

Investment and Financial System Design for Firms in Malaysia

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This paper investigates the impact of financial system design on investment. It is aimed to provide additional empirical evidence based on the original paper by Demircuc-Kunt and Maksimovic (2002). The firm-level data are used for Malaysian listed firms between 2000 and 2007. This paper also utilizes the same estimation method i.e. generalised method of moments for panel data, as proposed by Arellano and Bond (1991). The findings show that: first, the Risk Weighted Capital-adequacy Ratios and Core Capital Ratios have negative impact on investment of firms. This can be explained from Government intervention which is designed to encourage bank's lending to firm investment. Second, the capital market variables show negative effects on investment due to the presence of capital market imperfections. Finally, both gross domestic product and foreign direct investment show positive impacts on investment. This result is consistent with previous empirical evidence in which a firm is likely to have a larger investment when its investment opportunities are good. It is recommended to the policy maker to intervene the related policy with investment and financial design. It is because both variables are interrelated each other and give impact to the growth of economy in a country.

1. Introduction

The financial system is important in stimulating economic growth. It can be seen from the policy perspective that is aimed for expanding the financial system to foster growth. The contribution of financial system to economic growth can be seen in different aspects, such as in

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mobilizing savings, allocating these savings and competing investment projects. As a result, some countries concentrate on developing the banking system while others develop the capital market. The related issue here is how do firms in developing countries choose between debt (bank design) and equity (capital market design)? What role do capital markets play in this choice? Is this choice influenced by the development level of a country stock market? Many theoretical and empirical analyses show that these tasks are different in a market-based system and in a bank-based system. Most countries have both financial intermediaries (e.g., banks) and markets (e.g., stocks) but their relative importance differs.

Furthermore, important differences seem to exist between the developed and developing countries (Atkin and Glen, 1992; Agarwal and Mohtadi, 2004). According to Atkin and Glen (1992), these differences can be found in firms of G7 countries whose funds are generated from internal sources, while firms in developing countries, generate their funds from external sources (bank loans and equity). The statistics show that internal finance generates between 12 to 58 percent of the total finance in the developing countries and between 52 and 100 percent among the G7 countries. It means that, both the debt (bank design) and equity (capital market) are important sources for firms' investment in developing countries. It is different to developed countries where most of their investment comes from internal sources. Hence, in the developing countries the banking systems complement the stock market activity in increasing the firm investment.

In addition, to illustrate, at one extreme, the United State (US) has market-based financial systems where stock markets play an important role, while at another extreme, Germany has bank-based systems where banks dominate credit allocation. As in the German financial systems, Japan businesses were often subjected to the strong influence of great banks that played major roles in corporate control and governance. These banks were generally consensual keiretsu decision-makers. A horizontal keiretsu shows relationships between bank and industries, normally centred on a bank and trading company, for example, Mitsubishi. In Germany, the banks were often viewed as the primary decision makers (Allen and John, 1991). In the US, stock markets have pioneered the development of new technologies and industries, which offer more efficient informative signals than banks. The development of

securities market is more related to long-term financing, whereas the development of German and Japan banking sector is more related to the availability of short-term financing.

Furthermore, the theory of firm investment should be combined with the theory of financial systems. It can be seen from the financial system design that has implications for corporate governance mechanism in the U.S., Japan and Germany. It shows that an efficient oriented legal system that favourable to implement the contracts and reduce the cost of lending will eventually give positive impact on firms' investment.

The aim of this paper is to examine the relationship between investment and financial system design for firms in Malaysia. Many empirical studies on the relationship between finance and growth have been dominated by cross-country studies. Although the findings of these studies provide a useful guide on the finance-growth relationship, it is difficult to see the results in the generalized point of view. This generalized result provides a causal-link that is largely determined by the nature and operation of the financial institutions and policies pursued in each country (Arestis and Demetriades, 1997; Demetriades and Andrianova, 2004; Ang, 2008). Against this background, Malaysia is the only country to be chosen in this study as compared to other cross-country studies, because none has been done on the link between finance and economic growth at firm-level. Although, Ang (2008), and other researchers have already studied that financial development leads to higher output growth in Malaysia, their survey only focus on the aggregate data.

On the other hand, this study focuses on firm level data that is different from previous studies. This study differs from previous work on firm investment and financial systems, in the sense that it shows the investment in Malaysian listed firms which includes design variables; bank design (bank asset, bank loan and deposit money bank) and market design (market capitalization and values of shares traded) as independent variables. These variables are divided by total asset of banking system (TOA) as opposed to the original idea proposed by Demirguc-Kunt and Maksimovic which consider GDP as denominator. Therefore, the re-definition of those variables is more relevant to describe the level of financial system development. The variables of market design are market capitalization and value of turnovers. The

market capitalization is divided by total asset of banking system (TOA) and the value of turnovers is divided by market capitalization. In addition, this study acts as an extension to the model introduced by Demirguc-Kunt and Maksimovic except we only use the basic panel data to run the regression. However, in this study the dynamic panel model with GMM estimators are used.

