When the company performs poorly, the management can still whitewash earnings through managing the surplus held in company.

Myers and Majluf [3] propose the classic pecking order theory, arguing that companies prefer internal financing rather than external financing. As the company management has inside information, external investors would believe that the equity asset tends to be overpriced due to information asymmetry and thus ask for certain premium compensation. As a result, external financing cost would increase. The company either accepts the costly external financing or just gives up a value-enhancing investment project. Corporate cash holdings can effectively avoid external financing transaction costs as well as the cost of information asymmetry and enable a company to seize good investment opportunities or repay mandatory debts. The information asymmetry theory of cash holdings was developed on the basis of Myers's [34] pecking order theory. It holds that the information

asymmetry in the capital market makes it hard to launch external financing as it requires higher indirect financing costs. Therefore companies need more liquid assets to meet investment needs. In addition, when companies face financing constraints, cash reserve can be a buffer so as not to lose promising investment opportunities. Taking internal funds helps to reduce financing costs, which enables cash holdings to enhance corporate cash value.

Clearly, external financing costs affect companies' capital investment and cause underinvestment, where cash holdings will have positive effect on. Therefore, when having more cash flow at a certain period, companies will reserve more cash to save financing costs. Generally speaking, companies with large cash holdings would undertake positive NPV projects instead of missing investment opportunities because of the lack of funds. However, in the presence of agency conflicts, high level of cash holdings becomes the easiest way for the management to gain personal benefits, leading to reduction of the value of cash holdings, which has been proved empirically. Harford [5] shows that companies with sufficient cash tend to engage in merger and acquisition, which in turn results in reduction of value of their cash holdings. Faulkender and Wang [6] and Pinkowitz et al. [7] ascribe the value reduction of an extra dollar of cash holdings to agency costs. Wang Ligang, a Chinese scholar, proposes in his doctoral thesis [35] that, due to agency costs, any increase in cash holdings has a negative impact on a company performance. Yang Xingquan and Zhang Zhaonan [36] argue that China's listed companies cash holdings were worth less than book value, indicating that serious agency problem exists in China's listed companies and legal protection for investors is weak. Accordingly, this paper makes the following hypotheses.

*Hypothesis 1.* The value of cash holdings is negatively correlated with information asymmetry. The higher the level of information asymmetry is, the lower the value of a company's cash holdings will be.

Different from Jensen [4], Myers and Majluf [3] find that corporate financing constraints are positively correlated with the value of cash holdings. Given that Myers and Jensen and others obtained diametrically opposite conclusions on information asymmetry, we have reasons to speculate that information asymmetry is not simply linear with the value of cash holdings. In fact, when companies face serious financing constraints, they need to pay for high cost to launch external financing. In order to not miss promising projects or not to get their positions threatened, the management is inclined to hold more cash in early period as a result of reverse selection. That is to say, the management holds spare cash for self-interest because of the existence of agency costs, but the spare cash produces no economic benefits. Hence, the marginal value of these cash holdings will be declined because of high level of information asymmetry; when companies face low financing constraints and easily get funded, the management does not have to hold too much cash to cope with agency costs. In this case, cash holdings are what companies need for normal business

activities; therefore, the value of cash holdings will not be reduced.

*Hypothesis 2.* The level of information asymmetry has a nonlinear relation with the value of cash holdings. When a company is faced with severe financing constraints, the value of cash holdings is reduced due to the agency cost. While, when they are in less financing constraints times, holding cash will have a positive impact the value of company's cash holdings.

### 3. Research Design

*3.1. Sample Selection and Data Sources.* The sampling window for this paper ranges from 2007 to 2011, with the data in 2006 as those at one period lag. The following are the concrete screening principles and processes: (1) the nonfinancial and noninsurance companies listed in Shanghai securities regulatory commission and Shenzhen securities regulatory commission are selected; (2) the companies which issue A share, B share, or H share simultaneously are eliminated; (3) companies which are listed in or after 2007 are removed; (4) the companies which have undergone special treatment (ST), special treatment with \* (\*ST), or have been suspended and delisted and whose net asset value or primary business revenue is negative are eliminated; (5) the companies which ration shares, increase issues in stocks or issue convertible bonds are eliminated; (6) companies with data missing and abnormal changes are dismissed.

The final samples from 2007 to 2011 used in the paper are 588 companies, with a total of 2940 samples. The data are mainly taken from CSMAR data base (<http://www.gtarsc.com/>), and Excel, Eviews, and Stata software are used in the analysis procedure:

information asymmetry index and its structure,  
measurement of information asymmetry.

The paper selects illiquidity ratio, liquidity ratio, discretionary accruals, and earnings before interest and tax in market microstructure theory and corporate finance theory to measure the information asymmetry level.

Information asymmetry and liquidity are important components in market microstructure, and adverse selection costs (namely, information asymmetry cost) are key factors influencing the market liquidity (namely, transaction cost). Two indicators are selected in the paper which is comparatively better to measure liquidity-illiquidity ratio [37] and liquidity ratio [38] to study the effect of liquidity on information asymmetry. Illiquidity ratio is a comparatively perfect indicator to measure liquidity in two-dimension width and depth.

The calculation method is  $ILL_{t,d}^i = (1/N_t^i) \sum_{d=1}^{N_t^i} |r_{t,d}^i|/v_{t,d}^i$ , where  $ILL_{t,d}^i$ ,  $r_{t,d}^i$ , and  $v_{t,d}^i$  denote the illiquidity, the return rate, and the trading volume of stock  $i$  in trading day  $d$  in year  $t$ , respectively, and  $N_t^i$  is the number of market days in  $t$  year. This shows when the liquidity of the stock is at the high level (adverse selection cost in the low level), huge trading volume can only produce a small change in the stock price. So the larger the adverse selection level is, the larger the ILL is. The



liquidity ratio can be used to measure the turnover rate, and the calculation method:  $TURN_{t,d}^i = (1/N_t^i) \sum_{d=1}^{N_t^i} v_{t,d}^i / cv_{t,d}^i$ , where  $TURN_{t,d}^i$ ,  $cv_{t,d}^i$  denotes the liquidity and the number of shares of stock  $i$  traded on day  $d$  in year  $t$ , and other variables denotes the same as the former formula. Turnover rate measures the liquidity from the aspect of depth, which is widely used in empirical studies at home and abroad and thus suitable for all markets. Besides, since not all shares of a stock can be circulated in the Chinese stock market, the turnover rate of a stock is in fact that for the circulating shares in this paper and anticipates that there is a negative correlation between the adverse selection cost of the stock and the turnover rate.

