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## **Financing patterns, debt maturity and growth: Evidence from East Asia and the GCC Countries**

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### **Abstract**

The primary goal of this paper is to quantify the impact of financing constraints on corporate growth. For this, we use a sample of 1588 firms from the GCC and East Asia during the period 1999-2007. Specifically, we examine the relationships between growth and (1) the availability of internal finance, and (2) the debt maturity of external financing using an accelerator investment model extended to account for the extent to which companies use internal finance, long term debt and short term debt to finance their acquisition of long term assets. A company is constrained not only because it cannot access credit but also if it cannot access long term finance. This paper therefore includes the maturity of the debt as an explicit variable that impacts corporate long term investment. Our evidence supports earlier findings that because of asymmetric information and other market imperfections, small companies face more financing constraints than large companies, and have difficulties accessing long term finance. Our results also

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provide evidence that corporations in East Asia face financing constraints while those in the GCC seem to have easy access to long and short term finance.

**JEL Classification numbers:** G30, G31, G32

**Keywords:** investment, asymmetric information, internal finance, external finance

## 1 Introduction

When investment opportunities exist, underinvestment occurs mainly because corporations are unable to obtain the amount and maturity of financing needed. They are therefore financially constrained. Financing constraints are determined by micro economic factors mainly asymmetric information and conflicts of interest between lenders and borrowers and macroeconomic factors like credit control policies and the legal and institutional environment in which corporations and financial institutions operate.

For example capital market imperfections like credit control and asymmetric information as well as poor rights protection for capital providers and the inability of financial intermediaries to efficiently manage risk or to collect reliable information and monitor the use of funds by borrowers make lenders reluctant to provide long term funds to those entrepreneurs whose risk is difficult to assess. They become therefore sources of financing constraints that can lead to suboptimal level of investment and therefore hampers economic growth.

The existence of financing constraints explains why some firms cannot access the external finance needed to finance their growth. This situation makes

investment sensitive to the availability of cheap internal funds as access to external funds is difficult or expensive.

In this paper we postulate that some categories of companies in different countries can not invest and create wealth because of unavailability of external finance in general and long term finance in particular; i.e. they are financially constrained. Our hypothesis is that financing constraints act as a barrier to investment and long term growth. This study is expected to contribute towards enriching the literature by providing recent evidence of the existence of financing constraints and their impact on debt maturity. In the aftermath of the 2008 global financial crisis, this study is timely as important implications can be drawn for the Industrial policy prescription of promoting corporate investment and economic growth if we find evidence that long term investment is constrained because of unavailability of appropriate credit.

The organization of this paper is as follows: section 1 provides the theoretical background for the existence of financing constraints. Section 2 provides an overview of the financial and lending systems in the countries covered by our sample, namely the GCC, Malaysia, Japan, Singapore and Taiwan; In section 3 we present the theoretical investment model that emphasizes the cash-flow sensitivity modified by adding other financial variables measuring the maturity of the new debt raised which will help understand how companies in different countries finance their growth and what type of financing (long-term or short term) do they use. Section 4 provides the results of the empirical study. Concluding remarks are given in the last section.

## 2 Literature review on financing constraints

In a world of perfect capital markets where there are no bankruptcy costs, no agency problems, and no asymmetry of information exists, the financial policy of the firm would be irrelevant and the choice between internal capital, debt and equity will not impact investment [23]. However, because of asymmetric information, conflict of interest between insiders, shareholders and lenders, internal financing does not represent a perfect substitute for external financing and therefore the financing choices made will matter to a company.

*Limits to equity financing:* Myers and Majluf [25] propose a realistic theory of financing (the pecking order theory of financing) in which, in a world with asymmetric information, issuing new equity is perceived by the market as a signal of overvaluation and will negatively impact stock prices, thus corporations should use first their internally generated financing, second debt, and only as a last resort equities. Corporations for these reasons are therefore reluctant to issue new equity and will forgo good investment opportunities if they also have scarce internal resources or are unable to raise debt financing.

*Limits to debt financing:* Lenders may restrict lending because of adverse selection and moral hazard problems. When some default risk exists or is difficult to assess because of asymmetric information, lenders may require collateral or increase interest rates to include a risk premium or simply reject the loan application. Leland and Pyle [18] developed a signaling model of financial structure in which entrepreneurs seek financing of projects whose true qualities are known only to themselves. In this model, they show that entrepreneurs' willingness to invest in their own project (this serves as cash collateral) can serve

as a signal of project quality and thus reduces asymmetry of information. In this case also the scarcity of internal resources will lead to limited external financing.

According to Stiglitz and Weiss [33], when banks increase collateral requirements in order to distinguish between low and high risk borrowers, they may indirectly influence their average risk exposure as wealthier borrowers (who have more collateral) may be willing to undertake more risk; this is a case of moral hazard. Furthermore, allocating credit by varying interest rates will influence the quality of the borrowers as only those managers of a project with a high probability of failure will be willing to pay high interest rates; this is known as adverse selection. These considerations, not only constrain access to external financing and thus restrict investment, but also can lead to bank failure.

To summarize the above points, first, a firm can be financially constrained when it faces high costs of debt or is even denied access to credit entirely. It can also be constrained by being denied access to long term finance if interest rates are controlled and hence cannot be raised high enough to include an adequate risk premium. Second, because of asymmetric information, the loan officer might not be able to gather reliable information in order to assess the riskiness of the project to be funded and hence restricts lending. Third lenders may be reluctant to provide financing because of moral hazard or adverse selection problems. Finally, the legal and institutional environment may lead to credit rationing if there are contract enforcement problems or poor legal protection for credit providers. These considerations evolve into suboptimal investment and restrict economic growth.

*Which companies are more subject to financing constraints?* Companies are evidently not equal in the degree of financing constraints they face; small companies face more financing constraints because of the asymmetry of

information, the lack of internal resources or the inability to offer valuable assets as collateral and will have limited growth possibilities compared to large companies. Larger companies enjoy a wider coverage by the financial media and can provide valuable collateral which impacts in a positive way their debt capacity.

