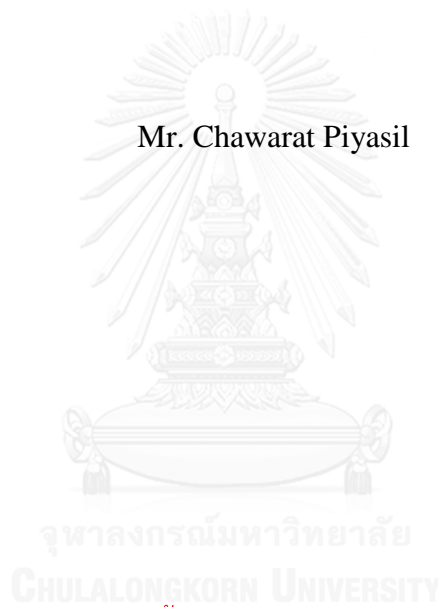


VALUE OF CASH DURING DOWNTURN

Mr. Chawarat Piyasil



บทคัดย่อและแฟ้มข้อมูลฉบับเต็มของวิทยานิพนธ์ตั้งแต่ปีการศึกษา 2554 ที่ให้บริการในคลังปัญญาจุฬาฯ (CUIR)
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มูลค่าของเงินสดในช่วงเศรษฐกิจถดถอย



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

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วิทยานิพนธ์ฉบับนี้ศึกษามูลค่าเงินสดของบริษัทในเอเชีย ได้แก่ ไทย ฟิลิปปินส์ ไต้หวัน และอินโดนีเซีย ที่ได้รับผลกระทบจากวิกฤติเศรษฐกิจเอเชียปี พ.ศ. 2540 เปรียบเทียบกับบริษัทจากประเทศนิวซีแลนด์และออสเตรเลีย โดยใช้ข้อมูลทางการเงินระหว่างปี พ.ศ. 2534 – 2548 ของกลุ่มตัวอย่างจำนวน 3,717 บริษัท จาก 6 ประเทศ

ผลการศึกษาพบว่า วิกฤติเศรษฐกิจเอเชียปี พ.ศ. 2540 มีผลกระทบต่อบริษัทในเอเชีย โดยในช่วงวิกฤติเศรษฐกิจการถือครองเงินสดของบริษัทไม่ส่งผลให้มูลค่าของบริษัทเพิ่มขึ้น และระดับการถือครองเงินสดของบริษัทมีผลกระทบต่อมูลค่าของบริษัทในช่วงวิกฤติเศรษฐกิจและช่วงเวลาปกติไม่แตกต่างกัน แต่อย่างไรก็ตามการถือครองเงินสดของบริษัทก็ไม่ส่งผลให้มูลค่าของบริษัทลดลง ซึ่งสอดคล้องกับทฤษฎีกระแสเงินสดอิสระ

การศึกษาอัตราการลงทุนของบริษัทในเอเชีย พบว่า ในช่วงหลังวิกฤติเศรษฐกิจ (ระยะฟื้นตัว) บริษัทที่ถือครองเงินสดมากมีการลงทุนน้อยกว่าบริษัทที่ถือครองเงินสดน้อย นอกจากนี้ การศึกษาอัตราการฟื้นตัวทางเศรษฐกิจของบริษัทในเอเชียในด้านมูลค่าทางการตลาด พบว่า ช่วงหลังวิกฤติเศรษฐกิจ บริษัทที่ถือครองเงินสดมากมีมูลค่าทางการตลาดไม่แตกต่างจากบริษัทที่ถือครองเงินสดน้อย ในด้านการจ่ายเงินปันผล พบว่า บริษัทที่ถือครองเงินสดมากมีการจ่ายเงินปันผลมากกว่าบริษัทที่ถือครองเงินสดน้อย โดยคงรูปแบบการจ่ายเงินปันผลตั้งแต่ช่วงเวลาปกติก่อนวิกฤติเศรษฐกิจต่อเนื่องไปจนถึงช่วงหลังวิกฤติเศรษฐกิจ และในด้านการทำกำไรหรือผลตอบแทนจากสินทรัพย์ พบว่า ในช่วงหลังวิกฤติเศรษฐกิจ บริษัทที่ถือครองเงินสดมากมีความสามารถในการทำกำไรจากสินทรัพย์ไม่แตกต่างจากบริษัทที่ถือครองเงินสดน้อย

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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 1991 and 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. After examining the investment rates among high cash Asian firms, the findings indicate that investment rates among high cash Asian firms are lower than low cash Asian firms during post-crisis period (i.e., recovery period). Moreover, the findings from examining the recovery rates (market valuation, dividend payout and return on assets) indicate that the market valuation of high cash Asian firms is not different from those low cash Asian firms during recovery period. However, high cash Asian firms are likely to pay dividends higher than those low cash Asian firms during pre-crisis period (i.e., normal period) and these patterns remain even after affected by the 1997 Asian financial crisis. For profitability (return on assets), high cash firms are not different in utilizing the assets to generate profit comparing to those low cash firms during recovery period.

Department: Banking and Finance Student's Signature

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Chapter 1: Introduction

1.1 Background and Problem Review

Corporate cash holding has recently received more attention in finance literatures. The optimal point of cash holding is a balance between the costs and benefits to firms. Opler, et al. (1999) study the determinant of firm's cash holdings. To maximize shareholders' wealth, firms have to hold cash at the level where marginal costs and marginal benefits from holding cash are equal. Firms that hold cash below the optimal point may not have enough available resources to fund the potential investment projects and may affect profitability of firms. On the other hand if firms hold cash above optimal level, it will be problem of agency costs of managerial discretion. It is a conflict of interest between managers and shareholders (Jensen (1986)). This problem is more concerned when firms hold more liquid assets than would be required to maximize shareholder wealth.

Likewise, cash holdings have recently become more crucial. There are many researchers who study firms' cash holdings. Most recent literatures have found that firms are likely to hold more cash than the past. Dittmar, Mahrt-Smith and Servaes (2003) find that the largest world corporations had reported a total \$1.5 trillion in liquid assets, almost 9% of book value of their assets at the end of 1998. Bates, Kahle and Stulz (2009) show that the average cash-to-assets ratio for U.S. industrial firms is more than doubles from 10.5% in 1980 to 23.2% in 2006. Moreover, increasing in cash holdings is significant across firms as well as across countries. These evidences would be described that even after improving of information and financial technology since 1980s, firms are likely to hold higher cash as the precautionary motive.

The internal fund is more important for firms during an economic downturn. Song and Lee (2012) study the long-term effects of financial crisis among East Asian firms. They find that the median cash-to-assets ratio for East Asian firms is almost double from 6.7% in 1996 to

12.1% in 2006 after crisis period. The result shows that the crisis had changed cash policies of firms because firms increase sensitivity to cash flow volatility. Arslan, Florackis and Ozkan (2006) study the hedging role of cash before and during financial crisis. The evidence shows that cash is an effective device for firms, especially during crisis period where is characterized by high asymmetric information and high costs of external capitals.

Most literatures argued that firms' cash holdings become more remarkable important and stand for firms' greatest device. They could help firms recovering or alleviating shocks from an economic downturn. DeAngelo, DeAngelo and Wruck (2002) show that cash can buy time for managers in financial distress firms. However, this role of cash is just for day-to-day basis. As result, the L.A. Gear Company went bankrupt after they could not improve operating performance from business. Mikkelsen and Partch (2003) show the opposite evidence. They investigate performance for high cash firms. The result shows that large cash reserve does not hinder the firms' performance. On the other side, large cash reserve supports investment activities of firms. Moreover, Acharya, Almeida and Campello (2007) show another role of cash as a hedging device for firms transferring resources over time state. Firms would accumulate cash and maintain debt capacity waiting for expected investment opportunity in foreseen future.

However, this advantage of cash in transferring resources has not been paid more attention from prior studies. A gap is that if firms could transfer resources across time, different firms should have different resources. Furthermore, different resources should not have the same value. Especially during an economic downturn when world is characterized by information asymmetry and limited external capital. Thus, value of cash holdings is expected to be higher. If this theoretical finding is practicable, we would expect that firms' internal resources (cash and equivalent) will have higher value during a bad time. This study examines the value of firms' cash holdings during an economic downturn where cash holdings are more important by using the 1997 Asian financial crisis period as a proxy for an economic downturn.

1.2 Research Question

There have been many empirical studies that examine the benefits of holding large cash. Most of them argue that cash is standing for an effective mechanism for firms when they face problems of costly external capitals or hardly access to external capitals during bad time. Some evidences show that large cash within firms does not lead to worse operating performance. Oppositely it rather enhances firms' value. However, the prior studies do not take into account the role of cash when firms are in downturn. The outcome of holding large cash has been unclear, especially during crisis period. Thus, this study aims to answer the question "Is cash worth more during an economic downturn?"

1.3 Objective of the Study

This study examines value of the firm's cash holdings during financial crisis period. Firms could use cash holdings to operate their businesses, invest in potential projects and meet debt obligation. Different firms hold different levels of cash. Firms with lower cash reserves will have more limitation to run business. They may find difficulty to generate enough funds to pay their expenditures or meet debt obligations during bad time. Therefore, they may be worse operating performances or even go bankrupt. From these aspects, we would expect the value of firms' cash holdings become higher during crisis. This study will examine the value of cash holdings that contribute to firm value between normal and during crisis period.

1.4 Scope of the Study

The thesis examines the role of cash holdings standing for an effective device for firms when firms face the financial crisis. The study will examine firms in economies affected by the 1997 Asian financial crisis; namely, Thailand, Philippines, Indonesia, and Taiwan during 1991-

2005. Moreover, the study will also analyze firms from Australia and New Zealand as a comparable sample.

The study excludes firms from Malaysia and Singapore from sample. For Malaysia, there were extensive government interventions. These government interventions distort the market mechanism. One of these interventions, Bank Negara Malaysia announced controls on foreign capital flows on September 1, 1998. This announcement prevented its internationalization. Firms' liquidity is directly affected by the control on foreign capital flows. This left direct foreign investment untouched. This intervention would introduce noise to an analysis as it distorts the market mechanism¹. For Singapore, the economy of Singapore is a major Foreign Direct Investment (FDI) inflow financier. It is a financial hub for international rather than regional investors. It has also benefited from global investors and institutions due to nature of Singapore's main industry namely, global financial service. Thus, firms in Singapore easily access to overseas capital markets². This would also make the noise to the analysis as well.

1.5 Contribution

The study will provide new empirical evidence on the role of cash holdings as an internal capital for firms. During an economic downturn, external capitals are excessive high cost and firms are not likely to receive more capitals. Firms' cash holdings are the important device for firms to operate businesses. The study examines the value of firm's cash holdings during an economic downturn. The analyses conducted in this thesis will add to the existing understanding of cash holdings by providing evidence on their role during a period of an economic downturn. Beyond that evidence from the study will clearly show the outcome of

¹ http://en.wikipedia.org/wiki/1997_Asian_financial_crisis

² http://en.wikipedia.org/wiki/Economy_of_Singapore

accumulating high cash holdings that could possibly help firms cope and recover from an economic downturn.

1.6 Organization of the Study

The remainder of this study is organized as follow. Chapter 2 provides the literature review and hypothesis development and Chapter 3 describes data and methodology. Chapter 4 reports the results and discussion, and lastly, Chapter 5 concludes the results of this study and suggests an area for future research.



Chapter 2: Literature Review and Hypotheses Development

2.1 Literature Review of Cash Holdings

The free cash flow theory has been long investigated by many researchers. Keynes (1936) argues that the advantage of liquidity assets is firms can undertake valuable projects when they are available. Besides, they can easily access external capital as they have more liquid assets use as collaterals. Myers (1977) argues that managers try to avoid the high debt ratio in order to protect their jobs and maintain their personal wealth. In some senses, firms that are financed by the high-risk debt obligations will pass up the positive net present value projects in some states in the future. These investment opportunities in positives net present value projects may create the benefits, and then add market value of the firms. Myers and Majluf (1984) investigate firms that raise cash by issuing stocks to finance valuable projects. The model shows that firms may choose not to issue stocks, and then they forego the valuable projects. They suggest that firms should have more relying on internal funds, and more prefer debts than common stocks. Similarly, Jensen (1986) argues the same thing, financing projects internally is practical action when the costs of external capital are extremely high.

However, cash holdings also have disadvantages. Holding more cash inside firms creates agency conflicts between managers and shareholders. Jensen (1986) suggests that the conflicts of interest between shareholders and managers in the way that managers motivation to act deviated from the best interest of shareholders. The managers have incentives to use cash inappropriately, investing in projects at point below the cost of capital or wasting cash inefficiency. Moreover, Miller and Orr (1966) argue that costs for holding liquid assets are lower return and tax disadvantage.

2.1.1 Evidences Support Cash Holdings

Firms could probably transfer their resources across time in the future state. Acharya, Almeida and Campello (2007) show that when firms have investment opportunities in the future but they are limited to access to external capital. These firms can use cash and debt to transfer resources across time state in the future. When the hedging need is high for the coming future, they should save high cash or maintain higher debt capacity. Both of them will increase the funding capacity of firms in the future. This resource transferring will allow constrained firms to match between the financing capacities and investment opportunities. It also enhances value of the firms. Lins, Servaes and Tufano (2010) find that two liquidity sources are incorporated to hedge against different risks. Excess cash can be used as a guard against future cash flow volatility in a bad session. Lines of credit also provide choices for firms taking business opportunities available in a good session.

The different firms have distinct level of cash holdings. Thus, the different levels of cash holdings should not have the same value. Constrained firms apparently have higher value of cash holdings comparing to unconstrained firms (Dittmar and Mahrt-Smith (2007)). Beyond that they find strong governance can reverse the effects on holding larger cash; both managers heavily invest in low return projects and excess cash decreases pressure of managers to behave in shareholders' best interest manner. Moreover, Almeida, Campello and Weisbach (2004) suggest that firms could use their internal funds to finance new profitable projects, which could contribute and increase value of firms. When costs of the external capitals are excessively high, they would find hardly to access to external capital. The internal funds are only resources available.

Many researchers are interested in the studies of cash holdings among constrained firms. One of these studies, Campello and Chen (2010) show that during the aggregate downturn and unavailability of credit, the stock returns of constrained firms declined more than unconstrained firms. This shock was caused from macroeconomic factors (higher credit

spreads, higher interest rates, lower demands and higher unemployment rates). When the researchers further examined constructing financial constraint return factors which were the differences of return between constrained and unconstrained firms, surprisingly, the result shows that the stock return from constrained firms outperformed the unconstrained firms when present of credit line available or during expansion periods. Fazzari, Hubbard and Petersen (1987) suggest that when firms face the financial constraints, investment spending rather vary with the internal resource available than the availability of net present value. Having available internal funds, firms possibly invest in projects that they cannot afford.

Cash as internal resource is very important especially when the external capital is costly. Kim, Mauer and Sherman (1998) investigate UK firms. They suggest that firms should invest in liquid assets (e.g. cash) that earn lower return when they anticipate a future need for costly external capital. The model from a study predicts that the optimal investment in liquid assets is increasing in terms of cost of external capital, the variance of future cash flows, and the return on future investment opportunities. On the other hand, it is decreasing in the return of difference between physical assets and liquid assets.

While the empirical researches show that large cash holding destroy performance of firms and decrease firm value when they spend cash windfalls, Mikkelsen and Partch (2003) find opposite result to the empirical works. They examine to determine whether policies of persistent large cash holdings hinder the performance of firms or not. They find that operating performance of high cash firms is comparable or greater than the performance of firms matched by size and industry or by a measure of productivity to hold substantial cash. Additionally, operating performance of high cash firms is not related to governance characteristics. They conclude that the policies of firms that hold large cash reserves are not the subject to poor performance and also do not present the conflicts of interest between managers and shareholders. Hence, policies of large cash holding can enhance firm value. Fresard (2010) tries to examine the real effect of cash holdings to the product market behavior. The result shows

that large cash reserves lead to future share gains comparable to the low cash reserves competitors. The effects of large cash holdings become enlarged when the competitors are facing a financial constraint and when the number of strategic interaction between the competitors is significance. Eventually, competitive effects of cash then lead to increase in firm value and performance. Moreover, having large cash reserves could contribute to firms' profitability. Recent studies show the evidences about relationship between cash holdings and profitability. Bigelli and Sánchez-Vidal (2012) investigate the cash holdings in Italian private firms showing that high cash holdings firms have greater profitability comparing to normal cash holdings firms. High cash holdings firms paid more dividends to shareholders. Moreover they invest more in medium term future horizon. Enqvist, Graham and Nikkinen (2014) investigate the impact of working capitals on firms' profitability in Finland. The result shows that the relationship is more notable during the economic downturn relative to economic boom session. They also find that the efficient inventory management and account receivable conversion period increase during the downturn. They suggest that to boost up the cash flow of firms may increase capacity of firms to finance working capital internally during the economic downturn.

To be lower in sensitivity of investment to cash flow, firms with conservative leverage policy are directed to maintain the financial flexibility. Marchica and Mura (2010) investigate the firms that adhere to conservative leverage policy. From their analysis, it reveals that the following period of low leverage, firms make a larger capital expenditures and increase in abnormal investments, the new investments are financed through new debt issuance. For instance, they also find a similar result when they account for the presence of excess cash in the investment decisions or leverage net of cash. Further, the long run performance tests disclose that firms with financial flexibility are not only taken more investments but they also have better investments.

An economic downturn is a time that global market is characterized by asymmetric information. Cash reserves are definitely main factors for firms driving operating performance.

Arslan, Florackis and Ozkan (2006) conduct the analysis for an emerging market, before and during a financial crisis period. The results show that cash rich firms have higher ability to take opportunity of profitability investment. The constrained firms exhibit higher investment-cash flow sensitivities than unconstrained firms. Moreover, this evidence shows that cash stands for an effective device for firms especially during the crisis periods. The cash reserves can be a hedging device opposite to the cash flow sensitivity and financial constraints. As Asian countries are bank base economies, the firms may suffer from the effects of credit cut during the crisis. One practical way to do to keep continuing their operations is to exhibit good health of their financial statement (balance sheet). Firms that have weak financial health may face the problem of credit shortage. Spaliara and Tsoukas (2013) investigate the business failure. They have considered the effect of macroeconomic conditions and financial healthiness in isolation. They suggest that one way for policy makers to alleviate the effects of financial crisis is to make financial cheaper and more easily access (internal financing capital). Mizen and Tsoukas (2012) examine the effects of Asian crisis and global financial crisis to the external capital premium. They find that the sensitivity of premium is higher especially for constrained firms.

During an economic downturn, one way for firms to generate cash flow to meet debt obligations or any other expenses is to liquidate corporate liquidities. Faulkender and Wang (2006) argue that corporate liquidities can reduce the possibility of confrontation the financial crisis costs if the firms cannot sufficiently generate cash flow to meet debt payment obligations. Campello, Graham and Harvey (2010) do a survey of 1,050 Chief Financial Officers (CFOs) in the U.S., Europe, and Asian to directly access whether their firms are credit constrained during global crisis of 2008. Their evidence shows constrained firms sold more assets and use cash reserves to fund their operation activities. Moreover, firms that cannot access external capitals would forego the investment opportunities. Duchin, Ozbas and Sensoy (2010) also find the same argument. Firms tend to burn through cash holding during crisis period. The investment activities of firms are positively related to cash reserve in the post crisis

period. The declining in investment activities is greatest among firms that have less cash reserves, high short term debts, financially constrained, or operate in industries totally depending on external finance.

After the economy recovery from crisis, management policies of firms are very conservative. Song and Lee (2012) investigate the long-term effects of Asian financial crisis on corporate cash holdings in eight East Asian Countries. The cash to assets ratio for Asian firms almost doubles from 6.7% in 1996 to 12.1% in 2006. This increasing in cash holding is not specific just only among financial constrained firms, but also including unconstrained firms. The Asian firms accumulate cash holding by reducing investment activities. The Asian crisis has systematically changed the cash policies of firms. The enlargement of cash holdings is mostly explained by the demand function for cash, and not partially explained by the firm characteristics of newly listed firms as the median investment ratio for IPO firms during crisis is not higher than those sub-sample firms. Moreover, they find that unconstrained firms (large, dividend payer, low-leverage firms) respond severely to the crisis. They tend to save more cash than constrained firms after the crisis. During crisis, the hedging role of cash is more significant in terms of world characterized by high asymmetric information and excessively costly external capital. Credit conditions are an important factor limiting the speed of recovery. Kannan (2012) studies the credit condition and recovery from financial crisis. By using industry level data, the evidence shows that industries that rely more on external capital finance grow more gradually than others industries during recovery periods after the crisis.

The relationship of excess cash and stock returns are examined by Simutin (2010). The evidence shows that high excess cash firms have lower stock returns than those of firms with lower level of excess cash. Firms with high excess cash also have higher market betas. However, cash is particularly valuable in market downturns. Moreover, the future investment activities are extremely and positively related to excess cash as these firms have plenty available resources to take advantage of investment opportunities after downturn.

The another evidence from DeAngelo, DeAngelo and Wruck (2002) showing that liquidity assets (cash and equivalent) are a good source for internal fund to subsidize the firm's losses and also liquidity assets can buy time for managers of firms that experience in a declining in growth opportunity waiting for a recovery. The evidence shows that the pressure of debt obligation is mitigated by highly liquid assets structures. As discussed by DeAngelo, DeAngelo and Wruck (2002), L.A. Gear Company collapsed after the firm first violated the debt covenants in 1997. Over six years suffering from losses and declining in revenues, L.A. Gear liquidated its assets to generate cash and use this liquidity liquidation to meet its debt obligation. Without performance improvement, L.A. Gear could not meet their covenants that obligate not only interest payment but also improving its business performance.

2.1.2 Evidences Against Cash Holdings

There are many studies finding evidences about the bad effects of holding more cash. Cash holdings also create the agency problems between managers and shareholders. Holding more cash inside, in this case, it is an opportunity for managers doing something that they never did before. Managers increase their power by increasing resources under their control (Kusnadi (2011)). This power of managers may destroy the value of the firms in case of bad decision investing in negative net present value projects. Blanchard, Lopez-de-Silanes and Shleifer (1994) find that when the firms receive cash windfall, managers will try to ensure the long-run survival and independence from the control of shareholders. They rather keep cash inside firms than pay dividends, share-repurchase, or reducing outstanding debts.

Even not invest in wasteful investments, managers with high cash on hand may do an acquisition. Blanchard, Lopez-de-Silanes and Shleifer (1994) show that when firms receive cash windfall, in some cases, managers use cash they received to make an acquisition in either related or unrelated to firms' businesses. The unrelated acquisitions especially fail in a few years. This finding is consistent with the previous argument from Jensen (1986) that agency

problem become more severe if the acquisitions are taken by bad managers. Tong (2011) examines the firm diversification on the value of corporate cash holdings. The result shows that the value of cash is lower in diversified firms (both unconstrained and constrained firms) than single-segment firms. The diversification has severely worsened on the value of cash if firms have lower level of corporate governance. Harford (1999) also shows the evidences that cash rich firms are more likely to make acquisitions, diversified acquisition then decrease the wealth of shareholders.

Furthermore, shareholder characteristics also indicate the value of cash. There are some studies try to investigate the relation of shareholder characteristics and value of cash holdings. Harford, Mansi and Maxwell (2008) show that when firms have high excess cash together with weak shareholder rights, this combination will lead to increase in capital expenditures and acquisitions. Firms with low shareholder rights together with high excess cash have lower profitability and valuations. Another study by Kusnadi (2011) examines the relationship between corporate governance mechanism and cash holdings for a sample of firms listed in Singapore and Malaysia. The result indicates that firms with less effective governance tend to build up more cash than those who have effective governance. When agency conflicts between managers and minority shareholders are more severe, managers have more incentive to hold more cash. Additionally, the value of cash holdings is found to be more negative when shareholders of the firms are single control, pyramid ownership, as well as family controlled firms.

Besides, Yung and Nafar (2014) extend the existing literature on determinants of cash holding consolidating with the creditor rights. The goals and risks from creditor objectives are slightly deviated from shareholders. Strong creditor rights increase levels of cash holding because it decreases investment levels of firms, risk taking, cash flow risk, and leverage of firms in order to ensure ability of firms to meet payment obligations. The result shows that excess cash that is induced by creditor rights has a significant negative impact to firm value.

Similarly, Martínez-Sola, García-Teruel and Martínez-Solano (2013) find that holding cash above and below optimal cash holding decrease the firm value. The result shows concave relationship between cash holdings and firm values. Especially a financial distress, the inability of firms to meet payment obligations makes value of firms decreasing.

