

THE ROLE OF FINANCIAL DEVELOPMENT TOWARD CAPITAL STRUCTURE CHOICE  
UNDER DIFFERENT MACROECONOMIC CONDITION

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ภายใต้ความแตกต่างของภาวะเศรษฐกิจมหภาค



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งานศึกษานี้แสดงให้เห็นว่าการพัฒนาทางการเงินมีผลต่อทางเลือกของโครงสร้างเงินทุนอย่างไร โดยศึกษาร่วมกับผลของสภาวะทางเศรษฐศาสตร์มหภาคต่อโครงสร้างเงินทุนร่วมด้วย

งานศึกษาใช้ข้อมูลระดับบริษัทจากประเทศที่ถูกกำหนดให้เป็นประเทศที่มีโครงสร้างการพัฒนาทางการเงินที่ดีและด้อย นำมาวิเคราะห์ข้อมูลด้วยการวิเคราะห์ถดถอยเชิงพหุคูณ ด้วยวิธีการจัดการข้อมูลประเภท Panel data ตัวอย่างถูกแบ่งออกเป็น บริษัทที่ไม่มี และมีข้อจำกัดทางการเงิน ตั้งแต่ปี 2000-2010 งานศึกษานี้ใช้สมการถดถอยที่ใช้อธิบายโครงสร้างเงินทุนประกอบไปด้วยตัวแปรลักษณะเฉพาะของบริษัท และ สภาวะทางเศรษฐศาสตร์มหภาค

ผลการศึกษาแสดงให้เห็นว่า ระดับของการพัฒนาทางการเงินมีความสัมพันธ์ต่อการตอบสนองของโครงสร้างเงินทุนต่อการเปลี่ยนแปลงสภาวะเศรษฐศาสตร์มหภาค โดยบริษัทในประเทศที่โครงสร้างทางการเงินพัฒนาแล้ว โครงสร้างเงินทุนจะเปลี่ยนไปตามภาวะเศรษฐศาสตร์มหภาคน้อยกว่า กล่าวคือผันผวนน้อยกว่า แสดงให้เห็นถึงบทบาทของการพัฒนาทางการเงินว่ามีส่วนช่วยในการเปลี่ยนแปลงโครงสร้างเงินทุนโดยการเพิ่มทางเลือก และการลดข้อจำกัดทางการเงินของบริษัท และเนื่องจากบริษัทที่มีข้อจำกัดทางการเงินอยู่แล้วจึงได้ประโยชน์จากการพัฒนาทางการเงินมากกว่าบริษัทที่มีข้อจำกัดทางการเงินน้อยกว่า



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This study provides the new evidences of how financial development affects firm's capital structure and also examines the role of financial development under different macroeconomic condition.

This study employs firm-level data from high and low financial development countries that consist of financially unconstrained and constrained firms in year 2000 to 2010. Fixed effect panel regression models that firm's capital structure is a function of macroeconomics condition and firm-specific variables are used.

The results show that level of financial development affects firm's leverage sensitivity to macroeconomic condition. We found both unconstrained and constrained firm leverage in high financial development are less sensitive to macroeconomic condition than firms in low financial development. We found constrained firms benefit more from well-functioning financial structure than unconstrained firm.

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# CHAPTER I

## INTRODUCTION

### 1.1 Background and Problem Review

Financing decision has been gained much attention in finance literature over the year since Modigliani-Miller proposed Irrelevance propositions. In addition, financing decision is relevant to shareholder wealth and goal of financial manager. Sources of fund are to come internally and externally. External fund can be roughly classified into debt financing and equity financing.

Academics and practitioners have developed studies trying to explain the behavior of firms to raise their fund; in other word, how firms determined their capital structure. There are many factors associated with firms' behavior raising their fund or firm's capital structure. That is, no exact rule or theory can explain the optimum of capital structure. All the theories try to explain the behavior; in fact we still observe and say that capital structure choice varies not only across firms and time but also country, partly explained by a market environment which is macroeconomic factors as well as a financial market environment, or financial development factors.

Many researchers try to understand which factors different in each firm contribute to how a firm set its target capital structure. We can find many studies assuring that firm-specific factors are determinations of capital structure.

Following literature incorporates macroeconomic condition into the determination of capital structure model. All literature reviewed concluded that macroeconomic condition is another contributing factor of capital structure behavior.

Our curiosity about further capital structure study arises when we see the essence and importance of banking and financial market<sup>1</sup>. Banking and Financial markets are a complex institution playing a central role in financial industry. The major role is to distribute fund to firms. Logically, if banking and financial market perform well-functions, benefits will go to raising fund activity and fund should be distributed to the efficient projects to be created by corporation.

When a firm decides to finance by using external sources, cost occurring from financing activity are transaction cost such as commission fee for underwriter or floatation cost, and information cost such as agency cost. These two costs will be determining cost of capital and in turn firm value.

This study conducts a term “financial development” as the financial environment that provides advantages to every firm in the same environment. Financial institutes play a service to link attributes together. Financial institutes do not even provide facilitation roles but do monitoring roles either, so they lessen the obstacles when firms access to financial market.

Financing obstacles arise from two factors which are internal factor, the factor that firms create and external factor, the factor that firms encounter. Level of financial development will associate to firm’s capital structure and financing method as external factors because it will facilitate financing and reduce financing obstacle.

Financial development will affect capital structure particularly when macroeconomic conditions are different. For instance, a country is in severe recession. Stock market falls sharply and banks are unable to loan their money due to higher risk or even no capability to provide fund needed (liquidity problem). If this situation develops, the undesired situation (economy getting worsen) will come unavoidably. Imagine that if a country has a good functioning of bond market (for example, lows either real cost<sup>2</sup> or information cost<sup>3</sup>), firms can use those efficient

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<sup>1</sup> Financial market refers to equity and bond market

<sup>2</sup> Real cost refers to transaction cost such as fee, commission payment.

<sup>3</sup> Information cost refers to cost from asymmetric information such as agency cost.

bond markets to subdue the credit scarcity problem remaining in intermediary market. The economy will benefit due to existing of well- functioning bond market.

Figure 1 shows the level of financial development will be related to leverage under the difference in macroeconomic condition. Macroeconomic condition could be seen as the channel of the effect of financial development toward firm capital structure. The reason is financial development will reduce the sensitivity of macroeconomic variation especially for constrained firm and this effect is clearly arising when economy is tough (recession). In conclusion, capital structure will also be determined by financial development through macroeconomic condition.

[Insert figure 1 in here]

This study, we will study again in the effect of macroeconomic condition that may associate with firms' capital structure. Beyond existing literatures this study will reassure the relationship of macroeconomic condition and capital structures are still able to explain in international samples, a group of selected countries. And importantly, this study explores and provides the new evidences of how financial development affects capital structure and its roles during the change in stages of economy. We use model that firm's capital structure is a function of macroeconomics conditions and firm-specific variables. The Figure 1 shows the link between the variables.

The findings show that financial development relates to firm's capital structure under different macroeconomic condition. Capital structure of firms in high financial development is less sensitive to macroeconomic condition and constrained firms benefit from financial development more than unconstrained firms.

## 1.2 Research Questions

1. Is firm leverage sensitive to macroeconomic condition?
2. Do macroeconomic conditions affect financially constrained and unconstrained firms in a different manner?
3. Do financial developments action their roles to facilitate and subdue the ability or barrier to access fund when macroeconomic conditions are different?

## 1.3 Objectives

The objective is an attempt to understand the determination of capital structure considered with macroeconomic condition and financial development, the essence of banking and financial markets, relationship and importance of financial market development toward capital structure.

Sample groups comprise the data of financially constrained and financially unconstrained firms in a different level of financial development.

## 1.4 Research Hypotheses

The main hypothesis is the level of financial development will be a contributing factor to determine how firms adjust their capital channeling through macroeconomic condition. Channeling conducts and implies the implication meaning that the relationship between capital structure and financial development will associate under different macroeconomic condition. And financial development level might reduce the effect of macroeconomic variation.

In detail, from question 1 whether firm leverage is sensitive to macroeconomic condition.

*Hypothesis 1 Firm leverage is sensitive to macroeconomic condition.*

Macroeconomic condition change should affect how a firm raises its capital, because macroeconomic condition which varies over time leads to both appropriate and inappropriate functions of every economic activity element and outcome. For example, the functions of financial market may perform differently and the demand and supply for firm's product generated and sold will be different in each stage and the higher benefits from using appropriate funding. All of examples are responsible to the hypothesis that firm leverage is sensitive to macroeconomic condition.

However, the direction is inconclusive, the three main capital structure theories, pecking order, trade off and market timing, reassure the different perspectives. That is, pecking order implies pro-cyclical between macroeconomic condition and leverage because firms first prefer using debt financing when expansion rather than equity financing due to equity financing generating highest agency cost comparing to debt. Trade-off would also imply pro-cyclical leverages because during expansion expected bankruptcy costs are lower, firms are more likely to have taxable income to shield if financing through debt and firms have more free cash flow, so debt should be more attractive than equity financing. On the contrary, Market timing would infer counter-cyclical because firms would time their equity during expansion opportunistically due to increase in firm market value.

Moreover, Passove (2003) argues that the primary reason Pfizer (his sample) and other technology companies often place such importance on a high bond rating is the possibility of being left out of the capital markets during market downturns. This show the possibility and clear picture that macroeconomic conditions will adversely affect firm's access to capital markets as an important factor in their firm's financial policies.

Baker (2009) addresses the importance of macroeconomic condition that it associates with firm's capital raising. He emphasized the potential shocks to the supply of capital are the first impact in shaping financial decisions.

In brief, we argue that firm leverage is sensitive to macroeconomic condition certainly but the direction is inconclusive. Pro-cyclical leverage to macroeconomic condition (when recession firm decreases debt) supported by pecking order and tradeoff theory. Counter-cyclical (when recession firm will increase debt) to macroeconomic condition supported by market timing hypothesis

The next question is whether macroeconomic conditions do affect financially constrained and unconstrained firms in a different manner.

*Hypothesis 2 financially constrained firms do not choose their capital structure in the same manner as unconstrained firms*

It is useful to state the concept of financial constraint used in this study. Financially constrained firms are defined as the set of firms that do not have sufficient cash to undertake investment opportunities and that face severe agency costs when accessing financial markets<sup>4</sup>. So, financially constrained firms are the firms that suffer from particular financial constraints such as credit to borrow money from bank, issuing bond or equity to implement their project.

The purpose is to observe the difference in macroeconomic condition effects to capital structure behavior between financially constrained and unconstrained firms. With firm's financial condition, types of financing method used by firms (debt or equity financing) and the way these capitals are chosen during the different in macroeconomic condition should be different. So, the constraint condition is responsible to the different firm capital structure behavior under different macroeconomic condition.

#### **Financially unconstrained firm**

We expect that financially unconstrained firm leverage is counter-cyclical with macroeconomic condition. That is, when economy is in expansion, firms would reduce their leverage implying that debt decrease and firms may be favorable to raise their equity. Reducing

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<sup>4</sup> See further detail of financial constraints in 3.2.2 : Define Financially constrained firm



debt leads to higher return on equity from capital and can increase capacity from raising fund through debt during bad economic condition.

In addition, Baker and Wurgler (2002) state when economy is in expansion, firm's market value is normally high. Firms should time their equity during that time.

When economy is in recession, leverage would increase due to time equity is not attractive anymore because of leading to higher cost of financing. Debt should increase due to once the firms want to raise money capital, financially unconstrained firm should be the priority of lenders for loan provider. And also we can use agency theory to explain this phenomenon. Jensen (1986) gives an example of agency problem from free cash flow. Managers have incentives to spend shareholders' cash for their own interest. Given this problem, debt can be used to reduce agency cost with another tool to control the manager moral insufficiency.

#### **Financially constrained firm**

Financially constrained firm leverage is pro-cyclical with macroeconomic condition. That is, when economy is in expansion, firms would increase their leverage implying that firm raises their fund through debt financing because the market value of asset is higher leading to higher collateral and higher firm's ability to creating debt. And debt financing should be relatively low cost than equity because constrained firms have high agency cost of equity due to their unpredictably incidence and existing information available to investor.

In recession, financially constrained firms have an insufficient ability to finance through debt. And they may be forced to commit equity issue with high cost in order to raise their capital needed.

Therefore, financially constrained and unconstrained firms raise funds in a different manner in expansion and recession period.

The last question whether financial development does action their role to facilitate and subdue the ability or barrier to access fund when macroeconomic conditions are different.

*Hypothesis 3* financial development will facilitate and perform their function relating to macroeconomic condition so the financial development will make the firm less sensitive to macroeconomic condition. And financially constrained firm should benefit more from financial development.

There are 2 groups which are financially constrained firm and unconstrained firm. And developments of financial structure in this study are banking sectors, bond market and equity market.

Level of financial development is associated with the sensitivity of firm capital structure under different macroeconomic condition depending on financial constraint firms are facing.

This argument can be interpreted that the effect of macroeconomic condition to leverage variability will be lessening due to good functioning of financial markets especially for financially constrained firm.

The underlying intuition of macroeconomic sensitivity reduction in financially constrained firms is the contribution of financial development roles to facilitate and perform the function as a financial structure both direct and indirect financing. The major problems of financially constrained firm are transaction cost and agency cost that can be alleviated by well-functioning financial structure as mentioned in 2.1.3. These two problems by nature of constrained firm contribute to the understanding of pro-cyclical leverage instead of counter-cyclical. This contribution of financial market leads to the argument that constrained firms in high financial development at least reduce those barriers resulting in less sensitivity of leverage toward macroeconomic condition due to the chance of choice opened.

To clarify, during in bust economy, constrained firm cannot easily borrow money and bank may face the situation of the credit-crunch and be unable to lend money, the economy is getting to worsen. On the other hand, during boom economy they may be unable to opportunistically time equity and commit using debt financing. Existing of financial development

will reduce these constraints and leads to less sensitivity of macroeconomic condition toward leverage.

Unconstrained firm is not suffering from financial constraint as constrained firm. The sensitivity can be either increase or decrease, so leverage sensitivity to macroeconomic condition is inconclusive. They can time security opportunistically along the favorable macroeconomic condition (counter cyclical) that leads to higher sensitivity. However, if a firm uses the development of financial structure to facilitate its optimal level of capital structure which should be the only one major reason of lesser sensitivity.

So level of financial development will be a contributing factor to determine capital structure through macroeconomic condition. That is, firm should be less sensitive to macroeconomic condition variation under higher level of financial development especially for constrained firm.

Another concerning is the effected size of financial development or magnitude of financial development toward the sensitivity of macroeconomic condition. Constrained firm should be more influenced than unconstrained firm due to the financial constraint firm faced. Generally, existing of financial development will reduce financial constraints associated with firm capital structure change, so firm with financial constraint should be more influenced and gain more advantages from financial development than unconstrained firm.

### 1.5 Contributions

This study incorporates financial development to capital structure study in order to observe the different reaction of firm capital structure to the different level of financial development.

We would be able to use the knowledge importantly to understand deeper on capital structure behavior and the important of financial development in term of firm's financing. And

the policy implication can either use the result in order to know or pay more attention to country' financial market improvement.

If the results show the useful of financial development to firm with different constraint, Policy maker can use them as proper policy implications during each stage of economy.

### 1.6 Organizations

This study is organized into five chapters. Chapter one is introduction and hypothesis of this study. Chapter two contains theoretical background and literature review. Chapter three presents data and methodology. Chapter four shows the result univariate statistics and model estimations as well as discussion. The Final chapter is summary.

