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Cash In Hand And Corporate Performance

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Abstract

Not long ago large cash holding in balance sheet would not be recommended. As we know, large cash in hand means the companies less invest in new projects and extend their business. However, the recent research reveals that U.S companies hold more cash than before, and the financial strength might have strong relationship with the performance. Especially during the financial crises, those who reserve more cash flow take great advantage of the flexibility compared with their competitors, since many of them avoid cash squeeze. It is noticed that after the crises U.S. firms held more cash than they did before. Furthermore financial flexibility became more important in managers' mind (Thomas, Kathleen et al., 2009).

Our paper will explain the importance of the cash policy in a company and reveal the effect of cash holding on the performance of the company. Here return on asset (ROA) and market share are considered as indicators of the firm's performance. We put our focus on the different cash policies in the companies among different industries. In this paper, we choose American companies as representatives. The OLS models are built based on the U.S companies' data during 1988 to 2009. The main finding is that more excess cash will result in worse performance in product market. Moreover, companies with sufficient cash in hand tend to have lower return on assets, due to the negative NPV effects of excess cash and agency cost. During the financial crisis the adverse effect of cash is mitigated. Through investigating the performance among same specific industries, we find that excess cash has less adverse influence for the companies in the energy sector.

Key words: Excess Cash¹, Market Share, Debt to Equity Ratio, Subprime Mortgage Crisis

¹ An additional amount of cash beyond what a company normally needs to have on hand.

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1. Introduction

In this chapter we will first introduce the research background. Then we raise our research interest and briefly discuss our empirical findings.

1.1 Background

Under the traditional theories such as Modigliani–Miller (1958) theorem there is an efficient market that a company has a certain value no matter how the financial structure is. However, the managers build different financial structure because there are many frictions of financing. Theoretically the main reason that managers hold cash in hand is paying back the short-term debt and long-term debt expired in one year. In such case, the managers simply regard the cash as the negative debt in the balance sheet. Most companies prefer to hold as less cash in hand as possible. The reasons are that the excess cash is a kind of waste of capital resource and too much excess cash is a negative signal to the stockholders that the company has no profitable project to invest.

In the new economic theories, more and more economists found that the cash does not play a role of the “negative” debt only. For example Gamba and Triantis (2008) argue that most managers prefer to hold the excess cash to hedge risks. First of all, we define *Excess cash* is an additional amount of cash beyond what a company normally needs to have on hand. Excess cash as the internal finance is an important part of the capital structure in a case that the external financing is costly. There are many factors which can affect the amount of the excess cash hold in hand in the company. From the theories of the behavioral corporate finance, the managers’ personal preferences will directly determine the financial structure and the usage of the excess cash. The entrenched managers prefer holding more excess cash in order to invest the lower return project (Jensen, 1986). In addition, since the companies which hold more excess cash can overcome the difficulties during the financial crisis period, the stockholders change their attitude to the excess cash in a short run after the crisis (Duchin, Ozbas et

al., 2010). The reason is that cash hold in hand² gives the companies more financial flexibility especially when the financial crisis occurs. However, even the cash hold in hand is an instrument of aversion the risks such as the credit crisis, the listed companies will spend the cash on the investments unless they know there will be a crisis in the near future. Moreover in a long term, the stock market will give a higher valuation to the corporations which prefer to invest in projects rather than holding the excess cash in hand.

The purpose of this paper is to examine the relationship between the amount of excess cash hold in hand and the performance of the firm in different companies. Various companies make different financial policies of holding excess cash in hand in order to adjust the capital structure and hedge the investment risks. Consequently, various companies from different industries in different countries will choose distinctive optimal amount of the excess cash hold in hand. We choose energy industry and communication industry as representatives of traditional mature industry and new emerging industry separately. Furthermore cash hold in hand will support the companies to survive during the financial depressed periods. On the contrary, the financial crisis affects the managers' decisions of the amount of excess cash in the financial structure. Previous researches more concentrate on the effect of excess cash in the capital structure. We put our focus on the changes of effect of excess cash during the latest big mortgage credit crisis. Thus the time periods of the data cover this financial crisis. The main question to be solved is that "dose the excess cash affect the company performance?" We use market share and return on asset as representatives of the performance. There are some sub-questions would be solved as well. For instance, "whether there is a relationship between the two representatives of performance?", "Does the effect of the excess cash change during the crisis?" and "Is there any difference influence of cash among different industries?"

² "Cash hold in hand" has the same definition as "excess cash" in our paper. An additional amount of cash beyond what a company normally needs to have on hand.

Unlike previous researches, the different performance between traditional industry and new emerging high-tech industry are explored in this paper. The latest data are used to find the relationship between the changes of the cash hold in hand and the corporation performance during the subprime mortgage crisis. By building the relationship among excess cash, market shares and return on equity, we found that excess cash plays a negative role to both market share and profitability. In addition, the traditional industry has less adverse effect of the excess cash. In order to gain more flexibility during the subprime mortgage crisis, the negative relation between excess cash and corporate performance diminishes to some extent.

1.2 Outline of the study

This paper is organized as followed. Section 2 will introduce the theories of the usage of the excess cash hold in hand. The section 3 will describe the method and the data of our paper. In this part we develop our models to verify the theories. Later we present the empirical results based on our model and hypothesizes in the section 4. In the final section we will summary our finding and conclude our suggestion regarding the optimal amount of the excess cash hold in hand in the company.

2. Theories and Hypotheses

In this chapter we first review and summarize the theories which discuss the problem of excess cash in the corporate performance. Based on these theories, we choose some variables. Furthermore, we raise some hypotheses which we will verify in the later chapters.