Agency problem has negative effect on value of firms and more severe during an economic downturn. Levin, Lin and Chu (2002) suggest that the crisis negatively impact firms' investment opportunities. The crisis also raises the incentives of controlling shareholders to expropriate minority investors. Holding high cash is an incentive for managers to turn resources into their private benefits. Besides, managers in Asian firms are able to control firms even the proportion of their cash flow right is relatively low. Their evidences show that ownership structure is an important determinant in determining the agency problems between controlling shareholders and outside investors, which has mainly affected the value of firms. Johnson, et al. (2000) study the difference in legal systems and the strength of legal enforcement across different countries. Their evidences show that weakness in corporate governance and bad economics prospection would lead to be more expropriation by managers. Almost managements in emerging markets are controlling shareholders and the economic downturn significantly increase the expropriation by managers. 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. Shleifer and Vishny (1997) do a survey of corporate governance. They show that there are several ways for insiders can possibly divert resources including outright theft, dilution of outsider investors by issuing share to insiders, excessive salaries, assets sales to themselves by controlling at favorable process or managers have the opportunity to increase their future wealth in proportion to their claims on firms' future cash flows. For evidences on expropriation in emerging markets, Johnson, et al. (2000) and Simon and La Porta (2000) show that controlling shareholders can simply transfer resources from firms to their own benefits

through self-dealing transactions. Moreover, controlling shareholders can increase their share in diluting of share issuing, insider trading, creeping acquisition or other transactions that discriminate against minority shareholders.

2.1.3 Other Evidences of Cash Holdings

Opler, et al. (1999) come with the main reason for firms holding more cash because firms experienced a large change in excess cash that occurring in operating loss. Firms with strong growth opportunities and riskier cash flows tend to build up high cash ratio. Importantly, high cash reserves do not only harm the value of firms or make agency conflicts more severe, but high cash also can maximize wealth of shareholders if managers use those cash reserves to pay back to shareholders. Cash can be used as a cushion for firms against the unexpected capital needs that may arise in the unforeseen future (DeAngelo and DeAngelo (2007)). Ramirez and Tadesse (2009) examine the relationship between uncertainty avoidance, multi-nationality and firm cash holdings. Base on large panel of firms in fifty countries, firms in countries with high level of uncertainty avoidance tend to hold more cash as it is a way to hedge against unanticipated session in the future.

Cash has been particularly determined as a key factor when firms are going to trouble, defining as financially constraints. Almeida, Campello and Weisbach (2011) argue that in order to mitigate the future financing constraints, firms have to invest in projects with the shorter payback periods, less risk and utilized more collateral assets. The operational hedges are more critical than financial hedges and they cannot be hedge by financial derivatives. Moreover, they find that constrained firms build up cash to meet their optimal cash saving by reducing in the current valuable investments. They should increase cash reserves to be a buffer against the economics shocks, while unconstrained firms should not.

Besides, today financing costs are very important as well. Hirth and Viswanatha (2011) show the evidence that low cash firms that face high financial costs today are more reluctant to

invest if they have less cash or their future cash flows are high volatile. Whited (1992) shows that firms that have less liquidity assets as collateral, especially small firms, may find a hardship to access external capitals or even they can access to external capitals, they will receive external funds at high discount rates.

2.1.4 Summary

There are benefits and costs of cash holdings. Large cash holdings do not lead to poor performance, instead they create value to firms (Mikkelson and Partch (2003)). Moreover cash-rich firms tend to have more profit comparing with normal cash holdings firms (Bigelli and Sánchez-Vidal (2012)). However, large cash holdings may create agency problems Jensen (1986).

Interestingly, most literatures argue that cash holdings carry a potentially important implication during an economic downturn. When liquidity shortage in economics downturn, firms response to continue the existing on-going projects or invest in profitable opportunities by using their internal capital fund (Atolia, Einarsson and Marquis (2011)), especially when there is excessively high costs of external capital (Kim, Mauer and Sherman (1998)). Most of literatures about crisis period, the researchers suggest that firms are better to keep cash within firms during crisis period (Arslan, Florackis and Ozkan (2006); Duchin, Ozbas and Sensoy (2010); Faulkender and Wang (2006); Song and Lee (2012)). Additionally, Lins, Servaes and Tufano (2010) show that excess cash can be used as guards against the future cash flow volatility. Moreover, Acharya, Almeida and Campello (2007) introduce the hedging perspective for cash and debts. Firms can transfer resource across a state of time. This will allow firms to match between investment opportunity and financing capacity.

However, the role of cash holdings during an economic downturn has not received more attention. Cash-rich firms may have better chance to investment in potential projects, and have better investment opportunity as they have plenty available resources to take these

advantages earlier. Firms with large cash on hand probably have a greater survival potential from crisis comparing to low cash firms. From these aspects, value of cash holdings in cash-rich firms should be higher comparing to low cash firms. Moreover, if this resources transferring are practical, we should observe the significant benefits from cash holdings, especially during an economic downturn. High cash firms tend to have the direct potential to alleviate from shocks and be ready to take investment opportunities. Thus, high cash firms will result in greater survival probability than low cash firms. This study aims to fill this gap that cash holdings could possibly help firms survive from an economic downturn.

2.2 Hypotheses Development

Theoretically, there are many reasons for firms to hold high cash reserves. First, precautionary motives, firms maintain high level of cash holdings to be a buffer against unexpected unforeseen future. The main objective is to prevent from the likelihood of cash shortfalls. Second, transaction motives, firms need more relying on liquidity management to meet their current expenses (Keynes (1936)). Last, cash reserves mean internal resources. In cases of high external costs and hardly access external funds, firms could prevent underinvestment costs by using internal funds. However, the external resources particularly include information asymmetry (Myers and Majluf (1984)). This asymmetric information consequently raises higher costs for external resources. Any particular motive is set to enhance value for firms, finally to shareholders. Especially, different strategies should have effects to value of cash in each circumstance distinctly.

2.2.1 Value of cash holdings between normal and crisis period

Most arguments of cash holdings debate toward the benefit of being effective device when firms are in a period of an economic downturn. Lins, Servaes and Tufano (2010) argue that excess cash can be used as a guard against cash flow volatility during a bad time. Firms can generate cash flow by liquidating assets during an economic downturn (Faulkender and

Wang (2006)). If firms could transfer resources across time, different firms should have different resources. Additionally, different resources should not have the same value. During an economic downturn, the market is full of asymmetric information. Unavailability of external capitals or extremely high cost of external capitals will directly affect firms' activities; operating performance, investment and debt obligation. The high cost and hardly access of external capital will contribute to be higher in value of internal resources. Moreover, the only available resource during an economic downturn is internal capital. Hence, we would expect that value of cash holdings have higher value during economic downturn. Thus, this would lead to the following hypothesis.

Hypothesis 1: Cash is more valuable during crisis than normal period.

2.2.2 Value added for high cash firms after crisis

When market capitals are perfect, there is no difference between internal and external resources. All firms have no limitation to get involved in external capitals. Hence, financing decisions and investment activities could be separately concerned. However, there is violation of the Modigliani-Miller theorem. Realistically the market capitals are not completely perfect and are driven by the asymmetry information. This leads to be unequal of these two resources. Generally, external capitals apparently have higher costs than internal resources. These different costs are more remarkable during an economic downturn. Firms will find hardly to access external capitals or receive external capitals with high costs. Their investment activities should have been regarding on internal resources (Keynes (1936)). Firms' cash holdings can enhance capability of firms to invest in profitable opportunities when the external capital is not available or high cost (Arslan, Florackis and Ozkan (2006)). When firms are constraints, investment activities among constrained firms tend to vary with internal funds available rather than availability of positive net present value projects (Fazzari, Hubbard and Petersen (1987)).

Besides, Campello, Graham and Harvey (2010) find that constrained firms reduce expenses by cutting in technology expenditures, employees' salaries, and capital expenditures due to tight funding during an economic downturn. These effects possibly pass through even after crisis period. The operating activities are merely depended on the available of internal funds. High cash firms would have potential to invest better than low cash firms because they have available plenty of liquid assets. Firms with high cash on hand could possibly invest immediately when there is a present of opportunity. From this reason, we would expect the different investment rates between cash-rich and low cash holdings firms after crisis period. This will lead to define the following hypothesis as.

Hypothesis 2: Investment rates for cash-rich firms are higher than firms with low cash holdings during recovery period.

2.2.3 Recovery for high cash firms after crisis

When the value of cash is different across firms, one would expect that this difference in value of cash would affect firms' actions. When firms suffer from an economic downturn, high cash firms probably take action before low cash firms. The operating activities would be resumed early. Firms with high cash are prompt to take profitable opportunities. Thus, these will lead to be better operating performance and investments opportunity. Bigelli and Sánchez-Vidal (2012) find that firms with high cash holdings have greater profitability than firms with normal cash holdings. This would imply that the high cash firms have better recovery rate than low cash firms. Shortage of internal funds during economic downturn is critically harm firms. Firms with low cash cannot generate enough capital to finance necessary investments, hence delaying in recovery rate. These will lead to the following hypothesis as.

Hypothesis 3: High cash firms recover more quickly from crisis than low cash firms.

Chapter 3: Data and Methodology

3.1 Data and Sample

Using Datastream and Worldscope database, the samples will be obtained from 4 countries including Thailand, Indonesia, Philippine and Taiwan, which all were affected by the Asian financial crisis (1997-1998) during 1991-2005. Moreover, this study will also analyze firms from Australia and New Zealand as a comparison. The nature of Australia and New Zealand markets are quite similar to Asian markets and they are not affected by Asian financial crisis. This comparison will obviously confirm whether or not the value of cash holdings in Asian countries is truly affected by the crisis. 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.

3.2 Methodology

In this section, I will investigate the value of cash holdings that have effect on firm value in an economic downturn during a period of Asian financial crisis 1997. To establish the basic regression, a model is adopted from Pinkowitz, Stulz and Williamson (2006), which is a value regression originally developed by Fama and French (1998). This value regression is used in processing an explanation across a wide range of research studies.³ It well explains cross-sectional variation in firm values. I will follow Pinkowitz, Stulz and Williamson (2006), I then add a Crisis dummy variable and its interaction terms into all variables to observe the value that cash holdings contribute to firm during crisis period.

³ The growing literatures that examine the value of cash (Faulkender and Wang (2006); Pinkowitz, Stulz and Williamson (2006)) use the Fama and French (1998) model to analyze the value of cash.

Pinkowitz, Stulz and Williamson (2006) use change in assets to be a proxy for investment component of expected net cash flows. Besides, future change of assets will absorb the expectation of growth of assets. The level of assets is not classified as part of investment. Therefore, the model excludes the level value of assets. For research and development variables (R&D), the data is not available for firms in Asian countries. I drop out this variable (Pinkowitz, Stulz and Williamson (2006) set R&D equal to zero in case of missing).

The model 1 is defined as follows:

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

Where:

- X_t is the level of variable X in year t divided by the level of total assets in year t.
- dX_t is the 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 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 expenses. R&D it equal to zero in case of missing.
- ***I*** is interest expenses.
- ***D*** is dividends defined as common dividends paid.
- ***Cash*** is liquid asset holdings, cash plus marketable securities (securities or debts that are to be sold within one year).
- ***Crisis dummy_i*** is dummy variable that takes value of 1 for period between 1997 and 2000, which is an Asian financial crisis⁴, 0 otherwise.

The expected result is a positive sign for the coefficient of the interaction terms between the past change in cash and crisis dummy variable. During crisis period, cash holdings contribute more to firm value.

The model includes the future change of independent variables to absorb the change in expectation of investors that could have impact on firm value at time t. However, the model has been concerned that if the actual value of future change can be collected, why the model include the future change as a proxy for expected value in order to absorb the investors' expectation. The error term makes a difference between expected value and actual value. This question has been explained by following equation.

$$dX_{t+1} = \mu_t + \varepsilon_{t+1}$$

Taking expectation both sides:

$$E(dX_{t+1}) = E(\mu_t) + E(\varepsilon_{t+1})$$

Because $E(\varepsilon/x) = 0$ and $E(x) = x$,

$$dX_{t+1} = \mu_t$$

⁴ IMF had announced that the early of 2000s was the recovery period for countries that were affected by Asian financial crisis 1997.

Where:

- dX_{t+1} is the change in the level of X from year t to year t+1, $X_{t+1} - X_t$.
- $-\mu_t$ is the expected value in year t.
- $-\epsilon_{t+1}$ is a difference that expectation deviates from actual value from year t to year t+1.

The model also includes the future change of market value to capture other future change of its unexpected components. According to Fama and French (1998), they explain that “Following (Kothari and Shanken (1992)), we use the change in future market value, $dV_{i,t+2}/A_t$, to purge other future changes of their unexpected components. To illustrate the logic, suppose the expected change in earnings from t to t + 2 has a positive effect on $(V_t - A_t/A_t)$, and the unexpected part of $(V_t - A_t/A_t)$ has a positive effect on V_{t+2} . The Kothari-Shanken argument then says that the slope on $dV_{i,t+2}/A_t$ in regression should be negative. Intuitively, the slope on $dV_{i,t+2}/A_t$ offsets the error in the realized change in earnings as a measure of the expected change. Similar logic says $dV_{i,t+2}/A_t$ can also offset the unexpected components of the future changes in assets, dividends, and debt. However, the two-year change in market value, $dV_{i,t+2}/A_t$, is not perfectly correlated with any of these unexpected components, so measurement error is a lingering problem in the regressions” (p. 824)⁵.

Further, to investigate an effect from different level 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 terms between High-cash dummy and Crisis dummy to the previous model. For

⁵ Fama and French (1998) use two year future change ($t+2$) to absorb the expectation. However, the model in this study is adopted from Pinkowitz, Stulz and Williamson (2006) which use one year change ($t+1$) to absorb the expectation.

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.

The model 2 is defined as follows:

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

Where:

-Crisis dummy_i is dummy variable that takes value of 1 for period between period between 1997 and 2000, 0 otherwise.

-High_cash dummy_{i,t} is dummy variable that take 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 the interaction terms 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 result is a positive sign for the coefficient of the interaction terms between high cash and crisis dummy variables. During crisis period, high cash firms have higher magnitude of value of cash holdings than low cash firms.

The next investigation is to examine the firm's investment rates. The test is designed for examining the investment rates of firms that are affected by Asian financial crisis. I adopt a model from Fazzari, Hubbard and Petersen (1987). Their research has been based on the imperfection of capital market. The internal resources do not act as a perfect substitution for external resources, and vice versa. Hence, the firm's investment decisions normally depend on various financial factors.⁶ The investment model is based on the traditional acceleration principle, which links the fluctuation in sales or output motivate change in capital spending or investment. I will add High-cash, Crisis, Recovery dummy variables and two interaction terms to the model. The test period will be separated into three; normal period 1991-1996, during crisis 1997-2000 and post crisis 2001-2005.

The model 3 is defined as follows:

$$\begin{aligned}
 (I/K)_{i,t} = & \alpha + \beta_1 \text{Tobin's } Q_{i,t} + \beta_2 \text{Cash Flow}_{i,t} + \beta_3 \text{High_cash dummy}_{i,t} \\
 & + \beta_4 \text{Crisis dummy}_i + \beta_5 \text{Recovery dummy}_i + \beta_6 \text{Crisis dummy}_i \\
 & \times \text{High_cash dummy}_{i,t} + \beta_7 \text{Recovery dummy}_i \times \text{High_cash dummy}_{i,t} \\
 & + \sum_{j=3}^7 (\beta_j \times \text{Tobin's } Q_{i,t}) + \sum_{j=3}^7 (\beta_j \times \text{Cash Flow}_{i,t}) + \varepsilon_{it} \quad (3)
 \end{aligned}$$

Where:

⁶ There are some critiques that the measurement issues of financial constraints are not relevant. However, the objective of financial constraints in this model is to control the effect to reflect the real impact on investment rate. Moreover, Rauh (2006) and Almeida and Campello (2007) find that even the measurements are not relevant, the cash flow remains effect the investment activities of firms.

- $(I/K)_{i,t}$ is investment-capital ratio, where I is investment in plant and equipment and K is beginning-of-period capital stock.
- **Tobin's $Q_{i,t}$** 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 to total assets
- **Cash Flow $_{i,t}$** is the sum of income after interest and tax, all noncash deductions from income (depreciation and amortization) and dividends to beginning-of-period capital stock.
- **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 $_i$** is dummy variable that takes value of 1 for period between period between 1997 and 2000, 0 otherwise.
- **Recovery dummy $_i$** is dummy variable that takes value of 1 for period between period between 2001 and 2005, 0 otherwise.
- **Crisis dummy $_i \times$ High_cash dummy $_{i,t}$** is the interaction terms 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.
- **Recovery dummy $_i \times$ High_cash dummy $_{i,t}$** is the interaction terms 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 2001 and 2005, 0 otherwise.

The expected result is a positive sign for the sum of the coefficients of high cash dummy variable and its interaction terms with Recovery dummy variable. During recovery period, high cash firms have higher investment rates than low cash firms.

Moreover, some of empirical investment models are based on the traditional acceleration principle, which links the demand for investment to the firm's output or sales (Abel and Blanchard (1986)). I will re-run the model by using two alternative measurements for Tobin's Q; change in sales, the current sales and three variables of lagged sales (t-1, t-2, t-3 and level of sales) in the model. The measurements are defined as follows:

- ***Change in sales_t*** is sales year t-1 to year t, divided by sales in year t-1.
- ***The current sales and lagged sales_{t,t}*** is the ratio of sales to the beginning-of-period capital stock.

Firms with plenty of internal resources are expected to be more ready to take any investment opportunities than firm with tight internal resources after affected from crisis. If this argument is practical, therefore we would see a better recovery rate after crisis in firms with high internal resources. In order to explore more on how cash standing as an important device of firms during post crisis period 2001-2005, three variables will be used as proxy for recovery rate; Tobin's Q, dividend payout, and return on assets during recovery period (post crisis period).

First, using Tobin's Q as a proxy for recovery rate. After affected from crisis, firms with high internal resources will have advantage over firm with low internal resources. Due to a costly of externals capital during crisis period, high internal resources allow firms to take growth opportunities. Hence, high cash firms are expected to have higher growth opportunities than low cash firms. This outcome could be observed from value that the markets give on firm. The model is adopted from Lang and Stulz (1993), designing for examining the relationship between Tobin's Q and firm diversification. I will add five more variables: Leverage variable as a financial flexibility, Firm's export revenue, Crisis dummy, Recovery dummy and High-cash dummy to the model. For Leverage variable, it will capture the effect of firms' ability to

borrow form external capital. Besides that Firm's export revenue is added into the model. After crisis period, exporters may have benefits of local currency depreciation. This weakness of exchange rate may have effect on market's valuation of firms.

The model 4 is defined as follows:

$$\begin{aligned}
 \text{Tobin's } Q_{i,t} = & \alpha + \beta_1 \text{Size}_{i,t} + \beta_2 \text{Leverage}_{i,t} + \beta_3 \text{Export_revenue}_{i,t} \\
 & + \beta_4 \text{High_cash dummy}_{i,t} + \beta_5 \text{Crisis dummy}_i + \beta_6 \text{Recovery dummy}_i \\
 & + \beta_7 \text{Crisis dummy}_i \times \text{High_cash dummy}_{i,t} + \beta_8 \text{Recovery dummy}_i \\
 & \times \text{High_cash dummy}_{i,t} + \sum_{j=4}^8 (\beta_j \times \text{Size}_{i,t}) + \sum_{j=4}^8 (\beta_j \times \text{Leverage}_{i,t}) \\
 & + \sum_{j=4}^8 (\beta_j \text{Export_revenue}_{i,t}) + \varepsilon_{i,t} \tag{4}
 \end{aligned}$$

Where:

- **Tobin's $Q_{i,t}$** 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 to total assets. Tobin's Q adjustments equal to Tobin's Q of firm minus the industry median Tobin's Q.
- **Size $_{i,t}$** is log of ratio between total assets to median of assets within industry.
- **Leverage $_{i,t}$** is total debt to total equity ratio.
- **Export_revenue $_{i,t}$** is firm's revenue from export products and services to total assets.
- **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*** $_i$ is dummy variable that takes value of 1 for period between period between 1997 and 2000, 0 otherwise.
- ***Recovery dummy*** $_i$ is dummy variable that takes value of 1 for period between period between 2001 and 2005, 0 otherwise.
- ***Crisis dummy*** $_i \times$ ***High_cash dummy*** $_{i,t}$ is the interaction terms 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.
- ***Recovery dummy*** $_i \times$ ***High_cash dummy*** $_{i,t}$ is the interaction terms 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 2001 and 2005, 0 otherwise.

The expected result is a positive sign for the sum of the coefficients of high cash dummy variable and its the interaction terms with Recovery dummy variable. During recovery period, high cash firms have higher growth opportunity than low cash firms.

Second, using dividend payout as a proxy for recovery rate. Firms that are affected from crisis may find difficulty to run businesses and hardly generate profits during crisis period. One would expect that firms with high internal resources are able to resume normal operating activities earlier. As a result when firms are back to run their businesses, goals are to set up with the aim of making profits and give returns back to shareholders. During recovery period, one of the indicators that could represent a firm's recovery rate is dividend payment. High cash firms are expected to pay dividends to shareholders with the higher rates comparing to those low cash firms after affected by the crisis. These higher rates of dividend payments imply that firms will have a better recovery rate. The model is adopted from Fama and French (2001). To investigate that which firm can pay dividends higher after crisis period, three dummy variables and two interaction terms are added to the regression.

The model 5 is defined as follows:

$$\begin{aligned}
 Dividend_{i,t} = & \alpha + \beta_1 Profitability_{i,t} + \beta_2 Growth\ Rate\ of\ Assets_{i,t} + \beta_3 Tobin's\ Q_{i,t} \\
 & + \beta_4 Size_{i,t} + \beta_5 High_cash\ dummy_{i,t} + \beta_6 Crisis\ dummy_i \\
 & + \beta_7 Recovery\ dummy_i + \beta_8 Crisis\ dummy_i \times High_cash\ dummy_{i,t} \\
 & + \beta_9 Recovery\ dummy_i \times High_cash\ dummy_{i,t} + \sum_{j=5}^9 (\beta_j \\
 & \times Profitability_{i,t}) + \sum_{j=5}^9 (\beta_j \times Growth\ Rate\ of\ Assets_{i,t}) + \sum_{j=5}^9 (\beta_j \\
 & \times Tobin's\ Q_{i,t}) + \sum_{j=5}^9 (\beta_j \times Size_{i,t}) \varepsilon_{i,t} \tag{5}
 \end{aligned}$$

Where:

- ***Dividend_{i,t}*** is payout ratio
- ***Profitability_{i,t}*** is (the ratio of earnings before interest to assets).
- ***Growth Rate of Assets_{i,t}*** is (the change in assets in fiscal year t).
- ***Tobin's Q_{i,t}*** 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 to total assets
- ***Size_{i,t}*** is log of ratio between total assets to median of assets within industry.
- ***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*** is dummy variable that takes value of 1 for period between period between 1997 and 2000, 0 otherwise.
- ***Recovery dummy_i*** is dummy variable that takes value of 1 for period between period between 2001 and 2005, 0 otherwise.
- ***Crisis dummy_i × High_cash dummy_{i,t}*** is the interaction terms 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.
- ***Recovery dummy_i × High_cash dummy_{i,t}*** is the interaction terms 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 2001 and 2005, 0 otherwise.

The expected result is a positive sign for the sum of the coefficients of high cash dummy variable and its interaction terms with Recovery dummy variable. During recovery period, high cash firms could resume to pay dividend to shareholders higher than low cash firms.

Last, using return on assets (ROA) as a proxy for recovery rate. Firm's profitability is generally defined as the effectiveness of utilizing its available resources. In other words, it measures how efficiency a firm uses assets to generate income. During an economic downturn, the internal resources are only available capitals of firm. This study will examine the relationship between firm's internal resources (cash holdings) and its profitability after effect from crisis. The model is adopted from Dogan (2013). The regression aims to examine the relationship between size of firm and firm's profitability. The model includes the variables that due to the assumption of their activities of firm's profitability. Besides, evidence from Dogan (2013) shows that all of the independent variables well explain the dependent variable with economically significant. For this study, I then add cash variable, high-cash dummy, crisis

dummy, recovery dummy and two interaction terms to explain the effect of cash holdings to ROA during recovery period.

