Value of Cash during Downturn

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Abstract

This study investigates the value of cash holdings among Asian firms: Thailand, The Philippines, Taiwan and Indonesia, which were affected by 1997 Asian financial crisis. Moreover, firms from Australia and New Zealand are analyzed as a comparison. For 3,717 firms from 6 countries between 1991and 2005, the findings indicate that the 1997 Asian financial crisis has impact on firms in Asian countries. Firms' cash holdings do not contribute more to the value of firms during crisis period. Furthermore, the high level of cash has the same impact on firm value between crisis and non-crisis period. Although firms do not gain advantage from cash holdings, they do not lead things getting worse. Indeed, the findings lend support to free cash flow theory.

Keywords: Cash value / Downturn / Crisis

Introduction

Corporate cash holdings have recently received more attention in finance literatures. The optimal point of cash holdings is a balance between the costs and benefits to firms. In contrast, holding cash other than optimal points may create agency problems.

Most recent literatures show that firms are likely to hold more cash than in the past. This increase in cash holdings is significant across firms as well as across countries. Some evidences show that cash as the internal fund is an effective device for firms, especially during crisis period. Firms would accumulate cash and maintain debt capacity and wait for expected investment opportunity in future.

However, this advantage of cash during downturn has not been paid more attention. The outcome of holding large amount of cash has been unclear. A gap is that the value contribution of cash holdings is expected to vary among firms. For instance, value of cash holdings is expected to be higher especially

during an economic downturn. This study examines the value of firms' cash holdings during crisis period when cash holdings are more remarkable resources.

Research Objective

1. To confirm that the 1997 Asian financial crisis has really affected Asian firms.

2. To investigate the benefits of firms' cash holdings as internal resource that standing for effective device when firms are in downturn.

3. To examine the value of firms' cash holdings between high and low cash firms that contributing differently to the value of firms.

Research Question

There have been many empirical studies that examine the benefits of holding large cash. Most of them argue that cash is considered an effective device in the mechanism of firms when they face the problem of costly or limited access to the external capitals. Some evidences show that large amount of cash within firms do not lead to worse operating performance. On the contrary, it rather enhances the value of firms. However, the prior studies do not take into account the role of cash when firms are in downturn. There is no consensus about the outcome of holding large amount of cash. Thus, this study aims to answer the question "Is cash worth more during crisis period?"

Scope of the Research

The thesis examines the role of cash holdings as an effective device for firms when firms face financial crisis. The study will examine firms in economies affected by the 1997 Asian financial crisis; namely, Thailand, Philippines, Indonesia, and Taiwan, the study will also analyze firms from Australia and New Zealand as a comparable sample. The data of this study will be in the periods of 1991 to 2005.

Related Literatures

There are benefits and costs of cash holdings. Firms can undertake valuable projects by using liquid assets when external capitals are not available. Firms are likely to maintain cash as internal resource as a guard against unexpected cash flow volatility which is a precautionary motive. However, holding more cash may create agency conflicts between managers and shareholders. The conflicts of interest

between managers and shareholders in that managers have motivation to act deviated from shareholders best interest. Moreover, the costs for liquid assets are lower return and tax disadvantage.

Large amount of cash holdings do not lead to poor performance. Instead, they create value to firms (Mikkelson & Partch, 2003). Interestingly, most literatures argue that cash holdings carry a potentially important implication during an economic downturn. When in liquidity shortage during economic downturn, firms respond to continue the existing on-going projects or invest in profitable opportunities by using their internal capital fund, especially when there is excessively high costs of external capital (Kim, Mauer & Sherman, 1998). Most of literatures about the crisis period suggest that firms should keep cash within firms during crisis period (Arslan, Florackis & Ozkan, 2006; Faulkender & Wang, 2006). Firms could generate cash flows by liquidating assets (DeAngelo, DeAngelo & Wruck, 2002; Almeida, Campello & Weisbach, 2004).

However, holding more cash inside firms has cost as well, free cash flow theory (Jensen, 1986). Managers increase their power by increasing resources under their control (Kusnadi, 2011), thus destroy value of firms (Blanchard, Lopez-de-Silanes & Shleifer, 1994). Martínez-Sola, García-Teruel & Martínez-Solano (2013) find that holding cash above and below optimal cash holding decrease the firm value. Especially a financial distress, the inability of firms to meet payment obligations makes value of firms decreasing. Johnson, et al. (2000) show that if such emerging markets experienced even small loss of confidence, the investors will reconsider the amount of expropriation by managers and adjust the amount they are willing to pay. This will be a fall in asset values and lower in value of firms. Lemmon & Lins (2003) suggest that the crisis negatively impact firms and it is raising incentive of controlling shareholders to expropriate minority shareholders. Holding high cash is an incentive for managers to turn resources into their private benefits especially when there is a shock from crisis (Shleifer & Vishny, 1997; Johnson et al., 2000b).