## CHAPTER II

### LITERATURE REVIEW

#### 2.1 Concept and Theoretical Background

##### 2.1.1 Capital Structure Theory and Potential Determinants of Capital Structure (Micro Perspectives)

Many papers have been written about capital structure and its determination after the Modigliani and Miller proposed Irrelevance theory. This section begins with capital structure theory and concept, and then we will propose factors related to a firm that may affect capital structure and company's financing decision.

To make a prediction on capital structure determinants, the important theories and concepts presented are pecking order theory, trade-off Theory, and signaling theory; as well as, hypothesis such as market timing and using debt financing to constrain manager.

Irrelevance theory assumes no asymmetric information which is unrealistic in the real world, while pecking order theory is based on the existing of information asymmetry. Since an asymmetric information problem exists, firms avoid external financing due to mispricing of security price due to information problem. The firm's equity is the most severely underpriced comparing to other instruments. As a result, firm will first use internal financing and prefer debt to equity when they have to raise external fund. (Myers and Majluf, 1984)

Irrelevance theory also assumes no bankruptcy cost, while in practical bankruptcy cost is very high and significance. Trade-off theory explains that firm will choose between the benefit from tax shelter and higher interest rate with bankruptcy cost. Trade-off will determine optimal capital structure which is the marginal tax shelter benefits equal marginal bankruptcy-related costs.

Even though, trade-off seems logical but sometimes it cannot explain some firms that keep leverage low or lower than optimal level implied by trade-off. Signaling theory can explain this occurrence and asymmetric information is also posited as an assumption. Signaling theory explain that good prospect companies do not prefer equity financing because shareholders as well as manager do not want to share the profit to new shareholder; while a firm with negative prospect would want to issue new stock to new investors to share the risks and the expected losses. This signal is more important and practical when a firm is big and less likely to encounter the problem of financial access because it has less chance to be forced to commit an undesired capital raising method. This perception entails to firms would like to reserve borrowing capacity leading to lower leverage implied by optimal capital structure.

Market timing (Baker and Wurgler, 2002) views capital structure choice reflects firm market timing. Firms will issue equity opportunistically when the share prices are high. High share prices conduct good time for equity timing because of low cost of capital.

Using debt financing to constrain manager or agency theoretic explanation of capital structure is another hypothesis. This hypothesis implies debt financing can reduce the cost from under and over investment by partly control manager's discretion using debt because manager will not want to increase any risk from over or under investment and from perquisites.

This next part presents the factors that influence the capital structure choice. According to Titman and Wessels (1998) state the factors that are a potential determinants of capital structure which are asset structure such as tangibility that firm can use it as a collateral, non-debt tax shields which is contradict to tax shelter or tax benefit, growth which may relate to agency cost that in turn relate to cost of financing, uniqueness which associates to cost when firm liquidated, industry classification, size which relate to transaction cost and agency cost, earnings volatility which can be used as firm return volatility or firm risk, and profitability which contribute to higher retained earnings. All of these determinations are wildly used in capital structure study.

### 2.1.2 Macroeconomic Condition and Capital Structure

The development of capital structure theory has started since 1950. There are three main understandings that can explain capital structure: agency approach, asymmetric information approach, and firm-specific approach.

Beyond the approaches mentioned, subsequent studies have incorporated macroeconomic conditions for raising understanding toward capital structure study.

Intuitively, macroeconomic conditions should affect the decision of firms to change their capital. That is, the decision during the stages of the business cycle should vary across firms with different firm conditions.

The firm condition can be the ability of the firm to access the funds which should be available theoretically in banking and financial markets. So differences in stages of the business cycle (economic conditions) and financial restrictions of firms should be intuitively dissimilar in terms of capital raising.

Here is an example of macroeconomic conditions influencing a capital structure decision. According to Brigham and Ehrhardt (2005, page 573) mention that market conditions are related to a capital structure decision. Market conditions which are conditions in the stock and bond markets would affect the capital structure decision. For example, during a credit crunch, there was no market at a reasonable interest rate for any new long-term bonds rated below triple B. Therefore, low-rated companies in need of capital were forced to go to the stock market or to the short-term debt market, regardless of their target capital structure. When conditions eased, however, these companies sold bonds to get their capital structure back on target.

### 2.1.3 Financial Development

Funds move from lenders to borrowers by two routes, direct financing through financial markets and indirect financing through financial intermediaries, commercial banks. Both are the activities in financial structure.

When discussing roles of financial structure, we need to consider transaction cost, risk sharing and asymmetric information. If financial structure has a well-functioning, it contributes to the concept of financial development.

Financial development<sup>5</sup> is conceptually, a process of reducing the costs development of acquiring information, enforcing contracts, and making transactions. Empirically, measuring financial development directly is challenging.

The function of financial market is also emphasized by Lavine (1997). He addressed in his paper that the framework with no information or transaction costs, there is no need for a financial system that expends resources such as searching for projects, scrutinizing managers and facilitating transactions. That is financial markets and institutions eliminate or at least are lessen the problem created by asymmetric information and transaction friction. Since the transaction and information costs decrease, they obviously serve the primary function which are facilitations, allocation of resources, across space and time, in and un-certain environment. He also mention primary function of financial market into five basic function which are

- facilitate the trading, hedging, diversifying, and pooling of risk
- allocate resources
- monitor managers and exert corporate control
- mobilize savings
- facilitate the exchange of goods and services.

As seeing the importance of financial system in each country, the financial system is the most heavily regulated sectors. The government regulates financial markets for two reasons: to increase the information available to investors and to ensure the soundness of the financial system.

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<sup>5</sup> <http://econ.worldbank.org>



From the above various study and financial structure roles, we believe and pay attention to the function and importance of banking and financial market because they are one of important economic system and one of important mechanism to enhance the economy, as well as business activities to be effective and efficient. They play an important role to match lender and borrower together and they facilitate security transactions and also financial agreements. Hence, financial market development has an objective to be an efficient center and enhance the capability of the financial activities.

The major roles of financial structure toward financing decision on a firm with different financial constraints of firm are it will facilitate firm financing activity both financially unconstrained and constrained firm. To point out shortly, well-functioning financial structure provides low transaction cost (major problem in low financial market) and reduce agency cost (cost occurring from asymmetric information)

Basically, we can look up efficient financial market in either supply and demand side, or many economists always say that both depth and breadth. That is, on supply side, there is a variety (wide range) of financial instruments to satisfy all class of asset demand such as offering many choices of issuer, credit risk, etc. And for the demand side, that is, there has to be sizable investment demand from various types of investors and investors have a different and diversity risk-return perspective. This condition results in a variety of market view and decision leading to an active exchange of financial market. The active transaction in financial market is the liquidity of financial market. The favorable both supply and demand side led too many advantages toward both whole economy and firms. For example, they accommodate large and varied issuance of financial instruments with minimum price effect, financial instruments can be quickly exchanged at reasonable cost and efficient clearing and settlement system is a key contributing factor that lower transaction cost.

The superficial explanation cited is the example of the importance of financial development. From those reason any country should concern and dedicate concentration to improve country's financial market.

Then let talk about the measurement of financial development. Unto now there is no exact indicator being a benchmark of financial development. There are many researchers trying to construct an indicator as a proxy for financial development. For instance, King and Levine (1993), Sasi and holden (2008) and Antzoulatos et al. (2008), etc. All indicators they created and proposed is good in any way from the reason they proposed and some indicator is favor to what they want to study and emphasize in their specific literature.

The purpose of this study suits the measurement proposed by Antzoulatos et al (2008) and these measures are conducted and considered by world economic forum. So the financial development index constructed in this paper is based on same criterion of Antzoulatos et al (2008).

Antzoulatos et al. (2008) use four categories to construct financial development indices. These include banks, financial institution, and stock market and bond market development indices. The proxies for banking sector development included deposit money bank assets to GDP, bank overhead costs, bank's concentration, bank's net interest margin, and private credit issued by domestic money bank and other financial institutions to GDP. The proxies for the development of financial institutions included a life insurance premium and non-life insurance premium. The development of stock market is the stock market capitalization to GDP, stock market total value traded to GDP, and finally with turnover ratio of stock market. The proxies for the bond market development include private bond market capitalization to GDP and public bond market capitalization to GDP.<sup>6</sup>

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<sup>6</sup> See appendix A for further detail

## 2.2 Related Literature Review

Korajczyk and Levy (2002) studied and provided evidence of how macroeconomic conditions affect capital structure. They created firm's target capital structure model as a function of macroeconomics condition and firm-specific variables and they spliced sample based on a measure of financial constraints to get financial constrained and financial unconstrained firm.

Their result indicates that unconstrained firms have counter-cyclical to macroeconomics condition while constrained sample is pro-cyclical. That is, their results support the hypothesis that unconstrained firms time their issue choice to coincide with periods of favorable macroeconomic conditions, while constrained firms do not. The reason behind this evidence is in case of financially unconstrained firm when economy is in bust, managers are forced to use debt financing when their compensation is relatively low during low return in the equity market or low corporate profits. Meanwhile, firms in the financially constraint have pro-cyclical leverage with macroeconomic condition because when high returns in equity market or high corporate profit, firm would borrow more once collateral values are higher.

Yeh and Roca (2012) also investigated the impact of macroeconomics conditions and their interactions with firm-specific factors on the determination of capital structure. The sample they used is only financial constraint firms and they study separately between over-leverage and under-leverage firms. By doing their procedure the result provides a new perspective on the impact of macroeconomic conditions and their interactions with firm-specific variables on capital structure over the business cycles. They also investigated over textile, plastics and electronic industries.

Their finding shows that macroeconomic conditions have a significantly positive effect on the capital structure decisions for the firms with the financial constraint of under-leverage relative to the target debt ratio and the interactions between macroeconomic conditions and firm specific variables also affect capital structure decision. But there is no significant effect emerges on the determination of firm with the financial constraint of over-leverage relative to target debt

ratio. In summary their study pointed out that this effect depends upon whether the firms are over-levered or under-levered relative to their target debt ratio.



## CHAPTER III METHODOLOGY

### 3.1 Data

This part first shows you how to specify the countries that we expect to use their firm level data in this study. We pay attention to financial development to find country nominees underlying the criteria mentioned along this data session and then will mention firm-level data which are quarterly data. The period of studying is between 2000 and 2010.

Financial development in this study is banking, bond and equity market. So we took banking sectors, equity markets and bond markets into consideration, for these three sectors are obviously important in term of capital raising. Table 2 summarizes measures of financial development that we use it as a proxy. Banking sector development included deposit money bank assets to GDP, bank overhead costs, bank's net interest margin, and private credit issued by domestic money bank and other financial institutions to GDP. The development of stock market is the stock market capitalization to GDP, stock market total value traded to GDP, and finally with turnover ratio of stock market. The proxies for the bond market development include private bond market capitalization to GDP and public bond market capitalization to GDP. We exclude bank concentration because it is hard to identify which manner is good. After getting composite indicators of each market, we pursue an index that can be used to represent the overall character of every market. Principal Component Analysis is used to construct a financial development index from three indicators. Figure 2 presents the steps of index construction.

[Insert table 1 in here]

This study then combines financial development index from 3 groups of indicators: banking, equity market and bond market.

### 3.1.1 The Composition Indicator

To create the composite indicator for bank, bond and equity market development, we follow the procedure of OECD paper named composite indicators of country performance and this method is widely used to construct composite indicators and also the way that World Bank uses to calculate the financial development.

Freudenberg (2003) provides the idea that composite indicators are synthetic indices of individual indicators and they are developed in a variety of economic performance and policy area. The method is concerned with composite indicators which could be compared and ranked countries in areas such as industrial competitiveness, sustainable development. Composite indicators are valued from integrated large amounts of information into easily understood format.

Figure 2 presents the composite indicator creation framework. This study first constructs a financial development index from three indicators; we obtain banking development, equity development and bond development indicators. This study then combines financial development index from 3 groups of indicators to obtain financial development index.

[Insert figure 2 in here]

The steps are present to be followed in constructing composite indicators

#### 1. Developing a theoretical framework for the composite.

All composite indicators have the same formula which is

$$I = \sum_{i=1}^n w_i X_i \quad (1)$$

Where I is composite index, X is normalized variable and w is weight of the X

For theoretical framework, the content is the same as we address to convince using the index. And the indices used are relevant to the objectives and question of the study.

## 2. Identifying and developing relevant variables.

Previously, we have heavily drawn in session 2.1.3 (Financial development) and appendix 1 provides a clear demonstration, as a matter fact; the entire picture is relevant and applicable.

## 3. Standardizing variables to allow comparisons.

The standardizing variable method in this study is the same criterion in the Financial Development Report (2012). This all series of data is under the distance from the best and the worst performers. We can call this method scaling factor Freudenberg (2003) which is distance from the best and worst performers.

The Financial Development Report (2012) converts the series to a 1 to 7 scale by using this formula

$$6 \times \frac{(\text{country score} - \text{sample minimum})}{(\text{Sample maximum} - \text{sample minimum})} + 1 \quad (2)$$

The sample minimum and sample maximum are, respectively, the lowest and highest country scores in the sample of countries covered by the Index.

For which a higher value indicates a worse outcome. The report relies on a normalization formula that, in addition to converting the series to a 1-to-7 scale, reverses it so that 1 and 7 still corresponds to the worst and best possible outcomes, respectively: by using this formula

$$-6 \times \frac{(\text{country score} - \text{sample minimum})}{(\text{Sample maximum} - \text{sample minimum})} + 7 \quad (3)$$

From this step we obtain the comparable series of data

## 4. Weighting variables and groups of variables.

Each index contributes an important benchmark of each banking and financial market development

Likewise The Financial Development Report (2012), we have taken a very conservative approach to the weighting of variables. We have generally weighted different components of the Index equally.

The product of these four steps will be presented in Appendix B

### 3.1.2 Principal Component Indicator

We construct a linear relationship from Principal Component 1 and use Equation (4) to find an index for comparison purpose because it is the best of reflecting characteristic of three indicators altogether. Then we plug in the value of banking bond and equity development indicator into the equation to obtain the financial development index. Appendix C presents the result of principal component analysis.

$$PC1 = FinDev\ index_{i,t} = 0.587Bank_{i,t} + 0.598Equity_{i,t} + 0.546Bond_{i,t} \quad (4)$$

Where  $Bank_{i,t}$ ,  $Equity_{i,t}$  and  $Bond_{i,t}$  are the composite indicator of banking, equity and bond development of country  $i$  at year  $t$ , respectively. The coefficients are loading factors.

### 3.1.3 Research Country Samples

Once achieving the financial development index, the next selection process is to find three representative countries in high and low level of financial development. The country defined outliers in this study are eliminated because financial development can vary over time. The objective is to identify which country is in high and in low financial development. See appendix D

The indicators are first sorted in each year, and then 5 countries in each level which are high, medium and low are selected. To seek for representative countries, time vary which leads to inconsistent level will not be included.



Time-varying outlier is the country that its ranking significantly changes, e.g. the worst case is it changes dramatically to the other level of financial development, it is excluded the sample.

To observe the country different level of financial development, this study desires the extremely high and low financial development to see the effect of financial development. Therefore, country-level samples are Netherlands Hong Kong United States from high group and Argentina Columbia and Mexico from low group as presented in Table 2

[Insert table 2 in here]

#### **3.1.4 Firm-Level Data**

All series are converted to real value in 1989 by removing inflation effect on number by using the consumer price index (CPI) inflation series. We use the same procedure of Korajczyk and Levy (2003) to handle with the data. They exclude financial firms because their capital structures are likely to be significant different from the capital structures of other firms and examine the determinants of financial choices when firms make significant changes to their capital structure. They include the sample which a firm must either the net value of equity (common and preferred) issued, repurchased, or paid out as a dividend or change in the book value of debt (straight and convertibles) of at least 5 % of the book value of assets in the previous quarter.

