



Financing Decision, Credit Risk Mitigation and Financial Performance of SMEs in Malaysia

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博士論文

Financing Decision, Credit Risk Mitigation and
Financial Performance of SMEs in Malaysia
マレーシアの中小企業の資金調達決定、信用リスク
軽減および財務実績

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Chapter 1: Introduction

1.1 Background and Purpose of the Research

Many factors are to influence the financing decisions of firms. Most studies on financing decisions have been based on firms in the developed countries, focusing mainly on firms being listed on the stock market. The primary objective of this study was to analyse the financing decision and performance of firms in Malaysia by focusing on the following aspects; the financial constraints faced by firms in this country and how financial constraints expand lease financing capacity along with debt financing, how the financial providers control the risk of default among Malaysian firms and whether the research and development activities are able to increase financial performance among the firms in Malaysia especially the SMEs where their competitiveness must be retained to ensure future survival.

This dissertation consisted of three main chapters; First, “Do Financial Constraint Expand Lease Financing Capacity? In the Perspective of Malaysian Firms”, second “Credit Risk Mitigation: In the Perspective of SMEs in Malaysia” and third “Role of Research & Development to increase Firm Financial Position. Do SMEs in Malaysia take advantage of it?” Malaysian firms are highlighted especially the SMEs. Besides, listed and unlisted firms from various industries like manufacturing, services, agriculture, and construction are also included.

This dissertation is to answer research questions as follows; What are the characteristics of firms having financial constraints? (refer to Chapter 2), Which financing method do the firms prefer, lease or debt financing? (refer to Chapter 2), How to mitigate the credit risk especially for the SMEs? (refer to Chapter 3), What are other factors to be considered to mitigate credit risk? (refer to Chapter 3) and What are the additional elements to increase the financial performance of the firms? (refer to Chapter 4).

In light of these questions, a few papers have been produced. The first paper is entitled “Do Financial Constraint Expand Lease Financing Capacity? In the Perspective of Malaysian Firms”. The objective of this paper was to analyse the impact of financial constraints of the firm decisions on their financing decision (either lease or debt financing). Besides, the motivation behind a firm decision to choose between lease and debt financing is also included. This paper has offered more insights on lease financing research related to financial constraint factors, especially from the Malaysian perspectives, providing a comprehensive coverage on listed and unlisted firms and SMEs in their sampling with various financing decision characteristics and behaviour especially for firms with financial constraints.

The second paper is entitled “Credit Risk Mitigation: In the Perspective of SMEs in Malaysia”. The objectives of this paper were to define and construct SME’s credit risk model in the SME financing process by the financial providers (FPs) in Malaysia. Besides, this study is to enhance the research contributions in the aspects of measuring the company’s performance by considering both financial and non-financial factors. This study want to prove whether the non-financial variable will have a significant impact on SMEs in Malaysia or not. This paper provides a guideline for creditors in analysing the SMEs financial strength prior to making important decisions in offering loans to the companies, hence, improving the banking system effectiveness in dealing with low cost and low non-performing loans (NPL).

The final paper is entitled “Role of Research & Development to increase Firm Financial Performance. Do the SMEs in Malaysia take advantage of it?”. The objective of this paper was to analyse whether the SMEs in Malaysia implement the Research and Development (R&D) activities. Besides, this study also examined whether the impact of R&D can increase the financial performance among the firms especially the SMEs in Malaysia. This paper gives more insights on the effect of R&D among Malaysian firms. This study also benefits policymakers of the respective fields in attracting more firms to utilize technology transfer in their daily business transactions.

1.2 Outline

The remainder of this study is organized as follows.

Chapter 2 examines the relationship between financial constraint factors and the decision of lease and debt financing in the Malaysian firms. The samples consist of 1150 firms including the listed, unlisted firms and SMEs where the total number of firms are 4497. This study covers a four year period from 2007 to 2010. The dependent variables are lease ratio and debt ratio whereas the independent variables comprise the financial constraint determinants such as internal funds, profitability, collateral, and size. The results indicate that the firms with financial constraints in terms of internal funds and profitability will prefer lease over debt financing. Moreover, the firms with financial constraints in terms of collateral and size prefer debt over lease financing. In addition, the listed firms will prefer lease over debt financing whereas the unlisted firms prefer debt financing due to financial constraints in terms of profit, collateral and size.

Chapter 3 proposed a credit risk mitigation model for SMEs combining financial and non-financial variables which were used to analyse the influence of owner educational level, gender, and age of the business. Multiple Discriminant Analysis (MDA) model, one of the extensively documented approaches, was used. The final samples for the estimation model consisted of 400 observations among which half were distressed and another half were non-distressed firms for the period from 2010 to 2015. The prediction models perform relatively well in the financial and non-financial variables. This evidence shows that the models serve as efficient early warning signals and thus, be beneficial for monitoring and evaluating credit risk.

Chapter 4 analyses the role of Research & Development to increase Firm Financial Position among the SMEs. The samples consist of 148 SMEs from the manufacturing, service, construction and agricultural sectors in Malaysia. This study covers a ten year period from the year 2004 until 2013. The dependent variables are ROA, ROE, net income and sales turnover. The results indicate that R&D expenses affect firm performance positively. Besides, the R&D expenses are more significant in the services sector compared to other sectors.

1.3 Summary

Based on Chapter 2, the lease and debt financing usage are dependent upon the types of financial constraints that the firms face. It also shows that a positive relationship exists between lease and debt financing due to the economic policy and characteristics of the firms in the Malaysian perspective. The financial constraint firms, especially for the firms with lower internal funds and lower collateral, prefer lease over debt financing, indicating that when the firms have less internal fund available, they do not use debt financing because of difficulties in getting a loan approval from banks or financial institutions. Firms with lower profit have the same impact in using lease and debt financing, indicating that the prospects or the firm financial capabilities are important for the financial providers either debt or lease financing provider to ensure the firm's future survival. Smaller firms with low internal funds, tend to lease more and borrow less, indicating that smaller firms may not have a strong financial position to apply for debt financing. Based on the analysis, it can be concluded that not all financial constraint factors can affect a firm to choose lease financing over debt financing. Besides, it depends on what types of financial constraints they face and the characteristics of the firms themselves.

Meanwhile, Chapter 3 provides lender and borrower a better reference in credit risk forecasting. The borrower will follow the standard fixed by the lender in order to be granted

the loan. Adopting the financial and non-financial elements on the credit evaluation is crucial to ensure a high score for the credit risk assessment. The model is estimated to ease a lender in identifying business strength from financial and non-financial views before making important decisions in offering loans to businesses. Most previous research only focus on financial factors namely profitability, leverage, liquidity and activity. In addition, to improve the model, this research should include non-financial factors specifically size, educational level and types of the industry into the model as it will bring an in-depth picture of the company performance in assessing credit risk. However, in perspective of Malaysian SMEs, the non-financial variables have a less impact on the credit risk assessment due to the nature and behaviour of the SMEs.

Finally, in Chapter 4, R&D expenses can play an important role to increase SMEs financial performance. SMEs need to take an opportunity to explore the benefit of R&D that may affect their financial performance. The government must also provide an incentive for SMEs which involve in R&D activities in order to receive the tax rebate as a means to encourage them and contribute to economic growth as well.

Chapter 2: Do Financial Constraints Expand Lease Financing Capacity? In the Perspective of Malaysian Firms.

Abstract

The purpose of this study was to examine the relationship between financial constraint factors and the decision of lease and debt financing in the Malaysian firms' perspectives. The samples consisted of 1150 firms including listed and unlisted firms, and SMEs where the total number of firm-year observations were 3294. This study covered a four- year period from 2007 to 2010. The dependent variables are lease ratio and debt ratio whereas the independent variables are the financial determinants such as internal funds, profitability, collateral, and size. This study also includes control variables such as uniqueness (R&D expenses), tax loss, and macroeconomic factors such as pre-recession and post-recession to analyse the economic impact on a firm financial decision. The results yielded that financially constrained firms with lower internal funds and collateral, prefer lease over debt financing. Firms with financial constraints in terms of size, prefer debt over lease financing. Listed firms prefer operating lease over debt financing and unlisted firms prefer debt financing due to financial constraints captured in terms of profit, collateral, and size.

2.1 Introduction

Access to external finance is a key determinant of a firm's ability to develop, operate and expand. The sources of external financing can be bank lending, informal financing, trade credit and leasing. Bank lending is one of the oldest, largest, and most widespread sources of external capital. Domestic banks including smaller community banks offer relationship-oriented lending services to firms based on soft and proprietary information such as information on the characteristics and reliability of the firm's owner (Berger, Hasan, and Klapper, 2004).¹ The composition of external finance has also attracted both theoretical and empirical papers. As described by Diamond (1984), banks contribute to the resolution of asymmetric information problems in lending through their monitoring advantage, thus, playing a significant role in shaping firms' liabilities. However, Sharpe (1990) and Rajan (1992) argued that a close firm-lender relationship may lead to an information quality capture, resulting in a hold-up problem where banks are able to extract rents from borrowing firms. Empirically, Denis and Mihov (2003) showed that the credit quality of the borrower is a key determinant of the type of external financing it uses, that is, their choice of public debt, bank debt and non-bank private debt. Berger and Udell (1995), Harhoff and Korting (1998) and Jiménez and Saurina (2004), for example, provide evidence on the impact that bank-firm relationships have on firm access to bank external funds.

The external financing that this study focused on was leasing. A key potential benefit of leasing is access to capital for firms that do not yet have assets to pledge as loan collateral. Small enterprises can often leverage an uncertain cash deposit to enter into a leasing agreement. Leasing differs from collateral-based lending in that the choice of whether to offer to finance is frequently determined by the ability of the asset to contribute to cash flow (either to the lessee or to the lessor in the case of forced liquidation) rather than the balance sheet value of the collateral. Thus, it is thought to be particularly valuable in many low- and middle-income countries where unsecured loans can be difficult to obtain. Leasing arrangements, generally, allow the lender to retain legal ownership of the asset, which facilitates seizure in the case of default and can considerably reduce the risk to lenders or lessors (Eisfeldt and Rampini, 2008).²

¹ Data samples from 49 developed and developing nations from year 1993 to 2000.

² They confirm that access to lease financing is the only source of external finance reliably related to growth in GDP and the manufacturing sector.

Leasing might play a special role in financing growth in countries with weak institutional frameworks (Berger and Udell, 2006). If bank lending requires good collateral laws or registries and efficient courts in the case of default, then leasing will be more likely to have a differential impact on firm growth in a country with a weak regulatory environment.

The objectives of this chapter were to analyse the relationship between financial constraints and the firm decision of getting lease or debt financing. This chapter analysed the impact of the different categories of financial constraints which can reflect the decision of the firm to choose lease financing. The analysis began with the classification of the samples into financially constrained to less financially constrained and then analysed them based on different categories of financial constraint factors. The main hypothesis was that financial constraints will lead firms to choose lease over debt financing. However, the decisions were dependent upon the types of financial constraints that the firms faced. This chapter analysed the impact of financial constraints on the firm's decision either to use lease financing or debt financing for various firms of listed, unlisted and SMEs in Malaysia. Overall, this chapter used samples from 1150 companies where 627 were the listed firms, 470 unlisted firms and 53 SMEs. The range of the period was from 2007 to 2010.

The results indicated that small firms used more lease financing compared to large firms. The findings also indicated that the lease financing could have a complementary relationship with debt financing and the use of lease financing was strongly related to measures of financial constraints including internal funds, profitability, collateral and size. For most constrained firms, they tended to use more lease over debt financing especially for firms with less internal funds, less collateral and smaller size. However, for lower profitability firms, to choose either lease or debt financing was hard due to their future survival.

2.1.1 Contributions of the study

In examining the relationship between the impact of financial constraints and the decision of either lease or debt financing, this study makes empirical contributions to financial variable related factor to decision of lease or debt financing.

The existing literature has examined the impact of financial constraints on the firm financial decisions (eg. Lasfer and Levis, 1998; Bowman, 1980; and Finucane 1988). However, most have focusing on developed country and specific region in Europe and US whereas this study focusing on developing country specifically in Asia region which is Malaysia. To my knowledge, this is the first paper to investigate the relationship between the impact of financial

constraint companies and their decision on choosing lease and debt financing from the Malaysian perspectives. Given the scarcity of Malaysian research in leasing, researchers can benefit where this can be a stepping stone for more exploration and discussion in this area. This study separate between the most constraint and less constraint on the financial variables to identify the effect on firm financial decisions.

Berger and Udell (2006) analysed the leasing decision in countries with weak institutional frameworks but this study focusing on Malaysia where the institutional frameworks consider strong and relevant with current economic situation. Besides that, Eisfeldt and Rampini (2009) claim that leasing is more important for small firms that are not publicly traded where the leasing theory predicts that financially distressed firms obtain more favourable financing terms from lessors than from traditional creditors because of the priority of lessors' claims in bankruptcy proceedings. This study extends the existing literature by examining the firms which is not fall on a bankruptcy stage where this study focusing on firms based on specific financial variable only.

Beside using the microeconomic factors to evaluate the financial constraint and financing decision, this study extends the existing literature by examining macroeconomic determinants to avoid endogeneity problem in the regression and also provides a comprehensive overview of the impact of financial constraint on company's decision. This study also uses three types of firms (listed, unlisted and SMEs), indicating that the analysis investigates the relationship between types of firms and the leasing decision. These three types of firms have different characteristics of their finances and operate in different regulatory frameworks.

The chapter is structured as follows: Section 2.2 briefly explains the leasing facilities in Malaysia. Section 2.3 reviews the relevant literature on financial constraint and lease financing particularly related to leasing as a complementary and substitution of debt financing, and the financial factors that influence firms to lease. Section 2.4 details the hypotheses regarding the relation of financial constraint factors to the lease or debt financing decisions. Section 2.5 and 2.6 describe the data and method used to test the hypothesis, and the analysis of the results. Section 2.7 concludes with a summary of the main findings.

2.2 Leasing facilities in Malaysia

From an economic perspective, leasing can be defined as a contract between two parties where one party (the lessor) provides an asset for usage to another party (the lessee) for a

specified period and is expected for specified payments in return (Fletcher et. Al., 2005). Leasing refers to asset-based financing. As lessors retain ownership of the assets they lease throughout the life of the contract, these leased assets are therefore an essential form of collateral in such contracts. Under lessee contract, the lessee pays a rental fee and acquires the right to use the asset for a specified period of time, but the asset belongs to the lessor. As a source of external financing, leasing is comparable to long-term debt. Leasing focuses on the lessee's ability to generate cash flows from the business operations to service the lease payments (Gallardo, 1997), as the lessor retains legal ownership of the asset. Hence, leasing separates the legal ownership of an asset from its economic use. Ownership of the asset may or may not pass to the customer at the end of the leasing contract. The lessor is less concerned with the lessee's default, thus, it is unlikely to require the lessee to provide collateral to be able to start a leasing agreement. The lessee only needs to pay a leasing fee for one period in advance. Yet, if a firm purchases capital, they would need to pay the full price upfront. Even if a firm uses debt to finance its purchase, the lender might require collateral for the loans. Leasing enables borrowers with a limited track record or credit histories and collateral to access the use of capital equipment, often even in cases where they would not qualify for traditional commercial bank lending (Gallardo, 1997; Berger and Udell, 2004).

Leasing was first introduced in Malaysia in September 1973 by the United Orient Leasing Company Berhad³ of Japan. It provides diversified financial services for the acquisition of movable and unmovable assets from office automation, ICT equipment, and manufacturing machinery to the commercial vehicle, medical equipment, vessels and construction equipment. Besides, the second earliest leasing company in Malaysia, Pembangunan Leasing Corporation (PLC)⁴ which was incorporated on 1 November 1977 was established to discover the commercial financing market, specifically through leasing facility. Now, it becomes the largest leasing provider in Malaysia. The total amount of leasing in Malaysia showed an increasing trend from only RM1.66 billion in the year 2004 to RM 14.72 billion in the year 2014.⁵ These figures indicate that the potentials of lease financing are very encouraging to be an alternative for debt financing among the firms.

³ Now it is called Orix leasing Malaysia Berhad which was involved in dealing finance lease, structured finance, real estate investment and development, and movable asset with 14 branched throughout Malaysia.

⁴ PLC is a subsidiary fully owned by Malaysian Development Bank, one of government linked company in Malaysia.

⁵ Source from Bank Negara Malaysia Annual Report 2014.

Prior studies on leasing in Malaysia are based on Al-Ijarah, the Islamic banking product. Ijarah in Islamic banking and finance can simply mean leasing or hiring. In Malaysia, the product under Al-Ijarah includes leasing (mostly for buildings, machines and property) and hire purchase (refer to vehicles). Technically, Al- Ijarah is an agreement between two parties, one being the owner of the asset, who gives possession of the assets for the use of the other party, the hirer, on an agreed rental over a mutually agreed period. It is also defined as transferring the “usufruct” of a particular property to another person in exchange for a rent claimed from him (Usmani, 2002). The word “usufruct” refers to the legal right to use someone else’s property temporarily and keep any profit made from it. Most studies related to leasing in Malaysia focus on shariah analysis issues where they found that Al-Ijarah is still in its early stages of development and there is much scope in Malaysia to further expand its applications for project financing (Mohammad H.K, 2007). Even though conventional leasing already started in the 1970’s compared to Islamic leasing which just started by the early 1990’s, Papers that relate to conventional leasing in Malaysian perspective are very limited.

2.3 Literature review

2.3.1 Financial constraint and leasing decisions

The most fundamental issue in financial economics is how firms obtain capital to fund operations and investment. Whited (1992)⁶ found that financial constraints, a moderated ability to access external financing, directly impacted firms’ capital investment plans. Besides, Atanasova and Wilson (2004) also examined financially constrained firms, where financing here is defined as access to internally generated funds, bank lending and accounts payable (or trade credit), using a disequilibrium model of lending. Their empirical analysis suggests that firm total assets, as a proxy for available collateral, is an important determinant of bank loan availability.

Fazzari et al. (1988), (2000) and Carpenter and Petersen (2002) found that the higher sensitivity of investment or firms’ growth to internal sources is taken as evidence for the presence of financing constraints. However, after the contradicting results presented by Kaplan and Zingales (1997, 2000), several studies have criticised the empirical test based on the cash flow sensitivity. One of the arguments has been that the investment-cash flow sensitivity cannot be interpreted as evidence for the financing constraints presence. Even financially successful

⁶ This paper presents evidence supporting the theory that problems of asymmetric information in debt markets affect financially firm’s ability to obtain outside finance.

firms may rely on internal sources of financing because of factors not related to the unavailability of low-cost external funds and consequently, they may exhibit high investment-cash flow sensitivity. Additional critiques have been put forward by Ericson and Whited (2000), Alti (2003) and Bond et al. (2004), which argued that the cash flow already contains information about a firm's investment opportunities. The significance of the cash flow sensitivity of investment may then provide additional information on expected profitability rather than on the severity of the financing constraints. The variables that increase a firm's ability to contract external finance will only have an effect on investment spending when investment demand is constrained by capital market imperfections.

Diamond (1991) asserted that banks contribute to the resolution of asymmetric information problems in lending through their monitoring advantage, thus, playing a significant role in shaping firms' liabilities. However, Sharpe (1990) and Rajan (1992) argued that a close firm-lender relationship may lead to an information quality capture, resulting in a "hold-up" problem in which banks are able to extract rents from borrowing firms. Empirically, Denis and Mihov (2003) showed that the credit quality of the borrower is a key determinant of the type of external financing used, that is, their choice of public debt, bank debt and non-bank private debt. Berger and Udell (1995), Harhoff and Korting (1998) and Jiménez and Saurina (2004), found the impact that bank-firm relationships have on firm access to bank external funds.

Following the arguments above, leasing might play a special role in financing growth in countries with weak institutional frameworks (Berger and Udell, 2006). If bank lending requires good collateral laws or registries and efficient courts in the case of default, then, leasing will be more likely to have a differential impact on firm growth in a country with a weak regulatory environment. However, if in that country, leasing relies on similar legal regulations and structures as other types of external financing, it may have no special role. Alternatively, Ho, Lam, and Sami (2004) contended that leasing is to avoid underinvestment problems owing to higher debt and found that higher levels of leasing is one of the defining characteristics of high-growth firms in Hong Kong.

2.3.2 Leasing as a complement to debt financing

Several studies investigate the relationship between lease and debt financing but the empirical evidence is mixed on whether leases and debts have complementary or substitutive relationship. Since 1976, a series of empirical studies have indicated that lease and debt financing are complements, not substitutes. The first part of the literature review will focus on

the lease and debt as a complementary relationship which means that lease and debt have a positive relationship. The first empirical study by Ang and Peterson (1984) showed that greater use of debt is associated with greater use of leasing. Ang and Peterson (1984) concluded that leases and debt are complements in which greater debt is associated with greater use of leasing. The data used included companies from several industries, obviously, with different debt capacities. However, the addition of the non-debt explanatory variables may not adequately control for diverse debt capacities, which may explain the complementary relation between debt and leases. A second criticism is that Ang and Peterson (1984) fail to include operating leases, focusing exclusively on finance leases. Graham et al. (1998) indicated that this may be a serious omission.

A study by Ang and Peterson (1984) was updated by Branson (1995), showing the same conclusion. Moreover, Finucane (1988) found that leases are positively related to the company's debt ratio, a number of bond issues and bond rating, although he also found that leases are negatively related to the company's ratio of subordinated debt to assets; Kang and Long (2001) found that companies with high levels of regular debt also have higher levels of leases; Mehran et al. (1999) found that the Tobit model estimation suggested that debt and finance leases are complementary, but they could not find evidence of a significant interaction between debt and operating leases.