The model 6 is defined as follows:

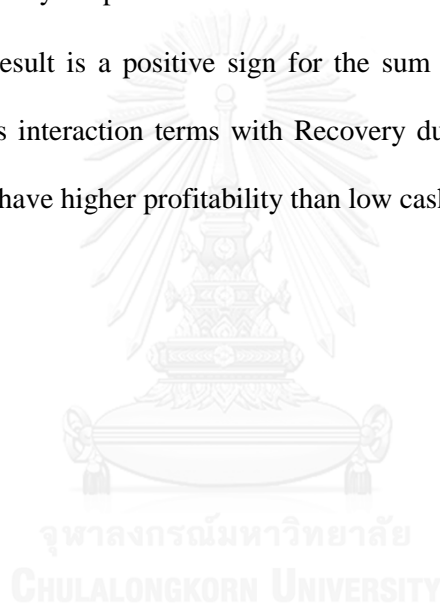
$$\begin{aligned}
 ROA_{i,t} = & \alpha + \beta_1 Size_{i,t} + \beta_2 Leverage_{i,t} + \beta_3 Liquidity_{i,t} \\
 & + \beta_4 Age_{i,t} + \beta_5 High_cash\ dummy_{i,t} + \beta_6 Crisis\ dummy_i \\
 & + \beta_7 Recovery\ dummy_i + \beta_8 Crisis\ dummy_i \times High_cash\ dummy_{i,t} \\
 & + \beta_9 Recovery\ dummy_i \times High_cash\ dummy_{i,t} + \sum_{j=5}^9 (\beta_j \times Size_{i,t}) \\
 & + \sum_{j=5}^9 (\beta_j \times Leverage_{i,t}) + \sum_{j=5}^9 (\beta_j \times Liquidity_{i,t}) + \sum_{j=5}^9 (\beta_j \times Age_{i,t}) \\
 & + \varepsilon_{i,t}
 \end{aligned} \tag{6}$$

Where:

- **$ROA_{i,t}$** is profit before interest and tax to total assets. ROA adjustments equal to firm's ROA minus the industry median ROA.
- **$Size_{i,t}$** is log of ratio between sales of firm to median of sales within industry.
- **$Leverage_{i,t}$** is total debt to total equity ratio.
- **$Liquidity_{i,t}$** is current assets to current liabilities.
- **$Age_{i,t}$** is age of firm.
- **$High_cash\ dummy_{i,t}$** is dummy variable that takes value of 1 if firm is in the top highest 30% of cash holdings rank within industry, 0 otherwise.
- **$Crisis\ dummy_i$** is dummy variable that takes value of 1 for period between period between 1997 and 2000, 0 otherwise.

- ***Recovery dummy_i*** is dummy variable that takes value of 1 for period between period between 2001 and 2005, 0 otherwise.
- ***Crisis dummy_i × High_cash dummy_{i,t}*** is the interaction terms 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.
- ***Recovery dummy_i × High_cash dummy_{i,t}*** is the interaction terms 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 2001 and 2005, 0 otherwise.

The expected result is a positive sign for the sum of the coefficients of high cash dummy variable and its interaction terms with Recovery dummy variable. During recovery period, high cash firms have higher profitability than low cash firms.



Chapter 4: Results and Discussion

4.1 Summary Statistics of the Value of Cash Holdings

Figure 1 and 2 show the patterns of firms to hold cash both level and change of cash holdings for period between 1991 and 2005. The samples are separated into high and low cash firms. High cash firms are those firms in the top 30 percentage of cash holding within the same industry and low cash firms are the others. There are 3,717 firms in total; Asian firms are 2,096 firms and Non-Asian firms are 1,621 firms.

Figure 1 shows that the patterns of firms in accumulating cash between 1991 and 1996 (normal period) are rather constant both high and low cash firms. After firms are affected from the 1997 Asian financial crisis, both high and low cash firms have accumulated more cash. The level of accumulating cash has been higher among high cash firms. Besides, low cash firms tend to accumulate more cash as well but in lower rate. These evidences consistent with Song and Lee (2012), they find that cash holdings among Asian country are almost double after affected by the 1997 Asian financial crisis. These patterns are not specified only for constrained firms but also unconstrained firms. Firms hold more cash as precautionary motive after affected by the crisis.

The patterns of change of cash holdings from figure 2 show that the patterns of spending cash holdings of high cash firms are more fluctuated than low cash firms between 1991 and 1997. However, after affected by the 1997 Asian financial crisis, high cash firms tend to save more cash than low cash firms between 1998 and 2000. Both firms hold more cash holdings as precautionary motive for being a guard against unexpected shock. Interestingly, both high and low cash firms have spent more cash between 2000 and 2002. These patterns imply that high cash firms would be ready to take investment opportunity after affected by the crisis (Whited (1992) and Arslan, Florackis and Ozkan (2006)). However, the accumulating more cash has cost as well, agency cost. Jensen (1986) argues that retaining higher internal

resource lead to increase in power of managers and it is a motive for them to deviate their actions from shareholders' best interest such as inefficient investments or spending on acquisitions. Moreover, Lemmon and Lins (2003) show that managers in emerging markets normally effectively control firms even they have low cash flow ownership and the crisis is raising incentive to expropriate by managers as well (Johnson, et al. (2000)). During 2002 to 2004, both high cash and low cash firms tend to resume saving more cash again but high cash tend to have higher saving rate. These evidences are consistent with Bigelli and Sánchez-Vidal (2012) that firms with high cash holdings have greater profitability than firms with normal cash holdings as they could take profitable opportunity earlier than low cash firms.



Figure 1: Level of the Cash Holdings

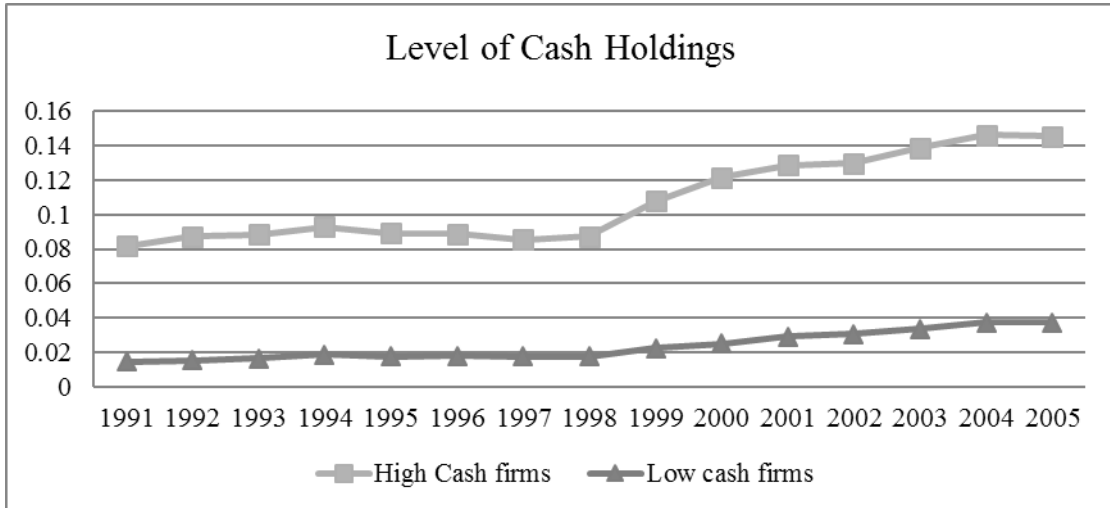
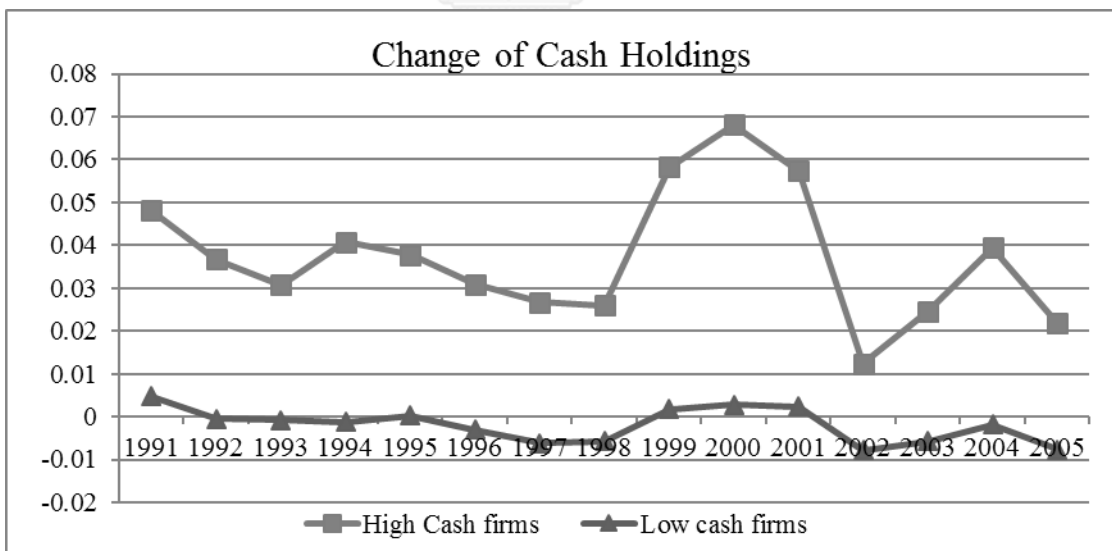


Figure 2: Change of the Cash Holdings



For summary descriptive statistics, table 1 shows results for the overall sample firms on the annual percentage. 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 ($\log(1 + (\text{ratio}))$).

The results show that the valuation of Asian firms, on average, sharply decreases between 1991 and 2005 (0.35% pre-crisis, 0.30% during crisis and 0.25% post-crisis). Besides, the past change of cash holdings ($d\text{Casht}$) also slightly decreases in the same pattern for the entire period (pre-crisis 1.40%, during crisis 1.05% and post-crisis 0.93%). While the past change of cash holdings in Asian firms are lower, firms in the comparable sample (i.e., Non-Asian firms) increase their cash reserves during crisis. The past change of cash holdings among Non-Asian firms increase from 0.47% pre-crisis to 2.16% during crisis and then sharply decreases to 0.14% in post-crisis period. The average value of Non-Asian firms slightly increases for the entire period (pre-crisis 0.29%, during crisis 0.32% and post-crisis 0.37%). Moreover, the results for significance of differences in mean between Asian and Non-Asian firms are statistically significance at 1% level for firm value and the past change in cash. These differences in mean between these two groups indicate that the effect of the crisis is likely to be unique to the Asian markets under investigation.

For other control variables, the results show that the patterns of the control variables between Asian and Non-Asian firms are almost different. The result of the current earnings among Asian firms shows that it decreases during crisis and then slightly increases in post-crisis period. In oppositely, the current earnings among Non-Asian firms sharply decrease overtime. These patterns of the current earnings between Asian and Non-Asian firms are significantly different. When comparing with the pattern of firm value, the pattern of current earning variable among Asian firms has similar direction with the firm value. However, the pattern of the current earnings variable among Non-Asian firms is in opposite direction with the firm value. Commonly, the patterns between firm value and earnings should be in the same direction. Profitability has positive influence on firm value (Chen and Chen (2011)). For net

assets, Asian firms tend to sharply decrease their net assets for entire period (pre-crisis 10.580%, during crisis 6.16% and post-crisis 3.76%). Oppositely, Non-Asian firms increase their net assets during crisis period from 4.10% to 8.38% and then decrease to 3.00% during post-crisis period. Reducing in holdings net assets has the same pattern with reducing in cash holdings among Asian firms. In order to examine the impact of cash holdings on firm value, therefore, it is important to control for unexpected effect like this unusual pattern between firm value and earnings.

In sum, the results from descriptive statistics show that there are different patterns of firms to hold cash as well as the value of firms between Asian and Non-Asian firms. These results indicate the initial evidence that crisis has affected on firms in Asian countries. These results are consistent with Duchin, Ozbas and Sensoy (2010) that firms tend to burn through cash holding during an economic downturn. In addition, cash holding is a good source for firms to subsidize losses and a good internal fund for firms to run normal operation (DeAngelo, DeAngelo and Wruck (2002)).

Table 1: Summary Statistics of the Value of Cash Holdings

This table presents descriptive statistics for firms in the final sample total 3,717 firms; Asian firms are 2,096 firms and Non-Asian firms are 1,621 firms. X_t is the level of variable X in year t divided by the level of assets in year t . dX_t is the future change in the level of X from year $t+1$ to year t divided by total assets in year t ($(X_{t+1}-X_t)/A_t$). dX_{t+1} is the past change in the level of X from year $t+1$ to year t divided by assets in year t ($(X_{t+1}-X_t)/A_t$). MV_t is the market of equity plus the book value of debt. $Cash_t$ is liquid assets, defined as cash and equivalents. $EBIT_t$ is earnings before interests and taxes. NA_t is net assets, which defined as total assets minus cash. I_t is interest expense. Div_t is common dividends. In order to reduce impact of outliers, I add a constant and take logs to a ratio of all variable. Significance of the difference in mean between Asian and Non-Asian firms measures is computed using the independent-sample t -test allowing for unequal variances.

Explanatory variables	Asian (2)						Non-Asian (3)						P-value of differences in mean (2) vs. (3)						
	Pre		During		Post		Pre		During		Post		Pre		During		Post		
	All	SD	All	SD	All	SD	All	SD	All	SD	All	SD	All	SD	All	SD	All	SD	
MV	N	2,272	3,089	9,232	14,593	1,176	1,727	5,667	8,570	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Mean (%)	0.35	0.30	0.25	0.28	0.29	0.32	0.37	0.35	0.28	0.28	0.30	0.32	0.30	0.32	0.30	0.32	0.30	0.30
	Median (%)	0.34	0.28	0.24	0.26	0.28	0.30	0.32	0.30	0.26	0.28	0.30	0.32	0.30	0.32	0.30	0.32	0.30	0.30
dCash _t	SD	0.15	0.15	0.17	0.16	0.13	0.21	0.28	0.25	0.15	0.15	0.17	0.16	0.13	0.21	0.28	0.25	0.15	0.15
	N	2,270	3,103	9,461	14,834	1,176	1,726	5,545	8,447	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Mean (%)	1.40	1.05	0.93	1.03	0.47	2.16	0.14	0.60	1.03	0.47	2.16	0.14	0.60	1.03	0.47	2.16	0.14	0.60
EBIT	Median (%)	0.50	0.40	0.41	0.42	0.15	0.46	0.33	0.32	0.50	0.40	0.41	0.42	0.15	0.46	0.33	0.32	0.50	0.40
	SD	0.05	0.05	0.05	0.05	0.04	0.10	0.14	0.13	0.05	0.05	0.05	0.05	0.04	0.10	0.14	0.13	0.05	0.05
	N	2,215	3,038	9,191	14,444	1,052	1,514	4,812	7,378	0.0024	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
dEBIT _t	Mean (%)	4.07	1.62	1.96	2.21	2.98	0.09	-5.76	-3.32	2.21	2.98	0.09	-5.76	-3.32	2.21	2.98	0.09	-5.76	-3.32
	Median (%)	3.94	2.47	2.60	2.83	3.80	2.85	0.03	1.90	3.94	2.47	2.60	2.83	3.80	2.85	0.03	1.90	3.94	2.47
	SD	0.03	0.08	0.07	0.07	0.11	0.16	0.25	0.22	0.03	0.08	0.07	0.07	0.11	0.16	0.25	0.22	0.03	0.08
dNA _t	N	2,221	3,062	9,271	14,554	1,049	1,533	5,090	7,672	0.0003	0.0141	0.8489	0.2727	0.0003	0.0141	0.8489	0.2727	0.0003	0.0141
	Mean (%)	1.31	-0.15	0.53	0.51	0.39	-1.18	0.60	0.22	1.31	-0.15	0.53	0.51	0.39	-1.18	0.60	0.22	1.31	-0.15
	Median (%)	0.89	0.38	0.53	0.56	0.46	0.45	0.32	0.38	0.89	0.38	0.53	0.56	0.46	0.45	0.32	0.38	0.89	0.38
dNA _t	SD	0.03	0.09	0.06	0.07	0.08	0.15	0.26	0.23	0.03	0.09	0.06	0.07	0.08	0.15	0.26	0.23	0.03	0.09
	N	2,271	3,093	9,420	14,784	1,165	1,712	5,405	8,282	0.0000	0.0000	0.0125	0.0000	0.0000	0.0000	0.0125	0.0000	0.0000	0.0000
	Mean (%)	10.58	6.16	3.76	5.31	4.10	8.38	3.00	4.27	10.58	6.16	3.76	5.31	4.10	8.38	3.00	4.27	10.58	6.16
I	Median (%)	7.44	4.47	2.69	3.72	2.67	5.41	3.45	3.60	7.44	4.47	2.69	3.72	2.67	5.41	3.45	3.60	7.44	4.47
	SD	0.11	0.14	0.13	0.13	0.13	0.14	0.20	0.18	0.11	0.14	0.13	0.13	0.13	0.14	0.20	0.18	0.11	0.14
	N	2,216	3,056	9,224	14,496	1,168	1,631	5,340	8,139	0.0139	0.0000	0.0008	0.0000	0.0139	0.0000	0.0008	0.0000	0.0139	0.0000
I	Mean (%)	1.07	1.59	0.70	0.94	0.96	0.78	0.99	0.94	1.07	1.59	0.70	0.94	0.96	0.78	0.99	0.94	1.07	1.59
	Median (%)	0.91	0.99	0.37	0.54	0.77	0.57	0.32	0.44	0.91	0.99	0.37	0.54	0.77	0.57	0.32	0.44	0.91	0.99
	SD	0.01	0.02	0.02	0.02	0.01	0.04	0.06	0.05	0.01	0.02	0.02	0.02	0.01	0.04	0.06	0.05	0.01	0.02

Table 1: Summary Statistics of the Value of Cash Holdings (Continued)

Explanatory variable	Asian (2)				Non-Asian (3)				P-value of differences in means (2) vs. (3)			
	Pre	During	Post	All	Pre	During	Post	All	Pre	During	Post	All
dI_t												
N	2,222	3,076	9,295	14,593	1,167	1,643	5,402	8,212				
Mean (%)	0.38	0.29	-0.06	0.08	-0.06	0.22	0.12	0.11	0.0000	0.4532	0.0170	0.5809
Median (%)	0.24	0.11	0.00	0.01	0.00	0.03	0.00	0.00				
SD	0.01	0.02	0.02	0.02	0.02	0.04	0.05	0.05				
N	2,208	3,067	9,319	14,594	1,174	1,666	5,450	8,290				
Mean (%)	1.11	0.48	0.76	0.76	1.19	1.14	0.72	0.87	0.1770	0.0000	0.1809	0.0000
Median (%)	0.71	0.00	0.00	0.00	0.85	0.57	0.00	0.00				
SD	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02				
N	2,226	3,086	9,365	14,677	1,174	1,672	5,474	8,320				
Mean (%)	0.27	0.05	0.20	0.18	0.17	0.25	0.14	0.16	0.0851	0.0027	0.0494	0.5972
Median (%)	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00				
SD	0.01	0.01	0.01	0.01	0.02	0.03	0.02	0.02				

4.2 Evidence of the Value of Cash Holdings during the Crisis Period

Now, I examine in the frame work of Eq. (1) whether or not the value of cash holdings could enhance the value of firms during crisis period. The estimated cross-sectional regression is derived from Pinkowitz, Stulz and Williamson (2006) which is originally developed by Fama and French (1998). The regression measures the effect of cash holdings on the value of firms. The regression controls for earnings, dividends, interests, debts and investments. These variables are expected to capture the information about expected net cash flows in financing decisions. Since the data is panel data, I conduct a test for Eq. (1) by using fixed effects approach in order to control for firm effects.⁷ The unobservable characteristics of firms will be controlled in the regression. However, the estimate of Asian dummy variable is omitted because it has time-invariant value with time-invariant effect. This would result in the perfect collinearity since the estimate of fixed effects approach uses the deviation from average to calculate $(x_i - \bar{x})$. In total, this difference does not vary with time variant and equal to zero. In order to use fixed effects regression, therefore, I separate the sample into Asian and Non-Asian firms before running the regression. In order to see the differences between two groups, I also estimate the difference in mean to indicate the different effect between two groups.⁸ The variables of interest are the interaction terms between the past change in cash holdings and crisis dummy variables. In Pinkowitz, Stulz and Williamson model, the future change variable is introduced to absorb the change in expectations. The future change in cash holdings is concerned if the next period change in cash holdings has impact on firm value. If it is a case,

⁷ The fixed effects approach is used instead of random effects because one assumption of random effects is to ensure that individual specific effect really is an unrelated effect. Fixed effects approach is almost more convincing than random effects. Moreover, interest in a time-invariant variable is no sufficient reason to use random effects approach.

⁸ The non-stationary data may prove the spurious as in a case of in time series. However, the data in this study is panel which consists of a large cross-sectional dimension and a small time-series dimension. Moreover, time dummy variable is added into the model (crisis dummy variable). It consequently separates the time dimension into short period. Therefore, the non-stationary is not a problem in this study. Furthermore, Kao (1999) shows that estimates of the parameter binding two independent non-stationary variables converges to zero in the case of panel data, whereas in the case of time series it is a random variable. Nevertheless, I also performed unit root test for panel data following Levin, Lin and Chu (2002). The results are reported in the Appendix show that unit root test t-statistic reject the null hypothesis of non-stationary for all variables and conclude that all variables are stationary.

therefore, I also interact this variable with crisis dummy variable to indicate the effect of the future change of cash holdings on firm value during crisis period. Moreover, I interact crisis dummy variable to the rest of control variables to control for the difference in slope. The effects of the control variables during crisis may have the impact on a key variable. Therefore, it is important to control the effects from the information missed by cash holdings variables. Thus, the coefficients of interaction terms between crisis dummy variable and the past change in cash holdings will reflect the true information about firm value. The variable of interest is the interaction terms between the past change of cash holdings and crisis dummy variable. The results are reported in Table 2.

Table 2 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 not different from 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 value of cash holdings for both Asian and Non-Asian firms contribute negatively to firm value during non-crisis period. 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 coefficients of future changes of cash holdings are positively significant for both Asian and Non-Asian firms. During the normal period for both Asian and Non-Asian firms, firm value

and future changes in cash holdings are positively related. To the extent that such changes are attributable to operating performance, this result is consistent with value being on average a correct indication of future prospects. Interestingly, the coefficients of crisis dummy variable are positively significant for Asian firms but insignificant for Non-Asian firms. The result confirms that the crisis has impact on firms in Asian countries.

For the control variables, as reported in Table 2, have quite the same direction between Asian and Non-Asian firms. Although most control variables have the same direction of coefficient during crisis period, several of them have the opposite sign of the coefficient between Asian and Non-Asian firms. The coefficients of the interaction terms between the level of interests and crisis dummy variable are negatively significant for Asian but positively insignificant for Non-Asian firms. These results imply that debt obligations lead to lower in value of Asian firms during crisis period than normal period. The coefficients of the interaction term between the past change of interests and crisis dummy variable are positively significant for Asian but negatively insignificant for Non-Asian firms. These results imply that during crisis period debt obligation in the last year contribute negatively to the value of Asian firms. However, the sum of coefficients of the level, past and future change of interests and crisis dummy variable are significantly positive. These results imply that the investors give more value to firms if firms raise fund by issue debts, the benefit of debts obligations is the tax advantage. Dividends are cash paid out of firms. Investors should give more value of dollars paid out if it is represents for minimizing expropriation of managers and controlling shareholders (Pinkowitz, Stulz and Williamson (2006)). The coefficients of the interaction terms between the past change of dividends and crisis dummy variables are positively significant for Asian but negatively insignificant for Non-Asian firms. These results imply that investors will put more value on Asian firms if Asian firms increase dividend payment during crisis period.

In sum, the results in table 2 are contrary to the hypothesis prediction that the value of cash holdings among Asian firms will contribute more to firm value during crisis period. The results imply that during non-crisis period, cash holdings of both Asian and Non-Asian firms contribute negatively to firm value. Moreover when firms are in crisis, this negative impact still exists and the negative effects are not different from normal period. These findings are consistent with free cash flow theory (Jensen (1986)) that when firms retain high cash holdings, it increases the internal resources and lead to be more power under control by managers. Managers' interests are not in the line with shareholders' best interests. These actions would result in negative effect on firm value. Moreover, Mishkin (1990) shows that capital markets are employed with full of asymmetry and adverse selection during crisis period. It is very hard to predict the real value. Although cash holdings do not add value to firms during crisis period, they do not lead to things getting worse either. These findings are also 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. The weak governance would lead to be opportunity for managers to expropriate benefits for their own. This will be a fall in asset values, therefore, lower in value of firms. The crisis negatively impact firms and it is raising incentive of controlling shareholders to expropriate minority shareholders (Lemmon and Lins (2003)). Perhaps, cash holdings could possibly help firms but the negative effect is dominated by agency problem. Thus, the results 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 cash holdings do not lead things getting worse during crisis period among firms in Asian countries, the cash holdings contribute severely more negative to firm value in Non-Asian countries.