The methodology requires a firm to have reported data for leverage calculation for eight quarters before and eight quarters after changing its capital structure. The reason is to screen samples that are irrelevant to capital structure change and the data was filtered out firms with unstable financial or operating status whose financial decision are influenced by factors other than those analyzed in the paper because a firm classified as financially distressed and get into

restructuring process if in any two years (eight quarters) after issuing junk bonds (Asquith et al, 1994)

## 3.2 Methodologies

### 3.2.1 Define the Term Leverage

The term capital structure refers to the mix of different types of securities issued by a company to finance its assets. The financial securities can be common equity, preferred stock and debt securities both straight and convertible.

This study examines the financial choices through change in capital structure. From Korajczyk and Levy (2003) disregard both preferred stock and convertible debt because the limitation of available data of such preferred stock and convertible is rarely reported quarterly. So we simply disentangle neither net common equities from preferred stock nor convertible from straight debt issue and repurchase.

There is no consensus on which fashion of capital structure should be used in particular study. In this research, we will study on the term capital structure and its related terms into two different benchmarks adopted from Cook and Tang (2010) study which mainly uses book-valued leverage ratios and market-valued leverage ratios in their study.

The explanation on whether book-valued leverage ratios or market-valued leverage ratios should be used in capital structure studies owing to the different in implication used of these measurements. Cook and Tang (2010) state the different implication of using these two measurements. That is, book-valued leverage is independent of factor that is not under the direct control of firms. This book method is relevant to the study of Fama and French (2002). However, market leverage better reflects the agency problems between creditors and equity holders and can serve as an indispensable input into WACC computations. So for those reasons firms may use book value than market value or vice versa. This study pays attention to level of financial development. Financial development also relates to agency problem so this study employs market leverage because it captures the agency problem as well as book leverage.

From Cook and Tang (2010) suggestion, we use both book and market leverage measure in this study.

Specifically, a book leverage ratio is:

$$BD_{i,t} = \frac{SD_{i,t} + LD_{i,t}}{TA_{i,t}} \quad (5)$$

Where  $SD_{i,t} + LD_{i,t}$  is the sum of firm i's short-term and long-term book value of debt at time t. and  $TA_{i,t}$  is book value of total asset of firm, i at time, t.

For market leverage ratio, we use

$$MD_{i,t} = \frac{SD_{i,t} + LD_{i,t}}{SD_{i,t} + LD_{i,t} + S_{i,t}P_{i,t}} \quad (6)$$

Where  $SD_{i,t} + LD_{i,t}$  is the sum of firm i's short-term and long-term book value of debt at time t.  $S_{i,t}P_{i,t}$  denotes the product of the number of common shares outstanding and the stock price per share of firm, i at time, t which is market value of the firms.

### 3.2.2 Define Financially Constrained and Unconstrained Firms

It is important to classify firms under the criteria of firm's financial constraints because a firm exposes a different cost from information asymmetry. This research samples classified firms into two categories referred to financially constrained and unconstrained firms.

According to the study of Fazzari et al. (1988), a number of evidence supports the criteria of investment-cash flow sensitivity as a character to discriminate firm with level of financial constraints. Fazzari et al. (1988) classify samples according to payout ratio or level of dividend distribution. This literature assert that financially constrained firm will increase in level of investment resulting from increase in internal fund because constrained firm face costly financing due to asymmetric information and agency problem. So firms are facing financial constraint will associate with higher investment-cash flow sensitivity. An investment-cash flow criterion is wildly used in many studies. Some empirical studies revisit to confirm the relationship between

financing constraint and investment-cash flow sensitivities such as Korajczyk and Levy (2003). Their result show that the investments undertaken by firms pay low dividends is more sensitive to fluctuations in cash flow than firms with high dividend payout ratio. The finding of Korajczyk and Levy (2003) reconciles Fazzari et al (1988) that investment for constrained sample is sensitive to variations in cash flows, while investment for unconstrained sample is not sensitive to variations in cash flows.

However, Kaplan and Zingales (1997) provide a contradict evidence that higher investment-cash flow sensitivities cannot be interpreted as evidence that firm is more financially constrained. That is, investment-cash flow sensitivities may increase as financing constrains are relaxed. The study classified firm into five categories depending on their financial constraint by employing the company financial statements and notes, then use them for quantitative information to classified firm into each category. They address the likelihood of being classified as financially constrained are firm with higher debt to total capital, higher Tobin's q, and for whom dividend payment are forbidden. The likelihood is lower in firms with high cash flow, high dividend, and high retained earnings for dividends.

There is a debate on the exact nature of the relation between financial constraint and investment-cash flow sensitivity. Fazzari et al (2000) comment on Kaplan and Zingales (1997) and reassure the priori study Fazzari et al (1998) that the classification of Kaplan and Zingales (1997) is based upon statements contained in annual report and it is difficult to make such classification based on information contained in the report. The classification of Kaplan and Zingales (1997) is based on financially distresses instead of financially constraints.

The difference in the definition of financial constraints and financial distress is obvious, so we would like to confirm that this study classify the firm due to the different level of financial constraints. A firm is defined as financially constrained if it does not have sufficient cash to undertake investment opportunities and if it faces severe agency costs when accessing financial system. These intuitions are wildly used in financially constraints study such as Fazzari et al

(2000) and Korajczyk and Levy (2003). And there is nothing to concern with investment- cash flow sensitivity.

Obviously now, dividend payment is an important criterion to determine whether firms are financially constrained. And from Lamont et al. (2001), unconstrained firm are more likely to make a major security repurchase than the firms classified as less constrained. So we can conclude that the relation of stock repurchases and dividend payments on financial constraint are alike.

Another benchmark used to determine investment opportunity is Tobin's q developed by James Tobin. Tobin's q is the ratio between the market value and replacement value of the same physical. The formula is present as follow

$$Tobin's\ q = \frac{Equity\ market\ value + Liability\ book\ value}{Equity\ book\ value + Liability\ book\ value} \quad (7)$$

Intuitively, if the market value reflected the recorded assets of a company, Tobin's q would be 1.0. If Tobin's q is greater than 1.0, then the market value is greater than the value of the company's recorded assets.

This suggests that the market value reflects some unmeasured or unrecorded assets of the company. High Tobin's q value implies companies to invest more in capital because they are worth more than the price they paid for them.

Hence, financially constrained firm and financially unconstrained firm are classified by using two criteria. To ensure if firm suffer from financial constraint, we observe the existence of investment opportunity combined with whether firms will pay for dividend or stock repurchase. Since dividends and security repurchases compete with the cost of fund investment, firms that have investment opportunities and face relatively high costs of external finance should choose

to retain net income for investment. Therefore, a firm-event window is labeled as financially constrained if it does meet these two criteria

1. The firm does not have a net repurchase of debt or equity and does not pay dividend within the event window
2. the firm's Tobin's  $q$ , defined as the sum of the market value of equity and the book value of debt, divided by the book value of assets, at the end of the event quarter should be greater than one

In conclusion, the financially constrained firm is the firm that does not have a net repurchase of debt or equity and does not pay for dividend and firm's Tobin's  $q$  is greater than one. And financially unconstrained firm is the firm that does not meet these two criteria.

### 3.2.3 Define Macroeconomics Condition

Since we intend to examine the impact of macroeconomic condition on capital structure across good and bad stage based on the macroeconomic factor, we will point out that which quarter that economy is in recession or expansion. Macroeconomic conditions in models are dummy variables. Normally the business will step along the business cycle as macro environment. So each country will pass through time during recession and expansion. The method determining the economy being in recession or expansion is smooth rate of change.

The method use in this study is the 6-month rate of change or year on year growth rate by using Composite Leading Indicators (CLIs) designed to provide early signals of turning points in business cycles.

The formula is the same way that wildly used in OECD and many institutions.

The formula for quarterly data:

$$R(t) = \left[ \left( \frac{C(t) \times 4}{\sum_{i=1}^4 C(t-i)} \right) - 1 \right]^{\frac{4}{2.5}} \times 100 \quad (8)$$

Where  $R(t)$  is the smoothed growth rate and  $C(t)$  is the CLI at quarter  $t$

From this procedure, the period of recession and expansion will be justified and can use to be a proxy of macroeconomic condition Appendix E. if the growth rate is negative for two successive quarters, the quarters enters into the recession period.

### 3.2.4 Control Variables

This section present potential determinant of capital structure and their assumptions in the Table 3, and also briefly present factors that different capital structure theories suggest may affect a company's capital structure decision. From the study of Titman and Wessels (1988) state that asset structure (Tangibility), non-debt tax shield, profitability, size, growth, uniqueness, income variability and industry classification are factors that may affect leverage according to different theories of capital structure. So, in this study, a list of control variables which are the potential determinants of capital structure mentioned in the Table 3

[Insert table 3 in here]

Here is discussion of each determinants used in this study

**1. Tangibility (asset structure)** is a concrete asset firms have. Banking sector always require asset that can be used as collateral in order to reduce some risk associated with lender. And Rajan and Zingales (1995) state that the larger the fraction of tangible assets, the more willing should lenders to be supply loans. From those reasons we can expect the positive

relation of tangibility and leverage on the other word, firm with relatively high asset tangibility should have higher leverage.

**2. Non-debt tax shield.** According to Modigliani and Miller (1958) state the effect of tax reduction is an incentive of firm to use debt financing. For example, an interest tax shield which is an example of tax shield or tax benefit can be a tax deductible for tax payer. On the other hand, non-debt corporate tax shield will decrease the tax advantage. Therefore, we expect that an increase in non-debt tax shield will affect leverage negatively.

**3. Profitability.** Based on Myers and Majluf (1984) study, they proposed the pecking order theory. This theory based on the existing of information asymmetry between manager (insiders) and investors (outsider), basically, investors are less informed parties. Existing of asymmetric information leads to higher cost of equity financing. Myers and Majluf (1984) suggest that firms have a financing decision beneath the pecking order hypothesis. This theory asserts that internal financing is the priority of firm financing decision rather than external financing. Once external financing required, firm will issue debt at the first place, then hybrid securities such as convertible bonds and then equity, respectively. Thus, profitability is negatively correlated with leverage because of the proposition of pecking order theory. That is, firms in general prefer internal fund than external fund and high profitability firm with higher profitability can finance their project by using debt before equity financing.

**4. Size.** The relationship between size and leverage is inconclusive. Basically, from Fama (1990), Small firm tends to face financial constraint because they have limited access to external capital markets due to information problem, and they also face higher transaction costs of public security issues due to less available information. Less available information leads to greater asymmetric information generating higher agency cost. In addition, stock exchange data indicate that transaction cost is especially high for small issue. Hence there are two arguments that can explain the relationship of these two variables in the different ways. Firstly, larger firms may issue debt at lower cost than smaller firms due to lower risk and lower bankruptcy cost. On the contrary, large firms tend to have less asymmetric information since these firms tend to provide



more information to outside investors Fama and Jensen (1983). This reason encourages firm to increase equity relative to debt. All reason contributes to an ambiguous direction of firm size toward firms' leverage.

**5. Growth.** The relationship between growth and leverage is inconclusive. According to Titman and Wessels (1988), we can expect both positive and negative relationships. That is, the cost associated with the agency problem is higher for growth firms and can be reduced by using short term rather than long term debt; we may expect that short term debt is positively related to growth and negatively related to growth for long term debt. Also we may expect a positive relationship between growth and leverage because higher growth opportunity leads to higher fund needed. Implying from pecking order theory that external funding through debt financing is the prior method firm adopted but high growth opportunity leads to the higher difficulty to lend money at the same time. So it is hard to sum up the association between growth and leverage.

**6. Uniqueness.** According to Titman and Wessels (1988), we can summarize that stakeholder of unique firm or asset is suffering relatively high costs in the event that they liquidate. This reason provides lower expected value recoverable in the event of bankruptcy. So, the relationship between uniqueness and leverage should be negative.

**7. Income variability** is a measure of business risk. Titman and Wessels (1988) suggest using income variability as a proxy for volatility rather than other measurements such as beta due to the lowest error than others. And in that study mention that firms' debt level is a decreasing function of the volatility of earning.

### 3.2.5 Model for Hypothesis Testing

*Process 1 General model*

$$Lev_{i,t} = c + \beta_i X_{i,t-1} + \delta_1 Recession_{i,t-1} + \varepsilon_{i,t} \quad (9)$$

Where  $X$  is Potential determinants of capital structure, *Recession* is dummy variable of macroeconomics condition, 1 stands for recession and 0 stands for expansion, and  $\varepsilon$  is disturbance term.

We expect that  $\delta_1$  is significant but the sign is inconclusive. The positive sign show leverage is counter-cyclical to macroeconomic condition which is supported by market timing hypothesis; on the other hand, the negative sign show leverage is pro-cyclical to macroeconomic condition which is supported by pecking order and trade-off theory. The sign of control variables should be consistent with the prior study.

There are studies argue that firm with different financial constraints should raise fund in a different manner, and can explain the inconclusive prediction of the capital structure choice toward macroeconomic condition.

*Process 2 The different effect of macroeconomic condition between unconstrained and constrained firms*

Model for unconstrained firm

$$Lev_{i,t} = c + \beta_i X_{i,t-1} + \delta_2 Recession_{i,t-1} + \varepsilon_{i,t} \quad (10a)$$

Model for constrained firm

$$Lev_{i,t} = c + \beta_i X_{i,t-1} + \delta_3 Recession_{i,t-1} + \varepsilon_{i,t} \quad (10b)$$

Where  $X$  is Potential determinants of capital structure, *Recession* is a dummy variable of macroeconomics condition, 1 stands for recession and 0 stands for expansion, and  $\varepsilon$  is disturbance term.

We expect that  $\delta_2$  is positively related with leverage. This can be interpreted that financially unconstrained firm leverage is counter-cyclical with macroeconomic condition. Firms will raise debt when economy is in recession and raise equity when economy is in expansion.

$\delta_3$  is negatively related. This can be interpreted that financially constrained firm leverage is pro-cyclical with macroeconomic condition. Firms will raise debt when economy is in expansion and raise equity when economy is in recession.

*Process 3 The importance and role of financial development on firm's capital structure*

In this argument, we will use two ways to test in order to see the result. The first methodology is straightforward. We will subcategory the firm depending on their country financial market development and compare the coefficients which are the sensitivity of leverage toward macroeconomics conditions. The regression model for every sample will be

$$Lev_{i,t} = c + \beta_i X_{i,t-1} + \delta Recession_{i,t-1} + \varepsilon_{i,t} \quad (11)$$

Where  $X$  Potential determinants of capital structure, Recession are a dummy variable of macroeconomics condition, 1 stands for recession and 0 stands for expansion, and  $\varepsilon$  is disturbance term.

[Insert table 4 in here]

We expect that  $\delta^{high}$  (coefficient of RECESSION estimated by firms in high financial development) is less than  $\delta^{low}$  for financially constrained firms. That is, level of financial development associates with the less sensitivity of firm capital structure. This can be interpreted that the effect of macroeconomic condition to leverage variability will be lessening due to good

functioning of financial markets. For unconstrained firm is hard to predict. Financially unconstrained firm may be indifferent in the financial development, for they can time in the way that they are preferable anyway. It is possible that their macroeconomic sensitivity either higher or lower. The case of higher sensitivity can be explained by opportunistic behavior and lower sensitivity tend to support the firm have target leverage. However, this study does not consider this argument.