Lewis and Schallheim (1992) framed the lease choice within the optimal capital structure choice. They showed that lease can increase a company's debt capacity by selling excess non-debt tax deductions and that leases and debt can be complementary within an optimal capital structure. Eisfeldt and Rampini (2008) presented another justification for increased debt capacity due to lease. They argued that leases provide the lessors with a benefit that consists of the ability to repossess the leased assets. They concluded that it is easier for a lessor to acquire a leased asset than it is to assure the collateral of a secured loan. Hence, leases proportionate higher debt capacity than secured lending. However, leases can give rise to agency costs because of the separation of ownership and control of the leased assets. Thus, they concluded that leases tend to be more frequently used by companies that are more financially constrained.

Lasfer and Levis (1998), drawing a sample of a large number of British companies, classified by size, concluded that leases and debt are complements for large companies. Tsay (2003) investigated how the tax liability and the residual value risk affect the lease-buy decision.

He found that when there is a negative correlation between earnings and residual value, companies should buy the assets instead of leasing them. On the other hand, if the correlation between earnings and the residual value is positive, companies should lease and, in this case, debt complements lease.

Bowman (1980) and Finucane (1988) also found the same result. They posit that leases are no different than debt financing, and as a result, it should also lead to higher levels of equity risk. Using 92 U.S. listed firms, Bowman first documented the previously identified positive relationship between debt and equity risk (measured as the covariation between firm returns and market returns). Next, he added to the analysis of a variable representing the present value of disclosed capital leases. After controlling for the positive correlation between leverage and capital leases (which he interpreted to mean that firms with higher levels of debt often had to turn to lease financing), he found that equity risk was indeed positively associated with the present value of capital leases. The result suggests that capital leases behave similarly to debt in their effect on equity risk.

2.3.3 Leases as a substitute to debt financing

Myers et al. (1976) developed a theoretical lease-buy decision model and defined the debt-to-lease displacement ratio (λ) that represents the substitution between debt and leases. For Myers et al. (1976), (λ) ranges between 0 and 1 (lease as a substitute to debt); however, they did not consider the possibility that (λ) could be < 0 (lease as a complement of debt). The most frequently advanced view is that leases and debt are perfect substitutes ($\lambda=1$). That is, an increase in leasing activity reduces borrowing of the same amount.

Other papers (Beattie et al., 2000; Marston and Harris, 1988; Yan, 2006) proposed that although there is a substitution effect, its magnitude is less than a full trade-off because some risk-sharing occurs between the lessee and the lessor (λ between 0 and 1). Marston and Harris (1988) used financial statement data and ordinary least squares (OLS) regression approach to examine the changes in debt and lease obligations (finance and operating leases). They found that the estimated coefficient of substitution between leases and debt was significantly positive and between 0 and 1, showing that companies reduced non-lease debt when leases increased but did so on a less than dollar-for-dollar basis. Beattie et al. (2000) investigated the degree of substitutability between a lease and non-lease debt financing using comprehensive measures of leases (finance and operating lease) and debt. To estimate total operating lease liabilities, they used the method of constructive capitalization suggested by Imhoff et al. (1991). They

found that lease and debt are partial substitutes, consistent with the argument that lessors bear some risks which are not inherent in debt contracts.

Yan (2006) yielded evidence that leases and debt substitute each other empirically rather than act as complements. Yan (2006) considered the cost of debt and interpreted rising interest rates paid on outstanding debt with rising leases as evidence of the substitution-theory and argued that this interpretation is in line with the trade-off theory of capital structure. They found that the degree of substitutability is greater for companies that pay no dividends (more asymmetric information), companies that have more investment opportunities (higher agency costs from underinvestment), or companies with higher marginal tax rates (transferring tax shields is less valuable). Yan (2006) also found that a higher lease ratio leads to less new debt financing, suggesting a substitutive relation between debts and leases. Therefore, the relationship between debt and leases found in the previous studies may be an unidentified mix of both the true relationship and the factors that simultaneously affect leasing and debt financing.

2.3.4 Reasons for the existence of leasing

Previous studies have identified the following three main reasons for the existence of leasing namely tax differential, debt substitutability and agency cost.

(i) Taxes and leasing

DeAngelo and Masulis (1980) showed that when the firm's debt capacity to fully use tax deductions is limited, their use of debt financing is reduced. Empirically, MacKie-Mason (1990) analysed incremental financing decisions using the discrete choice analysis to find that tax shields affect significantly the choice between issuing debt or equity. Similarly, Graham (1996) showed that the incremental use of debt is affected by the simulated firm-specific marginal tax rates. Lewis and Schallheim (1992) produced a model of leasing and borrowing decision, focusing on leasing as a means for selling excess non-debt tax deductions. In their model, non-debt tax shields are sold via leasing, therefore reducing the potential redundancy with interest deductions, making the marginal value of debt positive. The lessee responds by using additional debt. In this way, Lewis and Schallheim (1992) established a theoretical possibility of a positive relationship between debt and lease financing, even within the same firm.

Empirical evidence provided to date on the influence of taxes on leasing is mixed. Finucane (1988) showed that tax-related factors are not significantly associated with the level

of leasing by a firm. Mehran and Taggart (1997) used the ratio of reported tax less change in deferred tax over earnings before interest and tax to estimate the impact of taxes on leasing and found that the coefficient of this variable is not significant. Barclays and Smith (1995) found that companies with a high proportion of tax-loss carry forward rely more on lease finance. Sharpe and Nguyen (1995) constructed two alternative proxies for a firm's tax status. The first is the ratio of tax expense over pre-tax income. The second is a dummy variable equal to one if the firm reported in its financial statements tax-loss carry forward. These two measures are found to be significant, suggesting that capitalized leases are used more heavily by firms for which the tax-benefits of ownership appear low.

(ii) Leasing and debt capacity

Finance theory has considered leasing as a substitute for corporate borrowing. Myers, Dill and Bautista (1976) and Franks and Hodges (1978) view leasing and long-term debt as fixed, contractual obligations. Both leasing and debt reduce a firm's debt capacity, and as a consequence, greater use of lease financing should be associated with less reliance on debt. However, empirical evidence contradicts this approach. Several studies show that greater use of leasing tends to be associated with more debt financing. For example, Bowman (1980) found that firms with high levels of outstanding debt engage also in leasing activity. Ang and Peterson (1984) results showed a positive and statistically significant relationship between leasing activity and debt ratios.

The above studies however fail to control for the underlying factors that determine debt capacity. Smith and Wakeman (1985) argued that the results of Ang and Peterson (1984) probably reflect the difficulties of controlling debt capacity. They argued that firms with higher debt capacity may also have other characteristics that make leasing relatively attractive. Several more recent studies have analysed leasing decision after controlling for such considerations. Marston and Harris (1988) analysed the contemporaneous changes in leasing and changes in debt financing across sample firms and found these two variables to be inversely related, confirming that lease and debt are substitutes. They also found that firms that employ lease financing typically use higher levels of debt compared to firms that do not use leasing.

Sharpe and Nguyen (1995) analysed the intensity to use both operating and capital leasing. They hypothesized that a firm's propensity to lease is a function of the type of capital required and the extent of leasing-related transaction costs associated with such assets. They

controlled for these unobservable factors by analysing a firm's propensity to lease relative to other firms in its industry. They found that leasing propensity operating and capital leases over book value of fixed assets are substantially higher for lower-rated, non-dividend paying and poor cash firms. Their results suggest that leasing is used extensively by firms that are likely to face relatively high premiums for external funds.

(iii) Leasing and agency costs.

Another set of arguments for the determinants of leasing focuses on agency and contracting costs. Smith and Wakeman (1985) offered a unified analysis of the various incentives affecting the lease versus purchase decision and suggested that taxes are important in identifying potential lessees and lessors but they are less important in identifying the specific to the organization because the resulting bilateral monopoly problem would create agency conflicts between the lessor and the lessee. They predicted that leasing is more likely to occur if the value of the asset is not specialized to the firm. Similar conclusions are reached by Williamson (1988) who concluded that easily deployable assets which are assets with resale value and not firm-specific are likely to be leased.

Empirically, the extent to which leasing is determined by the resolution of potential agency conflicts is difficult to test. The main reason relates to the lack of data on the firms' asset types. However, previous studies have used some proxy variables to measure the impact of asset type on leasing propensity. The first proxy variable is the industry factor. Assets used by firms in a particular industry could easily be identified and their suitability for leasing could be assessed. Finucane (1988) and Kirshnan and Moyer (1994) found that leasing activity is more prevalent in certain industries than in others. In particular, firms in transportation, services and wholesale and retail trade are more likely to use leasing. Moreover, Finucane (1988) showed that firms that use mortgage secured notes or bonds are more likely to use leasing, indicating that firms with assets that make good collateral are also likely to have assets conducive to leasing.

The second proxy variable is the split of the firm's market value into assets in place and the proportion of the value that is accounted for by future growth opportunities. Several mechanisms can be used to reduce agency problems between managers and shareholders. Under the agency cost framework, firms with a higher proportion of growth opportunities should use less debt financing to mitigate underinvestment problems (Myers, 1976). Empirically, Barclays and Smith (1995) found that firms with greater growth opportunities as measured by book-to-market ratio rely more heavily on lease financing. An alternative

mechanism that can work to reduce the agency problem is the ownership structure (Shleifer and Vishney,1986). Smith and Wakeman (1985) considered the potential role of ownership structure as a determinant of leasing activity. They predicted that leasing is more likely to occur if the firm is closely held because leasing acts as a risk reduction mechanism for such a firm, especially if the lessor has a comparative advantage in disposing the asset in the second-hand market.

2.3.5 The characteristics of lease companies

Many papers investigate the characteristics of lessee companies. The main characteristics are size, industry, leverage and financial constraints, taxes, management compensation and ownership structure.

(i) Size

Size is generally considered as an important variable to explain the use of leases for several reasons. First, size is related to the costs of obtaining external funds. Smaller companies tend to bear higher costs for getting external financing, due to information asymmetry (Graham et al. 1998). Lessors may choose to reduce the uncertainty surrounding their claims by leasing rather than lending to small companies. Leases are preferred because the lessor's security is tied to the asset itself rather than his general credit. Thus, other elements held constant, smaller companies are predicted to lease relatively more, suggesting a negative relationship between size and leases.

Second, size is related to diversification and the ability to redeploy assets internally, and larger companies tend to be more diversified than smaller ones. Mehran et al. (1999) investigated the relationship between total leases and size, measured as total sales. Their results showed that size is positively related to leases, hence, larger companies with more diversification possibilities tend to lease more. Lasfer and Levis (1998) used total assets, the market value of equity and sales as proxies for size and they included these variables as an explanatory element and as a measure to differentiate types of companies (UK quoted and unquoted). Their results showed that the determinants of the financial leasing decisions, such as tax reasons and growth opportunities, depend on the size of the companies. In large companies, profitability, leverage and taxation are found to be positively correlated with leases, whereas in small companies the leasing decision do not appear to be driven by profitability or taxation reasons, but by growth opportunities. Deloof and Verschueren (1999) also investigated the determinants of the financial leasing decision by using total assets as a measure of size.

Their results showed that the coefficient of size is significant and positive for the entire samples, but also when the samples are split between small and large companies.

Third, annual turnover can be used as a measure of size. Adams and Hardwick (1998) investigated the relationship between a change in company size and the total lease share, for companies of different sizes. The results showed that the coefficient of the size variable (sales) was significantly less than zero, indicating that small companies tend to lease more than large companies. They also showed that the lease share tends to fall as company size increases.

Finally, Sharpe and Nguyen (1995) used size as a proxy for the flexibility of companies' investments and they found that small companies lease more than large companies, showing a statistically negative relationship between size and lease intensity. To control for endogeneity, they used the log of the number of employees as a proxy for the size of the company. The results showed that large companies have better conditions to find alternatives for assets that are no longer used. In contrast, for smaller companies, it is more difficult to predict the future needs for assets. They also found that companies with higher external capital costs tend to lease more. Similarly, Graham et al. (1998) hypothesized that larger companies tend to prefer debt over operating leases. They presented three main reasons: larger companies are more diversified and therefore cash flows have greater stability; larger companies have more economies of scale when they issue securities; and because of information asymmetry, smaller companies have to bear higher costs for obtaining external funds. They used the natural log of the market value of equity as a proxy for company size, finding a significant negative relationship between size and operation.

The results have been mixed since most of the studies found a significant relationship between size and lease, whereas others showed a negative relationship (Adams and Hardwick, 1998; Graham et al., 1998; Sharpe and Nguyen, 1995), and others still found a positive relationship (Deloof and Verschueren, 1999; Lasfer and Levis, 1998; Mehran et al., 1999). Few studies found a non-significant relationship between size and leases (Ang and Peterson, 1984; El- Gazzar et al., 1986). Firm size is an important determinant of financial constraints under the argument that it is related to firm fundamentals that may influence the probability of financial constraints. Prior studies using different firm samples have reported that firm size may affect financing policy (Audretsh & Elston, 2002; Carpenter & Petersen, 2002; Chirinko & Schaller, 1995; Gilchrist & Himmelberg, 1995). Hadlock & Pierce (2010) confirmed the relevance of firm size as an important predictor of financial constraints, thus, creating a financial constraint index based on firm size and age.

(ii) Industry

The industry determinants are related to the investment opportunity set and the type of assets used by the company. Several studies showed that leases tend to be more prevalent in some industries than in others, although Ang and Peterson (1984) showed that companies that use leases are not concentrated in a few industries, and that leasing occurred in every industry group considered in the samples. Their results also showed that non-leasing companies are found in all industries except the amusements industries. However, Ang and Peterson (1984) investigated only the existence of lease contracts in those industries and not the possibility of different levels of leasing (lease intensity).

Other studies have shown the industries in which leases are more dominant when compared to other industries. Finucane (1988) showed, by using the mean ratio of financial leases to total assets over five years for each industry (52 industries), that companies in certain industries, including air transport and retailing, used more lease financing than others. The paper identified several reasons, for example, certain industries have more specific assets, industry-wide differences in investment tax credits, the availability of assets as collateral, the rate of obsolescence of company-specific assets, the characteristics of secondary assets markets, marginal tax rates and debt capacity. Adams and Hardwick (1998) showed that service and utility companies use more leases, and construction companies tend to lease less. Gosman and Hanson (2000) also found that leases are prevalent in airlines and retail stores.

(iii) Leverage and financial constraints.

In general, most of the studies (Eisfeldt and Rampini, 2008; Sharpe and Nguyen, 1995) found that given that higher leverage companies have less debt capacity, they are more likely to use leases rather than other forms of financing. They found that companies facing greater financing constraints, due to information asymmetries, have a higher propensity to make off-balance sheet lease investments (operating leases). They argued that leases provide creditors with more security, higher priority in bankruptcy and more effective way of reducing adverse selection and moral hazard problems that arise from information asymmetries.

Companies have been found to use the lease as a means to avoid debt financing (Ang and Peterson, 1984; Marston and Harris, 1988; Myers et al., 1976); to obtain a lower cost of financing bypassing the tax allowances the company cannot claim when buying the asset from the lessor (Barclay and Smith, 1995; Graham et al., 1998; Sharpe and Nguyen, 1995); and to mitigate agency conflicts, especially the asset substitution problem (Smith and Wakeman,

1985; Stulz and Johnson, 1985). Bathala and Mukherjee (1995) found that lease covenants appeared to be less restrictive than those imposed by other creditors. Abdel-Khalik (1981) also asserted why some companies opt to use operating leases and they found three explanations: first, the violations of restrictive debt covenants in lending agreements may incentivize the use of lease contracts; second, the managers' beliefs about the perceptions of analysts and users in terms of the effects of finance leases; and finally, the existence of management compensation plans based on accounting numbers.

Leasing theory predicts that financially constraint firms obtain more favourable financing terms from lessors than from traditional creditors because of the priority of lessors' claims in bankruptcy proceedings. In the USA, Kare and Herbst (1990) found financial gearing to be higher for leasing companies. Krishnan and Moyer (1994) also found leasing companies to have higher levels of long-term debt, as well as higher growth rates, lower retained earnings, lower interest coverage and higher operating risk. They concluded that as bankruptcy potential increases, lease finance becomes more attractive.

Mayes and Nicholas (1988) found that the UK-based small companies tend to use leases to avoid large capital outlays. These results were confirmed by Drury and Braund (1990) who also concluded that the relative cost of leases, as well as tax motives are to be determinants of the decision to lease for large companies. Smaller companies tend to give more importance to other factors such as cash flow. Thomson (2005), based on a survey on the lease decision across the UK listed companies, found that avoiding large capital outlay and cash flow considerations are important for companies in terms of their decision to lease all asset types.

Smith and Wakeman's (1985)⁷ study identified eight reasons for leasing besides tax motivation. The eight reasons are asset values not tied to use and maintenance, assets not specialized for the company, the useful life of the asset exceeds the lessee's expected period of use of the asset, the lessee's bonds contain specific financial policy covenants, management compensation is a function of return on invested capital, the company is closely held, the lessor has market power, and the lessor has a comparative advantage in asset disposal.

Lasfer and Levis (1998) showed that the companies that use leasing are more likely to have tax losses, high fixed capital investment, high debt-to-equity ratio and to be larger than

⁷ The analysis suggest that taxes are important in identifying potential leases and lessors but are less important in identifying the specific assets leased.

companies that do not use leasing. However, the determinants of leasing are not homogeneous across firms of different sizes. For large companies, leasing, profitability, leverage and taxation are positively correlated. In contrast, for small companies, the leasing decision is not driven by taxation or by profitability, but by growth opportunities. They showed that small firms with high Tobin's q and those that are less profitable are more likely to use leasing.

Another strand of research on leasing bypasses the direct estimation of the relation between leasing and debt by implicitly assuming their substitutability and examining how corporate leasing decision is affected by financial contracting costs. For example, Sharpe and Nguyen (1995) suggested that cash-poor or lower-rated firms, those likely to face higher contracting costs, tend to lease more. Graham et al. (1998) showed that firms with more growth options in their investment opportunity sets have a lower proportion of fixed claims in the capital structure, debt, or leases alike. For small firms that are not publicly traded, leasing is even more important. Eisfeldt and Rampini (2008) claimed that leasing may be the largest source of external finance for these small firms.

Besides, there is extensive literature in finance examining the corporate decisions to lease, focusing on the tax considerations. The corporate lease-versus-buy decision is typically analysed under the Miller-Modigliani framework with no transaction costs or information asymmetries. Firms are indifferent about choosing between leasing and purchasing except in situations in which they face different tax rates (Miller and Upton, 1976; Myers, Dill and Bautista, 1976). Low tax rate firms lease more than high tax rate firms.

Two theoretical works discuss the determination of leasing-versus-debt decision. Eisfeldt and Rampini (2008), utilizing the argument of higher debt capacity of leasing, asserted that leasing ratio is increasing in a firm's financial constraints, being characterized as a firm having low internal funds or having a return on internal funds exceeding the market interest rate. Their leasing model implies a pecking order of external funds driven by financial constraints where more financially constrained firms to lease the asset while less constrained firms buy the asset and borrow against it. Rampini and Viswanathan (2009) argued that tangible assets are a key determinant of corporate debt capacity. Basing on the need to collateralize loans with tangible assets, the authors develop a dynamic model of a capital structure incorporating leasing as a financing alternative. As leasing amounts to a strong form of collateralization due to the relative ease with which the leased assets can be repossessed, the authors asserted that firms with low tangible assets will lease more and borrow less.

This paper is not the first attempt at addressing the relationship between leasing and financial constraints. Particularly related to this paper is the work of Eisfeldt and Rampini (2009). They incorporated financial constraints into a model of the choice between leasing and secured lending. Their model also implies that more financially constrained firms to lease more of their capital than less constrained firms. They argued that the benefit of leasing is that repossession of a leased asset is easier than foreclosure on the collateral of a secured loan, implying that leasing has higher debt capacity than secured lending. Leasing has been essentially ignored in the theoretical and empirical literature on investment in both finance and macroeconomics. Several studies directly investigate the relationship between leasing and debt financing but the empirical evidence is mixed. Ang and Peterson (1984) showed that greater use of debt is associated with greater use of leasing.

However, Yan (2006) found that a higher lease ratio leads to less new debt financing, suggesting a substitutive relation between debts and leases. Another strand of the research on leasing bypasses the direct estimation of the relation between leasing and debt by implicitly assuming their substitutability and examining how corporate leasing decision is affected by financial contracting costs. The finance literature analyses the effect of financial constraints on investment (Fazzari, Hubbard, and Petersen (1988), but does not consider firms' ability to deploy more capital by leasing it in the theory or adjust investment for changes in the amount of capital leased in the empirical work. Besides, Eisfeldt and Rampini (2009) produced a model that implies more financially constrained firms lease more of their capital than less constrained firms where agency cost plays an important role. They believed that the benefit of leasing where the repossession of a leased asset is easier than foreclosure on the collateral of a secured loan can contribute significantly to the choice of the lease. Sharpe and Nguyen (1995) suggested that cash-poor or lower-rated firms, those likely to face higher contracting costs, tend to lease more. Graham et al. (1998) showed that firms with more growth options in their investment opportunity sets have a lower proportion of fixed claims in the capital structure, debt, or leases alike.