In this study, Malaysian firms' investment is regressed against bank health measures variables (RWCR and CCR), design variables (bank and capital market) and macroeconomics variables by using a dynamic panel model with GMM (generalised method of moments). GMM model provides convergent estimators and derives from the instrumental variables concepts. This model uses suitable method in solving the endogeneity and serial correlation problems. In addition, the number of cross section is more than the number of series.

The bank health measures variables that consist of RWCR (Risk Weighted Capital-adequacy Ratios) and CCR (Core Capital Ratios) are also included in the equation. The bank health measure variables are important because these measures might give adverse impact on the willingness of banks to supply credit in the economy. This impact will lead the bank to reduce its lending activities. Therefore, this paper intends to show a more comprehensive financial system design that is different from previous work.

This paper also contributes to the literature by using a dynamic panel model with GMM estimators and focuses on Malaysian context only. Since independence, Malaysia has been experiencing rapid economic growth and financial development. At the initial stage, the Malaysian financial system was predominantly led by a bank-based financial system (BNM, 2010). The financial market, particularly the stock market, has been progressing well in recent years in line with the progress of the banking sector (Mansor, 2007). However, the empirical evidence is lacking except a few, such as Ismail and Pratomo (2006), and Ang (2008). For example, Ismail and Pratomo (2006) examined the relationship between financial system and investment using firm level data.

By utilizing the Malaysian commercial banks data and listed firm data from 2000 to 2007, the findings proof that: first, the RWCR and CCR

have negative impact on investment of firms. This can be explained from the government intervention in banking system which is designed to encourage bank's lending to firm's investment following the 1997-1998 Asian financial crises. However, the results are contrary to the earlier finding by Fukuda et al. (2005) in Japanese economy. Second, the capital market variables show negative effects on investment of firms due to the presence of capital market imperfections. The results are consistent to the earlier finding by Hatakeda (2002). Finally, both GDP and FDI show positive impacts on investment. This is consistent with previous empirical evidence in which a firm is likely to have a larger investment when its investment opportunities are good.

This paper aims to achieve three objectives. First, to examine the relationship between bank health measures and firms investment. These measures give impacts on the willingness of banking sector to supply loan in the economy. Second, to examine the firms' growth in investment with bank design and market design. Third, to examine the impact of macroeconomic variables on firm investment. A real GDP is the first indicator of the demand for banking operation and extension of loans for growing investment activities.

The remainder of the paper is organized as follows. Section two discusses the structure of the Malaysian financial system. Section three describes the theoretical framework on the relationship between firms' investment and financial system design. Model specification is discussed in section four. The empirical results are presented in section five. Finally, section six provides the conclusion and policy implication of the study.

2. Structure of the Malaysian financial system

As in the case of the financial systems in other countries, the Malaysian financial system is structured into two major categories, namely the financial intermediaries and the financial market. Among essential prerequisites to have a sound financial system, are to have stability in both financial intermediaries and financial markets. In Malaysia, the financial intermediaries which consist of Bank Negara Malaysia (BNM), commercial banks, investment banks and Islamic banks make up the banking system. The Islamic and conventional banking systems coexist and operate in parallel. In addition, non-bank financial intermediaries

(NBFIs) complement the banking system in mobilizing savings. These institutions also play an important role in the development of the capital market and in providing social security. The NBFIs comprise of other financial intermediaries, such as unit trust, cooperative societies and the housing credit institutions.

Conceptually, the intermediation includes mobilizing resources and allocating these resources for productive investment. Investment involves the use of funds for private and public sector investments, accumulation of international reserves and payments abroad for education purposes and others. In other words, the intermediation process includes mobilizing funds from the economy's surplus units to its deficit units to assist in expanding economic development. Therefore, the intermediation function has relationship with savings and investment decision which eventually influence the economic growth.

In this study, the commercial banks are used as proxy to the financial indicators in Malaysia. It is because the commercial banks are the largest and provide most funds in the Malaysian banking system. Table 1 presents the balance sheet items of Malaysian commercial banks. This table is relevant to the discussion because it shows the important component of the Malaysian financial sector. The commercial banks act as an indication of a rapid development and increasing size of the banking sector. As can be seen from the table, the total asset of the commercial banks (column A) has expanded. In 1970, the total assets of commercial banks was only RM4,460.2 million. The pattern showed an upward trend and reached RM1,145,816 million in 2007. An upward pattern is also observed from the deposit (column B) and loans (column C). The total deposit and total loans of the commercial banks has expanded. This pattern showed an upward trend and reached RM820,951.9 million and RM631,899.6 million respectively in 2007. In 1970, the total deposit and total loans of commercial banks were only RM3,391.8 million and RM2,359.6 million respectively.

However, the ratio of commercial bank deposits to total assets of banking system (TOA) showed a mix trend. In 1970, ratio of commercial bank deposits to TOA was 45% and decreased to 41.4% in 2003. Starting from 2004, ratio of commercial bank deposits to TOA showed an upward trend and reached 54.3% in 2006 and finally decreased to 49.7% in 2007. The ratio of loans to TOA showed no trend

or pattern (there is no upward or downward pattern), the range of ratio is around 32 to 41 percent. In 2000, the ratio of loans to deposits declined quite substantially due to Asian financial crisis in 1997/1998. The Asian crisis has affected the financial sector as shown in Table 1, column 7 under ratio of loans to deposits. Both loans and deposits are normally used in literature as they capture the strength of financial intermediation from savers to investors.