We also expect that the magnitude of the coefficients,  $\delta_{constrained}$ , between high and low financial development are higher than  $\delta_{unconstrained}$ . That is, the effect of financial development on constrained firm is higher than unconstrained firm by observing that the result for constrained firm will be more significant. This means that constrained firm is more sensitive to the level of financial development and gain to financial development benefit than unconstrained firm.

To test these hypotheses, this study uses Chow test and statistical test for the equality of regression coefficient.

#### A. Chow test: Testing for structural or parameter similarity of regression model

Chow test is widely used to test a structural break in time series or test the similarity of two regression model with identical variable but estimate from different sample group. To perform Chow test three models were estimated.

Model estimated from entire samples is called restricted model. We will obtain restricted residual sum of squares (RSSr) or sum squared residual (SSRr). Restricted model estimation is the model estimated from all firm, unconstrained firm and constrained firm. Data for Chow computation is taken from table 9

Model estimated from sub-sample is called unrestricted model. The two identical regression models are estimated with different sample groups. We will obtain two unrestricted

residual sum of squares (RSSur) or sum squared residual (SSRur) akin to the restricted model by combine two residual sum of square. Chow test is presented in Appendix G (Table 19)

The mechanics of Chow test are as follow:

1. Use the estimation result from panel A for all samples, panel B for unconstrained sample and panel C for constrained sample. All panels are presented in Table 4. We acquire restricted residual sum of squares (RSSr)
2. Use the estimation result from Table 9. We acquire unrestricted residual sum of squares, namely RSS1 is residual sum of squares in high development sample and RSS2 is residual sum of squares in low development sample.
3. Compute unrestricted residual sum of squares (RSSur).

$$RSSur = RSS1 + RSS2 \quad \text{with } df = (n_1 + n_2 - 2k)$$

Where  $n_1$  is the number of observation in high financial development sample,  $n_2$  is the number of observation in low financial development and  $k$  is the number of parameters estimated.

4. The idea behind the Chow test is that if in fact there is no difference in two regressions (regression model from high and low financial development), then the RSSr and RSSur should not be statistically different. We employ F test from the following ratio

$$F = \frac{(RSSr - RSSur)}{k} \bigg/ \frac{RSSur}{(n_1 + n_2 - 2k)}$$

; with  $df = k, (n_1 + n_2 - 2k)$

5. However there are some assumptions of chow test. That is, the error variances in two sub-samples are the same. Since we cannot observe the true error variances, we can obtain their estimates from RSS given from the regression

$$F = \frac{s_1^2}{s_2^2} = \frac{RSS1/n_1-2}{RSS2/n_2-2}$$

; With df. = (n<sub>1</sub>-2),(n<sub>2</sub>-2)

### B. Statistical test for the equality of regression coefficients

This next statistical test is straightforward, and provides statistics matter to ensure the difference of parameter is significantly different. The third question is hypothesized that the effect of macroeconomic condition to leverage variability will be lessening due to good functioning of financial markets especially for financially constrained firm. From Table 9, we conclude that the relationship direction between leverage and macroeconomic condition is alike between firms in high and low financial development. That is, unconstrained firm leverage is counter-cyclical and constrained firm is pro-cyclical<sup>7</sup>. And that result indicates the less sensitivity of leverage toward macroeconomic condition of firm in high financial development, not only constrained firm but also all samples and unconstrained firms. All calculation is presented in Appendix H.

This session shows testing on the difference of macroeconomic coefficients whether they are significant or not. In the same meaning, this is the test that if the less in sensitivity is statistically significant. The formula will be as follow

$$t - statistics = \frac{\delta_h + \delta_l}{\sqrt{\frac{V_h(SE_{\delta_h}^2) + V_l(SE_{\delta_l}^2)}{V_h + V_l}}}$$

<sup>7</sup> Macroeconomic condition variables are significant only constrained firms in high financial development and leverage measured by book value.

Where  $\delta_h$  is coefficient of recession in high financial development samples,  $\delta_l$  is coefficient of recession in high financial development samples.

The denominator is the estimated standard error of the difference, where  $V_h$  and  $V_l$  are the degree of freedom and  $SE_{\delta_h}^2$  and  $SE_{\delta_l}^2$  are the coefficient variances associated with the first and second groups respectively.



## CHAPTER IV

### DATA ANALYSIS AND FINDING

This study attempts to answer the questions that if firm leverage is sensitive to macroeconomic condition, macroeconomic condition will affect financially unconstrained and constrained firm in a different way and financial development will be a contributing determinant of firm's capital structure.

In the first place, the countries with high and low financial development (three countries each) will be the research samples. Bank, bond and equity market will be contributed to develop the composite index of financial development. After sorting the index, we get three countries from high financial developments which are the United States, Netherlands and Hong Kong, also; three countries from low financial developments which are Argentina, Columbia, and Mexico.

Entire countries afford the firm-level data for this capital structure study. The six representatives carry out, just as planned criteria, 6,079 window-events from book leverage and 4,685 window-events from market leverage.

All firm events are then classified according to financial condition. In total, we classify 5,857 unconstrained window-events and 222 constrained window-events from book leverage, likewise; 4,521 unconstrained window-events and 164 constrained window-events from market leverage. All samples and sub-samples will be used to test hypothesis to answer question 1 and 2 by panel estimation equation (9) to (10).

Therefore, the main objective is an attempt to understand the determination of capital structure considered with macroeconomic condition and level of financial development, all firms', unconstrained firm's and constrained firm's window-events will be divided according to that firm is in which country or else firm's window-event is in high or low financial development. Then event samples from each group will be estimated using equation (11). In order to examine the different macroeconomic condition to be affecting leverage sensitivity to macroeconomic



condition in the different financial development level, we use Chow-test and t-statistics for testing equality of regression parameters in two groups. Specifically, we test the different effect of macroeconomic condition on leverage between high and low financial development event groups.

Formerly we will have tested toward main effect. We then add one interaction variable, an interaction term between macroeconomic condition and financial development because hypothesis 3 intuitively indicates the interaction effect exists, which that the effect of one independent variable (macroeconomic condition) may depend on the level of the other independent variable (financial development), as a result the predictors have been additive (to be influenced) due to interaction effect. Thus, equation (12) will be introduced and all firms, unconstrained firms and constrained firms events-windows will be estimated on that equation to answer question 3.

#### 4.1 summarizing data set

Table 5 shows the constrained sample has a lower leverage regardless of leverage measurement method. This evidence implies those constrained firms tend to use equity financing more than debt financing. Since unconstrained firm in general is big firm and exposure to lower agency cost, unconstrained firm will issue debt at lower cost than constrained firm. This evidence can be explained by pecking order theory that firm prefers debt financing to hybrid and equity, and Trade-off theory that marginal benefit of debt financing is higher comparing with marginal cost for unconstrained sample. Korajczyk and Levy (2002) state that the reason of higher leverage in unconstrained sample is due to higher tangibility asset that can be used as collateral in unconstrained sample, however in this study the difference of tangibility is insignificant. Market leverage can be explained by using the effect from price. Constrained sample have higher growth and tobin'q on average, so they induce higher in stock price that in turn lower in leverage.

Table 5 also shows the statistics from high and low financial development. The averages of market leverage show that high financial developments have lower market leverage than low

financial development. The reason can be either low financial development will have, on average, lower price or low financial development usually financing debt along with the institutional structure that is not included in this study (debt financing dominates equity financing in low financial development because debt financing incurs less agency cost) is possible. This result holds in every descriptive statistics comparing high and low financial development for market leverage.

[Insert table 5 in here]

## 4.2 Examining Data Sets of Macroeconomic Condition and Leverage

### 4.2.1 Mean and standard deviation of leverage in each groups

The result from Table 6 shows constrained samples have lower leverages regardless of leverage measurement method in the same fashion as explain in the section 4.1. In addition this table expresses that those fashion still hold under different macroeconomic condition and financial development level. That is, constrained firms have lower leverage than unconstrained firms.

All firm and unconstrained firm have higher leverage during recession than expansion especially strong evidence in book leverage. This result means that during recession unconstrained firms increase in debt on average. While constrained firms have higher leverage during expansion

It is interesting that firm in low financial development for all firms have higher leverage during expansion. This evidence implies that firms in low financial development tend to use debt financing because low financial development environment will have higher cost of financing comparing to high financial development environment. Firm will prefer debt financing in low financial development environment because debt is claimed as less information cost than equity

financing. So, firm can avoid some cost by using debt financing in low financial development environment.

All of these evidences support that macroeconomic condition and level of financial development contribute to shape firm capital structure and firms in low financial development tend to have high leverage relatively which is support the nature of low financial development that firms prefers debt than equity due to existing uncontrollable information asymmetry. The direction is hard to predict from univariate because there are some important firm specific natures that affect firm's capital structure individually.

[Insert table 6 in here]

#### 4.2.2 Correlation of Leverage and Macroeconomic Condition

Table 7 presents the correlation coefficients between leverage measured with lagged recession variable used in estimation. The table also provides correlation significance (p-value).

The result indicates the positive correlation between leverage and recession for all firms and unconstrained firm window. Correlation of unconstrained sample is consistent with the hypothesis and the study of Korajczyk and Levy (2003) that unconstrained firm debt ratio is counter cyclical with macroeconomic condition. Unconstrained firms will increase debt when recession.

However, we do not find significant correlation between leverage and recession for constrained firms. The reason will be examined again after using regression technique because it is too early to state no correlation between leverage and macroeconomic condition because correlation statistics does not fix other independent variables constant and other variables in the model may have a correlation with leverage and also macroeconomic condition. Correlation statistics in this case is a misspecification problem in the format of regression estimation because correlation neglects other important variables that should be included in the model.

[Insert table 7 in here]

### 4.3 Estimation Result

This study develops panel regression to examine the relation of dependent and independent variables. All panels use firm fixed effect model estimation that has been tested for redundant fixed effect because each firm has a preference or unobservable on capital structure behavior and policy across firms differently.

The Hausman specification test is employed to test the fixed effects model or random effects model will be used. The test is statistically significant all regression; thus, the random effects model is rejected in favor of the fixed effects model at 10% or better critical level and fixed-effect model has higher adjusted R-squared. Hence, the fixed effects model has a statistical advantage over the random effects and pooled models.

According to correlation of attributes, most cross-correlation terms for the independent variables are fairly small, thus giving little cause for concern about the multicollinearity among the independent variables.

Test statistics and p-values are robust to heteroscedasticity, the models are estimated by White cross-section standard error and covariance method.

#### 4.3.1 Capital Structure Regression Estimation for all Firm Windows, Unconstrained Firm Windows and Constrained Firm Windows.

This section presents the estimated result being able to answer the first two questions that (1) whether firm leverage is sensitive to macroeconomic condition, conglomerating six countries together. In addition, even if firm may in the same country, firms react to macroeconomic condition differently because they have a different ability to access the fund needed as hypothesized (e.g. difference in cost of financing, ability to access fund). That is, (2)

whether financially constrained firms do not choose their capital structures in the same manner as unconstrained firms or not.

Table 8 presents the result from estimation equation (10.a)-(10.b). The difference among three regressions is the difference in sample groups to be used for estimation: all sample, unconstrained sample, constrained sample. Book and market leverage measures of leverage are used.

### **Control variables**

Firstly, we will discuss about control variables. Firm-specific variables are consistent with the prediction from some elements of both trade off and pecking order likewise the previous studies (Titman and Wessels, 1988, Korajczyk and Levy, 2003). Discussion of control variables cover the result from table 8 (section 4.3.1) and table 9 (section 4.3.2)

The coefficients of tangibility are significant and positive in general and unconstrained firms because fixed asset can be used as collateral and liquidated when gone bankruptcy (Rajan and Zingales, 1995), so creditors always feel more comfortable to firm with higher fixed asset. Insignificant constrained samples are interesting because it shows another unintended incidence of high fixed asset in constrained firms which is responsible to this noise. That is, high fixed asset can lead to either high ability to create debt or especially for constrained firm, even higher firm risk. Firm risk is high for constrained firms and constrained firm with high fixed asset come with high fixed cost and depreciation expense that induce higher risk and complication on asset management. This evidence is strong for firms in low financial development (Table 9) except constrained firms.

Non-debt tax shield sign is compatible with the correlation but it is not consistent with the assumption. The reason is the same of Titman and Wessels (1988). They question on the measurement that if it does capture the true aspects suggested by the theory. Non-debt tax shield should be net true economic value of depreciation and expense that it is very hard to measure that value. We do agree with that Titman and Wessels (1988) conclusion, this proxy is

depreciation that provides positive relation with debt ratio because firm will use debt financing for long-lasting asset, while constrained firm does not provide significantly because it is possible that debt financing is not for investing on fixed assets.

Profitability is the character that separate firms apart. Unconstrained firms are positive coefficient but constrained firms are negative coefficient. We hypothesize an ambiguous relation between leverage and profitability, so this result implies that financial constraint is responsible to the different relation. The result tell that unconstrained firm is compatible with Trade off, higher profitability, other things equal, implies higher tax saving from debt, lower probability of bankruptcy, and potentially higher overinvestment. All of which contribute to higher debt ratio (Hovakimian et al, 2004). This scenario will not be observed in constrained sample and firms in low financial development because these firms will use internal financing that can be taken from retained earnings before external financing with high cost of financing. It is consistent with Pecking order.

Size is significant and negative, only constrained samples measured by book leverage is insignificant. This finding is consistent that large firm tend to have less asymmetric information (Fama and Jensen, 1983). This reason supports firm to increase equity relative to debt.

The result shows growth is highly negative significance with market leverage. As we discuss earlier, growth can be viewed as growth opportunity, so growth company tends to have very profitable reinvestment opportunities reflecting on higher equity price. Firms that use market leverage will opportunistically issue equity. For Constrained firm, growth is also significant and negative even firms that use book leverage; in addition growth is one of two variables that are significant for constrained firm measured by book leverage. That means growth is important to constrained firm in term of financing. This is because imagine that constrained firm is a firm with financial problem during that moment. It is too risky for creditor to loan capital with higher risk from nature of growth together with nature of constrained firms, so we do not see the positive sign. The negative sign of growth in constrained firm is really close to the scenario of private

equity<sup>8</sup> that is equity security of operating firm that are not publicly traded. Investors observed growth opportunity and willing to invest in a company with growth opportunity but distressed, however investors come with goal strategy and management as a tradeoff for a firm. Moreover, growth is particular positive in unconstrained sample measured leverage by book value in low financial development. This positive can be explained that low financial development makes a mispricing on equity even if price increases but inappropriate level desired, unconstrained firms so prefer debt financing to avoid mispricing on firm value.

We first expect negative coefficient of income variability and the result shows as expected. Income variability measures a firm's risk or bankruptcy probability, so higher probability of bankruptcy, lower debt could be created. It is useful to emphasize and pay attention to the anomaly of insignificant in constrained sample measured by book leverage. Table 9 give clear understanding of insignificance of constrained firm, financial development is responsible in this situation. Income variability turns to positive relation in low financial development. Although firms expose high bankruptcy cost when income variability is high that make firm decide to equity financing, low financial development increase risk that in turn hard to take equity financing. Constrained firms go to debt financing with distinctive character such as high profit to compensate those risk. This result in insignificant income variability when not to have discriminated level of financial development

This next result regarding macroeconomic condition variables are main answer of questions.