Information asymmetry level can be measured in a number of ways, among which the quality of the accounting information reflects it directly. Not only does accounting information level reflect the level of information asymmetry of a company, but it reacts upon it as well. The quality of earnings has been the most studied subject in empirical studies on the accounting information quality. Earnings quality is a kind of nondiversifiable information risk, and investors will price systematically its influence on the capital market [39]. Drobertz et al. [40] find that the earnings deviation from analysts will devalue the company's cash holdings. Xiang Kai [41] holds that the earnings quality comprehensively reflects the transparency of the accounting information, which can have vital effect on agency conflicts and financing constraints. They regard the earnings quality as the breakthrough point to investigate the value of cash holdings and then find the company with better earnings quality has higher value of cash holdings. Quality accounting information can lower the level of information asymmetry among the management, shareholders, and investors and reduce the risk of adverse selection cost and liquidity risk. This will in turn lower the nondiversifiable information cost and pricing cost for investors and increase the liquidity of the stock, thus reducing the company's financing cost [42]. Companies with high accounting information quality can have easy access to external funds with low cost, and therefore there is no need to retain a large amount of cash to support its investment programs. So the amount of cash held in company will be reduced. Because discretionary accruals can be adopted to measure the earnings quality of an individual company, it has been widely used due to its reasonability and conciseness. Based on previous studies [43, 44], the paper selects the quality of discretionary accruals as the proxy variable for the accounting information quality [45]. Defond [46] finds that the Jones model with time series correction performs poorer than the Jones model with industry cross-section correction, and therefore this paper adopts the industry cross-section corrected Jones model to calculate accruals. Besides, Bank and Lawrenz [47] utilize a company's EBIT-value instead of the asset value as the state variable to investigate the effect of information asymmetry between the management and investors on the optimal capital structure decision. Guoqi and Shizhuan [48] believe EBIT can be used to evaluate the profitability of a company and examine the achievements of the management. As a result, profit before interest and tax

TABLE 1: Raw information asymmetry correlation coefficient.

	ASY	ILL	TURN	DAC	EBIT
ASY	1.0000				
ILL	0.6575***	1.0000			
TURN	-0.8542***	-0.2219***	1.0000		
DAC	0.0032	0.0220	0.0236	1.0000	
EBIT	0.2557***	-0.1572***	-0.1889***	0.0253	1.0000

Note: \*\*\*, \*\*, and \* denote the 1%, 5%, and 10% significance level, respectively.

is chosen as the proxy variable for information asymmetry between the management and investors, and its calculation is the indirect method which is extensively adopted in China: net profit + income tax + interest expenditure.

*3.2. Construction of Information Asymmetry Index.* Four indexes have been obtained to measure the information asymmetry by the methods mentioned above. The four raw information asymmetry indexes have been treated by the principal component analysis filtering out the idiosyncratic noise in raw the information asymmetry indexes but retain the common element, namely, information asymmetry.

Table 1 shows the correlation coefficient of all raw information asymmetry. As can be seen from it, there are positive and negative correlations between all information asymmetry indexes and the resultant information asymmetry proxy variables, which present comparatively complex relationships. For instance, there is a positive correlation between ILL and ASY and a significant negative correlation between TURN and ASY. The above correlation results, on the one hand, verify the reasonability of the raw information asymmetry and, on the other hand, the complicated interaction among all raw information asymmetry indexes in Chinese Capital Markets.

*3.3. Models and Research Variables.* The economic effect of cash holdings can be qualitatively investigated from the role cash holdings play in achieving company performance. Quantitatively, it can be estimated with the marginal value of cash holdings-the value created for shareholders by increase every 1 Yuan RMB in a company's cash holdings, and the conclusion of the two kinds of research methods should be consistent. Chinese researchers Gu and Sun [49] modify the classical value regression model from Fama-French [50], to investigate the marginal value of cash holdings. However, Faulkender and Wang [6] argue that the classical value regression model of Fama-French [50] does not include factors such as risk and lagged variables. Therefore, this paper uses the model employed by Faulkender and Wang [6] to research the effect of a company's financial characteristics on cash holdings' marginal value. Dittmar and Smith [12] also adopt the model in studying the effect of corporate governance on the value of cash holdings. Table 2 shows all the definitions of the research variables. Owing to the unavailability of R&D

TABLE 2: Definitions of research variables.

Variable	Definition	Calculation method
$r_{i,t} - R_{i,t}^B$	$r_{i,t}$ is the actual rate of return in an accounting year, and $R_{i,t}^B$ is benchmark rate of return	$r_{i,t}$ is the actual annual rate of return on the stock with dividend included in the return, and $R_{i,t}^B$ is the circulation-market-value-weighted actual annual rate of return on the industry
$E_{i,t}$	Earnings	
$NA_{i,t}$	Net asset	Difference between total assets and cash assets
$I_{i,t}$	Interest expense	Measured by financial expenses
$D_{i,t}$	Common stock dividends	Measured by cash dividends
$C_{i,t-1}$	Cash at previous year end	
$L_{i,t}$	Market value financial leverage	Total liabilities/total asset
$NF_{i,t}$	Net financing	Net cash inflow from financing
High	High financial constraints	Takes 1 for the top 20% ASY values, 0 for others
Low	Low financial constraints	Takes 1 for the bottom 20% ASY values, 0 for others

expenditure index, the model is adjusted slightly in the paper as follows:

$$\begin{aligned}
r_{i,t} - R_{i,t}^B = & \beta_0 + \beta_1 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_2 \frac{\Delta E_{i,t}}{M_{i,t-1}} + \beta_3 \frac{\Delta NA_{i,t}}{M_{i,t-1}} \\
& + \beta_4 \frac{\Delta I_{i,t}}{M_{i,t-1}} + \beta_5 \frac{\Delta D_{i,t}}{M_{i,t-1}} + \beta_6 \frac{C_{i,t-1}}{M_{i,t-1}} + \beta_7 L_{i,t} \\
& + \beta_8 \frac{NF_{i,t}}{M_{i,t-1}} + \beta_9 \frac{C_{i,t-1}}{M_{i,t-1}} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_{10} L_{i,t} \\
& \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \varepsilon_{i,t}.
\end{aligned} \tag{Model 1}$$