Table 1: Selected Financial Indicators of Malaysian Commercial Banks 1970-2007

| Year | Total assets = Total liabilities (A) | Deposit (B) | Deposits/TOA (%) | Loans (C) | Loans/TOA (%) | Loans/Deposits (%) |
|------|--------------------------------------|-------------|------------------|-----------|---------------|--------------------|
| 1970 | 4,460.2 | 3,391.8 | 45.0 | 2,359.6 | 31.7 | 69.6 |
| 1980 | 32,186.1 | 23,326.3 | 42.9 | 21,031.1 | 38.7 | 90.2 |
| 1990 | 129,284.6 | 62,259.1 | 27.9 | 80,758.0 | 36.1 | 129.7 |
| 2000 | 512,714.7 | 362,991.2 | 43.7 | 303,366.6 | 36.6 | 83.6 |
| 2001 | 529,735.5 | 368,791.8 | 42.6 | 324,922.1 | 37.6 | 88.1 |
| 2002 | 563,254.1 | 388,405.5 | 42.0 | 337,994.6 | 36.6 | 87.0 |
| 2003 | 629,975.3 | 433,007.5 | 41.4 | 355,610.1 | 34.0 | 82.1 |
| 2004 | 761,254.8 | 550,929.5 | 46.3 | 447,453.3 | 37.6 | 81.2 |
| 2005 | 884,599.5 | 644,891.1 | 50.4 | 524,722.8 | 41.0 | 81.4 |
| 2006 | 1,027,812.7 | 768,084.9 | 54.3 | 580,355.8 | 41.0 | 75.6 |
| 2007 | 1,145,816.0 | 820,951.9 | 49.7 | 631,899.6 | 38.3 | 77.0 |

Source: Bank Negara Malaysia's Statistical Bulletin (various issues). The figure for assets, loans and advances, and deposits are in RM million. TOA refers to total assets in banking system

In order to widen the financial sector, the government of Malaysia has also concentrated on promoting the stock market, Bursa Malaysia. Table 2 shows the key performance indicators of the market from 1980 to 2007. As shown in the table, the number of listed firms has increased over the years except in 2007. Importantly, after the Asian crisis 1997/1998, the size and liquidity of Bursa Malaysia had increased drastically as indicated by the value of turnovers and market capitalization. In 1990, the value of turnover was RM29,522 million.

Then, this figure increased eightfold to RM244,054 million in 2000. The market capitalization also increased the turnover value in 2000. The rapid growth of the Malaysian stock market prior to the Asian crisis was forced by many factors, for example, government policy through privatization policy and large portfolio investment inflows during the late 1990s.

Table 2: Selected Performance Indicators of Bursa Malaysia 1980-2007

| Year | Numbers Listed firms | Composite index | Value of turnovers (RM million) | Value of turnovers/ TOA (%) | Market capital (RM billion) | Value of turnovers/market capital (%) |
|------|----------------------|-----------------|---------------------------------|-----------------------------|-----------------------------|---------------------------------------|
| 1980 | 250 | 366.7 | 5,600 | - | - | - |
| 1990 | 285 | 505.9 | 29,522 | 13.21 | 131.7 | 22.42 |
| 2000 | 795 | 679.6 | 244,054 | 29.41 | 444.4 | 54.92 |
| 2001 | 812 | 696.1 | 85,012 | 9.82 | 465.0 | 18.28 |
| 2002 | 868 | 646.3 | 116,951 | 12.65 | 481.6 | 24.28 |
| 2003 | 906 | 793.9 | 183,886 | 17.57 | 640.3 | 28.72 |
| 2004 | 963 | 907.4 | 215,623 | 18.12 | 722.0 | 29.86 |
| 2005 | 1,021 | 899.8 | 177,321 | 13.84 | 695.3 | 25.50 |
| 2006 | 1,027 | 1,096.2 | 250,641 | 17.71 | 848.7 | 29.53 |
| 2007 | 987 | 1,445.0 | 540,173 | 32.70 | 1,106.2 | 48.83 |

Source: Bank Negara Malaysia's Statistical Bulletin

3. Theoretical framework

This paper builds on significant literature examining the relationship between financial system and investment. These literatures include empirical studies in financial development; and financial systems design and firm investment, either theoretically or empirically. The role of financial development in the process of economic development has been recognized in many literatures. The earlier study, for example, Schumpeter (1911) recognizes that entrepreneurs need credit to finance

the invention of new production techniques. Here, banks are seen as important agents in facilitating these financial intermediating activities and promoting long term economic development effect. The positive correlations between indicators of financial development and economic growth over long term reflect the importance of the financial sector. This view, later, was also supported by Goldsmith (1969), Shaw (1973) and MacKinnon (1973). In this paradigm, financial development is seen as exerting positive effects on economic growth.

Conversely, a few economists do not agree that the financial development play a vital role in accelerating economic growth. Among them are Robinson (1952), Lucas (1988) and Chandavakar (1992). Robinson (1952) questions the one-way causality effect between financial development and economic growth. Lucas (1988) argues that economists badly overstress the evidence of finance. Chandavakar (1992) believes that finance has little importance and only responds passively to economic growth. Likewise, financial development is shown to be passive to economic growth although there is higher demand for financial services.

