

Financial Constraints, Corporate Governance
and Corporate Cash Holdings: Evidence from Thai Market



An Independent Study Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Finance
Department of Banking and Finance
FACULTY OF COMMERCE AND ACCOUNTANCY
Chulalongkorn University
Academic Year 2020
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ข้อจำกัดทางการเงิน การกำกับดูแลกิจการ และ ปริมาณการถือเงินสดขององค์กร
หลักฐานจากตลาดในประเทศไทย



สารนิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

สาขาวิชาการเงิน ภาควิชาการธนาคารและการเงิน

คณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย

ปีการศึกษา 2563

ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

Independent Study Title Financial Constraints, Corporate Governance and
Corporate Cash Holdings: Evidence from Thai Market

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Chulalongkorn University in Partial Fulfillment of the Requirement for the Master of
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The objectives of this paper are to examine the relationship between corporate governance and financial constraints which play a substitution role in mitigating agency conflicts associated to corporate cash holdings of Thai listed company covering the period from 2008 to 2019. I use five firm specific characteristics of financial constraints i.e. annual payout ratio, firm size, leverage ratio, lifecycle ratio as well as collateral asset ratio and corporate governance score as proxies to determine the level of cash holdings. The result provides that financial constrained-firms hold larger amount of cash than financial less constrained-firms in order to have adequate financial cash slack for unanticipated situation. This is consistent with the study of Opler et al. 1999. In addition, an interesting finding is that corporate governance helps financially less-constrained firms to mitigate agency conflicts in corporate cash holdings. This is also consistent with the study of Harford et al. (2008) which suggests that stronger corporate governance will reduce agency conflict because shareholders can ensure that they will be better protected their wealth so they will allow firms to hold larger amount of cash holdings. Therefore, my paper suggests that the effectiveness of corporate governance strongly interrelate with financial constraints on corporate cash holdings in Thailand.

สาขาวิชา การเงิน

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การศึกษา

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6284045926 : MAJOR FINANCE

KEYWORD: corporate cash holdings, corporate governance, financial constraints

Pantawat Tangchitpianvit : Financial Constraints, Corporate Governance and
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Field of Study:	Finance	Student's Signature
	
Academic	2020	Advisor's Signature
Year:	

ACKNOWLEDGEMENTS

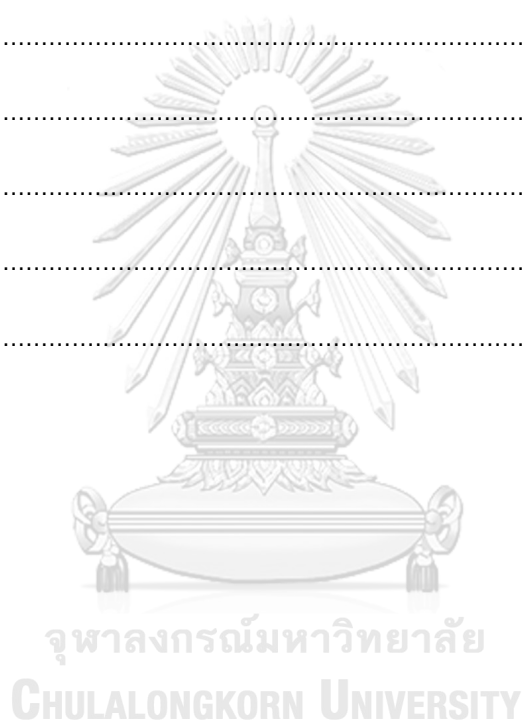
I would like to express my sincere appreciation to MSF program, enabling me to enhance my knowledge and skills related to financial fields. This special project will be not succeeded if without the assistance of the following contributors. My first gratitude is given to Assistant Professor Suparatana Tanthanongsakkun, Ph.D., my special project advisor, thank you for generously and friendly giving me good advice, yielding encouragement, and provide suggestion through the completion of this special project. Thanks are also given to this special project committee, Narapong Srivisal Ph.D. and Assistant Professor Kanyarat Sanoran, Ph.D. Besides, I would like to express my special gratitude to my family for pushing my motivation and encouragement at all times. Eventually, I would like to thank my friends in MSF program for providing me with nice friendship.

Pantawat Tangchitpianvit

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1. INTRODUCTION

1.1) Background

Regarding the corporate cash holdings, it has received growing interest from many groups of investors including academic researchers and business practitioners. Therefore, in order to support the idea why corporate cash holdings are important, the study of corporate precautionary cash holding by Han and Qui (2007) has suggested that the reasons of firms to hold cash are mainly to decrease transaction costs and preclude the loss from underinvestment which results from the lack of funds. Moreover, Sheu and Lee (2012) discover that firms which are in East Asian countries retain a large amount of cash holdings even after the economy that revived from the financial crisis.

Bates et al. (2009), Ferreira and Vilela (2004) have mentioned in their research that the amount of cash holding also plays a significant role in many firms because it provides an ability to pay as cash and instantly impacts on the company's performance. If the firm holds larger amount of cash, the cost of opportunity to make more transactions will increase. Nevertheless, if a company holds small cash, it may not be sufficient to cover routine expenses. Hence, the amount of cash that the firm held must be adequate to guarantee regular operations, bankruptcy, future projection, and emergencies.

Besides, Akbari, Rahmani, Ahmadi, and Shababi (2014) have published their paper about the corporate cash holdings which suggested that normally, managers try to search for an optimal level of cash holdings, relating to their advantages and disadvantages. Therefore, cash ought to be held at that level that trades off between surplus and adequate cash holding costs. In other words, corporate cash holdings provide both costs and benefits for the firms. Therefore, an optimum cash level should exist where the firm's performance is optimized.

However, according to Myers and Majluf (1984), firms would prefer internal cash rather than external financing so it can cause a large stockpile of cash. Therefore, shareholders may be concerned about the manager's behavior in managing the firm's cash reserves.

The corporate governance is counted as a key aspect considered by both shareholders and investors. Based on the empirical test of Dittmar and Mahrt-Smith (2007), weak corporate governance firms are inclined to waste cash, while firms with strong corporate governance provide well efficient use of their cash reserves. As shareholders, they would desire to maximize their own wealth through their own operating firm, but, if the firm is managed by managers who may waste corporate resources for their own benefits, so they may disregard the objective to maximize shareholder wealth. Also, self-interested managers may have an intention to use an excessive amount of cash from the company for their private benefits. This was recommended by Jensen and Meckling (1976).

Consequently, shareholders may have a motivation to develop and construct a good quality of the company's effective corporate governance in order to alleviate the agency conflicts. Hence, shareholders will permit the manager to hold more cash reserves once they are well protected by an effective governance mechanism. This is stated by Harford, Mansi and Maxwell (2008). In addition, according to Bebchuk (2007); Core, Holthausen and Larcker (1999), effective corporate governance helps enhance a firm's operational and financial transparency and mitigates the likelihood of wasting the company's cash reserve for managers' private benefit.

Apart from corporate governance effectiveness, financial constraints also play a major role in defining the firm's cash holdings. Conforming to the research of Lee and Park (2015), financially constrained firms are classified as firms which have restricted access to the external financial market,

so the managers of these companies will absolutely rely on internal financings and tend to reserve enough cash for the firm's unexpected situation which is called as "precautionary motive".

Regarding the precautionary motive, the shareholders of financially constrained firms are likely to be less worried about their managers who hold large cash slacks (Han and Qiu 2007; Harford et al. 2008).

Furthermore, Luo (2011) disputes that managers who have restricted access to the external financial market may have a choice for not wasting costly internal cash, which is determined as a disciplinary role of financial constraints. Conversely, I can say that for financially less-constrained firms, shareholders are likely to be more serious and want to improve their internal monitor to overlook their manager's behavior owing to a lack of the disciplinary function.

As I have mentioned earlier about the importance of corporate cash holding, corporate governance, and financial constraint, there is still room from previous studies in which most of them are concerned about their relationship in high shareholders protection countries such as the United State or some other countries in Europe. For example, Harford, Mansi, and Maxwell (2006) have studied the impact of corporate governance on firm cash holdings in the US and found inconsistent results with international studies because they used shareholder rights as only one proxy to represent the effectiveness of corporate governance.

However, in low shareholder protection countries that referred to countries in Asia, the conflict of interest problem may be more serious and have a strong impact on shareholders who want to maximize their own wealth. Also, there are no studies in Thailand that involved the effect of financial

constraints on corporate governance and cash holdings. The previous studies of Sudarat (2008) in Thailand only focus on the relationship between corporate cash holdings and corporate governance.

According to these reasons, I choose Thailand as a sample to investigate the relationships of corporate cash holding, financial constraint, and corporate governance.