*Financing constraints and the maturity of the debt raised:* The existence of financing constraints explains also why corporations might not access long term finance: banks with not enough information about the future use of the funds granted would monitor and control the borrower better via short term loans; long term finance becomes therefore reserved for big well known companies that suffer little from asymmetric information. Therefore the maturity structure of the debt will be impacted by financing constraints; there will be a shortage of long term finance while companies need long term finance in order to invest in long term projects without worrying about the risk of liquidation when their projects do not provide an immediate return, [12]. Therefore the lack of availability of long term finance will result in a squeeze on working capital and negatively impact productivity. (Nevertheless the disciplinary effect of short term debt, because it requires continuous monitoring, may force firms to be more productive in the short run, [12]).

While extensive empirical research shows a link between financing constraints and investment in many countries (Fazzari, Hubbard and Petersen [5] for US firms, Hoshi, Kashyap and Scharfstein [10] for Japanese firms, Harris, Schiantarelli and Siregar [8] for Indonesian firms, Hermes [9] for Chilean firms, Gelos and Werner [7] for Mexican firms, Bahlous and Nabli [3] for Tunisian

firms, Shena, Chien-An Wang [31], Ismail, Ibrahim, Yusoff, and Zainal [13] for Malaysian companies, Koo and Maeng [15] for Korean companies, Wen-Cheng Lu and Kuang-Hsien Wang [20] for Taiwanese firms and many others), only few studies attempted to assess the access to long term finance and its impact on growth. Kunt and Maksimovic [16] examined the maturity of the debt in 30 developed and developing countries during the period 1980-1991. Their results show that in developed countries, firms seem to have long-term debt as a greater proportion of their total debt. They argue that this result cannot be explained by matching of maturities of assets and liabilities as firms in developing countries have higher proportions of net fixed assets to total assets. Also, large firms have more long-term debt as a proportion of total assets compared to smaller firms. They also investigated the structure of financial institutions as a determinant of firms' financing choices and conclude like Kunt and Maksimovic [17] that the variation in the level of activity of the stock market explains financing choices for large firms. In countries with active stock markets, large firms have more long-term debt and debt of longer maturity. According to this study, economic growth is enhanced by the availability of long term finance.

Meghana, Ayyagari, Kunt and Maksimovic [2] studied many features of the business environment as obstacles to firm growth. Using a major firm level survey where firms report being affected by lack of security and enforcement of property rights, malfunctioning of financial markets, poor provision of infrastructure services, inefficient regulations and taxation, and broader governance features such as corruption and macroeconomic instability, they showed that many of these perceived obstacles are correlated with low performance. They define an obstacle to be binding if it has a significant impact on firm growth. Their regression results

indicate that only Finance, Crime and Political instability emerge as the *binding constraints with a direct impact on firm growth*. Their findings also provide evidence that larger firms are less affected by financing constraints than small or medium sized firms and that the cost of financing is the only financing constraint that seems to directly affect firm growth. Other obstacles investigated like excessive paperwork, lack of access to long term financing and collateral requirement do not seem to significantly affect firm growth. Love [6, 19] shows that the sensitivity of investment to cash flow depends negatively on financial development which suggests that in countries where the financial system is underdeveloped companies can only invest if they generate enough cash flow.

Many other studies investigate the firm-bank relationship as a way to alleviate asymmetry of information and to reduce financing constraints. The methodology used to measure the degree of financing constraints is the sensitivity of investment to internal funds. Hoshi, Kashyap, and Scharfstein [10] find that the cash flow sensitivity of investment in Japan depends on the bank firm relationships and also ascribes lower financing-constraints of *keiretsu* firms to the banking system in Japan. Semenov investigates the sensitivity of investment to internal funds and found that in countries with close bank-firm relationships investment is less sensitive to the availability of internal funds. They conclude that close ties in firm bank relationship helps reduce asymmetry of information. Park, Park and Yoon [26] highlight a positive effect of cash stock on investment for firms with a distant relationship with banks in Korea. Koo and Maeng [15], using Korean firm level data, find that investment for firms with higher bank debt ratio responds less sensitively to cash flow. They conclude that a close bank relationship improves the accessibility to external funds by firms.



### **3 Overview of the economic and financial reforms in the East-Asian and GCC countries**

*East-Asian:* Since 1970, East Asian countries have undergone various restructuring programs aiming to liberalize the financial sector by lifting restrictions on both interest-rate ceilings and the type of lending allowed. Lending increased dramatically until 1997 at the onset of the Asian financial crisis. The lending boom following the financial liberalization fueled by extraordinary rates of growth in per capita income resulted in the deterioration of the balance sheets of lending institutions and the proliferation of bad loans.

Mishkin [22] explains that reasons for excessive lending in the south Asian countries are the lack of expertise in risk management and the inadequacy of the regulatory and supervisory systems that characterized financial markets after the liberalization. Moral hazard and adverse selection problems caused by asymmetric information and by the confidence in government intervention to bailout excessive risk takers lead to the financial crisis, [22]. East Asian countries were known at that time for their weak financial regulation and supervision system.

The lessons learnt from this financial crisis were that more regulation as well as well-trained loan officers and risk assessment systems need to be implemented. Starting from 1998, south Asian countries adopted new policies to remake the banking and financial system. The countries least hit by the crisis were: Japan, Taiwan, Malaysia and Singapore. Even though Taiwan, Malaysia and Singapore had better supervisory and monetary system before the crisis, they implemented reforms to deal with non performing loans and to tighten banking and financial regulation and supervision in the lending system. In this study we focus on

financing constraints on the corporate sector during the post-crisis period 1999 till 2007, which was a recovery period for Malaysia, Singapore and Taiwan but not yet for Japan.

Japan similarly experienced an asset bubble of unprecedented proportions from 1985 to 1990. During this period Japanese banks were engaged in excessive lending fuelling the surge in asset prices *“From 1990, this bubble began to burst--first with a plunge in the Nikkei Stock Index, followed in early 1992 by a tumble in land prices. Both developments had a severe impact on the ability of corporate and individual borrowers to repay loans. The bursting of the bubble thus left banks throughout Japan--both large and small--in financial distress, burdened with massive amounts of bad debt”*, [1]. It is now well documented that the road to recovery for Japan was the longest. The deepening of Japan’s banking and financial sector crisis from 1997 led the Japanese authorities to implement reforms to tackle the bad debt problem and initiate fundamental financial system regulations in conformity with international best practice standards as promoted by the International Monetary Fund (IMF) and the World Bank.