Therefore, the general consensus among economists on the relationship between financial development and economic growth is never exist. Hence, a large body of empirical studies have been directed towards other issues. Among the issues is resolve the contrasting findings of data sample and financial designs. The former issue was addressed by King and Levine, 1993; Levine, 2002 and Ang, 2008. Their empirical studies have found that the level of financial development is a better predictor of economic growth. King and Levine (1993) also believe that financial systems influence long-term economic growth. Their findings show that financial systems affect the entrepreneurial activities and lead to productivity improvements. Their findings are consistent with others such as Beck, Levine and Loayza (2000), Levine and Zervos (1998), Gregorio and Guidotti (1995).

While Levine (2002) leads the later issue. He examines the degree to which a country's financial system is designed, i.e., market-based or bank based and use a broad cross-country dataset. His empirical finding supports the financial services, law and finance views and growth. He finds that by distinguishing countries based on their level of financial development can help in explaining cross-country difference in

economic growth. However, distinguishing countries by their financial structure does not help much in explaining cross-country differences in long-run economic growth. Indeed, his finding that relates with financial structure is similar to Wurgler (2000), Demirguc-Kunt and Maksimovic (2002) and Beck and Levine (2002). They found that the financial structure is not significant in the classification of market-based or bank-based view.

Beside the cross-country studies, other individual country case studies have also been carried out (Demetriades and Luintel, 1996; Thangavelu and Ang, 2004; Ang and McKibbin, 2007). These studies mainly focus on testing the Granger causal relationship between financial development and economic growth. Later, Ang (2008) finds that Malaysia has significant improvement in its financial system. His results show that financial development has a significant positive impact on economic growth in Malaysia. Another implication from his result is that the financial constraints imposed on the Malaysian financial system seem to have helped deepen the financial system.

Other studies, for example Beck and Levine (2004) and Naceur and Ghazouani (2007) use a panel data set. Their estimation technique is based on a dynamic panel model with GMM estimators. Beck and Levine (2004) analyze the link between stock market, bank development and economic growth in a panel of 40 countries. They find both stock markets liquidity and bank development positively influence economic growth. Nevertheless, Naceur and Ghazouani (2007) find no significant relationship between banking and stock market development and growth in 11 MENA region countries. In fact, the association between bank development and economic growth is negative after the stock market development is controlled.

The theory of firm investment should be integrated with the theory of financial systems. It is because the financial system design has obvious implications for corporate governance in the real sector; the differing corporate governance mechanisms in the U.S., Japan and Germany. It also reflects on the better functioning legal systems that make contracts easier to enforce and reduce monitoring costs and cost of direct lending and finally increase firms' investment.

One way to improve access to external finance is to aid in the development of a country's legal system, and then make firms and investors contract either directly as in a market-based system or through the intermediation of banks. The differences in the relative performance of the Japanese and the US economies have led the researchers to conclude that bank-based and market-based financial systems may produce different market environment. The effect of the legal and corporate finance can be viewed in [La Porta et al. (1997,1998), Demirguc-Kunt and Maksimovic (2002) and Chakraborty and Ray (2006)]. As a result, investment is higher, as is the growth rate of per capita income. From La Porta et al. (1997) it is found that the legal environment by both legal rules and enforcement influences the size and a country's capital markets. Moreover, La Porta et al. (1998) confirm the result of La Porta et al. (1997) that legal systems really matter for corporate governance whereby firms have to adapt to the limitations of the legal systems that they operate in. It also reflects the financial development explained by the legal rights and the efficiency of the legal system in enforcing those rights which is positively linked with long-run growth. Therefore, finding from La Porta et al. (1998) also lead to the market based system (US style) and bank-based system (Japanese style). However, the cross-country data by Levine (2002) provide no evidence for the bank-based or market-based views.

In line with the argument for bank-based systems in developing countries, an empirical study that investigates firms' access to external financing to fund growth has been done by Demirguc-Kunt and Maksimovic (1998, 2002). Demirguc-Kunt and Maksimovic (2002) examine the bank and market in developing and developed countries by using firm-level data for 40 countries. They find the proportion of firms in each country that rely on external finance differs across financial systems. They used the financial growth model based on Tobin's q , implicitly assuming that there is a positive correlation between firms' profit and their future investment opportunities from current valuations. In order to minimize potential bias, Demirguc-Kunt and Maksimovic (2002) control the differences in growth opportunities across countries by using the growth rates in GDP. The importance of the legal system on financing is consistent with the emphasis in La Porta et al. (1998). However, their finding shows that the legal system in developing and developed countries access to external finance, stock markets and the banking system are differently affected.

While, the survey of the role of financial market development in the financing choice of firms in developing countries have been done by Agarwal and Mohtadi (2004) using a dynamic panel approach with aggregate firm level data. The findings show that stock market variables are significantly and negatively associated with the firm debt levels relative to their equity position, while banking sector variables are positively associated with debt equity ratio. Their findings also confirm the results of the study done by Razin, Sadka, and Yuen (1998) on the issue that both external debt and equity flows are more likely to take place in a more open economy than a closed one. They use a foreign direct investment (FDI) as a measure of capital inflows.