1.2) Significance of problem

By reason of conflict of interest between shareholders and managers, although cash holdings generate quite a low rate of return, managers may still want to hold excess cash for their own interest and gather it for satisfying them i.e. spending for their own benefits. As a result, managers will try to aggregate cash more than it should be especially in a weak corporate governance standard environment. However, I also expect that effective corporate governance has an impact on types of a firm which is classified into financially constrained firms and financially less-constrained firms to hold the cash. In order to investigate the relationship among corporate cash holdings, financial constraints, and corporate governance, I will test the empirical results in this study.

1.3) Objectives

- To inspect the relationship between corporate governance and financial constraints in minimizing agency conflicts associated with corporate cash holdings.
- To inspect the empirical determinants of the level of corporate cash holdings, financial constraint and corporate governance for a sample of Thai listed companies over the period from 2008 to 2019.

1.4) Scope of the study

I first examine the relationship between corporate cash holdings and financial constraints. Then, I will combine corporate governance to be another factor for studies and find the relationship among these 3 factors. I expect that the general corporate governance effectiveness on cash holdings will be more important for financially less- constrained firms.

Besides my first empirical tests, I also inspect the direct relationship between corporate governance and financial constraints. I expect that financially less-constrained firms are inclined to get stronger corporate governance effectiveness than constrained firms, and I also further expect that financially less-constrained firms are likely to improve corporate governance effectiveness which means that the shareholders of financially less-constrained firms or firms that lose the financial constraint disciplinary function will have more incentives to develop corporate governance standard for transparency and the productive controlling of managers. In other words, I expect that strong corporate governance will reduce agency conflicts in corporate cash holdings crucially for financially less-constrained firms.

Financially less-constrained firms have been classified as firms that are more benefit from corporate governance mechanisms (lower agency problem to concern) and lose the disciplinary function of financial constraints than those which are classified as constrained firms in defining the levels of cash holdings.

2. RESEARCH CONTRIBUTION

This research has 2 main contributions:

- This research examines the effect of corporate governance and financial constraint on cash holdings in a weak corporate governance environment which is Thailand.

Although some studies have already investigated these relationships, most of them have been done by applying samples in high shareholder protection countries indicated by Dittmar, Mahrt-Smith and Servaes (2003) as well as most prior studies just only concerned about the importance of each governance mechanism in mitigating agency problems. Therefore, countries with low shareholder rights such as Thailand may or may not have the same relationships as the high one in which there is none of the studies pay attention to it yet.

- In this research, I have decided to address and examine whether good corporate governance helps reduce agency conflicts in separate dimensions between financially less-constrained firms and constrained firms. Hence, my research will be useful and beneficial to many groups of people including managers, shareholders, investors, practitioners, etc. because they will better understand the implication among these relationships which suiting with their activisms.

3. LITERATURE REVIEWS

In a world of the ideal capital market, the study of Opler et al.,(1999) suggests that corporate cash holdings determinations are irrelevant. Within the market, the demand and supply for cash are in equilibrium and all firms can find an external source of finance when they desire. Nonetheless, in the real world, firms cannot easily fund their money because they may face with liquidity issues. For example, if firms expect to reduce their dividends and investments, they would rather hold cash to cope with the life cycle of the economy in which cash availability is a shortage.

Therefore, the major motivation of firms to hold cash is when they are in an inefficient market which must focus on the transaction cost motive and the precautionary motive referring to Bates et al. (2009). The transaction cost motive states that firms with a lack of internal funds will raise external financing sources by issuing new debt and/or equity or cutting dividends, as well as selling assets. On the contrary, the precautionary motive emphasizes on the cost of the forgone investment opportunity. Firms ought to be prevented from investing in profitable projects if they don't have liquid assets. Consequently, firms try to aggregate cash to meet their unexpected circumstances that may arise.

From a previous study, Harford et al. (2008), regarding with governance mechanism grounded on inside ownership and provisions from antitakeover, discovers that firms with weaker corporate governance structures are likely to retain fewer cash holdings, while firms that have good abilities in overseeing are likely to permit their managers to retain a larger amount of cash holdings.

Denis and Sibilkov (2010) use a lot of standards of a firm's financial constraints. These standards help depict the firm's adequacy of funding in accessing to external financial markets. They find that financially constrained firms are supposed to have larger reliance on cash holdings, so

cash holdings are necessary for them because they help provides unconditional liquidity right away without transaction costs.

Luo (2011) examines financial constraints in terms of their disciplinary role for cash dispersion as a way for determining agency conflicts and figures out that the disciplinary impact is more severe in weak corporate governance firms. Nevertheless, the prior study still has not explored the relationship between effective governance and financial constraints with respect to corporate cash holdings. In other words, this can imply that there is still unclear evidence to show improving transparency in such a way that the financial constraints instantly define shareholder reliance on corporate governance effectiveness.

Stein (1997) and Stulz (1990) dispute that private benefits of managers should accrue along with the gross productivity of firm investments. Myers and Majluf (1984) mention that the way to reserve internal cash is one of the cheapest methods in retaining enough amounts of capital for investment. Nonetheless, there will be a conflict that shareholders may have agency conflicts towards managers' private benefits, particularly once there are huge accumulations of cash in the firm. Also, according to Harford et al. (2008), those shareholders will not permit their managers to gather a huge level of internal cash unless they construct good governance effectiveness.

In addition, financial constraints may have an influence on managers' decisions for cash holdings. To clarify, those who have restricted access to the external fund will have a lower opportunity to spoil internal cash. They would rather keep internal cash for funding in future positive NPV projects (Opler et al. 1999; Almeida et al. 2004). It can be called as the disciplinary role of financial constraints in cash dispersion (Luo, 2011) which had shown that shareholders of financially constrained firms that

comparatively have fewer agency conflicts will permit their managers to hold higher amounts of cash reserves in order to avert higher costs of external financing.

Similarly, the study of Faulkender and Wang (2008) suggests that cash holdings are more worthy for constrained firms than for less-constrained firms. Denis and Sibilkov (2010) also explain that a higher amount of cash holdings causes financially constrained firms to engage in value-adding projects that may be neglected. On the other hand, shareholders of financially less-constrained firms may get less advantage from the disciplinary role of financial constraints. At the same time, managers of financially less- constrained firms are disregarded for inappropriate use of internal cash, since those firms have somewhat effortlessly entered the external market.

Hence, shareholders of financially less-constrained firms will confront more serious agency problems regarding managers' discretion on corporate cash holdings, causing shareholders of financially less-constrained firms trying to monitor their managers.

4. HYPOTHESES DEVELOPMENT

The primary aim of this research is to inspect the relationship between corporate governance and financial constraints regarding the amount of corporate cash holdings. This study predicts the hypothesis as follow:

H_1 : The levels of cash holdings for financially less-constrained firms are lower than financially constrained firms.

I predict that higher level of cash holdings allows financially constrained firms to engage in projects that create value for shareholders otherwise they may be bypassed. Therefore, they are likely to hold more cash as a reserve.

Myers and Majluf (1984) discover that referring to an incomplete capital market, there is an asymmetry of information between firms' shareholders and managers resulting in expensive financing from external sources that leads to the problem of adverse selection. Managers may be obliged to get rid of projects that generate high value since they are reluctant to find external financial capital by issuing underpriced securities. Thus, a high level of cash can generate value to those firms encountering with external financial constraints by storing firm's expenditures that make their investment reliable to the accessibility of internal funds (Stein, 2003; Franzoni, 2009).

H_2 : The levels of cash holdings for financially less-constrained firms will increase further with a good corporate governance mechanism.

The advantage of an effective corporate governance mechanism ought to be higher for financially less-constrained firms than for financially constrained firms. Comparing with the specific level of corporate governance, agency conflicts that respected to cash holdings can be alleviated

more importantly for financially less-constrained firms since corporate governance is the key perspective in which agency conflicts can be mitigated. Also, as a low shareholder protection country in Thailand, shareholders tend to be more concerned about the agency conflicts in financially less-constrained firms, so they ought to expect an improvement in corporate governance score in order to allow firms to hold more cash. On the contrary, agency conflicts respecting financially constrained firms are already reduced to a proper range by the disciplinary role of financial constraints, so shareholders are not much concerned as financially less-constrained firms. Hence, the level of cash holdings for financially constrained firms does not change much with a change in corporate governance mechanism. Overall, I expect that the level of corporate cash holdings of financially less-constrained firms is more responsive respecting to corporate governance effectiveness.

H_3 : Financially less-constrained firms have stronger corporate governance than constrained firms.

Luo (2011) discovers that corporate governance and financial constraints act as proxies for corporate cash holdings. As managers of financially constrained firms should not have much discipline equal to managers of financially less-constrained firms, so the shareholders of financially less-constrained firms hinge on better internal monitoring than those who are in financially constrained firms.