Because of government’s delay to deal aggressively with the bad debt problem it was not until late 2003 that some recovery signs started to be seen. After the long period of stagnation in Japan, the strengthening of the financial system together with a political will to initiate the necessary reforms led to the recovery of the corporate sector. Year 2007 was the fourth year of healthy economic growth supported by a stronger financial sector and by healthier financial institutions that are no longer burdened by bad loans. Balance sheets have been cleaned up and lending is once again on the agenda, [29]. The question

raised at this juncture is how did companies fund their investment projects during the post-crisis period? If companies were, during the period of analysis, financially constrained, their investment and growth would be linked to their ability to generate cash flows internally.

**GCC:** During the period of 2000-2009, several banking system reforms took place in the GCC countries which comprises Oman, Qatar, Kuwait, Bahrain, Saudi Arabia and United Arab Emirates (UAE). Historically, the banking system played a significant role in the financial intermediation in most of these countries.

The banking sector in the GCC is mainly characterized by ease of access to bank credit and the competitive environment in which commercial bank markets operate. The policy of almost no direct government intervention and free entry of foreign banks is likely to have made local banks more efficient during this period. As a result, the GCC countries have well-developed, technologically advanced banking systems which are integrated with the other economies of the world, [4]. Bahrain is observed to have a greater diversity and sophistication of the banking system compared to the other GCC countries. The rest of the GCC countries like Oman, Qatar and Kuwait rely more on the public sector; countries like Saudi Arabia and United Arab Emirates, on the other hand, have few foreign banks operating in their market.

Starting from the year 2000, the GCC region in general, has been experiencing periods of excess liquidity. The funds are generally channeled to the local banks or branches of foreign banks. During the oil boom period of 2003-2008, most GCC countries especially Qatar and UAE experienced a remarkable increase in banking system credit to private sector. The real average

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credit growth was almost 23 percent a year which led to increasing bank leverage and almost doubled the ratio of private sector credit to non-oil GDP to 122 percent in 2008, [14] .

As of 2008, there were about USD205 billion in deposits in Saudi banks, USD173 billion in the UAE and USD50 billion in Qatar [30]. Banks were therefore eager to lend and their involvement in industrialization was regarded “massive”. Large loans were provided to firms either directly or in syndication between various banks.

Based on the above analysis, one should expect to find evidence of financing constraints in the East Asian countries as a result of the tight regulations and reforms of the lending industry in the post crisis period. On the contrary, we expect to find no significant financing constraints in the GCC because of the excess liquidity and the easy lending process during the same period.

## **4 Analysis of firms financing structure in the GCC and East Asian countries**

### **4.1 Data description**

In this study we use balance sheet and income statement data of 1588 active companies from Japan, Malaysia, Taiwan, Singapore and the GCC. This data set retrieved from Mergent database consists of companies from the manufacturing sector for which the data were crosschecked and for which at least 4 years of consecutive observations are available during the period 1999 till 2007. Our sample contains 1176 companies from Japan, 47 companies from the GCC, 210

companies from Malaysia, 72 companies from Taiwan and 86 firms from Singapore. Our companies are from different sizes and not all of them are listed in the stock market.

We seek to test for the existence of financing constraints due to asymmetric information and or other market imperfections for the selected countries. We therefore, grouped the companies by size based on the average amount of assets during the period of analysis. A company is classified as small if the average total assets during this period is lower than the median of the sample and is considered large otherwise. We also did the classification according to the number of employees and the final results are not significantly different. Table 1 reports some descriptive statistics of the data.

Table1: Descriptive statistics and debt analysis of our sample  
by size and by country

Country	Number of firms	Average number of employees	Median number of employees	LTD/TD median	LTD/K median	LTD/TA median	TD/TA median	Growth rate of K median
<b>Malaysia</b>	210	3249	723	0.189	0.134	0.079	0.48	0.027
<i>Small</i>	115	588	474	0.046	0.109	0.047	0.471	0.024
<i>Large</i>	95	5482	1728	0.254	0.195	0.114	0.512	0.031
<b>Japan</b>	1176	7103	1659	0.19	0.221	0.10	0.62	0.030
<i>Small</i>	586	1409	913	0.146	0.196	0.087	0.60	0.021
<i>Large</i>	590	17385	6417	0.206	0.282	0.128	0.642	0.031
<b>Singapore</b>	86	4554	600	0.146	0.157	0.066	0.50	0.025
<i>Small</i>	48	716	370	0.111	0.136	0.045	0.514	0.023
<i>Large</i>	38	8279	1683	0.185	0.189	0.085	0.496	0.022
<b>Taiwan</b>	72	7178	2953	0.278	0.236	0.121	0.502	0.067
<i>Small</i>	36	2686	1024	0.168	0.158	0.081	0.456	0.048
<i>Large</i>	36	11905	4800	0.205	0.247	0.108	0.538	0.073
<b>GCC</b>	47	3935	818	0.311	0.251	0.151	0.46	0.122
<i>Small</i>	26	196	179	0.371	0.258	0.186	0.52	0.134
<i>Large</i>	21	6771	3732	0.266	0.233	0.125	0.41	0.088

## 4.2 Ratio analysis of the debt structure: some stylized facts

In this section we explore the impact of financing policies and/or asymmetric information on South East Asian manufacturing firms and the GCC countries via the analysis of some indicators of financial structure for groups of firms which by assumption are facing different degree of financing constraints (ie. small vs large). The following indicators of financial structure are therefore calculated (Tables 1, stock variables are valued end-of-year):

- TD/TA: total debt to total Assets ratio.
- LTD/TD: ratio of long term to total debt.
- LTD/K: ratio of long term debt to fixed assets.
- LTD/TA: ratio of long term debt to total assets.

Figures 1-5 below present the stylized facts of the impact of financing and credit policies in the South East Asian countries and the GCC, where capital structure and the debt maturity of the companies in different groups and countries are highlighted.