Table 2: Evidence of the Value of Cash Holdings during Crisis Period

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). All other explanatory variables are defined as in Table 1. 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 computed from $\bar{x}_1 - \bar{x}_2 / \sqrt{SE_1^2 + SE_2^2}$; degree of freedom is computed by $(SE_1 + SE_2)^2 / \left[\left(\frac{SE_1^2}{n_1 - 1} \right) + \left(\frac{SE_2^2}{n_2 - 1} \right) \right]$. 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*** (0.0041)	0.2821*** (0.0058)	0.000
1 if Crisis	0.0165*** (0.0055)	0.0167 (0.0107)	0.986
dCash _t	-0.2078*** (0.0391)	-0.1016*** (0.0284)	0.028
dCash _t x Crisis	0.0333 (0.0659)	-0.2999*** (0.0976)	0.005
dCash _{t+1}	0.0823** (0.0396)	0.1321*** (0.0261)	0.293
dCash _{t+1} x Crisis	-0.0857 (0.0693)	-0.1089 (0.0828)	0.830
EBIT	0.0755 (0.0611)	-0.0672*** (0.0235)	0.029
EBIT x Crisis	0.1021 (0.0807)	0.2196*** (0.0628)	0.251
dEBIT _t	-0.1327*** (0.0382)	0.0347* (0.0200)	0.000
dEBIT x Crisis	-0.0430 (0.0576)	-0.0919 (0.0593)	0.554
dEBIT _{t+1}	0.0186 (0.0341)	-0.0326 (0.0247)	0.225
dEBIT _{t+1} x Crisis	-0.0311 (0.0440)	0.1821*** (0.0625)	0.005
dNA _t	0.0002 (0.0114)	-0.0487*** (0.0154)	0.011
dNA _t x Crisis	-0.0400* (0.0208)	-0.0381 (0.0339)	0.959
dNA _{t+1}	0.0513*** (0.0063)	0.0263*** (0.0060)	0.004
dNA _{t+1} x Crisis	0.0159 (0.0117)	0.0155 (0.0117)	0.982
I	1.4566*** (0.3622)	0.4737 (0.4681)	0.097
I x Crisis	-0.9810*** (0.3129)	0.0011 (0.7447)	0.224
dI _t	-0.1312 (0.1713)	-0.0716 (0.3827)	0.887

Table 2: Evidence of the Value of Cash Holdings during Crisis Period (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
dI _t x Crisis	0.6404*** (0.2209)	-0.1877 (0.5774)	0.180
dI _{t+1}	0.7441*** (0.2131)	1.0282*** (0.2695)	0.408
dI _{t+1} x Crisis	-0.1532 (0.2294)	-0.1681 (0.5677)	0.981
Div	3.2367*** (0.2933)	3.9635*** (0.4350)	0.166
Div x Crisis	-1.0560 (0.4076)	-2.0189*** (0.4584)	0.117
dDiv _t	-1.1043*** (0.1790)	-0.8566*** (0.2279)	0.393
dDiv _t x Crisis	0.5656*** (0.2569)	0.5233 (0.3189)	0.918
dDiv _{t+1}	0.8302*** (0.1423)	1.0192*** (0.2387)	0.496
dDiv _{t+1} x Crisis	-0.0134 (0.2513)	-0.4796 (0.3012)	0.235
dMV _{t+1}	-0.1767*** (0.0068)	-0.1094*** (0.0100)	0.000
dMV _{t+1} x Crisis	0.0269** (0.0125)	-0.0366* (0.0197)	0.006
Number of Observations	13,558	6,676	
Adjusted R ² (%)	52.89	60.06	



4.3 Evidence of the Level of Cash Holdings during the Crisis Period

In this section, I will examine further from the previous analysis. World is characterized by information asymmetry and costly external capital, only an internal resource is available during crisis period. Firms with plenty of internal resources are expected to have more chance to cope and alleviate shocks from the effect of crisis. Therefore, firms with high level of cash reserves are expected to have higher value than low cash firms. 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 and then lead to be higher in firm values during crisis period. The fixed effects approach is used to determine the relation between value of high cash holdings and firm value. The variable of interest is the interaction terms between the past change of cash holdings, high cash and crisis dummy variable.

The results from further investigation the impact of high cash on value of firms (Eq. 2) are in Table 3. 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 both Asian and Non-Asian firms. The difference in mean between Asian and Non-Asian firms is insignificant as well. These results imply that high cash reserves do not affect differently on firm value during crisis and normal 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 but 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 the value of cash holdings among low cash firms contribute negatively to firm value during normal period. Furthermore, 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 negative effects on the value of cash holdings still remain regardless of the level of cash. The coefficients of the future changes of cash holdings and its interaction term with high cash dummy variable are positively insignificant for Asian but positively significant for Non-Asian firms. These results imply that Asian investors do not differentiate the impact of high cash holdings on firm value but Non-Asian investors tend to give more value on high cash firms if the future cash holdings increase. However, the coefficients of the future changes are positively significant for both Asian and Non-Asian firms. These results imply if firms have better performance in the next year during normal period, investors will add more value on firms. Furthermore, the results also confirm the previous results that the crisis has impact on firms in Asian countries as the coefficients of crisis dummy variable are positively significant for Asian but insignificant for Non-Asian firms.

For the control variables, almost coefficients have the same pattern and indifferent between Asia and Non-Asian firms during crisis period except for the interaction terms between the current dividend, crisis and high cash dummy variables. The coefficients of the interaction terms between the current dividend, crisis and high cash dummy variables show the opposite signs and are significantly different between Asian and Non-Asian firms. The coefficients of the current dividend are positively significant for high cash Asian but negatively significant for high cash Non-Asian firms during crisis period. These results imply that dividends have positively impact on high cash firms in Asian countries but negative relation among high cash firms in Non-Asian countries during crisis period. These findings are in line with dividend signaling theory. Firm's dividend decision can convey valuable information about the firm itself, thus the value of firm (Miller and Rock (1985)).

Table 3: Evidence of the Level of Cash Holdings during Crisis Period

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). All other explanatory variables are defined as in Table 2. 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 2. 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*** (0.0046)	0.2807*** (0.0067)	0.000
1 if Crisis	0.0185*** (0.0061)	0.0097 (0.0109)	0.483
1 if High Cash	0.0059 (0.0066)	0.0010 (0.0105)	0.690
1 if Crisis x High Cash	0.0099 (0.0104)	0.0158 (0.0194)	0.789
dCash _t	-0.3649*** (0.0574)	-0.1546*** (0.0428)	0.003
dCash _t x Crisis	0.1148 (0.0942)	-0.0342 (0.1672)	0.438
dCash _t x High Cash	0.2178*** (0.0769)	0.0617 (0.0546)	0.098
dCash _t x Crisis x High cash	-0.1712 (0.1288)	-0.3081 (0.1880)	0.548
dCash _{t+1}	0.0790* (0.0480)	0.0697** (0.0350)	0.875
dCash _{t+1} x Crisis	0.0108 (0.1228)	-0.1145 (0.1115)	0.450
dCash _{t+1} x High Cash	0.0057 (0.0762)	0.0988** (0.0496)	0.305
dCash _{t+1} x Crisis x High Cash	-0.0974 (0.1514)	0.0220 (0.1529)	0.579
EBIT	-0.0445 (0.0597)	-0.0476 (0.0298)	0.962
EBIT x Crisis	0.2372*** (0.0836)	0.2281*** (0.0741)	0.936
EBIT x High Cash	0.4566*** (0.1244)	-0.0374 (0.0398)	0.000
EBIT x Crisis x High Cash	-0.4456** (0.1888)	-0.1165 (0.1125)	0.134
dEBIT _t	-0.0795** (0.0398)	-0.0040 (0.0213)	0.094
dEBIT _t x Crisis	-0.1143* (0.0622)	-0.0431 (0.0733)	0.459
dEBIT _t x High Cash	-0.2045** (0.0896)	0.0827* (0.0432)	0.004
dEBIT _t x Crisis x High Cash	0.2300* (0.1240)	-0.0422 (0.1356)	0.138

Table 3: Evidence of the Level of Cash Holdings during Crisis Period (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
dEBIT _{t+1}	0.0056 (0.0391)	0.0396 (0.0324)	0.374
dEBIT _{t+1} x Crisis	0.0227 -0.0530)	0.1866** (0.0842)	0.035
dEBIT _{t+1} x High Cash	0.0305 (0.0831)	0.0141 (0.0457)	0.863
dEBIT _{t+1} x Crisis x High Cash	-0.0206 (0.1033)	-0.0350 (0.1206)	0.928
dNA _t	0.0174 (0.0131)	-0.0514*** (0.0184)	0.002
dNA _t x Crisis	-0.0504** (0.0234)	-0.0192 (0.0373)	0.478
dNA _t x High Cash	-0.0257 (0.0281)	0.0100 (0.0318)	0.400
dNA _t x Crisis x High Cash	0.0188 (0.0482)	-0.0716 (0.0698)	0.286
dNA _{t+1}	0.0443*** (0.0064)	0.0168*** (0.0054)	0.001
dNA _{t+1} x Crisis	0.0187 (0.0122)	0.0175 (0.0109)	0.939
dNA _{t+1} x High Cash	0.0823*** (0.0252)	0.0974*** (0.0259)	0.677
dNA _{t+1} x Crisis x High Cash	-0.0810* (0.0433)	-0.0110 (0.0526)	0.304
I	1.3605*** (0.4025)	0.4115 (0.4676)	0.124
I x Crisis	-0.8482** (0.3590)	-0.0919 (0.7843)	0.381
I x High Cash	0.2773 (0.3350)	0.1701 (0.8554)	0.907
I x Crisis x High Cash	-0.4536 (0.4969)	-0.1415 (1.4475)	0.838
dI _t	-0.1553 (0.1966)	0.2960 (0.2627)	0.169
dI _t x Crisis	0.6029** (0.2517)	-0.1582 (0.3916)	0.102
dI _t x High Cash	0.0727 (0.3431)	-1.1476** (0.5084)	0.047
dI _t x Crisis x High Cash	0.1834 (0.4843)	-1.6070 (1.2163)	0.171
dI _{t+1}	0.6376* (0.3736)	1.0670*** (0.2509)	0.337
dI _{t+1} x High Cash	0.1825 (0.3833)	-0.3312 (0.8279)	0.573
dI _{t+1} x Crisis x High Cash	0.0097 (0.4519)	-0.1386 (1.2480)	0.911
Div	4.1839*** (0.3377)	4.0707*** (0.4927)	0.850
Div x Crisis	-2.5468*** (0.4233)	-1.0405** (0.4795)	0.019

Table 3: Evidence of the Level of Cash Holdings during Crisis Period (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
Div x High Cash	-1.8818*** (0.4554)	-0.2008 (0.4964)	0.013
Div x Crisis x High Cash	2.2790*** (0.6442)	-1.4696* (0.7637)	0.000
dDiv _t	-1.5237*** (0.2215)	-0.7427*** (0.2829)	0.030
dDiv _t x Crisis	0.9199*** (0.3098)	-0.3147 (0.4281)	0.019
dDiv _t x High Cash	0.7448* (0.4039)	-0.2758 (0.4479)	0.091
dDiv _t x Crisis x High Cash	-0.4060 (0.5746)	1.2097** (0.5633)	0.045
dDiv _{t+1}	0.8065*** (0.1517)	1.0486*** (0.2588)	0.420
dDiv _{t+1} x Crisis	-0.3090 (0.3408)	-0.2534 (0.4585)	0.922
dDiv _{t+1} x High Cash	0.0458 (0.2769)	0.0600 (0.4733)	0.979
dDiv _{t+1} x Crisis x High Cash	0.3065 (0.4605)	-0.4182 (0.6487)	0.362
dMV _{t+1}	-0.1720*** (0.0076)	-0.1162*** (0.0107)	0.000
dMV _{t+1} x Crisis	0.0317** (0.0134)	-0.0145 (0.0226)	0.078
dMV _{t+1} x High Cash	-0.0173 (0.0153)	0.0062 (0.0240)	0.408
dMV _{t+1} x Crisis x High Cash	-0.0170 (0.0258)	-0.0552 (0.0405)	0.426
Number of Observations	13,558	6,676	
Adjusted R ² (%)	23.45	22.11	

4.4 Summary Statistics of the Investment Rates during Recovery Period

Table 4 reports summary statistics for investment rates of the sample firms on the annual percentage. In order to reduce the impact of outliers, a constant is added to the ratio and then taking log (log (1+ (ratio))). Panel A shows descriptive statistics results for all sample firms. Panel B shows descriptive statistics results for high cash firms.

The results of descriptive statistics from Panel A show that the investment rates of all samples firms, on average, decrease between 1991 and 2005 (0.49% pre-crisis, 0.41% during crisis and 0.29% post-crisis). Especially among Asian firms, the investment rates sharply decrease for entire period (0.69% pre-crisis, 0.57% during crisis and 0.43% post-crisis). The investment rates of Non-Asian firms also have the same pattern of investment rates but they slightly decrease (0.11% pre-crisis, 0.10% during crisis and 0.07% post-crisis). The differences in mean are all significant at 1% level. For Tobin's Q, the results show that the market valuation of all sample firms slightly decreases for entire period (0.33% pre-crisis, 0.31% during crisis and 0.29% post-crisis). The market valuation among Asian firms sharply decreases for entire period comparing to all sample firms (0.34% pre-crisis, 0.30% during crisis and 0.25 post-crisis). For non-Asian firms, they have different pattern of market valuation. The market valuation of Non-Asian firms increases over time (0.29% pre-crisis, 0.32% during crisis and 0.37% post-crisis). For change of sales, current and lagged sales, Asian and Non-Asian firms have the same pattern of descriptive statistic results. All variables decrease during recovery period.

The results from Panel B show that the investment rates for high cash firms. All high cash firms decrease investment rates overtime (0.58% pre-crisis, 0.42% during crisis and 0.24% post-crisis). The investment rates among high cash Asian firms have the same pattern but sharply decrease (0.74% pre-crisis, 0.60% during crisis and 0.38% post-crisis). Non-Asian cash rich firms' investment rates slightly decline as well as all sample firms (0.10% pre-crisis, 0.07%

during crisis and 0.04% post-crisis period). The market valuation of all high cash firms is stable for entire period (0.33% pre-crisis, 0.31% during crisis and 0.31% post-crisis). In contrast, the market valuation of high cash Asian firms slightly decreases (0.34% pre-crisis, 0.31% during crisis and 0.24% post-crisis). The results show opposite direction for high cash Non-Asian firms. The market valuation of high cash Non-Asian firms increases over time (0.30% pre-crisis, 0.32% during crisis and 0.40 post crisis). The change in sales among all high cash firms and high cash Asian firms are stable for entire period but decrease in post-crisis period for high cash Non-Asian firms. The others variables, high cash Asian and high cash Non-Asian firms have the same pattern.

In sum, the results of descriptive statistics are not consistent with figure 2. The pattern of investment rates of all sample firms decrease over time. The Asian and Non-Asian firms have the same pattern of declining in investment rates. Moreover, the results of descriptive statistics among high cash firms show the same pattern. Investment rates among high cash Asian and Non-Asian firms decrease over time. The findings from descriptive statistics initially indicate that the investment rates among high cash firms are not different from those firms with lower cash holdings during recovery period. These findings are consistent with Song and Lee (2012) that Asian firms tend to accumulate more cash reserves by reducing investment activities after affected by crisis.

Table 4: Summary Statistics of the Investment Rates during Recovery Period

This table presents descriptive statistics for firms in the final sample total 3,717 firms; Asian firms are 2,096 firms and Non-Asian firms are 1,621 firms. I/K_t is investment-capital ratio, where I is investment in plant and equipment and K is beginning-of-period capital stock. Tobin's Q 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 to total assets. Cash Flow is the sum of income after interest and tax, all noncash deductions from income (depreciation and amortization) and dividends to beginning-of-period capital stock. Change in sales is sales year $t-1$ to year t , divided by sales in year $t-1$. Lagged sales are the ratio of sales to the beginning-of-period capital stock. Pre-crisis is a period between 1991 and 1996. During crisis is a period between 1997 and 2000. Post-crisis is a period between 2001 and 2005. In order to reduce impact of outliers, I add a constant and take logs to a ratio of all variable. Significance of the difference in mean between Asian and Non-Asian firms measurement is computed using the independent-sample t -test allowing for unequal variances.

Variables	All (1)						Asian (2)						Non-Asian (3)						P-value of difference in mean (2) vs. (3)					
	Pre	During	Post	All	Pre	Post	Pre	During	Post	All	Pre	Post	Pre	During	Post	All	Pre	During	Post	All				
$I/K_{t,t}$	3,447	4,812	15,146	23,405	2,270	3,108	9,473	14,851	1,177	1,704	5,673	8,554	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Mean(%)	0.49	0.41	0.29	0.35	0.69	0.57	0.43	0.50	0.11	0.10	0.07	0.08												
Median(%)	0.19	0.15	0.09	0.12	0.39	0.32	0.24	0.27	0.06	0.03	0.01	0.02												
SD	0.68	0.61	0.48	0.55	0.75	0.68	0.54	0.62	0.16	0.23	0.21	0.21												
Tobin's $Q_{t,t}$	3,448	4,816	14,899	23,163	2,272	3,089	9,232	14,593	1,176	1,727	5,667	8,570	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Mean(%)	0.33	0.31	0.29	0.30	0.34	0.30	0.25	0.27	0.29	0.32	0.37	0.35												
Median(%)	0.32	0.29	0.26	0.27	0.34	0.28	0.23	0.26	0.28	0.30	0.32	0.30												
SD	0.14	0.17	0.22	0.20	0.15	0.15	0.17	0.16	0.13	0.21	0.28	0.25												
Cash flow $_{t,t}$	3,354	4,484	13,880	21,718	2,187	2,822	8,403	13,412	1,167	1,662	5,477	8,306	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Mean(%)	0.46	0.62	0.46	0.49	0.65	0.87	0.67	0.71	0.10	0.19	0.12	0.13												
Median(%)	0.12	0.35	0.25	0.25	0.40	0.68	0.57	0.57	0.00	0.09	0.03	0.03												
SD	0.73	0.79	0.63	0.69	0.82	0.86	0.68	0.75	0.22	0.39	0.35	0.34												
Change in Sales $_{t,t}$	2,767	3,682	12,902	19,351	1,755	2,552	8,401	12,708	1,012	1,130	4,501	6,643	0.001	0.002	0.001	0.006	0.001	0.002	0.002	0.567				
Mean(%)	0.05	0.05	0.05	0.05	0.07	0.04	0.05	0.05	0.03	0.07	0.06	0.06												
Median(%)	0.04	0.04	0.05	0.04	0.05	0.04	0.05	0.05	0.03	0.03	0.04	0.03												
SD	0.22	0.23	0.36	0.32	0.19	0.20	0.18	0.18	0.25	0.29	0.55	0.48												
$S/K_{t,t}$	3,447	4,811	15,150	23,408	2,270	3,107	9,477	14,854	1,177	1,704	5,673	8,554	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Mean(%)	1.15	1.11	1.00	1.04	1.44	1.45	1.41	1.42	0.58	0.47	0.33	0.39												
Median(%)	0.94	0.94	0.97	0.96	1.28	1.23	1.29	1.28	0.53	0.37	0.12	0.23												
SD	0.86	0.90	0.85	0.87	0.88	0.89	0.77	0.81	0.41	0.48	0.48	0.48												
$S/K_{t,t-1}$	2,797	3,915	13,682	20,394	1,728	2,606	8,608	12,942	1,069	1,309	5,074	7,452	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Mean(%)	1.12	1.14	1.01	1.05	1.44	1.45	1.40	1.42	0.60	0.51	0.35	0.41												
Median(%)	0.92	0.95	0.97	0.95	1.30	1.22	1.27	1.27	0.55	0.44	0.14	0.27												
SD	0.85	0.89	0.86	0.87	0.89	0.89	0.79	0.82	0.41	0.45	0.50	0.49												

4.5 Evidence of the Investment Rates during Recovery Period using Tobin's Q

The next investigation is to examine the firm's investment rates. The test is designed for examining the investment rates of firms that are affected by Asian financial crisis. I adopt a model from Fazzari, Hubbard and Petersen (1987). Their research has been designed in a view of the imperfection of capital market. The internal resources do not act as a perfect substitution for external resources, and vice versa. Hence, the firm's investment decisions normally depend on various financial factors. I will add high cash, crisis, recovery dummy variables and two interaction terms to the model. I also interact all dummy variables and their interaction terms with the other control variables to control for difference in slope as well. The test period will be separated into three; normal period 1991-1996, during crisis 1997-2000 and recovery period 2001-2005. Since the data is panel data, I conduct a test for Eq. (3) by using fixed effects approach in order to control for firm effects. The unobservable characteristics of firms will be controlled in the regression. I separate the sample into Asian and Non-Asian firms before running the regression. In order to see the difference between two groups, I also estimate the difference in mean to indicate the different effect between two groups. The variable of interest is the sum of the coefficients of high cash dummy variable and its interaction terms with recovery dummy variable.

Table 5 shows the results from estimated fixed effect approach of Asian, Non-Asian firms and significance of the difference in mean in column 1, 2 and 3, respectively. The coefficients of high cash firms are negatively insignificant for both Asian and Non-Asian firms. These results imply that the investment rates of high cash firms are not different from those low cash firms during normal period. The coefficients of the interaction terms between high cash and recovery dummy variables are negatively insignificant for both Asian and Non-Asian firms. The difference in mean is insignificantly different as well. These results imply that investment rates among high cash firms during recovery period are not different from during normal period. Furthermore, the sum of coefficients of the high cash dummy variable and its interaction terms

with the recovery dummy variables is negatively significant (-0.0462 with P-value 0.031) for Asian but negatively insignificant (-0.0025 with P-value 0.624) for Non-Asian firms. These results indicate that the investment rates among high cash Asian firms are significantly different from those low cash Asian firms and tend to decrease during recovery period. The coefficients of the interaction terms between high cash and crisis dummy variables are positively insignificant for Asian but negatively insignificant for Non-Asian firms. These results imply that the investments rates among high cash firms during crisis period are not different from during normal period. The sum of the coefficients of high cash and its interaction terms with crisis dummy variable is negatively insignificant (-0.0134 with P-value 0.637) for Asian and negatively insignificant (-0.25 with P-value 0.768) for Non-Asian firms. These results imply that the investment rate among high cash both Asian and Non-Asian firms are not different from those low cash firms during crisis period. The coefficients of crisis dummy variables are negatively significant for Asian firms but negatively insignificant for Non-Asian firms. The difference in mean is significant at 10% level. These results imply that the crisis have negative impact on investment rates for firms in Asian countries. Moreover, the coefficients of recovery dummy variable are negatively significant for Asian but negatively insignificant for Non-Asian firms. The difference in mean is significant at 5% level. These results imply that the negative effect of the crisis still exists during recovery period.

For the control variables, Tobin's Q and cash flow seem to have strong impact on the investment rates among Asian firms as the coefficients are almost significant. The coefficients of the interaction terms between Tobin's Q and crisis period are positively significant for Asian but positively insignificant for Non-Asian firms. The difference in mean is significant at 1% level. The coefficients of the interaction terms between Tobin's Q and recovery period are the same as the coefficients of the interaction terms between Tobin's Q and crisis period. These results imply that the market valuation of Asian firms has positive relation to their investment rates both during crisis and recovery period. Moreover, the relationship could not observe

among Non-Asian firms. The coefficients of the interaction terms between cash flow and crisis dummy variables are negatively significant for Asian but negatively insignificant for non-Asian firms as same as the coefficients of the interaction terms between cash flow and recovery dummy variables. These results imply that low cash firms among Asian countries tend to save cash as internal resources when firms face the economic downturn. The coefficients of cash flow variables are positively significant for both Asian and Non-Asian firms. These result imply that during normal period, the investment rates vary positively to the level of internal resources (Fazzari, Hubbard and Petersen (1987)).