The following sections of this paper will examine the firm investment with financial system design variables and bank health measures variables.

4. Research design

In this section, the discussion will focus on the regression model of financial system design and bank health measures to firm growth in investment. The dependent variable is represented by the firm growth in investment. While, the independent variables consist of bank variables, capital market variables, bank health measures variables and macroeconomic variables. A generalised method of moments (GMM) is employed to examine the panel data analysis of regression model in the period from years 2000 to 2007. Panel data analysis allows for both cross sectional and time series effect that simply cannot be observed in pure cross-section or pure time series (Baltagi, 2008).

4.1 The model

The basic model follows Demirguc-Kunt and Maksimovic (1998, 2002) but design variables, bank health measures variables and Tobin's Q variable are added in this study. The *BANK* and *CAPMKT* variables are used as proxy for design. *BH* refers to bank health measures (RWCR and CCR). The basic regression model for investment and financial system design can be written as follows:

$$Investment_{it} = \alpha + \beta_1 BH_{it} + \beta_2 Design_{it} + \beta_3 Q_{it} + \beta_4 GDP_{it} + \beta_5 FDI_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

where *Investment* uses the growth of firms in total assets which represent the growth investment of firms as dependent variable.

Further, firm growth in investment equations are as follow:

$$\begin{aligned} Investment_{it} = & \alpha + \beta_1 RWCR_{it} + \beta_2 BANK_{it} + \beta_3 CAPMKT_{it} + \beta_4 GDP_{it} + \\ & \beta_5 Q_{it} + \beta_6 FDI_{it} \\ & + \mu_i + \varepsilon_{it} \end{aligned} \quad (2)$$

$$\begin{aligned} Investment_{it} = & \alpha + \beta_1 CCR_{it} + \beta_2 BANK_{it} + \beta_3 CAPMKT_{it} + \beta_4 GDP_{it} + \\ & \beta_5 Q_{it} + \beta_6 FDI_{it} \\ & + \mu_i + \varepsilon_{it} \end{aligned} \quad (3)$$

BANK refers to the *BDEPOSIT*, *BLOAN* and *BANKASET*. *BDEPOSIT* is the ratio of total bank deposit over total assets of financial institution. *BLOAN* is the ratio of total bank loans over total assets of financial institution. *BANKASET* is the ratio of bank assets over total assets of financial institution. *CAPMKT* refers to the *MC* and *TOR*. *MC* is the ratio of market capitalization over total assets of the financial institutions. *TOR* is the ratio of total value of shares traded in the stock exchange over market capitalization. *GDP* is the real GDP growth rate. *Q* is Tobin's q. *FDI* refers to the Foreign Direct Investment. μ_i is the individual effect of firm *i* and $\varepsilon_{i,t}$ is the error term.

In this paper, the generalised method of moments (GMM) is used to test any relationship between investment and financial system design. This method developed by Arellano and Bond (1991) that provides convergent estimators and derives from the instrumental variables principles. Consistent with the previous literature, this paper assumes that the investment of the firm, I^* , is a function of a vector, X , of independent variables. These independent variables include the bank health measures, capital market, banking indicators and control variables. This can be formalized by the following equation.

$$I_{it}^* = \alpha I_{it-1}^* + \beta' X_{it} + \mu_i + \varepsilon_{it} \quad (4)$$

Therefore, this study utilizes the new technique of dynamic panel methodology that address suitable method in solving the endogeneity and serial correlation problems. The estimation technique used in this

study is based on a dynamic panel model with GMM estimators. The Demirguc-Kunt and Maksimovic (2002) only use the basic panel data to run the regression. In addition the several variables are added in the equation to capture the relationship between investment, bank health and financial system design.

4.1.1 Dependent variables

The percent change in total assets is used as proxy for growth opportunities for investment. Titman and Wessels (1988), Harris and Ravi (1991), Ghosh et al. (2000) and Ismail (2005), among others, suggest the growth of total assets is one of the indicators for growth opportunities. This variable is expected to generate future investments for the firms.

4.1.2 Independent variables

Based on the previous literatures that have been discussed in the earlier part, the exogenous factors have been identified into four main categories; the bank health measures, bank proxies, capital market proxies and macroeconomic conditions. The macroeconomic conditions are treated as control variables.

The bank health measures proxies

The list of bank health measures are as follows:

- a) *Risk Weighted Capital-adequacy Ratios (RWCR)*
- b) *Core Capital Ratios (CCR)*

Since data available for main bank in Malaysia is limited, thus this study cannot match each firm with its main bank like the main bank relation in Japan. In this study the RWCR and CCR are collected from notes to the Financial Statements of all commercial banks published by Bank Negara Malaysia (BNM). The average bank health measure of 22 Malaysian commercial banks is used to match with 300 listed firms in Bursa Malaysia.