For small firms that are not publicly traded, leasing is even more important. Eisfeldt and Rampini (2009) claimed that leasing may be the largest source of external finance for these small firms. Leasing theory predicts that financially distressed firms obtain more favourable financing terms from lessors than from traditional creditors because of the priority of lessors' claims in bankruptcy proceedings. They concluded that as bankruptcy potential increases, lease finance becomes more attractive. Vakhitov and Zameletdinov (2015) found that leasing is a

progressive trend of use of scientific and technological progress in material production and has a positive effect on the value of macroeconomic indicators, including economic growth. Besides, the latest issues on leasing also focus on the economic implications of the earnings impact from lease capitalization. This paper found that both negative and positive impacts possess an incremental explanatory power for concurrent stock returns beyond reported earnings (Su.J.H and Yuli.S, 2015).

Based on this argument and mixed findings, the leasing and financial constraint are still relevant and interesting to investigate and discuss further. Next chapter provides details on the hypotheses of this paper.

2.4 Hypotheses Development

Companies have been found to lease as a means to avoid debt financing (Ang and Peterson, 1984; Marston and Harris, 1988; Myers et al., 1976). As the higher debt capacity of leasing is more valuable to firms that are short on internal funds, they predict that the lease versus borrowing decision depends on the available internal funds and the return on the internal funds. Literature suggests that firms with low internally generated cash flow or high fluctuation in their internal funds are more constrained (García-Vega, Guariglia, & Spaliara, 2012).

Based on the previous studies, the firms with less internal fund are more difficult to get debt financing due to the financial capacity and they will opt for alternative financing likes leasing. In the case of Malaysia, a very limited financing provider's offer lease financing for firms but it is still reasonable that the firms with less internal fund tend to use lease financing. Thus, I hypothesize that the choice of lease financing compared to debt financing based on the internal fund capacity of the firms is as follows:

Hypotheses 1: *Firms with less internal funds tend to use lease financing compared to debt financing.*

Previous studies show that leasing is used by less profitable companies. For less profitable firms, the conflicts of interest between debtholders and stockholders may lead to costly underinvestment problem. These underinvestment incentives can be alleviated by reducing the amount of debt in the capital structure (Myers, 1976) or using financing with high priority claims such as leasing or secured debt (Stulz & Johnson, 1985). Thus, less profitable firms should prefer lease over debt financing. The nature of debt is an important determinant

of the profitability of a firm. The Pecking Order theory states that more profitable firms often carry little or no debt. Titman and Wessels (1988) cited in Yoon and Jang (2005), observed that highly profitable firms have lower levels of leverage than less profitable firms because they first use their earnings before seeking outside capital. The Pecking order theory popularized by Myers and Majluf (1984) holds that retained earnings are a preferable source of financing for the firm, and if external funding is required, debt is chosen over equity.

Based on the previous studies, less profitable firms use more leasing compared to debt financing. However, in the case of Malaysian firms, the financial institutions do not look for the firm profitability in order to get the loan, but the collateral or any secured guarantee that they can hold from the firm to get a loan approved. The profitability of the firm is not a major concern for the firm to choose for either lease or debt financing. Thus, I hypothesize that the choice of lease financing compared to debt financing based on the profitability of the firms is as follows:

Hypotheses 2: *Firms with less profit tend to use either lease or debt financing.*

Graham, Lemmon and Schallheim (1998) argued that leasing is tied to tangible assets, thus, firms that use more tangible assets in their production process should use more leases. However, their argument may not apply to operating leases as much as to capital leases since a true lease allows the lessee to use a physical asset without appearing on the balance sheet. According to Rampini and Viswanathan (2009), the high tangibility of assets is equivalent to a better ability of collateralization, which determines financial leverage, and firms with fewer tangible assets are more constrained and use more leases and less borrowing.

Based on the previous studies, firms with less collateral use more lease financing compared to debt financing. In the perspective of Malaysia, collateral possession is important for the firm to get debt financing approved. Thus, I hypothesize that the choice of lease financing compared to debt financing based on the collateral capacity of the firm is as follows:

Hypotheses 3: *Firms with less collateral tend to use more lease financing compare to debt financing*

Eisfeldt and Rampini (2009) suggested that the market-to-book ratio also indicates the extent to which a firm is constrained since it measures the value of capital inside the firm relative to the replacement cost of the capital. Their model predicts that the use of leases is positively related to the market-to-book ratio. Alternatively, the market-to-book ratio can be a

proxy for the growth option in a firm's investment opportunity set. For firms with more growth opportunities, the conflicts of interest between debtholders and stockholders may lead to costly underinvestment problem. These underinvestment incentives can be alleviated by reducing the amount of debt in the capital structure (Myers, 1976) or by using financing with high priority claims such as leasing or secured debt (Stulz and Johnson, 1985).

The previous studies showed mixed results for the firm to choose either lease or debt financing in terms of firm growth capacity. In the Malaysian firm perspective, the financial institution concerns about the repayment records on other loans and fewer concerns about the firm growth capacity. Thus, I hypothesize that the choice of lease financing compared to debt financing based on the firm growth capacity is as follows:

Hypotheses 4: *Firms with low growth tend to use either lease or debt financing.*

Size is related to the costs of obtaining external funds. Smaller companies tend to bear higher costs for getting external financing, due to information asymmetry (Graham et al., 1998). Lessors may choose to reduce the uncertainty surrounding their claims by leasing rather than lending to small companies. Leases are preferred because the lessor's security is tied to the asset itself rather than his general credit. Smaller companies are predicted to lease relatively more, suggesting a negative relationship between size and leases. Size is related to diversification and the ability to redeploy assets internally, and larger companies tend to be more diversified than smaller ones. Mehran et al. (1999) investigated the relationship between total leases and size, measured as total sales. Their results showed that size is positively related to leases. Deloof and Verschuere (1999) also investigated the determinants of the financial leasing decision and used total assets as a measure of size. Their results showed that the coefficient of size is significant and positive for the entire sample, but also when the sample is split between small and large companies.

Based on previous studies, size is positively related to lease financing. From the perspective of Malaysian firms, financial institutions concern about the capability of the firm to pay back the loan, and one of the criteria they look at is the size of the firms. It is difficult for the firm to get debt financing if the firm does not have a strong size capacity. Thus, I hypothesize that the choice of lease financing compared to debt financing based on the size of the firms is as follow:

Hypotheses 5: *Firms with less size tend to use more lease financing compared to debt financing.*

2.5 Data and Methodology

For this analysis, the samples comprised Malaysian firms listed in the Bureau van Dijk Orbis Database between 2007 and 2010 (4 years). The samples consisted of listed, unlisted (the firms not defined as SME and not listed in Bursa Malaysia) and SMEs from various industries. The samples derived from three different categories of a firm because it has a different impact on financial constraints and the behaviour of the firm decision to obtain either lease financing or debt financing. Each firm in these samples possessed data for all the variables used in this analysis. The final samples comprised 1150 firms; 627 from listed firms, 470 from unlisted firms, and 53 from SME's. The total number of firm-year observations were 4497.

All the listed firms were derived from the Bursa Malaysia and for the unlisted and SME firms, they must not be listed on the Bursa Malaysia and the businesses must still be active and operational. For the definition of SMEs in Malaysia, these samples used the criteria set up by the SME Corporation Malaysia as shown in Figure 2.1.

Sectors	SMALL		MEDIUM	
	Sales turnover	No. of employees	Sales turnover	No. of employees
Manufacturing	From RM300,000 to less than RM15 million	From 5 to less than 75 workers	From RM 15 million to not exceeding RM50 million	From 75 to not exceeding 200 workers
Services and Other sectors*	Sales turnover from RM300,000 to less than RM3 million	From 5 to less than 30 workers	From RM 3 million to not exceeding RM 20 million	Full time employees from 30 to not exceeding 75

Figure 2.1: Definition of SMEs in Malaysia

2.5.1 Dependent variables

The main dependent variables were the lease ratio and debt ratio. This paper adopts Graham et al. (1998) to measure the present value of the operating leases as the current year rental expense and the rental commitments over the next five years. To calculate for lease ratio, this analysis added the current rental expense to the Present Value of the operating lease

commitments for the next five years and then divided it by the total assets. Total assets represented the market value of the firm since this study also used the unlisted and SME firms as its samples. Since it is operating leases and not the capital leases that typically enjoy the repossession advantage, this paper relied on operating leases which was to be utilized in this empirical analysis of leasing versus borrowing decision. Since different companies have different costs of lease capital, this paper used 7%, the average of the short-term borrowing rates to calculate the present value of the operating leases. Adhering to Graham et al. (1998), this paper also computed the debt ratio as the long-term debt divided by the total assets.

2.5.2 Independent variables

This paper also used five different variables to proxy for the extent to which firms are financially constrained, including internal funds (Internal funds), profitability margin (Profit), asset tangibility (Collateral) growth opportunities (Growth), and size (Size). Literature suggests that firms with low internally generated cash flow or high fluctuation in their internal funds are more constrained (García-Vega, Guariglia, & Spaliara, 2012). This paper measures the internal funds by the ratio of gross operating income to total assets. Eisfeldt and Rampini (2009) suggested that the market-to-book ratio also indicates the extent to which a firm is constrained since it measures the value of capital inside the firm relative to the replacement cost of the capital. Their model predicts that the use of leases is positively related to the market-to-book ratio. The market-to-book ratio can be a proxy for the growth option in a firm's investment opportunity set. For firms with more growth opportunities, the conflicts of interest between debtholders and stockholders may lead to costly underinvestment problem. These underinvestment incentives can be alleviated by reducing the amount of debt in the capital structure (Myers, 1976) or by using financing with high priority claims such as leasing or secured debt (Stulz and Johnson, 1985). Thus, high-growth firms should prefer lease over debt financing.

Graham, Lemmon, and Schallheim (1998) argued that leasing is tied to tangible assets, thus, those firms that use more tangible assets in their production process should use more leases. According to Rampini and Viswanathan (2009), the high tangibility of assets is equivalent to a better ability of collateralization, which determines financial leverage, and firms with fewer tangible assets are more constrained and use more leases and less borrowing. We measure the asset tangibility by the ratio of the property, plant, and equipment to total assets. We also include firm size as another proxy for financial constraint as Eisfeldt and Rampini

(2009) suggest that the size of the firm is increasing in internal funds. Following Barclay and Smith (1995), we measure firm size by the natural log of firm size.

2.5.3 Control variables

Previous literature suggests that leasing and debt decisions are affected by agency costs, tax incentives, and financial situation. Titman and Wessels (1988) suggest that the uniqueness of the firm's assets can be categorized by its investment in research and development. Since the distribution of the expenditures on research and development is highly skewed and more than half of the firms do not have any research and development in any year, this paper uses the dummy (Uniqueness) equal to one when the firm has expenditures on research and development as the proxy for firm's asset uniqueness and the analysis expect the use of leases to be negatively related to the asset uniqueness. An alternative argument for why firms with more R&D spending might use less leasing is that intangible assets like research and development cannot be repossessed and thereby the agency problem involved is severe.

Lewis and Schallheim (1992) suggest that the non-debt tax shields can encourage firms to lease since leasing offers the opportunity to "sell" tax shields to the party that values them more highly. Leasing is relatively cheaper when the lessor "buys" the tax shields by reducing the lease payment. Consistent with Barclay and Smith (1995), this paper proxy the non-debt tax shields by the dummy variable (Tax-loss) equal to one if the firm has tax-loss-carry forwards. This paper expects that firms with tax-loss-carry forwards to use more operating leases and secured debt.

Besides the microeconomic factors which are reflected by the firm itself, this paper also used the macroeconomic factor to understand the relationship between real economic situation and the decision of the firm to take a lease or debt financing. For the macroeconomic factors, this study also analysed the effect of leasing and debt financing for pre-recession and post-recession. The period for pre-recession was from 2007 to 2008 and post-recession from 2009 to 2010. It is important to compare both periods because the firms might face a financial constraint in terms of internal funds, growth, collateral, or size and this may affect their decision towards the lease or debt financing.

2.6 Results

2.6.1 Descriptive statistics

Table 2.1 shows the use of lease and debt financing based on industry. This study used 7 categories of industry, i.e. manufacturing, services, retail, communication, construction, transportation, and agriculture. The industry that used leasing the most is manufacturing and the industry that used debt the most is retail. From the table, the manufacturing, construction, and transportation industries used more lease over debt financing whereas other industries like services, retail, communication, and agriculture used more debt financing over lease financing.

Table 2.1: The use of leasing and debt: Average by industry.

This table reports the average leasing and debt ratio by industry. The sample includes 3294 observations for 1150 firms from 2007 to 2010. Overall there are 7 different industries used in this sample and the details are as follows.

Industry	No of observations	Operating lease	Debt
Manufacturing	1744	0.2124	0.2011
Services	220	0.1109	0.1928
Retail	265	0.1054	0.2339
Communication	97	0.1096	0.2284
Construction	752	0.2120	0.2041
Transportation	132	0.2113	0.2081
Agricultures	84	0.1067	0.1534
	3294		

Table 2.2 shows the time series of leases and debt based on a yearly basis. This analysis used a four year period from 2007 to 2010. The total number of observations for these years were 3294. The table shows the average debt ratio was higher compared to operating lease from 2007 to 2010.

Table 2.2: Time series of leases and debt. The average every year.

The table reports the time series of operating lease and debt ratio. The samples include 3294 observations for 1150 firms from 2007 to 2010.

Year	No of observations	Operating lease	Debt
2007	842	0.1267	0.2422
2008	832	0.1129	0.2379
2009	826	0.1075	0.2382
2010	794	0.0982	0.2362

Table 2.3 shows the descriptive statistics for the variables used in this paper. The table shows the mean, standard deviation, minimum, and maximum for each variable. On average, the operating lease ratio and the debt ratio were 0.1233 and 0.2446. For financial variables, the internal funds showed on average 0.0599, profit 0.0447, collateral 0.3579, growth 0.9118, and the average size of the firm was 0.5054. For the control variables, the uniqueness variables which indicated for R&D expenses showed 0.1433, while tax-loss showed an average of 0.7956.

Table 2.3: Descriptive statistics

Summary of the statistics. The table reports the summary of statistics for the sample data. The samples include 3294 observations for 1150 firms from 2007 to 2010.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Operating lease	3294	0.1233	0.1058	0.00012	0.5132
Debt	3294	0.2446	0.2149	0.00008	0.9058
Internal funds	3294	0.0599	0.0678	-0.1216	0.2676
Profit	3294	0.0447	0.0554	-0.1082	0.2008
Collateral	3294	0.3579	0.2653	0.0001	0.9919
Growth	3294	0.9118	0.0673	0.7192	0.9999
Size	3294	0.5054	0.2332	0.1821	0.9961
Uniqueness	3294	0.1433	0.3504	0	1
Tax-loss	3294	0.7956	0.4030	0	1

Table 2.4 provides data on the relationship between dependent variables and the financial variables. The dependent variables were Operating lease and Debt. The independent variables were internal funds, profit, collateral growth, and size. The control variables were

uniqueness or the R&D expenses, and tax-loss. Column 1 in Table 2.4, indicated that there was a strong negative correlation between operation lease and growth, and a small positive correlation between operating lease and size and uniqueness variables. Column 2 indicated that there was a small negative correlation between debt and internal funds, profit, and size. In summary, there was a negative relationship between both operating lease/debt and the financial variables.

Table 2.4: Pairwise correlation

This table provides data on the strength and the direction of a linear relationship between variables. The dependent variables are the Operating lease ratio and Debt ratio. The independent variables are internal funds, profit, collateral, and size. The control variables are uniqueness or the uniqueness (R&D expenses) and tax-loss.

	Operating lease ratio	Debt ratio
Internal		
funds	-0.0383*	-0.1294*
Profit	-0.0467*	-0.1237*
Collateral	-0.0526*	-0.0639*
Growth	-0.9885*	-0.0136
Size	0.1619*	-0.1981*
Uniqueness	0.1155*	0.0181
Taxloss	-0.0445*	-0.019

2.6.2 The decision between lease and debt financing.

Table 2.5 reports the results of the OLS regression of leasing debt and the financial variables are internal funds, profit, collateral, growth, and size. The full samples included 3294 observations for 1150 firms from 2007 to 2010. The data were split between the higher and the lower of the financial variables. The higher constrained firms were the firms that ranked in the bottom half and the less constrained firms were the firms that ranked in the top half of the overall financial variables. First of all, before the samples split according to each financial variable, the relationship between operating lease and internal funds and collateral showed a positive relationship whereas the relationship between operating lease and profit, growth, and size showed a negative relationship. Hence, overall, when firms have less profit, growth, and size, the number of firms opting for lease increase.

From the second column of the table onwards, the samples were arranged between the most constraints and less constraint of internal funds. Under the most constraint of internal funds, the regression established that the internal fund was positively significant for the choice of leasing and internal funds accounted for 97.63% of the explained variability in choosing a lease financing as stated in R^2 . Under less constraint of internal funds, the regression also established that the internal fund was positively not significance for choice of leasing and the internal funds accounted for 97.95% of the explained variability in choosing a lease financing. Hence, when the firm has less constraint on the internal funds, they choose to lease.

In the third column, under the most constraint, profit was positive with no significant relationship between operating leases and profit and profit accounted for 97.64% of the explained variability in choosing lease financing. Under less constraint of profit, the regression established that the profit was negatively less significant for the choice of leasing and profit accounted for 97.94% of the explained variability in choosing a lease financing as stated in R^2 . Hence, when the firm has less constraint in terms of profit, they will choose lease as a source of financing.

For a fourth column, under the most constraint, collateral was negative with highly significant relationship between operating lease and collateral and collateral accounted for 97.76% of the explained variability in choosing a lease financing. Under less constraints of collateral, the regression established positive and highly significant for the choice of leasing, and collateral accounted for 97.86% of the explained variability in choosing a lease financing. Hence, when the firms have less collateral they will prefer lease as their source of financing.

For a fifth column, under most constraint and less constraint , growth was negative with highly significant relationship between lease and growth were accounted for 10.98% and 29.45% of the explained variability in choosing a lease financing. Hence, when the firms have constraint and non-constraints in terms of growth, they will prefer lease for their alternative means of financing.

For the last column, under most constraint and less constraint, size was negative with highly significant relationship between lease and size and they accounted for 98.01% and 97.46% of the explained variability in choosing a lease financing. Hence, when the firms have constraint and non-constraints in terms of size, they will prefer lease for their alternative means of financing. As a summary for Table 5, all the financial variables which include internal funds, growth, collateral and size, the firms will prefer lease as their alternative means of financing.

Table 2.5: Determinants of leasing which are constrained by internal funds, profit, collateral and size

The table reports the results of OLS regression of leasing. The full sample includes 3294 observations for 1150 firms from 2007 to 2010. The most constrained firms are the firms that ranked in the bottom half and the less constrained firms are the firms that ranked in the top half of the constraint variables. ***, **, * denote significance at the 1%, 5% and 10% levels, respectively.

OPERATING LEASE	All samples	INTERNAL FUNDS		PROFIT		COLLATERAL		GROWTH		SIZE	
		Most constraint	Less constraint	Most constraint	Less constraint	Most constraint	Less constraint	Most constraint	Less constraint	Most constraint	Less constraint
Internal funds	0.0289 0.046**	0.04951 0.067*	0.0152 0.420	0.0044 0.867	0.0405 0.019**	0.0319 0.154	0.0146 0.434	0.2259 0.140	0.1306 0.146	0.0452 0.034**	0.0136 0.493
Profit	-0.0186 0.293	-0.0397 0.157	0.0034 0.883	0.0104 0.740	-0.0276 0.228	-0.0237 0.386	-0.0055 0.807	-0.4541 0.015**	-0.2101 0.057*	-0.0278 0.290	-0.0076 0.754
Collateral	0.0005 0.614	-0.0074 0.623	0.0017 0.212	-0.0199 0.511	0.0021 0.151	-0.0118 0.009***	0.0115 0.001***	-0.0856 0.001***	-0.0937 0.001***	-0.0018 0.001***	0.0028 0.108
Growth	-1.5633 0.001***	-1.570 0.001***	-1.5567 0.001***	-1.569 0.001***	-1.557 0.001***	-1.568 0.001***	-1.563 0.001***	-0.0898 0.001***	-0.0328 0.001***	-1.5573 0.001***	-1.5710 0.001***
Size	-0.0077 0.001***	-0.0065 0.001***	-0.0097 0.001***	-0.0063 0.001***	-0.0098 0.001***	-0.0076 0.001***	-0.0041 0.024**	0.2099 0.001***	0.1578 0.001***	-0.0068 0.014**	-0.0067 0.051*
Control variables:											
Uniqueness	-0.0035 0.001***	-0.0031 0.01***	-0.0037 0.001***	-0.0031 0.01***	-0.0036 0.001***	-0.0020 0.097**	-0.0035 0.001***	0.0412 0.001***	0.0086 0.066*	-0.0026 0.061*	-0.0039 0.001***
Tax loss	0.0018 0.01***	0.0071 0.57	0.0022 0.012**	0.0039 0.73	0.0024 0.006*	0.0013 0.191	-0.0035 0.001***	-0.0284 0.001***	0.0115 0.005***	0.0020 0.099*	0.0015 0.098*
Constant	1.5505 0.001***	1.5578 0.001***	1.5445 0.001***	1.5574 0.001***	1.5451 0.001***	1.5574 0.001***	0.0016 0.001***	0.1758 0.001***	0.1013 0.001***	1.5446 0.001***	1.5566 0.001***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.9778	0.9763	0.9795	0.9764	0.9794	0.9776	0.9786	0.1098	0.2945	0.9801	0.9746
N	3294	1647	1647	1647	1647	1647	1647	1647	1647	1647	1647

Table 2.6 shows the results of OLS regression of debt where financial variables are internal funds, profit growth, collateral and size. The full samples included 3294 observations for 1150 firms from 2007 to 2010. The most constrained firms were the firms that ranked in the bottom half and the less constrained firms were the firms that ranked in the top half of the constraint variables. First of all, before the samples were arranged according to the constraint variables, the relationship between debts and profit showed a positive relationship whereas the relationship between debt and internal funds, collateral, growth and size showed a negative relationship.