According to Manne (1965), effective corporate governance can help control and punish poor management which also prohibits managers from misconduct. Thereby, I expect that financially less-constrained firms are likely to have a stronger level of effective corporate governance than those which are constrained firms.

5. SAMPLE AND DATA

For sample, I use publicly traded Thai firms listed on the Stock Exchange of Thailand (SET) from 2008-2019 which covers the global economic downturn period and many stages of the firm's life cycle.

For data, there are 3 major sources of data. First is the corporate governance score provided by Thai Institute of Directors Association (Thai IOD). I collect these data from Thai IOD report published on their website. Second, I collect market data e.g. stock returns, market index returns, and risk-free from Bloomberg. Lastly, I collect accounting data and shareholder ownership from SETSMART. Then, I exclude firms that their listed date of entering to SET market is after the year 2008, and if their book value of equity is negative. Also, due to data unavailability in Thailand, I will exclude some variables that have been used in previous literature.

The statistic variable descriptions are summarized below:

Cash/TA is the value of cash and cash equivalents scaled down by total assets. FCF/TA is free cash flow that calculated from cash flow from operating activities minus the capital expenditure scaled down by the total assets. NWC/TA is the value of networking capital scaled down by total assets. Market to Book is the value of market equity divided by the book value of the equity. Asset Tangibility is a ratio calculated from plant properties and equipment divided by total assets. Sales growth is calculated from current sales minus prior sales divided by prior sales. CG score is the corporate governance score obtained from Thai IOD report. Institutional ownership is the value of shares holding by domestic and international juristic entities divided by total shares outstanding. Idiosyncratic volatility is idiosyncratic return volatility which is a standard error of epsilon terms from

the capital asset pricing model. Firm age is the age of firms since the first day that registered into the SET database scaled down by the age of firm as of 2019. ROA is the return on total assets. Firm size is calculated from firm market capitalization scaled down by total assets.

For financial constraint criteria, I use five firm-specific characteristics to measure financial constraints comprising of annual payout ratio, firm size, leverage, collateral assets, and life cycle instead of using any of the indices found in the literature because I extend alternative ways that are more appropriate for Thailand. Below, I provide details involving my measurement for financial constraints criteria:

- Annual payout ratio: From the literature of Almeida et al. (2004), financially less-constrained firms can generally pay higher dividends, while constrained firms retain lower dividends because they do not have enough cash. I define payout ratio as the ratio of dividends to operating income. I define firms in the top three deciles of the annual cash payout ratio distribution as the financially less-constrained group in each year. Under this criterion, I also exclude firms that do not regularly pay dividends.

- Firm size: Larger firms are more stable confronting with frictions from external finance. According to Almeida et al. (2004), I measure firm size by using market capitalization and assign firms which are in the top three deciles using firm size as criteria to be the financially less-constrained group in each year.

Noted that the reason I use top three deciles as a criterion for annual payout ratio and firm size to classify firm type to be financially less-constrained is that when I sort these data, the rest of the samples (bottom seven decile) is different from the top three deciles that is why I do not use half-and-half to separate between them.

This is the same method as the previous study of Lee and Park (2015). Hence, in this case, the financially constrained firm can be defined as financially typical firms to avoid the argument that some constraint firms are not exact constraint firms.

- Leverage: I measure leverage as the ratio of long-term debt over the beginning-of-period of total assets, firms will be classified as financially constrained firms if the average leverage ratio over the previous two years is lower than its industry median.

- Life cycle: I define life cycle as the ratio of retained earnings to total assets. Firm will be classified as financially less-constrained firms when the average life cycle ratio over the previous two years is lower than the industry median because they are likely to be in growth stages which have more investment opportunities to invest and vice versa. Under this criterion, I exclude firms that their retained earnings are non-positive.

- Collateral assets: I measure as the sum of inventory and property, plant and equipment over total assets. Firms which have greater collateral assets will sustain more of external financing so it will be classified as financially less-constrained firms if the average collateral assets ratio is higher than industry median over the previous 2 years and vice versa.

Table 1 panel A shows the summary of descriptive statistics of keys variables before excluding outlier observations. As for reasons that outliers are observations that appear to deviate materially from other observations in the sample, so it can cause the data to be non-normal distribution. Therefore, I decide to eliminate outliers of some key statistic variables including FCF / TA, NWC / TA, Market to Book, Sales growth, and Firm size because the data of these variables include some odd data. For example, the maximum value of Market to Book is 57.9775, and the minimum value is -2.6776

which should not be happened in the general case. Also, the maximum value of sales growth is 44.7398 (4473.98%) which is too high for normal business.

Table 1 panel B represents the summary statistics of variables after excluding outlier observations. The criteria that I use to eliminate are 0.5% of total observations ranking from their maximum and minimum amount which are removed by 48 observations. The reason for this is to reduce the skewness distribution among data to make the maximum and the minimum number of variables are shown in a proper range. For instance, the maximum value of sales growth is reduced from 44.7398 to 3.4137 and the minimum value of Market to Book is increased from -2.6776 to 0.1807 which reflects more appropriate value in general. All the variables in both panels are unitless. The number of observations is 4,728 and some are 4,092 which represents unbalanced panel data.

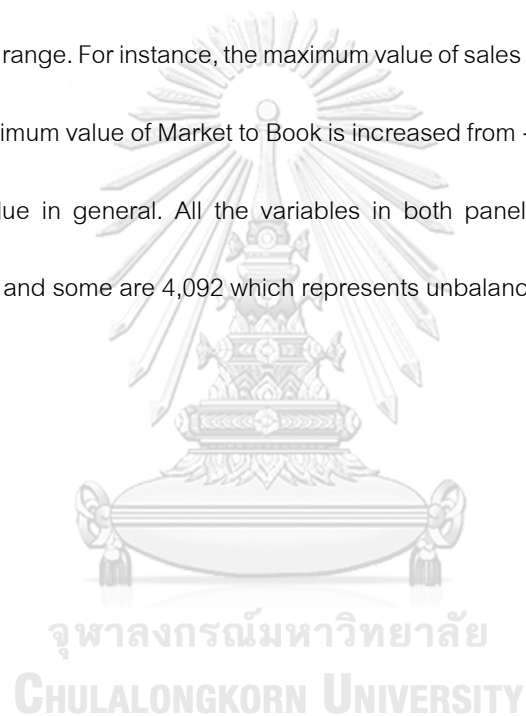


Table 1: Descriptive statistics of variables

This table contains the summary of descriptive statistics of variables from the period 2008 to 2019. It is separated into 2 panels which are A and B. Panel A shows the summary of descriptive statistics of variables before excluding outlier observations while panel B shows the summary of descriptive statistics of variables after excluding outlier observations. Also, I report the summary statistic for the proxy of five financial constraint criteria mentioned in the previous section including annual payout ratio, firm size, leverage, life cycle, and collateral asset ratio.

Panel A: Descriptive statistic variables before excluding outlier observations

Variables	Observations	Mean	Std. Dev.	Median	Min	Max
Cash/TA	4,728	0.0864	0.1306	0.0441	0.0001	0.8699
FCF/TA	4,728	0.0268	0.1158	0.0281	-1.1313	0.9697
NWC/TA	4,092	0.0009	0.1513	0.0033	-3.6032	0.8164
Market to Book	4,728	1.6893	1.9077	1.1632	-2.6776	57.9775
Asset Tangibility	4,728	0.3555	0.2599	0.3277	0	0.9908
Sales growth	4,728	0.1168	1.0192	0.0349	-0.9826	44.7398
CG Score	4,278	3.5979	0.9321	4	2	5
Institutional ownership	4,728	0.5718	0.3504	0.6527	0.0018	0.9900
Idiosyncratic risk	4,728	0.0012	0.0012	0.0008	0.00001	0.0170
Firm Age	4,728	0.7499	0.1873	0.7764	0.0896	1
ROA	4,728	0.0406	0.0897	0.0410	-0.7433	0.7484
Firm size	4,728	0.8845	1.1330	0.6175	0.0238	44.3599
Annual payout ratio	3,575	0.5131	0.2598	0.4956	0.0058	0.9582
Leverage ratio	4,728	0.2876	0.1494	0.2741	0	0.8654
Life cycle ratio	3,850	0.2411	0.1817	0.2364	0.0011	0.8112
Collateral asset ratio	4,728	0.4178	0.2763	0.3876	0.0007	0.8975

Table 1: Descriptive statistics of variables (cont.)