Based on (Model 1), the calculation formula for cash holdings' marginal value is

$$\beta_1 + \beta_9 \left( \frac{C_{i,t-1}}{M_{i,t-1}} \right) + \beta_{10} L_{i,t}. \tag{1}$$

To measure the effect of information asymmetry on the value of cash holdings, the index  $ASY_{i,t}$  which is to indicate the information asymmetry level is added in the right side of (Model 1), and the (Model 2) is obtained as follows:

$$\begin{aligned}
r_{i,t} - R_{i,t}^B = & \beta_0 + \beta_1 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_2 \frac{\Delta E_{i,t}}{M_{i,t-1}} + \beta_3 \frac{\Delta NA_{i,t}}{M_{i,t-1}} \\
& + \beta_4 \frac{\Delta I_{i,t}}{M_{i,t-1}} + \beta_5 \frac{\Delta D_{i,t}}{M_{i,t-1}} + \beta_6 \frac{C_{i,t-1}}{M_{i,t-1}} + \beta_7 L_{i,t} \\
& + \beta_8 \frac{NF_{i,t}}{M_{i,t-1}} + \beta_9 \frac{C_{i,t-1}}{M_{i,t-1}} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_{10} L_{i,t} \\
& \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_{11} ASY_{i,t} + \beta_{12} ASY_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \varepsilon_{i,t}.
\end{aligned} \tag{Model 2}$$

These two models are basically the same, which can be calculated with the following formula:

$$\beta_1 + \beta_9 \left( \frac{C_{i,t-1}}{M_{i,t-1}} \right) + \beta_{10} L_{i,t} + \beta_{12} ASY_{i,t}. \tag{2}$$

In order to test (Model 2), the paper takes Qu Wenzhou [51] for reference and divides samples into three groups according to the distribution of the ASY values. Companies with the ASY values ranking among the top 20% are regarded as the high agency cost group (high), and companies with the ASY values ranking among the bottom 20% belong to the low agency cost group (low). Assign value 1 to  $High_{i,t}$  of the companies in high agency cost group and 0 to other companies. Assign value 1 to the  $Low_{i,t}$  of the companies in low agency cost group and 0 to other companies. In (Model 3),  $\beta_{11}$  is the change in terms of the cash holdings marginal value of the companies with high agency cost.  $\beta_{12}$  is the change in the cash holdings marginal value of the companies with low agency cost. According to Hypothesis 2, the cash holdings marginal value decreases in companies with high agency cost and decreases in companies with low agency cost. So this paper anticipates  $\beta_{11} < 0$  and  $\beta_{12} > 0$ :

$$\begin{aligned}
r_{i,t} - R_{i,t}^B = & \beta_0 + \beta_1 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_2 \frac{\Delta E_{i,t}}{M_{i,t-1}} + \beta_3 \frac{\Delta NA_{i,t}}{M_{i,t-1}} \\
& + \beta_4 \frac{\Delta I_{i,t}}{M_{i,t-1}} + \beta_5 \frac{\Delta D_{i,t}}{M_{i,t-1}} + \beta_6 \frac{C_{i,t-1}}{M_{i,t-1}} + \beta_7 L_{i,t} \\
& + \beta_8 \frac{NF_{i,t}}{M_{i,t-1}} + \beta_9 \frac{C_{i,t-1}}{M_{i,t-1}} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_{10} L_{i,t} \\
& \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_{11} \frac{\Delta C_{i,t}}{M_{i,t-1}} \times High_{i,t} + \beta_{12} \frac{\Delta C_{i,t}}{M_{i,t-1}} \\
& \times Low_{i,t} + \varepsilon_{i,t}.
\end{aligned} \tag{Model 3}$$

$\Delta x$  equals  $x_t - x_{t-1}$  in models in the paper, which is the increment of  $X$  from period  $t-1$  to period  $t$ . All the variables

TABLE 3: Statistics of the population distribution of ASY values.

Samples	Mean	Median	Min.	Max.	Std.
2007	-0.6395	-0.8345	-3.0800	4.8144	1.0288
2008	0.8006	0.7493	-3.3797	4.7013	1.1144
2009	-0.6905	-0.6934	-4.5196	3.1067	0.8605
2010	-0.0206	0.0145	-3.5360	5.0002	0.8119
2011	0.5500	0.5820	-3.0445	4.3691	0.7837

are standardized with the equity value of the company in the previous year, and this treatment enables the regression coefficient for the model variables to directly denote the effect of the unit cash change in holdings on shareholder value, namely, the marginal value of cash holdings.

## 4. Empirical Results and Analysis

*4.1. Descriptive Statistics.* From Table 3, we can see that the level of information asymmetry of listed companies is still very high from 2007 to 2011. But the difference in information asymmetry between companies is narrowing down, which may be due to improvements in the capital market and the completion of the reform of nontradable shares.

Table 4 shows the descriptive statistics of major variables. From the table we can see that the mean, the median, the minimum, the maximum, and the standard deviation of the excess return  $r_{i,t} - R_{i,t}^B$  are 0.1426, 0.0066, -1.7996, 7.2598, and 0.6992, respectively, which shows there is a big excess return difference among these sample companies, depending on industries and business scopes. The mean and the standard deviation of the incremental cash ( $\Delta C_{i,t}/M_{i,t-1}$ ) are 6.82% and 153.76%, respectively, while the mean and the median of the cash holdings ( $C_{i,t-1}/M_{i,t-1}$ ) are 31.05% and 25.72%, respectively, indicating that the incremental cash and the cash held in company of some of these listed companies are higher than that of the sample average. Besides, there are big difference in the cash held in company, the profitability, the level of incremental investment, and financing capability; the median of the level of the added dividend is 0, lower than the mean, indicating that over half of listed companies in our country do not pay dividends, and medium and small investors' power to require listed companies to return surplus cash are quite weak; the median of net financing is -0.0207; that is to say, more than half of the listed companies' net cash inflow from financing are negative, implying that few companies have financing opportunity to access cash inflow. The mean and the median of the financing leverage are 50.17% and 49.97%, respectively, showing that the distribution of the population is fairly symmetrical, while the standard deviation of 0.2905 means sample companies utilize financing leverage differently. According to comparison, American listed companies' mean and median of financing leverage are 27.78% and 22.65%, respectively, lower than those of China, which may be the result of relatively higher financing leverage  $L_{i,t}$  calculated with the equity market value, while the equity market value was reduced by the sluggish stock market before 2005.