Table 5: Evidence of the Investment Rates during Recovery Period using Tobin's Q

The estimated regression of fixed effects uses to analyze the investment rates of firms after affected by the 1997 Asian financial crisis. 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: normal (1991-1996), during crisis (1997-2000), and recovery period (2001-2005). The dependent variable is the investment rate. The high cash dummy variable is 1(0) if firms are in the top 30 percentile within the same industry (otherwise). The crisis period is 1(0) if firms are in the period of Asian financial crisis 1997-2000 (otherwise). The recovery period is 1(0) if firms are in the period after Asian financial crisis 2001-2005 (otherwise). All other explanatory variables are defined as in Table 6. 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 2. 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	0.3445*** (0.0381)	0.0579*** (0.0118)	0.000
1 if High Cash	-0.0450 (0.0407)	-0.0013 (0.0145)	0.312
1 if Crisis	-0.0683* (0.0360)	0.0021 (0.0121)	0.064
1 if Recovery	-0.0845** (0.0343)	-0.0120 (0.0124)	0.047
1 if High Cash x Crisis	0.0316 (0.0483)	-0.0012 (0.0166)	0.521
1 if High Cash x Recovery	-0.0016 (0.0457)	-0.0012 (0.0157)	0.994
Tobin's Q	-0.1351* (0.0742)	0.0112 (0.0294)	0.067
Tobin's Q x High Cash	0.0150 (0.0956)	-0.0156 (0.0388)	0.767
Tobin's Q x Crisis	0.3187*** (0.0946)	0.0068 (0.0292)	0.002
Tobin's Q x Recovery	0.2485*** (0.0834)	0.0185 (0.0301)	0.009
Tobin's Q x High Cash x Crisis	-0.0613 (0.1209)	0.0019 (0.0418)	0.621
Tobin's Q x High Cash x Recovery	0.0223 (0.1017)	-0.0050 (0.0396)	0.802

Table 5: Evidence of the Investment Rates during Recovery Period using Tobin's Q (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
Cash Flow	0.4573*** (0.0501)	0.1626** (0.0699)	0.001
Cash Flow x High Cash	-0.0625 (0.0395)	-0.1049 (0.0668)	0.584
Cash Flow x Crisis	-0.1457*** (0.0378)	-0.0419 (0.0642)	0.164
Cash Flow x Recovery	-0.1372*** (0.0381)	-0.0045 (0.0707)	0.099
Cash Flow x High Cash x Crisis	-0.0019 (0.0487)	0.0277 (0.0818)	0.756
Cash Flow x High Cash x Recovery	0.0640 (0.0483)	0.0225 (0.0826)	0.665
Number of Observations	12,947	7,852	
Adjusted R ² (%)	83.11	76.66 ⁹	

⁹ When includes firm and year fixed effects in the model, the adjusted R-squared is substantially larger for this model. It proves that when the firm specific effects are controlled in fixed effects model, the model is better fit the data. Besides, the adjusted R-squared in the pooled OLS is lower than fixed effects approach (see appendices). This larger in adjusted R-squared is in line with the results reported in prior cross-sectional studies (Aggarwal and Samwick (2003); Campa and Kedia (2002) and Ekkayokkaya and Paudyal (2015)). This improvement of adjusted R-squared implies that there are some unobserved firm characteristics and it is better to use fixed effects approach to analyze.

4.6 Evidence of the Investment Rates during Recovery Period using Sales

Some of empirical investment models links the demand for investments to the output or sales. In this section, I will reinvestigate the investment rates by using sales instead of Tobin's Q. I will re-run the estimated regression Eq. (3) by using two alternative measurements for Tobin's Q: (1) change in sales and (2) current and lagged sales. The high cash, crisis and recovery dummy variables are added to the estimated regression as same as the previous investigation. The variable of interest is the sum of the coefficients of high cash dummy variable and its interaction terms with recovery dummy variable.

Table 6 shows the results from estimated fixed effect approach of Asian, Non-Asian firms and the difference in mean in column 1, 2 and 3, respectively. The coefficients of high cash dummy variables are positively insignificant for Asian but negatively insignificant for Non-Asian firms. These results imply that the investment rates among high cash firms are not different from those low cash firms during normal period. The coefficient of the interaction terms between high cash and recovery dummy variables are negatively insignificant for both Asian and Non-Asian firms. These results imply that the investment rates among high cash firms during recovery period are not different from normal period. The sum of the coefficients of high cash and its interaction terms with recovery dummy variable are negatively insignificant (-0.0088 with P-value 0.725) for Asian but negatively significant (-0.0157 with P-value 0.026) for Non-Asian firms. These results imply that the investment rates among high cash Asian firms are not different from those low cash Asian firms during recovery period. Oppositely, investment rates among high cash Non-Asian firms are significantly different and tend to decrease during recovery period. The coefficient of the interaction terms between high cash and crisis dummy variables are positively insignificant for Asian but negatively insignificant for Non-Asian firms. These results imply that the investment rates among high cash Asian firms during recovery period are not different from those high cash during normal period. The coefficients of crisis dummy variables are negatively insignificant for Asian but positively

insignificant for Non-Asian firms. These results imply that the crisis has no impact on investment rates of firms. There is not different in investment rates during crisis period. The coefficients of recovery dummy variable are negatively insignificant for both Asian and Non-Asian firms. The results imply that investment rates are not different during recovery period.

For the control variables, the coefficients of the interaction terms between current sales, high cash and recovery dummy variables are positively significant for Asian but negatively significant for Non-Asian firms. The difference in mean is significantly different at 5% level. These results imply that the current sales among high cash Asian firms motivate the investment rates of firms. Oppositely, the investment rates among high cash Non-Asian firms tend to decrease if sales increase. The coefficients of the interaction terms between current sales, high cash and crisis dummy variables are positively significant for Asian firms but negatively insignificant for Non-Asian firms. The difference in mean is significant different as well. These results imply that the investment rates among high cash Asian firms during crisis period are encouraged by sales. The coefficients of cash flow are positively significant for both Asian and Non-Asian firms. These results imply that the cash flow is an important factor to determine the firm's investment activities (Fazzari, Hubbard and Petersen (1987)).

In sum, the results from investigating the investment rates using sales are consistent with the previous investigating using Tobin's Q. The findings do not support the hypothesis prediction. The investment rates among high cash Asian firms are not different from those low cash firms during recovery period. However, the findings indicate that the investment rates among high cash Asian firms are well explained by sales (Abel and Blanchard (1986)). The findings indicate that sales are important determinants for firm's investment decisions especially during crisis and recovery period.

Table 6: Evidence of the Investment Rates during Recovery Period using Sales

The estimated regression of fixed effects uses to analyze the investment rates of firms after affected by the 1997 Asian financial crisis. 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: normal period (1991-1996), during crisis (1997-2000), and recovery period (2001-2005). The dependent variable is investment in plant and equipment and K is beginning-of-period capital stock. Change in sales is sales year t-1 to year t, divided by sales in year t-1. Lagged sales (S/K) are the ratio of sales to the beginning-of-period capital stock. All other explanatory variables and periods are defined as in Table 6. 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 2. 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	-0.2920*** (0.0670)	-0.0312* (0.0166)	0.000
1 if High Cash	0.0330 (0.0628)	-0.0047 (0.0129)	0.557
1 if Crisis	-0.0509 (0.0370)	0.0077 (0.0119)	0.132
1 if Recovery	-0.0548 (0.0408)	-0.0070 (0.0172)	0.280
1 if High Cash x Crisis	0.0124 (0.0668)	-0.0137 (0.0175)	0.706
1 if High Cash x Recovery	-0.0418 (0.0695)	-0.0110 (0.0156)	0.666
Change in Sales	0.0219 (0.1613)	0.0036 (0.0336)	0.912
Change in Sales x High Cash	0.1028 (0.1848)	-0.0596 (0.0369)	0.389
Change in Sales x Crisis	0.1222 (0.1817)	0.0126 (0.0373)	0.555
Change in Sales x Recovery	-0.0396 (0.1657)	-0.0152 (0.0338)	0.885
Change in Sales x High Cash x Crisis	-0.2593 (0.2245)	0.0615 (0.0492)	0.163
Change in Sales x High Cash x Recovery	-0.1202 (0.1929)	0.0734* (0.0374)	0.325
S/K _t	0.5426*** (0.1654)	0.2287*** (0.0471)	0.068
S/K _t x High Cash	-0.4437 (0.2751)	0.0790 (0.0611)	0.064
S/K _t x Crisis	-0.0238 (0.1992)	0.0460 (0.0819)	0.746
S/K _t x Recovery	-0.1037 (0.1766)	0.0381 (0.0592)	0.447
S/K _t x High Cash x Crisis	0.6590** (0.3313)	-0.5084 (0.3255)	0.012
S/K _t x High Cash x Recovery	0.4824* (0.2924)	-0.2212** (0.0873)	0.021
S/K _{t-1}	0.2376 (0.2089)	-0.0089 (0.0433)	0.248
S/K _{t-1} x High Cash	0.2726 (0.3118)	-0.0042 (0.0770)	0.389

Table 6: Evidence of the Investment Rates during Recovery Period using Sales (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
S/K _{t-1} x Crisis	-0.1900 (0.2355)	0.0365 (0.1030)	0.378
S/K _{t-1} x Recovery	-0.1506 (0.2157)	-0.0039 (0.0542)	0.509
S/K _{t-1} x High Cash x Crisis	-0.5488 (0.3681)	0.3681 (0.3553)	0.073
S/K _{t-1} x High Cash x Recovery	-0.2664 (0.3206)	0.1452 (0.1052)	0.223
S/K _{t-2}	-0.2721* (0.1652)	-0.0148 (0.0363)	0.128
S/K _{t-2} x High Cash	0.3809** (0.1857)	0.0325 (0.0638)	0.076
S/K _{t-2} x Crisis	0.3001 (0.2060)	-0.0396 (0.0834)	0.126
S/K _{t-2} x Recovery	0.2773* (0.1684)	-0.0218 (0.0456)	0.087
S/K _{t-2} x High Cash x Crisis	-0.2780 (0.2545)	0.1255 (0.1671)	0.185
S/K _{t-2} x High Cash x Recovery	-0.4347** (0.1975)	-0.0129 (0.0830)	0.049
S/K _{t-3}	0.0306 (0.0462)	0.0203 (0.0312)	0.853
S/K _{t-3} x High Cash	-0.1942*** (0.0605)	-0.1017 (0.0622)	0.286
S/K _{t-3} x Crisis	-0.0127 (0.1156)	-0.0260 (0.0624)	0.919
S/K _{t-3} x Recovery	-0.0175 (0.0556)	-0.0051 (0.0394)	0.855
S/K _{t-3} x High Cash x Crisis	0.0909 (0.1563)	0.0228 (0.1384)	0.744
S/K _{t-3} x High Cash x Recovery	0.2088*** (0.0722)	0.0950 (0.0832)	0.302
Cash Flow	0.2114** (0.0838)	0.1533*** (0.0382)	0.527
Cash Flow x High Cash	-0.0569 (0.1207)	-0.0539 (0.0376)	0.981
Cash Flow x Crisis	-0.2175** (0.0843)	-0.1715 (0.1186)	0.752
Cash Flow x Recovery	-0.1266 (0.0885)	-0.0846 (0.0523)	0.684
Cash Flow x High Cash x Crisis	0.0678 (0.1377)	0.1224 (0.1503)	0.789
Cash Flow x High Cash x Recovery	0.0376 (0.1224)	0.0382 (0.0662)	0.997
Number of Observations	7,477	4,390	
Adjusted R ² (%)	86.48	82.92	

4.7 Summary Statistics of the Tobin's Q

Table 7 reports summary statistics for the market valuation of the sample firms on the annual percentage. In order to reduce the impact of outliers, a constant is added to the ratio and then taking log (log (1+ (ratio))). Panel A shows descriptive statistics results for all sample firms. Panel B shows descriptive statistics results for high cash firms.

The results from Panel A show that the market valuation of all firms increases over time (-0.02% pre-crisis, -0.01% during crisis and 0.00% post-crisis). The Non-Asian firms have the same increasing pattern of the market valuation (-0.08% pre-crisis, 0.01% during crisis and 0.09% post-crisis). Oppositely, the results of the market valuation among Asian firms are different. The market valuation among Asian firms tends to decrease over time (0.01% pre-crisis, -0.02% during crisis and -0.04% post-crisis). For sizes, Asian firms tend to increase their assets during crisis period (0.92%) and then the assets declined to 0.87% during post-crisis period. In contrast, Non-Asian firms tend to build up their assets over time (0.18% pre-crisis, 0.20% during crisis and 0.22% post-crisis). Revenues from export goods and service among Asian firms increase over time (0.03% pre-crisis, 0.04% during crisis and 0.05% post-crisis). The leverage ratio of Asian firms sharply increases from 0.22% pre-crisis to 0.27% during crisis and decreases to 0.19% post-crisis period. There are opposite results for Non-Asian firms, their leverage ratio decreases over time (0.17% pre-crisis, 0.15% during crisis and 0.11 post-crisis).

Panel B is the descriptive statistics for high cash firms. The results show that the market valuation of all high cash firms increases from 0.00% during crisis to 0.04% post-crisis. The market valuation of high cash Non-Asian firms sharply increases from 0.00% during crisis to 0.12% post-crisis period. However, high cash Asian firms show the opposite results. The market valuation of high cash Asian firms slightly decreases from 0.00% during crisis to -0.01% post-crisis period. The total assets of all high cash firms slightly decrease over time (0.73% pre-crisis, 0.69% during crisis and 0.49% post-crisis). High cash Asian firms' total assets increase

from 0.93% pre-crisis to 0.99% during crisis and then sharply decrease to 0.74% post-crisis period. For high cash Non-Asian firms, total assets slightly increase from 0.10% during crisis to 0.11% post-crisis period. Interestingly, the export revenues among high cash Asian firms increase over time (0.03% pre-crisis, 0.05% during crisis and 0.06% post crisis period). The leverage ratio for all high cash firms and high cash Non-Asian firms decreases over time. Oppositely, the leverage ratio among high cash Asian firms increases from 0.18% post- crisis to 0.19% during crisis and then drop to 0.11% post-crisis period.

In sum, the market valuation among high cash Asian firms decreases with lower rate during recovery period comparing to all Asian firms. High cash Asian firms tend to decrease their assets as same as the other firms during recovery period but their proportions of decreasing the total assets are higher than those low cash Asian firms. The export revenues among high cash firms increase higher than those low cash Asian firms. These results from descriptive statistics initially indicate that high cash Asian firms are likely to have higher growth opportunity and then the higher in market valuation than low cash firms after affected by the crisis. These findings are consistent with Opler, et al. (1999) that firms tend to build up high cash ratio if they have strong growth opportunity. Moreover, the results are consistent with the previous investment rate investigation that firms tend to build up assets by cutting down the investment projects after affected by the crisis (Song and Lee (2012)).

Table 7: Summary Statistics of the Tobin's Q

This table presents descriptive statistics for firms in the final sample total 3,717 firms; Asian firms are 2,096 firms and Non-Asian firms are 1,621 firms. Tobin's Q 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 to total assets. Tobin's Q adjustments equal to Tobin's Q of firm minus the industry median Tobin's Q. Size is ratio between assets to median of assets within industry. Leverage is total debt to equity ratio. Export revenue is firm's revenue from export products and services to total assets. Pre-crisis is a period between 1991 and 1996. During crisis is a period between 1997 and 2000. Post-crisis is a period between 2001 and 2005. In order to reduce impact of outliers, I add a constant and take logs to a ratio of all variable. Significance of the difference in mean between Asian and Non-Asian firms measurement is computed using the independent-sample *t*-test allowing for unequal variances.

Variables	All (1)									Asian (2)						Non-Asian (3)						P-value of difference in mean (2) vs. (3)																
	Pre			During			Post			All			Pre			During			Post			All			Pre			During			Post			All				
	N	Mean(%)	Median(%)	SD	N	Mean(%)	Median(%)	SD	N	Mean(%)	Median(%)	SD	N	Mean(%)	Median(%)	SD	N	Mean(%)	Median(%)	SD	N	Mean(%)	Median(%)	SD	N	Mean(%)	Median(%)	SD	N	Mean(%)	Median(%)	SD	N	Mean(%)	Median(%)	SD		
Tobin's Q	3,373	4,730	14,614	22,717	2,227	3,057	9,134	14,418	1,146	1,673	5,480	8,299	0.01	0.01	0.01	0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Size	3,450	4,842	15,156	23,448	2,273	3,113	9,480	14,866	1,177	1,729	5,676	8,582	0.30	0.33	0.30	0.40	0.43	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	
Export Revenue	3,278	4,726	14,996	23,000	2,102	2,997	9,327	14,426	1,176	1,729	5,669	8,574	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Leverage	3,420	4,603	14,738	22,761	2,266	2,899	9,209	14,374	1,154	1,704	5,529	8,387	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18

Panel A: Tobin's Q for all firms

Table 7: Summary Statistics of the Tobin's Q (Continued)

Variables	Panel B: Tobin's Q for high cash firms															
	All (1)				Asian (2)				Non-Asian (3)				P-value of difference in mean (2) vs. (3)			
	Pre	During	Post	All	Pre	During	Post	All	Pre	During	Post	All	Pre	During	Post	All
Tobin's Q	1,059	1,464	4,560	7,083	788	966	2,733	4,487	271	498	1,827	2,596	0.305	0.991	0.000	0.000
Mean(%)	0.00	0.00	0.04	0.03	0.00	0.00	-0.01	-0.01	-0.02	0.00	0.12	0.08				
Median(%)	0.03	0.00	0.01	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.10	0.05				
SD	0.34	0.40	0.42	0.41	0.35	0.34	0.30	0.32	0.31	0.51	0.55	0.52				
Size	1,059	1,464	4,560	7,083	788	966	2,733	4,487	271	498	1,827	2,596	0.000	0.000	0.000	0.000
Mean(%)	0.73	0.69	0.49	0.57	0.93	0.99	0.74	0.83	0.15	0.10	0.11	0.11				
Median(%)	0.40	0.30	0.23	0.27	0.60	0.56	0.43	0.48	0.06	0.03	0.04	0.04				
SD	0.78	0.91	0.71	0.77	0.80	0.99	0.81	0.86	0.21	0.19	0.18	0.18				
Export Revenue	1,059	1,464	4,560	7,083	788	966	2,733	4,487	271	498	1,827	2,596	0.000	0.000	0.000	0.000
Mean(%)	0.02	0.03	0.03	0.03	0.03	0.05	0.06	0.05	0.00	0.00	0.00	0.00				
Median(%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
SD	0.07	0.08	0.09	0.09	0.07	0.09	0.11	0.10	0.02	0.01	0.00	0.01				
Leverage	1,059	1,464	4,560	7,083	788	966	2,733	4,487	271	498	1,827	2,596	0.000	0.000	0.000	0.000
Mean(%)	0.16	0.15	0.08	0.11	0.18	0.19	0.11	0.14	0.11	0.08	0.04	0.05				
Median(%)	0.13	0.05	0.01	0.03	0.15	0.10	0.06	0.08	0.05	0.00	0.00	0.00				
SD	0.17	0.27	0.16	0.19	0.17	0.29	0.16	0.20	0.16	0.20	0.14	0.16				

4.8 Evidence of the Tobin's Q during Recovery Period

Firms with higher internal resources are expected to resume their businesses and investment activities early than those low cash firm. Therefore, high cash firms are expected to have better recovery rates than those low cash firms during recovery period. In this section, a proxy for recovery rate is the market valuations of firms (Tobin's Q). The model is adopted from Lang and Stulz (1993), designing for examining the relationship between Tobin's Q and firm diversification. I add high cash dummy variable to indicate the market valuation fir high cash firms. The test period will be separated into three; normal period 1991-1996, during crisis 1997-2000 and recovery period 2001-2005. Since the data is panel data, I conduct a test for Eq. (4) by using fixed effects approach in order to control for firm effects. The unobservable characteristics of firms will be controlled in the regression. I separate the sample into Asian and Non-Asian firms before running the regression. In order to see the difference between two groups, I also estimate the difference in mean to indicate the different effect between two groups. The variable of interest is the sum of the coefficients of high cash dummy variable and its interaction terms with recovery dummy variable.

Table 8 shows the results from investigating the market valuation of firms during recovery period. The results for Asian, Non-Asian firms and the difference in mean are in column 1, 2 and 3, respectively. The coefficients of the interaction terms between high cash and recovery dummy variables are negatively insignificant for both high cash Asian and high cash Non-Asian firms. These results imply that the market valuation among high cash firms during recovery period is not different from those high cash firms during normal period. The coefficients of high cash dummy variable are positively insignificant for Asian but positively significant for Non-Asian firms. These results imply that the market valuation among high cash Asian firms is not different from those low cash Asian firms during normal period but high cash Non-Asian firms tend to have higher market value comparing to low cash Non-Asian firms during normal period. The sum of the coefficients of high cash and its interaction terms with

recovery dummy variable are negatively insignificant (-0.0156 with P-value 0.300) for Asian but positively significant (0.0467 with P-value 0.058) for Non-Asian firms. These results imply that the market valuation among high cash Asian firms is not different from those low cash Asian firms during recovery period. Oppositely, the market valuation among high cash Non-Asian firms tends to be significantly higher than those low cash Non-Asian firms during recovery period. The coefficients of the interaction terms between high cash and crisis dummy variables are negatively insignificant for Asian but negatively significant for Non-Asian firms. The difference in mean is significant at 10% level. These results imply that there is not different in market valuation of high cash Asian firms between normal and crisis period. In contrast, the market valuation among high cash Non-Asian firms is likely to decrease during crisis period. The sum of the coefficients of high cash and its interaction with crisis dummy variable are negatively insignificant (-0.0145 with P-value 0.530) for Asian but negatively significant (-0.0677 with P-value 0.056) for Non-Asian firms. These results imply that the market valuation among high cash Asian firms is not different from those low cash Asian firms during crisis period. In contrast, the market valuation among high cash Non-Asian firms tends to be significantly lower than those low cash Non-Asian firms during crisis period. The coefficients of the crisis dummy variables are negatively significant for Asian but positively significant for Non-Asian firms. The difference in mean is significantly different at 1% level. These results imply that the crisis has negative impact on firms in Asian countries. Oppositely, the market valuation of firms with low cash in Non-Asian countries tends to increase during crisis period. The coefficients of recovery dummy variables are negatively significant for Asian but positively significant for Non-Asian firms. The difference in mean is also significantly different at 1% level. These results imply that the negative impact of the crisis on Asian firms still exists during recovery period.

For the control variables, the coefficients of the interaction terms between size and crisis dummy variable are positively significant for Asian but negatively insignificant for Non-

Asian firms. These results imply that retaining high assets will lead to higher in market valuation among low cash Asian firms during crisis period. The coefficients of the interaction terms between export revenues and crisis dummy variable are positively significant to Asian but negatively insignificant for Non-Asian firms as same as the coefficient of the interaction term between export revenues and recovery dummy variable. These result imply that the export revenue increase the market valuation of firms in Asian countries during crisis and recovery period comparing to normal period. The coefficients of the interaction term between leverage and crisis dummy variables are positively significant for Asian but negatively insignificant for Non-Asian firms. Moreover, the coefficients of the interaction term between leverage and recovery dummy variables are positively significant for Asian but negatively significant for Non-Asian firms. These results imply that the ability to access external capital during crisis and recovery period of low cash Asian firms can increase the market valuation of firms.

In sum, the results from investigating the market valuation of high cash firms during recovery period are contrary to previous results from descriptive statistics. The findings do not support the hypothesis prediction that high cash firms tend to have better recovery rates (market valuation) during recovery period. The findings indicate that market valuation of high cash Asian firms is not different from those firms with low cash during recovery period. The crisis has impact on the market valuation of both high and low cash firms. These findings are consistent with Yung and Nafar (2014) that the decisions of firms are forced by the creditors' rights. The objectives of creditors, decisions are to minimize risk taking and make sure that firms could meet debt obligations. These actions decrease firm value.