2.1 Literature review

In the corporate governance theories, the economists always put their attentions on the financial structure. The debt to equity ratio is the most important index of the financial structure. Modigliani and Miller (1958) propose that the market value of the company is irrelevant to the cost of capital. Therefore the managers should be

indifference with the various leverage level (Ogden, 2002). However, in reality, the value of the company is determined by the capital structure of the company. There are many reasons. The debt has an advantage that the tax on the interest of debt is removable. But more debt indicates more distress cost. The information asymmetry between the stockholders and managers will cause the agency cost. Due to these costs, there is a trade-off relation between debt and equity (Modigliani and Miller, 1958). In the pecking order theory, the excess cash represents the internal financing which is the first priority. On the other hand, excess cash induces agency cost because the entrenched managers always use it to invest. Therefore, the managers should determine a proper leverage level for the company in a certain developing period. Evgeny (2006) believes that the optimal financial structure is the key factor affecting the interaction in output market of the companies. Furthermore in the competitive environment, the debt is carried as a strategic advantage (Evgeny, 2006). The base of the strategic advantage is the limited responsibility. The company facing bankrupt will lose a limited amount of assets. Thus the shareholders lose their benefits but the creditors are not strongly affected by the bankrupt. While the return for the shareholders will increase more if the investments succeed, thus asset substitution problem exists (Culp, 2006). The potential benefits from risky investments are incentives for the companies to choose the debt as a strategic advantage. When there is more competition in the production market, the company has the tendency to determine a higher optimal leverage level for the company.

In the traditional theories, there is no friction in financing. Thereby the managers could obtain as many debts as they want in the ideal world. In such situation, most managers use the cash to balance the balance sheets. They regard the cash as the “negative” debt in the balance sheet when they decide the financial structure of the companies (Viral, Heitor et al., 2005). Acharya et al (2007) find that there is a strong negative relation between the cash and the debt, when the company has no restriction to get finance external. These unrestricted companies prefer to use the excess cash to pay the debt rather than holding them in hand. When the company faces a dangerous

high debt-equity ratio, the managers can use the cash pay off the debt to lower the equity-debt ratio. In addition, they also find that if the company has high demand of hedging risks such as restrictions of financing, the manager is willing to hold the excess cash (Acharya et al, 2007). Actually, the more debt a company has, the more possible it faces a threat of bankruptcy. All banks limit the supply of the credit to the companies which already have many debts. Under such case, the managers use cash hold in hand as the internal financing. Thus, the amount of excess cash has a strong correlation, either negative or positive, with the amount of the debt in the company.

In the real capital market, there exist different restrictions to different companies to get the external finance. These constraint companies get the external finance costly. Moreover there are agency conflicts among the stakeholders in the corporations. The managers are monitored by both the creditors and the shareholders. But even if both stakeholders want to maximize the profits, they have different preference to the investments. Especially after getting the earnings, the managers have to choose to pay the interests to the creditors firstly or pay the dividend to the shareholders firstly. Usually the creditors and shareholders write down these rules of payments in the contracts. Because the external financing is costly and restricted, the managers prefer the internal financing when they decide to invest in new investments. The excess cash is regarded as the internal financing in the corporation governance. When a company has stable earning, the managers of this company will use the cash to lower the leverage level in order to reduce the cost of financing. On the other side, most companies especially the new emerging and small companies have uncertain future. They have difficulties to obtain the loans from the banks and issue new equities in the stock markets. In these firms, the managers will retain the earnings as excess cash in order to finance the investment internally. At the same time there are various risks of investments from the macro-economic environment. For example, the governments increase the interest rates. This measure will not only increase the cost of the capital but also tighten the credit of the investments from the banks. In that case, the internal financing shows its comparative advantages over the external financing. The

managers hold the excess cash in hand in order to hedge these risks. Therefore the constraint companies with more desire to hedge various risks intend to hold more cash in hand.

At 2008, there was a big financial crisis caused by the American subprime mortgage credit crisis. This financial crisis affected the economy around most areas in the world. During this crisis, some big financial institutions went bankruptcy because of the bad loans. Therefore the banks raised the limitations of the loans and they lower the value of the collaterals. These actions reduced the supply among the capital market. All the companies faced the finance supply shock in the capital market (Duchin, Ozbas et al., 2010). These constrained companies which depend on the external finance decreased much more investments and divested some non-core business by selling the assets, with the aim of overcoming the supply shock. The cash, which reserved before the crisis occurred, mitigated the threat from the tight of the credit supply. The excess cash hold in hand is a main kind of internal finance which can support the future investments, when there will be some problems to get the external finance. Therefore if there is not any good investment opportunity for the company, the manager should reserve the excess cash for better investments in future rather than investing in the poor projects. But the reservation of the excess cash will reduce the investments at the present period. Another important solution to solve the problem of investments decline is to enhance the development of the short-term debt. The short-term debt adds the flexibility of the cash flow in the company while the long-term debt does not have such effect. Since most economists pay attentions on the financial flexibility when they research the financial structures in companies, they think the cash hold in hand and the debt issued should be balanced. In the capital market, the external finance is more costly than the internal finance. Most managers prefer to hold the excess cash when there will be a potential investment to seize or when there will be a financial crisis to avoid (Andrea and Alexander, 2008).