From the second column of the table onwards, the samples were arranged between the most constraints and less constraint. Under the most constraint on internal funds, the relationship established that the internal fund was negative with moderate significance for the choice of debt and internal funds accounted for 6.14% of the explained variability in choosing a debt financing. Under less constraint of internal funds, the regression established that the internal fund was negative with less significance for the choice of debt and the internal fund accounted for 3.82% of the explained variability in choosing debt financing. Hence, when the firms have constraints in terms of internal funds, they will take debt as their financing.

On a third column, under the most constraint and less constraint in terms of profit, the relationship established that the profit was positive with low significance for choice of debt and profit accounted for 6.27% and 3.37% of the explained variability in choosing the debt financing. Hence, when the firms have high profit, they will take debt as their source of financing.

The collateral side, under the most constraint column, was positive with no significant relationship between debt and collateral and collateral accounted for 6.97% of the explained variability in choosing the debt financing. Under less constraint of collateral, the regression established that the collateral was negative with high significance for the choice of debt and the collateral accounted for 8.27% of the explained variability in choosing debt financing. Hence, when the firms have constraints in terms of collateral, they will take debt as their financing.

On the fifth column, under the most constraint in terms of growth, it was positive with high significance for the choice of debt financing and growth accounted for 5.75% of the explained variability in choosing debt financing. Under less constraint of growth, the regression established that the growth was positive with no significance for the choice of debt

and it accounted for 8.07% of the explained variability in choosing debt financing. Hence, when firms have high growth, they will choose debt financing.

On the last column, under the most constraint in terms of size, the regression established that the size was positive with high significance for the choice of debt and it accounted for 9.71% of the explained variability in choosing debt financing. For less constraint in terms of size, the regression established that the size was negative with highly significance for the choice of debt financing and size accounted for 8.67% of the explained variability in choosing debt financing. Hence, when firms have either high or low size, they will choose debt financing.

Table 2.6: Determinants of debt which are constrained by internal fund, profit, collateral, growth and size.

The table reports the results of OLS regression of debt. The full samples include 3294 observations for 1150 firms from 2007 to 2010. The most constrained firms are the firms that ranked in the bottom half and the less constrained firms are the firms that ranked in the top half of growth. ***, **, denote significance at the 1% and 5% levels, respectively.

DEBT	All samples	INTERNAL FUNDS		PROFIT		COLLATERAL		GROWTH		SIZE	
		Most constraint	Less constraint	Most constraint	Less constraint	Most constraint	Less constraint	Most constraint	Less constraint	Most constraint	Less constraint
Internal funds	-0.5643 0.003***	-0.7465 0.033**	-0.1572 0.534	-0.7231 0.034**	-0.4537 0.048**	-0.2694 0.356	-0.6989 0.005***	-1.0229 0.001***	-0.0906 0.710	-0.9344 0.004***	-0.4100 0.036**
Profit	0.3409 0.145	0.7291 0.045**	0.0310 0.921	0.7668 0.06*	0.4330 0.157	-0.0224 0.95	0.5782 0.058*	0.6785 0.057*	-0.0358 0.905	0.3052 0.448	0.4918 0.039**
Collateral	-0.0491 0.001***	-0.0423 0.032**	-0.0579 0.003***	-0.0482 0.015**	-0.0497 0.009***	0.0893 0.13	-0.2021 0.001***	-0.0395 0.057*	-0.0959 0.001***	-0.0514 0.009***	-0.0325 0.059*
Growth	-0.1172 0.035**	-0.1531 0.060*	-0.0866 0.256	-0.1623 0.047**	-0.0897 0.237	-0.1675 0.032**	0.0095 0.904	0.1222 0.001***	0.00287 0.563	-0.2147 0.012**	0.0775 0.215
Size	-0.1979 0.001***	-0.2126 0.001***	-0.1721 0.001***	-0.2167 0.001***	-0.1644 0.001***	-0.2161 0.001***	-0.2213 0.001***	-0.2136 0.001***	-0.2287 0.001***	0.1479 0.001***	-0.3910 0.001***
Control variables:											
Uniqueness	0.02311 0.030**	0.0415 0.008***	0.0095 0.512	0.0512 0.001***	0.0002 0.984	0.0432 0.007***	-0.0096 0.5	0.0071 0.688	0.0276 0.030**	0.1214 0.001***	-0.0313 0.002***
Tax loss	-0.0423 0.001***	-0.0700 0.001***	-0.0300 0.011***	-0.0701 0.001***	-0.0267 0.026**	-0.0631 0.001***	0.0003 0.981	-0.0373 0.026**	-0.0462 0.001***	-0.1017 0.001***	-0.0104 0.244
Constant	0.5181 0.001***	0.5834 0.001***	0.4459 0.001***	0.5959 0.001***	0.4381 0.001***	0.5593 0.001***	0.4755 0.001***	0.3562 0.001***	0.4119 0.001***	0.5767 0.001***	0.4288 0.001***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.0614	0.057	0.0382	0.0627	0.0337	0.0697	0.0827	0.0575	0.0807	0.0971	0.0867
N	3294	1647	1647	1647	1647	1647	1647	1647	1647	1647	1647

Table 2.7 shows the results of OLS regression between lease and debt with the financial variables under the condition of pre-recession and post-recession period. Besides the microeconomic factors which are reflected by the firm itself, this thesis also used the macroeconomic factor to understand the relationship between real economic situation and the decision of the firm to take a lease or debt financing. For the macroeconomic factors, this study also analysed the effect of lease and debt financing for pre-recession and post-recession. The period for pre-recession was from the year 2007 until 2008 and post-recession from the year 2009 until 2010. It is important to compare both periods because the firm might face financial variables difficulties in terms of internal funds, profit, collateral, growth, and size where this could affect their decision towards the lease or debt financing. The samples included 1659 observations for pre-recession and 1635 observations for post-recession.

On the first two-column under pre-recession, the relationship established that the growth and size were negative with high significance for the choice of the lease, and both accounted for 98.79% of the explained variability in choosing a lease financing. While for debt, the relationship established that collateral and size indicated negative with highly significance or choice of debt and both accounted for 5.22% of the explained variability in choosing a debt financing. Hence, during the economic crisis, the firms with low growth and size will choose lease and the firms that have low collateral will choose debt financing.

For the last two columns under post-recession, the relationship established that the internal fund was positive with high significance for the choice of the lease while profit, growth and size indicated a negative with high significance for the choice of the lease. The internal fund, profit, growth and size accounted for 98.96% of the explained variability in choosing a lease financing. While for debt, the relationship established that internal fund and size showed a negative with high significance for the choice of debt and both accounted for 7.58% of the explained variability in choosing a debt financing. Hence, after the economic crisis, firms with less financial capacity in terms of growth and size will prefer lease. For firms which have less internal funds, growth and size will also prefer to choose debt for their financing.

Table 2.7: Determinant of leasing and debt towards financial constraint pre and post-recession time.

The table reports the results of OLS regression of leasing and debt. The full sample includes 1659 observations for pre-recession (2007-2008) and 1635 observations for post-recession (2009-2010) ***, **, denote significance at the 1%, and 5% levels, respectively.

	Pre-recession		Post-recession	
	Lease	Debt	Lease	Debt
Internal funds	0.0269 0.119	-0.4681 0.108	0.0420 0.001***	-0.6555 0.02***
Profit	-0.0118 0.576	0.3333 0.350	-0.0373 0.012**	0.3468 0.262
Collateral	0.0005 0.622	-0.0732 0.001***	0.0112 0.975	-0.0265 0.171
Growth	-1.6649 0.001***	-0.0517 0.508	-1.4503 0.001***	-0.1825 0.021**
Size	-0.0086 0.001***	-0.1859 0.001***	-0.0065 0.001***	-0.2066 0.001***
Control variables:				
Uniqueness	-0.0031 0.001***	0.0132 0.376	-0.0046 0.001***	0.0323 0.033**
Tax loss	0.0008 0.282	-0.0345 0.012**	0.0021 0.001***	-0.0491 0.001***
Constant	1.6523 0.001***	0.4533 0.001***	1.4386 0.001***	0.5812 0.001***
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
R-squared	0.9879	0.0522	0.9896	0.0758
N	1659	1659	1635	1635

Table 2.8 shows the results of Tobit regression relationship of leasing and debt. The results indicated that lease and debt had a positive relationship or complement each other. In the perspective of Malaysian firms, these results may happen due to government policy to encourage healthy competition between the loan provider and the lease company. Various packages and financing products have their own characteristic and benefit for a firm to choose. Besides, different characteristics of financial constraints may affect the decision for a firm to choose a lease or debt financing.

Table 2.8: The relation between leases and debt.

The table reports the results of Tobit regression in which Debt ratio is treated as an explanatory variable. The full sample includes 3294 observations for 1150 firms from 2007 to 2010. ***, **, denote significance at the 1%, and 5% levels, respectively.

Dependent variable	Operating lease (pooled Tobit)
Debt ratio	0.0011 0.407
Variables used to measure financial constraint:	
Internal funds	0.0295 0.042**
Profit	-0.0190 0.283
Collateral	0.0018 0.579
Growth	-1.5632 0.001***
Size	-0.0075 0.001***
Control variables:	
Uniqueness	-0.0035 0.001***
Tax loss	0.0018 0.009***
Industry dummy	Yes
Year dummy	Yes
Constant	1.5500 0.001**
R-Squared	0.9778

Overall, not all financial constraint firms tend to use lease financing compared to debt financing. It depends on what types of financial constraints that the firm face. From the analysis, it is found that the firms that have financial constraints in terms of internal funds, profit, collateral and size choose to use lease and debt financing. However, for firms that have fewer growth opportunities, it is difficult for them to choose either lease or debt financing because of their future survival. To ensure the main results are robust to different model specifications, this section performed a series of additional tests. The additional tests included first, the analysis on the relationship between leasing and financial variable based on the listed and unlisted firms. Second, the analysis of the relationship between leasing and financial constraint variables based on the size of the total asset.

Table 2.9 shows the relationship between leasing and financial variables based on listed and unlisted firms. The results indicated that for listed firms when the lease was a dependent variable, the regression established that the growth and size were negative and highly significant for the choice of lease and it accounted for 97.72% of the explained variability in choosing lease financing. In terms of debt financing as a dependent variable, the regression established that internal fund, collateral and size was negative and highly significant for the choice of debt financing and it accounted for 6.58% of the explained variability in choosing a debt financing.

For unlisted firms, the results indicated that when the lease was a dependent variable, the regression established that the growth and size were negative and highly significant for the choice of lease and it accounted for 97.93% of the explained variability in choosing lease financing. In terms of debt financing as a dependent variable, the regression established that size was negative and highly significant for the choice of debt financing and it accounted for 2.28% of the explained variability in choosing a debt financing.

Table 2.10 shows the relationship between leasing and financial constraint variables based on the size of total assets. This table sorts the sample firms into large, and small sizes of the firm based on their total asset. It shows that small size firms tended to use leasing when they had a financial constraint on growth and size. Large firms also tended to use leasing once they had less internal funds, growth and size. This is because the small firms do not have enough collateral to pledge for debt financing. While this finding may partially reflect the fact that firms accumulate tangible assets as they grow in size, it is also consistent with Rampini and Viswanathan's (2009) prediction that tangibility determines firm leverage and the lack of

tangibility increases the incentive to lease. In summary, the relationship between types and size of firms and decision to leasing are consistent with the main results.

Table 2.9: Relationship between leasing and financial constraint variables based on listed and unlisted firms.

This table reports the results of regression for lease and debt under samples of listed and unlisted firms. ***, **, * denote significance at the 1%, 5% and 10% levels, respectively.

	Listed firms		Unlisted firms	
	Operating lease	Debt ratio	Operating lease	Debt ratio
Variable used to measure financial constraint				
Internal funds	0.0479 0.027**	-0.7664 0.007***	0.0086 0.712	-0.2832 0.355
Profit	-0.0411 0.085*	0.4970 0.115	0.0163 0.552	0.2246 0.535
Collateral	-0.0013 0.310	-0.0534 0.001***	0.0045 0.017**	-0.0405 0.10*
Growth	-1.564 0.001***	-0.1264 0.063*	-1.5628 0.001***	-0.1122 0.25
Size	-0.0068 0.001***	-0.2204 0.001***	-0.0109 0.001***	-0.1379 0.001***
Control variables:				
Tax loss	0.0017 0.072*	-0.0637 0.001***	-0.0037 0.015**	-0.0178 0.376
Industry dummy	Yes	Yes	Yes	Yes
Constant	1.551 0.001***	0.5572 0.001***	1.5495 0.001***	0.4320 0.001***
R-Squared	0.9772	0.0658	0.9793	0.0228
N	2305		989	

Table 2.10: Relationship between leasing and financial constraint variables based on size of total asset.

This table divided the samples into large and small size of the firm total assets. Year dummies and industry category dummies are included in regressions. ***, **, * denote significance at the 1%, 5% and 10% levels, respectively.

Operating lease ratio	Large firm	Small size
Internal funds	0.0428 0.023**	0.0152 0.419
Profit	-0.0308 0.180	0.0033 0.888
Collateral	-0.0012 0.864	0.0018 0.215
Growth	-1.5628 0.001***	-1.5566 0.001***
Size	-0.0058 0.004***	-0.0096 0.001***
Control variables:		
Uniqueness	-0.0019 0.046**	0.0036 0.001***
Tax loss	0.0012 0.148	0.0022 0.012**
BLR	-0.020 0.805	0.0283 0.727
Constant	1.549 0.001***	1.5428 0.001***
R ² from OLS	0.9752	0.9795
N	1647	1647

2.7 Conclusion

As a conclusion, the results show that the use of leases and debt financing are dependent on the types of financial variables that can promote financial constraint on the firms. It also shows that it has a positive relationship between a lease and debt financing due to the economic policy and characteristics of the firms in Malaysia. For the financial constraint firm, especially for the firms with lower internal funds and lower collateral, they prefer to use lease over debt financing. Hence, when the firms have less internal fund available, they do not use debt financing because of difficulties to get the loan approval from the bank or financial institutions. The same goes for collateral. For firms with less collateral, they cannot use debt financing because of the unavailability of an asset to act as collateral and in order for them to take debt financing, they must have good and enough collateral to get loan approval from the bank.

Firms with lower growth have tended to use debt financing rather than lease financing. Hence, the prospect or the firm development is important for the financial provider either debt or lease financing provider to ensure the firm can survive in the future. Firms that are smaller, with low internal funds, tend to lease more and borrow less. The smaller firms may not have a strong financial position to apply for debt financing. Besides, the firms that have less collateral will use more lease compared to debt financing. This is due to the demand for collateral if the firms use debt financing. From the analysis, not all financial constraint factors can affect a firm to choose lease financing over debt financing. It depends on what types of financial constraints that they face.

Chapter 3: Credit Risk Mitigation: In Perspective of SMEs in Malaysia.

Abstract

The study proposed a credit risk mitigation model for SMEs combining financial and non-financial variables which were used to analyse the influence of owner educational level, gender, and age of the business. Multiple Discriminant Analysis (MDA) model, one of the extensively documented approaches, was used. The final samples for the estimation model consisted of 400 observations among which half were distressed and another half were non-distressed firms for the period from 2010 to 2015. The prediction models perform relatively well in the both variables. The model predicts that financial variable have a significant impact on the credit risk assessment for SMEs, while the non-financial variables have a less impact on the credit risk assessment for SMEs in Malaysia perspective. This evidence shows that the models serve as efficient early warning signals and can thus, be beneficial for monitoring and evaluating credit risk.

3.1 Introduction

SMEs constitute 97.3% with 645,136 of all businesses in Malaysia and contribute 57.5% of total employment in the country (SME CORP, 2011), whereas the total contribution of 33.1% to gross domestic product and 19% to export are still lagging behind as compared to other Asian countries. The Eleventh Malaysia Plan covering 2016 to 2020 has encouraged all parties to support enhancing SMEs capability to stay competitive and resilient to the domestic market as well as discover new opportunities in the global market.

In order to expand the business, SMEs need financial and non-financial support. Financial institutions are now offering a lot of financial products to fund the companies. Besides, the SME Bank (one of the government-linked agencies) is established to fully offer fund for the SMEs. However, these initiatives might be short-lived since the SME Bank is now suffering from a high non-performing loan (NPL) at 12.3% over other commercial bank loans that offer as lower as 3.15% (SME Bank, Annual Report, 2014).

An analysis of the creditworthiness of SMEs by banks has made much progress since the bad loan problems of the 1990s – 2000s in Malaysia. One example is an implementation of the internal credit rating system that ranks companies according to their financial strength. In addition to major financial indicators, such as the capital adequacy ratio, there are cases where qualitative factors, such as management's abilities and financial transparency, are also taken into account. Since 2000s, the financial scoring model has become pervasive (Malaysia Financial Services Authority, 2003). Scoring is a lending model constructed by statistical methods that estimate the probability of bankruptcy of loan claims and uses the probability to determine loan extension and loan rate spreads. The scoring method does not manage risks on a case-by-case basis but manages the risks on loans throughout the portfolio control based on the law of large numbers. Therefore, its accuracy tends to increase as the data pool becomes larger, hence, emphasizing the importance of database construction.

On the other hand, theoretically, there are limits to internal ratings and scoring by banks (Hirata 2005). First, in many cases, there are problems with the quality of the financial statements of the SMEs. According to a survey by the Small and Medium Enterprise Agency, only about 30% of firms are considering preparing accounts based on appropriate accounting for strengthening financing capability (Small and Medium Enterprise Agency 2004). Second, there is a time lag of information. There have been many cases where the latest financial statements for the settlement dates acquired for examination were from 3–15 months ago, so

the current states of the companies are unclear. Besides, monitoring after financing is not sufficient. With financial statements alone, banks have difficulties in grasping the situations of their clients due to daily changes throughout the fiscal year.

Every bank has its model in measuring the company's performance. Even though the best model is secured, default still occurs. The measurement of a company's financial performance is taken from different aspects. It is suggested by previous research to not only focus on one aspect, but precise measurement should also be considered from different views.

This study aimed to develop a model to assess company credit risk. The model is estimated to provide creditors in analysing the financial strength of SMEs before making important decisions in offering loans to SMEs. The early sign can be traced to anticipate the event of default. Prudent measurement will improve effectiveness in the banking system that operates within low costs and low NPL.

The financial institution or creditor has applied the best model in assessing and predicting the company's financial health before considering loan and investment to the company. However, with the help of the existing model, the non-performing loan still occurs. Therefore the existing model needs to be improved in order to reduce and control any default of loan from the company. This model will provide an in-depth information to financial institutions, creditors, and investors and act as an additional tool in assessing company performance. In short, it will reduce the probability of default and convince all parties to invest.

Besides, the paper aims to prove whether the non-financial variables for the evaluation of credit risk for the SMEs will have a significant relationship or not. This study focuses on assessing SME credit risk by developing a model to predict the company loan default. The model will consider both financial and non-financial factors. Financial ratios will be used to measure the company's financial performance. In addition to size, the educational level of the company's owner, the gender of the owner and the age of the businesses are taken into consideration on non-financial factors.

3.1.1 Contributions of the study

In examining the relationship between the credit risk mitigation and firm's financial performance, this study makes empirical and methodological contributions to credit risk mitigation research and policy making.

(i) Empirical contribution

The existing literature has examined the impact of credit risk mitigation to the loan default (Norlida et al, 2015; Lopez and Saidenberg, 2000). Whereas, this study focus on the borrower capability and quality to ensure they able to pay the loan as agreed. This study adds to the existing literature by considering the relationship between financial and non-financial factors of the borrower to mitigate the credit risk.

Besides that, this study focusing on SMEs and specifically in Malaysia where as a developing county, credit risk assessment is vital to stabilize the financial market volatility and economic uncertainty. This study extends the existing literature by examining and predicting credit risk among SMEs where I believed that it is significant to have a separate credit risk model between small and large firms because of their different behaviours.

Other than that, a wide literature and previous study on credit risk considered financial factors or quantitative data into their study (Fabi et al, 2005; James & Hwan, 2006; Barbara et al, 2008). Profitability, leverage and liquidity ratio have the most significant explanatory power in explaining the company's financial performance but I believed that the company's performance must be assessed based on non-financial factors as well. This study aims to shed light on the existing literature by examining both financial and non-financial factor to have an effective credit risk mitigation.

(ii) Methodological contributions

This study used Multiple Discriminant Analysis (MDA) model where it perform relatively well especially in the model of financial and non-financial variables thus, it can expand the scope of research where most of the research contributions done in Malaysia regarding corporate failures have been focusing on public listed entities due to easy access to financial data using many bankruptcy prediction models such as univariate analysis, logit regression model, hazard model, and probit model. The contributions of Altman (1968); Altman, Edward, Haldeman, and Narayanan (1977); Beaver (1966); Deakin (1977); Blum (1974); and Ohlson (1983) have spawned huge literature on the topic of financial distress. This can be seen mostly in large public listed firms due to easy access to their financial data. However, very little number of researches on small and medium enterprises (SMEs) has been done as a result of the difficulty in accessing their financial data and other information.

The chapter is structured as follows: Section 3.2 briefly explains the relevant literature on credit risk, mechanism and impact on credit risk, financial and non-financial factors.