The bank proxies

There are a number of bank proxies. They are as follows:

- a) *Ratio of total bank assets over total assets of banking system (BANKASET)*. This ratio is an indicator of the size of the banking sector in relation to the financial institution in the economy. Demirguc-Kunt and Huizinga (1998) find that Malaysia have relatively high ratios for both bank and capital market variables.
- b) *Ratio of total bank loans over total assets of banking system (BLOAN)*. This ratio is also an indicator of the size of the banking sector in relation to the financial institution in the economy. Higher bank loans with less non-performing loans will bring higher return depositors and shareholders or bank loans as the main source of revenue and positively affects profits (Bashir, 2000).
- c) *Ratio of total bank deposit over total assets of banking system (BDEPOSIT)*. As in the case of the previous measure, this ratio is also an indicator of the size of the banking sector. The total deposit money bank is used as a proxy to the efficiency of capital allocation that correlated with financial development (Demirguc-Kunt & Maksimovic 2002).

The capital market proxies

The list of capital market proxies are as follows:

- a) *Ratio of market capitalization over total assets of banking system (MC)*.

The assumption behind this measure is that overall market size is positively correlated with the ability to mobilize capital and diversify risk on the total asset of the financial institution.

- b) *Ratio of total value of shares traded in the stock exchange over market capitalization (TOR)*. This variable measures the organized trading of firm equity as a share of national market capitalization and therefore should positively reflect liquidity of an economy. The total value traded ratio complements the market capitalization ratio even though the market is large, there may be little trading occur.

The control variables

In order to isolate the contribution of financial system to the choice of firms in financial structure, other variables that may affect the financing choice of firms are being controlled. The control variables are as follows:

- a) *GDP*. The real GDP growth is the most direct measure of macroeconomic development. It is the first indicator of the demand for banking businesses, for example the extension of loans of growing investment activities, supply of funds such as deposits from customers. GDP is the most useful indicator of the business cycle, while the firms' growth model is expected to be related to the GDP cycle.
- b) *Q*. The Tobin's q is from the definition of Simple q in Perfect and Wiles (1994). The book value of total assets is used rather than the replacement value of total assets, as the denominator of simple q.
- c) *FDI*. The Foreign Direct Investment (FDI) is from the total of FDI divided by GDP. This figure is collected from the compilation of financial and investment income accounts of the balance of payments (BOP) and international investment position (IIP) statistics. The source is from Department of Statistics, Malaysia. These two statistics measure the openness of economy with the rest of the world and its net worth. According to Alfaro et al. (2004), countries with well-developed financial markets gain significantly from FDI. FDI as a measure of capital inflows that improve the external financing growth of firm and improve the growth of economy. In addition, FDI is used, as a control variable since it is presumed that FDI is a determinant of growth (Agarwal & Mohtadi 2004).

Sample data

Data were extracted from various sources. Worldscope was the main source of data for firm level. The total value of shares traded in the stock exchange divided by market capitalization. The total value of shares traded (TOR), market capitalization, bank deposit, bank assets, bank loans and total asset of banking system (TOA) are from Bank Negara

Malaysia, Annual Reports (various issues). While for macroeconomics variables, the data are collected from the World Economic Outlook, published by International Monetary Fund (IMF). Data for FDI (Foreign Direct Investment) is from Quarterly Survey of International Investment and Service in relation to FDI statistics, Department of Statistics.

There are two alternative measures of the bank health. The first measure is by identifying the name of commercial banks in Malaysia and matching them with the firm that has long term-debt. The relevant financial data are collected from Financial Statements of all commercial banks published by Bank Negara Malaysia (BNM).

The second method is by identifying the regulatory capital ratio. In Malaysia, the regulatory capital ratio was implemented with the aim of rebuilding and strengthening the balance sheets of commercial banks through management of capital adequacy positions that comply with BNM requirement. All banks are required to adopt a minimum standard of capital adequacy called the Capital Adequacy Ratio (CAR). The CAR is set at a minimum of 8% to prevent banks from going overboard in granting loans. The CAR is measured based on the amount of total equity divided by total weighted assets (risk). In the simplest formulation, a bank capital is the 'cushion' for potential losses, which protect the bank depositors or other lenders, thereby maintaining confidence in the banking system.

In collecting the CAR figures, the Risk Weighted Capital-adequacy Ratios (RWCR) and the Core Capital Ratios (CCR) are employed. This measure has been used in the literature to test the robustness of the result. Since data available for main bank in Malaysia is limited, thus this study cannot match each firm with its main bank like the main bank relation in Japan. In this study the CAR data is collected from notes to the Financial Statements of all commercial banks published by Bank Negara Malaysia (BNM). The average of RWCR and CCR of 22 Malaysian commercial banks are used to match with 300 listed firms in Bursa Malaysia.