Based on studies on the value of cash holdings, researchers at home and abroad have used different indexes as the criteria to grade the degree of financing constraints, such as company scale, dividend payout ratio, ownership concentration, and asset-liability ratio. Next, this paper will use some frequently applied criteria in traditional studies to examine the differences in ASY values grouped with those indexes mentioned in the preceding sentence. As is shown in Table 5, ASY values vary significantly with different company scale, dividend payout ratio, ownership concentration, and asset-liability ratio. For large scale companies, dividend paying companies, companies with higher ownership concentration, and companies with low asset-liability ratio, the level of information asymmetry is higher than that of small scale companies, nondividend paying companies, companies with lower ownership concentration, and companies with high asset-liability ratio; that is, the former types of companies are subject to higher financing constraints. Thus it can be seen that the information asymmetry index ASY in this paper can more comprehensively reflect the financing constraint of a company, which ultimately reflects its severity of the principal-agency problem in a company.

*4.2. Analysis of Multiple Regression Results.* In this paper we use least square method to carry out multiple regression analysis of cross-sectional data. The analysis results are shown in Table 6.

In (Model 1), the regression coefficient for cash increment ( $\Delta C_{i,t}/M_{i,t-1}$ ) is 0.5970 and is significant at the confidence level of 1%, which indicates that a 1 Yuan increase in cash holding of a listed company can only add 0.5970 Yuan for shareholder. There is a cash discount of about 40%. The coefficient for  $(C_{i,t-1}/M_{i,t-1}) \times (\Delta C_{i,t}/M_{i,t-1})$  is 0.0112, but not significant, meaning that, in general, the level of cash held in company cannot increase a company's value of cash holdings. This differs from the research results of Faulkender and Wang [6]. The coefficient for  $L_{i,t} \times (\Delta C_{i,t}/M_{i,t-1})$  is -0.8692 and is significantly negative, meaning the value of cash holdings decreases with an increase in the leverage level. To listed companies in China, the actual leverage level has direct impacts on the value of cash. So companies with a high leverage level will use the cash increment to pay debts and interests, while companies with a low leverage level will invest them into projects with a negative net present value. From the sample regression results, we can estimate the average value of cash holdings of listed companies in China between 2007 and 2011 is  $0.5970 + 0.0112 \times 0.3105 - 0.8692 \times 0.5017 = 0.1644$ . This indicates that there is a discount in the value of cash holdings of these companies. Specifically, the value of 1 Yuan increase in cash holding actually is 0.1644 Yuan with a big discount.

Comparing (Model 1) and (Model 2), we can see that the model's overall significance and goodness of fit are improved dramatically and significant at the 1% confidence level, after the information asymmetry variable is introduced into the model. This indicates that information asymmetry is an important factor affecting the value of cash holding. The regression coefficient for ASY is -0.1049, significantly negatively correlated with the value of cash holdings at the

TABLE 4: Descriptive statistics of major variables.

Variable	Mean	Median	Min.	Max.	Std.
$r_{i,t} - R_{i,t}^B$	0.1426	0.0066	-1.7996	7.2598	0.6992
$\Delta C_{i,t}/M_{i,t-1}$	0.0682	0.0174	-10.261	80.339	1.5376
$\Delta E_{i,t}/M_{i,t-1}$	0.0630	0.0119	-4.4618	80.165	1.5281
$\Delta NA_{i,t}/M_{i,t-1}$	0.4402	0.1099	-8.6546	613.83	11.439
$\Delta I_{i,t}/M_{i,t-1}$	0.0045	0.0006	-0.6003	4.0695	0.0883
$\Delta D_{i,t}/M_{i,t-1}$	1.31E - 11	0.0000	-7.55E - 10	3.70E - 08	6.89E - 10
$C_{i,t-1}/M_{i,t-1}$	0.3105	0.2572	-14.544	4.6753	0.4100
$L_{i,t}$	0.5017	0.4997	0.0071	7.1440	0.2905
$NF_{i,t}/M_{i,t-1}$	-0.0347	-0.0207	-107.39	15.639	2.0522
$(C_{i,t-1}/M_{i,t-1}) \times (\Delta C_{i,t}/M_{i,t-1})$	0.0110	0.0019	-121.21	90.433	2.8233
$L_{i,t} \times (\Delta C_{i,t}/M_{i,t-1})$	0.0442	0.0059	-6.5944	53.080	1.0288
$ASY_{i,t}$	-0.0004	0.0250	-4.5196	5.0002	1.1080
$ASY_{i,t} \times (\Delta C_{i,t}/M_{i,t-1})$	0.0410	-0.0005	-7.3845	130.01	2.4178
$(\Delta C_{i,t}/M_{i,t-1}) \times High_{i,t}$	2.2131	0.0000	0.0000	6454.4	119.06
$(\Delta C_{i,t}/M_{i,t-1}) \times Low_{i,t}$	0.0065	0.0000	0.0000	1.1438	0.0442

Note: statistics in the table are of relevant variables, including the mean, median, minimum, maximum, and standard deviation.

TABLE 5: ASY based on different criteria.

Criteria	Sample <sup>ⓐ</sup>	Observations	Mean (ASY)	Std.	t-test
Scale	Large	588	0.22131	1.0004	-17.903***
	Small	588	0.10639	1.2406	
Dividend payout ratio	Dividend	1485	0.19240	1.09633	-35.853***
	Nondividend	1455	-0.19637	1.08525	
Ownership concentration	High	588	0.4536	1.1573	-12.552***
	Low	588	-0.4540	0.9090	
Asset-liability ratio	High	588	-0.0195	1.1493	-53.561***
	Low	588	0.1598	1.1214	

Note: \*\*\* denotes significance at the 1% significance level.

<sup>ⓐ</sup> Companies are ordered in company scale, with the top 20% as the group of large scale companies and the bottom 20% as the group of small scale companies; dividend paying ratio is decided by whether companies paid dividend in the previous year or not, and they are classified as the dividend paying group and the nondividend paying group; ordered in the ratio of total shares held by the top 5 shareholders, top 20% companies are classified as the group of high ownership concentration, and the bottom 20% as the group of low ownership concentration. Arranged in descending order of the asset-liability ratio, the top 20% of the companies are defined as the group with high liabilities and the bottom 20% as the group with low liabilities.