Section 3.3 details the hypotheses development on the impact of financial and non-financial factors on the firm financial position. Section 3.4 and 3.5 describe the data and method used to test the hypothesis, and the analysis of the results. Section 3.6 concludes with a summary of the main findings.

3.2 Literature Review

3.2.1 Definition of Credit Risk

Credit refers to borrowing and lending of money. Basically, it refers to a loan that is granted to a borrower or a financial instrument that involves pre-determined fixed payments and is made over a set of time period. According to Anita (2008), credit risk is defined as the potential loss of valuable assets caused by a probable weakening in the creditworthiness of the counterparty or its inability to meet contractual obligations. It has been identified as the dominant risk for banking firms as the core business of banks are loan lending and deposit activities (Basel Committee, 2001). Credit risk depends on the ability of borrowers to generate sufficient cash flows through operation, earnings, or asset sales to meet their future interest and principal payment of the outstanding debt.

Lopez and Saidenberg (2000) define credit risk as the degree of value fluctuations in debt instruments and derivatives due to changes in the underlying credit quality of borrowers and counterparties. Credit risk is defined as the possibility of loss due to default in financing. It involves the borrower's failure to repay or meet a contractual obligation. According to Norlida et al (2015) credit risk depends on the ability of the borrower to generate adequate cash flows through operation, earnings, or asset sales to meet their future interest and principal payment of the outstanding debt. Credit risk widely reviews and draws attention from Basel Committee in establishing policies for financial institution guidance, (Basel Committee, 2001). The committee identifies credit risk as the dominant risk for banking and firms related to lending and deposit activities. Therefore, Credit risk assessment system is very crucial in determining the capability of a company to pay the loan. Lack of skill and knowledge on predicting credit assessment will cause wrong interpretation, hence, causing inaccurate findings.

3.2.2 Mechanism of Credit Risk Management

Most previous studies indicate that every financial institution and company with core business in lending must have an appropriate and perfect credit assessment model. A vital valuation is financial stability in assessing a company's performance. Furthermore, based on

extensive literature, all aspects should be considered in the measurement model to determine the overall performance of the company. Financial information is a major contribution in analysing the company's performance. It assists stakeholders to make informed judgments considering numerous proportions of financial information in combination, (Godfrey et al, 2010).

Didier, Cossin and PirotteHugues (2000) argued that due to the increasing sophistication of financial instruments, especially over the counter (OTC) products, traditional methods of risk evaluation are no longer adequate. They suggested that advanced methodologies be used in the current common practice. Treacy and Carey (1998) investigated the internal mechanism of credit risk assessment of major US banks and showed that large banks tend to have an in-house risk assessment procedure and do not solely rely on the ratings provided by the public rating agencies. They claimed that US banks assess borrower's credit ratings mostly for major commercial loans and not for individuals or small amounts of loans. They, however, highlight that there is no standard or universal method used by banks and rating assessments still rely heavily on human-based assessment over figure based.

The default prediction model has become one of the oldest and major tools used to predict the probability of default. Empirical studies on default prediction dated back to the 1960s, pioneered by Beaver and Altman (Hol, Westgaard & Wijst, 2002). It started with a univariate discriminant analysis developed by Beaver in 1966 and is expanded by Altman (1968) towards multivariate discriminant analysis (MDA) which is still being applied today through the famous Z-score model.

3.2.3 Impact of Credit Risk Management

Franke, Härdle and Hafner (2011) argued that the primary goal of risk management models is to help credit analysts define whether a loan should be issued, how much risk premium is required, and how much adjustment in loss reserve account should be made. Credit risk management would have an impact on the performance of the firm. Financial reporting plays a crucial role in providing information that is useful to present and potential investors and creditors to help them decide on investments, credits and trading activities (Spiceland, Sepe & Tomassini, 2007). Shen and Hassan (2012) found that the financial ratios on credit ratings are significantly affected by the level of information asymmetries. They also suggested that for banks to improve the credit rating, the information asymmetry in the country should be reduced.

Assessing credit risk is said as the leading topic in modern finance, hence, financial

institutions have heavily focused on the topic due to the increasing number of default loan by applicants. They use both internal and external credit scoring in deciding on loan approval (Dean & Silvia, 2008). Credit risk management is very crucial to make them retain and compete internationally. The financial institutions have increased the awareness and precaution in granting a loan to potential applicants in order to control loan default (Lin, 2009).

In recent years, financial market volatility and economic uncertainty have attracted financial institutions to focus on credit risk management. The existing models on assessing company creditworthiness are still weak and need to be improved, with the help of the existing model, the creditors still suffer from a high percentage of loan default by SME. Identifying the qualified loan receiver is critical as the SMEs are considered riskier than large businesses (James & Hwan, 2006) (Barbara et al, 2008). During the process of giving out a loan, financial institutions stand with their own credit risk model. Hence, it is high time have a separate credit risk model for the SMEs and large companies (Altman & Sabato, 2007). Beck (2007) proved that small and medium enterprises are more constrained by financing and other institutional obstacles than large enterprises. He used the concept of the access possibilities frontier to clarify the difficulties in managing risk and transaction costs involved in SME especially in the developing countries.

Credit risk assessment is vital in order to attract and sustain the investor's confidence to invest in Malaysia. Therefore the prudent credit risk assessment should help in improving the financial system of the country. The bankruptcy rate in Malaysia shows a growth pattern, reflecting the increased rate in the failure of debt repayment (Norlida et al, 2015).

An extensive literature has been developed in predicting credit risks among the SMEs. The elements comprise multi-angled assessment, contributing to the sound empirical study. No single measurement of financial performance is adequate for evaluating the company's performance (Damona, 2004). Four aspects of measurement namely, measuring liquidity, leverage, profitability and efficiency of the companies are determined from literature. When evaluating the overall performance, multiple measurements of performance will exist (Shashua et al, 1974).

3.2.4 Financial Factor

Literature on credit risk has considered financial factors or quantitative data into their study (Fabi et al, 2005). Profitability, leverage and liquidity ratio have the most significant explanatory power in explaining the company's financial performance, (James & Hwan, 2006)

and (Kanitsorn & Dessalegn, 2011). A financial ratio is a common and powerful tool used in assessing a company's performance. It is highly significant in picturing a correlation between earning and the probability of default (Barbara et al 2008). The ratio can demonstrate an outstanding idea of the company's financial situation (Dean & Silvia 2008). Altman and Sabato (2007) have developed a model by using a complete set of financial ratio considering profitability, leverage and liquidity ratio in order to determine companies with prudent creditworthiness. These categories of the ratio are used in predicting the likelihood of the SMEs experiencing financial distress. The financial capability of the SME is stronger when considering various ratios in combination instead of a single ratio (Kanitsorn & Dessalegn, 2011)

Jaroslav et al (2014) indicated that the financial capability of a borrower is an important factor that reflects the capacity to repay one's obligation to the bank which is determined by the level of the financial performance of the company. Besides, it will affect the business operation, leading toward a financial crisis. According to Kalogeras (2005), the first step in the assessment of financial viability is the financial analysis.

The financial ratio is calculated based on information gathered from financial statements, therefore the company should provide precise accounting figures (Norlida et al, 2015). An important condition of effective SMEs financing via bank loans is transparent conduct by all parties involved (European Association of Craft, Small and medium-sized Enterprises, 2007; Bain & Company, Inc. and the Institute of International Finance, 2013). SME should provide true and correct information, as these are entered into commercial banks' rating models, and banks should use transparent criteria when granting loans.

3.2.5 Non-financial Factors

In developing a credit risk assessment model, the company's performance must be assessed based on non-financial factors as well. Qualitative information is crucial as it act as supplementary tools for credit risk prediction (Dean & Silvia, 2008). It is agreed that quantitative data are not sufficient in explaining a company's performance as it needs to be supported with the soft fact (qualitative data) such as a number of employees, a region where the business carried out, and industry type (Bina, 2003).

Simon (2013) discovered that firm credit assessment is typically based only on hard information. However, he emphasized the relevance of including soft information in addition to hard information to improve credit default prediction. Soft information indeed, improves the

credit default prediction model (Simon, 2013). Research on the role of qualitative information such as management quality and market position is scarce (Bina, 2003). In addition, non-financial factors such as the age of the companies and educational level of the business owners must be taken into consideration (Kanitsorn & Dessalegn, 2011). Barbara et al (2008) considered both financial and non-financial factors such as profitability, debt level, sector and geographical or location matter in their study.

Carter et al (2007) examined the effect of gender on the bank lending process for small businesses. They found that in the process of considering an application, the applicant's educational status plays an important role, and a lower level of attained education of a female applicant is mostly rejected. When the loan applicant is male, the loan officer is most likely to know about the business plan, financial history, and general characteristics of the applicant. On the other hand, when a female is applying for the loan, the officers are more interested in knowing whether she has done enough research, and her educational background is mostly discussed.

Irwin & Scott (2010) examined the barriers faced by the SMEs in securing bank financing in the UK. More specifically, they have examined the personal characteristics of entrepreneurs in applying for bank financing by considering ethnicity, gender, and attained education. The empirical result of the paper showed that 18% of men face difficulties in financing their start-ups, compared to 12% of women. However, the result is not statistically significant at the 5% level. Still, it suggests that men are more financially constrained than women, due to their past repayment history and lower commitment to their businesses.

In the existing Credit risk assessment models, a loan provider includes various types of hard information (quantitative information). Even though a model shows almost 80% accuracy, Francesco et al (2013) strongly suggested non-financial factors to be considered in the future model in order to understand how these data affect financial and credit historical determinants. According to Bogdan (2013), banks must use different types of information like skills, management team experience, ownership quality, the company strategies and market share to get a more precise lending decision.

According to Lim and Envick (2011) there is a significant difference in risk-taking between the male and female respondents. Males prefer to be more aggressive when they identify any competitive opportunity to enter the market. Women are not so interested in the growth of their firms; they are satisfied when the company is in a stable condition. However,

women are found to be more innovative than men, which is one of their advantages in the formation of the new enterprise. In this context, Langowitz and Minniti (2007) state that women are more risk-averse than men and higher riskiness do not prevent men from starting a business.

There are mix finding on the role of non-financial variables to the credit assessment. Garwe and Fatoki (2012) confirmed that gender does not have any significant impact on SME finance. They found no difference in the question of availability of credit from commercial banks to male and female-owned SMEs. Hence, according to their study, it can be said that commercial banks do not differ for male and female-owned SMEs while providing credits. Their research showed that both males and females were given the same priority while providing loans. The only difference is that females are more discouraged to apply for bank financing than males due to the reasons that females are fearful of rejection due to the lack of education, personal assets or collateral.

Besides that, Macintosh (1994) claims that small businesses due to their small size are not in need of control system and control documents in same extent as larger firms. He argues that smaller firms can be managed without these formal systems and therefore reduces the amount of information available for the banks. Some SMEs and unlisted firms do not need to expose information in the same extent as larger and publicly held firms, due to legally enforced transparency or shareholders' demand on information (Bruns, 2004).

3.3 Hypotheses Development

Based on the current literature review for financial and non-financial factors for credit risk evaluation, I develop the following hypotheses to test or define the relationship between both factors for the financial provider evaluation on the SMEs:

Hypotheses 1: *SMEs with a good financial position have lower credit risk.*

This is because profitability, leverage and liquidity ratio have the most significant explanatory power in explaining the company's financial performance. When company have a good financial performance, they can commit and able to pay their instalment regularly. Besides that when a company have a strong financial performance, it is highly significant in picturing a correlation between earning and the probability of default. Moreover, the financial capability of a borrower is an important factor that reflects the capacity to repay one's

obligation to the bank which is determined by the level of the financial performance of the company.

Hypotheses 2: *Non-financial variables might have or less impact on SMEs credit risk besides the good financial position.*

There are literature suggest that the company's performance must be assessed based on non-financial factors as well. Qualitative information is crucial as it act as supplementary tools for credit risk prediction (Dean & Silvia, 2008). Banks or financial institutions must use different types of information, skills, experience, education, and gender in order to understand how this type of data affect the financial and credit historical determinant for more precise lending decision. Soft information indeed, improves the credit default prediction model (Simon, 2013). Thus is may minimize the credit risk of the borrower.

However, the financial institution or the banks have to be careful in their credit assessment to SMEs in order to make the right decision and not misjudge a customer. The financial institution and the bank should have to collect necessary information in order to make a good judgement (Bruns, 2004). Garwe and Fatoki (2012) confirmed that gender does not have any significant impact on SME finance. They found no difference in the question of availability of credit from commercial banks to male and female-owned SMEs. SMEs do not need to expose information in the same extent as larger and publicly held firms, due to legally enforced transparency or shareholders' demand on information (Bruns, 2004). Macintosh (1994) claims that small businesses due to their small size are not in need of control system and control documents in same extent as larger firms. He argues that smaller firms can be managed without these formal systems and therefore reduces the amount of information available for the banks.

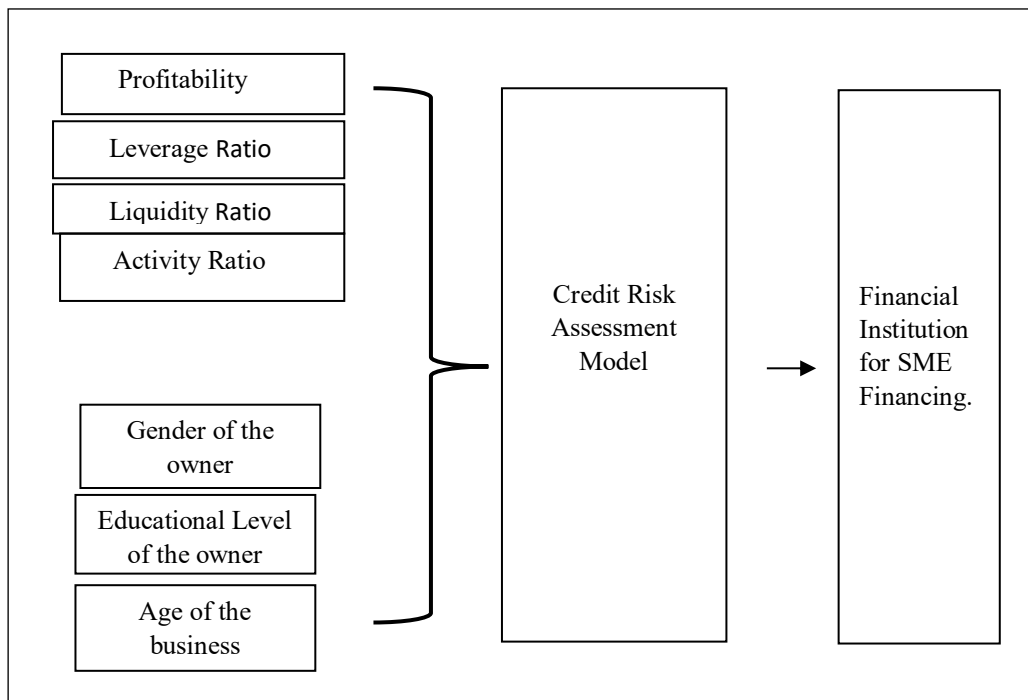


Figure 3.1 : Research Framework

3.4 Data and Methodology

The research data were gathered from the Companies Commission of Malaysia (SSM) database and the samples were identified based on the SME's definition adopted by the National SME Development Council. The samples consisted of different sectors and industries. Financial statements were used to extract the financial variables and the companies' profiles were utilized to obtain the non-financial variables.

The final samples for the estimation model consisted of 400 companies where 50 percent were distressed SMEs and another 50 percent non-distressed from 2010 to 2015. Both distressed and non-distressed companies were extracted from the Companies Commission of Malaysia (SMM). A distressed company is a company classified under winding off by court order or creditors request in Part X Section 218 of 1 I and (2) of the Malaysian Companies Act 1965. One of the circumstances that the company wound up by court is due to the company's inability to settle its debts. The definition of inability to pay debts is when it is proven to the satisfaction of the Court that the company is unable to pay its debts. In order to determine whether a company is unable to pay its debts, the Court shall take into account the contingent and prospective liabilities of the company.

To investigate whether financial and non-financial variables influence the occurrence of the SME's high credit risk, the MDA model function of the following form was estimated:

$$D = \alpha + \beta_1 TLA + \beta_2 SLA + \beta_3 LQT + \beta_4 STA + \beta_5 EDU + \beta_6 AGE + \beta_7 GENDER$$

Where D refers to discriminant score, α refers to estimated constant, TLA is a ratio of total liabilities to total assets, SLA is a ratio of short term liabilities to total assets, LQT is a ratio of current assets to current liabilities, STA is a ratio of total sales to total assets, EBIT is a ratio of earnings before interest and tax to total asset, EDU is a dummy for education level that is equal to 1 otherwise zero, AGE is a year of firm business operations, GENDER is a dummy for the gender of managing director that equals to 1 otherwise zero.

A forward stepwise procedure was applied in which the predictor variables to be included based only on the contribution they made. A stepwise procedure is usually applied when there is a lack of theoretical basis in the selection of the predictor variables. Two models have been developed, they are Model 1 (include financial variables only) and Model 2 (include financial and non-financial variables). Model 2 is designed to produce a superior result to those obtained from Model 1.

$$\text{Model 1 : } D = \alpha + \beta_1 TLA + \beta_2 SLA + \beta_3 LQT + \beta_4 STA$$

$$\text{Model 2: } D = \alpha + \beta_1 TLA + \beta_2 SLA + \beta_3 LQT + \beta_4 STA + \beta_5 EDU + \beta_6 AGE + \beta_7 GENDER$$

3.5 Results

3.5.1 Descriptive statistics

Table 3.1 presents the results of mean differences in the variables used to estimate the Multiple Discriminant Analysis model. Out of seven independent variables that were used, TLA, LQT, AGE and GENDER were not significantly different between distressed and non-distressed SMEs. For financial variables, the results indicated that the average TLA for distressed SMEs was 0.64 whereas non-distressed SMEs only 0.54. Besides, the average of short-term liabilities to the total asset for distressed SMEs was 0.75 whereas non-distressed SMEs only showed an average of 0.004. In terms of LQT, the average was much higher for non-distressed SMEs when compared to distressed SMEs.

For non-financial variables, the average for EDU under distressed SMEs was 0.675, somewhat higher than the non-distressed SMEs of 0.61. The average for distressed SMEs of AGE was 4.64, lesser than non-distressed SMEs of 4.75. For GENDER, the average for distressed SMEs was 0.66 whereas for non-distressed SMEs was 0.59.

Table 3.1: Descriptive statistics

*, **, *** significant at 10 percent, 5 percent and 1 percent levels respectively. The variables are total liabilities to total assets (TLA), short term liabilities to total assets (SLA), liquidity (LQT), sales to total assets (STA), education levels (EDU), age of company (AGE), gender of the owner (GENDER)

Variables	Mean	Standard deviation	Mean	Standard deviation	Sig.
	Distressed SME's		Non-Distressed SME's		
TLA	0.6402	0.2376	0.5441	0.2723	0.907
SLA	0.7597	0.065	0.004	0.0026	0.001***
LQT	0.8419	0.3872	380.59	692.64	0.833
STA	0.0535	0.0697	0.0848	0.0747	0.011**
EDU	0.675	0.4695	0.61	0.4889	0.042**
AGE	4.645	1.584	4.75	1.568	0.849
GENDER	0.66	0.4748	0.59	0.493	0.141
OBSERVATION	200		200		

Multicollinearity was not an issue in this analysis as indicated by a variance inflating factor (VIF) reported in Table 3.2. The R^2 was relatively low for all the variables. The VIF ranged from 1.011 to 1.522 which was less than 10, indicating that there was no issue of multicollinearity for this analysis.

Table 3.2: Variance inflating factor

Variables	R^2	VIF = $1/(1-R^2)$
TLA	0.343	1.522
SLA	0.258	1.347
LQT	0.132	1.15
STA	0.045	1.047
EDU	0.036	1.037
AGE	0.011	1.011
GENDER	0.052	1.054

3.5.2 Multiple Discriminant Analysis

Using samples of distressed and non-distressed SMEs, a stepwise discriminant analysis was used to ascertain the discriminating power of the variables. Stepwise MDA allowed the

variables selected for analysis to be ranked according to their influence on the final results. The variables with the highest influence that passed the test of eligibility were, then, included in the examination.

$$\text{Model 1: } D = \alpha + \beta_1 TLA + \beta_2 SLA + \beta_3 LQT + \beta_4 STA$$

Table 3.3: Canonical Linear Discriminant Analysis

Fcn	Canon.	Eigenvalue	Variance		Likelihood	F	df1	df2	Prob>F
	Corr.		Prop.	Cumul.	Ratio				
1	0.9926	66.89	1	1	0.0147	6606	4	395	0.000

Table 3.4: Standardized canonical discriminant function coefficient

	Function 1
TLA	-0.0012
SLA	-1.003
LQT	0.0093
STA	0.1215

$$\text{Model 2: } D = \alpha + \beta_1 TLA + \beta_2 SLA + \beta_3 LQT + \beta_4 STA + \beta_5 EDU + \beta_6 AGE + \beta_7 GENDER$$

Table 3.5: Canonical Linear Discriminant Analysis

Fcn	Canon.	Eigenvalue	Variance		Likelihood	F	df1	df2	Prob>F
	Corr.		Prop.	Cumul.	Ratio				
1	0.9927	67.639	1	1	0.0146	3787.8	7	392	0

Table 3.6: Standardized canonical discriminant function coefficient

	Function 2
TLA	0.0065
SLA	-0.1931
LQT	0.0109
STA	0.1479
EDU	0.1823
AGE	-0.0097
GENDER	-0.1309

Tables 3.3 to 3.6 show the Canonical Discriminant Function Coefficients. The Canonical Discriminant Function Coefficients structure, also known as canonical loading or discriminant loadings, represents correlations between observed variables and the unobserved discriminant functions. The standardized discriminant coefficients function in a manner analogous to standardized regression coefficients in OLS regression. Table 3.4 showed that a one standard deviation decrease on the total liabilities to total assets (TLA) variables, resulting in a .012 standard deviation decrease in the predicted values on discriminant function 1. The short term liabilities to total assets (SLA) variables showed a 1.003 standard deviation decrease in the predicted values on discriminant function 1. The current assets to current liabilities (LQT) variables resulted in a 0.0093 standard deviation increase in the predicted values on discriminant function 1. Finally, for total sales to total assets (STA) variables resulted in a 0.1215 standard deviation increase in the predicted values on discriminant function 1.