In the corporation management, the decisions of changing capital structure, investing

in new projects and so on are made by the managers especially the top managers as CEO. Thus the personal preferences of the managers will involve the financing strategies of the companies. In the corporate management, there are various agent conflictions. Some developing countries do not have perfect regulations and laws to protect the shareholders rights. In that case the entrenched managers in the poor monitoring company could build the empire company to ensure their positions. They are willing to reserve the cash to financing the investments which are not beneficial to the increase of the company's value. The entrenched managers do not rely on the external financing such as debt and equity, since the monitor from the stakeholders restricts their entrenchment (Jensen, 1986). Some other researchers also point out that the entrenched managers spend cash more quickly than other managers in the good governance companies. Because unnecessary cash payment cannot bring the profits to the company, this action can destroy the flexibility of the cash flow in the company and reduced the value of the stock price. On the contrary, the researchers also found that the more excess cash hold in hand, the more possible will the top managers lose their jobs. The reason is that the creditors and shareholders have right to monitor the managers' behaviors. Too much cash hold in hand would be considered as wasting capital resources. Couderc (2005) also asserts that the company, which has more excess cash, earns less profit than others (Couderc, 2005). Therefore the excess cash is regarded as the agency cost especially in the poor governance companies. In the good governance companies, the agent conflictions could be mitigated by building a optimal capital structure (Harford, Mansi et al., 2008). Therefore the excess cash is considered as an important part of the capital structure. The researchers indicated that the most important thing for the top managers is not "how much cash should they hold in hand" but "how to use the excess cash" (Dittmar and Jan, 2007). This is a further problem for the economics to discuss the usage of the excess cash in the company.

2.2 Variables and hypotheses

Dependent variable

At first we choose the return of assets (ROA) of the corporations as the independent variable. We calculate the return of assets of a corporation through dividing the company's earnings before the deduction of interest, tax and amortization expenses by its total assets. The ROA reflects the performance of a company to earn the net income by making use of its assets. The assets of the company contain both debt and equity. So ROA reflects the profitability of the company before the leverage. This index can be used to compare different companies' performance in the same industry (Susan, Belverd, et al., 2008). Both debt and equity can finance the operations and investments of the companies. If the company has more profitable investment, the ROA of the company will increase. The proper financial structure can mitigate agency cost and so on. The good governance companies would not waste excess cash. Most managers use the cash to adjust the financial structure in the corporation, for instance pay off the short-term debt or buy back the equities from the shareholders. Also, excess cash can be used as internal financing to invest profitable projects especially when there are restrictions to get external financing. In addition, using internal financing has lower cost than external financing. When the company efficiently utilizes the assets and obtains more and more income, the ROA will increase at the same time. Therefore we choose ROA as an index reflecting the performance of the company.

Variable: the return of assets of the company: ROA

In order to relate the performance of corporations to the production market, we select another variable which is market share of the company in the production market. We use industry-adjusted data. As we know that firms in the different industries rely on the production market in different degrees. If the company depends on the production market, the more market share the company obtains, the more sensitive to the changes of the market. However, the corporations target to seize more market share. The adjustments in the financial structure and the managerial strategies lead to the changes of the market share for this firm. This influence on the market share always lags

because that the reaction of the market is slow. Nevertheless, the changes of the market shares can explain the previous performance of the company.

Variable: the market share of the company: $\Delta Mars$

We choose the ROA which responds to the current changes of the assets to represent the present performance of the firms. On the other hand, we use the market share which reacts to the previous performance of the corporations. We will build two regressions with these two dependent variables separately later. At first, we want to verify the relationship between these two variables. We assume that the previous performance influences the current activities of the enterprise. When a firm obtains a large part of the market share, it shows that this company operated and developed well in previous stages. As we all know that the more market share a company seizes, the more profits it can obtain. Due to the scale of economic, the corporations can reduce the cost of the products. It also takes advantage of the bargaining power to get more trade credit from the suppliers and customers. In addition, when the enterprise has a stronger competitiveness, such companies as the oligopolies and local monopolies, it would get more and more profits through enlarging the production and increasing the goods' prices. Therefore these companies have higher ROA which indicates that they have better current performance and prosperous development.

Hypothesis 1

H₀: There is a positive relation between the market share a company holds and the ROA of the company.

H₁: There is no relation or a negative relation between the market share a company holds and the ROA of the company.

Independent variables

In a balance sheet, we always can figure out the cash and cash equivalent. The amount of the excess cash held by a company would influence its performance. Because the cash held in hand is regarded as a kind of waste of the capital resource, most firms do

not hold much excess cash in hand. Due to much excess cash in the balance sheet will give the stockholders a negative signal that this company has no profitable program to invest in future, the managers insist various investments. For some managers, even if the projects are not profitable or very uncertain to successful, they still carry on these investments in order to increase the expected ROA of the enterprise. Especially for the entrenched managers, they build the empire with more investments to confirm their positions. But when the corporations trap in the non-profitable investments, the flow of the capital will be unsmooth. The overheated investments threaten the operation of the company. Except for these aggressive operations, much excess cash reflects the managers' over caution against the risks. The stockholders value the company which has more investments higher. The more investments a company has and the larger the production scale of the company is, the more market share this firm obtains. Therefore, we expected that the excess cash hold in hand will play a negative role in the performance of a company.

Variable: the amount of the excess cash holding in a company: Exca

Hypothesis 2

H₀: There is a negative relation between excess cash a corporation holds in hand and both the ROA and market share.

H₁: There is no relation or a positive relation between excess cash a corporation holds in hand and both the ROA and market share.

As known that market share could be calculated by corporation's revenue, so that the value of sales determines the market share of a company. If a company's value of sales increases much, for instance more than average industrial growth rate, its market share would ascend. The sales value also affects ROA in a certain degree. Under economies of scale, the more products a company sells, the lower marginal cost of product is. Therefore, net income may increase when sales go up. When a corporation does not rely on buying new assets and such expensive methods to expansion, the

total asset could be assumed as fixed. If we presume that a company enhances its own productivity to increase sales, thereby ROA grows with sales value.

Variable: the value of sales in a company: SIZE

Hypothesis 3

H₀: There is a positive relation between the value of sales and both the ROA and market share.

H₁: There is no relation or a negative relation between the value of sales and both the ROA and market share.