1% confidence level, confirming Hypothesis 1 that the value of cash holdings will decrease with an increase in the information asymmetry level. This differs from the conclusion by Myers and Majluf [3] that large amounts of cash held by companies to avoid external financing cost induced by information asymmetry do not go to valuable investments, thus not promoting company values. The higher the level of information asymmetry is, the harder for external investors to supervise the actions of the management, which will cause serious free cash flow problems. Out of self-serving motives, the management may make some low value, rather than high-value investments, causing reduction in the value of cash holdings. This agrees with the conclusion by Jensen [4] that the value of cash holdings will decrease with an increase in the information asymmetry level, and high information asymmetry level will cause impairment to the cash value of a company. Moreover, in (Model 2), the coefficient for  $ASY_{i,t} \times (\Delta C_{i,t}/M_{i,t-1})$  is -0.2165 and is significant at the 1% confidence level, indicating that the value of cash holdings

suffers a further discount with the increase in information asymmetry. Now, we can estimate the marginal value of cash brought to shareholders through 1 Yuan cash increases from an information asymmetry perspective:  $0.6525 + 0.0078 \times 0.3105 - 0.8661 \times 0.5017 - 0.2165 \times (-0.0004) = 0.2205$ .

Regression results show that in China 1 Yuan in cash of listed companies creates value less than 1 (a big discount). Chinese listed companies' agency costs for cash holdings exceed the advantages that cash holdings bring in overcoming the costly expenditure for external financing; that is, Chinese companies' cash holding is an act of value destruction rather than of value creation. This reveals serious agency problems on the part of China's listed companies. The management and the controlling shareholders of a company are very likely to accumulate a large amount of cash in the company for their own interest and waste them for "in-service consumption," "empire building," or engage in "affiliate transactions" to transfer the company's cash assets, thereby reducing the role of cash holdings in creating value, which impairs the interests



TABLE 6: Multiple regression results.

Variable	(Model 1)	(Model 2)	(Model 3)
Constant	0.0702** (2.4376)	0.0578** (2.0491)	0.0735** (2.5586)
$\Delta C_{i,t}/M_{i,t-1}$	0.5970*** (4.2802)	0.6525*** (4.7643)	0.5061*** (3.6025)
$E_{i,t}/M_{i,t-1}$	0.2862*** (5.4522)	0.2557*** (4.9545)	0.2902*** (5.5509)
$NA_{i,t}/M_{i,t-1}$	-0.0355*** (-3.5361)	-0.0192* (-1.8939)	-0.0218** (-2.1271)
$I_{i,t}/M_{i,t-1}$	-0.0538 (-0.1570)	0.5377 (1.5486)	0.4179 (1.1508)
$D_{i,t}/M_{i,t-1}$	$7.30E + 07$ (0.6066)	$2.17E + 08^*$ (1.7662)	$3.26E + 08^{**}$ (2.4663)
$C_{i,t-1}/M_{i,t-1}$	-0.0746* (-1.8078)	-0.0395 (-0.9708)	-0.0872** (-2.0903)
$L_{i,t}$	0.1836*** (4.0795)	0.1713*** (3.8846)	0.1705*** (3.8057)
$NF_{i,t}/M_{i,t-1}$	0.0599*** (2.6960)	-0.0193 (-0.7423)	0.0139 (0.5652)
$(C_{i,t-1}/M_{i,t-1}) \times (\Delta C_{i,t}/M_{i,t-1})$	0.0112 (1.0119)	0.0078 (0.7187)	0.0267** (2.2380)
$L_{i,t} \times (\Delta C_{i,t}/M_{i,t-1})$	-0.8692*** (-4.3652)	-0.8661*** (-4.4402)	-0.6723*** (-3.3519)
$ASY_{i,t}$		-0.1049*** (-9.1320)	
$ASY_{i,t} \times (\Delta C_{i,t}/M_{i,t-1})$		-0.2165*** (-5.3150)	
$(\Delta C_{i,t}/M_{i,t-1}) \times High_{i,t}$			-0.3688*** (-4.1401)
$(\Delta C_{i,t}/M_{i,t-1}) \times Low_{i,t}$			0.6514*** (3.9512)
$F$	7.5288***	17.0805***	9.4311***
Adj. $R^2$	0.0217	0.0616	0.0333

Note: the numerical value in parentheses is the  $t$  statistic for the coefficient; \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% significance level.

of medium and small shareholders. Therefore, compared with the information asymmetry theory, we believe that the agency theory is more suitable to explain the behavior of cash holdings of Chinese listed companies.

The regression results of (Model 3) present that the coefficient for  $(\Delta C_{i,t}/M_{i,t-1}) \times High_{i,t}$  is significantly negative, while that for  $(\Delta C_{i,t}/M_{i,t-1}) \times Low_{i,t}$  is significantly positive. This fact shows that the relationship between the value of cash holdings and information asymmetry is not a monotonic one. When the information asymmetry level is very high, the value of cash holdings will be reduced and vice versa. When companies are faced with high financing constraints, due to the high external financing costs, the management, out of their motive of self-serving (agency costs), tends to reserve much cash at an earlier stage; on the other hand, investors are rendered unable to oversee the behavior of the management, and thus the management will be more likely to manipulate the company's free cash flow for self-interest with ease due to the high level of information asymmetry. So the value of cash holding will be still much lower, which is consistent with Jensen [4]. But at the same time, we find that companies with low agency costs have a higher value of cash holding. This is similar to the empirical results of Myers and Majluf [3].

When there exist external financial frictions, the higher the cost of external financing is, the greater the value of cash holdings is. Particularly when companies face more valuable growth opportunities, this positive relationship will become more apparent. Generally, a high level of cash holdings will enable companies to seize opportunities to undertake projects with positive NPVs instead of losing investment opportunities because of a lack of capital. However, in the presence of agency conflicts, a high level of cash holdings is the handy tool for the management to seek personal gains, which results in the reduction in the value of cash

holdings. Fama [1] proposes the efficient market hypothesis, believing that, due to inconsistent utility functions for the management and external investors of a company, the management may act, out of selfishness and self-interest of homo economicus, in deviation from the goal for interests of investors, concealing or exaggerating some information to aggravate information asymmetry and exploit their operation rights and controlling power to infringe on investors' interests [2, 33]. Meanwhile, Jensen [4] proposes the free cash flow hypothesis to explain the management's motive to hold cash. He believed that holding a large amount of cash was consistent with the interests of the company management but inconsistent with that of shareholders. The management has incentives to use their controlling right for their own personal interests thanks to information asymmetry. When a company is not doing well, the management can also whitewash earnings by managing earnings through the cash held. As a result, it is difficult for external investors to supervise the management's behavior, and managers will seek to maximize their own interests and make investment decisions deviating from the objective of maximizing the interests of enterprises by investing the company's free cash into projects that will bring in nonmonetary benefits, such as enlarging the scale of the enterprise, or managers may be keen on building their own corporate empire or diversifying investments to obtain personal prestige, power, status, remuneration, and other additional personal incomes, which will cause reduction in the value of corporate cash.