In sum, the role of cash holdings during economic downturn has not received more attention. Cash-rich firms that suffer from the crisis impact may have better chance to start investment in potential projects as they have plenty of resources available to take these advantages earlier. Moreover, firms with high level of cash probably have a greater potential to weather crisis than low cash firms. For instance, we would observe the significant benefits from holding cash especially during crisis period. Thus, this study will prove whether that cash holdings could possibly help firms survive from an economic downturn.

Hypothesis Development

Most arguments of cash holdings debate toward the benefit of being an effective device when firms are in a period of economic downturn. The only available resource during an economic downturn is internal capital. Hence we would expect that cash holdings as an internal resource have higher value during economic downturn. Thus, this would lead to the following hypothesis:

Hypothesis: Cash is more valuable during crisis period than normal period.

Data

Using Datastream & Worldscope database, the samples will be obtained from 4 countries including Thailand, Indonesia, The Philippines and Taiwan, which all were affected by the Asian financial crisis (1997-1998) collected during 1991 to 2005. Moreover, this study will also analyze firms from Australia and New Zealand as a comparison. To remain in the final sample, a firm must meet the following criteria:

1. Firms are not financial institutions and utility firms.
2. Firms in the sample have to be publicly traded on the markets over the period 1991-2005.

Methodology

This study is a quantitative research using regression analysis, fixed effect approach, to investigate the relation between value of cash holdings and value of firms. The dependent variable is firm value. The independent variables are the level and change of earnings, interests, dividends, investments and assets. The assets are separated into liquid assets and net assets. The crisis dummy is added to indicate the effects of Asian financial crisis 1997. In order to make comparison, significance of the difference is used to differentiate the difference between Asian and Non-Asian firms.

Value of Cash during Crisis

I will investigate the value of cash holdings that have an effect on firm value in an economic downturn during the period of 1997 Asian financial crisis. To establish the basic regression, a model is adopted from Pinkowitz, Stulz & Williamson (2006), which is a value regression originally developed by Fama & French (1998). This value regression is used in processing an explanation across a wide range of research studies. It well explains cross-sectional variation in firm values. Since that data is panel, I will

use fixed effects approach in order to control for unobservable characteristics of firms. I then add a *Crisis dummy* variable and interaction term between *Crisis dummy* and *change in Cash* to observe the value that cash holdings contribute to firm during crisis period. The model is defined as follows:

$$V_{i,t} = \propto + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \beta_5 dNA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} dCash_{i,t} + \beta_{17} dCash_{i,t+1} + \beta_{18} Crisis\ dummy_i + \sum_{j=1}^{17} (\beta_j \times Crisis\ dummy_i) + \varepsilon_{i,t} \quad (1)$$

Where:

- $\mathbf{X}_t$ is the level of variable X in year *t* divided by the level of total assets in year *t*.

- $\mathbf{dX}_t$ is the past change in level of X from year *t*-1 to year *t*, X_t-X_{t-1}, divided by total assets in year *t*.

- dX_{t+1} is the future change in the level of X from year *t* to year *t*+1, X_{t+1}-X_t, divided by total assets in year *t*.

- *V* is the market value of firm calculated at fiscal year end as the sum of market value of equity, the book value of short-term debt, and the book value of long-term debt.

- *E* is earnings value before extraordinary items plus interest, deferred tax credits, and investment tax credits.

- *NA* is net assets defined as total assets minus liquid assets.

- *RD* is research and development expense. When R&D is missing, we set it equal to zero.

- *I* is interest expense.

- *D* is dividends defined as common dividends paid.

- *Cash* is liquid asset holdings.

- Crisis $dummy_i$ is dummy variable that takes value of 1 for period between 1997 and 2000, which is an Asian financial crisis, 0 otherwise.

The expected results are positive signs for an interaction term between *the past changes of cash holdings* and *crisis dummy variable* and an interaction term between *the future changes of cash holdings* and *crisis dummy variable.* During crisis period, cash holdings contribute more to firm value.