The debt to equity ratio is the most important index of a corporation's financial structure. The leverage level has an effect on the ROA of the company. As we know, a part of tax on income can be removed when this part of income are used to pay the interest of the debts. The tax shield of the debts motivates the manager to take more debts. On the other hand, the interests of debt increase the cost of financing when the amount of debts rises. Too many debts are bankrupt pressures to a company. The creditors require more interest to insure their benefits. Due to the creditors have a priority of the assets, the stockholders could get the remaining benefit after the creditors when the company bankrupts. Therefore the stockholders will decrease the expected value of the enterprise when there are many debts. Both the creditors and the stockholders have rights to monitor the operation of the corporation. However, the creditors have different targets with the stockholders. The stockholders have more incentives to encourage the profitable investments and monitor the performance of the managers. Whilst the creditors put focus on getting more interest and getting back the principal, so they force the managers to operate the company more prudentially. Such agency conflicts will hinder the development of the company. Therefore the market share will stop growing or even decrease, when the managers representing the creditors are over averse to the risks.

Variable: the square of the difference between the debt to equity ratio in a company and the average ratio in that industry: DtE

As the traditional theories said that the cash hold in hand is negative debt, the managers will use the excess cash to balance the balance sheets. The excess cash can pay off the short term debt. When a firm has many short term debts and many long term debts which will maturity in one year, the managers will prefer to hold more excess cash in hand. Therefore the excess cash affects the changes of the financial structure. When the managers choose an aggressive financing strategy to raise more and more debts, the costs of financing also increase. The managers should hold more excess cash in hand to pay back more and more interests. Furthermore the cash increase the operational flexibility, especially when the agency conflicts are intense in the company. We know that the high debt to equity ratio leads to the severe conflicts between creditors and stockholders. Under this situation, the excess cash works as the internal financing which gives the managers more chances to invest into the new projects.

Hypothesis 4

H₀: There is a positive relation between the debt to equity ratio and the excess cash a company holds.

H₁: There is no relation or a negative relation between the debt to equity ratio and the excess cash a company holds.

Dummy variables

In the financial market there are many risks such as increase of the interest rates and restrictions of the credits. Therefore when the macro-economic environment becomes unstable, the managers will increase the excess cash hold in hand to avoid the risks. The economic depression, especially when GDP declines, affects the financial market passively. For example, the investments contractions would be tighter for the companies which depend on the external financing (Davis, 2004). Recently, the

biggest and powerful financial crisis named subprime mortgage crisis occurred in 2008. From 2002 to 2004, the interest rates maintained relative low level in US, so that the low interest rates attracted much international cash flow in to American markets especially the real estate market. The overheated investments in real estate market caused the housing prices climbed to the peak at 2005-2006. When the house prices decreased in US, the adjustable-rate mortgage reset its rate into a high level. Thus more and more mortgage delinquencies and foreclosures emerged. It triggered this financial crisis affecting the economies around the world. During this financial crisis, many banks and mortgage companies in America bankrupted. More financial institutions started to merger in order to prevent shutting down. Due to the decrease of the capital in banks, the banks restrict the loans and raise more strict requirements of the credit. Furthermore all the governments around the world take measures to tight the credit. Under this situation, the companies cannot easily get capital from financial market. On the other hand, the excess cash gives the managers operational flexibility. The excess cash is the main part of the internal financing of a corporation. The firms which hold much cash in hand can invest in new programs and expand the productions without the limits of financing. Especially after the subprime mortgage crisis, the external financing is costly and scarce. The managers adjust the financial structure of the company in order to reduce the financing cost. Most managers prefer to hold excess cash in hand rather than carrying aggressive investments under the unstable economic environment.

Variable: the dummy variable to differentiate the time period when the US subprime mortgage crisis happened in 2008: FC

Hypothesis 5

H₀: During the subprime mortgage crisis, excess cash has stronger impact on the performance.

H₁: During the subprime mortgage crisis, excess cash has less impact on the performance.

MacKay and M. Phillips (2005) find that the firms' financial structure can be determined by the industry-related factors. The partial-equilibrium models show that the companies determine their own financial structure according to the choices of the intra-industry peers (MacKay, 2005). The reason is that the risks of financing are various among industries. The traditional labour intensive industries are mature, so that they have relative stable earnings. The companies in the labour intensive industries have relative fixed financial structures. They have good relationships with the local banks and government. Because both banks and government support the development of these mature industries, these corporations have fewer difficulties to get the credit. The managers of these companies do not need to hold excess cash to pay down the debt or finance the investment. As a result, the excess cash is relative less in the enterprises of the labour intensive industries. Our paper uses the energy industry as the representative of the traditional industry. On the other side, when the company is a new emerging such as technology and capital intensive industrial company, it has many uncertain chances and risks in operation. Therefore the managers cannot insure the profits for the stakeholders. In addition, most banks and financial institutions limit the financial support to these immature companies, except the ones which are encouraged developing by the governments. Most new companies have no qualification to carry out the Initial Public Offering. Consequently the external financing is costly and limited for these new corporations. However, these companies need more capital to increase the production and expand the market. The managers have to rely on the excess cash to finance the investments. Accordingly, the managers of the firms in the new emerging industries prefer to retain the earnings as excess cash. We choose the communication industry to represent the new emerging industry.

Variable: the dummy variable to distinguish the industries: INDE/INDC

Hypothesis 6

H₀: In the specific industries, excess cash has stronger impact on the performance.

H₁: In the specific industries, excess cash has less impact on the performance.

3. Methodology and sample definition

In the chapter we introduce the methodology. First we present the method including the panel data regressions and the criterion. Later the data sample will be defined. Based on the methodology and the sample pool, models are built to examine the hypotheses above.