In collecting the data for investment growth of firms as dependent variables, there are few steps that need to be considered:

First, firms' data are from listed companies in Bursa Saham Kuala Lumpur. The firms selected in this study are observed within the fiscal year between 2000 and 2007. The 2000 data were used for computing the percentage change on total assets as proxy for growth opportunities of firms. Second, reduce problems of heteroscedasticity (not equal variance) in selecting the firms' data for regression. The heteroscedasticity arise as a result of the presence of outliers. An outlier, is a difference, either very small or very large to the observations in the sample. The inclusion or exclusion of such an observation, especially if the sample size is small, can substantially alter the result of regression analysis (Gujarati, 2009). Thus, in selecting firms for this study, some outliers have been dropped from this sample. Third, the firms that are omitted are those which are suspended and fail to consistently produce their annual report for every year or more. Besides that, several observations are also deleted because of missing data for individual firm's variables necessary for the regression. Fourth, the market value of the firm is calculated as the sum of total liabilities, the value of the common stocks, and the estimated value of preferred stocks. The value of preferred stock is estimated as preferred dividend multiplied by 10. Himmelberg et al. (1999) and Aivazian et al. (2005) use the same definition. The market value of common stock is calculated as average stock price multiplied by number of shares of the firm. Fifth, since data available is limited, it is difficult to calculate the replacement value of assets. According to Perfect and Wiles (1994), replacement value of the firm assets is difficult to be estimated because active markets for used capital goods do not generally exist and cost reductions flowing from technological innovations are difficult to be calculated. Therefore, this study only uses Tobin's q according to the definition of Simple q in Perfect and Wiles (1994). The book value of total assets is used rather than the replacement value of total assets, as the denominator of simple q¹. Finally, after checking and screening for errors and missing variables, unbalanced panel data of 1498 observations among 300 firms are used for estimation.

¹ Tobin's Q in this study is (market value + liabilities)/book value of total assets. Aivazian et al. (2005) and Yuan and Motohashi (2008), use the similar method in calculating of Tobin's Q.

5. Empirical results

The estimation results of investment and financial system design are presented in Table 3, and Table 4. The estimation period is from 2000 to 2007. Table 3 shows the GMM-in differences estimation results for the investment growth of firms using RWCR variable in equation. In this case, RWCR is used as independent variables. The regression is estimated as unbalanced panel. From the null hypothesis under J test, the over-identifying restrictions are valid. It implies that GMM method is suitable to be used in this study. This method is similarly used by Agarwal and Mohtadi (2004) and Naceur and Ghazouani (2007).

The results show that bank health measure (RWCR) has a negative impact on firm investment at the 5% significance level. This negative RWCR – investment relationship is robust for column 2 and 6 only. This implies that when RWCR measure of the bank health deteriorated, the bank's lending attitude was not tightened and consequently the investment of firms increased between 2000 and 2007. However, this result does not support the finding from Fukuda, Kasuya and Nakajima (2005) that banks' attempts to improve these regulatory measures by decreasing the firm investment through tightening the banks' lending.

This can be explained from the government intervention in banking system. It implements prudent and conservative regulations on investment banks and finance houses which are designed to encourage bank's lending to firm investment after the 1997-1998 Asian financial crises. Due to that phenomenon, the lending activities were increased between 2000 and 2007 in Malaysia. This can be implemented by injecting large amount of capital into problematic banks, moving non-performing loans out of banks, and setting up rescue government organizations to deal with non-performing loans.

All the capital market variables show a significant effect although they have opposite effects on the firms' investment. For example in Column (1), capital market variable (TOR, MC) show a negative and significant effect. This implies that the negative effect is accounted by the imperfections of the capital market (Hatakeda, 2002). This is because, in the presence of capital market imperfections, the investment decisions of firms depend on not only marginal q but also financial variables such as cash flow and leverage (debt). This significant effect is consistent to the

Hubbard (1998) that the more constrained the access to capital markets, the greater the sensitivity of investment to financial variables. While, the entire bank variables show no significant effect on firm investment.

Table 3 GMM - in differences estimates of the relationship between investment growth and financial system design using RWCR

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---------------------|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|-----------------------|
| RWCR | -4.41E-05 (0.0002) | -0.0013** (0.0006) | 7.10E-06 (0.0002) | -00009 (0.0006) | -5.57E-05 (0.0002) | -0.0013** (0.0006) |
| BANKASET | 0.1697 (0.2819) | 0.2195 (0.2956) | | | | |
| BLOAN | | | 0.4222 (0.7015) | 0.5117 (0.6892) | | |
| BDEPOSIT | | | | | 0.1631 (0.2709) | 0.2106 (0.2836) |
| MC | -0.5527** (0.2674) | | -0.4263* (0.2348) | | -0.5498** (0.2648) | |
| TOR | | -1.5741** (0.7615) | | -1.1376* (0.6266) | | -1.5631** (0.7528) |
| GDP | 0.0547*** (0.0131) | 0.1006*** (0.0325) | 0.0498*** (0.0134) | 0.08189*** (0.0287) | 0.0535*** (0.0127) | 0.0987*** (0.0313) |
| Q | 0.0051 (0.0039) | 0.0051 (0.0039) | 0.0051 (0.0039) | 0.0051 (0.0195) | 0.0051 (0.0039) | 0.0051 (0.0039) |
| FDI | 0.7177** (0.3687) | 4.2219* (2.0152) | 0.7262** (0.3769) | 3.2605** (1.5954) | 0.7514* (0.4029) | 4.2409** (2.0309) |
| J-statistic | 11.87 | 11.87 | 11.87 | 11.87 | 11.87 | 11.87 |
| No. of firms | 300 | 300 | 300 | 300 | 300 | 300 |
| No. of observations | 1498 | 1498 | 1498 | 1498 | 1498 | 1498 |

Table.3: Using RWCR in independent variables. For J test (similar to Sargan test), under the null hypothesis that the over-identifying restrictions are valid. The J statistic is distributed as a $\chi^{(p-k)}$, where k is the number of estimated coefficients and p is the instrument rank.