From the above figure, the total debt ratio (TD/TA) of the total sample shows that companies in Japan have the highest debt ratio (62%) as compared to companies from Malaysia (48%), Taiwan (50%), Singapore (50%) and the GCC (46%). Indeed earlier studies about Japanese companies documented that Japanese firms are more aggressive in their financing structure which can be explained by the Kieretsu system practiced in Japan, where the banking system has a close relationship with the firms (Hoshi, Kashyap, and Scharfstein [10] and Rajan and Zingales [27, 28]); This also corroborates recent findings by Shigeki Kunieda, Junichiro Takahata, and Haruna Yada [32] who report that the debt ratio of Japanese companies were very high during the 1970 till 1999 (around 80%) and

that after the financial crisis in the late 1990s, Japanese firms strove to reduce debt. The debt ratio of Japanese firms dropped to about 65% in 2005.

However, after 2005, the debt ratio has stabilized to around 64% and rose again in 2009 to 67%, [32]. Other studies about recent trend of Japanese lending system document that banks were often engaged in sham loan restructurings that kept credit flowing to otherwise insolvent borrowers and ensured lending to unhealthy borrowers (ever-greening) [34]. Taiwan comes next after Japan in the leverage. For instance the average debt ratio is 50% found is the same as what is report by the national statistics for the corporate sector in Taiwan (see [www.singstat.gov.sg/pubn/reference/yos11/statsT-corporate.pdf](http://www.singstat.gov.sg/pubn/reference/yos11/statsT-corporate.pdf)).

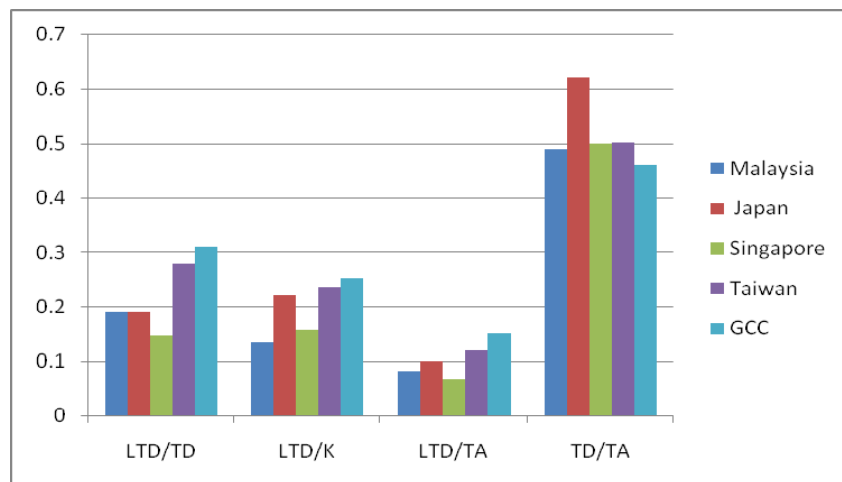


Figure 1: Capital Structure and debt Maturity for all companies by country

However, when it comes to what type of leverage long term or short term companies use, it is clear that the selected GCC companies have a much higher long term debt per dollar invested in stock of capital (LTD/K) or per dollar

invested in total assets (LTD/TA) or per dollar raised in debt (LTD/TD) than any other country covered by our study. It is interesting to note that the total debt ratio for GCC companies is lower than what is observed for Japan, Taiwan or Singapore. Hence, this infers that access to long term credit is easy for the companies from the GCC countries as opposed to the other selected countries. Indeed from the year 2000, the GCC region in general, has been experiencing periods of excess liquidity. During the oil boom period of 2003-2008, most GCC countries especially Qatar and UAE experienced a remarkable increase in banking system credit to private sector. We also note that companies in Taiwan seem to have the higher ratio of long term debts per dollar invested in the stock of capital than any other East Asian country in our sample which suggests a more efficient allocation of long term credit.

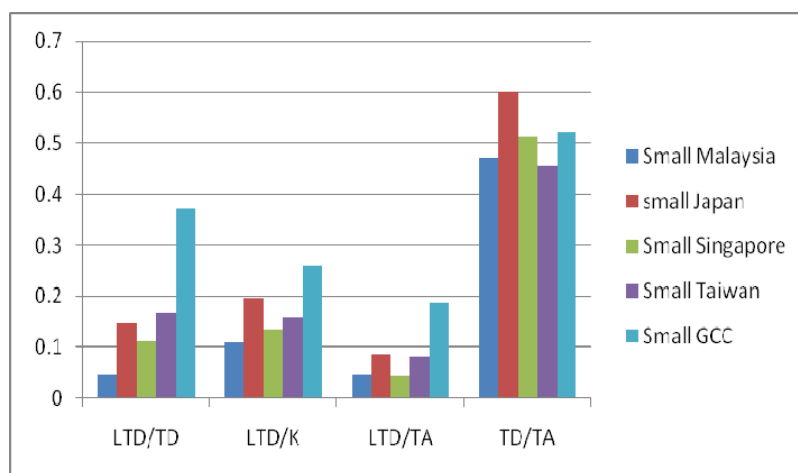


Figure 2: Capital Structure and debt Maturity for small companies by country

When we analyze the debt structure of the different size groups as shown in Figure 2, it appears that there is a different pattern of financing between the small



companies and the larger ones in the selected countries. For instance, in Japan, there exists the biggest gap in the use of long term finance between the larger companies and the smaller ones. It is clear that large companies in Japan benefit from a better access to long term finance than small companies.

Our ratio analysis also suggests that Malaysian companies are not using as much long term debt as their counterparts from other south East Asian countries. In fact Malaysian companies have the lowest ratio of long term debt per dollar invested in stock of capital and per dollar of total assets for our total sample and especially for the small companies; the ratio of long term debt per dollar invested in stock of capital for the larger companies is still lower than the other selected countries except for Singapore. Earlier studies also documented a more conservative lending system in Malaysia compared other Asian countries [24].