3.1 Methodology

In order to capture the overall relationship for all the companies in a relative long period, the panel data model is introduced. It is believed that the two dimensions model could improve the accuracy of the regression (Harris and Sollis, 2003). Baltagi (2001) provides some advantages of using panel data, e.g. they allow heterogeneity in individual firms, which is absent in the time series analysis. In addition, panel data regression gives more variability that result in less collinearity among different variables as the cross sectional dimensions of time series provide more degrees of freedom and more efficiency. Micro-based panel data is widely used when there are large number of individual units and short time period. A simple two-variable panel model could be written as

$$y_{it} = x'_{it}\beta + z'_{it}\gamma + e_{it} \quad (1)$$

With $i (=1, \dots, N)$ denoting individuals and firms while $t (=1, \dots, T)$ denoting time. In our case i refers to different corporations and t varies from 1988 to 2009. y and x are dependent and independent variables with the dimensions $(T \times 1)$ and $(T \times N)$, respectively. z_{it} is the deterministic component which could be several forms. e_{it} is the error term and should follow a random walk process $\text{IID} \sim (0, \sigma_e^2)$. In order to

obtain an IID error term, the specific fixed effect or random effect might be included. Generally speaking, there are three type of fixed effect model: the cross-sectional fixed which measure the specific constant for one company throughout the whole sample period, period fixed which indicates the common shock to all firms in a certain year, and double fixed models. We will use Hausman test to identify which model fits the data best and report the chosen effects in the estimated results.

There are several methods to test the stationary of variables. Levin and Lin (1992), hereafter LL, develop a model for panel series. Their null hypothesis is that all i series in the panel have a unit root, while the alternative is that all individual series are stationary. Thus it is a common unit root test. The shortcoming is that it assumes all series in the panel are the same, i.e they are either $I(1)$ or $I(0)$. Im, Peseran and Shin (1995, 1997) (IPS) introduce a model to test the individual unit root process. Different from LL, their hypothesis is that each series in the panel contains a unit root for all i , and the alternative is that at least one of the individual series in the panel is stationary. In particular, they apply ADF test to all the series and take the average of test statistics. Compare to LL, IPS is more powerful. However, this model requires large T as the distribution of panel test statistics depends on T . Therefore, it doesn't fit the unbalance panel. Those two models have low power when models include fixed effects. Maddala and Wu (1999) improve IPS test by inserting Fisher-type test, in order to combine the p-value obtained from the ADF tests for all i series. It does not require the balance panel, thus they argue that Fisher-p test is better than IPS test. Since our data is an unbalance panel, Fisher-ADF unit root test is the proper model to test the stationary.

As discussed in section 2.2, we select several variables and insure they are valid in terms of measuring the concepts. Return on asset (ROA) and market share (MARS) could be considered as indicators of the firm's performance. First, we try to indentify the relationship between these two dependent variables. Secondly, the regression between the dependent variables and the independent variables will be made. The

main independent variable is excess cash (EXCA). To gain better regression, other independent variables such as Debt to Equity ratio (DtE) and size, will be included in our models. Furthermore, to examine the influence of the 2008 financial crisis on the cash holding policy, the time dummy variable FC is used. With the aim to distinguish the emerging industries and traditional industries, we select some certain industries as representatives and identify the difference in terms of cash holding policy.

We use Eviews 6 to process the data and models. Firstly the unit root test is made to examine the stationarity of the series. Then we check the correlation table to avoid multicollinearity problem and decide which independent variables should be included in the regression. As our models are based on panel data, we test the cross-section and fixed period effect to decide whether include them or not. AR terms might be introduced based on the autocorrelation tests. In addition, the coefficients' characteristics, R^2 , p-value, information criteria (AIC and SBC) and Wald test are checked to identify the quality of regression. The Granger causality test is performed to investigate the causality among these variables.

3.2 Data

We gather the annual firm data from COMPUSTAT during the period 1988-2009. COMPUSTAT is widely used among quantitative researchers and investors. We select some items randomly and compare with the companies' annual reports in order to ensure the data's reliability. The 21 years horizon allows us to build valid models. To assure the data's sufficiency, items without information on sales, cash and total assets are excluded. In the industry level, we select among the four-digit SIC and exclude those ended with 0 and 9. In order to attain better comparison within industry, all the data will be adjusted based on industry, thus we further set 10 companies as minimum requirement for chosen industries. The step could exclude those extreme industries thus it ensures the consistency of our sample and improve the reliability of the data. After these select processes we have 78 industries and 9855 companies for the further procedure. Our selection process is similar with Campello (2006). Specifically, we

will use the annual data in 2008 as a dummy to examine the changes in the 2008 financial crisis. In term of the industrial distinction, we use the Major Group 48-Communications and Major Group 49- Electric, Gas, And Sanitary Services in the SIC system. Based on the previous selection result, Communications sector includes 4 industries (4812, 4813, 4833, 4841) while energy sector consists of 5 subsets (4911, 4922, 4923, 4924, 4931). Appendix 1 provides the detail description in the end of the paper.

Table 1 shows the results from the unit tests. Levin, Lin test assumes common unit root process while the other two tests assume individual unit root process. As all the p-values are smaller than 1%, the null hypothesis is rejected, we conclude that all the variable series are stationary.

Table 1: Unit root tests

Test (p-value)	ROA	MARS	EXCA	DtE	SIZE
Levin, Lin	0.000	0.000	0.000	0.000	0.000
Im, Peseran and Shin	0.000	0.000	0.000	0.000	0.000
Fisher- ADF test	0.000	0.000	0.000	0.000	0.000

Following table provides the correlation matrix of our independent variables. Since all the figures are less than 0.3, there is no evidence shows that they are correlated. Thus the multicollinearity problem does not exist.