Value of High Cash during Crisis

Subsequently, I investigate an effect from different levels of cash on a value of firms during crisis period, whether or not the high cash firms have higher magnitude of value of cash holdings than low cash firms during crisis period. I will add two variables; *High-cash dummy* and interaction term between *High-cash dummy* and *Crisis dummy* to the previous model. For the firm that is classified as high cash firm, I will sort the sample by amount of firm's cash holdings of each industry in descending order then divided into three ranges; high cash firm is in the top highest 30% rank within industry (industry-adjusted).

The model 2 is defined as follows:

$$V_{i,t} = \propto + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \beta_5 dNA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} dCash_{i,t} + \beta_{17} dCash_{i,t+1} + \beta_{18} Crisis\ dummy_i + \beta_{19} High_{cash} dummy_{i,t} + \beta_{20} Crisis\ dummy_i \times High\ cash\ dummy_{i,t} + \sum_{j=1}^{17} (\beta_j \times Crisis\ dummy_i) + \sum_{j=1}^{17} (\beta_j \times High\ cash\ dummy_{i,t}) + \sum_{j=1}^{17} (\beta_j\ Crisis\ dummy_i \times High\ cash\ dummy_{i,t}) + \varepsilon_{i,t} \quad (2)$$

Where:

- **High_cash dummy$_{i,t}$** is dummy variable that takes value of 1 if firm is in the top highest 30% of cash holdings rank within industry, 0 otherwise.

- **Crisis dummy$_i$ * High cash dummy$_{i,t}$** is an interaction term of two dummy variables. It takes value of 1 if firm is in the top highest 30% of cash holdings rank within industry for period between 1997 and 2000, 0 otherwise.

The expected results are positive signs for an interaction term between *the past changes of cash holdings, High_cash and crisis dummy variables* and an interaction term between *the future changes of cash holdings, High_cash and crisis dummy variables*. During crisis period, high cash firm has higher magnitude of value of cash holdings than low cash firms.

Results

The final sample consists of 3,717 firms in total; 2,096 from Asian firms and 1,621 from Non-Asian firms. All variables are standardized by total assets. In order to reduce the impact of outliers, a constant is added to the ratio and then taking log (log (1+ (X_t /A_t))). For research and development variables (R&D), the data is not available for firms in Asian countries. Thus, this variable is dropped out

(Pinkowitz, Stulz & Williamson (2006) set R&D equal to zero in case of missing). Table 1 shows the results from Eq. (1) by using fixed effects approach in order to control the effects on the firms. However, the estimate of Asian dummy variable is omitted because it has time-invariant value with time-invariant effect. In order to use fixed effects regression, I separate the sample into Asian and Non-Asian firms before running the regression. Moreover to see the difference between two groups, I also estimate the difference in mean to indicate the different effect between two groups.

Table 1 shows the results of Asian, Non-Asian firms and significance of the difference in mean in column 1, 2, and 3, respectively. The coefficients of interaction terms between the past changes of cash holdings and crisis dummy variable are positively insignificant for Asian firms but negatively significant for Non-Asian firms. Moreover, the difference in mean is statistically significant at 1% level. These results indicate that the value of cash holdings among Asian firms during crisis period is indifferent from that during non-crisis period. In contrast, the results from a falsification test in comparable sample imply that the value of cash holdings among Non-Asian firms contribute negatively to firms value during crisis period. This negative contribution among Non-Asian firms is significantly different from in Asian firms at 1 % level. The coefficients of past changes of cash holdings are negatively significant for Asian firms and negatively significant for Non-Asian firms. Moreover, the difference in mean is statistically significant at 5% level. These results imply that during non-crisis period, value of cash holdings for both Asian and Non-Asian firms contribute negatively to firm value. The coefficients of interaction terms between crisis dummy and future changes of cash holdings variables are negatively insignificant for Asian firms and negatively insignificant for Non-Asian firms. The difference in mean is also insignificant. The coefficients of future changes in cash holdings during non-crisis period are positively significant for Asian firms and positively significant for Non-Asian firms. The difference in mean is also insignificant. The results imply that the future changes in cash holdings contribute positively to firm value both Asian and Non-Asian firms during normal period. Interestingly, the coefficients of crisis dummy variable are positively significant for Asian firms but insignificant for Non-Asian firms. The result implies that the crisis has impact on firms in Asian countries.