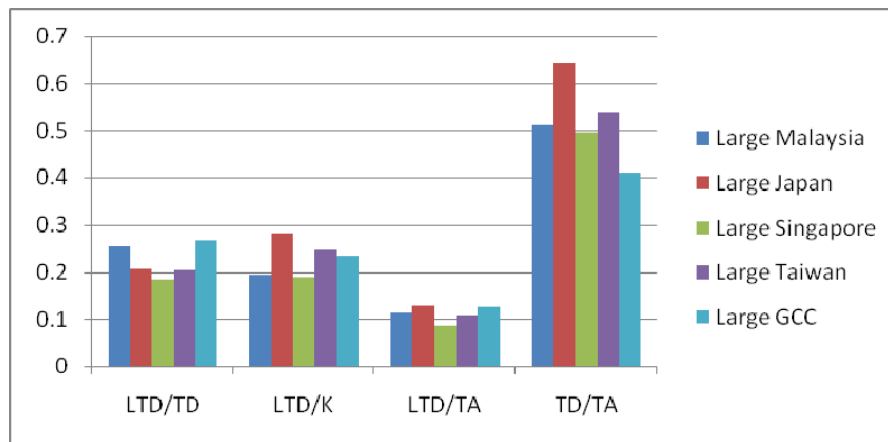


Figure 3: Capital Structure and Debt Maturity of Large Companies

Figure 4 and 5 compare the structure of the debt of the smaller companies and the larger ones by assessing the percentage of long term debt in the total debt and

the ratio of long term debt to Stock of capital LTD/K. Figure 4 shows clearly that in the GCC countries, companies enjoy a much better access to long term finance than any of the other countries studied.

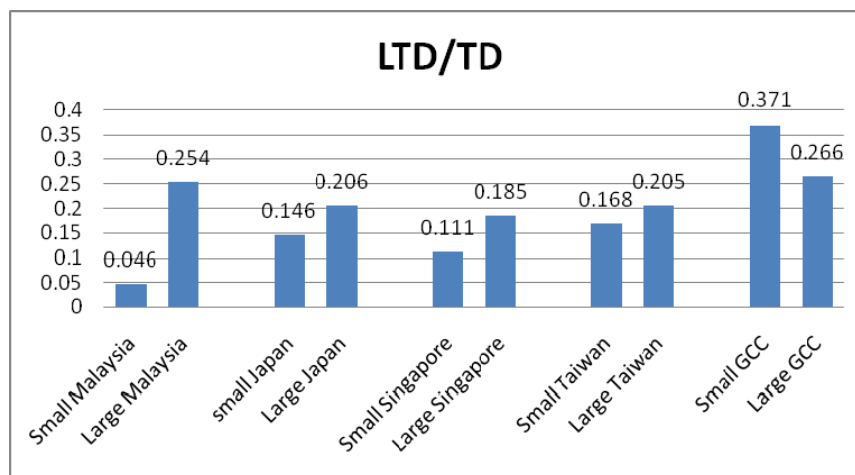


Figure 4: Long term debt as a percentage of total debt by size and country

Among the East Asian countries in our sample, in Taiwan and Japan, companies have more long term debt than companies in Malaysia or Singapore. Indeed Malaysian small companies have a much smaller percentage of long term debt than any other country as it evidenced in Figure 4. It is also observed that the gap between Malaysian larger companies and their smaller counterparts is also much bigger than for companies from other countries in our sample (see Table 1 for the value of the ratios).

The above analysis underscores the finding that patterns of financing vary across countries as well as between the different sizes of companies. First we find Japanese companies to be more aggressive in their financing structure which can be explained by the Kieretsu system practiced in Japan, where the banking system

has a close relationship with the firms (Hoshi, Kashyap, and Scharfstein [10] and Rajan and Zingales [27]). Malaysian companies on the other hand are the most conservative in their capital structure. The question that arises at this level is whether this different pattern of financing explains the differences in the growth rates of these companies as well as the varying rates of economic growth in these countries. We therefore proceed with the econometric models for testing for seemingly stronger financing constraints in Malaysia, Singapore than in Japan; Taiwan or the GCC countries.

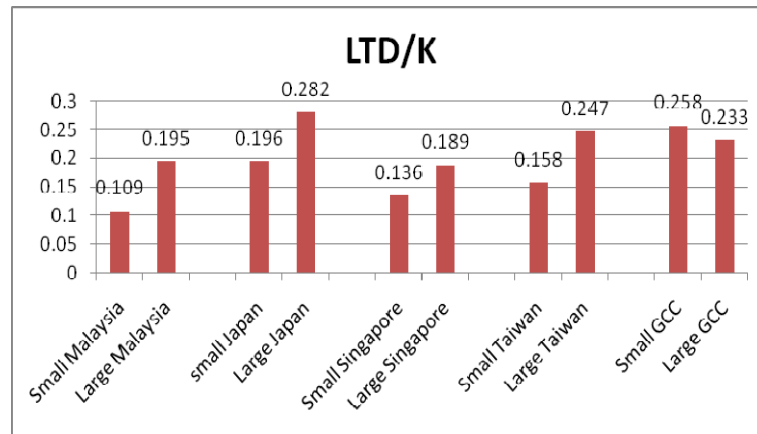


Figure 5: Percentage of stock of capital financed with long term debt by size and country

## 5 Theoretical Model of Growth and financing constraints:

### our test

#### 5.1 Methodology

Following the pioneering work of Fazzari, Hubbard and Petersen [5] for US firms, many attempt to further modify the accelerator model by adding new

variables, e.g. the amount of bank loans or the bank relationship or the amount of cash held or the collateral provided Bahlous and Nabli [3], highlight- the role of financial liberalization in Tunisia to ease financing constraints on small or non exporting companies. Other studies like Shena, Chien-An Wang [31], Ismail, Ibrahim, Yusoff, Zainal [13], Koo and Maeng [15] investigate the firm-bank relationship as a way to alleviate asymmetry of information and to reduce financing constraints. The methodology used to measure the degree of financing constraints is the sensitivity of investment to internal funds. Hoshi, Kashyap, and Scharfstein [10] find that the cash flow sensitivity of investment in Japan depends on the bank firm relationships and also ascribes lower financing-constraints of *keiretsu* firms to the banking system in Japan. Semenov investigates the sensitivity of investment to internal funds and find that countries with close bank-firm relationships investment is less sensitive to the availability of internal funds. They iterate that close ties in firm bank relationship helps reduce asymmetry of information. Park, Park and Yoon [27] highlight a positive effect of cash stock on investment for firms with a distant relationship with banks in Korea. Koo and Maeng [15], using Korean firm level data, find that investment for firms with higher bank debt ratio responds less sensitively to cash flow. They further conclude that a close bank relationship improves the accessibility to external funds by firms.