Table 2: correlation matrix of independent variables

	EXCA	DTE	SIZE
EXCA	1	-0.011293097	-0.20531595
DTE	-0.0112931	1	-0.0198735
SIZE	-0.2053159	-0.019873498	1

3.3 Model

3.3.1 Connection between market share and return on assets

This step is to test the relationship between the two dependent variables. $\Delta MARS_{i,t}$ is defined as industry-adjusted market share growth and calculated as firm sales year growth minus industry average growth. According to Campello (2006), the use of industry-adjusted data could remove the industry related factors, thus it could reduce the probability of fake regression which is from the certain industry impact. By the definition, $\Delta MARS_{i,t}$ is determined not only by the sales growth of the company but also by the rivals' performance within the same industry. $\Delta MARS_{i,t}$ is an indicator of the performance in the product market. λ and \mathcal{G} are the time and cross-sectional fixed effect, respectively. ROA is EBITDA divided by total assets and be seen as a representative of profitability. We also use the industry-adjusted data. $ROA_{i,t-1}$ refers to the return on asset at time t-1. It is a way to check how the firm's management utilize the capital, therefore could be seen as a proxy to measure the efficient of the investment performance. As both of the dependent variables are determined by many factors, it is improper to run the regression between them directly. Thus we introduce Granger causality test to investigate the time relationship between them.

3.3.2 Relationship between market share and excess cash

To investigate the link from operation in product market to the financial strength, we use the following equation:

$$\Delta MARS_{i,t} = \alpha + \lambda + \mathcal{G} + \beta EXCA_{i,t-1} + \theta Size_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

$\Delta MARS_{i,t}$ has the same explanation with last section. λ and \mathcal{G} are the time and cross-sectional fixed effect, respectively. We follow MacKay (2005) and Laurent (2007) to standardize the ratio of cash to total assets within each industry-year. $EXCA_{i,t-1}$ is the ratio of cash to total assets minus industry average and then divided the difference by the industry standard deviation. The motivation behind the calculation is that the standard deviation among different industries is not the same. With the same deviation level, the firm in the industry which has lower standard

deviation will gain more benefit than in the industry with higher standard deviation level. Excess cash could be considered as an indicator of financial strength. Size is defined as the log value of sales. By the regression (2), we will check if financial strength leads to better market performance.

3.3.3 Profitability and cash holding.

Regression (3) is to examine the relationship between profitability and cash position

$$ROA_{i,t} = \alpha + \lambda + \vartheta + \beta EXCA_{i,t-2} + \theta Size_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

3.3.4 Is cash negative debt?

Traditional theory reveals that cash could be considered as negative debt. In previous section we have mentioned that companies usually use excess to pay off debt in order to maintain debt capacity for future. However, some managers would like to keep financial flexibility as they see cash as a source of internal finance. The following regression is performed to identify their relationship.

$$EXCA_{i,t} = \alpha + \lambda + \vartheta + \beta DtE_{i,t-2} + \varepsilon_{i,t} \quad (4)$$

DtE is long-term debt scaled by total assets which measures the leverage level. Other variables are similar with those in equation (2).

3.3.5. Impact of financial crisis and industry distinction.

Dummy variable FC will be added into model (2), (3) and (4) in case they are valid in order to examine if cash holding has strong impact under the financial crisis. In addition, we could see if the firm which has more cash reserve will gain advantage in term of profitability and market performance. FC is defined for the data of 2008.

As we mentioned in the hypothesis section, the optimal cash varies among different sectors due to the business cycle and tax affect. In particular, we will compare the differences between energy and telecom industries. Energy sector could be seen as representative of mature sector while telecom industry belongs to emerging sector.

Traditionally speaking, firms in emerging sector face more challenge that comes from the high business volatility. Therefore, they have high demand for financial strength and enjoy higher market premium for more cash reserve. In our paper, INDE and INDC stand for energy and communication industries, respectively. To simplest, we formulate one dummy for one big sector, and these two dummies will be added to the regressions separately. Then the different affect on varies industries could be identified.

4. Results

4.1 The time relationship between market performance and profitability

We perform the Granger causality test between market performance and probability and then get the result in table 3. The estimated result shows that ROA Granger causes MARS but not the other way around, which means that the better market performance will happen after higher profitability. The reason behind might be explained as followed: When a firm enjoys high profitability, it is usually also in financial strength position. The firm will have more financial support to improve marketing and selling which raise their competency compared to rivals. As we know, the innovation plays increasing important role in modern business world, so the firm will benefit from more investment in research and development which could improve its product in the long term period. The improvement in the product will finally transform to the advantage in the market. Additionally, as the firm has a good performance on utilizing the stakeholders' capital and the stakeholders should have more possibility to make further investment if needed. In other words, if the company wants to expand its business or enter a new project, it is easier for it to attain proper finance. Therefore, the firm with higher profitability is more possible to improve market share in the next period.

Table 3: Granger causality test: MARS ROA

Null Hypothesis:	F-Statistic	Prob.
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MARS does not Granger Cause ROA	0.08213	0.9212
ROA does not Granger Cause MARS	21.5157	0.0000

4.2 More cash means better market performance?

As discussed above, Fisher-ADF is the proper test to examine the unit root of our variable series. The test results (see table 1) show that Δ MARS, EXCA and SIZE are stationary. Thus we could turn to OLS regression. By checking the autocorrelation function and comparing different models we determine to contain AR (1) in the regression. Thus the model could be written as

$$\Delta MARS_{i,t} = \alpha + \lambda + \vartheta + \Delta MARS_{i,t-1} + \beta EXCA_{i,t-1} + \theta Size_{i,t-1} + \varepsilon_{i,t} \quad (5)$$

Table 4 illustrates the results of regression (5). The probability figures are less than 5% that the coefficients for all the regressors are significant. Thus, the more excess cash could explain worse market performance in the later period. The finding here is in line with Fresard (2009). However, the small R square value and big probability value of F-test show that the regression is weak, which might indicate that some independent variables are missing in this model. Thus we further perform the Granger causality test to investigate the time order of market share and cash holding.