Table 8: Evidence of the Tobin's Q during Recovery Period

The estimated regression of fixed effects uses to analyze Tobin's Q as a proxy for recovery rate of firms after affected by the 1997 Asian financial crisis. 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: normal period (1991-1996), during crisis (1997-2000), and recovery period (2001-2005). The dependent variable is the Tobin's Q, defined as the market value of firm to total assets. The high cash dummy variable is 1(0) if firms are in the top 30 percentile within the same industry (otherwise). The crisis period is 1(0) if firms are in the period of Asian financial crisis 1997-2000 (otherwise). The recovery period is 1(0) if firms are in the period after Asian financial crisis 2001-2005 (otherwise). All other explanatory variables are defined as in Table 11. 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 2. 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	0.0226 (0.0266)	-0.1753*** (0.0267)	0.000
1 if High Cash	0.0116 (0.0308)	0.0682* (0.0402)	0.264
1 if Crisis	-0.1333*** (0.0250)	0.1500*** (0.0299)	0.000
1 if Recovery	-0.0909*** (0.0246)	0.3078*** (0.0313)	0.000
1 if High Cash x Crisis	-0.0261 (0.0363)	-0.1358*** (0.0496)	0.074
1 if High Cash x Recovery	-0.0271 (0.0343)	-0.0215 (0.0471)	0.923
Size	-0.0029 (0.0278)	-0.0069 (0.0582)	0.950
Size x High Cash	0.0039 (0.0213)	0.0321 (0.0792)	0.731
Size x Crisis	0.0511*** (0.0170)	-0.0607 (0.0422)	0.014
Size x Recovery	0.0008 (0.0175)	-0.1168** (0.0453)	0.016
Size x High Cash x Crisis	-0.0120 (0.0260)	0.0272 (0.1028)	0.711
Size x High Cash x Recovery	0.0256 (0.0255)	-0.1726 (0.1059)	0.069
Export Revenue	-0.1943 (0.1565)	-0.1305 (0.5972)	0.918
Export Revenue x High Cash	-0.1131 (0.2590)	4.4588*** (0.6831)	0.000
Export Revenue x Crisis	0.3122* (0.1687)	-0.2395 (0.5523)	0.339
Export Revenue x Recovery	0.2953* (0.1600)	-0.5309 (0.7938)	0.308
Export Revenue x High Cash x Crisis	0.0836 (0.3018)	-2.4436*** (0.7690)	0.002
Export Revenue x High Cash x Recovery	0.1459 (0.2797)	3.0495*** (1.0123)	0.006

Table 8: Evidence of the Tobin's Q during Recovery Period (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
Leverage	-0.0601 (0.0648)	0.1380* (0.0753)	0.046
Leverage x High Cash	-0.0944 (0.0900)	-0.2778** (0.1208)	0.223
Leverage x Crisis	0.1217* (0.0657)	-0.0877 (0.0956)	0.071
Leverage x Recovery	0.1854*** (0.0656)	-0.1883** (0.0831)	0.000
Leverage x High Cash x Crisis	0.0878 (0.0996)	0.4188** (0.1687)	0.091
Leverage x High Cash x Recovery	0.0820 (0.1045)	0.1005 (0.1528)	0.920
Number of Observations	13,527	8,104	
Adjusted R ² (%)	40.33	43.47	



4.9 Summary Statistics of the Payout Ratio

Table 9 reports summary statistics for the payout ratio of the sample firms on the annual percentage. In order to reduce the impact of outliers, a constant is added to the ratio and then taking log (log (1+ (ratio))). Panel A shows descriptive statistics results for all sample firms. Panel B shows descriptive statistics results for high cash firms.

Panel A shows the descriptive statistics results for all firms. Dividends among Asian firms sharply decrease during crisis period and slightly increase during post-crisis period (1.14% pre-crisis, 0.54% during crisis and 0.81% post-crisis). Oppositely, Non-Asian firms tend to decrease their dividend payout over time (1.33% pre-crisis, 1.08% during crisis and 0.65% post-crisis). The profitability of all firms declines for entire period (0.03% pre-crisis, 0.01% during crisis and -0.01% post-crisis). For Asian firms, the profitability tends to decrease from 0.04% pre-crisis to 0.02% during crisis period and is stable at 0.02% post-crisis period. In contrast, profitability among Non-Asian firms tends to decrease over time (0.03% pre-crisis 0.00% during crisis and -0.06% post-crisis). The growth of assets among Asian firms tends to decrease from 0.06% pre-crisis to 0.02% during crisis period and is stable at 0.02% post-crisis. For Non-Asian firms, the growth of assets increases from 0.01% pre-crisis to 0.03% during crisis and then decrease to -0.01% post-crisis period. The market valuation for all firms decreases over time (0.33% pre-crisis, 0.31% during crisis and 0.29% post-crisis). For Asian firms, the market valuation has the same pattern as all firms. The market valuation of Asian firms decreases over time (0.34% pre-crisis, 0.30% during crisis and 0.25% post-crisis). Contrary to Asian firms, the market valuation of Non-Asian firms increases for entire period (0.25% pre-crisis, 0.27% during crisis and 0.29% post-crisis). The total assets for Asian firm sharply increase from 0.76% pre-crisis to 0.92% during crisis and then slightly decrease to 0.87% post-crisis period. For Non-Asian firms, the total assets increase for entire period (0.18% pre-crisis, 0.20% during crisis and 0.22% post-crisis).

Panel B shows descriptive statistics results of dividend payout for high cash firms. For all high cash firms, the dividend payout decreases from 1.00% pre-crisis to 0.62% during crisis and then increases to 0.72% post-crisis period. The dividend payout among high cash Asian firms decreases from 0.98% pre-crisis to 0.68% during crisis and then increases to 1.00% post-crisis period. In contrast, Non-Asian firms tend to decrease their dividend payout (1.04% pre-crisis, 0.50% during crisis and 0.26% post-crisis). For profitability, all high cash firms and high cash Non-Asian firms have the same decreasing pattern of profitability (0.04% pre-crisis, 0.02% during crisis and -0.01% post-crisis for all high cash firms and 0.02% pre-crisis, -0.02% during crisis and -0.09% post-crisis for high cash Non-Asian firms). However, the profitability among high cash Asian firms drops from 0.05% pre-crisis to 0.03% during crisis and then increases to 0.04% post-crisis period. The growth of assets for all high cash firms tends to decrease over time (0.04% pre-crisis, 0.03% during crisis and -0.01% post-crisis). For high cash Asian firms, the growth of assets decreases from 0.05% pre-crisis to 0.03% during crisis and is stable at 0.03% post-crisis period. For high cash Asian firms, the market valuation tends to decrease over time (0.34% pre-crisis, 0.31% during crisis and 0.24% post-crisis). In contrast, the market valuation among high cash Non-Asian firms tends to increase over time (0.30% pre-crisis, 0.32% during crisis and 0.42% post-crisis). The total assets for all high cash firms tend to decrease for entire period (0.73% pre-crisis, 0.69% during crisis and 0.49% post-crisis). For high cash Asian firms, the total assets increase from 0.93% pre-crisis to 0.99% during crisis and then decrease to 0.74% post-crisis.

In sum, the descriptive statistics results show that the dividend payout of all firms decreases during crisis period. However, all firms tend to increase dividends to shareholders during post-crisis period (recovery period). These patterns are also observed among high cash Asian firms. Oppositely, Non-Asian firms are likely to decrease their dividends. These findings show that there is a different pattern of dividends among Asian and Non-Asian firms during recovery period. Moreover, the percentages of dividends payout among high cash Asian firms

are higher than those Asian firms during recovery period. These findings initially indicate that high cash Asian firms are likely to have higher rate of dividend payout to shareholders than low cash firms during recovery period.



Table 9: Summary Statistics of the Payout Ratio

This table presents descriptive statistics for firms in the final sample total 3,717 firms; Asian firms are 2,096 firms and Non-Asian firms are 1,621 firms. Payout ratio is the dividend payments to total net income. Profitability is the ratio of earnings before interest to total assets. Growth rate of assets is the change in assets from year t-1 to t divided by total assets in year t. Tobin's Q 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 to total assets. Size is the log of ratio between total assets to median of total assets within industry. Pre-crisis is a period between 1991 and 1996. During crisis is a period between 1997 and 2000. Post-crisis is a period between 2001 and 2005. In order to reduce impact of outliers, I add a constant and take logs to a ratio of all variable. Significance of the difference in mean between Asian and Non-Asian firms measurement is computed using the independent-sample *t*-test allowing for unequal variances.

Variables	Panel A: Dividend Payout for All Firms																
	All (1)				Asian (2)				Non-Asian (3)				P-value of difference in mean (2) vs. (3)				
	Pre	During	Post	All	Pre	During	Post	All	Pre	During	Post	All	Pre	During	Post	All	
Payout ratio	N	3,042	4,612	14,530	22,184	1,925	2,976	8,786	13,687	1,117	1,636	5,744	8,497	0.000	0.000	0.000	0.074
	Mean(%)	1.21	0.73	0.75	0.81	1.14	0.54	0.81	0.80	1.33	1.08	0.65	0.82	0.000	0.000	0.000	0.000
	Median(%)	1.59	0.00	0.00	0.00	1.51	0.00	0.64	0.00	1.73	1.64	0.00	0.00	0.000	0.000	0.000	0.000
Profitability	SD	0.77	0.84	0.84	0.85	0.76	0.75	0.83	0.82	0.76	0.87	0.85	0.88	0.000	0.000	0.000	0.000
	N	3,446	4,787	14,685	22,918	2,272	3,095	9,452	14,819	1,174	1,692	5,233	8,099	0.000	0.000	0.000	0.000
	Mean(%)	0.03	0.01	-0.01	0.00	0.04	0.02	0.02	0.02	0.02	0.03	-0.06	-0.04	0.000	0.000	0.000	0.000
Growth Rate Of Assets	Median(%)	0.04	0.03	0.02	0.03	0.04	0.02	0.03	0.03	0.04	0.03	0.00	0.02	0.000	0.000	0.000	0.000
	SD	0.06	0.11	0.15	0.14	0.03	0.08	0.07	0.07	0.09	0.14	0.23	0.20	0.000	0.000	0.000	0.000
	N	2,747	3,773	12,980	19,500	1,722	2,535	8,429	12,686	1,025	1,238	4,551	6,814	0.000	0.000	0.000	0.000
Tobin's Q	Mean(%)	0.04	0.02	0.01	0.02	0.06	0.02	0.02	0.02	0.01	0.03	-0.01	0.00	0.000	0.000	0.000	0.000
	Median(%)	0.04	0.03	0.02	0.03	0.05	0.03	0.02	0.03	0.02	0.03	0.02	0.02	0.000	0.000	0.000	0.000
	SD	0.09	0.11	0.16	0.14	0.07	0.10	0.12	0.11	0.11	0.11	0.21	0.19	0.000	0.000	0.000	0.000
Size	N	3,448	4,816	14,899	23,163	2,272	3,089	9,232	14,593	1,176	1,727	5,667	8,570	0.000	0.000	0.000	0.000
	Mean(%)	0.33	0.31	0.29	0.30	0.34	0.30	0.25	0.27	0.29	0.32	0.37	0.35	0.000	0.000	0.000	0.000
	Median(%)	0.32	0.29	0.26	0.27	0.34	0.28	0.23	0.26	0.28	0.30	0.32	0.30	0.000	0.000	0.000	0.000
Size	SD	0.14	0.17	0.22	0.20	0.15	0.15	0.17	0.16	0.13	0.21	0.28	0.25	0.000	0.000	0.000	0.000
	N	3,450	4,842	15,156	23,448	2,273	3,113	9,480	14,866	1,177	1,729	5,676	8,582	0.000	0.000	0.000	0.000
	Mean(%)	0.56	0.66	0.63	0.62	0.76	0.92	0.87	0.86	0.18	0.20	0.22	0.21	0.000	0.000	0.000	0.000
Size	Median(%)	0.30	0.31	0.32	0.31	0.47	0.54	0.52	0.51	0.08	0.06	0.08	0.07	0.000	0.000	0.000	0.000
	SD	0.67	0.84	0.82	0.81	0.73	0.92	0.91	0.89	0.25	0.37	0.39	0.37	0.000	0.000	0.000	0.000

Table 9: Summary Statistics of the Payout Ratio (Continued)

Panel B: Dividend Payout for High Cash Firms

Panel B Variables	All (1)			Asian (2)			Non-Asian (3)			P-value of difference in mean (2) vs. (3)			
	Pre	During	Post	All	Pre	During	Post	All	Pre	During	Post	All	
Payout ratio	N	1,059	1,464	4,560	7,083	788	966	2,733	4,487	271	498	1,827	2,596
	Mean(%)	1.00	0.62	0.70	0.73	0.98	0.68	1.00	0.93	1.04	0.50	0.26	0.39
	Median(%)	1.43	0.00	0.00	0.00	1.39	0.00	1.44	1.30	1.62	0.00	0.00	0.00
Profitability	SD	0.82	0.80	0.83	0.83	0.80	0.79	0.83	0.82	0.87	0.80	0.62	0.73
	N	1,059	1,464	4,560	7,083	788	966	2,733	4,487	271	498	1,827	2,596
	Mean(%)	0.04	0.02	-0.01	0.00	0.05	0.03	0.04	0.04	0.02	-0.02	-0.09	-0.06
Growth Rate of Assets	Median(%)	0.04	0.03	0.02	0.03	0.05	0.03	0.04	0.04	0.04	0.00	0.00	0.00
	SD	0.08	0.13	0.17	0.16	0.03	0.09	0.06	0.06	0.15	0.19	0.25	0.23
	N	1,059	1,464	4,560	7,083	788	966	2,733	4,487	271	498	1,827	2,596
Tobin's Q	Mean(%)	0.04	0.03	0.01	0.02	0.05	0.03	0.03	0.03	0.00	0.03	-0.01	0.00
	Median(%)	0.03	0.01	0.01	0.02	0.04	0.03	0.03	0.03	0.02	0.00	0.00	0.00
	SD	0.09	0.10	0.15	0.14	0.06	0.09	0.09	0.09	0.14	0.11	0.21	0.19
Size	N	1,059	1,464	4,560	7,083	788	966	2,733	4,487	271	498	1,827	2,596
	Mean(%)	0.33	0.31	0.31	0.31	0.34	0.31	0.24	0.28	0.30	0.32	0.40	0.38
	Median(%)	0.33	0.29	0.27	0.28	0.34	0.29	0.24	0.27	0.29	0.28	0.34	0.32
Size	SD	0.16	0.22	0.27	0.25	0.16	0.19	0.19	0.19	0.16	0.28	0.35	0.32
	N	1,059	1,464	4,560	7,083	788	966	2,733	4,487	271	498	1,827	2,596
	Mean(%)	0.73	0.69	0.49	0.57	0.93	0.99	0.74	0.83	0.15	0.10	0.11	0.11
Median(%)	0.40	0.30	0.23	0.27	0.60	0.56	0.43	0.48	0.06	0.03	0.04	0.04	
SD	0.78	0.91	0.71	0.77	0.80	0.99	0.81	0.86	0.21	0.19	0.18	0.18	

4.10 Evidence of the Payout Ratio during Recovery Period

After affected by crisis, firms with plenty of internal resources are expected to resume their business activities earlier than those firms with less internal resources and then have better recovery rate. In order to observe the recovery rate, dividend payout as a proxy for recovery rate is examined in this section. High cash firms are expected to have higher percentages of dividend payments to shareholders than those low cash firms during recovery period. The model is adopted from Fama and French (2001). To see the different of dividend payout between high and low cash firms, high cash dummy variable is added to indicate the market valuation for high cash firms. The test period will be separated into three; normal period 1991-1996, during crisis 1997-2000 and recovery period 2001-2005. Since the data is panel data, I conduct a test for Eq. (5) by using fixed effects approach in order to control for firm effects. The unobservable characteristics of firms will be controlled in the regression. I separate the sample into Asian and Non-Asian firms before running the regression. In order to see the difference between two groups, I also estimate the difference in mean to indicate the different effect between two groups. The variable of interest is the sum of the coefficients of high cash dummy variable and its interaction terms with recovery dummy variable.

Table 10 shows the results from investigating dividend payout of firms during recovery period. The results for Asian, Non-Asian and the difference in mean are in column 1, 2 and 3, respectively. The coefficients of the interaction terms between high cash and recovery dummy variables are positively insignificant for Asian but negatively insignificant for Non-Asian firms. These results imply that the dividend payout among high cash Asian and Non-Asian firms during recovery period is not different from during normal period. The coefficients of high cash dummy variable are negatively insignificant for Asian but positively insignificant for Non-Asian firms. These results imply that there is not different in pattern of paying dividends among high and low cash firms during normal period. However, the sum of the coefficients of the high cash and its interaction terms with recovery dummy variable are positively significant (0.1209

with P-value 0.007) for Asian firms but negatively insignificant for (-0.0230 with P-value 0.634) for Non-Asian firms. These results imply that the dividend payout among high cash Asian firms are significantly different and higher than those low cash Asian firms during recovery period. In contrast, this evidence is weak as the both coefficients themselves are not significant. The coefficients of the interaction terms between high cash and crisis dummy variables are positively insignificant for Asian but negatively insignificant for Non-Asian firms. These results imply that the dividend payout among high cash Asian and Non-Asian firms during crisis period is not different from those high cash firms during normal period. The coefficients of crisis and recovery dummy variables are negatively significant for Asian firms. For Non-Asian firms, the only coefficient of crisis dummy variable is positively significant. The differences in mean of both crisis and recovery dummy variables are significantly different between Asian and Non-Asian firms. These results imply that the crisis has negative impact on dividend policies among low cash Asian firms and affected continuously on firms during recovery period. In contrast, low cash Non-Asian firms tend to increase their dividends during crisis period.

For the controls variables, the profitability and total assets have strong impact on dividend payout among Asian firms. All coefficients of profitability and its interaction terms with period dummy variables are all statistically significant. Both coefficients of the interaction terms of profitability with crisis and recovery dummy variable are all positively significant for Asian but insignificant for Non-Asian firms. The difference in means is significantly different at 10% level. These results imply that earnings encourage high cash Asian firms to pay dividends during crisis and recovery period. The coefficients of Tobin's Q and recovery dummy variables are positively significant for Asian but negatively insignificant for Non-Asian firms. These results imply that the market valuation of Asian firms has positive relation to the dividend payout during recovery period. The coefficients of the interaction terms between size, high cash and crisis dummy variables are negatively significant for Asian but negatively insignificant for

Non-Asian firms. Holding other things constant, these results imply that high cash Asian firms tend to keep assets with in firms instead of paying dividends to shareholders during crisis period. The coefficients of the interaction terms between size and crisis dummy variable are negatively significant for Asian firms as same as the coefficients of the interaction terms between size and recovery dummy variable. These results imply that Asian firms are likely to retain high level of assets after affected by the crisis (Song and Lee (2012)).

Overall, the results from investigating the dividend payout among high cash Asian firms during recovery period indicate that after affected by the crisis, the dividend payout among high cash firms is higher than low cash firms during recovery period. These findings support the hypothesis prediction but they are weak evidences. The results imply that the high cash firms tend to have better recovery rate during recovery period. These findings are consistent with Bigelli and Sánchez-Vidal (2012) that high cash firms have more profitability than low cash firms and pay higher dividends to shareholders. The dividend payout provides the information about the firm's financial well-being, the dividends signaling theory (Miller and Rock (1985)).

Table 10: Evidence of the Payout Ratio during Recovery Period

The estimated regression of fixed effects uses to analyze dividend payout as a proxy for recovery rate of firms after affected by the 1997 Asian financial crisis. 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: normal period (1991-1996), during crisis (1997-2000), and recovery period (2001-2005). The dependent variable is the Tobin's Q, defined as the market value of firm to total assets. The high cash dummy variable is 1(0) if firms are in the top 30 percentile within the same industry (otherwise). The crisis period is 1(0) if firms are in the period of Asian financial crisis 1997-2000 (otherwise). The recovery period is 1(0) if firms are in the period after Asian financial crisis 2001-2005 (otherwise). All other explanatory variables are defined as in Table 14. 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 2. 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	0.7426** (0.0961)	0.5563*** (0.1011)	0.182
1 if High Cash	-0.0470 (0.1394)	0.1540 (0.1571)	0.339
1 if Crisis	-0.4428*** (0.0991)	0.2976*** (0.1096)	0.000
1 if Recovery	-0.3511*** (0.0968)	0.1776 (0.1099)	0.000
1 if High Cash x Crisis	0.0778 (0.1585)	-0.2074 (0.1783)	0.232
1 if High Cash x Recovery	0.1679 (0.1469)	-0.1770 (0.1636)	0.117
Profitability	3.5314*** (0.8101)	1.1099*** (0.5599)	0.014
Profitability x High Cash	-3.1738*** (1.2052)	-0.9950 (0.6666)	0.114
Profitability x Crisis	-3.0468*** (0.8469)	-0.7122 (0.5574)	0.021
Profitability x Recovery	-1.6018* (0.8270)	-0.9544* (0.5615)	0.517
Profitability x High Cash x Crisis	3.7606*** (1.2729)	1.0820 (0.6913)	0.064
Profitability x High Cash x Recovery	3.4868*** (1.3142)	0.9435 (0.6696)	0.085
Growth of Assets	1.3492*** (0.3491)	0.7744*** (0.2097)	0.158
Growth of Assets x High Cash	-1.2661* (0.6678)	-0.3329 (0.3631)	0.220
Growth of Assets x Crisis	-0.7811** (0.3725)	-0.5060* (0.2635)	0.547
Growth of Assets x Recovery	-1.2673*** (0.3483)	-0.4951** (0.2157)	0.059
Growth of Assets x High Cash x Crisis	1.1883 (0.7328)	0.0760 (0.5022)	0.211
Growth of Assets x High Cash x Recovery	1.7704** (0.6874)	0.1673 (0.3736)	0.040
Tobin's Q	-0.1040 (0.2068)	0.7126*** (0.2526)	0.012

Table 10: Evidence of the Payout Ratio during Recovery Period (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
Tobin's Q x High Cash	0.3847 (0.3001)	-0.2747 (0.4370)	0.214
Tobin's Q x Crisis	0.2830 (0.2437)	-0.6182** (0.2734)	0.014
Tobin's Q x Recovery	0.7671*** (0.2191)	-0.4175 (0.2542)	0.000
Tobin's Q x High Cash x Crisis	-0.2502 (0.3713)	0.2847 (0.4527)	0.361
Tobin's Q x High Cash x Recovery	-0.4827 (0.3224)	0.3011 (0.4423)	0.152
Size	0.4375*** (0.0750)	0.1003 (0.1425)	0.036
Size x High Cash	0.1072** (0.0540)	0.0845 (0.2245)	0.922
Size x Crisis	-0.1843*** (0.0506)	-0.0388 (0.1082)	0.223
Size x Recovery	-0.2539*** (0.0507)	-0.0056 (0.1219)	0.060
Size x High Cash x Crisis	-0.1221** (0.0598)	-0.0125 (0.2197)	0.631
Size x High Cash x Recovery	-0.0667 (0.0572)	-0.0475 (0.2763)	0.946
Number of Observations	12,257	6,368	
Adjusted R ² (%)	57.25	78.84	

4.11 Summary Statistics of the ROA

Table 11 reports summary statistics for the return on assets (ROA) of the sample firms on the annual percentage. In order to reduce the impact of outliers, a constant is added to the ratio and then taking log (log (1+ (ratio))). Panel A shows descriptive statistics results for all sample firms. Panel B shows descriptive statistics results for high cash firms.

Panel A shows results of descriptive statistics for all firms. ROA of Asian firms decreases from 0.00% pre-crisis to -0.01% during crisis and then increases to 0.00% post-crisis. All firms and Non-Asian firms have the same declining pattern of ROA. ROA of all firms decreases over time (0.00% pre-crisis, -0.01% during crisis and -0.02% post-crisis) as same as Non-Asian firms (-0.02% pre-crisis, -0.02% during crisis and -0.06% post-crisis). The results from Panel B show descriptive statistics for high cash firms. ROA of all high cash firms decreases over time (0.00% pre-crisis, -0.01% during crisis and -0.03% post-crisis). Oppositely, ROA among high cash Asian firms is stable for entire period (0.01% pre-crisis, 0.01% during crisis and 0.01% post-crisis). ROA among high cash Non-Asian firms decreases from -0.03% during crisis to -0.09% post-crisis period.

In sum, the results from descriptive statistics show that the crisis has negative impact on Asian firms. The profitability among Asian firms decreases during crisis period. However, the effect no longer exists during recovery period. Furthermore, the descriptive statistics among high cash firms indicate that the profitability among high cash Asian firms is normally higher than those low cash firms. The crisis has no impact on the profitability of high cash Asian firms. The high cash Asian firms possibly remain utilizing their assets to generate profits during crisis and recovery period as same as pre-crisis period. These findings are consistent with Mikkelsen and Partch (2003) that high cash firms have greater performance comparing to those low cash firms in the same industry.