In this study we also use an investment equation to check for the existence of financing constraints on the corporate sector and to highlight the impact of financing constraints on the maturity structure of companies in Japan, Malaysia, Taiwan, Singapore, and the GCC during the recent period 1999 to 2007. The model is based on the standard accelerator hypothesis and is extended to account

for financing constraints as well as for the maturity of the new debt raised. The dependent variable is the change in fixed assets; the three explanatory variables included in this model are the change in sales, internal finance as measured by cash flow generated in the current year, the new long term debt raised measured by the change in the amount of long term debt; and the new short term debt raised measured by the change in the amount of current liabilities during the year. Finally we include dummy variables to account for industry differences.

Adding these new terms, the following model is tested:

$$\frac{\Delta K}{K_{i,t-1}} = \alpha_0 + \alpha_1 \frac{\Delta Y}{K_{i,t-1}} + \alpha_2 \frac{CF_{i,t-1}}{K_{i,t-1}} + \alpha_3 \frac{\Delta LTD}{K_{i,t-1}} + \alpha_4 \frac{\Delta CL}{K_{i,t-1}} + \alpha_5 \text{industry} + \varepsilon$$

With

$\Delta K / K_{i,t-1}$  the change in fixed assets of company i over the period t-1 to t, which is the measure of growth of capital stock for company i.

$\Delta Y / K_{i,t-1}$  is the change in sales to capital stock ratio which is expected to measure future profitability,

$CF_{i,t} / K_{i,t-1}$  is the cash flow to capital stock ratio,

$\Delta LTD / K_{i,t-1}$  is the change in the amount of long term debt to capital stock ratio.

$\Delta CL / K_{i,t-1}$  is the change in the amount of current liabilities to capital stock ratio since the previous year.

*Industry* is a dummy variable to account for the difference in the financing patterns in different industries.

The cash flow variable represents the willingness of the company to risk its own resources. This variable is expected to be non significant when firms are not financially constrained. It is also considered as We also considers that if a firm has difficulties obtaining external finance, its investment should display sensitivity to

the availability of cash flow. We also stratify the companies according to size, as one would expect that large companies are less subject to asymmetric information than small companies, and hence the cash flow variable which measures the availability of internal funds should not be a significant determinant of large firms' investment.

The impact of financing constraints on the choice of debt maturity will be captured via two additional variables; one measures the new long term debt raised during the year  $\Delta LTD$  which is the difference between the amount of long term debt in the ending of year balance sheet and the beginning of year balance sheet., and the other measures the new short term debt  $\Delta CL$  measured as the difference between the ending amount of current liabilities and beginning amount in the balance sheet. The assets-liabilities management principle requires the matching of maturities between assets and liabilities. Companies seeking to finance long term investments should raise long term finance while short term finance like revolving loans should be used to finance the working capital. If companies are constrained in their access to long term finance because of asymmetric information for example, they will be excessively using short term finance to fund their long term assets. This might make the company more vulnerable to financial distress. We postulate here that growth, as measured by investment in the capital stock, should be financed by long term debt or new equities if the company has easy access to long term finance and with internal cash and short term debt if the company is financially constrained.

To summarize our hypothesis one should look at the following financing patterns in companies:

- First the cash flow coefficient ( $a_2$ ) if significant, will suggest the existence of financing constraints. We expect that these constraints are binding only for small sized companies.
- We expect companies of different sizes to have different access to long term finance. For those companies that have easy access to long term finance their investment would be significantly sensitive to the change in long term debt and ( $\alpha_3$ ) would be positive and significant.
- If investment is more sensitive to new short term debt than to new long term debt, this would suggest that because of asymmetric information lending institutions would monitor better the borrower through short term finance. In this case companies would be considered as having difficulties accessing long term debt which would be also a form of financing constraints.

We estimate the model for each country using GLS method with White heteroskedasticity consistent standard errors and covariance on our panel of companies. Residual autocorrelation was also corrected using the AR variable in the model whenever the D-W syndicates a problem of autocorrelation. Finally we test for the possible multicollinearity between the dependent variables. We find no presence of significant correlation between and among the selected independent variables.

## **5.2 Financing patterns in the East-Asian and GCC countries: the results**

### **5.2.1 Malaysia**

Our results for Malaysian companies provide evidence on the existence of financing constraints only for the small sized firms. As shown by Table 1, the cash flow coefficient for small companies is positive and significant ( $a_2 = 0.202$ ). The coefficient of the variable new long term debt raised is not significantly different from zero. This result suggests that small firms invest mainly when internal finance and short term debt are made available which suggests some evidence on financing constraints.

It is interesting to note that, contrary to small sized companies, large companies do not seem to be limited in their growth opportunities in case of unavailability of internally generated cash flow. Indeed large companies can raise external long term finance to fund their new acquisition of stock of capital as shown by the coefficient of new long term debt  $a_3 = 0.857$  for large companies. This coefficient is higher than that for small companies ( $a_3 = 0.398$ ). This result suggests a bigger reliance on and an easier access to long term finance for large companies. The opposite is true for small companies where the coefficient of the new long term debt raised is not significant while the coefficient of new short term debt raised  $a_4 = 0.208$  is significant. Small companies, recourse more to short term finance than to long term debt in financing their long term investment. In other words, small companies are financing long term assets with short term debt and with internally generated funds. This finding seems to be inconsistent with the



fundamental tenet in finance of matching the maturity of assets and liabilities. Large companies are therefore not financially constrained as their investment is made possible during the period of our study due to the availability of external finance.