#### **Macroeconomic condition**

This section investigates the effect of macroeconomic condition and financial constraints in determining capital structure.

The result indicates the positive coefficients between Leverage and Recession for all firms and unconstrained firm windows regardless of leverage measurement. This result is

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<sup>8</sup> Private equity is a general term of this alternative investment. I do believe in this situation should be venture capital or growth capital.

consistent with the hypothesis and the study of Korajczyk and Levy (2003) that unconstrained firm debt ratio is counter cyclical with macroeconomic condition.

This evidence is inconsistent either trade off or pecking order theory while market timing hypothesis (Baker and Wurler, 2002) can explain this phenomenon. Baker and Wurgler state that the choice of firms' debt-equity mix reflects their market timing. Firms issue equity when economy is in expansion because their share prices are high during that time and they will then turn to use internal or debt financing when their share prices are low, during recession. So, firm's capital structure changes along with the pattern that firms issue equity opportunistically in a favorable period.

It is interesting that this counter-cyclical can be explained by agency theory. Referring to agency theoretic explanation of capital structure, shareholders require financing by creating debt during recession because debt issuing, in addition, will control manager from his discretions and pay much attention on investing only in valuable and reasonable projects.

Constrained firm windows are also consistent with the priori study. The result shows negative coefficient when measured by book leverage but coefficient of recession is not statistically significant when measured by market leverage. So, constrained firm leverage is pro-cyclical with macroeconomic condition.

From the reason behind unconstrained firms, counter cyclical reflects opportunistic behavior. On the contrary, pro-cyclical in this case means firms will not opportunistic issue equity along the market timing point of view. It is understandable that equity financing is not a cheapest choice of financing in that moment even though it should be. It is because pro-cyclical happen with constrained firms, and constrained firms are the firm with high agency cost that in turn higher in required rate of return. For that reason, they will issue debt instead of equity during expansion because they avoid high agency cost that is normally reduce by debt financing and firm's ability to increase debt is higher during expansion when collateral value is higher.



The result shows macroeconomic condition change will affect constrained firm leverage more than does unconstrained firms.

Macroeconomic condition change influences constrained firm choice of financing more than firms with a variety of choice as the unconstrained. Opportunity choice is more limit for higher financial constraints, so constrained firms will be forced to choose one way or another choice. For example, the extreme case that constrained firms must finance a project, assuming that they choose either debt or equity. Unluckily the country economy is in recession, banks do not lent money easily as usually. They have to commit equity financing. On the other hand, choices are more open for firms with less constraint.

[Insert table 8 in here]

#### **4.3.2 Capital Structure and Macroeconomic Condition in Different Financial Development**

Main and final objective of this research is to understand the determination of capital structure considered with macroeconomic condition and financial development. To answer the final question that whether financial development will facilitate and perform their function relating to macroeconomic condition, this section estimate regression model from each sample group separately in order to see how changes in macroeconomic condition and leverage among a different sample groups. The previous sample groups namely all firm, unconstrained firm and constrained firm-event windows will be sub-categorized according to each country's financial development which is high and low financial development.

To observe the different association between leverage and other variables including macroeconomic condition in different level of financial development, firms being confronted by. Equation (3) is used in a different sample groups.

The sample groups are now all firm, unconstrained firm and constrained firm- event windows in both high and low financial development.

The result from Table 9 indicates that the relationship between firm's leverage and recession is similar between high and low financial development, particularly in all samples and financially unconstrained firms (counter-cyclical) but the coefficients of financially constrained firm in low financial development countries are negative but not statistically significant. The insignificant results mean firms in low financial development environment will not systematically determine their capital structure due to the change in macroeconomic condition.

Section 4.3.1 and 4.3.2 show insignificant coefficient of recession, and all of noisy experiment is from constrained firm. Korajczyk and Levy (2003) suspect this evidence from the converse direction that lead to different judgment on capital structure. During expansion, constrained firm create debt along with higher value of collateral, however firms tend to be less constrained as collateral increase and they will prefer equity during expansion. We do agree with Korajczyk and Levy (2003). This study also tests macroeconomic condition impact on leverage in different financial development. The result shows that none of constrained samples in low financial development was influenced by macroeconomic condition. This result questions on factor that determine leverage of financially constrained firm and particularly in low financial development. It is possible that some character of low financial development country is responsible such as debt domination over equity financing or debt market usually more develop in advance than equity in less-developed country. The evidence from Table 6 that firm in low financial development tend to have higher leverage supports this argument.

Another interesting issue is unconstrained firm in high financial development is moderate significant with recession while unconstrained firm in low development is very strong significant. This result show that macroeconomic condition more influences unconstrained firm capital structure determination in low financial development than high financial development. The reason is similar with the previous section (4.2.1).

Section 4.2.1 indicates that macroeconomic condition affects constrained firms more than unconstrained firms, in addition now, we know that, between unconstrained firms,

unconstrained firms in high financial development country are less impacted from macroeconomic condition surge. In other words, macroeconomic condition influenced leverage of firm in low financial development more than do in high financial development. With these two effects, we can induce an understanding that the most suffering firms in term of financing activities are constrained firms in low financial development country.

Moreover, we conduct further test to ensure the result to firmly answer the last question. Result from Table 8 and 9 will be utilized for coefficients equality test and Chow test respectively.

The result of equality testing of parameter is presented in blankets on Table 9. There are very strong evidences against the equality of corresponding two coefficients of macroeconomic condition. Each pairs show the reduction of leverage sensitivity toward macroeconomic condition and the reduction is significant. These results increase our understanding that higher financial development level will reduce the effect of macroeconomic condition by observing the reduction of leverage sensitivity toward macroeconomic condition.

Unfortunately, the shaded value is the statistics that calculate from insignificant coefficient. Thought they have the same pattern (the reduction in macroeconomic coefficients and also the difference are not significant), it does not make any sense and is unreasonable to test, so we will not interpret these shaded values in table 9

The result of Chow test is presented in the last row on Table 4.9. The result show F-statistics of chow test are highly significant indicating that the firms in high financial development determine their capital structure different from firms in low financial development either unconstrained firm or constrained firm, also regardless of leverage measures. From Chow test, it can be conclude that all independent variables affect dependent variable differently, but it cannot conclude for individual effect from independent variable; however chow test provides the important evidence that firms in different financial structure have a different behavior.

[Insert table 9 in here]

The interaction effect between macroeconomic condition and financial development does intuitively exist. The assumption that the effect of macroeconomic condition may depend on the level financial development; as a result the predictors have been affected due to interaction effect. Appendix I presents the result that support the previous result that, All interaction terms from different sample groups and leverage measures are significant. The result indicates the same negative sign of interaction terms in any regression. The negative sign means high financial development will reduce the effect from macroeconomic condition or firm's leverage in high financial development will be less sensitive to macroeconomic condition. The result also shows that the coefficient of interaction term in constrained sample is bigger than unconstrained samples.

#### **4.3.3 Understanding roles of financial development and the reduction of leverage sensitivity**

Financial industry is a service industry. Its main functions are facilitation and monitoring. Its roles contributes to reduce real (transaction) cost and information cost for all firms in the county. Well-functioning financial structure provides low transaction cost and reduce agency cost.

A firm itself encounters a difference in ability to access fund. Those obstacles are high transaction cost and high information cost. As this study categorizes a firm by financial constraints, there are financially unconstrained firms and constrained firms.

A firm in well-functioning financial structure will utilize this advantage in favor, while a firm in bad-functioning financial structure will encounter the problem from this bad financial structure condition.

The fact that unconstrained and constrained firms will respond to macroeconomic condition in a different manner is due to firm's financial constraints. Basically, it is understandable that unconstrained firms are freer on choice of financing.

The reduction of leverage sensitivity toward macroeconomic in high financial development condition is easy to understand for constrained firms. Well-functioning financial structure encourages firms to more opportunity choice with lower transaction cost or less information failure. Even though nothing of a firm is change, it is less constraint from the essence of well-functioning financial structure by the way. We know that when expansion, constrained firms will prefer debt financing to opportunistic equity because of lower cost of financing, well-functioning financial structure lessens this barrier and firms can higher issue equity relatively. Therefore, existing of financial development will reduce these constraint and leads to less sensitivity of leverage to macroeconomic condition.

Unconstrained firms are more difficult because they are not subject to financial constraints. The fact from the result shows the reduction of sensitivity. We can summarize that macroeconomic condition change will affect unconstrained firm in high financial development less than in low financial development. This result also shows that firm in high financial development will utilize the benefit from well-functioning other than only take advantage from favorable choice to macroeconomic condition opportunistically relative to other firm in low financial development.

## CHAPTER V

### SUMMARY

Capital structure study is an important issue for a large number of applications on firm's financing decision. The importance of capital structure decision is that not only it can influence the return for its shareholders and firm's risk but also whether or not a firm will survive in a recession or a surge in economy, nevertheless, capital structure of firms in high financial development and low financial development will be dissimilar. Thus, the objective of this paper is to understand the determination of capital structure considered with macroeconomic condition and financial development toward capital structure choice.

To begin with hypothesis 1 that "firm leverage is sensitive to macroeconomic condition", we find that the relationship between firm's leverage and macroeconomic condition is counter-cyclical for all samples.

Hypothesis 2, then, "financially constrained firms do not choose their capital structure in the same manner as unconstrained firms". The finding shows that the relationship between firm's leverage and macroeconomic condition is counter-cyclical for unconstrained firms regardless of leverage measurement. That is, when economy is in expansion, unconstrained firms would reduce their leverage implying that debt decrease and firms may be favorable to raise their equity. Reducing debt leads to higher return on equity from capital and capacity to raise fund through debt during depression. On the other hand, financially constrained firm leverage is pro-cyclical with macroeconomic condition. That is, when economy is in expansion, firms would increase their leverage implying that firm raises their fund through debt financing because the market value of asset is higher leading to higher collateral and more ability to create debt. And debt financing should be relatively low cost than equity financing.

Lastly, hypothesis 3 is "financial development will facilitate and perform their function relating to macroeconomic condition, so firm should react to macroeconomic condition

differently. And financially constrained firm should be benefit more from financial development”.

The result, first, also indicates that those relationships between leverage and macroeconomic condition is applicable both high and low financial development environment of unconstrained firms and high financial development of constrained firms but we could not find the evidence of the relationship between leverage and macroeconomic condition for constrained firms in low financial development countries.

Next and most importantly, leverage in high financial development country will be less sensitive to macroeconomic condition and constrained firm benefits more than unconstrained firm. The finding can also be summarized that the levels of financial development will be related to leverage under the difference in macroeconomic condition as being interaction effect. Macroeconomic condition could be seen as the channel of the effect of financial development toward firm capital structure. The reason behind this phenomenon is the contributing roles of financial development to enhance firm ability to access fund when they want, and reduce the barrier or surge from economic condition. The major roles of financial structure toward financing decision of firm are it will facilitate firm financing activity both financially unconstrained and constrained firm. To point out shortly, well-functioning financial structure provides low transaction cost (major problem in financial market) and reduce agency cost (cost occurring from asymmetric information). In addition higher magnitude in constrained is because constrained firms are suffered from higher firm's agency problem that can be lessen if firms are in high financial development and gain more benefits from financial development

Finally, the model that is estimated from high and low financial development is not the same in both unconstrained and constrained firms. This finding is explicit the importance of financial development that can affect firm capital structure. The result can be included beyond the reduction in sensitivity of macroeconomic variation that capital structure and firm-specific variables relationship will change under different level of financial development.

In conclusion, conventional capital structure model has been improved by knowing the effect and contribution of financial development toward capital structure. General applicability is

wildly encourage onward capital structure decision or financing decision to both enhancement and stability purpose in order to remain the business strong in the long run. To attain knowledge from this study, capital structure is not the decision on only firm-specific or debt creation being preferable in variety of circumstances but also and existing of risk exposure and how to balance risk along with the agency cost. Moreover, how to be compatible according to the macroeconomic condition or business environment that change over time and lastly, what source of fund is the most appropriate in particular firm's context (firm condition and time). All decision is also unavoidably influenced by the financial development. Further study should examine the role of financial development on speed of adjustment of capital structure because their facilitation function enhances firms to adjust their capital in the favorable ways faster.



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**Table 1: Banking and financial market development determination**

Here are proxies of each sector. Detail of each proxy is written in Appendix A

Determinant	Measure
1. Banking Sector	<ul style="list-style-type: none"> <li>- deposit money bank assets to GDP</li> <li>- bank overhead costs</li> <li>- bank's net interest margin</li> <li>- private credit issued by domestic money bank</li> </ul>
2. Equity Market	<ul style="list-style-type: none"> <li>- stock market capitalization to GDP</li> <li>- stock market total value traded to GDP</li> <li>- turnover ratio of stock market</li> </ul>
3. Bond Market	<ul style="list-style-type: none"> <li>- bond market capitalization to GDP</li> </ul>

**Table 2: Country-level samples**

Level of financial development	Country
high	United states
	Netherlands
	Hong Kong
low	Argentina
	Columbia
	Mexico

Table 3: Potential determinants of capital structure (firm-specific variables)

Determinant	Proxy	Assumption
1. tangibility	Fixed asset/Total assets	positive
2. non-debt tax shield	Depreciation/total assets	negative
3. profitability	EBIT/Total asset	ambiguous <sup>9</sup>
4. size	Log(sales)	ambiguous
5. growth	Percentage change in total asset	ambiguous
6. uniqueness	R&D/sales	negative
7. income variability	Standard deviation of EBIT/Total asset	negative

Table 4: Sensitivity of leverage to macroeconomic condition

The variables,  $\delta$ , are the coefficient of lagged Recession and expected sign from estimation after controlling for firm-specific variables of all firm, unconstrained firm and constrained event windows in high and low financial development.