Table 3.6 showed a one standard deviation decrease on the total liabilities to total assets (TLA) variables which resulted in a .0065 standard deviation increase in the predicted values on discriminant function 2. The short term liabilities to total assets (SLA) variables resulted in a 0.1931 standard deviation decrease in the predicted values on discriminant function 2. The current assets to current liabilities (LQT) variables showed a 0.0109 standard deviation increase in the predicted values on discriminant function 2. The total sales to total assets (STA) variables resulted in a 0.1479 standard deviation increase in the predicted values on discriminant function 2. The education (EDU) variables showed a 0.1823 standard deviation increase in the predicted values on discriminant function 2. The age (AGE) variables resulted in a 0.0097 standard deviation decrease in the predicted values on discriminant function 2. Finally, the GENDER

variables showed a 0.1039 standard deviation decrease in the predicted values on discriminant function 2.

Table 3.7: Stepwise MDA for estimated model

Variables	Category	Model 1		Model 2	
		Standardized canonical discriminant function coefficient	Wilks Lambda	Standardized canonical discriminant function coefficient	Wilks Lambda
TLA	Financial	-0.0012	0.9657 (0.000)***	0.0065	0.5258 (0.000)***
SLA	Financial	-1.003	0.015 (0.000)***	-0.1931	0.4767 (0.000)***
LQT	Financial	0.0093	0.8688 (0.000)***	0.0109	0.8972 (0.0021)***
STA	Financial	0.1215	0.955 (0.000)***	0.1479	0.892 (0.0032)***
EDU	Non-financial			0.1823	0.9954 (0.1759)
AGE	Non-financial			-0.0097	0.9989 (0.5058)
GENDER	Non-financial			-0.1309	0.9948 (0.1489)
Wilk Lambda		0.9657 (0.000)***		0.5258 (0.000)***	
Observation		400		400	

Based on Table 3.7 of the stepwise procedure, model 2 outperformed model 1 based on Wilk's Lambda and classification accuracy. Wilk's Lambda indicated the significance of the discriminant function. The smaller the Wilk's Lambda for an independent variable, the more likely that the variable adds to the discriminant function. Wilk's Lambda was used in the second context of discriminant analysis to test the significance of the discriminant function as a whole. It also showed that model 2 had 52.58 percent unexplained variation in the group variables, whereas model 1 had 96.57 percent respectively. Therefore, the discriminant function in model 2 revealed a significant association between groups and all predictors, accounting for 47.42 percent of between-group variability as compared to model 1 for just 3.43 percent. A closer

analysis of the standardized canonical discriminant function coefficient in model 3, which combined financial and non-financial variables with the lowest Wilks' lambda, revealed two significant predictors that had the highest discriminating power, namely SLA (-0.1931) and STA (0.1479).

I found that all the non-financial factors didn't indicate the significant predictors. This may be due to certain factors firstly, SMEs in Malaysia mostly operate in rural areas and did not have strong educational backgrounds compared to bigger companies where they need educational qualifications to manage and run the business operations. Second, most of the SMEs in Malaysia are family businesses. They come from the old generation to the grandchild generation. The father will guide the son to manage and handle the business until they know the daily operation of the business. So, it reflects that the age of the owner will be 45-70 years old compared to a younger generation age 25-45 years old. It may give different outcomes if we used private firms where the owner and manager come from different ages depending on their educational background, working experience and credibility. Third, most of the SMEs in Malaysia come from manufacturing and service sectors and are equally managed by males and females. In Malaysia, females play a significant role in the number of SMEs, especially in the food and service industries, as it may be impacted by the government's economic plan in the late 80s where they encouraged females to start up a small business at their home to support the family by introducing many short-term grant schemes for them as capital. The results might be different if we analyzed private firms as most of the owners and managers are male because of the nature and composition of that business. So, to answer a second hypothesis, non-financial factors might have less impact on credit assessment for SMEs as they provide less information and irrelevant contributions for financial institution evaluation.

3.6 Conclusion

This study improves the existing models of credit risk assessment on distressed prediction in various ways. It enhances research contributions in the aspects of measuring credit risk among firms by considering both financial and non-financial factors. A few aspects in four categories of financial ratios will be explained to give insights on the financial part, whereas three factors represent the non-financial one.

Past studies have mostly focused on financial factors, namely profitability, leverage, liquidity and activity (Kanitsorn & Dessalegn, 2011), (Altman and Sabato, 2007) (James &

Hwan, 2006). Hence, it is assumed that these aspects are very powerful in determining the company's financial performance and the information is adequate in developing a model on credit risk assessment.

Besides an additional category of a financial ratio, this study proposes to consider non-financial factors, specifically the educational level of the owners, the age of the SMEs, and gender of the owners to be included into the model as they will bring an in-depth picture of the company performance in assessing credit risk. However, after completing this study, it indicates that the non-financial variables have an insignificant impact for assessing the SMEs based on the behaviour and the traditional background of SMEs in Malaysia. However, it may have a strong and significant impact in listed and larger firms due to the high qualification and strong demand for the quality leader to manage the firms.

In future we might have a sample from the larger and listed firms and provide a better reference in assessing companies' credit risk. Creditors, investors, and fund providers will have a precise model in assessing a company's credit risk in order to reduce loan default. In addition, all identified problems will be answered and benefits will go to all parties involved.

Chapter 4: Role of Research and Development to Increase Firm Financial Performance. Do SMEs in Malaysia Take Advantages on it?

Abstract

This chapter examined the effect of R&D activities on SMEs' financial performance in the Malaysian perspectives. The contribution of this paper is to prove the effect of R&D activities on the financial performance of SMEs in Malaysia. SMEs also take advantages of R&D activities to increase their financial performance despite the fact that SMEs may lack of equipment and fund to run the R&D activities compared to large firms. The samples consisted of 352 observations from four main types of industries such as manufacturing, services, construction and agriculture which cover 10 years period from 2004 to 2013. A few regression analyses were conducted to identify the effect of R&D activities and patent outputs for the firms' financial performance. The results indicated that R&D activities affected positively the firms' financial performance and the manufacturing and construction sectors showed the most significant impact from the R&D activities for the SMEs.

4.1 Introduction

The SMEs growth is crucial to ensure survival and subsequent consolidation in their operating markets (Lotti et al., 2009). In addition, SMEs are considered to be the main driving force behind economic and employment growth in many countries. Hence, they should be given a special status in major government policies. The economic budget such as 10th Malaysia Economic Plan (RMK-10) and the 11TH Malaysia Economic Plan (RMK-11) focus on enhancing SME productivity, encouraging business formation as well as promoting innovative and high growth firms in a move towards creating overall conducive entrepreneurship and SME ecosystem. Innovation is one strategy to increase the SME's competitive advantage on the global stage.

This study analysed the role of research and development (R&D) to increase SME financial performance, focusing on Malaysia. Regression analysis was used for data gathered from 2004 to 2013 through 352 observations mainly from various industries such as manufacturing, services, construction and agriculture. SMEs should consistently invest in market research, R&D and innovation in order to increase their competitiveness. Firm-level competitiveness indicates a firm's ability to design, produce and market products superior to those offered by competitors, where superiority can be evaluated from several factors, like price, quality and technological advancement. Firm-level competitiveness focuses on the behaviours and performance of firms. Generally, competitiveness is considered synonymous with success. In very simple terms, success refers to the achievement of company objectives. Performance should be measured in terms of how an organization manages its critical success factors (Ferguson and Dickenson, 1982). Beside financial or market-based indicators, one of the variables that can be used to measure competitiveness is innovation.

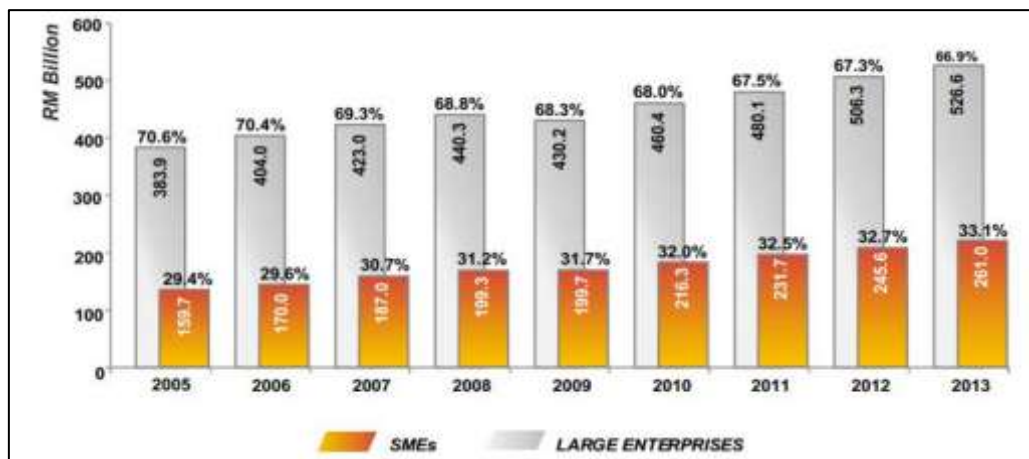
Small and medium enterprises (SMEs) play an important role in fostering growth, employment and income. Malaysia has been a success story, enjoying significant economic and social progress for several decades, thus, facilitating a transition from a low-income to a middle-income nation. The role of SMEs will become increasingly critical, not only as an enabler of growth by providing support to large firms but also as a driver of economic growth.

The development of a competitive and resilient small and medium enterprise sector is a key component of the Malaysian Government's economic growth strategy. Malaysian Government has embarked on promoting entrepreneurship and SMEs as important thrusts to achieve a balanced economic development and higher living standard at all strata of society.

The SME sector contributes 32% of the real gross domestic product (GDP) and 19% of the total export value of the nation. Beside large enterprises, SME also plays an important role in national GDP. In 2013, the SMEs GDP strengthened to 6.3 percent as compared to the growth of overall GDP at 4.7 percent as shown in Figure 2. The growth of SMEs GDP was supported by positive momentum across all sectors with Services, Manufacturing and Construction being the major contributors. 88.8 percent were accounted for a total of SMEs GDP.

Figure 4.1:

Value-Added and Percentage Share to overall GDP at Constant 2005 Prices



Source: Department of Statistics Malaysia

Innovation is a key factor in sustaining Malaysia’s competitiveness in the face of rapid globalization. The current level of R&D indicators is used to explore the systems of innovation in Malaysia. Malaysia has realized the importance of technology and begun making large investments in this area. Realizing the ample opportunities to increase the contribution of SMEs in the domestic economy, the Malaysian government has set a number of performance targets for SME development. These targets are to increase SMEs’ contribution to GDP to 37% and its share of total exports to 22%, and for SMEs to employ over 6.2 million workers by 2010. The Government’s programs and initiatives for SME development will, therefore, be focused on achieving these targets, especially in the areas of developing human capabilities and the necessary enabling infrastructure that will allow for the establishment of high performance and high value-added SMEs. It is notable that the dynamic Malaysian economy has become more competitive across a broad range of manufactured goods and also managed to switch to higher value-added manufacturing products (Wilson, 2000).

4.1.1 Contributions of the study

In examining the relationship between R&D on SMEs performance, this study makes empirical contributions to R&D related research and policy making. The existing literature has examined the effect of R&D spending on firm's performance (Branch, 1974; Sougiannis, 1994; Eberhart et al. 2004). However, most previous research have been based on a developed country, and this study extends the existing literature by examining the relationship in developing countries focusing on Malaysia only. In developing countries, there need a strong support by government in terms of facility, incentive, fund and advice to encourage firm to do R&D compare to developed countries where there already have a good facility, enough funds and strong framework to follow.

Many studies have found that R&D intensity has a positive effect on SMEs growth especially concerning the need for structural transformation in the economies of developed countries (Deloof, 2003; Baptista and Karaoz, 2011). However, many failures have occurred due to complexity, sophistication, and dynamism of the processes. This study adds to the existing literature by considering that SMEs in Malaysia have different characteristics compare to developed countries where most of the SMEs operates in rural area, less facility and equipment, lack of skill workers and well-trained worker to handle the R&D and so on.

Besides that, this study control the endogeneity by divide the SMEs based on the type of industry where it will provide better analysis on the effect of R&D on SMEs performance. It is because different type of industry might have different impact of R&D. Some industries need R&D to become more competitive for example manufacturing and agriculture industry and some industry no need R&D to sustain their daily business.

This chapter is structured as follows: Section 4.2 reviews the relevant literature on research and development (R&D) activities, the effect of R&D, the relationship of SMEs and R&D activities and also the importance of patents. Section 4.3 briefly explains the hypotheses development. Section 4.4 and 4.5 describe the data and method used to test the hypothesis, and the analysis of the results. Section 4.6 concludes with a summary of the main findings.

4.2 Literature Review

4.2.1 Research and Development (R&D) activities

R&D has independent and similar effects on a firm's knowledge base and productivity, we can expect the two types of innovative activity relating as substitutes as suggested by Joseph

Schumpeter, innovation involves the creation of market value and thus, it is deeply related to the entrepreneurial activity (Schumpeter, 1934). This theory states that innovation is at the heart of economic growth, driven by the entrepreneurial spirit of individuals and linked to the constant “creative destruction”, shaping capitalist economies. Innovation is a key for achieving a competitive edge. Innovation, as a strategy and a process, deals with how to develop successful new products or processes. Having valuable knowledge at the right moment plays a key role. Knowledge is considered a key intangible resource of which proper management leads to wisdom and business success. Innovation represents a way to create more values in a firm. It enables firms to achieve sustainable competitive advantages and is thus, a key factor for growth (Cheng and Tao, 1999).

According to Romer (1986), technological innovation is created in the R&D sectors using human capital and the existing knowledge stock. It is then used in the production of final goods, leading to a permanent increase in the rate of output. Innovation enables sustainable economic growth, given that there are constant returns to innovation in terms of human capital employed in the R&D sectors. The positive relationship between a country’s R&D and productivity growth has also been confirmed by studies using international panel data, such as Frantzen (2000) and Griffith (2001).

4.2.2 Effect of Research and Development (R&D)

The effect of R&D spending on firms’ future performance is widely studied in the literature. However, whether R&D expenditure can improve earnings and valuation and the extent of its impact is still debatable. There is a considerable evidence that R&D activities tend to increase firms’ future profitability (Branch 1974; Sougiannis 1994; Eberhart et al. 2004), bring a positive impact on a firm’s market value (Chauvin and Hirschey 1993; Sougiannis 1994; Armstrong et al. 2006) and earn excess stock returns (Lev and Sougiannis 1996; Chan et al. 2001). On the other hand, the cost of R&D spending has also been drawing more attention. The trade-off between R&D benefits and cost is more challenging than previously thought and in some circumstances, it has been demonstrated that the risk of investment failure even outweighs the benefits (Shi 2003). R&D intensity has also been found to be positively associated with return volatility by Chan et al. (2001).

Innovation through R&D is the cornerstone of sustained growth and prosperity. Many countries including Malaysia aspire to innovate more and they need to boost the innovation capabilities at a rapid rate. Empirical studies suggest that the benefits of innovation are large.

R&D related innovations, which represent a small subset of the range of innovations, are found to contribute no less than 1.4 percentage points of annual GDP growth in the United States. The benefits of innovation go much beyond the private returns to innovation. For the United States, R&D is estimated to provide a return to the country as a whole of as much as 30 percent (Jones, 2002). A major source of technical change leading to productivity growth comes from research and development (R&D) expenditure, both domestic R&D and via spill overs from international R&D investment.

Technological innovation is the main driving force of economic growth. As one important channel to generate new technology, the intensity of research and development (R&D) spending is found to be positively associated with firm operating performance and market valuation (Branch 1974; Chauvin and Hirschey 1993; Sougiannis 1994; Eberhart et al. 2004; Armstrong et al. 2006). However, R&D is also associated with risk. Chan et al. (2001) found that R&D intensity is positively associated with return volatility, while Shi (2003) argued that R&D risks dominate their benefits. The optimal level of R&D spending has always been questioned and becomes even more complicated when the effect of R&D spending varies with firm's characteristics (Chan et al. 1990; Eberhart et al. 2004).

4.2.3 Relationship between SMEs and research & development (R&D) activities.

Throughout the world, the role of small and medium-sized enterprises (SMEs) is increasingly prominent (Veskaisri et al., 2007). SMEs can be established in any locality for any kind of business activity in an urban or rural area (Khalique et al., 2011). The two main primary reasons for the existence of small firms are: (1) to provide goods and services to satisfy customers' needs in a manner that they will continue to use and recommend the firms' goods and services, i.e. "customer service business" and (2) to create desired goods and services so that the investment in the firm is converted to cash as quickly as possible, i.e. "cash conversion business" (Armstrong & Drnevich, 2009).

Mayer and Blaas (2002) asserted that, in recent decades, SMEs have begun to utilize technology transfer through R&D as a strategic means of meeting challenges posed by the globalization of business. However, the history of technology transfer has not been one of unqualified success. Many failures have occurred for reasons that have not always been clear (Cohen, 2004). This is mostly due to the complexity, sophistication, and dynamism of the processes, the high requirement of financial, human, physical, and technological resources, a lack of or low technology absorptive capacity in the recipients, as well as differences in culture

and languages, business practices, rules and regulations, economic situations, competitors and technological infrastructure (Nahar, 2001).

The influence of R&D intensity on SME growth is an issue of great interest and complexity, especially concerning the need for structural transformation in the economies of developed countries. Many studies have found that R&D intensity has a positive effect on SME growth. R&D expenditure contributes to increased diversification of activities, making SMEs more competitive (Deloof, 2003; Baptista and Karaoz, 2011). R&D expenditure allows for increased export capacity, which may contribute decisively to reducing the level of risk associated with SME activities (Beise-Zee and Rammer, 2006). R&D investment increases absorptive capacity, for example, the capacity to absorb knowledge created from the relationships formed with agents outside the firm, as well as the capacity to use that knowledge to increase firm performance (Cohen and Levinthal, 1989 and Gilsing et al., 2008). R&D activity is a well-organized process of knowledge creation, production, diffusion, and application. Griliches, 1986 and Griliches 1990, Mansfield (1988), Goto and Suzuki (1989), Meliciani (2000), Timmer (2003), and Gonzalez and Gascon (2004) have provided theoretical argument as well as empirical evidence from various industries in many countries regarding the notion that R&D could result in better production technology, elevating the productivity and the rates of return on investment for both firm and industry level.

The positive relationship between countries owned R&D and productivity growth has been also confirmed by studies using international panel data, such as Frantzen (2000) and Griffith, Redding and Reenen (2002). R&D expenditure is an important part of the competitive strategy of the firm. Decisions on R&D projects have to go to the same decision process as other investment decisions. However, it seems to be more difficult to forecast the market profitability of R&D projects when compared to other investment decisions. New knowledge and new technology generated from R&D activities increase productivity, not only at the firm level but also at the industry and national levels. An increase in productivity eventually leads to higher returns to investment, higher income levels and greater economic growth. It is expected that countries that engage in more R&D activities will tend to achieve higher income levels.

However, R&D intensity can also reduce growth in SMEs. R&D investment is associated with a high level of risk, added to which is its contribution to the creation of intangible assets in a firm, which in turn may make the level of risk faced by SMEs even higher.

This may add to SME's difficulties in obtaining external finance, hampering efforts to grow and diversify (Yasuda, 2005; Muller and Zimmermann, 2009). The efficient use of R&D investment requires management may even contribute to decreased growth (Santarelli and Sterlacchini, 1990; Muller and Zimmermann, 2009).

R&D expenditures are positively correlated with firm performance (Branch, 1974; Erickson and Jacobson, 1992; Long and Ravenscraft, 1993; Hitt et al. 1995). It is also widely adopted that investments in research and development contribute significantly to sales, productivity and firm profits (Romer, 1990; Geroski, Machin and Van Reenen, 1993; Jones, 1995). Several studies have concluded a positive relationship between R&D investment and market value of the firm (Chan et al. 1990; Doukas and Switzer, 1992; Chauvin and Hirschey, 1993). Hall and Hayashi (1989), concluded that investing in research and development is a very important intangible asset, leading to higher profits, in a greater duration of time. Harmantzis et al. (2005), also concluded that the market value of the firm and sales have a significant positive relationship with R&D.

4.2.4 Patent

The patent is the most important indicator of research outcome. Patent statistics will provide a potentially useful source of information on R&D activities. According to Goto and Suzuki (1989), the time lag between input and output would be two years in conducting measurement of production efficiency on R&D performance. Porter and Stern (2000) are one of the first studies that utilizes aggregate level patent data to examine the determinants and the effects of innovation. They found that innovation is positively related to human capital in the R&D sectors and national knowledge stock. Lerner (2002a, 2002b) analyses changes in patenting activity of foreign and domestic issuers following patent reforms in sixty countries over 15 years. He found an increase in patenting activity among foreigners, indicating increased technology transfer, but his study neither examines technology transfer nor the heterogeneity of responses across firms. Ernst (1995) used sales-based performance indicators to assess the impact of patenting behaviour on performance. The indicators used to test the impact are relative sales growth, relative sales per employee, and relative development of sales per employee. Based on these three performance measures, Ernst concluded that patent-active firms show a better performance.