Panel B: Descriptive statistic variables after excluding outlier observations

Variables	Observations	Mean	Std. Dev.	Median	Min	Max
Cash/TA	4,728	0.0864	0.1306	0.0441	0.0001	0.8699
FCF/TA	4,680	0.0271	0.0997	0.0281	-0.4085	0.4356
NWC/TA	4,044	0.0045	0.1014	0.0033	-0.6723	0.5051
Market to Book	4,680	1.6240	1.4533	1.1632	0.1807	10.6416
Asset Tangibility	4,728	0.3555	0.2599	0.3277	0	0.9908
Sales growth	4,680	0.0720	0.3276	0.0349	-0.7350	3.4137
CG Score	4,278	3.5979	0.9321	4	2	5
Institutional ownership	4,728	0.5718	0.3504	0.6527	0.0018	0.9900
Idiosyncratic risk	4,728	0.0012	0.0012	0.0008	0.00001	0.0170
Firm Age	4,728	0.7499	0.1873	0.7764	0.0896	1
ROA	4,728	0.0406	0.0897	0.0410	-0.7433	0.7484
Firm size	4,680	0.8461	0.8022	0.6175	0.0478	5.9061
Annual payout ratio	3,575	0.5131	0.2598	0.4956	0.0058	0.9582
Leverage ratio	4,728	0.2876	0.1494	0.2741	0	0.8654
Life cycle ratio	3,850	0.2411	0.1817	0.2364	0.0011	0.8112
Collateral asset ratio	4,728	0.4178	0.2763	0.3876	0.0007	0.8975

Table 2 shows the number of firm classifications under five financial constraint criteria.

The classification criteria that I use are the number of firms that are classified as financially constrained firms or less-constrained firms in each specific time period. For example, firms that stay as constrained firms or less-constrained firms in the whole period, and firms that stay as constrained firms or less-constrained firms from 1 year to 3 years consecutively. The reason for the classification is to scope in the details of dummy variable criteria and see the consistency and direction of the data across time.

Table 2: Number of firm classifications under five financial constraint criteria

This table contains the summary number of firms based on the specific periods which classified their type into financially less-constrained firm or financially constrained firm under five financial constraint criteria.

Financial Constraint Criteria / Firm type		Number of firms classified into each group				
		Whole period	1-3 years	4-6 years	7-9 years	10-12 years
Payout criteria	- Be financially less-constrained firm	29	198	154	87	35
	- Be financially constrained firm	41	226	166	95	50
Firm size Criteria	- Be financially less-constrained firm	76	258	202	153	79
	- Be financially constrained firm	219	315	277	240	225
Leverage Criteria	- Be financially less-constrained firm	117	332	270	193	108
	- Be financially constrained firm	104	306	221	159	94
Life cycle Criteria	- Be financially less-constrained firm	63	204	158	92	57
	- Be financially constrained firm	92	222	162	111	88
Collateral Criteria	- Be financially less-constrained firm	117	341	248	186	110
	- Be financially constrained firm	119	336	239	167	113

6. METHODOLOGIES

My research is designed to include two different sets of regression tests. First are tests of the determinants of corporate cash holdings by financial constraints and include corporate governance (H_1, H_2). Second, tests of the direct causal relationship between corporate governance and financial constraint (H_3). In order to control for the transaction motives and precautionary motives for a cash reserve, I use the fixed effect estimation model from a way of Dittmar and Mahrt-Smith (2007) who determine excess cash as residuals, and then I run as panel data.

6.1) The relationship between corporate cash holdings and financial constraints

In this part, I examine whether the levels of cash holdings for financially less-constrained firms are lower than financially constrained firms. Regarding to previous literature, I define excess cash to be cash that is not necessary for investment and operation.

The following regression model 1 according to Dittmar and Mahrt-Smith (2007) is represented as:

$$\begin{aligned}
 (Cash_{i,t}/TA_{i,t}) &= \beta_i + \beta_1(LC\ Dummy_{i,t}) + \beta_2(FCF_{i,t}/TA_{i,t}) \\
 &+ \beta_3(NWC_{i,t}/TA_{i,t}) + \beta_4(Market\ to\ Book\ ratio_{i,t}) \\
 &+ \beta_5(Asset\ tangibility_{i,t}) + \beta_6(Sales\ growth_{i,t}) \\
 &+ Year\ Dummies + \varepsilon_{i,t} \quad \dots\dots\dots(1)
 \end{aligned}$$

For each financial constraint criteria, I run a regression using LC Dummy to be control variables for determining the level of cash holdings. It is a dummy variable that equals to one if I classified the firm as financially less-constrained firms and zero if I classified the firms as constrained firms. The dummy variable is based on the five financial constraint criteria mentioned earlier. For example, LC Payout means using an annual payout ratio as criteria.

For the first set of tests (used for H_1, H_2), I use the **level of cash holdings** as the dependent variable. In order to control for influences on corporate cash holdings, I reconsider determinant of corporate cash holdings adopted from the study of Opler et al. (1999) and Dittmar and Mahrt-Smith (2007) which is about the purpose of transforming a non-cash financial asset into cash respecting to the optimal level of cash holdings.

Regarding control variables, I include **net working capital** to control for potential cash substitutes and the transaction motive. In addition, to control for the cumulation of precautionary financial slack, I use **free cash flow** which is calculated by the cash flow from operating activities minus capital expenditure (CAPEX). I have scaled down dependent variable which is cash and some explanatory variables which included free cash flows (FCF), and net working capital (NWC) by dividing by total assets (TA) to reduce the effect from skewness distribution.

Moreover, I have control variables for **investment opportunities** which are measured by the **market-to-book ratio**, **asset tangibility** by following Berger, Ofek, and Swary (1996) and Almeida and Campello (2007) which is calculated from plant properties and equipment divided by total assets and **sales growth** which is calculated from current sales minus prior sales divided by prior sales.

For β_i , it describes the constant term that captures the firm fixed effect to control for time-series dependence for a given firm. Also, I used Year Dummies to control for cross-section dependence on market-wide events.

6.2) The relationship among corporate cash holdings, corporate governance, and financial constraints

To study the effects from the interaction of corporate governance effectiveness and financial constraints on corporate cash holdings, I initially conduct mean difference tests for estimating the amount of cash holdings, as defined by corporate governance effectiveness in financial less-constrained firms under each of the five financial constraint criteria.

For each year, I filter all financially less-constrained firms into the bottom third, middle third, and top third regarding corporate governance effectiveness which is measured from CG score. After that, I compare the mean of the approximated cash holdings in the high corporate governance effective group (Group 1) with the low corporate governance effective group (Group 0).

Furthermore, in order to get the more precise test of the impact of corporate governance effectiveness on corporate cash holdings, I run a regression of firm cash holdings on the interaction between corporate governance effectiveness and five financial constraints.

Regression model 2, with all the control variables, is as follows:

$$\begin{aligned}
 (Cash_{i,t}/TA_{i,t}) &= \beta_i + \beta_1(LC\ Dummy_{i,t}) + \beta_2(CG\ Score_{i,t}) \\
 &+ \beta_3(CG\ Score_{i,t} * LC\ Dummy_{i,t}) + \beta_4(FCF_{i,t}/TA_{i,t}) \\
 &+ \beta_5(NWC_{i,t}/TA_{i,t}) + \beta_6(Market\ to\ Book\ ratio_{i,t}) \\
 &+ \beta_7(Asset\ tangibility_{i,t}) + \beta_8(Institutional\ ownership_{i,t}) \\
 &+ \beta_9(idiosyncratic\ volatility_{i,t}) + \beta_{10}(Firm\ Age_{i,t}) \\
 &+ \beta_{11}(Sale\ growth_{i,t}) + Year\ Dummies + \varepsilon_{i,t} \quad \dots\dots\dots(2)
 \end{aligned}$$

where CG Score is the aggregate index of effective corporate governance score in Thailand.

For the control variables, they are the same as I have mentioned in (1) except things that I use to control

the effect from other corporate governance aspects and standards. Thereby, I include **institutional ownership** which is the portion of the value of shares holding by domestic and international juristic entity divided by total shares outstanding, **idiosyncratic stock volatility** which is idiosyncratic return volatility for each year, and **firm age** which is the age since the first day that the firm registered in the SET database scaled down by the firm age as of the end of 2019. I have still scaled-down dependent variable which is cash and some explanatory variables which included free cash flows (FCF), and net working capital (NWC) by dividing by total assets to reduce the effect from skewness distribution.