Sample	Financial Development	
	high	low
All firm	$(+, -)\delta$	$(+, -)\delta$
unconstrained firm	$+\delta$	$+\delta$
constrained firm	$-\delta$	$-\delta$

<sup>9</sup> Ambiguous assumption may arise from different aspect or theory

**Table 5: Mean and standard deviation of leverage**

The table presents mean and standard deviation (bold) of leverage as well as p-value of mean difference in parenthesis: difference in firm's financial constraints (unconstrained firm-constrained firm) and in level of financial development (high financial development-low financial development).

types of firms	book leverage			market leverage		
	all firms	unconstrained firms	constrained firms	all firms	unconstrained firms	constrained firms
mean	0.2645	0.2659	0.2218	0.2748	0.2774	0.1872
s.d.	[0.1982]	[0.1984]	[0.1784]	[0.2342]	[0.2350]	[0.18891]
uncon-con (p-value)			<b>0.0441**</b> (0.003)			<b>0.0902***</b> (0.000)
financial development level	high	high	high	high	high	high
	low	low	low	low	low	low
mean	0.2707	0.2175	0.2198	0.2674	0.2706	0.1720
s.d.	[0.1982]	[0.1921]	[0.1765]	[0.2258]	[0.2266]	[0.1797]
high-low (p-value)	<b>0.0532***</b> (0.000)	<b>0.056***</b> (0.000)	<b>-0.0156***</b> (0.4101)	<b>-0.0677***</b> (0.000)	<b>-0.0633***</b> (0.001)	<b>-0.1741***</b> (0.000)

**Table 6: Mean and standard deviation of leverage under different macroeconomic condition**

The table presents mean and standard deviation (bold) of leverage under different condition which are firm financial condition, macroeconomic condition and financial structure condition. As well as p-value of mean difference: different macroeconomic condition (expansion-recession) is in parenthesis with underlying, different financial constraint (unconstrained firm-constrained firm) is in parenthesis in constrained firm column, different financial development (high financial development-low financial development) is in the parenthesis at the middle between high and low.

type of firms macro condition	book leverage			market leverage		
	all firms	unconstrained firms	constrained firms	all firms	unconstrained firms	constrained firms
<b>expansion</b>	<b>0.2613</b> [0.1922]	<b>0.2629</b> [0.1924]	<b>0.2386</b> [0.1942]	<b>0.2734</b> [0.2323]	<b>0.2763</b> [0.2328]	<b>0.1879</b> [0.1832]
uncon-con (p-value)			<i>0.0243***</i> (0.000)			<i>0.0884***</i> (0.000)
<b>recession</b>	<b>0.2711</b> [0.2102]	<b>0.2721</b> [0.2106]	<b>0.2160</b> [0.1722]	<b>0.2754</b> [0.2351]	<b>0.2780</b> [0.2360]	<b>0.1855</b> [0.2020]
uncon-con (p-value)			<i>0.0561***</i> (0.000)			<i>0.0925***</i> (0.001)
expansion- recession (p-value)	<b>-0.0098***</b> (0.000)	<b>-0.0092***</b> (0.000)	<b>0.0226</b> (0.0074)	<b>-0.002</b> (0.400)	<b>-0.0017</b> (0.288)	<b>0.0024</b> (0.957)
financial development level macro condition	high low	high low	high low	high low	high low	high low
<b>expansion</b>	<b>0.2682</b> [0.1915]	<b>0.2702</b> [0.1918]	<b>0.2391</b> [0.1935]	<b>0.2665</b> [0.2245]	<b>0.2698</b> [0.2265]	<b>0.1829</b> [0.1988]
	<b>0.0047***</b> (0.000)	<b>0.0696***</b> (0.000)	<b>0.0029**</b> (0.0313)	<b>-0.0639***</b> (0.000)	<b>-0.0593***</b> (0.000)	<b>-0.2537***</b> (0.000)
<b>recession</b>	<b>0.2754</b> [0.2103]	<b>0.2764</b> [0.2104]	<b>0.2121</b> [0.1665]	<b>0.2692</b> [0.2263]	<b>0.2721</b> [0.2267]	<b>0.1668</b> [0.1698]
	<b>0.0556***</b> (0.000)	<b>0.0571***</b> (0.000)	<b>-0.0101</b> (0.724)	<b>-0.0913***</b> (0.000)	<b>-0.097***</b> (0.000)	<b>-0.176***</b> (0.005)
expansion- recession (p-value)	<b>-0.0072**</b> (0.002)	<b>-0.0062**</b> (0.009)	<b>0.027**</b> (0.002)	<b>-0.0027</b> (0.354)	<b>-0.0023</b> (0.432)	<b>0.0161</b> (0.1067)
	<b>0.0008**</b> (0.013)	<b>-0.0187**</b> (0.022)	<b>0.014</b> (0.770)	<b>-0.030</b> (0.023)	<b>-0.035**</b> (0.0229)	<b>0.0938</b> (0.326)

**Table 7: The correlation coefficients between leverage measures with lagged macroeconomic condition**

The table presents the correlation of leverage measure with lagged firm-specific variables used in equation estimation, as well as p-values (in parenthesis). Statistically significance is at the 1%, 5%, and 10% level are marked with \*\*\*, \*\*, and \* respectively.

types of firms	book leverage				market leverage			
	all firms	unconstrained firms	constrained firms		all firms	unconstrained firms	constrained firms	
recession	0.0358**** (0.0000)	0.0346**** (0.0000)	-0.0139 (0.6707)		0.0149* (0.0672)	0.0142* (0.0867)	-0.0188 (0.5615)	
	high	low	high	low	high	low	high	low
level of financial development	0.0186** (0.0393)	0.0207 (0.2641)	0.0152* (0.0950)	0.0230 (0.2209)	-0.0599* (0.4004)	0.0574 (0.1196)	0.0602** (0.0050)	0.0624** (0.0043)
	high	low	high	low	high	low	high	low
recession					0.0017 (0.8436)	0.003220 (0.7203)	-0.0366 (0.2873)	-0.0277 (0.7783)
	high	low	high	low	high	low	high	low





Table 9: Macroeconomic condition effect on leverage

The table presents coefficients on lagged recession and leverages, standard error (in parenthesis) and corresponding statistics of different sample groups, namely all sample, unconstrained sample and constrained sample event windows. The equation used to estimate is as follows:

$$Lev_{i,t} = c_i + \beta_i X_{i,t-1} + \delta_i Recession_{i,t-1} + \varepsilon_{i,t}$$

Where  $c_i$  is a constant,  $X_{i,t-1}$  is Potential determinants of capital structure, *Recession* is a dummy variable of macroeconomics condition, 1 stands for recession and 0 stands for expansion, and  $\varepsilon_{i,t}$  is disturbance term. We show only coefficient of Recession for brevity. The null hypothesis is coefficient equal to zero, Coefficients that are significantly different from zero at the 1%, 5%, and 10% level are marked with \*\*\*, \*\*, and \* respectively

	high financial development						low financial development					
	book leverage			market leverage			book leverage			market leverage		
	all firms	un- constrained firms	constrained firms	all firms	un- constrained firms	constrained firms	all firms	un- constrained firms	constrained firms	all firms	un- constrained firms	constrained firms
C	0.4262 <sup>***</sup> (0.0235)	0.4271 <sup>***</sup> (0.0243)	0.1607 <sup>***</sup> (0.0675)	0.3885 <sup>***</sup> (0.0417)	0.3975 <sup>***</sup> (0.0446)	0.2073 <sup>***</sup> (0.0630)	0.2554 <sup>***</sup> (0.0332)	0.2720 <sup>***</sup> (0.0342)	0.4696 <sup>***</sup> (0.1083)	0.4305 <sup>***</sup> (0.0576)	0.5563 <sup>***</sup> (0.0704)	1.0764 <sup>***</sup> (0.2044)
TANG	0.0340 <sup>***</sup> (0.0178)	0.0407 (0.0188)	0.0347 (0.0607)	0.0778 (0.0563)	0.0934 (0.0582)	-0.0811 (0.0622)	0.0711 <sup>***</sup> (0.0333)	0.0693 <sup>***</sup> (0.0344)	0.015 (0.0831)	0.3289 <sup>***</sup> (0.0379)	0.3146 <sup>***</sup> (0.0384)	0.4711 <sup>***</sup> (0.2385)
NDTAX	0.0956 (0.2072)	0.0512 <sup>***</sup> (0.2001)	0.8325 (0.7211)	1.8123 <sup>***</sup> (0.3420)	1.7697 <sup>***</sup> (0.3480)	-0.2903 (0.6232)	1.3651 (0.9138)	1.5219 (0.9690)	-2.1804 (1.7550)	0.4472 (0.8546)	1.0590 <sup>***</sup> (0.9016)	-11.5838 <sup>***</sup> (4.3782)
PROFIT	0.0470 <sup>***</sup> (0.0048)	0.0468 <sup>***</sup> (0.0048)	-0.1436 (0.1511)	0.0568 <sup>***</sup> (0.0065)	0.0571 <sup>***</sup> (0.0066)	-0.0875 (0.0557)	-0.1503 (0.1163)	-0.1332 (0.1130)	-0.1910 (0.3951)	-0.38760 <sup>***</sup> (0.1710)	-0.3123 <sup>***</sup> (0.1380)	0.0435 <sup>***</sup> (0.0065)
LNSALE	-0.0203 <sup>***</sup> (0.0026)	-0.0204 <sup>***</sup> (0.0027)	0.0027 (0.0092)	-0.0178 <sup>***</sup> (0.0053)	-0.0184 <sup>***</sup> (0.0056)	-0.0045 (0.0080)	-0.0083 <sup>***</sup> (0.0037)	-0.0102 <sup>***</sup> (0.0040)	-0.0286 <sup>***</sup> (0.0128)	-0.0281 <sup>***</sup> (0.0072)	-0.0397 <sup>***</sup> (0.0085)	-0.1229 <sup>***</sup> (0.0216)
GROWTH	-0.0447 <sup>***</sup> (0.0076)	-0.0464 <sup>***</sup> (0.0081)	-0.0553 <sup>***</sup> (0.0201)	-0.0855 <sup>***</sup> (0.0130)	-0.0884 <sup>***</sup> (0.0138)	-0.0597 <sup>***</sup> (0.0188)	0.0268 <sup>***</sup> (0.0040)	0.0276 <sup>***</sup> (0.0040)	-0.1277 <sup>***</sup> (0.0494)	-0.0998 <sup>***</sup> (0.0373)	-0.07401 <sup>***</sup> (0.0359)	-0.2727 (0.1807)

Table 9 (cont'd 2)

	high financial development			low financial development		
	book leverage		market leverage	book leverage		market leverage
	all firms	un- constrained firms	all firms	un- constrained firms	all firms	un- constrained firms
UNIQUE	0.0041 (0.0046)	0.0041 (0.0046)	0.0044 (0.0037)	0.0045 (0.0037)	-0.1805 (4.3573)	-0.0778 (3.8997)
INCVAR	-0.1202 <sup>***</sup> (0.0112)	-0.1198 <sup>***</sup> (0.0113)	-0.1543 <sup>***</sup> (0.0146)	-0.1545 <sup>***</sup> (0.0150)	-0.9042 <sup>***</sup> (0.3150)	-2.8075 <sup>***</sup> (0.3990)
RECESSION	0.0072 <sup>***</sup> (0.0019)	0.00766 <sup>***</sup> (0.0019)	0.0052 <sup>***</sup> (0.0020)	0.0051 <sup>***</sup> (0.0020)	0.0503 <sup>***</sup> (0.0131)	0.0490 <sup>***</sup> (0.0130)
$\beta_{uncon} - \beta_{con}$ (p-value)		0.0180 <sup>***</sup> [0.0000]		0.0098 <sup>***</sup> [0.0027]		0.0493 <sup>***</sup> [0.0211]
fixed effect	firm	firm	firm	firm	firm	firm
obs.	12,271	11,982	12,825	12,367	2,168	2,086
Adj R-squared	0.7951	0.7948	0.7997	0.7998	0.8335	0.8432
F-statistic	74.1332	73.2686	70.7368	69.90002	85.7421	94.9474
$\chi^2_{prob}$ (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
equality testing p-value		book leverage	$(\beta_{high\ finderv}^{book} - \beta_{low\ finderv}^{book})$ of all firms [p-value]	$(\beta_{high\ finderv}^{book} - \beta_{low\ finderv}^{book})$ of unconstrained firms [p-value]	-0.0228 <sup>***</sup> [0.000]	-0.0221 <sup>***</sup> [0.000]
			$(\beta_{high\ finderv}^{book} - \beta_{low\ finderv}^{book})$ of constrained firms [p-value]			-0.0072 [0.1168]



Figure 1: The link between the variables (Scope of though)

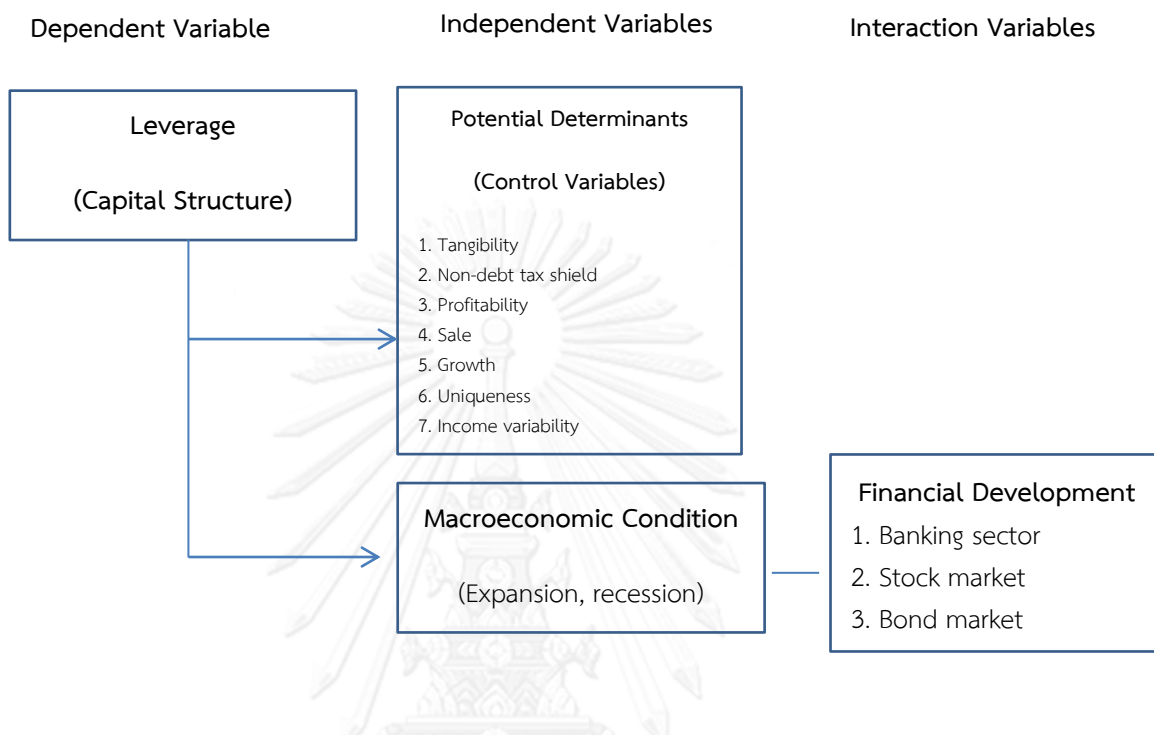
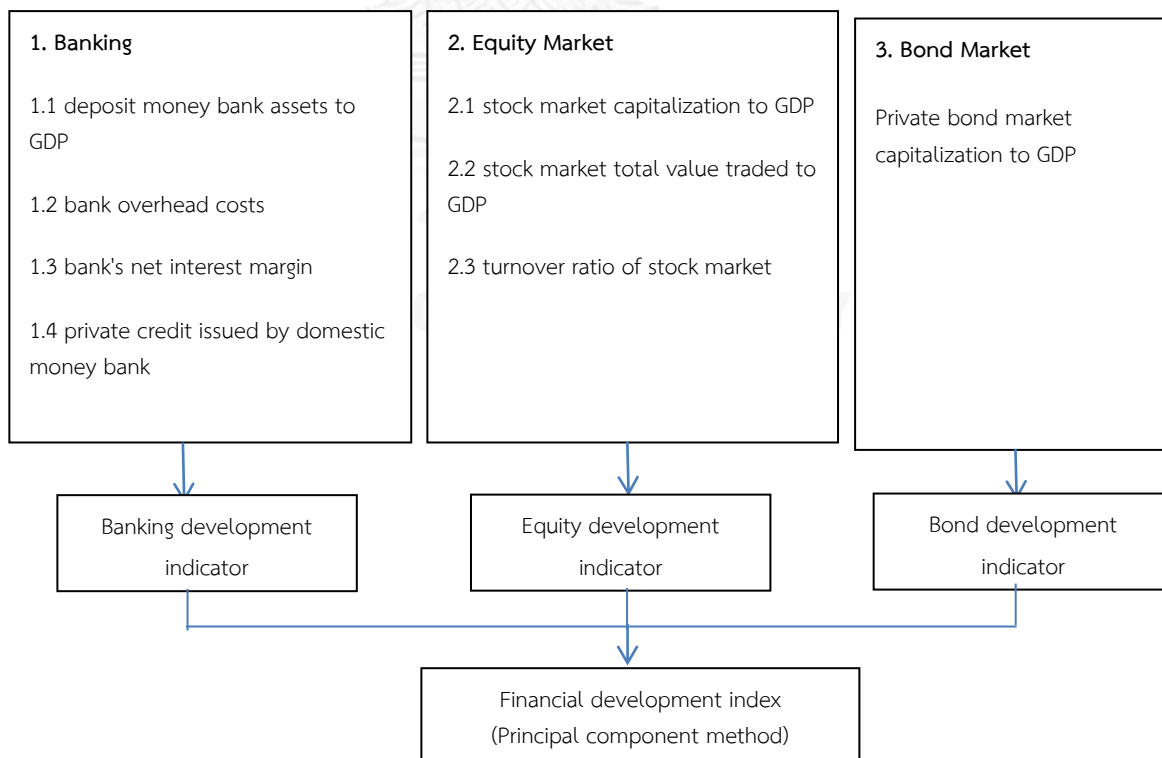


Figure 2: Composite financial development indicator framework





APPENDIX

จุฬาลงกรณ์มหาวิทยาลัย  
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## Appendix A

### Banking and Financial Market Development detail

The prior session written explain financial development, banking and financial markets in detail and we have stated that this study suits the measures proposed by Antzoulatos et al (2008). So the financial development index constructed in this paper is based on same criterion of Antzoulatos et al (2008).