The world is characterized by information asymmetry and costly external capital. The only internal resources are available during crisis period. Firms with plenty of internal resources are expected to have more chance to cope with and alleviate the shocks from the effect of the crisis. Therefore, firms with high level of cash reserves are expected to have higher value than low-cash holders. I, therefore,

examine further from the previous analysis. The high cash dummy will be added in the Eq. (1) to see whether or not firms with high level of cash holdings (firms that hold cash above 70 percentile industry-adjusted) will have higher magnitude of value that leads to be higher in firm value during crisis period.

The results from further investigation the impact of high cash on value of firms (Eq. 2) are in Table 2. The results of Asian, Non-Asian firms and significance of the difference in mean between two groups are in column 1, 2 and 3, respectively. The coefficients of the interaction terms between the past changes in cash holdings, crisis and high cash dummy variables are negatively insignificant for Asian firms and negatively insignificant for Non-Asian firms. The difference in mean between Asian and Non-Asian firms is insignificant as well. These results imply that there is no difference in effects of high cash reserve to firm value during crisis and non-crisis period both Asian and Non-Asian firms. The coefficients of the interaction terms between the past changes in cash holdings and high cash dummy variable are positively significant for Asian firms and positively insignificant for Non-Asian firms. However, the coefficients the past changes of cash holdings are negatively significant for Asian firms and negatively significant for Non-Asian firms. These results imply that during normal period, the value of cash holdings among low cash firms contribute negatively to firm value. Furthermore as the sum of the coefficients of the past changes of cash holdings and its interaction term with high cash dummy variable is significantly negative, implying that the high level of cash has no different impact on firm value during normal period. The coefficients of the future changes of cash holdings and its interaction term with high cash dummy variable are insignificant both Asian and Non-Asian firms. These results imply that investors do not differentiate the impact of high cash holdings on firm value. However, the coefficients of the future changes are positively significant for both Asian and Non-Asian firms. These results imply that during non-crisis period, if firms have better performance in the next period, investors will add more value on firms. However, the results also confirm the previous results that the crisis has impact on firms in Asian countries.

Conclusion

The traditional evidence on cash holdings shows that a lot of cash in firms is bad. Holding too much cash in firms possibly creates agency problem, free cash flow theory (Jensen, 1986). To prevent from an unsatisfactory situation, shareholders are not likely to leave too much cash in firms. However, the most recent evidences about cash holdings show that firms tend to accumulate more cash (Bates, Kahle & Stulz, 2009). These evidences imply that cash is good and contrary to the traditional wisdom. Despite the

researches on cash holdings, there is less evidences about the outcome of cash accumulation has been disclosed. Especially during an economic downturn, when the markets are full of information asymmetry and costly external capital. Firms tend to rely more on internal capital. Thus, this study aims to investigate the value of cash holdings during an economic downturn.

The findings are contrary to the hypothesis prediction. The results imply that during non-crisis period, cash holdings of both Asian and Non-Asian firms contribute negatively to firm value. Moreover, this negative impact still exists and cannot differentiate the effect of cash holdings between crisis and non-crisis period. Although cash holdings do not add value to firms during crisis period, they do not lead to things going bad as well. Markets are employed with high asymmetry during crisis period. It is rather difficult to measure value of assets (Mishkin, 1990; Johnson et al., 2000a). These findings are consistent with Johnson et al. (2000) that if such emerging markets experienced even small loss of confidence, the investors will reconsider the amount of expropriation by managers and adjust the amount they are willing to pay. This will be a fall in asset values and lower firm value. The crisis negatively impact firms and it is raising incentive of controlling shareholders to expropriate minority shareholders (ML Lemmon & KV Lins, 2003). Thus, these findings lend support free cash flow problem. In contrast, the results from falsification test conducted in comparable sample indicate that cash holdings among Non-Asian firms contribute even more negative to the value of firms in Non-Asian countries. These results imply that although cash holdings among Asian firms do not enhance firm value during crisis period, they do not lead things worse. Further examination, the results from investigating the impact of high cash level on firm value indicate that the impact of high cash level is not different contribution to firm value both Asian and Non-Asian firms. The results are contrary to the hypothesis prediction as well. The higher cash in firms is possibly an incentive for managers to divert resources for their private benefits, especially when there is a shock from crisis (Shleifer & Vishy, 1997; Johnson et al., 2000b).

Finally, apart from high asymmetry information during crisis period, free cash flow problem is one of an important determinant that has affected the value of cash holdings then firm value. This study assumes that the rational managers are likely to afford all attempts to make firms survive during crisis period. Thus, such managers will keep their actions in line with the shareholders best interest. In this sense, the degree of agency problem should be reduced. Since the framework of this research is investigate the benefit of cash holdings and the findings cannot provide the support hypothesis that value

of cash holdings contribute positively to firm value during crisis period, it is interesting whether when agency problem is accounted would affect the value of cash holdings to firm value during crisis period or not.