***, **, * significant at the 1%, 5% and 10% level respectively. Standard errors are given in parentheses.

Both the GDP growth and FDI have positive impact on firm investment. It means that these control variables are important variables to firm investment. However, there is no identifying effect on Q variable.

Table 4 presents the estimation results for the investment growth of firms that using CCR in independent variables. The results in Table 4 are similar to those presented in Table 3. The basic specification is given in equation (4). The bank health measure (CCR) has a negative impact on firm investment at the 5% significance level. This negative

relationship is robust for column 2 and 6 only. The capital market variables show negative effects on firms' investment, implying the presence of capital market imperfections. This result is similar to those presented in Table 3 that using RWCR in independent variables.

Table 4 GMM – in differences estimates of the relationship between investment growth and financial system design using CCR

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---------------------|-----------------------|-----------------------|-----------------------|---------------------------|-----------------------|------------------------|
| CCR | -3.96E-05 (0.0002) | -0.0013** (0.0006) | -6.07E-06 (0.0002) | -0.0007 (0.0005) | -5.06E-05 (0.0001) | -0.0013 ** (0.0006) |
| BANKASET | 0.1769 (0.2588) | 0.4582 (0.3505) | | | | |
| BLOAN | | | 0.4195 (0.6137) | 0.7949 (0.6080) | | |
| BDEPOSIT | | | | | 0.1719 (0.2515) | 0.4420 (0.3381) |
| MC | -0.5547** (0.2656) | | -0.4268* (0.2277) | | -0.5522** (0.2636) | |
| TOR | | -1.7591** (0.8423) | | -0.9902* (0.5282) | | -1.7379** (0.8297) |
| GDPGROWTH | 0.0546*** (0.0131) | 0.1023*** (0.0333) | 0.0498*** (0.0127) | 0.0724** * (0.0227) | 0.0533*** (0.0126) | 0.0984*** (0.0311) |
| Q | 0.0051 (0.0039) | 0.0051 (0.0039) | 0.0051 (0.0039) | 0.0051 (0.0039) | 0.0051 (0.0039) | 0.0051 (0.0039) |
| FDI | 0.7192** (0.3674) | 4.6815** (2.215) | 0.7259** (0.3732) | 2.9623** (1.4138) | 0.7551* (0.4002) | 4.7263** (2.2421) |
| J-statistic | 11.87 | 11.87 | 11.87 | 11.87 | 11.87 | 11.87 |
| No. of firms | 300 | 300 | 300 | 300 | 300 | 300 |
| No. of observations | 1498 | 1498 | 1498 | 1498 | 1498 | 1498 |

Table.4: Using CCR in independent variables. For J test (similar to Sargan test), under the null hypothesis that the over-identifying restrictions are valid. The J statistic is distributed as a $\chi^2_{(p-k)}$, where k is the number of estimated coefficients and p is the instrument rank.

***, **, * significant at the 1%, 5% and 10% level respectively. Standard errors are given in parentheses.

The impacts of other variables on investment have the expected signs: Both GDP growth and FDI have positive impacts which are statistically significant at 10% and 5% significance level respectively. This is consistent with previous empirical evidence which states a firm is likely to have a larger investment when its country's economy is good.

The result above has provided some additional empirical evidence related to bank health measures and financial system design on investment in Malaysia. Therefore, the role of bank health measures and financial system design of a country is interrelated to each other. It can be seen that the variables of bank health measures, capital market and macroeconomic bring a great impact on firm investment.

5. Conclusions

The financial systems of some countries are designed as market-based (capital market design), whereas the financial systems of other countries are designed as bank-based (bank design). This paper investigates the impact of financial system design and bank health measures on investment in Malaysia. The findings show that: first, the bank health measures (RWCR and CCR) have a negative impact on firm investment. This implies that when the bank health deteriorated, the bank's lending was not tightened and consequently the investment of firms increased between 2000 and 2007. Second, the capital market variables show negative effects on investment due to the presence of capital market imperfections. Finally, both GDP and FDI have positive impacts that are consistent with previous empirical evidence which states that a firm is likely to have a larger investment when its country's economy is good.

From the policy implication perspective, it is suggested that the Malaysian government should: first, intervene the banking system in the case of bank health measures might give negative impacts on investment. It should be done by injecting large amount of capital into problematic banks, moving non-performing loans out of banks, and setting up rescue government organizations to deal with non-performing loans. Second, the more constrained to access to capital markets, the greater the sensitivity of investment to cash flow and leverage. It implies that the government should encourage the firms to maintain their cash flow in a good position and reduce their debt. Furthermore, debt is a signal of management's information about investment opportunities. It can be done by giving more incentive and tax exemption to these firms in operating their business.

As a conclusion it is recommended to the policy maker in Malaysia and other developing countries to intervene the policy that related with investment and financial design. It is because both of these variables are interrelated with each other and give much impact to the growth of economy in a country.

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