To sum up, based on empirical studies of the market microstructure theory and empirical evidence of the finance theory, the information asymmetry between the management and investors impairs the value of cash holdings of listed companies in China. The management of listed companies in China has more insider information than external investors,

TABLE 7: Test result of robustness.

Variables	regression (4)	regression (5)	regression (6)
Constant	0.1124*** (2.9497)	0.0755*** (2.62645)	0.0651** (2.2665)
$\Delta C_{i,t}/M_{i,t-1}$	0.8683*** (5.5521)	0.62785*** (4.51225)	0.5006*** (3.5540)
$E_{i,t}/M_{i,t-1}$	0.2820*** (5.3858)	0.2607*** (4.8651)	0.2799*** (5.3469)
$NA_{i,t}/M_{i,t-1}$	-0.0189* (-1.7451)	-0.0064 (-0.5447)	-0.03079*** (-3.0505)
$I_{i,t}/M_{i,t-1}$	0.2321 (0.6659)	0.3492 (0.9529)	-0.1075 (-0.3149)
$D_{i,t}/M_{i,t-1}$	2.36E + 08* (1.8275)	5.25E + 08*** (3.6124)	9.30E + 07 (0.775008)
$C_{i,t-1}/M_{i,t-1}$	-0.0994** (-2.3696)	-0.1046** (-2.5190)	-0.0649 (-1.5677)
$L_{i,t}$	0.1817*** (4.0469)	0.1750*** (3.9046)	0.1738*** (3.8708)
$NF_{i,t}/M_{i,t-1}$	-0.0034 (-0.1231)	-0.0330 (-1.1746)	0.0588*** (2.6517)
$(C_{i,t-1}/M_{i,t-1}) \times (\Delta C_{i,t}/M_{i,t-1})$	0.0240** (2.0711)	0.0249** (2.0590)	0.0088*** (0.7899)
$L_{i,t} \times (\Delta C_{i,t}/M_{i,t-1})$	-0.7798*** (-3.9004)	-0.7918*** (-3.9506)	-0.7773*** (-3.8939)
ILL <sub><i>i,t</i></sub>	-0.5230 (-1.4546)		
ILL <sub><i>i,t</i></sub> $\times (\Delta C_{i,t}/M_{i,t-1})$	-4.5138*** (-3.8139)		
High <sub><i>i,t</i></sub>		-0.1598 (-1.3530)	
$(\Delta C_{i,t}/M_{i,t-1}) \times \text{High}_{i,t}$		-0.0061*** (-3.1947)	
Low <sub><i>i,t</i></sub>			0.5702*** (2.9534)
$(\Delta C_{i,t}/M_{i,t-1}) \times \text{Low}_{i,t}$			0.5338 (1.5681)
F	7.7745***	8.9657***	8.1677***
Adj. R <sup>2</sup>	0.0270	0.0315	0.0284

Note: the numerical value in parentheses is the *t* statistic for coefficients; \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% significance level, respectively.

which makes external financing more expensive than internal financing. Investors will require the company to pay a premium for utilizing external capital, causing external financing more costly and forcing the management to hold a large amount of cash [52].

## 5. Robustness Test

(Model 2) is constructed based on the first principal component from the four indexes, utilizing it as the proxy variable of information asymmetry. In order to further prove the validity of the conclusion, the noncurrent ratio ILL is used as the proxy variable of information asymmetry to test the robustness of (Model 2). To make the three conclusions more general and more convincing,  $ASY_{i,t}$  in (Model 2) will be replaced by  $\text{High}_{i,t}$  and  $\text{Low}_{i,t}$  to test the robustness of (Model 3).

In general, the regression results of all models are basically robust. The results of regression (4) show that the value of cash holdings will decrease with the rise in the level of information asymmetry, which is consistent with the regression results of (Model 2). Regression (5) shows that when using the top 20% of the highest level of information asymmetry as the proxy variable, it has a significantly negative correlation with the value of cash holdings, and this is consistent with the coefficients of  $(\Delta C_{i,t}/M_{i,t-1}) \times \text{High}_{i,t}$  in (Model 3). It suggests that a higher degree of information asymmetry will lead to a lower value of cash holdings. The coefficient of  $\text{Low}_{i,t}$  in regression (6) is significantly positive, which is also consistent with the coefficients of  $(\Delta C_{i,t}/M_{i,t-1}) \times \text{Low}_{i,t}$  in (Model 3). It shows that a lower degree of information

asymmetry will lead to a higher value of cash holdings. It also confirms the nonlinear relationship between the cash value and information asymmetry, which provides a strong evidence for Hypothesis 2 (Table 7).

## 6. Conclusion

Drawing on the research findings of the market microstructure theory and corporate finance, this paper selects illiquidity ratio, liquidity ratio, discretionary accruals, and earnings before interest and tax (EBIT) as the proxy variables of information asymmetry. Then a new composite index for information asymmetry is formed based on the first component and used to test the effect of information asymmetry on the value of cash holdings. Finally, the relationship between the agency costs rooted in information asymmetry and the value of cash holdings is further analyzed; the main conclusions are as follows.

- (1) The cash increment has a significant effect on the value of cash in a company, while the effect of cash held at company has minimum effect or less significant effect on the value of cash. The former conclusion is the same as previous research results, while the latter is different from the findings of most scholars.
- (2) A company with a higher level of information asymmetry has a lower value of cash holdings. With the increase in the level of information asymmetry, the value of cash further discounts. This empirical evidence is consistent with Jensen's free cash flow hypothesis [4]. That is to say, the empirical results

in this paper provide support to the free cash flow hypothesis. Our research shows that a high level of information asymmetry can lead to high external financing costs. When a company faces cost difference between internal and external financing, the management, for the purpose of saving financing costs, tends to retain more cash for future use at an earlier time when the company owns relatively abundant cash. Harford [5] shows that the management tends to hold more cash due to the existence of entrenchment effect.