Table 1

The estimated regression of fixed effects uses to analyze the impact of cash holdings on value of firms during crisis period. The sample consists of firms in Asian (Thailand, the Philippines, Taiwan and Indonesia) and Non-Asian (Australia and New Zealand). The period of analysis is divided into three periods: pre-crisis (1991-1996), during crisis (1997-2000), and post-crisis (2001-2005). The dependent variable is the value of firms. The crisis period is 1(0) if firms are in the period of Asian financial crisis 1997-2000 (otherwise). Significance of the difference in means between Asian and Non-Asian firms is computed using the independent-sample *t*-test allowing for unequal variance; T-value is $\bar{x}_1 - \bar{x}_2 / \sqrt{SE_1^2 + SE_2^2}$; degree of freedom is $(SE_1 + SE_2)^2 / \left[\left(\frac{SE_1^2}{n_1 - 1}\right) + \left(\frac{SE_2^2}{n_2 - 1}\right)\right]$. Significance is corrected for heteroskedasticity. Standard error is in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
constant	0.2288***	0.2821***	0.0000
	(0.0041)	(0.0058)	
1 if Crisis	0.0165***	0.0167	0.9857
	(0.0055)	(0.0107)	
$dCash_t$	-0.2078***	-0.1016***	0.0279
	(0.0391)	(0.0284)	
$dCash_t$ x Crisis	0.0333	-0.2999***	0.0047
	(0.0659)	(0.0976)	
$dCash_{t+1}$	0.0823**	0.1321***	0.2930
	(0.0396)	(0.0261)	
$dCash_{t+1}$ x Crisis	-0.0857	-0.1089	0.8302
	(0.0693)	(0.0828)	
Control Variables	Yes	Yes	
Firms Fixed Effects	Yes	Yes	
Year Fixed Effects	Yes	Yes	
Number of Observations	13,558	6,676	
Adjusted R^2 (%)	52.89	60.06	

Table 2

The estimated regression of fixed effects uses to analyze the level of cash holdings that have impact to value of firms during crisis period. The sample consists of firms in Asian (Thailand, the Philippines, Taiwan and Indonesia) and Non-Asian (Australia and New Zealand). The period of analysis is divided into three periods: pre-crisis (1991-1996), during crisis (1997-2000), and post-crisis (2001-2005). The dependent variable is the value of firms. The high cash dummy variable is 1(0) if firms are in the top 30 percentile within the same industry (otherwise). Significance of the difference in mean between Asian and Non-Asian firms is computed using the independent-sample *t*-test allowing for unequal variance. Calculations of T-value and degree of freedom are defined as in Table 1. Significance is corrected for heteroskedasticity. Standard error is in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level respectively.

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
constant	0.2228***	0.2807***	0.0000
	(0.0046)	(0.0067)	
1 if Crisis	0.0185***	0.0097	0.4833
	(0.0061)	(0.0109)	
1 if High Cash	0.0059	0.0010	0.6903
	(0.0066)	(0.0105)	
1 if Crisis x High Cash	0.0099	0.0158	0.7892
	(0.0104)	(0.0194)	
$dCash_{,}$	-0.3649***	-0.1546***	0.0033
	(0.0574)	(0.0428)	
$dCash_{,}$ x Crisis	0.1148	-0.0342	0.4377
	(0.0942)	(0.1672)	
$dCash_{,}$ x High Cash	0.2178***	0.0617	0.0979
	(0.0769)	(0.0546)	
$dCash_{,}$ x Crisis x High cash	-0.1712	-0.3081	0.5478
	(0.1288)	(0.1880)	
$dCash_{,-1}$	0.0790*	0.0697**	0.8750
	(0.0480)	(0.0350)	
$dCash_{,-1}$ x Crisis	0.0108	-0.1145	0.4499
	(0.1228)	(0.1115)	
$dCash_{,-1}$ x High Cash	0.0057	0.0988**	0.3054
	(0.0762)	(0.0496)	
$dCash_{,-1}$ x Crisis x High Cash	-0.0974	0.0220	0.5789
	(0.1514)	(0.1529)	
Control Variables	Yes	Yes	
Firms Fixed Effects	Yes	Yes	
Year Fixed Effects	Yes	Yes	
Number of Observations	13,558	6,676	
Adjusted R^2 (%)	53.66	60.87	

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