We will restate again this affair assuring that those measures are appropriate with my objectives. Reiterating financial development indices, Antzoulatos et al (2008) use four categories to construct financial development indices. These include banks, financial institution, stock market and bond market development indices. In this study, there is nothing to do with financial institute development which is including institutional environment such as policies, regulations, laws and supervision because we specify our study on banking and financial market development(stock and bond market) which are the primary element of capital structure raising choices.

The table 10 summarizes the nine indices proposed by Antzoulatos et al (2008). The first column reports the index used. The second provides a definition which is technical description and the third is important of each. The indices are organized into three groups and all groups are intuitively considered being the way of firm's capital raising. Among each group corresponding to a major segment of the financial development proposed by Financial development and structure database, World Bank.

Table 10: Banking, equity and bond market indices

Index	Definitions	Importance(measure)
<b>1. Banking</b>		
1.1 deposit money bank assets to GDP	Claims on domestic real nonfinancial sector by deposit money banks as a share of GDP	measure the size of banks
1.2 bank overhead costs	Accounting value of a bank's overhead costs as a share of its total assets.	measures the efficiency of banking sectors in term of cost
1.3 bank's concentration	Assets of three largest banks as a share of assets of all commercial banks.	measures the banking structure
1.4 bank's net interest margin	Accounting value of bank's net interest revenue as a share of its interest-bearing (total earning) assets.	measures the efficiency of banking sector in term of profits
1.5 private credit issued by domestic money bank	Private credit by deposit money banks to GDP	Measures the level of financial services, Distinguishes the credit issued to private from public sector.
<b>2. Equity market</b>		
2.1 stock market capitalization to GDP	Value of listed shares to GDP	Measures the size of stock market
2.2 stock market total value traded to GDP	Total shares traded on the stock market exchange to GDP	Measures the activity of the stock market or liquidity
2.3 turnover ratio of stock market	Ratio of the value of total shares traded to average real market capitalization	Measure the efficiency of stock market
<b>3. Bond market</b>		
private bond market capitalization to GDP	Private domestic debt securities issued by financial institutions and corporations as a share of GDP	Measures the size of bond market

Basically, indices we used rely on the study of Antzoulatos et al (2008) and we concern the indicator that indicates the corporation's capital raising facilitation. Also all indicators are commonly used by The World Bank to numerate the level of financial development.

Appendix B  
Composite indicator

Table 11: Banking sector indicator

Country/year	banking sector indicator													
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010			
Argentina	2.9277	2.6244	1.3732	1.7706	1.8667	2.2351	2.6568	1.5299	1.5188	1.5998	1.5029			
Austria	4.0038	4.5062	4.5851	4.6746	4.4954	4.5677	4.8799	4.2791	4.4003	4.2697	4.3196			
Belgium	3.8964	4.2052	4.1599	4.2541	4.0801	4.0304	3.7670	4.1071	4.2009	4.0852	4.1140			
Brazil	3.2514	3.4346	3.3487	3.3189	2.9006	3.2986	3.5072	2.6650	2.9027	2.8068	2.9290			
China	4.1557	4.5634	4.6903	4.9919	4.9210	4.7809	4.3322	4.5609	4.4582	4.3505	4.4980			
Colombia	1.9647	2.0658	2.0928	2.0508	2.1022	2.5807	2.9710	2.5189	2.6579	2.7574	2.7529			
Finland	3.2467	3.6071	3.6332	3.9554	3.7428	3.8061	3.3748	4.2541	3.9409	3.8668	3.8351			
France	3.6014	3.8864	3.9642	4.2456	4.1799	4.2166	4.4006	4.2184	4.2672	4.1678	4.1841			
Germany	4.1927	4.6808	4.8536	4.9212	4.7645	4.7376	4.8549	4.5936	4.3455	4.1746	4.1013			
Hong Kong	4.6220	5.5911	5.5860	5.3795	5.3961	5.4406	4.7470	4.8133	4.4685	3.8793	4.3266			
India	3.1906	3.2377	3.2242	3.4051	3.3912	3.4512	3.8430	3.5942	3.4590	3.4880	3.4415			
Indonesia	2.7955	3.1728	3.0512	3.2581	3.5629	3.4589	3.5691	3.0802	3.3063	3.3953	3.4810			
Italy	3.5058	3.7981	3.5244	3.8520	3.6925	4.1153	4.5892	4.1088	4.2608	4.1514	4.2963			
Japan	5.6391	5.6656	5.0036	5.0359	4.8688	4.8193	5.1175	4.6658	4.5916	4.4962	4.4694			
Malaysia	4.7499	5.2018	5.1046	5.1547	5.0365	4.8439	4.8533	4.6291	4.4528	4.5783	4.5353			
Mexico	3.2916	3.2170	2.7499	2.7848	3.0440	2.5776	3.0151	3.2515	3.1482	3.1039	3.9893			
Netherlands	4.7901	5.2921	5.3194	5.4832	5.8826	5.7071	4.9404	5.6030	5.2232	5.9239	5.5087			
Peru	2.8826	2.9139	2.6267	2.4597	2.3582	2.7750	2.4778	2.4317	2.7309	3.0769	2.9359			
Portugal	4.1319	4.8102	5.0566	5.2272	5.1678	5.0375	4.6071	5.1419	5.0750	5.1272	5.2004			
Singapore	4.1716	4.7380	4.8563	4.6906	4.7114	4.4171	3.8967	4.1000	4.4000	4.2924	4.1670			
Spain	4.0344	4.4607	4.3835	4.5822	4.7856	5.0924	5.4724	5.6587	5.7139	5.7473	5.7290			
Switzerland	4.6791	5.2725	5.3919	5.5716	5.3583	5.5698	4.7438	5.1095	4.5567	4.7288	4.5014			
Thailand	4.1747	4.3907	4.4586	4.5993	4.6273	4.6203	4.4611	4.0190	4.1220	3.9386	3.9088			
United Kingdom	3.8772	4.3456	4.4748	4.6612	4.8170	5.0359	5.3725	5.1147	5.5128	5.4547	5.3239			
United States	3.1491	3.9677	3.2767	3.3593	3.3148	3.4567	4.0268	3.1211	3.3883	3.9898	3.3513			



Table 12: Equity market indicator

Country/year	equity indicator										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Argentina	1,2100	1,3489	1,5262	1,3586	1,2539	1,3670	1,0137	1,0233	1,0664	1,0130	1,0186
Austria	1,2713	1,3074	1,2278	1,3559	1,4984	1,6095	1,6969	1,6283	1,4424	1,2493	1,8465
Belgium	1,6443	1,7226	1,6642	1,7149	1,8740	1,9966	1,9950	1,9276	1,6166	1,5200	1,6744
Brazil	1,4827	1,4830	1,4553	1,6220	1,6436	1,6223	1,6432	1,7482	1,6130	1,7021	2,0708
China	2,6507	2,3133	2,0100	2,5108	3,0310	2,2478	2,4832	3,5253	2,3965	2,9518	3,5173
Colombia	1,0000	1,0124	1,0091	1,0000	1,0113	1,1390	1,1950	1,0908	1,1122	1,1726	1,3450
Finland	3,8072	3,9100	3,9017	4,0877	4,3200	4,2657	4,1341	3,7378	2,5717	1,7985	2,2641
France	2,5905	2,8938	2,8265	3,1941	3,3230	3,0057	3,2222	2,8981	2,3029	1,8403	2,1972
Germany	2,2833	3,0233	3,1072	3,3957	3,3727	3,3980	3,4925	2,9177	2,2775	1,8413	2,3055
Hong Kong	4,9378	4,5396	4,4126	5,0533	5,3153	4,9562	4,3143	5,3970	5,6273	5,7430	6,7103
India	3,7757	3,4557	2,9253	3,3667	3,2449	2,7021	2,6278	2,3721	2,0203	2,2562	2,5745
Indonesia	1,3105	1,3876	1,4454	1,4859	1,6410	1,7326	1,5378	1,6517	1,5043	1,6374	1,7738
Italy	2,4931	2,5293	2,5731	3,1406	3,1778	3,2931	3,1690	3,1760	1,6443	1,7017	2,8819
Japan	2,3240	2,4407	2,3780	2,9996	3,4391	3,6456	3,7202	3,1423	2,3253	2,1019	2,5174
Malaysia	2,4778	2,1555	2,1660	2,5716	2,6008	2,2257	2,0767	2,2031	1,6649	1,6449	1,9529
Mexico	1,3033	1,3794	1,2934	1,3049	1,3944	1,2650	1,2615	1,2444	1,3006	1,2305	1,4102
Netherlands	3,7044	5,1047	4,0423	4,0245	4,5839	4,2917	4,0999	3,9232	2,5679	2,1649	2,5122
Peru	1,1626	1,1316	1,1606	1,1214	1,0571	1,0632	1,1312	1,2198	1,1715	1,1319	1,1986
Portugal	2,1204	1,9197	1,7217	1,7952	2,0311	1,9216	2,0965	2,2234	1,5866	1,4309	1,4837
Singapore	3,1207	2,8860	2,7705	3,5541	3,4904	3,3930	3,3414	3,5025	2,6437	2,4597	2,9220
Spain	3,9533	4,1062	4,4785	4,5769	4,4783	4,4500	4,1944	3,7388	2,6796	2,4169	2,8373
Switzerland	4,8781	4,2554	4,9080	5,4900	5,4589	5,3755	5,5277	5,1542	3,5131	2,7441	3,1459
Thailand	1,6937	2,3396	2,4906	3,3437	3,2531	2,6031	2,2737	1,8413	1,6251	1,8799	2,5070
United Kingdom	3,2690	3,5333	3,6495	4,2029	5,0536	4,8969	4,1332	4,9486	3,4945	2,7697	3,0493
United States	5,2183	5,7990	5,6833	5,1493	5,0385	4,6695	5,0475	4,6737	4,6249	4,3966	4,2432



## Appendix C

### Principal component analysis

#### Principal Components Analysis

Eigenvalues: (Sum = 3, Average = 1)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	1.854318	1.215486	0.6181	1.854318	0.6181
2	0.638832	0.131981	0.2129	2.493149	0.8310
3	0.506851	---	0.1690	3.000000	1.0000

Eigenvectors (loadings):

Variable	PC 1	PC 2	PC 3
BANK	0.586800	-0.470128	0.659276
EQUITY	0.597746	-0.297736	-0.744348
BOND	0.546229	0.830863	0.106306

Ordinary correlations:

	BANK	EQUITY	BOND
BANK	1.000000		
EQUITY	0.491107	1.000000	
BOND	0.380346	0.407307	1.000000

## Appendix D

Table 14: The financial development level during 2000 to 2010

level/year	ranking	over period	2000	2001	2002	2003	2004	
High	1	United States	8.77	United States	9.27	United States	8.87	United States
	2	Netherlands	7.87	Netherlands	8.33	Switzerland	8.40	Netherlands
	3	Switzerland	7.30	Netherlands	7.51	Netherlands	8.06	Switzerland
	4	Hong Kong	7.07	Japan	7.12	Hong Kong	7.31	Hong Kong
	5	Spain	6.87	Hong Kong	6.86	Germany	6.95	UK
	6	Japan	6.45	Germany	6.83	Japan	6.79	Spain
	7	UK	6.26	Malaysia	6.07	Spain	6.58	Japan
	8	Germany	6.20	Spain	5.99	Malaysia	6.33	Germany
	9	France	5.93	Finland	5.78	UK	6.24	France
	10	Malaysia	5.90	Singapore	5.73	France	6.24	Malaysia
Medium	11	Italy	5.72	UK	5.72	Singapore	6.13	Finland
	12	Portugal	5.58	France	5.65	Finland	6.07	Singapore
	13	Finland	5.58	Belgium	5.33	Portugal	5.95	Italy
	14	Singapore	5.52	Italy	5.27	Italy	5.66	Portugal
	15	Austria	5.36	Portugal	5.26	Belgium	5.58	Thailand
	16	China	5.20	China	5.06	Austria	5.35	China
	17	Belgium	5.14	Austria	4.95	Thailand	5.25	Austria
	18	Thailand	4.93	India	4.85	China	5.24	Belgium
	19	India	4.90	Thailand	4.40	India	4.56	India
	20	Brazil	3.78	Brazil	3.72	Brazil	3.73	Indonesia
Low	21	Mexico	3.50	Mexico	3.57	Mexico	3.39	Brazil
	22	Indonesia	3.45	Argentina	3.27	Indonesia	3.30	Mexico
	23	Peru	2.92	Peru	3.07	Peru	2.77	Peru
	24	Colombia	2.62	Indonesia	3.05	Argentina	2.72	Argentina
	25	Argentina	2.60	Colombia	2.36	Colombia	2.35	Colombia

Table 14 (cont'd)

level/year	ranking	2005	2006	2007	2008	2009	2010
High	1	United States	United States	United States	United States	United States	United States
	2	Netherlands	Netherlands	Netherlands	Spain	Spain	Netherlands
	3	Switzerland	Spain	Spain	Netherlands	Netherlands	Spain
	4	Hong Kong	Switzerland	Switzerland	Hong Kong	Hong Kong	Hong Kong
	5	Spain	Japan	Hong Kong	UK	UK	Italy
	6	UK	Hong Kong	UK	Switzerland	Portugal	Portugal
	7	Japan	UK	Japan	France	Switzerland	France
	8	Germany	Germany	France	Japan	France	Austria
	9	Italy	Italy	Italy	Portugal	Malaysia	Malaysia
	10	Finland	France	Finland	Germany	Japan	Switzerland
Medium	11	France	Malaysia	Portugal	Austria	Italy	China
	12	Malaysia	Finland	Germany	Malaysia	Austria	UK
	13	Singapore	Austria	Malaysia	Italy	China	Japan
	14	Portugal	Portugal	China	Singapore	Belgium	Belgium
	15	Austria	Singapore	Singapore	Finland	Germany	Germany
	16	Thailand	Thailand	Austria	China	Singapore	Singapore
	17	China	China	Belgium	Belgium	Finland	Thailand
	18	Belgium	Belgium	Thailand	Thailand	Thailand	Finland
	19	India	India	India	India	India	Brazil
	20	Brazil	Brazil	Brazil	Brazil	Brazil	India
Low	21	Indonesia	Indonesia	Mexico	Mexico	Indonesia	Mexico
	22	Mexico	Mexico	Indonesia	Indonesia	Mexico	Indonesia
	23	Argentina	Colombia	Peru	Peru	Peru	Peru
	24	Peru	Argentina	Colombia	Colombia	Colombia	Colombia
	25	Colombia	Peru	Argentina	Argentina	Argentina	Argentina