Table 11: Summary Statistics of the ROA

This table presents descriptive statistics for firms in the final sample total 3,717 firms; Asian firms are 2,096 firms and Non-Asian firms are 1,621 firms. ROA is profit before interest and tax to total assets. ROA adjustments are equal to firm's ROA minus the industry median ROA. Size is ratio between sales of firm to median of sales within industry. Leverage is total debt to total equity ratio. Age is age of firms. Pre-crisis is a period between 1991 and 1996. During crisis is a period between 1997 and 2000. Post-crisis is a period between 2001 and 2005. In order to reduce impact of outliers, I add a constant and take logs to a ratio of all variable. Significance of the difference in mean between Asian and Non-Asian firms measurement is computed using the independent-sample *t*-test allowing for unequal variances.

Variables	Panel A: Return on Assets for All Firms											
	All				Asian				Non-Asian			
	Pre	During	Post	All	Pre	During	Post	All	Pre	During	Post	All
ROA	3,445	4,787	14,685	22,917	2,272	3,095	9,453	14,820	1,173	1,692	5,232	8,097
Mean(%)	0.00	-0.01	-0.02	-0.02	0.00	-0.01	0.00	0.00	-0.02	-0.02	-0.06	-0.05
Median(%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SD	0.08	0.11	0.15	0.13	0.03	0.08	0.07	0.07	0.12	0.15	0.23	0.20
Size	3,449	4,842	15,148	23,439	2,273	3,113	9,480	14,866	1,176	1,729	5,668	8,573
Mean(%)	0.31	0.33	0.37	0.35	0.29	0.32	0.35	0.34	0.35	0.36	0.39	0.37
Median(%)	0.30	0.30	0.32	0.31	0.29	0.30	0.32	0.31	0.34	0.34	0.30	0.32
SD	0.15	0.21	0.29	0.26	0.13	0.16	0.20	0.19	0.18	0.27	0.40	0.35
Leverage	3,420	4,603	14,738	22,761	2,266	2,899	9,209	14,374	1,154	1,704	5,529	8,387
Mean(%)	0.20	0.23	0.16	0.18	0.22	0.27	0.19	0.22	0.17	0.15	0.11	0.12
Median(%)	0.17	0.17	0.11	0.13	0.19	0.20	0.15	0.17	0.14	0.12	0.03	0.07
SD	0.18	0.29	0.24	0.24	0.18	0.33	0.25	0.26	0.18	0.18	0.21	0.20
Liquidity	3,375	4,734	14,959	23,068	2,246	3,078	9,437	14,761	1,129	1,656	5,522	8,307
Mean(%)	0.41	0.42	0.49	0.46	0.40	0.38	0.44	0.42	0.43	0.49	0.57	0.53
Median(%)	0.38	0.37	0.41	0.40	0.37	0.35	0.41	0.39	0.40	0.40	0.43	0.42
SD	0.19	0.27	0.31	0.29	0.18	0.23	0.22	0.22	0.20	0.33	0.42	0.38
Age	7,041	8,171	15,158	30,370	4,109	4,549	8,689	17,347	2,932	3,622	6,469	13,023
Mean	4.59	6.25	7.81	6.64	3.45	5.79	7.33	6.01	6.18	6.83	8.46	7.49
Median	4.00	5.00	7.00	5.00	3.00	6.00	7.00	5.00	5.00	5.00	7.00	6.00
SD	4.63	5.18	6.09	5.69	2.46	3.71	5.18	4.57	6.23	6.54	7.08	6.82

P-value of difference in mean (2) vs. (3)

0.000 0.004 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

4.12 Evidence of the ROA during Recovery Period

Firm's profitability is generally defined as the effective utilized its available resource. In other words, it measures how efficiency a firm uses assets to generate income. During an economic downturn, the internal resource is only available capital of firm. This study will examine the relationship between firm's internal resource, cash holdings and its profitability after effect from crisis. The model is adopted from Dogan (2013). The regression aims to examine the relationship between size of firm and firm's profitability. The test period will be separated into three; normal period 1991-1996, during crisis 1997-2000 and recovery period 2001-2005. Since the data is panel data, I conduct a test for Eq. (6) by using fixed effects approach in order to control for firm effects. The unobservable characteristics of firms will be controlled in the regression. I separate the sample into Asian and Non-Asian firms before running the regression. In order to see the difference between two groups, I also estimate the difference in mean to indicate the different effect between two groups. The variable of interest is the sum of the coefficients of high cash dummy variable and its interaction terms with recovery dummy variable.

Table 12 shows the results from investigating profitability of firms during recovery period. The results for Asian, Non-Asian and the difference in mean are in column 1, 2 and 3, respectively. The coefficients of the interaction terms between high cash and recovery dummy variables are negatively insignificant for Asian but positively insignificant for Non-Asian firms. These results imply that profitability among high cash both Asian and Non-Asian firms during recovery period is not different from normal period. The coefficients of high cash dummy variable are positively significant for Asian but negatively insignificant for Non-Asian firms. These results imply that high cash Asian firms normally have higher profitability comparing to those low cash firms during normal period. Furthermore, the sum of the coefficients of high cash dummy variable and its interaction terms with recovery dummy variable are positively insignificant (0.0058 with P-value 0.709) for Asian but negatively significant (-0.070 with P-

value 0.041) for Non-Asian firms. These results imply that the profitability among high cash Asian firms is not different from those low cash Asian firms during recovery period. Oppositely, the profitability among high cash Non-Asian firms is lower than those low cash Non-Asian firms during recovery period. The coefficients of the interaction terms between high cash and crisis dummy variables are negatively insignificant for Asian but positively insignificant for Non-Asian firms. These results imply that the profitability among high both Asian and Non-Asian firms during crisis period is not different from during normal period. The coefficients of crisis dummy variable are negatively insignificant for Asian but positively insignificant for Non-Asian firms. These results imply that the profitability among low cash Asian and Non-Asian firms during crisis period is not different from during normal period. The coefficients of recovery dummy variables are positively insignificant for Asian but negatively significant for Non-Asian firms. These results imply that the profitability among low cash Asian firms during recovery period is not different from pre-crisis period. In contrast, the profitability among low cash Non-Asian firms during recovery period is lower than during normal period.

For the control variables, the coefficients of the interaction terms between size, high cash and recovery dummy variables are negatively significant for Asian but negatively insignificant for Non-Asian firms. These results imply that high cash Asian firms are likely to keep assets within firms after affected by the crisis. The coefficients of the interaction terms between liquidity, high cash and both crisis and recovery dummy variables are positively significant for Asian but insignificant for Non-Asian firms. These results imply that liquidity has positive impact on profitability of high cash Asian firms during crisis and recovery period.

In sum, the results from Table 12 investigating ROA during recovery period are contrary to the initial findings from previous descriptive statistics in Table 11. These findings do not support the hypothesis prediction. When including the control variables, the results show that the profitability among high cash Asian firms is not different from those low cash Asian firms during recovery period. These findings are inconsistent with Enqvist, Graham and

Nikkinen (2014) and Fresard (2010) that cash rich firms will have comparable profitability comparing to low cash firms when firms face financial distress. However, the findings indicate that profitability among high cash firms is normally higher than low cash firms during normal period (Mikkelsen and Partch (2003)).



Table 12: Evidence of the ROA during Recovery Period

The estimated regression of fixed effects uses to analyze the profitability as a proxy for recovery rate of firms after affected by the 1997 Asian financial crisis. 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: normal period (1991-1996), during crisis (1997-2000), and recovery period (2001-2005). The dependent variable is the Tobin's Q, defined as the market value of firm to total assets. The high cash dummy variable is 1(0) if firms are in the top 30 percentile within the same industry (otherwise). The crisis period is 1(0) if firms are in the period of Asian financial crisis 1997-2000 (otherwise). The recovery period is 1(0) if firms are in the period after Asian financial crisis 2001-2005 (otherwise). All other explanatory variables are defined as in Table 17. 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 2. 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	-0.0447*** (0.0066)	-0.0653*** (0.0181)	0.283
1 if High Cash	0.0163** (0.0082)	-0.1038 (0.1199)	0.317
1 if Crisis	-0.0019 (0.0110)	0.0103 (0.0256)	0.661
1 if Recovery	0.0067 (0.0100)	-0.0551* (0.0281)	0.038
1 if High Cash x Crisis	-0.0235 (0.0199)	0.1049 (0.1217)	0.298
1 if High Cash x Recovery	-0.0105 (0.0178)	0.0330 (0.1241)	0.729
Size	0.1008*** (0.0134)	0.0525* (0.0277)	0.117
Size x High Cash	0.0509*** (0.0162)	0.2222 (0.1874)	0.362
Size x Crisis	-0.0039 (0.0125)	-0.0621** (0.0284)	0.061
Size x Recovery	-0.0194 (0.0142)	-0.0175 (0.0275)	0.950
Size x High Cash x crisis	-0.0324 (0.0227)	-0.2053 (0.1867)	0.358
Size x High Cash x recovery	-0.0421* (0.0250)	-0.2044 (0.1891)	0.395
Leverage	-0.0251** (0.0110)	-0.0348 (0.0307)	0.767
Leverage x High Cash	-0.0297** (0.0144)	0.0010 (0.1184)	0.797
Leverage x Crisis	0.0222* (0.0128)	-0.0703 (0.0501)	0.074
Leverage x Recovery	-0.0080 (0.0119)	-0.0694 (0.0594)	0.312
Leverage x High Cash x Crisis	0.0135 (0.0243)	-0.0120 (0.1247)	0.840
Leverage x High Cash x Recovery	0.0408 (0.0298)	-0.0345 (0.1779)	0.676

Table 12: Evidence of the ROA during Recovery Period (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
Liquidity	0.0503*** (0.0123)	-0.0109 (0.0377)	0.123
Liquidity x High Cash	-0.0454*** (0.0130)	0.0181 (0.0717)	0.384
Liquidity x Crisis	0.0073 (0.0171)	0.0471 (0.0445)	0.404
Liquidity x Recovery	-0.0045 (0.0138)	0.0695* (0.0414)	0.090
Liquidity x High Cash x Crisis	0.0507** (0.0247)	-0.0237 (0.0790)	0.369
Liquidity x High Cash x Recovery	0.0383* (0.0210)	0.0313 (0.0776)	0.931
Age	-0.0019*** (0.0005)	0.0033** (0.0015)	0.001
Age x High Cash	0.0000 (0.0006)	-0.0001 (0.0014)	0.963
Age x Crisis	-0.0001 (0.0006)	0.0000 (0.0006)	0.883
Age x Recovery	0.0013** (0.0006)	0.0018*** (0.0006)	0.519
Age x High Cash x Crisis	0.0007 (0.0008)	-0.0003 (0.0019)	0.619
Age x High Cash x Recovery	0.0000 (0.0007)	0.0008 (0.0019)	0.687
Number of Observations	12,841	7,353	
Adjusted R ² (%)	35.5	34.54	

Chapter 5: Conclusion and Future Research

The traditional wisdom about cash holdings suggests that maintaining high level cash reserves within firms is bad, the free cash flow theory. Jensen (1986) argues that higher resources within firms increase power of managers and raise incentive for them to deviate their actions from shareholders' best interest (agency problem). However, the recent literatures about cash indicate that firms are likely to hold more cash (Dittmar, Mahrt-Smith and Servaes (2003) and Bates, Kahle and Stulz (2009)). These evidences are contrary to the traditional wisdom and imply that cash is good. Despite the researches on firm's cash holdings, there is no consensus about the outcome of cash accumulation. Especially when firms are in downturn, when the markets are full of asymmetry and excessively high costs of external capitals. The internal resources are effective devices for firms during an economic downturn. This study attempts to investigate the benefits of cash holdings when firms are in downturn. The 1997 Asian financial crisis is used to indicate for an economic downturn. Therefore, cash holdings as internal capitals are expected to be more valuable during crisis period.

Regarding from investigating the value of cash holdings, the findings indicate that the 1997 Asian financial crisis has affected on Asian firms. However, the evidences indicate that cash holdings do not add more value to firms during crisis period. The evidences lend support the free cash flow theory. During crisis period, markets are employed with asymmetric information and adverse selection (Mishkin (1990)). Most of managements in emerging markets are controlling shareholders (Johnson, et al. (2000)). During crisis period, it is a chance for controlling shareholders to expropriate minority shareholders (Lemmon and Lins (2003)). Moreover, there is no difference in contribution of high level of cash to the value of firms. The cash holdings negatively contribute to firms value even after investigate among group of high cash holdings within the same industry. Although cash holdings do not add more value to firms,

they do not lead firms to get worse. The evidences show that cash holdings among Non-Asian firms tend to have negative impact on the value of firms comparing to Asian firms.

Further examination is the investment rates among high cash firms during recovery period. Firms with plenty of internal resources available are expected to be ready to invest early than those low internal resources. However, the findings indicate that the investment rates among high cash Asian firms are lower than low cash Asian firms during recovery period. The evidences show the same results either using market valuation or sale accelerators. Asian firms tend to accumulate and retain higher cash reserves within firm to be a buffer against the economic shocks (Almeida, Campello and Weisbach (2011) by reducing valuable investment activities (Song and Lee (2012)).

Due to limited external resources provided during crisis, cash holdings as internal resources stand for an effective device for firms. High cash firms as availability of internal resources are expected to be ready to take any potential opportunity after affected by the crisis. They are expected to have better recovery rates comparing to those low cash firms that have limited resources available during recovery period. The market valuation, dividend payout and return on assets are the proxies for recovery rate of firms during recovery period. First, the evidences from investigating the market valuation among high cash firms in Asian countries show that the market valuation among high cash Asian firms is not different from those low cash Asian firms during recovery period. The market valuation among Asian firms tends to significantly decrease during crisis period and remain decreasing even during recovery period. The creditors' rights are the unavoidable determinant during crisis and recovery period. Firms cannot decide independently and then decrease market valuation of firms (Yung and Nafar (2014)). Second, the dividend payout is a proxy for recovery rate. The evidences from examining the dividend payout indicate that high cash Asian firms pay higher dividends to shareholders than low cash Asian firms during recovery period. However, this evidence is statistical artifact and weak support. The dividend payments among high cash Asian firms have

been higher since pre-crisis period. These dividend payments among high cash Asian firms remain higher during crisis and recovery period. These findings support the dividend signaling theory that dividends provide the unobserved information about the future earnings and financial conditions to the markets (Miller and Rock (1985)). High cash holdings firms are likely to pay more dividends to shareholders (Bigelli and Sánchez-Vidal (2012)). Last, the return on assets (ROA) is a proxy for recovery rate. The evidences show that high cash Asian firms are not different in utilizing the assets to generate profits comparing to low cash Asian firms during recovery period. Similarity in profitability may be a reason from high cash firms tend to accumulate more cash and cut down investment activities after affected by the crisis (Almeida, Campello and Weisbach (2011) and Song and Lee (2012)). However, the evidences indicate that profitability among high cash Asian firms is comparable to those low cash firms before the crisis (Mikkelsen and Partch (2003)).

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 to investigate the benefit of cash holdings and almost findings do not support hypotheses prediction except for dividend payments, it is interesting whether when agency problem is accounted would have impact on firms value, activities and performance of firms or not.

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APPENDIX



จุฬาลงกรณ์มหาวิทยาลัย
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The objective of this study is to investigate the value of cash holdings that contribute to firm value of during an economic downturn by using the 1997 Asian financial crisis as a proxy for an economic downturn. The fixed effects approach is used to investigate the value of cash holdings in six countries between 1991 and 2005. In order to do a falsification test, the Asian dummy variable will be added to indicate the difference between test samples (Thailand, Indonesia, Philippines, Indonesia and Taiwan) and comparable samples (Australia and New Zealand). Unfortunately, the Asian dummy variable is not allowed to include in the fixed effects approach as it is omitted. In order to add Asian dummy variable into the model, the pooled OLS regression is used to analyze the value of cash holdings. It allows adding Asian dummy variable in the model. In this section, the results from the pooled OLS regression approach are reported as follow.

The results for table A to table G show in Appendix A to G. The results from investigating the pooled OLS regression approach by including Asian dummy variable in the model. Most of the results are consistent with the results from fixed effect approach except for the results from table G in Appendix G which is the results from investigating a return on assets during recovery period. The results from table G show that the coefficients of the interaction terms between high cash and recovery dummy variables are positively significant for Asian but negatively insignificant for Non-Asian firms. These results indicate that the profitability among high cash Asian firms during recovery period is higher than normal period. The coefficients of high cash dummy variable are positively insignificant for Asian but negatively insignificant for Non-Asian firms. These results imply that the profitability among high cash firms is not different from those low cash firms during normal period. The sum of the coefficients of high cash dummy variable and its interaction term with recovery dummy variable are positively significant (0.0374 with P-value 0.000) for Asian but negatively significant (-0.1049 with P-value 0.000) for Non-Asian firms. These results imply that the profitability among high cash Asian firms is higher than low cash Asian firms during recovery period. Oppositely, the

profitability among high cash Non-Asian firms is lower than those low cash Non-Asian firms during recovery period.

When allowing varies in the unobserved firm characteristics, the results from investigating return on assets during recovery period are contrary to the previous fixed effects approach. The findings support the hypothesis prediction that high cash firms will have higher profitability and then better recovery rate during recovery period. However, the results from the pooled OLS regression approach might be bias and inconsistent. It might be a case that unobserved heterogeneity is correlated with regressors. Therefore, the results from fixed effects approach are better and consistent estimate.

Overall when added an Asian dummy variable in the pooled OLS regression approach, most of the results are consistent with the results from fixed effects approach. These findings insist on the conclusions from the fixed effects approach that the value of cash holdings does not enhance the value of firms when firms are in an economic downturn. The costs of agency problem probably overstate the benefits of cash holdings.

Appendix A

Table A: Evidence of the Value of Cash Holdings during the Crisis Period (the Pooled OLS Regression Approach)

The estimated pooled OLS regression uses to analyze the impact of value of cash holdings during crisis period. The sample consists of firms in Asian (Thailand, the Philippines, Taiwan and Indonesia) and Non-Asian (Australia and New Zealand). The Asian dummy variable is 1(0) if firms are in Asian countries (otherwise). All other explanatory variables are defined as in Table 2. Significance of the difference in means between Asian and Non-Asian firms is from the estimated pooled OLS regression by including all samples and using Asian dummy variable to indicate the difference. 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	0.2254*** (0.0028)	0.2810*** (0.0174)	0.000
1 if Crisis	0.0756*** (0.0052)	-0.0398 (0.0229)	0.166
dCash _t	-0.2404*** (0.0517)	-0.0368 (0.0347)	0.001
dCash _t x Crisis	0.0713 (0.0826)	-0.2831*** (0.0985)	0.006
dCash _{t+1}	0.0810 (0.0549)	0.1645*** (0.0443)	0.237
dCash _{t+1} x Crisis	-0.0572 (0.0785)	-0.1944** (0.0959)	0.268
EBIT	0.0492 (0.0737)	-0.2404*** (0.0231)	0.000
EBIT x Crisis	0.2302** (0.1019)	0.0855 (0.0756)	0.254
dEBIT _t	-0.0969* (0.0499)	0.1069*** (0.0264)	0.000
dEBIT _t x Crisis	-0.2116*** (0.0758)	-0.0706 (0.0753)	0.187
dEBIT _{t+1}	-0.0043 (0.0422)	-0.0753*** (0.0288)	0.164
dEBIT _{t+1} x Crisis	-0.0383 (0.0594)	0.0899* (0.0539)	0.110
dNA _t	-0.0577*** (0.0152)	0.0131 (0.0166)	0.002
dNA _t x Crisis	0.0148 (0.0233)	-0.0593 (0.0387)	0.101
dNA _{t+1}	0.0429*** (0.0069)	0.0413*** (0.0070)	0.867
dNA _{t+1} x Crisis	0.0053 (0.0115)	-0.0117 (0.0137)	0.343
I	2.5689*** (0.3965)	0.5115 (0.4197)	0.000
I x Crisis	-0.6148 (0.4361)	1.9356 (1.3421)	0.071
dI _t	-0.5269** (0.2658)	-0.2990 (0.3417)	0.598
dI _t x Crisis	0.7685** (0.3003)	0.3405 (0.8600)	0.638
dI _{t+1}	0.9618*** (0.3025)	0.6465* (0.3539)	0.598

Table A: Evidence of the Value of Cash Holdings during the Crisis Period (the Pooled OLS Regression Approach) (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
$dI_{t+1} \times \text{Crisis}$	-0.1551 (0.3484)	1.4809 (0.9289)	0.638
Div	2.8751*** (0.2042)	4.2021*** (0.2167)	0.000
Div \times Crisis	-1.1631 (0.4180)	-1.4758*** (0.4988)	0.044
$dDiv_t$	-1.0393*** (0.1953)	-1.0276*** (0.3066)	0.974
$dDiv_t \times \text{Crisis}$	0.1639 (0.3537)	0.6901 (0.4276)	0.343
$dDiv_{t+1}$	0.7476*** (0.1817)	0.7353*** (0.2616)	0.969
$dDiv_{t+1} \times \text{Crisis}$	0.1591 (0.3138)	0.0459 (0.3398)	0.870
dMV_{t+1}	-0.1651*** (0.0085)	-0.0632*** (0.0122)	0.000
$dMV_{t+1} \times \text{Crisis}$	0.0431** (0.0133)	0.0029 (0.0289)	0.206
Country Fixed Effects	Yes	Yes	
Number of Observations	13,558	6,676	
Adjusted R^2 (%)	20.79	14.52	

Appendix B

Table B: Evidence of the Level of Cash Holdings during the Crisis Period (the Pooled OLS Regression Approach)

The estimated pooled OLS regression uses 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). All other explanatory variables are defined as in Table 2. Significance of the difference in means between Asian and Non-Asian firms is from the estimated pooled OLS regression by including all samples and using Asian dummy variable to indicate the difference. 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	0.2185*** (0.0034)	0.2595*** (0.0102)	0.000
1 if Crisis	0.0736*** (0.0060)	-0.0513** (0.0251)	0.000
1 if High Cash	-0.0132** (0.0057)	0.0841*** (0.0322)	0.195
1 if Crisis x High Cash	0.0149 (0.0121)	-0.0290 (0.0708)	0.353
dCash _t	-0.4752*** (0.0716)	-0.1475*** (0.0538)	0.004
dCash _t x Crisis	0.1484 (0.1287)	-.01314 (0.2455)	0.345
dCash _t x High Cash	0.2736*** (0.0984)	0.1279* (0.0689)	0.456
dCash _t x Crisis x High cash	-0.1473 (0.1716)	-0.2415 (0.2741)	0.607
dCash _{t+1}	0.0910 (0.0667)	0.1355** (0.0554)	0.981
dCash _{t+1} x Crisis	0.0835 (0.1160)	-0.2596** (0.1102)	0.056
dCash _{t+1} x High Cash	-0.0209 (0.1037)	0.0803 (0.0819)	0.324
dCash _{t+1} x Crisis x High Cash	-0.1809 (0.1590)	0.1361 (0.1799)	0.326
EBIT	-0.1188 (0.0857)	-0.1853*** (0.0277)	0.897
EBIT x Crisis	0.4028*** (0.1172)	0.0721 (0.0962)	0.028
EBIT x High Cash	0.5566*** (0.1518)	-0.1138** (0.0516)	0.000
EBIT x Crisis x High Cash	-0.6230*** (0.2229)	0.0155 (0.1729)	0.026
dEBIT _t	-0.0067 (0.0643)	0.0699*** (0.0262)	0.467
dEBIT _t x Crisis	-0.3195*** (0.0909)	-0.0487 (0.0967)	0.042
dEBIT _t x High Cash	-0.3433*** (0.1148)	0.0816 (0.0602)	0.001
dEBIT _t x Crisis x High Cash	0.4593** (0.1722)	-0.0653 (0.1660)	0.028