6.3) The relationship between corporate governance mechanism and financial constraints

Considering the impact of financial constraints on the level of corporate governance effectiveness, I run the following regression for model 3 as follow:

$$\begin{aligned}
 (CG\ Score_{i,t}) &= \beta_i + \beta_1(LC\ Dummy_{i,t}) + \beta_2(FCF_{i,t}/TA_{i,t}) \\
 &+ \beta_3(Firm\ Size_{i,t}) + \beta_4(Market\ to\ Book\ ratio_{i,t}) \\
 &+ \beta_5(Asset\ tangibility_{i,t}) \\
 &+ \beta_6(Institutional\ ownership_{i,t}) \\
 &+ \beta_7(idiosyncratic\ volatility_{i,t}) \\
 &+ \beta_8(Firm\ Age_{i,t}) + \beta_9(ROA_{i,t}) \\
 &+ Year\ Dummies + \varepsilon_{i,t} \dots\dots\dots(3)
 \end{aligned}$$

where **CG Score** is the aggregate index of effective corporate governance score in Thailand, and **LC Dummy** is a dummy variable which will equal to one if I classified the firm as financial less constrained firms and zero if I classified the firms as constrained firms. The dummy variable is based on the five financial constraint criteria mentioned earlier.

Based on the second set of tests used for (H_3), the dependent variable is the effective corporate governance standard (CG Score). The literature confirms that the internal governance standard is correlated with many firm characteristics. Hence, I design to adopt the following control variables in my regression model. I include **free cash flow** and **firm size** because these two are proper proxies describing levels of agency problem within firms. I have scaled down firm size and free cash flow by dividing by total assets to reduce the effect from skewness distribution.

Regarding Linck, Netter, and Yang (2008), to control for the level of advising and monitoring costs, I also include the following variables which are **market-to-book ratio**, **asset tangibility ratio**, and **idiosyncratic stock volatility**. Firms with high levels of advising and monitoring costs should be better in internal monitoring effectiveness. The study of Gillian and Starks (2000) suggests that institutional investors provide efficient monitoring of their managers through governance standards. Also, firm age is concerning to ownership dispersion. Therefore, I also add **institutional ownership** and **firm age** to proxy for firms' investor bases which is scaled down by the age of firm as of the end of 2019 to reduce the effect of skewness distribution. Lastly, in order to control for firm performance, I add **return on assets (ROA)** as another control variable.

7. EMPIRICAL RESULTS

7.1) Descriptive analysis of all variables under five constraint criteria

From Table 3, it provides comparisons of cash holdings, CG score, and other company characteristics of subsamples by each financial constraint criteria. Also, this table shows the results of mean difference test for each variable between financially constrained firms and financially less-constrained firms under five constraint criteria. From this table, it can be noticed that financially less-constrained firms seem to be distinguished from financially constrained firms regarding to all five financial constraint criteria.

Regarding the results, I find some prominent characteristics in which financially constrained firms are likely to hold larger cash holdings (Cash/TA) for a transaction and precautionary motives than financially less-constrained firms. For example, the value of Cash/TA and FCF/TA under 3 financial constraint criteria including leverage, lifecycle, and collateral asset ratio for financially less-constrained firms is smaller than financially constrained firms observing from the p-value (0.0000) that is significant at 1% level. This is compatible with the findings in the previous literature (Opler et al. 1999; Han and Qiu 2007) which suggest that financially constrained firms tend to hold larger cash in order to have enough financial cash slack or available cash for unexpected circumstances in upcoming investment that can generate positive benefits to firms.

Also, from table 3, it also depicts that financially less-constrained firms are likely to develop better corporate governance mechanisms rather than financially constrained firms observing from the mean difference. Under four criteria which are firm size, leverage, life cycle, and collateral asset ratio, the mean difference of financially constrained firms is less than financially less-constrained firms and the p-value is around 0.0000 which is significant at 1% level implying that financially less-constrained

firm has higher average CG score which is more sensitive to construct an effective corporate governance mechanism. This is also consistent with the study of Berry et al. (2006) in that financially less-constrained firms will have more demand for the disciplinary effects by developing corporate governance effectiveness to ensure that agency conflict of firms will be mitigated. Also, shareholders of these firms can certify that their wealth protection will not be minimized.

Moreover, market to book ratio and sales growth that capture the investment opportunities of firms seem to significantly impact on financially constrained firms less than financially less-constrained firms observing from the p-value of mean difference test (0.0000) implying that financially less-constrained firms have more growth opportunities to invest rather than financially constrained firms. This is also consistent with the previous study of Bubbigo (2012).

In addition, the mean difference test of asset tangibility ratio shows that financially less-constrained firms have an average of this ratio higher than financially constrained firms which reflect higher tangible assets for financially less-constrained firms to operate their business. This can still observe from the p-value that is significant at 1% level. The result is compatible with the study of Berger, Ofek, and Swary (1996) which mentioned that the more tangible assets that firms have, the higher chance for a firm's manager to find their own private benefit which caused agency conflict to have occurred especially for financially less-constrained firms.

Table 3: Descriptive statistics and mean test of all variables under five financial constraint criteria

This table shows results of descriptive statistics and mean difference test for all variables classified between financially constrained firms and financially less-constrained firms.

Also, it provides comparisons of cash holdings, CG score, and other company characteristics of subsamples by each financial constraint criteria.

Variables	Statistics	Financial Constraint Criteria									
		Payout ratio		Firm size		Leverage ratio		Life cycle ratio		Collateral asset ratio	
		Constrained firms (C)	Less-constrained firms (LC)	Constrained firms (C)	Less-constrained firms (LC)	Constrained firms (C)	Less-constrained firms (LC)	Constrained firms (C)	Less-constrained firms (LC)	Constrained firms (C)	Less-constrained firms (LC)
Cash / TA	Mean	0.0801	0.1175	0.0826	0.0953	0.0999	0.0739	0.1052	0.0783	0.1024	0.0705
	Median	0.0438	0.0598	0.0426	0.0489	0.0534	0.0383	0.0616	0.0370	0.0583	0.0333
	Std. Dev.	0.1182	0.1676	0.1241	0.1444	0.1352	0.1251	0.1445	0.1296	0.1359	0.1233
	#Obs	2,499	1,076	3,300	1,428	2,271	2,457	1,879	1,971	2,362	2,366
	Mean diff (C-LC)	-0.0374		-0.0127		0.0280		0.0269		0.0319	
	P-Value (Ha <0)	0.0000		0.0011		1.0000		1.0000		1.0000	
FCF / TA	Mean	0.0280	0.0616	0.0213	0.0412	0.0408	0.0146	0.0562	0.0135	0.0360	0.0183
	Median	0.0292	0.0579	0.0249	0.0363	0.0386	0.0167	0.0561	0.0185	0.0330	0.0214
	Std. Dev.	0.1028	0.1171	0.1241	0.1154	0.1364	0.1046	0.1034	0.1054	0.1340	0.1076
	#Obs	2,488	1,058	3,272	1,408	2,235	2,445	1,861	1,963	2,328	2,352
	Mean diff (C-LC)	-0.0337		-0.0199		0.0282		0.0427		0.0177	
	P-Value (Ha <0)	0.0000		0.0000		1.0000		1.0000		1.0000	
NWC / TA	Mean	0.0093	0.0039	0.0025	0.0093	0.0009	0.0075	0.0070	0.0100	-0.0019	0.0038
	Median	0.0055	0.0011	0.0029	0.0040	0.0031	0.0037	0.0035	0.0060	0.0036	0.0029
	Std. Dev.	0.0911	0.0790	0.1739	0.0861	0.1926	0.1108	0.0737	0.1074	0.1611	0.1468
	#Obs	2,151	883	2,841	1,203	1,822	2,222	1,787	1,510	1,824	2,220
	Mean diff (C-LC)	0.0054		-0.0068		-0.0066		-0.0029		-0.0057	
	P-Value (Ha <0)	0.9476		0.0257		0.0200		0.1619		0.3306	
Market to Book	Mean	1.5544	2.0086	1.3007	2.3776	1.4747	1.7446	1.6897	1.5634	1.7100	1.5382
	Median	1.1503	1.3514	0.9786	1.7063	1.0548	1.2546	1.2139	1.1188	1.2290	1.0901
	Std. Dev.	1.2956	1.8332	1.0399	1.9319	1.2986	1.5789	1.4499	1.4565	1.4957	1.4104
	#Obs	2,494	1,059	3,275	1,405	2,252	2,428	1,869	1,955	2,338	2,342
	Mean diff (C-LC)	-0.4542		-1.0768		-0.0938		0.1263		0.1718	
	P-Value (Ha <0)	0.0000		0.0000		0.0000		0.9964		1.0000	
Asset Tangibility	Mean	0.3486	0.3716	0.3453	0.3791	0.3069	0.4004	0.3585	0.3411	0.1951	0.5157
	Median	0.3245	0.3575	0.3132	0.3759	0.2606	0.4133	0.3463	0.2955	0.1645	0.5279
	Std. Dev.	0.2529	0.2856	0.2557	0.2682	0.2523	0.2589	0.2228	0.2813	0.1612	0.2403
	#Obs	2,499	1,076	3,300	1,428	2,271	2,457	1,879	1,971	2,362	2,366
	Mean diff (C-LC)	-0.0230		-0.0337		-0.0935		0.0174		-0.3206	
	P-Value (Ha <0)	0.0071		0.0000		0.0000		0.9828		0.0000	
Sales Growth	Mean	0.0778	0.0359	0.0602	0.0993	0.0486	0.0848	0.0441	0.0869	0.0774	0.0667
	Median	0.0493	0.0264	0.0202	0.0620	0.0202	0.0502	0.0303	0.0455	0.0384	0.0321
	Std. Dev.	0.2920	0.2278	0.3483	0.2938	0.3142	0.3493	0.2280	0.3134	0.3390	0.3276
	#Obs	2,486	1,072	3,262	1,418	2,253	2,427	1,873	1,957	2,334	2,346
	Mean diff (C-LC)	0.0419		-0.0391		-0.0362		-0.0428		0.0108	
	P-Value (Ha <0)	1.0000		0.0001		0.0001		0.0000		0.8696	

Table 3: Descriptive statistics and mean test of all variables under five financial constraint criteria (cont.)