## Appendix E

Table 15: Macroeconomic condition

	CLI	Argentina rate of change	CLI	Columbia rate of change	CLI	Mexico rate of change			
Q1 2000	111.9		-0.0251		100.4				
Q2 2000	120.6		0.0009		100.3				
Q3 2000	117		0.0242		101.2				
Q4 2000	117.6		0.0365		99.7				
Q1 2001	109.6	-0.0964	0.0438	11.2660	98.3	-0.0333			
Q2 2001	120.4	0.0584	0.0417	1.0845	99.2	-0.0108			
Q3 2001	111.3	-0.0659	0.0393	0.1243	100.1	0.0080			
Q4 2001	105.2	-0.1294	recession	0.0346	-0.2181	98.5	-0.0133		
Q1 2002	91.7	-0.2699	recession	0.0288	-0.4034	recession	100.1	0.0174	
Q2 2002	104.1	-0.0451	recession	0.0247	-0.4537	recession	101.8	0.0377	
Q3 2002	100.4	-0.0412	recession	0.0242	-0.3581	recession	100.4	0.0044	
Q4 2002	101.6	0.0200		0.0259	-0.1207	recession	100.2	0.0000	
Q1 2003	96.7	-0.0438		0.0309	0.3266		100.2	-0.0067	
Q2 2003	112.2	0.1888		0.0350	0.5704		99.8	-0.0135	recession
Q3 2003	110.6	0.1254		0.0365	0.4420		99.9	-0.0040	recession
Q4 2003	113.6	0.1295		0.0361	0.2080		100.2	0.0028	
Q1 2004	107.5	-0.0114		0.0400	0.2609		101.9	0.0302	
Q2 2004	120.2	0.1362		-0.0428	0.2677		101.8	0.0216	
Q3 2004	120.2	0.1042		0.0528	0.6316		102.7	0.0279	
Q4 2004	124.1	0.1237		0.0549	0.4815		104.7	0.0484	
Q1 2005	116.1	-0.0256		0.0532	0.1949		105.2	0.0380	
Q2 2005	132.7	0.1722		0.0578	0.2262		106.5	0.0452	
Q3 2005	131.3	0.1061		0.0544	-0.0084		108.7	0.0606	
Q4 2005	135.3	0.1199		0.0525	-0.0752	recession	111.5	0.0798	
Q1 2006	126.3	-0.0314		0.0505	-0.1143	recession	114	0.0908	
Q2 2006	143	0.1449		0.0472	-0.1886	recession	113.7	0.0517	
Q3 2006	142.8	0.1074		0.0507	-0.0150	recession	114.5	0.0363	
Q4 2006	147	0.1212		0.0624	0.4170		115.7	0.0323	
Q1 2007	136.3	-0.0394		0.0723	0.6575		116.9	0.0341	
Q2 2007	155.4	0.1516		0.0734	0.4513		117.8	0.0364	
Q3 2007	155.4	0.1126		0.0713	0.1686		118.4	0.0301	
Q4 2007	160.3	0.1298		0.0667	-0.0723		120.9	0.0510	
Q1 2008	148	-0.0402		0.0575	-0.2855	recession	122.2	0.0504	
Q2 2008	167.5	0.1347		0.0529	-0.3179	recession	123.1	0.0441	
Q3 2008	166.2	0.0865		0.0414	-0.4772	recession	121.9	0.0099	
Q4 2008	166.8	0.0635		0.0243	-0.7270	recession	112.3	-0.1244	
Q1 2009	151	-0.1075		0.0140	-0.8408	recession	107.8	-0.1562	recession
Q2 2009	166.2	0.0328		0.0075	-0.9071	recession	111	-0.0716	recession
Q3 2009	165.6	0.0301		0.0060	-0.8723	recession	112.8	-0.0064	recession
Q4 2009	171.2	0.0881		0.0128	-0.0124	recession	115.1	0.0601	
Q1 2010	161.2	-0.0224		0.0182	1.5651		116.6	0.0715	
Q2 2010	185.9	0.1980		0.0246	2.5491		117.8	0.0557	
Q3 2010	179.8	0.0838		0.0337	2.5127		118.2	0.0366	
Q4 2010	187	0.1168		0.0361	1.1537		121.2	0.0591	

Table 15 (cont'd)

	CLI	Hong Kong rate of change		CLI	Netherlands rate of change		CLI	United States rate of change	
Q1 2000	98.5			92.202			94.9		
Q2 2000	88.5			92.9686			95		
Q3 2000	94.6			93.6044			94.167		
Q4 2000	95.6			94.0229			92.367		
Q1 2001	86.3	-0.1322		93.9517	0.0129		89.533	-0.0766	
Q2 2001	88.1	-0.0547	recession	93.7674	0.0022		87.533	-0.0887	recession
Q3 2001	67.5	-0.3816	recession	93.694	-0.0024		86.5	-0.0763	recession
Q4 2001	91	0.1286		93.9334	0.0013		85.467	-0.0625	recession
Q1 2002	78.1	-0.0967		94.711	0.0150		86.733	-0.0096	recession
Q2 2002	77.5	-0.0714	recession	95.4006	0.0235		88.567	0.0374	
Q3 2002	71.8	-0.1335	recession	95.6403	0.0205		88.567	0.0325	
Q4 2002	78.8	-0.0160	recession	95.6575	0.0124		88.7	0.0252	
Q1 2003	64.8	-0.2340	recession	95.4264	0.0012		88.933	0.0144	
Q2 2003	85	0.2694		95.5269	-0.0001		89.333	0.0116	
Q3 2003	92.6	0.3981		96.3479	0.0132		91.367	0.0451	
Q4 2003	102.5	0.4778		97.5347	0.0302		94.367	0.0868	
Q1 2004	98.1	0.2293		98.4659	0.0378		97.2	0.1112	
Q2 2004	103	0.1468		99.1176	0.0357		99.2	0.1075	
Q3 2004	95.2	-0.0615		99.5836	0.0282		100.933	0.0920	
Q4 2004	103.5	0.0617		99.9017	0.0200		102.667	0.0786	
Q1 2005	107.2	0.1186		100.1717	0.0146		104.333	0.0702	
Q2 2005	108.4	0.0984		100.5767	0.0142		105	0.0510	
Q3 2005	106.7	0.0487		101.4235	0.0219		105.8	0.0401	
Q4 2005	116.7	0.1585		102.534	0.0323		106.433	0.0305	
Q1 2006	102.2	-0.1078		103.6012	0.0386		107.633	0.0342	
Q2 2006	111.2	0.0401		104.5538	0.0398		106.9	0.0103	
Q3 2006	105.4	-0.0551		105.3857	0.0369		106	-0.0103	
Q4 2006	119.1	0.1544		106.1109	0.0324		105.733	-0.0151	recession
Q1 2007	116.9	0.1107		106.6424	0.0265		105.733	-0.0125	recession
Q2 2007	119.4	0.0898		107.0735	0.0213		105.533	-0.0084	recession
Q3 2007	112.2	-0.0413		107.494	0.0180		104.667	-0.0163	recession
Q4 2007	114.7	-0.0299	recession	107.8496	0.0153		102.367	-0.0459	recession
Q1 2008	101.9	-0.1850	recession	108.0222	0.0113		99.067	-0.0829	recession
Q2 2008	79.7	-0.4202	recession	107.7996	0.0028		96.433	-0.0988	recession
Q3 2008	68.3	-0.4746	recession	106.4389	-0.0200		92	-0.1337	recession
Q4 2008	76.3	-0.2476	recession	103.7563	-0.0555	recession	84.7	-0.2012	recession
Q1 2009	68.5	-0.2435	recession	101.8815	-0.0685	recession	79.233	-0.2268	recession
Q2 2009	84.3	0.2534		102.3151	-0.0401	recession	78.767	-0.1639	recession
Q3 2009	88.5	0.3215		104.1771	0.0090		80.867	-0.0532	recession
Q4 2009	92.28	0.2719		106.1306	0.0485		83	0.0420	
Q1 2010	92.88	0.1881		107.5437	0.0612		85.033	0.0923	
Q2 2010	95.99	0.1187		108.3114	0.0503		86.667	0.0944	
Q3 2010	99.16	0.1194		108.6432	0.0318		87.267	0.0651	
Q4 2010	96.83	0.0297		109.1363	0.0221		88.5	0.0569	

## Appendix F

Table 16: The correlation coefficients between leverage measures with lagged firm-specific variables

The table presents the correlation of leverage measure with lagged firm-specific variables used in equation estimation, as well as p-values (in parenthesis). Statistically significance at the 1%, 5%, and 10% level are marked with \*\*\*, \*\*, and \* respectively.

Variables	All firm-windows		unconstrained firm-windows		constrained firm-windows	
	book leverage	market leverage	book leverage	market leverage	book leverage	market leverage
GROWTH	-0.0089 (0.2722)	-0.0739*** (0.0000)	-0.0100 (0.2232)	-0.0700*** (0.0000)	-0.0862** (0.0083)	-0.1040** (0.0013)
INCVAR	-0.0410*** (0.0000)	-0.0506*** (0.0000)	-0.0377*** (0.0000)	-0.0489*** (0.0000)	-0.1088*** (0.0009)	-0.0652** (0.0440)
LNSALE	0.0801*** (0.0000)	0.0889*** (0.0000)	0.0720*** (0.0000)	0.0807*** (0.0000)	0.2696*** (0.0000)	0.3501*** (0.0000)
NDTAX	0.0652*** (0.0000)	-0.0173** (0.0343)	0.0602*** (0.0000)	-0.0190** (0.0225)	0.2261*** (0.0000)	0.0476 (0.1412)
PROFIT	-0.0242** (0.0029)	-0.0455*** (0.0000)	-0.0279*** (0.0007)	-0.0460*** (0.0000)	-0.1647*** (0.0000)	-0.1569*** (0.0000)
TANG	0.1794*** (0.0000)	0.0611*** (0.0000)	0.1810*** (0.0000)	0.0568*** (0.0000)	0.1356*** (0.0000)	0.1547*** (0.0000)
UNIQUE	0.0240** (0.0031)	0.0367*** (0.0000)	0.0320*** (0.0001)	0.0372*** (0.0000)	-0.2028*** (0.0000)	0.0496 (0.1258)



## Appendix G

Table 17: Equality testing of parameter

In order to observe the effect of macroeconomic on leverage, this study tests the difference only on macroeconomic condition. Null hypothesis is  $\delta_{high} = \delta_{low}$ , Coefficients that are statistically significantly different from zero at the 1%, 5%, and 10% level are marked with \*\*\*, \*\*, and \* respectively.

All firms in high and low financial development country									
		Recession	S.E.	number of obs.	Df.	S.E. of mean diff.	mean diff.	t-scores	p-value
book	high	0.00718	0.00186	12271	12262	0.003713062	-0.0229	-6.1553	0.0000
	low	0.03004	0.00757	2920	2911				
market	high	0.00519	0.00198	12825	12816	0.005305706	-0.0451	-8.4965	0.0000
	low	0.05027	0.01311	2168	2159				
Unconstrained firms in high and low financial development country									
		Recession	S.E.	number of obs.	Df.	S.E. of mean diff.	mean diff.	t-scores	p-value
book	high	0.00766	0.001883	11982	11973	0.003723659	-0.0221	-5.9409	0.0000
	low	0.029782	0.007631	2794	2785				
market	high	0.005116	0.002023	12367	12358	0.00374827	-0.0247	-6.5806	0.0000
	low	0.029782	0.007631	2794	2785				
constrained firms in high and low financial development country									
		Recession	S.E.	number of obs.	Df.	S.E. of mean diff.	mean diff.	t-scores	p-value
book	high	-0.0104	0.0060	721	712	0.010035051	-0.0119	-1.1920	0.1168
	low	-0.00321	0.01822	215	206				
market	high	-0.00473	0.00955	821	812	0.027985914	-0.0044	-0.1578	0.4374
	low	-0.00031	0.07266	134	125				

## Appendix H

Table 18: Chow test

This table presents Chow test calculation in order to indicate the different of two regression model

Chow test: Null hypothesis is no significant difference between RSSur and RSSr. Assumption test: Null hypothesis is  $S_1^2 = S_2^2$ , Coefficients that are significantly different from zero at the 1%, 5%, and 10% level are marked with \*\*\*, \*\*, and \* respectively.

All firms between high and low financial development country					
book leverage			market leverage		
RSSr	119.7838		RSSr	150.3887	
RSS1	100.1546		RSS1	123.2069	
RSS2	18.2006	k = 9	RSS2	26.1471	k = 9
RSSur	118.3552	d.f.= 15173	RSSur	149.354	d.f.= 14975
F-stat	20.3489		F-stat	11.5268	
p-value	1.86E-34		p-value	3.21E-18	
Assumption test			Assumption test		
$S_1^2$	0.0082		$S_1^2$	0.0096	
$S_2^2$	0.0062		$S_2^2$	0.0121	
F-stat		1.7129	F-stat		0.6335
p-value		0.0802	p-value		0.7693
Unconstrained firms between high and low financial development country					
RSSr	119.7838		RSSr	144.5794	
RSS1	100.1546		RSS1	119.9956	
RSS2	18.2006	k = 9	RSS2	23.0460	k = 9
RSSur	118.3552	d.f. = 15173	RSSur	143.0416	d.f = 14435
F-stat	20.3489		F-stat	17.2425	
p-value	1.86E-34		p-value	1.08E-28	
Assumption test			Assumption test		
$S_1^2$	0.0082		$S_1^2$	0.0097	
$S_2^2$	0.0062		$S_2^2$	0.0111	
F-stat		1.712855	F-stat		0.7701
p-value		0.080237	p-value		0.6443
constrained firms between high and low financial development country					
RSSr	3.2151		RSSr	4.8946	
RSS1	2.1167		RSS1	2.6910	
RSS2	1.0067	k = 9	RSS2	1.8018	k = 9
RSSur	3.1099	d.f. = 918	RSSur	4.4928	d.f.= 937
F-stat	3.4509		F-stat	9.3116	
p-value	0.0003		p-value	1.25E-13	
Assumption test			Assumption test		
$S_1^2$	0.0029		$S_1^2$	0.0033	
$S_2^2$	0.0047		$S_2^2$	0.0137	
F-stat		0.3831	F-stat		0.0579
p-value		0.9435	p-value		0.999963

## Appendix I



	book leverage			market leverage		
	all firms	un - constrained firms	constrained firms	all firms	un - constrained firms	constrained firms
obs.	15191	14776	936	14993	14453	955
Adj R-squared	0.7973	0.796732	0.862295	0.8079	0.810203	0.82455
F-statistic	75.4777	74.3995	66.0541	74.6772	74.7951	49.2092
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
$\delta + \gamma$ [p-value]	0.0071 <sup>***</sup> [0.0002]	0.0075 <sup>**</sup> [0.0021]	-0.0092 <sup>***</sup> [0.000]	0.0053 <sup>***</sup> [0.0000]	0.005 <sup>***</sup> [0.0000]	0.0006 <sup>***</sup> [0.0000]

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