Table B: Evidence of the Level of Cash Holdings during the Crisis Period (the Pooled OLS Regression Approach) (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
dEBIT _{t+1}	-0.0453 (0.0469)	-0.0697* (0.0375)	0.870
dEBIT _{t+1} x Crisis	-0.0183 (0.0748)	0.0619 (0.0580)	0.497
dEBIT _{t+1} x High Cash	0.0943 (0.0972)	0.0048 (0.0571)	0.148
dEBIT _{t+1} x Crisis x High Cash	-0.0489 (0.1291)	0.0566 (0.1217)	0.344
dNA _t	-0.0251 (0.0175)	0.0198 (0.0242)	0.001
dNA _t x Crisis	-0.0004 (0.0262)	-0.0319 (0.0479)	0.030
dNA _t x High Cash	-0.0324 (0.0345)	0.0114 (0.0328)	0.078
dNA _t x Crisis x High Cash	-0.0054 (0.0554)	-0.0769 (0.0840)	0.341
dNA _{t+1}	0.0402*** (0.0071)	0.0307*** (0.0068)	0.745
dNA _{t+1} x Crisis	0.0049 (0.0115)	-0.0111 (0.0137)	0.097
dNA _{t+1} x High Cash	0.0519* (0.0304)	0.0480 (0.0311)	0.201
dNA _{t+1} x Crisis x High Cash	-0.0588 (0.0536)	0.0433 (0.0572)	0.707
I	2.3240*** (0.5022)	1.3108*** (0.5210)	0.743
I x Crisis	-0.4189 (0.5465)	2.8466*** (1.6255)	0.134
I x High Cash	0.7311 (0.5661)	-2.7030 (0.9257)	0.000
I x Crisis x High Cash	-0.6058 (0.7076)	-1.5497 (2.3347)	0.535
dI _t	-0.5812* (0.3101)	-0.4666 (0.5414)	0.923
dI _t x Crisis	0.8117** (0.3476)	0.5330 (0.9812)	0.906
dI _t x High Cash	0.2090 (0.4568)	0.2312 (0.6597)	0.424
dI _t x Crisis x High Cash	-0.1665 (0.5665)	-2.1782 (1.6492)	0.130
dI _{t+1}	0.7032 (0.5002)	0.9023** (0.3909)	0.155
dI _{t+1} x Crisis	0.0380 (0.5620)	2.3283** (1.0293)	0.049
dI _{t+1} x High Cash	0.4935 (0.5207)	-0.6100 (0.9252)	0.135

Table B: Evidence of the Level of Cash Holdings during the Crisis Period (the Pooled OLS Regression Approach) (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
dI _{t+1} x Crisis x High Cash	-0.2689 (0.6219)	-3.7658** (1.6160)	0.058
Div	3.0642*** (0.2635)	4.2386*** (0.2351)	0.000
Div x Crisis	-1.3359*** (0.4853)	-0.5527 (0.5416)	0.640
Div x High Cash	-0.5112 (0.4060)	-0.0517 (0.5455)	0.931
Div x Crisis x High Cash	1.9599** (0.7960)	-1.5990* (0.9362)	0.008
dDiv _t	-1.3601*** (0.2563)	-0.7329** (0.3426)	0.754
dDiv _t x Crisis	0.3699 (0.4432)	-0.4197 (0.5074)	0.405
dDiv _t x High Cash	0.5570 (0.3975)	-0.7130 (0.6016)	0.173
dDiv _t x Crisis x High Cash	-0.0870 (0.7097)	1.7723** (0.7278)	0.107
dDiv _{t+1}	0.3118 (0.2024)	0.8298*** (0.3108)	0.332
dDiv _{t+1} x Crisis	-0.0750 (0.3718)	-0.0284 (0.5116)	0.965
dDiv _{t+1} x High Cash	0.8689*** (0.3238)	-0.1065 (0.5213)	0.078
dDiv _{t+1} x Crisis x High Cash	0.2293 (0.6183)	0.0607 (0.7212)	0.877
dMV _{t+1}	-0.1638*** (0.3238)	-0.0681*** (0.0156)	0.000
dMV _{t+1} x Crisis	0.0393** (0.0155)	0.0219 (0.0329)	0.703
dMV _{t+1} x High Cash	-0.0097 (0.0176)	-0.0063 (0.0254)	0.849
dMV _{t+1} x Crisis x High Cash	0.0128 (0.0294)	-0.0244 (0.0655)	0.657
Country Fixed Effects	Yes	Yes	
Number of Observations	13,558	6,676	
Adjusted R ² (%)	31.34	17.66	

Appendix C

Table C: Evidence of the Investment Rates during Recovery Period using Tobin's Q (the Pooled OLS Regression Approach)

The estimated pooled OLS regression uses to analyze the investment rates of firms after affected by the 1997 Asian financial crisis. The sample consists of firms in Asian (Thailand, the Philippines, Taiwan and Indonesia) and Non-Asian (Australia and New Zealand). The dependent variable is the investment rate. The Asian dummy variable is 1(0) if firms are in Asian countries (otherwise). All other explanatory variables and periods are defined as in Table 6. Significance of the difference in means between Asian and Non-Asian firms is from the estimated pooled OLS regression by including all samples and using Asian dummy variable to indicate the difference. 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	0.0918*** (0.0337)	0.0488*** (0.0106)	0.012
1 if High Cash	-0.1199*** (0.0471)	0.0114 (0.0160)	0.045
1 if Crisis	0.0579 (0.0426)	0.0106 (0.0140)	0.008
1 if Recovery	-0.0026 (0.0352)	-0.0062 (0.0116)	0.045
1 if High Cash x Crisis	0.0371 (0.0611)	-0.0177 (0.0199)	0.704
1 if High Cash x Recovery	0.0306 (0.0508)	-0.0249 (0.0170)	0.182
Tobin's Q	-0.2064*** (0.0686)	-0.0175 (0.0370)	0.015
Tobin's Q x High Cash	0.0049 (0.0977)	-0.0539 (0.0604)	0.609
Tobin's Q x Crisis	0.2769*** (0.0977)	-0.0110 (0.0407)	0.007
Tobin's Q x Recovery	0.2433*** (0.0724)	0.0144 (0.0386)	0.005
Tobin's Q x High Cash x Crisis	-0.1252 (0.1287)	0.0656 (0.0637)	0.184
Tobin's Q x High Cash x Recovery	-0.1191 (0.1033)	0.0472 (0.0616)	0.167
Cash Flow	0.8522*** (0.0280)	0.5585*** (0.0761)	0.000
Cash Flow x High Cash	0.0517 (0.0396)	-0.0446 (0.1145)	0.427
Cash Flow x Crisis	-0.2377*** (0.0423)	-0.0741 (0.0960)	0.119
Cash Flow x Recovery	-0.2509*** (0.0331)	-0.1831** (0.0902)	0.480
Cash Flow x High Cash x Crisis	-0.0346 (0.0681)	-0.2678* (0.1441)	0.143
Cash Flow x High Cash x Recovery	-0.00637 (0.0530)	-0.1037 (0.1333)	0.780
Country Fixed Effects	Yes	Yes	
Number of Observations	12,947	7,852	
Adjusted R ² (%)	72.97	42.39	

Appendix D

Table D: Evidence of the Investment Rates during Recovery Period using Sales (the Pooled OLS Regression Approach)

The estimated pooled OLS regression uses to analyze the investment rates of firms after affected by the 1997 Asian financial crisis. The sample consists of firms in Asian (Thailand, the Philippines, Taiwan and Indonesia) and Non-Asian (Australia and New Zealand). The dependent variable is the investment rate. The Asian dummy variable is 1(0) if firms are in Asian countries (otherwise). All other explanatory variables and periods are defined as in Table 9. 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	-0.1756*** (0.0506)	-0.0222*** (0.0081)	0.017
1 if High Cash	-0.0069 (0.0624)	0.0099 (0.0105)	0.113
1 if Crisis	0.0504 (0.0596)	0.0056 (0.0144)	0.012
1 if Recovery	0.0322 (0.0504)	0.0150 (0.0095)	0.171
1 if High Cash x Crisis	-0.1184 (0.0850)	-0.0292 (0.204)	0.002
1 if High Cash x Recovery	-0.0779 (0.0760)	-0.0088 (0.0120)	0.114
Change in Sales	0.3828** (0.1541)	0.0305 (0.0345)	0.026
Change in Sales x High Cash	-0.1978 (0.1813)	-0.0138 (0.0421)	0.323
Change in Sales x Crisis	-0.1731 (0.1836)	0.0230 (0.0457)	0.300
Change in Sales x Recovery	-0.3398** (0.1598)	-0.0220 (0.0348)	0.052
Change in Sales x High Cash x Crisis	0.0216 (0.2389)	0.0038 (0.0594)	0.942
Change in Sales x High Cash x Recovery	0.2370 (0.1986)	0.0118 (0.0427)	0.268
S/K _t	-0.0071 (0.1783)	0.1534** (0.0584)	0.392
S/K _t x High Cash	-0.4081 (0.2894)	0.0366 (0.0732)	0.137
S/K _t x Crisis	0.2876 (0.2156)	-0.2232 (0.1403)	0.047
S/K _t x Recovery	0.0314 (0.1956)	-0.1054 (0.0746)	0.514
S/K _t x High Cash x Crisis	0.5490 (0.3726)	-0.2496 (0.3042)	0.097
S/K _t x High Cash x Recovery	0.5978* (0.3076)	-0.0378 (0.1026)	0.050
S/K _{t-1}	0.4853** (0.2291)	0.0025 (0.0788)	0.047
S/K _{t-1} x High Cash	0.0421 (0.3714)	-0.0205 (0.0935)	0.907
S/K _{t-1} x Crisis	-0.3404 (0.2749)	0.3480* (0.1943)	0.041

Table D: Evidence of the Investment Rates during Recovery Period using Sales (the Pooled OLS Regression Approach) (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
S/K _{t-1} x Recovery	-0.2629 (0.2442)	0.1052 (0.1063)	0.167
S/K _{t-1} x High Cash x Crisis	-0.4235 (0.4503)	0.1698 (0.3901)	0.319
S/K _{t-1} x High Cash x Recovery	-0.2571 (0.3890)	-0.0622 (0.272)	0.634
S/K _{t-2}	-0.2930* (0.1653)	-0.0460 (0.0562)	0.157
S/K _{t-2} x High Cash	0.3970* (0.2370)	0.0109 (0.0871)	0.126
S/K _{t-2} x Crisis	0.2708 (0.2242)	-0.2839 (0.1733)	0.050
S/K _{t-2} x Recovery	0.2721 (0.1693)	0.0268 (0.0946)	0.206
S/K _{t-2} x High Cash x Crisis	-0.1904 (0.3371)	0.3072 (0.3322)	0.293
S/K _{t-2} x High Cash x Recovery	-0.3810 (0.2519)	0.0140 (0.1261)	0.161
S/K _{t-3}	0.0252 (0.0503)	0.0350 (0.0315)	0.896
S/K _{t-3} x High Cash	-0.0721 (0.0657)	-0.0377 (0.0561)	0.690
S/K _{t-3} x Crisis	-0.0872 (0.1288)	0.0874 (0.1025)	0.275
S/K _{t-3} x Recovery	-0.0350 (0.0549)	-0.0276 (0.0529)	0.922
S/K _{t-3} x High Cash x Crisis	0.1284 (0.1832)	-0.1231 (0.1750)	0.321
S/K _{t-3} x High Cash x Recovery	0.0929 (0.0806)	0.0668 (0.0789)	0.817
Cash Flow	0.6717*** (0.1002)	0.3212*** (0.0450)	0.001
Cash Flow x High Cash	0.0155 (0.1256)	-0.1275** (0.0569)	0.300
Cash Flow x Crisis	-0.4093*** (0.1011)	0.2777** (0.1244)	0.000
Cash Flow x Recovery	-0.1912* (0.1033)	-0.1017 (0.0738)	0.481
Cash Flow x High Cash x Crisis	-0.1060 (0.1476)	-0.2513 (0.1670)	0.109
Cash Flow x High Cash x Recovery	-0.0733 (0.1349)	0.0494 (0.0921)	0.453
Country Fixed Effects	Yes	Yes	
Number of Observations	7,477	4,390	
Adjusted R ² (%)	79.35	57.63	

Appendix E

Table E: Evidence of the Tobin's Q during Recovery Period (the Pooled OLS Regression Approach)

The estimated pooled OLS regression uses to analyze Tobin's Q as a proxy for recovery rate of firms after affected by the 1997 Asian financial crisis. The sample consists of firms in Asian (Thailand, the Philippines, Taiwan and Indonesia) and Non-Asian (Australia and New Zealand). The dependent variable is the Tobin's Q, defined as the market value of firm to total assets. The Asian dummy variable is 1(0) if firms are in Asian countries (otherwise). All other explanatory variables and periods are defined as in Table 11. 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	-0.0694* (0.0387)	-0.1199*** (0.0316)	0.312
1 if High Cash	0.0831 (0.0805)	0.1612*** (0.0608)	0.428
1 if Crisis	-0.1368* (0.0563)	0.0835* (0.0430)	0.002
1 if Recovery	0.0885** (0.0452)	0.2378*** (0.0375)	0.011
1 if High Cash x Crisis	-0.1551 (0.1067)	-0.2692 (0.1718)	0.573
1 if High Cash x Recovery	-0.3410*** (0.0913)	0.0386 (0.0791)	0.002
Size	-0.0002 (0.0203)	0.0865*** (0.0247)	0.007
Size x High Cash	-0.0379 (0.0418)	0.0674 (0.0807)	0.247
Size x Crisis	0.0338 (0.0242)	-0.0869*** (0.0291)	0.001
Size x Recovery	-0.0479** (0.0217)	-0.1508*** (0.0271)	0.003
Size x High Cash x Crisis	0.0848* (0.0496)	-0.0296 (0.1175)	0.370
Size x High Cash x Recovery	0.1617*** (0.0442)	-0.3322*** (0.1059)	0.000
Export Revenue	-0.1236 (0.1224)	-0.0655 (0.2337)	0.826
Export Revenue x High Cash	-0.0376 (0.2506)	0.4422 (1.0042)	0.643
Export Revenue x Crisis	0.2622* (0.1436)	-0.0059 (0.3061)	0.428
Export Revenue x Recovery	0.4950*** (0.1270)	-0.0164 (0.4269)	0.251
Export Revenue x High Cash x Crisis	-0.0695 (0.2869)	0.1058 (1.3189)	0.897
Export Revenue x High Cash x Recovery	0.1042 (0.2585)	5.5957** (2.4832)	0.028
Leverage	-0.0280 (0.0453)	0.0417 (0.0646)	0.377
Leverage x High Cash	-0.0391 (0.0865)	-0.3737*** (0.1204)	0.024
Leverage x Crisis	0.0800 (0.0530)	0.0742 (0.0928)	0.943
Leverage x Recovery	0.1028* (0.0527)	-0.1195 (0.0744)	0.015

Table E: Evidence of the Tobin's Q during Recovery Period (the Pooled OLS Regression Approach) (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
Leverage x High Cash x Crisis	0.0184 (0.0997)	0.0949 (0.3105)	0.814
Leverage x High Cash x Recovery	-0.0592 (0.1155)	0.0931 (0.1653)	0.450
Country Fixed Effects	Yes	Yes	
Number of Observations	13,527	8,104	
Adjusted R ² (%)	5.96	3.25	



Appendix F

Table F: Evidence of the Payout Ratio during Recovery Period (the Pooled OLS Regression Approach)

The estimated pooled OLS regression uses to analyze dividend payout as a proxy for recovery rate of firms after affected by the 1997 Asian financial crisis. The sample consists of firms in Asian (Thailand, the Philippines, Taiwan and Indonesia) and Non-Asian (Australia and New Zealand). The dependent variable is the Tobin's Q, defined as the market value of firm to total assets. The Asian dummy variable is 1(0) if firms are in Asian countries (otherwise). All other explanatory variables and periods are defined as in Table 14. 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	0.3939*** (0.0729)	0.9905*** (0.1176)	0.867
1 if High Cash	0.0162 (0.1169)	-0.1345 (0.2318)	0.329
1 if Crisis	-0.0290 (0.0965)	0.5131*** (0.1415)	0.027
1 if Recovery	0.1862** (0.0775)	0.2237 (0.1378)	0.000
1 if High Cash x Crisis	0.0682 (0.1581)	0.1863 (0.3038)	0.675
1 if High Cash x Recovery	0.1794 (0.1262)	-0.4754* (0.2681)	0.108
Profitability	8.9079*** (0.7085)	5.7145*** (1.0629)	0.012
Profitability x High Cash	-5.0721*** (0.9618)	-4.0723*** (1.2681)	0.530
Profitability x Crisis	-5.4255*** (0.8051)	-2.0077* (1.1845)	0.017
Profitability x Recovery	-4.3211*** (0.7929)	-4.1076*** (1.0806)	0.873
Profitability x High Cash x Crisis	6.0725*** (1.19297)	2.7950* (1.4320)	0.072
Profitability x High Cash x Recovery	5.9077*** (1.1297)	3.6018*** (1.2891)	0.192
Growth of Assets	0.5367* (0.3011)	0.7941** (0.3160)	0.555
Growth of Assets x High Cash	-1.6057** (0.4699)	-0.3188 (0.5755)	0.073
Growth of Assets x Crisis	0.0126 (0.3350)	-1.3533*** (0.4466)	0.014
Growth of Assets x Recovery	-0.2186 (0.3198)	-0.8074** (0.3313)	0.201
Growth of Assets x High Cash x Crisis	1.1126* (0.5857)	-0.0018 (0.7620)	0.246
Growth of Assets x High Cash x Recovery	1.8087*** (0.5291)	0.2125 (0.5929)	0.045
Tobin's Q	-0.0240 (0.1465)	0.6799** (0.3152)	0.043
Tobin's Q x High Cash	-0.1491 (0.2170)	0.0996 (0.5155)	0.930
Tobin's Q x Crisis	0.0412 (0.2120)	-0.9056** (0.3551)	0.022
Tobin's Q x Recovery	0.4823*** (0.1706)	-0.5658 (0.3489)	0.007

Table F: Evidence of the Payout Ratio during Recovery Period (the Pooled OLS Regression Approach) (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
Tobin's Q x High Cash x Crisis	0.3273 (0.3186)	-0.1194 (0.5848)	0.502
Tobin's Q x High Cash x Recovery	-0.0628 (0.2605)	0.0600 (0.54536)	0.838
Size	0.0275*** (0.0412)	0.2095*** (0.0631)	0.016
Size x High Cash	0.1067 (0.0672)	0.3521* (0.1872)	0.217
Size x Crisis	-0.0063 (0.0514)	-0.1265 (0.0803)	0.207
Size x Recovery	-0.0433 (0.0438)	0.0235 (0.0691)	0.809
Size x High Cash x Crisis	-0.1670* (0.0894)	-0.0026 (0.2708)	0.564
Size x High Cash x Recovery	-0.0500 (0.0739)	-0.4883** (0.2221)	0.061
Country Fixed Effects	Yes	Yes	
Number of Observations	12,257	6,368	
Adjusted R ² (%)	28.08	30.76	

Appendix G

Table G: Evidence of the ROA during Recovery Period (the Pooled OLS Regression Approach)

The estimated pooled OLS regression uses to analyze the profitability as a proxy for recovery rate of firms after affected by the 1997 Asian financial crisis. The sample consists of firms in Asian (Thailand, the Philippines, Taiwan and Indonesia) and Non-Asian (Australia and New Zealand). The dependent variable is the Tobin's Q, defined as the market value of firm to total assets. The Asian dummy variable is 1(0) if firms are in Asian countries (otherwise). All other explanatory variables and periods are defined as in Table 17. 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	-0.0261*** (0.0038)	-0.0413** (0.0201)	0.458
1 if High Cash	0.0054 (0.0074)	-0.0429 (0.1118)	0.666
1 if Crisis	-0.0313*** (0.0101)	-0.0093 (0.0269)	0.443
1 if Recovery	-0.0316*** (0.0056)	-0.0674** (0.0248)	0.159
1 if High Cash x Crisis	0.0072 (0.0186)	-0.0171 (0.1208)	0.842
1 if High Cash x Recovery	0.0320*** (0.0129)	-0.0620 (0.1149)	0.416
Size	0.0690*** (0.0064)	0.0783*** (0.0265)	0.734
Size x High Cash	0.0368*** (0.0116)	0.1380 (0.1252)	0.421
Size x Crisis	0.0152 (0.0102)	0.0097 (0.0333)	0.874
Size x Recovery	-0.0039 (0.0081)	-0.0093 (0.0297)	0.862
Size x High Cash x crisis	-0.0231 (0.0218)	0.0879 (0.1618)	0.496
Size x High Cash x recovery	-0.0265 (0.0170)	-0.0588 (0.1281)	0.803
Leverage	-0.0415*** (0.0055)	-0.0337* (0.0204)	0.712
Leverage x High Cash	-0.0073 (0.0104)	0.0048 (0.0987)	0.903
Leverage x Crisis	0.0494*** (0.0128)	0.0496 (0.0315)	0.996
Leverage x Recovery	0.0138* (0.0078)	0.0419 (0.0429)	0.519
Leverage x High Cash x Crisis	-0.0221 (0.0235)	-0.3132 (0.1682)	0.260
Leverage x High Cash x Recovery	0.0186 (0.0199)	0.1119 (0.1543)	0.549
Liquidity	0.0114* (0.0063)	0.0111 (0.0352)	0.993
Liquidity x High Cash	-0.0073 (0.0090)	-0.0437 (0.1047)	0.729
Liquidity x Crisis	0.0477*** (0.0149)	-0.0324 (0.0447)	0.089
Liquidity x Recovery	0.0446*** (0.0092)	0.0258 (0.0394)	0.642

Table G: Evidence of the ROA during Recovery Period (the Pooled OLS Regression Approach) (Continued)

Explanatory variables	Asian (1)	Non-Asian (2)	P-value of difference (3)
Liquidity x High Cash x Crisis	0.0014 (0.0230)	0.0564 (0.1113)	0.629
Liquidity x High Cash x Recovery	-0.0329** (0.0156)	0.0704 (0.1073)	0.340
Age	-0.0003 (0.0003)	0.0003 (0.0004)	0.200
Age x High Cash	-0.0002 (0.0005)	0.0007 (0.0014)	0.551
Age x Crisis	0.0000 (0.0005)	0.0002 (0.0007)	0.777
Age x Recovery	0.0010*** (0.0003)	0.0016*** (0.0005)	0.289
Age x High Cash x Crisis	0.000 (0.0008)	-0.0016 (0.0018)	0.401
Age x High Cash x Recovery	-0.0009 (0.0006)	-0.0021 (0.0019)	0.517
Country Fixed Effects	Yes	Yes	
Number of Observations	12,841	7,353	
Adjusted R ² (%)	12.25	6.78	

Appendix H

Table H: Evidence of the Panel Unit Root Test (Levin, Lin and Chu (2002))

	Variables	Statistics	probability	Cross-sectional	Observations
Model 1 and 2	MV	-82.2807	0.0000	1,185	10,230
	dCash _t	-136.833	0.0000	1,179	10,169
	dCash _{t+1}	-252.523	0.0000	1,192	10,254
	EBIT	-82.167	0.0000	1,062	9,221
	dEBIT _t	-100.465	0.0000	1,097	9,492
	dEBIT _{t+1}	-103.884	0.0000	1,129	9,712
	dNA _t	-118.512	0.0000	1,138	9,819
	dNA _{t+1}	-61.679	0.0000	1,195	10,277
	I	-1476.74	0.0000	1,101	9,595
	dI _t	-21715	0.0000	1,131	9,822
	dI _{t+1}	-5445.57	0.0000	1,139	9,880
	Div	-351.505	0.0000	843	7,730
	dDiv _t	-1324.78	0.0000	904	8,263
	dDiv _{t+1}	-29802.6	0.0000	903	8,218
	dMV _{t+1}	-62.6542	0.0000	1,055	9,043
Model 3	investment rate (I/K)	-15496.2	0.0000	1,179	10,181
	Tobin's Q	-82.2807	0.0000	1,185	10,230
	Cash Flow	-464.347	0.0000	992	8,156
	Change of Sales	-61.3908	0.0000	857	7,785
	sale/K _t	-310.483	0.0000	1,184	10,208
	sale/K _{t-1}	-210.892	0.0000	906	8,211
	sale/K _{t-2}	-166.798	0.0000	864	7,407
	sale/K _{t-3}	-140.462	0.0000	793	6,486
Model 4	Tobin's Q	-233.656	0.0000	1,163	9,965
	Size	-90.8548	0.0000	1,197	10,291
	Export Revenue	-3.72053	0.0001	371	3,061
	Leverage	-5722.33	0.0000	1,085	9,208
Model 5	Dividend payment	-22035	0.0000	744	7,505
	Profitability	-84.2198	0.0000	1,135	9,896
	Growth of Assets	-46.5647	0.0000	852	7,654
	Tobin's Q	-82.2807	0.0000	1,185	10,230
	Size	-90.8548	0.0000	1,197	10,291
Model 6	ROA	-79.6351	0.0000	1,139	9,914
	Size	-109.926	0.0000	1,192	10,265
	Leverage	-5723.37	0.0000	1,086	9,213
	Liquidity	-124.937	0.0000	1,167	10,041

VITA

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