- (3) There is no purely monotonic relationship between the agent cost and the value of cash holdings. The empirical research, based on the market microstructure theory and the corporate finance theory, shows that when a company faces a high degree of financing constraints, the value of cash holdings will be very low; while the financing constraints are very low, the value of cash holdings would rise. This implies that the relationship between agency costs caused by information asymmetry and the value of cash holdings is not linear. The financing constraints hypothesis based on the information asymmetry cannot fully explain the value of cash holdings of listed companies in China. The value of cash holdings of listed companies in China may have something to do with the shareholder rights hypothesis induced by financing constraints and the cash expenditure hypothesis due to the agency costs. When the level of information asymmetry is low, which means low financing costs, the company can obtain abundant funds and the company management does not have to hold more cash. So, under this condition, the value of cash holdings is relatively high. When the level of information asymmetry is high, which implies high financing costs, the management tends to hold excess cash for the agent rather than the principal's interests. Thus, the puzzle of the value of cash holdings is mainly due to the agency costs.

In addition, the policy implication of this study is very obvious: at present, the research on the value of cash holdings in companies mainly concentrates on the western countries whose financial markets are fairly developed but pays little attention to the less developed capital markets in developing countries. A large body of literature documents that the information asymmetry on the part of companies in developing countries is more serious than that in developed countries due to the imperfection of financial markets. Information asymmetry has a huge impact on companies' financial behavior in developing countries and that impact is even more significant in China. Therefore, on the one hand, this research tries to explore and solve this puzzle in corporate finance in China from the perspective of the market microstructure theory and corporate finance. This paper represents a new research perspective, new methods, and new ideas, which will contribute to the most wanted development of China's market microstructure research and corporate finance research. Meanwhile, this paper tries to reveal the mechanism of the effects of information asymmetry on the

value of cash holdings, which will help deepen the study in this area in China. On the other hand, it provides theoretical support to our enterprises' efficient management of cash flows, decision making in cash holdings, and substantial reduction in the agency costs. It can also provide relevant policy recommendations for building capital markets with matched demands, a reasonable system and perfect functions, and provides a reference to investors' investment decisions.

## Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

## Acknowledgments

This work was jointly supported by the National Science Foundation of China under Grant nos. 11101053, 70921001, and 71171024, the Key Project of Chinese Ministry of Education under Grant no. 211118, the China Postdoctoral Science Foundation under Grant no. 20140550097, the Hunan Provincial NSF under Grant no. 11JJ1001, and the Scientific Research Funds of Hunan Provincial Science and Technology Department of China under Grant no. 2013SK3143.

## References

- [1] E. F. Fama, "Efficient capital markets: a review of theory and empirical work," *The Journal of Finance*, vol. 25, no. 2, pp. 383–417, 1970.
- [2] M. C. Jensen and W. H. Meckling, "Theory of the firm: managerial behavior, agency costs and ownership structure," *Journal of Financial Economics*, vol. 3, no. 4, pp. 305–360, 1976.
- [3] S. C. Myers and N. S. Majluf, "Corporate financing and investment decisions when firms have information that investors do not have," *Journal of Financial Economics*, vol. 13, no. 2, pp. 187–221, 1984.
- [4] M. C. Jensen, "Agency costs of free cash flow, corporate finance and takeovers," *The American Economic Review*, vol. 76, no. 2, pp. 323–329, 1986.
- [5] J. Harford, "Corporate cash reserves and acquisitions," *The Journal of Finance*, vol. 54, no. 6, pp. 1969–1997, 1999.
- [6] M. Faulkender and R. Wang, "Corporate financial policy and the value of cash," *The Journal of Finance*, vol. 61, no. 4, pp. 1957–1990, 2006.
- [7] L. Pinkowitz, R. Stulz, and R. Williamson, "Does the contribution of corporate cash holdings and dividends to firm value depend on governance? A cross-country analysis," *The Journal of Finance*, vol. 61, no. 6, pp. 2725–2751, 2006.
- [8] H. Almeida, M. Campello, and M. S. Weisbach, "The cash flow sensitivity of cash," *The Journal of Finance*, vol. 59, no. 4, pp. 1777–1804, 2004.
- [9] V. V. Acharya and L. H. Pedersen, "Asset pricing with liquidity risk," *Journal of Financial Economics*, vol. 77, no. 2, pp. 375–410, 2005.
- [10] D. J. Denis and V. Sibilkov, "Financial constraints, investment, and the value of cash holdings," *Review of Financial Studies*, vol. 23, no. 1, pp. 247–269, 2010.