4.2.5 R&D impact on different industries

R&D intensity and innovation activities are seen as key factors in explaining the changes in technological gaps and in competitiveness in world trade (Freeman et al., 1991; Wakelin, 1998). R&D provides an important contribution to increased productivity (Wieser, 2005; Yeh et al., 2010). In an early study of manufacturing industries in the US, Bound et al. (1984) aimed to investigate who does R&D and who patents. The study found that R&D is prevalent in most industries, but with particular high intensity in high-tech industries such as within chemicals, drugs, computing as well as in professional and scientific instruments. Their results also implied that both very small and very large firms are more R&D intensive than the averaged sized firm. Unlike previous studies that searched for correlates of firm R&D intensity, Cohen and Klepper (1992) used an empirical approach to analyze the distribution of firm R&D intensities across industries in the manufacturing sector. The study found that the distributions for industry R&D intensity display a regular pattern, which can be characterized as the result of a probabilistic process between industries.

Most of the previous studies within the fields of R&D and innovation have focused on R&D within the manufacturing industry, despite the fact that the service industry is becoming all the more important for advanced economies in terms of employment and economic growth (Tether, 2005; Leiponen, 2012). According to Tether (2005), the innovation activities for services tend to put a greater emphasis on soft capabilities, in training and human capital for instance, whereas manufacturing applies a more mechanistic approach, which is more oriented towards the creation of well-defined products and processes. Cohen and Klepper (1996b) have earlier studied the composition of R&D activities within manufacturing industries by examining the role firm size plays in conditioning the relative amount of R&D activities aimed at process and product innovation undertaken by firms. According to Cohen (2010) two industry characteristics will determine the relative attractiveness of the two types of R&D. The study found that industry conditions that foster prospects for rapid firm growth and the ability to sell innovation in disembodied form would decrease the relative benefit of cost-spreading.

4.3 Hypotheses Development

Based on the previous literature, research and development (R&D) activity can affect positively the firm performance. However, most studies focus only on big firms which have capabilities in terms of financial and technological equipment. In the case of SMEs, most of them lack of financial capacity and proper technological equipment to run the R&D activities.

However, SMEs can still run the R&D activity by considering the size of asset, age, leverage and industry types of the SMEs. Based on this scenario, this chapter produces two hypotheses:

Hypotheses 1: *R&D intensity have a positive impact on SMEs performance*

Many studies have found that R&D intensity has a positive effect on SMEs growth. R&D expenditure contributes to increased diversification of activities, making SMEs more competitive (Deloof, 2003; Baptista and Karaoz, 2011). The positive relationship between countries own R&D and productivity growth has been also confirmed by studies using international panel data (Frantzen, 2000). R&D expenditures are positively correlated with firm performance (Branch, 1974; Erickson and Jacobson, 1992; Long and Ravenscraft, 1993; Hitt et al. 1995).

Hypotheses 2: *Manufacturing industry have positive impact on R&D expenses*

Most of the previous studies within the fields of R&D and innovation have focused on R&D within the manufacturing industry, despite the fact that the service industry is becoming all the more important for advanced economies in terms of employment and economic growth (Tether, 2005; Leiponen, 2012) and it indicate a positive relationship based on the manufacturing industry conditions that foster prospects for rapid firm growth and the ability to sell innovation in disembodied form would decrease the relative benefit of cost-spreading.

4.4 Data and Methodology

In this analysis, the financial data of Malaysian SMEs from Bureau van Dijk Orbis Database. SME Corp were gathered. The total number of SMEs here is based on the number of business registrations to the Companies Commissions of Malaysia (SSM). The SMEs were selected based on the definition stated in Table 4.1. However, it is difficult to know how many SMEs are still active and still run their businesses. This is because, due to high-level of competitiveness, many SMEs in Malaysia cannot survive their businesses in the long run. Besides, most SMEs in Malaysia do not have a proper financial statement recording. After a thorough checking for the active SMEs with sufficient financial reporting, the total number of observations for these samples were 352. All the data were extracted from the Companies Commissions of Malaysia (SSM) database, and the SME financial reports were based on the SMEs Corporation Agencies.

Sectors	SMALL		MEDIUM	
	Sales turnover	No. of employees	Sales turnover	No. of employees
Manufacturing	From RM300,000 to less than RM15 million	From 5 to less than 75 workers	From RM 15 million to not exceeding RM50 million	From 75 to not exceeding 200 workers
Services and Other sectors*	Sales turnover from RM300,000 to less than RM3 million	From 5 to less than 30 workers	From RM 3 million to not exceeding RM 20 million	Full time employees from 30 to not exceeding 75

Figure 4.1: Definition of SMEs in Malaysia

4.4.1 Dependent variable

The dependent variables in this analysis comprised annual return on assets (ROA), annual net income, and sales turnover.

ROA is an accounting measure for firm performance and it is widely adopted by many studies (e.g., Anderson et al. 2000; Coombs and Gilley 2005; Gedajlovic and Shapiro 1998; Henderson and Fredrickson 2001; Hogan and Lewis 2005; Kato et al. 2005; Tosi et al. 2000). *ROA* can be used as an indicator of how profitable a company is relative to its total assets. It gives an idea as to how efficient management is at using its assets to generate earnings. It can be calculated as follows:

$$ROA = \text{NET INCOME} / \text{TOTAL ASSETS}$$

ROE is the amount of net income returned as a percentage of shareholder's equity. It measures the firm profitability by revealing how much profit a company generates with the money that shareholders have invested. It can be calculated as follows:

$$ROE = \text{NET INCOME} / \text{SHAREHOLDERS EQUITY}$$

Net income is a company's total earnings or profit. It is important to measure how profitable the company is over a period of time. It can be calculated by taking revenues and adjusting for the cost of doing business, depreciation, interest, taxes and other expenses.

Operating revenue (Sales turnover) is about income derived from sources related to a company's daily operations.

4.4.2 Independent variables

The main independent variables for this study are *research and development expenses*. R&D expenses were measured by R&D intensity where research and development expenses were divided by sales amount. Hall and Hayashi (1989) stated that R&D is an important intangible capital that can lead to more long-lasting and supernormal returns; it is embodied in the firm and its employees and includes knowledge, accumulated know-how, technical expertise, trade secrets, patents, etc. R&D investment, an independent variable in our study, was measured by R&D intensity (R&D expenditures as a percentage of sales). R&D expenditures and sales were also obtained from the Orbis database. Many past studies have tried to investigate the linear relationship between R&D investment and firm performance where R&D intensity is usually adopted (e.g., Erickson and Jacobson 1992; and Henderson and Fredrickson 2001).

The second independent variable was the *number of patents*. Pakes and Griliches (1984) and Bound et al. (1984) found a strong relationship between R&D spending and the number of patents. This data can also be obtained from the Orbis database.

4.4.3 Control variables

Firm performance can be influenced by many other factors besides R&D. Therefore, in order to avoid the potential omitted variable problem, controls for firm characteristics such as firm size, firm age, and leverages were also included in this study.

Firm size is measured by the natural logarithm of total assets (Finkelstein and Boyd 1998), which was obtained from the Orbis Database. Empirical studies show that large firms may have greater resources to develop sustained R&D programs and exploit innovations (e.g. Guay 1999), so firm size may affect organizational performance (Im et al. 2001).

Firm age is defined as the observation year minus the registered start year. The extensive information of firm age is unique and should enable us to accurately assess the age effect on growth persistence.

Leverages is one of several financial measurements that look at how much capital comes in the form of debt (loans), or assesses the ability of a company to meet financial

obligations. Ross, Westerfield and Jordan (1998) asserted that the use of debt in a firm's capital structure is called financial leverage. The more debt a firm has (as a percentage of assets), the greater is its degree of financial leverage. Leverage is measured as a long term debt divided by the summation of long term debt and equity. The same approach was employed by Rajan and Zingales (1995). This method reflects the percentage of long term debt in the companies' capital structure.

Firm types. For this study, 4 types of firms were used. The indicator for each type is as follows; 1 is for manufacturing, 2 is for services, 3 is for construction, and 4 is for agriculture. Overall, the estimations of this study are as follows:

1. $ROA = \beta_0 + \beta_1 RND + \beta_2 PTNTS + \beta_3(SIZE) + \beta_4 (AGE) + \beta_5 (LEVERAGE) + \beta_6 (FIRMTYPES) + \beta_7 (CONS) + \varepsilon$
2. $ROE = \beta_0 + \beta_1 RND + \beta_2 PTNTS + \beta_3(SIZE) + \beta_4 (AGE) + \beta_5 (LEVERAGE) + \beta_6 (FIRMTYPES) + \beta_7 (CONS) + \varepsilon$
3. $NET\ INCOME = \beta_0 + \beta_1 RND + \beta_2 PTNTS + \beta_3(SIZE) + \beta_4 (AGE) + \beta_5 (LEVERAGE) + \beta_6 (FIRMTYPES) + \beta_7 (CONS) + \varepsilon$
4. $REVENUE\ (SALES\ TURNOVER) = \beta_0 + \beta_1 RND + \beta_2 PTNTS + \beta_3(SIZE) + \beta_4 (AGE) + \beta_5(LEVERAGE) + \beta_6 (FIRMTYPES) + \beta_7 (CONS) + \varepsilon$

Where : RND = research and development intensity

PTNTS = no of patents

SIZE = total assets

AGE = age of firm since registered

LEVERAGE = the debt in firms capital structure

FIRMTYPES = types of industry/sector

4.5 Results

4.5.1 Descriptive statistic

Table 4.1 presents the descriptive statistics of the variables used in this study. The total number of observations were 352. To determine the effect and relationship between R&D expenses and firm financial performance, 10 year period was used; 2004 until 2013. The average for each of the variables can be seen in Table 4.1. This table gives descriptive statistics on the set of dependent and independent variables. It provides data on mean, standard deviation, min, and max. The variables used in this study were ROA, ROE, Net income, Sales turnover, Research intensity, no of patents, firm size, firm age, leverage and firm types.

Table 4.1
Descriptive statistic

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	352	5.419	2.4639	1.612	9.911
ROE	352	10.8338	5.9991	-0.808	37.72
Net income	352	10988.86	14043.38	-1699.52	74393
Sales turnover	352	198493.6	218950.5	-1049	1100546
Research and development expenses	352	8514.51	11311.66	0	55027.32
Patent	352	0.7556	3.2012	0	22
Firm size	352	206867.3	231164.4	68.62	1142721
Firm age	352	25.53	13.6944	5	57
Leverage	352	47.9818	20.5924	0	97.9

Table 4.2 presents the correlation coefficient of the variables used in this study. The data showed that net income and sales turnover had a strong correlation with the research and development expenses and patent. The other variables showed that there was not a very strong correlation between the variables.

Table 4.2
Correlation Coefficient

This table provides data on the strength and the direction of a linear relationship between variables.

	ROA	ROE	NET INCOME	SALES TURNOVER	R&D INTENSITY	PATENT	FIRM SIZE	FIRM AGE	LEVERAGE	FIRM TYPE
ROA	1									
ROE	0.5941*	1								
NET INCOME	0.3512*	0.2254*	1							
SALES TURNOVER	-0.0196	0.1280*	0.5580*	1						
R&D INTENSITY	-0.0619	0.0878	0.4922*	0.9360*	1					
PATENT	0.0157	-0.0826	0.0982	0.0802	0.1071*	1				
FIRM SIZE	0.0008	-0.0088	0.8254*	0.6562*	0.6096*	0.0827	1			
FIRM AGE	-0.0266	0.0665	0.4143*	0.3734	0.4395*	0.1906*	0.5437*	1		
LEVERAGE	0.0537	-0.1691*	0.2148*	0.0250	0.0215	0.1952*	0.1402*	0.1704*	1	
FIRM TYPE	0.0357	0.0128	0.2445*	-0.0545	-0.0146	-0.0888	0.2924*	0.1415	0.0894	1

Table 4.3
OLS Regression results

This table reports regressions of dependent variable and independent variable. The dependent variable are net income and sales turnover. ***, **, * denote significance at the 1%, 5% and 10% levels, respectively.

Variables	Net income	Net income	Sales turnover	Sales turnover
R&D intensity	18.16 (0.001)***	0.0042 (0.009)***	0.6049 (0.001)***	16.66 (0.001)***
No of patents	1389.26 (0.284)	91.59 (0.499)	201.87 (0.326)	-781.07 (0.516)
Firm Size		0.0512 (0.001)***		0.2106 (0.001)***
Firm age		68.6052 (0.073)*		1980.38 (0.001)***
Leverages		70.94 (0.001)***		51.82 (0.782)
Firm types		92.22 (0.914)		30847.57 (0.001)***
Constant	44919.86 (0.001)***	1466.73 (0.001)***	5685.78 (0.001)***	104215 (0.001)***
N	352	352	352	352
R-sq	59.65%	69.45%	24.43%	60.10%

Table 4.3 shows the results for the OLS regression analysis where the dependent variables are net income and sales turnover. The regression established that the R&D intensity showed positive, highly significant relationship with net income and R&D intensity which accounted for 69.45% of the explained variability in net income as stated in R². For the second dependent variable, sales turnover, the regression established that R&D intensity showed

positive, highly significant relationship with sales turnover and R&D intensity which accounted for 60.10% of the explained variability in sales turnover as also stated in R^2 .

Hypothesis 1 depicts that research and development expenses can affect positively the firm performance. The results showed that indeed R&D expenses can affect positively the firm performance based on net income and sales turnovers measurement. When firms allocate more funds for R&D expenses, it can increase firm performance, leading to a higher level of competitiveness for the firms.

Tables 4.4 and 4.5 present the summary of regression analysis by industries for all types of the firm which consist of manufacturing, services, construction and agriculture. The data for this chapter used 352 SMEs as samples. The distribution of the samples was as follows, manufacturing 226, services 34, construction 79 and agriculture 13. Table 4.4 shows the results for the OLS regression analysis where the dependent variable was net income. The regression established that the relationship between R&D intensity and net income under the manufacturing industry was positive and highly significant with R&D intensity accounted for 67.19% of the explained variability in net income as stated in R^2 . The same goes for the construction industry, where the regression established that the relationship between R&D intensity positive and the net income was positive and highly significant with R&D intensity accounted for 72.57% of the explained variability in net income as stated in R^2 . However, the services and agriculture industry indicated a negative and highly significant relationship between R&D intensity and number of patents with net income as stated in R^2 accounted for 96.71% and 99.87% of the explained variability.

Table 4.5 shows results for the OLS regression analysis where the dependent variable was sales turnover. The regression established that the relationship between R&D intensity and sales turnover under manufacturing, services, construction and agriculture industry was positive and highly significant with R&D intensity accounted for 88.58% (manufacturing), 99.68% (services), 96.43% (construction) and 99.10% (agriculture) of the explained variability for sales turnover. In Malaysia, the service sector contributes a very high number to a total of SMEs compared to manufacturing sectors. Based on the results for both the dependent variables of net income and sales turnover, R&D intensity has a significant relationship not only with manufacturing but other industry too. Hence, the hypothesis 2 can be accepted partially.

Table 4.4**Regression results from different firm types⁸****Dependent Variable: Net income**

This table reports regressions of dependent variable and independent variable divided by firm types. The dependent variable are net income. ***, **, * denote significance at the 1%, 5% and 10% levels, respectively.

Variables	Manufacturing	Services	Construction	Agriculture
R&D intensity	0.0104 (0.04)**	-0.7415 (0.001)***	0.2747 (0.016)**	-0.071 (0.126)
No of patents	140.42 (0.01)***	-4892.15 (0.001)***	1290.99 (0.287)	-1539.57 (0.002)***
Firm size	0.0458 (0.001)***	0.1051 (0.001)***	0.0484 (0.001)***	0.0931 (0.001)***
Firm age	-73.61 (0.111)	43.2 (0.667)	-114.56 (0.117)	18.42 -0.371
Leverages	93.15 (0.001)***	19.72 (0.492)	17.83 (0.733)	4.8773 (0.496)
Constant	1934.45 (0.189)	3147.19 (0.17)	1079.36 (0.64)	-739.87 (0.230)
N	226	34	79	13
R-square	67.19%	96.71%	72.57%	99.87%

⁸ For future research, to indicate that R&D in SMEs is important, we may add a cross term (R&D expenditure multiplies by firm size) as an explanatory variable.

Table 4.5**Regression results from different firm types****Dependent Variable: Sales turnover**

This table reports regressions of dependent variable and independent variable divided by firm types. The dependent variable is sales turnover. ***, **, * denote significance at the 1%, 5% and 10% levels, respectively.

Variables	Manufacturing	Services	Construction	Agriculture
R&D intensity	15.78 (0.001)***	19.07 (0.001)***	18.42 (0.001)***	17.18 (0.001)***
No of patents	1069.25 (0.04)**	3307.53 -0.409	-1682.68 (0.757)	29875.15 (0.009)***
Firm size	0.2927 (0.001)***	0.03612 (0.07)*	0.0184 (0.381)	0.045 (0.408)
Firm age	-2612.87 (0.001)***	-803.25 (0.020)**	-671.59 (0.042)**	85.17 (0.866)
Leverages	54.4 (0.848)	-223.07 (0.024)**	-162.72 (0.49)	87.16 (0.626)
Constant	77161.22 (0.001)***	34776.67 (0.001)***	59674.27 (0.001)***	-3683.69 (0.802)
N	226	34	79	13
R-square	88.58%	99.68%	96.43%	99.10%

4.6 Conclusion

In this study, an analysis of how R&D activity can increase firm performance is conducted. Two hypotheses are proposed based on the academic literature review and theoretical framework. As a result, R&D activity can affect firm performance positively and R&D activity is significant in various sectors.

Various factors may contribute to R&D investment which has a greater importance in determining the SMEs performance: (i) the product's shorter life cycle and the high cost of R&D investment at its origin erect entry barriers through sunk costs, which on the one hand, diminish competition faced by high-tech SMEs and, on the other hand, create a need to diversify activities; (ii) more highly qualified human resources may be a determinant, in high-tech SMEs, for more efficient management of R&D projects; and (iii) greater capacity to implement cooperation strategies with similar firms may allow acquiring experience benchmarks in R&D project management.

The limitation of this study that is the non-recording of R&D expenses in the financial statements of SMEs is very high which can limit the number of samples. This limitation may affect the results of the study. Furthermore, there is difficulty in modelling such research because many R&D expenditures are calculated in the income statements as production costs and not specifically as R&D expenses figures.

As a conclusion, based on these results, R&D expenses can play an important role to increase SME financial performance. SMEs need to take an opportunity to explore the benefit of R&D that may affect their financial performance. The government must also provide an incentive for SMEs who involve in R&D activities to get the tax rebate as a means of motivation and it can contribute to economic growth as well.

Chapter 5: Conclusion

As a conclusion, this thesis strives to understand the SMEs decision on choosing lease or debt financing, the credit risk mitigation procedure for SMEs and the role of research and development activity that can increase the SMEs financial performance. This study is based on the Malaysian SME perspectives.

The results in chapter 2 show that the use of lease and debt financing are dependent on the types of financial constraints that the firm face. It also shows that it has a positive relationship between a lease and debt financing due to the economic policy and characteristics of the firm in the Malaysian perspective. For the financial constraint firm, especially for the firm with lower internal funds and lower collateral, they prefer to use lease over debt financing. It indicates that when the firm has a less internal fund available, they did not use debt financing because of difficulties to get the loan approval from the bank or financial institutions.

A firm with lower profit has the same impact when using lease and debt financing. It indicates that the data of future prospect or the firm financial capabilities are important for either debt or lease financing provider to ensure the firm can survive in the future. Firms that are smaller, with low internal funds, tend to lease more and borrow less. It indicates that the smaller firms may lack a strong financial position to apply for debt financing. From the analysis done, it can be concluded that not all financial constraint factors can affect a firm to choose lease over debt financing. It depends on what types of financial constraints they face and the characteristics of the firm itself.

Chapter 3 analyzes the impact of financial and non-financial factors on where it provides lender and borrower a better reference in credit risk forecasting. The borrower will follow the standard procedure set up by the lender in order to be granted the loan. Adopting the financial and non-financial for credit evaluation of SMEs is very crucial to ensure a high score for the credit risk assessment. The model is estimated to provide a lender in analyzing business strength for financial and non-financial views before making important decisions in giving out loans to business.

Most of the previous research only focused on financial factors namely profitability, leverage, liquidity and activity (Kanitsorn & Dessalegn, 2011), (Altman and Sabato, 2007) (James & Hwan, 2006). Besides an additional category of a financial ratio, this study proposes non-financial factors specifically size, educational level and types of the industry to be included

into the model as it will bring an in-depth picture of the company performance in assessing credit risk.

Chapter 4 analyzes the impact of research and development (R&D) activity on the SME performance. SMEs are used as samples because SMEs might not have a strong financial capacity and lack of equipment and expert personnel to run the research and development (R&D) activity. The control variables such as the asset size of the SME's, age of the SME's, leverage capacity and types of industries of the SMEs are included for this analysis. Based on these results, R&D activity indicates a strong positive relationship to increase SME financial performance. However, the involvement of many parties for example, government agencies and support from financing sectors is needed to attract and encourage more SMEs involved in the R&D to increase the firms future performance.