Variables	Statistics	Financial Constraint Criteria									
		Payout ratio		Firm size		Leverage ratio		Life cycle ratio		Collateral asset ratio	
		Constrained firms (C)	Less-constrained firms (LC)	Constrained firms (C)	Less-constrained firms (LC)	Constrained firms (C)	Less-constrained firms (LC)	Constrained firms (C)	Less-constrained firms (LC)	Constrained firms (C)	Less-constrained firms (LC)
CG Score	Mean	3.7753	3.7319	3.3304	4.1721	3.3409	3.8194	3.6702	3.7538	3.5191	3.5760
	Median	4.0000	4.0000	3.0000	4.0000	3.0000	4.0000	4.0000	4.0000	4.0000	4.0000
	Std. Dev.	0.8867	0.8514	0.8279	0.8631	0.8371	0.9530	0.8545	0.9277	0.9098	0.9545
	#Obs	2,328	966	2,918	1,360	1,980	2,298	1,879	1,971	2,174	2,104
Institutional Ownership	Mean diff (C-LC)	0.0435		-0.8417		-0.4785		-0.0836		-0.0569	
	P-Value (Ha <0)	0.9024		0.0000		0.0000		0.0025		0.0000	
	Mean	0.6154	0.6018	0.4889	0.7645	0.5514	0.5914	0.6095	0.5715	0.6122	0.5322
	Median	0.7460	0.6917	0.4873	0.9023	0.5985	0.6807	0.7089	0.6636	0.7354	0.5538
Idiosyncratic Risk	Std. Dev.	0.3425	0.3456	0.3485	0.2722	0.3532	0.3478	0.3390	0.3594	0.3439	0.3534
	#Obs	2,499	1,076	3,300	1,428	2,271	2,457	1,879	1,971	2,362	2,366
	Mean diff (C-LC)	0.0136		-0.2756		-0.0400		0.0380		0.0800	
	P-Value (Ha <0)	0.8622		0.0000		0.0000		0.9996		1.0000	
Firm Age	Mean	0.0013	0.0008	0.0012	0.0010	0.0012	0.0014	0.0011	0.0012	0.0012	0.0013
	Median	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	Std. Dev.	0.0011	0.0008	0.0011	0.0010	0.0011	0.0010	0.0010	0.0010	0.0011	0.0011
	#Obs	2,499	1,076	3,300	1,428	2,271	2,457	1,879	1,971	2,362	2,366
ROA	Mean diff (C-LC)	0.0005		0.0002		-0.0002		-0.0001		-0.0001	
	P-Value (Ha <0)	1.0000		0.6684		0.0000		0.0002		0.0181	
	Mean	0.7535	0.7380	0.7427	0.7668	0.7507	0.7493	0.7650	0.7316	0.7562	0.7438
	Median	0.7857	0.7632	0.7684	0.7908	0.7805	0.7742	0.7870	0.7692	0.7867	0.7651
Firm Size	Std. Dev.	0.1853	0.1883	0.1919	0.1752	0.1893	0.1855	0.1734	0.2020	0.1859	0.1886
	#Obs	2,499	1,076	3,300	1,428	2,271	2,457	1,879	1,971	2,362	2,366
	Mean diff (C-LC)	0.0155		-0.0241		0.0014		0.0334		0.0124	
	P-Value (Ha <0)	0.9889		0.0000		0.6032		1.0000		0.9884	
ROA	Mean	0.0555	0.0698	0.0285	0.0688	0.0468	0.0366	0.0807	0.0346	0.0446	0.0367
	Median	0.0496	0.0636	0.0333	0.0592	0.0488	0.0329	0.0719	0.0283	0.0439	0.0370
	Std. Dev.	0.0664	0.0775	0.1225	0.0766	0.1398	0.0779	0.0711	0.0564	0.1358	0.0816
	#Obs	2,499	1,076	3,300	1,428	2,271	2,457	1,879	1,971	2,362	2,366
Firm Size	Mean diff (C-LC)	-0.0144		-0.0404		0.0101		0.0461		0.0080	
	P-Value (Ha <0)	0.0000		0.0000		0.9993		1.0000		0.9989	
	Mean	0.7746	1.1633	0.7258	1.1138	0.9476	0.7505	1.0564	0.6797	0.8712	0.8214
	Median	0.5968	0.8477	0.5504	0.7586	0.7038	0.5085	0.7684	0.4817	0.6379	0.5720
Firm Size	Std. Dev.	0.6809	1.0009	0.6438	1.0367	0.8325	0.7607	0.8710	0.6738	0.8309	0.7723
	#Obs	2,480	1,066	3,281	1,399	2,253	2,427	1,864	1,956	2,327	2,353
	Mean diff (C-LC)	-0.3887		-0.3880		0.1970		0.3767		0.0498	
	P-Value (Ha <0)	0.0000		0.0000		1.0000		1.0000		0.9831	

7.2) Analysis of the relationship between corporate cash holdings and financial constraints

According to model 1 described in the methodology section, I expect to see the significant negative relationship between corporate cash holdings and financially less- constrained firms by looking at the coefficient of LC DUMMY term.

From Table 4, under three financial constraint criteria which are leverage, life cycle, and collateral ratio, the coefficient for LC DUMMY is negative and significant at 1%, 1%, and 5% level respectively. This is consistent with my expectation that financially constrained firms hold a larger amount of cash holdings than financially less-constrained firms. This supports the findings in the previous literature (Opler et al. 1999; Han and Qiu 2007) which suggest that financially constrained firms are likely to hold larger cash holdings to have adequate financial cash slack for an unanticipated situation of positive NPV investment.

In addition, regarding payout ratio criteria, the coefficient for LC Payout is positive and significant at the 1% level. Also, the coefficient for LC Size of firm size criteria is positive but not significant which is not consistent with my first hypothesis.

However, my result is still consistent with the previous study of Lee and Park (2015). He suggests that the reason may be because the dividend is sticky, firms that have high payout ratio may have to maintain their payout rate. In order to do that they may have to store available cash (slack) for paying dividends to shareholders. Therefore, this type of firm may hold a larger amount of cash holdings. Also, firms with larger sizes may have to store their cash slacks to be available for upcoming positive NPV projects or investments. Hence, these can be reasons to explain why the first and second criteria of financial constraints are not consistent with my expectation.

Table 4: Determinants of the level of cash holdings by financial constraint criteria

This table shows the results of the regression that test the relationship between financial constraint and corporate cash holdings by using fixed effect estimation model and running as panel data to inspect whether the levels of cash holdings for financially less-constrained firms are lower than constrained firms. The definition of variables is provided in Appendix (Table A2).

$$(Cash_{i,t}/TA_{i,t}) = \beta_0 + \beta_1(LC\ Dummy_{i,t}) + \beta_2(FCF_{i,t}/TA_{i,t}) + \beta_3(NWC_{i,t}/TA_{i,t}) + \beta_4(Market\ to\ Book\ ratio_{i,t}) + \beta_5(Asset\ tangibility_{i,t}) + \beta_6(Sales\ growth_{i,t}) + Year\ Dummies + \varepsilon_{i,t}$$