Table 4 Link between market share and excess cash

Variables	coefficient	Prob.
C	30.99856	0.0000
MARS(-1)	-0.033374	0.0000
EXCA(-1)	-1.500548	0.0000
SIZE(-1)	-6.480974	0.0000
Cross-section fixed	yes	
Period fixed	yes	
# Obs	70271	
R square	0.07	
S.E of regression	53.85029	
Prob(F-statistic)	1.00	

Based on the test result below, we could show that EXCA Granger causes MARS but not reversal. This finding accords with agency cost theory of free cash flow (Jensen,

1986). Cash flow could be seen as negative NPV. Thus shareholders regard excess cash as a negative signal that the company has no potential good investment. As a result, the decline performance in product market will follow the increasing cash reserve.

Table 5 Granger causality test: MARS and EXCA

Null Hypothesis:	F-Statistic	Prob.
EXCA does not Granger Cause MARS	8.02118	0.0003
MARS does not Granger Cause EXCA	1.34818	0.2597

4.3 Profitability and excess cash

We use return on asset as an indicator of the firm's profitability and regression (3) is perform to identify the linkage from financial strength to the profitability. After examine the autocorrelation function and compare different models we decide to include AR (1) in the regression.

$$ROA_{i,t} = \alpha + \lambda + \vartheta + ROA_{i,t-1} + \beta EXCA_{i,t-2} + \theta Size_{i,t-1} + \varepsilon_{i,t} \quad (6)$$

R square and the p-value show that it is a sufficient model. In other words, there is linear relationship between return on asset and the excess cash. In particular, the excess cash has negative impact on the profitability, which is in line with our hypothesis 2. Considering the economic magnitude, a one-standard deviation increase in cash compared to rivals in year t will result in a 2.7% decrease in profitability in year t+2. According to the theory of optimal cash holding, we could use the agency cost and opportunity cost to explain this outcome. Too much excess cash in hand might impair the operating performance, as the management tend to invest in negative NPV projects or make bad acquisition which known as overinvestment problem. In addition, cash has lower return than WACC and may be seen as negative NPV project. Thus too much cash in hand will lower the profitability. Empirical study revealed that the cash reduction would gain a positive market reaction. Traditionally people thought that the firms with rich excess cash enjoy more debt capacity. However, the empirical research made by Acharya et al (2007) show that cash is not equivalent with negative

debt and the debt decreasing now will not certainly result in increasing debt capacity in the next period. Our finding is similar with Couderc (2005) and Bruch et al (2009). They find that sales growths in firms with free cash flow are less profitable than those without free cash flow. Therefore, excess cash might hurt the profitability in later period.

Table 6 Relationship between ROA and EXCA

Variables	coefficient	Prob.
C	-0.329336	0.0000
ROA(-1)	0.364113	0.0000
EXCA(-2)	-0.027249	0.0022
SIZE(-1)	0.029787	0.0001
Cross-section fixed	yes	
Period fixed	yes	
# Obs	70271	
R square	0.436127	
S.E of regression	1.519328	
Prob(F-statistic)	0.00	

4.4 Relationship between cash and leverage

The regression (4) is run to investigate the relationship between cash and debt to equity ratio.

$$EXCA_{i,t} = \alpha + \lambda + \vartheta + \beta DTE_{i,t-2} + \varepsilon_{i,t} \quad (4)$$

We also perform Granger causality test. However, we find that there is neither linear relation nor Granger causality between them. This result is in line with Acharya et al (2007)'s finding. They reveal that cash is no necessary negative debt. Below tables present the test outputs.

Table 7 Relationship between cash and leverage

Variables	coefficient	Prob.
C	-0.005957	0.0169
DTE(-1)	0.005037	0.0622
Cross-section fixed	yes	
Period fixed	yes	

# Obs	80143
R square	0.56264
S.E of regression	0.687546
Prob(F-statistic)	0,00

Table 8 Granger causality: cash and leverage

Null Hypothesis:	F-Statistic	Prob.
EXCA does not Granger Cause DTE	1.58292	0.2054
DTE does not Granger Cause EXCA	2.00366	0.1348

4.5 Impact of financial crisis 2008

We introduce the dummy variable FC to examine the financial crisis influence on the relationship between profitability and excess cash. This regression refers to our hypothesis which is a one-side test, thus we use 10% critical value instead of 5%.

$$ROA_{i,t} = \alpha + \lambda + \vartheta + ROA_{i,t} + \beta EXCA_{i,t-2} + \theta Size_{i,t-1} + FC + \varepsilon_{i,t} \quad (7)$$

The linear relationship is still sufficient. We could see that FC has negative impact on the profitability, as the financial crisis led to economic decline in 2008. Excess cash still has a negative coefficient. However, compared with the data in Table 6 where the FC is excluded, excess cash has less negative influence. One reason is that during the crisis firms need more financial flexibility and offset the negative impact. Excess cash is viewed as an internal finance which has several advantages compared to external finance especially in terms of strategic benefit. At least it could buffer against operating volatility and unexpected distress in order to ensure lower possibility of financial distress. The firm could use excess cash as substitute of expensive outside finance due to lower transaction cost. In addition, the firm will have enough financial support to realize the real option in the future when good investment opportunity presents. Generally speaking, firms face difficulty to external finance as the banks tend to restrict the loan during financial crisis. The downturn of the stock market made the situation worse. The firm with rich cash reserve could support the operation itself and has higher probability to survive. Therefore, more excess cash is in favor when the crisis comes.