Table 2 : Malaysia/K

	R <sup>2</sup>	$a_0$	$a_1$	$a_2$	$a_3$	$a_4$
All companies	0.28	-0.039 (-0.93)	-0.002 (-0.14)	0.162 (3.26)**	0.443 (5.275)**	0.249 (3.69)**
Small	0.48	-0.059 (-3.52)**	0.156 (3.06)**	0.202 (3.17)**	0.398 (1.75)	0.208 (2.09)**
Large	0.40	0.002 (0.05)	-0.009 (-2.83)**	0.099 (1.18)	0.857 (8.64)**	0.305 (2.88)**

T statistic in parentheses under each coefficient, Method of estimation GLS with white heteroskedasticity-consistent standard error and covariance. F statistic is highly significant for all groups.

Our results also indicate that for small companies, the accelerator variable  $\Delta Y/K_{i,t-1}$  has a coefficient  $a_1 = 0.156$  and is positive and significant as expected in theory. This reflects that small companies increase their investment in capital stock when they have positive information about future sales. However this is not the case for large companies as their accelerator variable is negative and significant.

Based on these results it can be concluded that there is strong evidence that small companies in Malaysia are financially constrained during the period of study as their investment in capital stock is sensitive to the amount of cash flow

internally generated. Large companies' investment in contrast is not dependent on internal finance but is made possible thanks to long term debts as well as to short term debt. This result supports earlier findings by Ibrahim, Yusoff, Zainal [13] which document evidence that Malaysian listed companies are financially constrained. However, in their study they don't distinguish between small and large companies.

### 5.2.2. Taiwan

As shown in Table 3, when all companies are considered, the cash flow variable has a coefficient of  $a_2 = 0.215$  but not significant at the 10% level. The reliance on long term debt seems to be significant for all companies as the coefficient is positive and significant at a 5% level. It is interesting to note that the coefficient of the variable new long term debt raised is higher than the coefficient of the cash flow; it suggests that investment is more sensitive to the availability of new long term debt than to internal cash flow. When the sample is divided in two groups, (large and small) the cash flow variable appears to be positive and significant only for large companies  $a_2 = 0.551$ . This result is not consistent with our hypothesis that large companies depend on internally generated funds in order to finance their growth more than small companies. However, Taiwanese companies in our sample are generally labor intense companies compared to all other countries studied (see table for the number of employees by size and country in our sample) which could explain their easy access to external finance. Our results further suggest that the larger companies in our sample finance their

growth with internally generated funds as well as short term debts and long term debts, while the smaller companies only depend on the availability of long term debts.

Table 3 : Taiwan

	$R^2$	$a_0$	$a_1$	$a_2$	$a_3$	$a_4$
All companies	0.49	-0.124 (-4.34)**	-0.038 (-4.79)**	0.215 (1.73)*	0.821 (2.98)**	0.203 (6.74)**
Small	0.40	-0.152 (-3.27)**	0.056 (0.62)	0.0867 (1.56)	0.757 (2.56)**	0.026 (0.318)
Large	0.59	-0.060 (-1.63)	-0.081 (-3.64)**	0.551 (2.47)**	0.812 (2.73)**	0.362 (5.69)**

T statistic in parentheses under each coefficient, (\*) significant at 10% error level and (\*\*) significant at 5% error level Method of estimation GLS with white heteroskedasticity-consistent standard error and covariance. F Statistic is highly significant for all groups.

This result supports earlier finding by Shen and Wang [31] who demonstrate that investment is less sensitive to cash flow for firms with strong bank relationships because of the reductions in information asymmetry and by Wen-Cheng Lu and Kuang-Hsien Wang [20] who test for the impact of liquidity constraints on investment in Taiwan. It is also observed that the accelerator variable has a coefficient  $a_1$  positive but not significant for small companies while the coefficient has wrong sign for large companies.

### 5.2.3. Singapore

The results for Singapore are given in Table 4. Firstly, we note that the accelerator variable has the expected positive sign but is only significant for the larger companies: we can therefore infer that large firms in Singapore during the period of analysis are more likely to invest in response to recent changes in sales which convey information about future sales. Regarding financing constraints, our results also suggest that when the total sample is considered, the investment seems to be sensitive to the availability of internal cash flow but indicates also a strong recourse of the corporate sector to long term debt to finance their growth. When we divide the companies in our sample into two groups, our results for small companies show that the cash flow coefficient for small companies  $a_2 = 0.235$  is positive and significant. This finding provides evidence that small companies in Singapore are financially constrained as their investment is sensitive to the availability of internal funds. For large companies the cash flow coefficient  $a_2$  is not significantly different from zero which supports the view that large companies are not financially constrained and that they do not exhibit any sensitivity of investment to cash flow. This can be evidence of the impact of asymmetric information and other capital market imperfections on small companies.

The impact of new long term debt on investment is not significant for small companies when compared to the larger ones. The coefficient  $a_3 = 0.331$  is positive and significant for large companies and not for small companies. The coefficient  $a_4$  is significant only for small companies indicating a lack of availability of long term finance for the small companies as they are using current

liabilities to finance their investment in the stock of capital. Large companies, on the other hand, do not rely on current liabilities for their long term investments.

Table 4: Singapore

Size	R <sup>2</sup>	$a_0$	$a_1$	$a_2$	$a_3$	$a_4$
All companies	0.37	-0.045 (-1.88)	0.011 (1.35)	0.203 (2.71)**	0.250 (1.83)*	0.134 (2.18)**
Small	0.49	-0.039 (-0.70)	0.001 (0.017)	0.235 (3.38)**	0.261 (1.73)	0.171 (3.14)**
Large	0.23	-0.003 (-0.046)	0.06 (2.55)**	-0.001 (-0.01)	0.331 (2.46)**	-0.046 (-0.51)

T statistic in parentheses under each coefficient, Method of estimation GLS with white heteroskedasticity-consistent standard error and covariance. F Statistic is highly significant for all groups.

For Singapore our results suggest the existence of financing constraints leading to limited access to long term finance for small companies and to excess sensitivity of investment to the availability of internally generated funds. This therefore limits their growth due to unavailability of internal funds.