- [11] L. Pinkowitz and R. Williamson, "What is the market value of dollar of corporate cash," *Journal of Applied Corporate Finance*, no. 19, pp. 74–81, 2007.
- [12] A. Dittmar and J. Mahrt-Smith, "Corporate governance and the value of cash holdings," *Journal of Financial Economics*, vol. 83, no. 3, pp. 599–634, 2007.
- [13] W. H. Mikkelsen and M. M. Partch, "Do persistent large cash reserves hinder performance?" *Journal of Financial and Quantitative Analysis*, vol. 38, no. 2, pp. 275–294, 2003.
- [14] Z. Tong, "Firm diversification and the value of corporate cash holdings," *Journal of Corporate Finance*, vol. 17, no. 3, pp. 741–758, 2011.
- [15] V. Subramaniam, T. T. Tang, H. Yue, and X. Zhou, "Firm structure and corporate cash holdings," *Journal of Corporate Finance*, vol. 17, no. 3, pp. 759–773, 2011.
- [16] L. Pinkowitz and R. Williamson, "What is a dollar worth, the market value of cash holdings," Working Paper, Georgetown University, 2004.
- [17] L. Fresard, "Financial strength and product market behavior: the real effects of corporate cash holdings," *The Journal of Finance*, vol. 65, no. 3, pp. 1097–1122, 2010.
- [18] F. Wen and X. Yang, "Skewness of return distribution and coefficient of risk premium," *Journal of Systems Science and Complexity*, vol. 22, no. 3, pp. 360–371, 2009.
- [19] F. Wen and Z. Liu, "A copula-based correlation measure and its application in chinese stock market," *International Journal of Information Technology and Decision Making*, vol. 8, no. 4, pp. 787–801, 2009.
- [20] R. A. Korajczyk and D. J. Lucas, "Equity issues with time-varying asymmetric information," *Journal of Financial and Quantitative Analysis*, no. 7, pp. 397–417, 1992.
- [21] H. Choe, R. W. Masulis, and V. Nanda, "Common stock offerings across the business cycle. Theory and evidence," *Journal of Empirical Finance*, vol. 1, no. 1, pp. 3–31, 1993.
- [22] P. V. Viswanath, "Strategic considerations the pecking order hypothesis, and market reactions to equity financing," *Journal of Financial and Quantitative Analysis*, no. 28, pp. 213–234, 1993.
- [23] S. T. Bharath, P. Pasquariello, and G. Wu, "Does asymmetric information drive capital structure decisions," *Review of Financial Studies*, vol. 22, no. 8, pp. 3211–3243, 2009.
- [24] D. M. Autore and T. Kovacs, "Equity issues and temporal variation in information asymmetry," *Journal of Banking and Finance*, vol. 34, no. 1, pp. 12–23, 2010.
- [25] E. F. Fama and K. R. French, "Financing decisions: who issues stock?" *Journal of Financial Economics*, vol. 76, no. 3, pp. 549–582, 2005.
- [26] M. T. Leary and M. R. Roberts, "The pecking order, debt capacity, and information asymmetry," Working Paper, Duke University, 2007.
- [27] K. H. Chung, J. Kim, Y. S. Kim, and H. Zhang, "Information asymmetry and corporate cash holdings," SSRN Working Paper, University of New York, 2012.
- [28] T. Opler, L. Pinkowitz, R. Stulz, and R. Williamson, "The determinants and implications of corporate cash holdings," *Journal of Financial Economics*, vol. 52, no. 1, pp. 3–46, 1999.
- [29] A. Dittmar, J. Mahrt-Smith, and H. Servaes, "International corporate governance and corporate cash holdings," *Journal of Financial and Quantitative Analysis*, vol. 38, no. 1, pp. 111–113, 2003.
- [30] M. O'Hara, "Making market microstructure matter," *Financial Management*, vol. 28, no. 2, pp. 83–91, 1999.
- [31] A. Madhavan, "Market microstructure: a survey," *Journal of Financial Markets*, vol. 3, no. 3, pp. 205–258, 2000.
- [32] M. L. Lipson, "Market microstructure and corporate finance," *Journal of Corporate Finance*, vol. 9, no. 4, pp. 377–384, 2003.
- [33] R. La Porta, F. Lopez-De-Silanes, A. Shleifer, and R. W. Vishny, "Agency problems and dividend policies around the world," *The Journal of Finance*, vol. 55, no. 1, pp. 1–33, 2000.
- [34] S. C. Myers, "The capital structure puzzle," *The Journal of Finance*, vol. 39, no. 3, pp. 574–592, 1984.
- [35] W. Ligang, *Analysis on the Determinants and Value Effect of the Corporate Cash Holdings in China*, Zhejiang University, Hangzhou, China, 2007.
- [36] Y. Xingquan and Z. Zhaonan, "Institution background, ownership property and the value of corporate cash holdings," *Economic Research Journal*, no. 12, pp. 111–123, 2008.
- [37] Y. Amihud, "Illiquidity and stock returns: cross-section and time-series effects," *Journal of Financial Markets*, vol. 5, no. 1, pp. 31–56, 2002.
- [38] T. Xijin and G. Gongning, "The liquidity of Chinese level and the conduction mechanism study: an empirical analysis based on data from 2005 to 2009," *Journal of Anhui University (Humanities and Social Sciences)*, no. 3, pp. 137–143, 2010.
- [39] J. Francisa, R. LaFond, P. Olsson, and K. Schippe, "The market pricing of accruals quality," *Journal of Accounting and Economics*, vol. 39, no. 2, pp. 295–327, 2005.
- [40] W. Drobetz, M. C. Grüniger, and S. Hirschvogel, "Information asymmetry and the value of cash," *Journal of Banking and Finance*, vol. 34, no. 9, pp. 2168–2184, 2010.
- [41] X. Kai, "Earning quality and corporate cash holdings: empirical evidence from the Chinese stock market," *Journal of Central University of Finance and Economics*, no. 7, pp. 79–85, 2009.
- [42] D. Easley and M. O'Hara, "Information and the cost of capital," *The Journal of Finance*, vol. 59, no. 4, pp. 1553–1583, 2004.
- [43] K. Schipper and L. Vincent, "Earnings quality," *Accounting Horizons*, vol. 17, pp. 97–110, 2003.
- [44] C. Leuz, D. Nanda, and P. D. Wysocki, "Earnings management and investor protection: an international comparison," *Journal of Financial Economics*, vol. 69, no. 3, pp. 505–527, 2003.
- [45] L. Zhirui, *Information Asymmetry and Cash Holding*, Shantou University, Shantou, China, 2009.
- [46] M. L. Defond and K. R. Subramanyam, "Auditor changes and discretionary accruals," *Journal of Accounting and Economics*, vol. 25, no. 1, pp. 35–67, 1998.
- [47] M. Bank and J. Lawrenz, "Information asymmetry between management and investors in the optimal capital structure decision," <http://www.researchgate.net/publication>.
- [48] F. Guoqi and H. Shizhuan, "Application and comparison of EBIT and EAT in financial management," *Cai Kuai Yue Kan*, no. 11, pp. 85–87, 2010.
- [49] N. Gu and J. Sun, "The market value of cash: evidence from Chinese listed companies," *Journal of Management Sciences*, vol. 21, no. 4, pp. 96–104, 2008.
- [50] E. F. Fama and K. R. French, "Taxes, financing decisions, and firm value," *The Journal of Finance*, vol. 53, no. 3, pp. 819–843, 1998.
- [51] Q. Wenzhou, X. Yalu, and Y. Yumei, "Information asymmetry, financing constraints and investment: cash flow sensitivity," *Economic Research Journal*, no. 6, pp. 105–117, 2011.
- [52] L. L. Lundstrum, "Firm value, information problems and the internal capital market," *Review of Quantitative Finance and Accounting*, vol. 21, no. 2, pp. 141–156, 2003.





# Hindawi

Submit your manuscripts at  
<http://www.hindawi.com>