Variables	Dependent Variable (Cash / TA)				
FCF / TA	0.117*** (0.0289)	0.113*** (0.0220)	0.108*** (0.0220)	0.111*** (0.0282)	0.115*** (0.0220)
NWC / TA	-0.0136 (0.0319)	-0.0066 (0.0204)	-0.0056 (0.0203)	-0.0294 (0.0304)	-0.0027 (0.0204)
Market to Book	-0.0046** (0.0022)	-0.0031* (0.0018)	-0.0031* (0.0017)	-0.0039* (0.0022)	-0.0031* (0.0018)
Asset Tangibility	-0.0460* (0.0235)	-0.0641*** (0.0171)	-0.0501*** (0.0173)	-0.0291 (0.0229)	-0.0434** (0.0192)
Sales Growth	-0.0047 (0.0077)	-0.0039 (0.0051)	-0.0035 (0.0051)	-0.0023 (0.0072)	-0.0037 (0.0051)
LC Payout	0.0240*** (0.0058)				
LC Size		0.0032 (0.0085)			
LC Leverage			-0.0258*** (0.0056)		
LC Life Cycle				-0.0265*** (0.0068)	
LC Collateral Asset					-0.0153** (0.0066)
Observations	2,980	3,928	3,928	3,238	3,928
Adjusted R-Square	0.021	0.015	0.021	0.019	0.017

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

7.3) Analysis of mean difference test of corporate cash holdings by corporate governance

According to the table 5, under all five constraint criteria, the mean difference of the high corporate governance group (group 1) has held more cash holdings than the mean difference of the low corporate governance group (group 0) at 1% significant level. Therefore, my results provide clear proof that stronger corporate governance effectiveness will enable financially less-constrained firms to relish a larger level of corporate cash slack. Also, this result is compatible with Harford et al. (2008), who suggest that firms with weaker corporate governance will hold fewer cash holdings because managers of those firms may spend cash on non-positive NPV projects.

Table 5: Univariate test of corporate governance on cash holdings

This table represents the preliminary results from the mean difference test of corporate cash holdings for financially less-constrained firms by corporate governance score. High CG represents a group that has a high corporate governance score. Low CG represents a group that has a low corporate governance score. The results of the P-value for mean difference tests have been shown in the bracket.

CG score (Group)	Financial constraint criteria				
	(1) Payout ratio	(2) Firm size	(3) Leverage ratio	(4) Life cycle ratio	(5) Collateral asset ratio
Mean of High CG (Group 1)	0.1484	0.1468	0.0569	0.0930	0.0546
#observations	319	447	763	591	698
Mean of Low CG (Group 0)	0.1104	0.1057	0.0458	0.0716	0.0459
#observations	319	447	763	591	698
Diff (Low - High)	-0.0380	-0.0411	-0.0111	-0.0214	-0.0087
P-value of (Ha: diff < 0)	(0.0034)	(0.0005)	(0.0000)	(0.0038)	(0.0003)

7.4) Analysis of the relationship among corporate cash holdings, corporate governance, and financial constraints

According to model 2 described in the methodology section, I expect to see the significantly positive relationship that financially less-constrained firm with higher corporate governance scores will increase their corporate cash holdings further than financially constrained firms. This can be seen from the interaction term (β_3) between CG Score and LC Dummy that should have significant and positive coefficients under all five constraint criteria.

From table 6, it shows the regression results for Model 2 that tests the relationship among corporate cash holdings, corporate governance, and financial constraints. The term CG * LC DUMMY represents the interaction term of corporate governance score for each criterion of financial constraints which run regression separately.

For example, CG * LC Payout means interaction term using annual LC payout ratio as criteria. I find that under all five constraint criteria, the coefficient for CG Score is positive and three-fifth of financial constraint criteria which are annual payout ratio, firm size, and life cycle ratio are also significant at the 1% level. This can be indicated that higher effective corporate governance enhances firms to hold a higher amount of corporate cash holdings. My result supports and is consistent with the findings of Harford et al. (2008) which suggests that with respect to the agency problem on firm cash holdings, stronger corporate governance firms hold larger amounts of cash because of lower agency conflicts.

The most remarkable results are that the interaction term between CG Score and LC Dummy (CG * LC Dummy term) has a positive coefficient and significant at 1% level under four financial constraint criteria except the interaction term under firm size criteria that has a positive relationship

and significant at 10%. These results are compatible with my second hypothesis (H_2) in which financially less-constrained firms with stronger corporate governance effectiveness will hold larger cash slacks. Therefore, this can imply that stronger corporate governance helps alleviate agency conflicts and contributes to higher corporate cash holdings, particularly for financially less-constrained firms. Most of the control variables are quite consistent with the empirical results from previous studies especially for the term of FCF/TA which uses to control for the cumulation of precautionary financial slack. The coefficient is positive and significant at 1% level under all five financial constraint criteria suggesting that firms that have available free cash flow will hold as a cash reserve to benefit their current and future investment needs. The negative sign on market to book coefficient may be indicated that firms with high growth opportunity will hold less cash due to the fact that costly debt financing may predominate the benefits of firms from accumulating cash for precautionary reasons. This is consistent with the study of Bates et al., (2009).

Table 6: Interaction of corporate governance and financial constraints on corporate cash holdings under five financial constraint criteria

This table shows the regression results that test the relationship among financial constraint, corporate governance, and corporate cash holdings by using fixed effect estimation model and running as panel data to inspect whether the amount of cash holdings for financially less-constrained firms will increase more when they construct and implement stronger corporate governance mechanism. The definition of variables is provided in Appendix (Table A2).

$$(Cash_{i,t}/TA_{i,t}) = \beta_i + \beta_1(LC Dummy_{i,t}) + \beta_2(CG Score_{i,t}) + \beta_3(CG Score_{i,t} * LC Dummy_{i,t}) + \beta_4(FCF_{i,t}/TA_{i,t}) + \beta_5(NWC_{i,t}/TA_{i,t}) + \beta_6(Market\ to\ Book\ ratio_{i,t}) + \beta_7(Asset\ tangibility_{i,t}) + \beta_8(Institutional\ ownership_{i,t}) + \beta_9(idiosyncratic\ volatility_{i,t}) + \beta_{10}(Firm\ Age_{i,t}) + \beta_{11}(Sale\ growth_{i,t}) + Year\ Dummies + \varepsilon_{i,t}$$

Variables	Dependent Variable (Cash / TA)				
CG Score	0.0138*** (0.0046)	0.0169*** (0.0041)	0.0068 (0.0049)	0.0186*** (0.0053)	0.0017 (0.0045)
FCF / TA	0.1480*** (0.0292)	0.1200*** (0.0231)	0.1140*** (0.0230)	0.123*** (0.0288)	0.118*** (0.0230)
NWC / TA	-0.0034 (0.0331)	-0.0048 (0.0219)	-0.0088 (0.0218)	-0.0326 (0.0314)	-0.0356 (0.0218)
Market to Book	-0.005** (0.0022)	-0.0002 (0.0019)	-0.0001 (0.0019)	-0.0032 (0.0022)	-0.0020 (0.0019)
Asset Tangibility	-0.0709*** (0.0240)	-0.0652*** (0.0185)	-0.0568*** (0.0186)	-0.0491** (0.0236)	-0.0371** (0.0205)
Institutional Ownership	-0.0331 (0.0338)	-0.0298 (0.0241)	-0.0265 (0.0239)	-0.0137 (0.0313)	-0.0294 (0.0239)
Idiosyncratic Risk	0.922 (1.978)	1.673 (1.558)	1.446 (1.550)	1.855 (1.885)	0.985 (1.549)
Firm Age	-0.0357** (0.0139)	-0.0389*** (0.0115)	-0.0429*** (0.0114)	-0.0419*** (0.0135)	-0.0370*** (0.0114)
Sales Growth	-0.0079 (0.0079)	-0.0049 (0.0056)	-0.0062 (0.0055)	-0.0086 (0.0075)	-0.0046 (0.0056)

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6: Interaction of corporate governance and financial constraints on corporate cash holdings under five financial constraint criteria (cont.)

Variables	Dependent Variable (Cash / TA)				
LC Payout	-0.176*** (0.0235)				
CG * LC Payout	0.0548*** (0.0060)				
LC Size		-0.0443* (0.0235)			
CG * LC Size		0.0112* (0.0059)			
LC Leverage				-0.107*** (0.0195)	
CG * LC Leverage				0.0240*** (0.0055)	
LC Life cycle				-0.0927*** (0.0241)	
CG * LC Life cycle				0.0172*** (0.0063)	
LC Collateral asset					-0.1380*** (0.0192)
CG * LC Collateral asset					0.0334*** (0.0052)
Observations	2,819	3,640	3,640	3,071	3,640
Adjusted R-Square	0.079	0.030	0.040	0.043	0.044

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

7.5) Analysis of the direct relationship between corporate governance and financial constraints

According to model 3 described in the methodology section, I expect to see the significantly positive relationship between financially less-constrained firms and corporate governance by looking at the coefficient of LC DUMMY term.

Following Table 7, it shows the regression results for Model 3 that tests the direct relationship between corporate governance effectiveness and financial constraints.