Table 9 Link between ROA and EXCA included FC

Variables	coefficient	Prob.
C	-0.194827	0.0000
ROA(-1)	0.366689	0.0000
EXCA(-2)	-0.02672	0.0027
SIZE(-1)	0.034355	0.0000
FC	-0.117448	0.0001
Cross-section fixed	Yes	
Period fixed	No	
# Obs	70271	
R square	0.436272	
S.E of regression	1.519145	
Prob(F-statistic)	0.000	

4.6 Industry characteristic

As described before, communications and energy sectors are considered as the typical industries to identify the difference of cash's impact. The earlier results reveal that there is linear relationship between profitability and excess cash, while the linkage between excess cash and market share is weak. Therefore, the industry dummies are brought into this model. Note that those regressions correspond to hypothesis 6. As they are one-side test we apply 10% critical value to explain the result.

$$ROA_{i,t} = \alpha + \lambda + \mathcal{G} + ROA_{i,t-1} + \beta EXCA_{i,t-2} + \theta Size_{i,t-1} + INDC + \varepsilon_{i,t} \quad (8)$$

$$ROA_{i,t} = \alpha + \lambda + \mathcal{G} + ROA_{i,t-1} + \beta EXCA_{i,t-2} + \theta Size_{i,t-1} + INDE + \varepsilon_{i,t} \quad (9)$$

The estimated output (unreported) shows that INDC is not significant in the regression. Thus, the communications industry dummy doesn't have big impact on the cash policy. However, the dummy variable refers to energy sectors is significant, which means the companies within the energy industries hold different cash positions compared with other sectors. Moreover, the coefficient of excess cash in t-2 increases a bit comparing to table 6. Though the excess cash plays a negative role to the profitability, the effect is less significant than the general model (regression (6)). It

makes smaller adverse influence on the return on assets. Given the explanation about the negative impact, the firms in traditional industries are more cautious and less aggressive, thus they are more careful about new investment. Additionally, companies in this sector are mostly huge players; they usually hold a good relationship with the capital market and banks which could benefit via easier access to external finance. Moreover, they gain advance experience about how to manage excess cash and avoid damage of the firms' value. As a result, the coefficient of the excess cash is less when the INDE is included.

Table 10 Link between ROA and EXCA included INDE

Variables	coefficient	Prob.
C	-0.238533	0.0000
ROA(-1)	0.664864	0.0000
EXCA(-2)	-0.008102	0.0221
SIZE(-1)	0.044846	0.0000
INDE	-0.043297	0.0794
Cross-section fixed	no	
Period fixed	yes	
# Obs	70271	
R square	0.221625	
S.E of regression	1.674838	
Prob(F-statistic)	0	

5. Conclusion

The influence of company's cash policy attracts much attention within the academia. Some scholars insist that firms should hold less cash in hand and pay back the short term debt, while some others argue that companies need to maintain some financial flexibility to avoid potential risk, such as the financial crisis which might lead to credit restrictions and difficulty to access finance resource. Obviously too little or too much cash will impair the company. How to determine the optimal level of cash holding is an important issue in corporate finance. Our paper is to investigate the link from excess cash to market profitability. Particularly, we want to identify if the firms had more cash could perform better when they are challenged by the crisis. By

investigating some sample industries we could find the various impacts of cash holding.

Based on the regressions in section 4, we could see the better situation in product market will follow the improvement of investment return, since the company had better return last period could assure its access to capital in the future. Furthermore, cash holding Granger causes market share. Excess cash might hinder the market share growth in the next period. In addition, our test result doesn't suggest excess cash is negative debt, which is similar with Acharya et al (2007)'s argument. However, we could reveal that excess cash has a negative impact on the profitability. This finding is in line with Brush (2000)'s finding. Agency cost and negative NPV effect might be the reason behind it. During the financial crisis the negative impact was somehow mitigate as firms need more financial flexibility. Specially, for those companies in the energy sector, excess cash has less adverse influence.

Our finding ensures the agency theory of free cash flow. More specifically, we find the negative impact of cash flow on company performance. This finding is useful for the financial managers and policy makers in the company. In addition, this important linkage between cash and performance will give some clues to the researchers and investors when they evaluate a corporation. Unfortunately we didn't identify the role of cash in particular situation such as acquisition. We are looking forward to the future research in this domain.

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Appendix

Appendix 1 (source: http://www.osha.gov/pls/imis/sic_manual.html)

Major Group 48: Communications

Industry Group 481: Telephone Communications

- 4812 [Radiotelephone Communications](#)
- 4813 [Telephone Communications, Except Radiotelephone](#)

Industry Group 482: Telegraph And Other Message Communications

- 4822 [Telegraph and Other Message Communications](#)

Industry Group 483: Radio And Television Broadcasting Stations

- 4832 [Radio Broadcasting Stations](#)
- 4833 [Television Broadcasting Stations](#)

Industry Group 484: Cable And Other Pay Television Services

- 4841 [Cable and Other Pay Television Services](#)

Industry Group 489: Communications Services, Not Elsewhere

- 4899 [Communications Services, Not Elsewhere Classified](#)

Major Group 49: Electric, Gas, And Sanitary Services

Industry Group 491: Electric Services

- 4911 [Electric Services](#)

Industry Group 492: Gas Production And Distribution

- 4922 [Natural Gas Transmission](#)
- 4923 [Natural Gas Transmission and Distribution](#)
- 4924 [Natural Gas Distribution](#)
- 4925 [Mixed, Manufactured, or Liquefied Petroleum Gas Production and/or](#)

Industry Group 493: Combination Electric And Gas, And Other Utility

- 4931 [Electric and Other Services Combined](#)
- 4932 [Gas and Other Services Combined](#)
- 4939 [Combination Utilities, Not Elsewhere Classified](#)