#### 5.2.4. Financing patterns in Japan

In order to investigate the financing constraints in the corporate sector in Japan, we test our model on the sample of 1176 companies from the manufacturing sector. The results are given in Table 5. The accelerator variable has the positive and significant coefficient  $a_1$  for the group of all companies when considered together but when we divide the sample into two groups

according to size it appears that only large companies are more likely to invest when they have positive information about future sales. It can be suggested here that large companies do have the rational behavior expected by the model.

The coefficient of the cash flow variable  $a_2$  measuring the sensitivity of investment to the availability of internally generated funds has a positive and significant coefficient for the total sample as well as for the two size groups. However the coefficient is higher for small companies than for the larger ones ( $a_2 = 0.194$  for the smaller companies and  $a_2 = 0.126$  for the larger ones) suggesting that small companies are facing more financing constraints than the larger ones. The cash flow generated can serve as cash collateral and signals the willingness of the company to invest its own resources. This could be the result of the reforms implemented which aimed to regulate and cleanup banks' balance sheets from the bad loans after the Asian financial crisis.

Table 5 : Japan

Size	R <sup>2</sup>	$a_0$	$a_1$	$a_2$	$a_3$	$a_4$
All companies	0.27	0.007 (0.41)	0.034 (3.18)**	0.169 (10.01)**	0.145 (3.46)**	0.121 (5.07)**
Small	0.23	0.014 (0.73)	0.009 (0.67)	0.194 (10.93)**	0.117 (2.72)**	0.153 (7.67)**
Large	0.27	0.003 (-0.49)	0.080 (5.21)**	0.126 (3.90)**	0.279 (2.56)**	0.068 (1.36)

T statistic in parentheses under each coefficient, Method of estimation GLS with white heteroskedasticity-consistent standard error and covariance. F statistic is highly significant for all groups.

Regarding the access to long term finance, our results suggest that all companies have access to long term finance. The coefficient  $a_3$  is positive and significant for all sizes. However the coefficient is higher for larger companies than for their smaller peers. On the other hand the coefficient of the change in short term debt  $a_4$  is not significant for the large companies but is positive and significant for the small ones. This result suggests that large companies in contrast to small companies do not use short term liabilities to finance fixed assets probably because long term finance is available when needed. The reliance of small firms on short term debt to finance long term investment suggests a poor asset liability management and supports also the hypothesis of financing constraints. The excess use of short term debt and the need of internal finance to finance long term assets after the crisis in Japan could be explained by the inability of Japanese firms to use collateral to get loans because of the deterioration of the value of land and other fixed assets which usually serve as collateral to reduce the asymmetry of information. This perhaps explains why small companies do need the cash collateral and use heavily short term debt.

This result on the existence of financing constraints in Japan complements our earlier finding about the relatively high debt ratio and high long term debt ratio of large Japanese companies. One possible explanation is that financing constraints especially for small companies might have been the consequence of the reforms implemented in Japan in order to reduce the bad loan problem and to improve the financial system. It also support the finding by Hoshi, Kashyap, and Scharfstein [10, 11] and McGuire [21] who assert less liquidity constraints of *keiretsu* firms to the role of the main bank system in Japan and conclude that there are less

financing constraints for bank-affiliated firms than independent firms in Japan. Small companies are found to be more likely to be independent firms than the bank affiliated ones as they would suffer from financing constraints.

#### 5.2.5. GCC

The results of our investment equation for the sample of 47 GCC companies are given in Table 6. The coefficient of the accelerator variable is not significant suggesting that corporations invest even when they do not expect any growth in sales.

The coefficient of the cash flow variable is not significant for any of the size groups. It seems that the corporate sector in the GCC does not suffer from any barrier to investment; their investment is not hampered by the lack of internal finance. Moreover the companies of our sample observe an increase in long term debt when investment increases. In fact the coefficient of the variable change in long term debt ( $\Delta LTD / K_{i,t-1}$ ) is positive and significant when all the sample is considered as well as when the sample is divided into small companies and large companies. This result suggests that neither the smaller companies in nor the larger ones during the period studied, need to generate funds internally in order to invest.

Accordingly, they can also access long term finance in a systematic way whenever they decide to invest. Large companies use more short term debt to finance their growth as the coefficient of the variable (change in short term debt) is also positive, significant and at the same time, shows a higher in magnitude than for the smaller ones.



Table 6 : GCC

	$R^2$	$a_0$	$a_1$	$a_2$	$a_3$	$a_4$
All Companies	0.34	0.122 (1.72)	-0.121 (-0.66)	0.291 (1.09)	0.615 (4.19)**	0.912 (3.26)**
Small	0.58	0.103 (1.77)	-0.495 (-1.80)	0.267 (1.09)	0.675 (4.97)**	0.556 (1.91)*
Large	0.45	0.222 (2.23)**	-0.087 (-0.46)	-0.317 (-0.79)	0.548 (4.58)**	1.361 (6.15)**

T statistic in parentheses under each coefficient, Method of estimation GLS with white heteroskedasticity-consistent standard error and covariance. F statistic is highly significant for all groups.

The GCC countries were during the period of our study enjoying high growth rates and an easy access to funding in comparison with the East Asian countries in the period after the crisis.

## 6 Concluding remarks

This paper investigated the impact of asymmetric information, capital markets frictions, and credit control policies on corporate investment and growth in the GCC and in four East Asian countries namely Malaysia, Taiwan, Singapore and Japan during the period 1999-2007. If the financial system in a country does not fulfill its functions of allocating resources to their most efficient uses, monitoring the use of the funds and managing and evaluating risk, because of a tight regulatory framework, credit rationing policies, contract enforcement problems

and scarcity of capital, corporate investment and hence economic growth will be impeded. The analysis indicates that small corporations in most of the East Asian countries are financially constrained. Their investment is determined by the availability of internal finance. Investment for large companies seems more determined by the amount of new long term debt obtained and for the small companies by short term debt raised. Small sized companies face evidently more asymmetric information than large companies which translates into more difficulties for small firms to access external finance and more precisely long term finance. Whereas, in the GCC no financing constraints seem to significantly affect investment for both small as well as large companies. In the GCC, investment is determined both by long term and short term loans. Our study suggests that in the GCC economic growth is enhanced by easy access to long term credit in an aggressive lending environment during the study period.

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