The results from table 7 depict that LC Dummy terms (LC Size, Leverage, Life Cycle, and Collateral Asset) have positive coefficients that are significant at the 1% level under four financial constraint criteria except for only payout ratio criteria that have negative coefficients. These results support the third hypothesis (H_3), implying that financially less-constrained firms tend to improve their corporate governance score in order to enforce stronger discipline on managers than constrained firms. This is consistent with the previous study of Luo (2011). However, one reason why the payout criteria is not consistent with my expectation maybe because firms that pay high payout rate can be signaled as firms that make a loan for their shareholders, or maybe those firms are about to exit or face with insolvency so the corporate governance effectiveness among these kinds of firms may not be quite good and strong.

In addition, table 7 also represents the approximations of control variables which are used in preceding corporate governance findings. Regarding Linck et al. (2008), I decide to adopt the asset tangibility ratio, the market-to-book ratio, and idiosyncratic stock volatility as control variables for determining the level of advising and monitoring costs. The results present that idiosyncratic stock volatility has negative coefficients under all five financial constraint criteria which infers that firms

exposing to higher risk tend to have lower corporate governance effectiveness. Also, I include firm age variable to control for the impact of firms' investor bases and I find that it has a positive coefficient and significant at 1% level related to the corporate governance effectiveness under all five financial constraint criteria which is compatible with preceding corporate governance findings of Berry et al. (2006). This explains that firms with a greater age tend to adopt stronger governance standards. Besides, the positive coefficients of term market to book ratio under three constraint criteria (Firm size, Leverage, and Life cycle) are significant at 5%, and under the rest of two criteria (Payout and Collateral asset) are significant at 1% level. These may reflect that firms which have growth opportunities may want to create their value by investing in a positive NPV project to get positive benefits. In order to do that they may be encouraged to implement an effective governance mechanism within the firms. This is consistent with the study of Bubbigo (2012).

Besides, the coefficient of ROA tends to be positive to corporate governance under all financial constraint criteria and significant at 10% significant level under two financial constraint criteria implying that firms with good performance are more likely to develop corporate governance standards to be even better. This is compatible with the study of Gupta and Sharma (2014).

Table 7: Determinants of corporate governance by financial constraint criteria

This table shows the regression results that tests the direct relationship between corporate governance and financial constraints by using fixed effect estimation model and running as panel data to inspect that financially less-constrained firms are likely to improve and develop stronger corporate governance than constrained firms. The definition of variables is provided in Appendix (Table A2).

$$(CG\ Score_{i,t}) = \beta_i + \beta_1(LC\ Dummy_{i,t}) + \beta_2(FCF_{i,t}/TA_{i,t}) + \beta_3(Firm\ Size_{i,t}) + \beta_4(Market\ to\ Book\ ratio_{i,t}) + \beta_5(Asset\ tangibility_{i,t}) + \beta_6(Institutional\ ownership_{i,t}) + \beta_7(idiosyncratic\ volatility_{i,t}) + \beta_8(Firm\ Age_{i,t}) + \beta_9(ROA_{i,t}) + Year\ Dummies + \varepsilon_{i,t}$$

Variables	Dependent Variable (CG Score)				
FCF / TA	-0.0088 (0.1090)	-0.0077 (0.0948)	-0.0069 (0.0948)	-0.0377 (0.1060)	-0.0218 (0.0950)
Firm Size	-0.1400*** (0.0388)	-0.1420*** (0.0267)	-0.1140*** (0.0270)	-0.1070*** (0.0374)	-0.1320*** (0.0268)
Market to Book	0.0691*** (0.0198)	0.0368** (0.0145)	0.0347** (0.0145)	0.0460** (0.0197)	0.0437*** (0.0144)
Asset Tangibility	0.0243 (0.1130)	0.0321 (0.0869)	-0.0185 (0.0879)	-0.0127 (0.1100)	-0.0615 (0.0967)
Institutional Ownership	-0.1830 (0.1500)	-0.1890* (0.1120)	-0.1520 (0.1120)	-0.2050 (0.1390)	-0.1570 (0.1120)
Idiosyncratic Risk	-13.63 (8.9470)	-21.77*** (7.1870)	-21.38*** (7.1870)	-20.13** (8.4190)	-20.71*** (7.2190)
Firm Age	0.8660*** (0.0610)	1.0510*** (0.0504)	1.0500*** (0.0504)	0.9870*** (0.0580)	1.0450*** (0.0505)
ROA	0.1010 (0.2150)	0.2240 (0.1480)	0.2770* (0.1470)	0.2370 (0.2170)	0.2750* (0.1480)
LC Payout	-0.1210*** (0.0264)				
LC Size		0.2170*** (0.0399)			
LC Leverage			0.1540*** (0.0283)		
LC Life Cycle				0.1670*** (0.0316)	
LC Collateral Asset					0.0957*** (0.0337)
Observations	3,254	4,203	4,203	3,534	4,203
Adjusted R-Square	0.093	0.130	0.130	0.116	0.125

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

8. CONCLUSION

My study examines the interaction of financial constraints and corporate governance effectiveness in describing the level of corporate cash holdings. By using corporate governance score and five firm-specific characteristics of financial constraints including payout ratio, firm size, leverage ratio, life cycle ratio, and collateral asset ratio, I find that corporate governance effectiveness can help alleviate agency concerns on cash holdings more crucially for financially less-constrained firms due to the lack of their disciplinary function and better corporate governance effectiveness helps increase cash holdings for financially less-constrained firms because shareholders have already ensured that their managers will not spend cash slacks in an inappropriate way or minimize their wealth objective.

In addition, this paper provides some proof that there is a direct relationship between financial constraints and corporate governance which indicates that financially less-constrained firms generally have stronger corporate governance and tend to improve better corporate governance effectiveness to resolve the agency problems within the firms while most of the previous studies from Thailand have not incorporated the role of financial constraint for their analysis yet. They only inspected the importance of corporate governance mechanisms in reducing agency problems.

To summarize, I find that corporate governance helps alleviate agency problems not in the same way between financially less-constrained firms and financially constrained firms. The results from the empirical test may have some implications for shareholder activism with respect to the concern of corporate cash holdings. Hence, there are still some rooms for further studies to concentrate more on deeper analysis related to this topic.

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APPENDIX

Table A1: Correlations between variables for examination

This table shows the correlation matrix of all statistic variables after excluding outlier observations of FCF / TA, NWC / TA, Market to Book, Sales growth, and Firm size to reduce the skewness distribution.

Correlation	Cash	FCF	NWC	Market to Book	Asset Tangibility	Sales growth	CG Score	Institutional ownership	Idiosyncratic risk	Firm Age	ROA	Firm size
Cash	1											
FCF	0.123	1										
NWC	-0.0065	-0.2648	1									
Market to Book	0.061	0.1857	0.031	1								
Asset Tangibility	-0.0533	-0.0576	-0.1163	0.0832	1							
Sales growth	-0.0078	-0.0461	0.0949	0.0751	-0.0253	1						
CG Score	0.1302	0.0402	0.0903	0.1771	0.0588	0.0085	1					
Institutional ownership	0.1132	0.0767	0.0013	0.0798	0.0726	-0.0115	0.2675	1				
Idiosyncratic risk	0.0073	-0.0354	-0.0539	0.0133	-0.0113	0.0481	-0.1122	-0.0642	1			
Firm Age	-0.0164	-0.0193	-0.0174	0.063	0.0089	-0.0767	0.1627	0.0756	-0.1764	1		
ROA	0.1527	0.3904	0.1722	0.3105	-0.0486	0.1682	0.1486	0.0735	0.0793	-0.0644	1	
Firm size	0.1362	0.2753	-0.0014	0.8084	0.0707	0.0695	0.0506	0.0487	0.1367	0.0733	0.4374	1

Table A2: Variable definitions

This table represents the summary definition of all statistic variables that use in my paper.

Variables	Definition
Cash / TA	Value of cash and cash equivalents scaled down by total assets
FCF / TA	Free cash flow that calculated from cash flow from operating activities minus capital expenditure, scaled down by total assets
NWC / TA	Value of net working capital scaled down by total assets
Market to Book	Value of market equity divided by the book value of the equity
Asset Tangibility	A ratio calculated from plant properties and equipment divided by total assets
Sales growth	Current sales minus prior sales divided by prior sales
CG score	The corporate governance score obtained from Thai IOD report
Institutional Ownership	Value of shares holding by domestic and international juristic entity divided by total shares outstanding
Idiosyncratic risk	Idiosyncratic return volatility which is the standard error of epsilon terms from the capital asset pricing model
Firm age	The age of firms since the first day that registered into the SET database scaled down by the age of firm as of 2019
ROA	The returns on total assets
Firm size	The size of the firm calculated from firm market capitalization scaled down by total assets

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