References

- Abdel-Khalik, A.R. (1981). The Economic Effects on Lessees of FASB Statement No. 13, Accounting for Leases. *Financial Accounting Standards Board, Stamford, CT.*
- Adams and Hardwick (1998). Determinants of the leasing decision in United Kingdom listed companies. *Applied Financial Economics*, Vol. 8 No. 5, pp. 487-494.
- Alti, A. (2003). How sensitive is investment to cash flow when financing is frictionless. *Journal of Finance*, 58, 707–722.
- Altman, E. (1968). Discriminant analysis and the prediction of corporate bankruptcy. *Journal of Finance*, 28 (5), 589-609.
- Altman and Sabato (2007). Modeling Credit Risk for SMEs: Evidence from the U.S. Market, *Abacus*, Volume 43, Issue 3, pages 332–357, September
- Anderson, M., Banker, R., and Ravindran, S. (2000). Executive Compensation in the Information Technology Industry. *Management Science*, (46:4), pp 530-547.
- Ang, J. and Peterson, P. (1984). The leasing puzzle, *Journal of Finance*, Vol. 39 No. 4, pp. 1055-1065.
- Anita, C. (2008). Credit risk management: Prescription for Indian banks. In Silva, A. F. C. (Ed.). *Credit risk models: new tools of credit risk management* (pp. 3-15). Hyderabad, India: *The ICAI University Press*.
- Armstrong, C., Davila, A., & Foster, G. (2006). Venture-backed private equity valuation and financial statement information. *Review of Accounting Studies*, 11(1), 119–154.
- Armstrong, C. E., & Drnevich, P. L. (2009). Small business strategies: refining strategic management theory for the entrepreneurial and small business contexts. *Atlanta Competitive Advantage Conference Paper*, 29.
- Atanasova, C.V. and Wilson, N. (2004). Disequilibrium in the U.K. Corporate Loan Market, *Journal of Banking and Finance*, 28, 595-614.
- Audretsch, D.B. and Julie A.E. (2002). Does Firm Size Matter? Evidence on the Impacts of Liquidity Constraints on Firm Investment Behavior in Germany. *The International Journal of Industrial Organization*, vol. 20, pp.1-17.
- Bain & Company, Inc. and The Institute of International Finance (2013). Restoring Financing and Growth to Europe's SMEs. <http://www.bain.com/Images/reportrestoringfinancingandgrowthtoEurope'sSMEs.pdf>
- Baptista, R., Karaoz, M. (2011). Turbulence in growing and declining industries. *Small Business Economics*, 36, 249-270.
- Barbara L., Massililiano M. and Antonello E. (2008). A credit Risk Model for Italian, SMEs, *Universita Degli studi Di Modena, Dipartimento di Economia Politica*.
- Barclay, M.J. and Smith, C.W. Jr (1995). The priority structure of corporate liabilities. *Journal of Finance*, Vol. 50, pp. 899-917

- Basel Committee on Banking Supervision (2001). Risk management practices and regulatory capital: Cross-sectorial comparison. *Switzerland: Bank for International Settlements*.
- Bathala, C. and Mukherjee, T. (1995). A survey of leasing in small firms. *Journal of Small Business Finance*, Vol. 4 Nos 2/3, pp. 113-127.
- Beattie V., Goodacre A., and Thomson S. (2000). Operating leases and the assessment of lease debt substitutability, *Journal of Banking and Finance*, Vol. 24 No. 3, pp. 427-470.
- Beise-Zee, and R. Rammer, (2006). Local user-producer interaction in innovation and export performance of firms. *Small Business Economics*, 27, 207-222.
- Berger, A., and Udell, G. (1995). Relationship Lending and Lines of Credit in Small Firm Finance, *Journal of Business*, 68 (3), 351–381.
- Berger, Allen N., Iftekhar Hasan, and Leora F. Klapper. (2004). Further Evidence on the Link between Finance and Growth: An International Analysis of Community Banking and Economic Performance. *Journal of Financial Services Research* 25: 169-202.
- Berger, Allen N. and Gregory F. Udell (2006). A More Complete Conceptual Framework for SME Finance. *Journal of Banking and Finance* 30(11), 2945-2966.
- Bina Lehman (2003). Is It Worth the While? The Relevance of Qualitative Information in Credit Rating. *Working paper presented at EFMA 2003 Helinski Meetings*. P 1-25.
- Bogdan C. V. (2013). Current Trends in the Approach of the Credit Relationship Between Banks and Companies, University Iasi Romania. *Journal of Public Administration, Finance and Law*, Issue 3/2013.
- Bond, S., A. Klemm, R. Newton-Smith, M. Syed, and G. Vlieghe (2004). The roles of expected profitability, Tobin's Q and cash flow in econometric models of company investment, *The Institute for Fiscal Studies Working Paper*, 12.
- Bound, J., Cummins, C., Griliches, Z., Hall, B.H., and Jaffe, A. (1984). Who does R&D and who patents? *Patents and Productivity*, ed.: *University of Chicago Press*, 21-54.
- Bowman, R. G. (1980). The Debt Equivalence of Leases: An Empirical Examination. *Accounting Review*, April, 237-53.
- Branson, B. (1995). An empirical re-examination of the leasing puzzle. *Quarterly Journal of Business and Economics*, Vol. 34 No. 3, pp. 3-18.
- Branch, B. (1974). Research and Development Activity and Profitability: A Distributed Lag Analysis. *The Journal of Political Economy*, (82:5), pp 999-1011.
- Bruns, V. (2004). How Receive Bank Loans. *JIBS Research Reports*, Printed by Parajett AB
- Carpenter, R., and B. C. Petersen (2002). Is the growth of small firms constrained by internal finance?, *The Review of Economics and Statistics*, 84, 298–309.
- Carter, S., Shaw, E., Lam, W. and Wilson, F. (2007). Gender, Entrepreneurship, and Bank Lending: The Criteria and Processes Used by Bank Loan Officers in Assessing Applications. *Entrepreneurship Theory and Practice*, Vol. 31(3), pp. 427-444.

- Chan, L., Lakonishok, J., & Sougiannis, T. (2001). The stock market valuation of Research and Development expenditures. *Journal of Finance*, 56(6), 2431–2456
- Chan, S. H. J. D. Martin, and J. W. Kensinger. (1990). Corporate research and development expenditures and share value. *Journal of Financial Economics*, 26(2): 255-276.
- Chauvin, K. W., and M. Hirschey. (1993). Advertising, R&D expenditures and the market value of the firm. *Financial Management*, 22(4): 128-140.
- Cheng, LK., Tao, Z. (1999). The impact of public policies on innovation and imitation: The role of R&D technology in growth models. *International Economic Review* 40 (1), 187-207.
- Chirinko, R. S. and H. Schaller (1995). Bubbles, fundamentals, and investment: A multiple equation testing strategy. *Journal of Monetary Economics* 38 (1), 47–76.
- Cohen, Wesley M. and Daniel A. Levinthal (1989). Innovation and Learning: The Two Faces of R&d. *Economic Journal*, 99:569-96.
- Cohen, W. Klepper, S. (1992): The Anatomy of Industry R&D Intensity Distributions, *The American Economic Review*, Vol. 82, No. 4, pp. 773-799
- Cohen, W. Klepper, S. (1996b): Firm size and the nature of Innovation within Industries: The case of Process and Product R&D, *The Review of Economics and Statistics*, Vol. 78, No 2, pp. 232-243
- Cohen, G. (2004). *Technology Transfer: Strategic Management in Developing Countries*, Sage Publications, New Delhi.
- Cohen, W. (2010): —Fifty years of empirical studies of innovative activity and performance. In: Hall, B., Rosenberg, N. (Eds.), *Handbook of the Economics of Innovation*, Vol. 1. NorthHolland, pp. 129–213.
- Coombs, J., and Gilley, K. (2005). Stakeholder Management as a Predictor of CEO Compensation: Main Effects and Interactions with Financial Performance. *Strategic Management Journal*, (26:9) 2005, pp 827-840.
- Damona Doye (1976), Evaluating Financial Performance and Position, Oklahoma L. Shashua, Y. Goldschmidt, an *Index For Evaluating Financial Index*, 1976 State University, AGEC-790.
- Dean Fantazzini and Silvia Figini (2008). Random Survival Forests Models for SME Credit Risk Measurement. *Methodol Comput Appl Probab* 11:29-45.
- DeAngelo, Harry, and Ronald W. Masulis (1980). Optimal Capital Structure under Corporate and Personal Taxation. *Journal of Financial Economics* 8: 3–29.
- Deloof, M. and Verschueren, I. (1999). Are leases and debt substitutes? Evidence from Belgian firms, *Financial Management*, Vol. 28 No. 2, pp. 91-95.

- Deloof, M. (2003). Does working capital management affect profitability of Belgian firms? *Journal of Business Finance and Accounting*, 30, 573-588.
- Denis, D.J. and Mihov, V.T. (2003). The Choice Among Bank Debt, Non-Bank Private Debt and Public Debt: Evidence from New Corporate Borrowings. *Journal of Financial Economics*, 1, 3-28.
- Diamond, Douglas W. (1984). Financial Intermediation and Delegated Monitoring, *Rev. Econ, Studies* 51, 393-414.
- Diamond, Douglas W. (1991). Debt maturity structure and liquidity risk. *Journal of Economics* 106, 709-738.
- Didier, Cossin and PirotteHugues (2000). Advanced credit risk analysis, financial approaches and mathematical models to assess, price and manage credit risk, *Wiley*, 372 pages.
- Doukas, J., and L. N. Switzer (1992). The stock market's valuation of R&D spending and market concentration. *Journal of Economics and Business*, 44(2): 95-114.
- Drury, J. and Braund, S. (1990). The leasing decision: a comparison of theory and practice. *Accounting and Business Research*. Vol. 20 No. 79, pp. 179-191
- Eberhart, A., Maxwell, W., & Siddique, A. (2004). An examination of long-term abnormal stock returns and operating performance following R&D increases. *Journal of Finance*, 59(2), 623–650.
- Eisfeldt, Andrea L., & Rampini, Adriano A. (2008). New or used? Investment with credit constraints. *Journal of Monetary Economics*, 54, 2656–2681.
- Eisfeldt, Andrea L., & Rampini, Adriano A. (2009). Leasing, Ability to Repossess, and Debt Capacity. *The Review of Financial Studies*, 22(4), 1621–1657.
- El-Gazzar, S., Lilien, S. and Pastena, V. (1986). Accounting for leases by lessees. *Journal of Accounting and Economics*, Vol. 8 No. 3, pp. 217-237.
- Ericson, T., and T. Whited (2000). Measurement error and the relationship between investment and Q. *Journal of Political Economy*, 108, 1027–1057.
- Erickson, G., and Jacobson, R. (1992). Gaining Comparative Advantage through Discretionary Expenditures: The Returns to R&D and Advertising. *Management Science*, (38:9), pp 1264-1279.
- Ernst, Holger. (1995). Patenting Strategies in the German Mechanical Engineering Industry and their Relationship to company performance. *Technovation*, Vol. 15, pp.225-240.
- European Association of Craft, SMEs (2007). Crafts, Trades and SMEs need better access to finance. www.ueapme.com/.../041027_SME-finance_final.d
- Fabi, F., S. Laviola and P.MarulloReedtz (2005). The New Basel Capital Accord and Banks' Lending Decisions, *Journal of Financial Stability*, 1, 501-521.

- Fazzari, S., R. Glenn Hubbard, and B. Petersen (1988). Finance Constraints and Corporate Investment. *Brookings Papers on Economic Activity* 1, 141-195.
- Fazzari, S. M., R. G. Hubbard, and B. C. Petersen (2000). Investment-cash flow sensitivities are useful: A comment on Kaplan and Zingales, *Quarterly Journal of Economics*, 115, 695–705.
- Ferguson, C.R. and Dickenson, R. (1982). Critical success factors for directors in the eighties. *Business Horizons*, May-June.
- Finkelstein S, Boyd BK. (1998). How Much Does the CEO matter? The Role of Managerial Discretion in the Setting of CEO Compensation. *The Academy of Management Journal*, 41:179-199.
- Finucane, T.J. (1988). Some Empirical Evidence on the Use of Financial Leases, *Journal of Financial Research*, Winter, 321-33.
- Fletcher, M.; Freeman, R.; Sultanov, M. and Umarov, U. (2005). Leasing in development. *Guidelines for emerging economies. IFC*.
- Franke, Jürgen, Wolfgang Karl Härdle and Christian Matthias Hafner (2011). Credit Risk Management, Part 3, 543-560, *Statistics Of Financial Markets*, Universitext, Springer Berlin Heidelberg,
- Franks, J., and S. Hodges (1978). Valuation of Financial Leases: A Note. *Journal of Finance*, pp. 657-669.
- Frantzen, Dirk. (2000). R&D, Human Capital and International Technology Spillovers: A Cross Country Analysis. *Scandinavian Journal of Economics*, Vol. 102 No. 1, pp. 57-75.
- Francesco Dainelli, Francesco Giunta and Fabrizio Cipollini (2013). Determinants of SME Credit Worthiness Under Basel Rules: The Value of Credit History Information, University of Florence, *PSL Quarterly Review*, Vol. 66, No. 264, pp. 21-47, 2013.
- Freeman, C, Sharp, M. and Walker, W. (1991) “Technology and the Future of Europe”, *Pinter Publishers, London*.
- Gallardo, J.,(1997). Leasing to support small businesses and microenterprises. In: The World Bank, *Policy Research Working Paper* 1857.
- Garcia-Vega, M., A. Guariglia, & M.-E. Spaliara. (2012). Volatility, Financial Constraints, and Trade. *International Review of Economics and Finance*, 21, 2012, 57–76.
- Garwe, D. K. and Fatoki, O. (2012). The impact of gender on SME characteristics and access to debt finance in South Africa. *Development Southern Africa*, Vol. 29(3), pp. 448-461
- Gedajlovic, E., and Shapiro, D. (1998). Management and Ownership Effects: Evidence from Five Countries. *Strategic Management Journal* (19:6), pp 533-553.
- Geroski, P, Machin, S, and Van Reenen, J. (1993). The Profitability of Innovating Firms. *Journal of Economics*, 24(2), 198-211.

- Gilchrist, S. and C. P. Himmelberg (1995). Evidence on the role of cash flow for investment. *Journal of Monetary Economics* 36 (3), 541–572.
- Gilsing, V., Nooteboom, B., Vanhaverbeke, W., Duysters, G., Van Den Oord, A. (2008). Network embeddedness and the exploration of novel technologies: technological distance, betweenness centrality and density. *Research Policy*, 37, 1717-1731.
- Godfrey, J., Hodgson, A., Tarca, A., Hamilton, J. & Holmes, S. (2010). *Accounting Theory. Milton QLD: John Wiley & Sons.*
- Gonzalez and Gascon., E. Gonzalez, F. Gascon. (2004). Sources of productivity growth in the Spanish pharmaceutical industry, 1994-2000. *Research Policy*, 33, pp. 735-745.
- Gosman, M. and Hanson, E. (2000). The impact of leasing on lenders' evaluation of firms' debt levels. *Commercial Lending Review*, Vol. 15 No. 3, pp. 53-60.
- Goto and Suzuki. (1989). R&D capital, rate of return on R&D investment and spillover of R&D in Japanese manufacturing industries. *The Review of Economics and Statistics*, 71, pp. 555-564.
- Graham, John R., (1996), Debt and the marginal tax rate, *Journal of Financial Economics* 41, 41–73.
- Graham, J., Lemmon, M., & Schallheim, J. (1998). Debt, leases, taxes, and the endogeneity of corporate tax status. *Journal of Finance*, 53, 131–162.
- Griffith Rachel, Stephen Redding, and John Van Reenen (2001). Mapping the Two Faces of R&D: Productivity Growth in a Panel of OECD Countries. *The Institute for Fiscal Studies, Working Paper*, 02/00.
- Griliches, Z. Griliches. Productivity (1986). R&D and basic research at the firm level in the 1970's. *American Economic Review*, 76, pp.141-154.
- Griliches, Z. Griliches (1990). Patents statistics as economic indicators: A survey. *Journal of Economic Literature*, 28 (4), pp. 1661-1707.
- Guay, W. (1999). The Sensitivity of CEO Wealth to Equity Risk: An Analysis of the Magnitude and Determinants. *Journal of Financial Economics*, (53:1), pp 43-72.
- Hall, B. & Hayashi, F. (1989). Research and Development as an Investment. *Working Paper, National Bureau of Economic Research.*
- Hadlock, C. J., & Pierce, J. R. (2010). New Evidence on Measuring Financial Constraints: Moving Beyond the KZ Index. *Review of Financial Studies*, 23(5), 1909-1940.
- Harhoff, D. and Korting, T. (1998). Lending Relationships in Germany - Empirical Evidence from Survey Data, Papers 98-21, *Centre for European Economic Research.*
- Harmantzis, Fotios (2004). Inside the Telecom Crash: Bankruptcies, Fallacies and Scandals A Closer Look at the WorldCom Case. *International Telecommunications Society 15th Biennial Conference*, Sept 05-07, 2004, Berlin, Germany.

- Henderson, A., and Fredrickson. J. (2001). Top Management Team Coordination Needs and the CEO Pay Gap: A Competitive Test of Economic and Behavioral Views. *Academy of Management Journal*, (44:1), pp 96-117.
- Hirata, H. (2005). Recent Development in Japan's Small and Medium-sized Enterprise Finance, Keiei Shirin, *Hosei Journal of Business*, 41(2): 31–51.
- Hitt, M., Hoskisson, R., and Kim, H. (1997). International Diversification: Effects on Innovation and Firm Performance in Product-Diversified Firms. *Academy of Management Journal*, (40:4), pp 767-798.
- Ho, S.M., Lam, K. and Sami, H. (2004). The investment opportunity set, director ownership, and corporate policies: evidence from an emerging market. *Journal of Corporate Finance*, 10(3): 383–408.
- Hogan, C., and Lewis, C. (2005). Long-Run Investment Decisions, Operating Performance, and Shareholder Value Creation of Firms Adopting Compensation Plans Based on Economic Profits. *Journal of Financial and Quantitative Analysis*. (40:4), pp 721-745.
- Hol, S., Westgaard, S., & Van Der Wijst, N. (2002). Capital structure and the prediction of bankruptcy. Retrieved from <http://www.ru.lv/~peter/ida/bankruptcy/hol.pdf>
- Imhoff, E.A., Lipe, R.C. & Wright, D.W. (1997). Operating leases: Income effects of constructive capitalization, *Accounting Horizons*, Vol. 11, no. 2, pp. 12-32.
- Im, K., Dow, K., and Grover, V. (2001). Research Report: A Reexamination of It Investment and the Market Value of the Firm--an Event Study Methodology. *Information Systems Research*, (12:1), pp 103-117.
- International Finance Corporation (2013). Closing the Credit Gap for Formal and Informal Micro, Small, and Medium Enterprises, World Bank Group: Washington, USA. Available at: <http://www.ifc.org/wps/wcm>
- Irwin, D., Scott, J. M. (2010). Barriers faced by SMEs in raising bank finance. *International Journal of Entrepreneurial Behaviour and Research*, Vol. 16(9), pp. 245-259.
- James W. Kolari, G. Hwan Shin (2006). Assessing the Profitability and Riskiness of Small Business Lenders in the Banking Industry. <http://ssrn.com/abstract=1017093>.
- Jaroslav B., Premysl B., Roman H. and Valer H. (2013). Determinants of Credit Risk of SMEs in the Banking Sector of the Czech Republic and Slovakia. *PSL Quarterly Review*, vol. 66 n. 264 (2013), 21-47.
- Jiménez, G. and Saurina, J. (2004). Collateral, Type of Lender and Relationship Banking as Determinants of Credit Risk. *Journal of Banking and Finance*, 28, 2191-2212.
- Jones, C and Williams, J. (1995). Measuring the Social Rate of Return to R&D. *Quarterly Journal of Economics*, 113(4), 119-35.
- Jones, Charles (2002). Source of U.S. Economic Growth in a World of Ideas. *American Economic Review*, 92.
- Kalogeras, N. (2005). Evaluating the Financial Performance of Agri-food Firms: a Multicriteria Decision-aid Approach. *Journal of Food Engineering*, Vol. 70, No. 5, pp. 365-371.

- Kanitsorn T. and Dessalegn G. M. (2011). Modeling SME Credit Risk Thai Empirical Evidence. *Management Pty.Ltd. Small Enterprise Research* 18(1):63-79.
- Kang, S. and Long, M. (2001). The fixed payment financing decision: to borrow or lease. *Review of Financial Economics*, Vol. 10 No. 1, pp. 41-55.
- Kaplan S., and Luigi Z. (1997). Do Financing Constraints Explain Why Investment is Correlated with Cash Flow. *Quarterly Journal of Economics*, CXII (1997), 169-215.
- Kaplan, Steven and Zingales (2000). Investment-Cash Flow Sensitivities Are Not Valid Measures of Financing Constraints, *National Bureau of Economic Research*, Working Paper 7659.
- Kare, D. and Herbst, A. (1990). The influence of profitability on a firm's lease-or borrow decision. *Advances in Accounting*, Vol. 8 No. 8, pp. 25-36.
- Kato, H., Lemmon, M., Luo, M., and Schallheim, J. (2005). An Empirical Examination of the Costs and Benefits of Executive Stock Options: Evidence from Japan. *Journal of Financial Economics*, (78:2), pp 435-461.
- Khalique, M., Shaari, J. A. N., Isa, A. H. Md., & Ageel, A. (2011). The challenges faced by the small and medium enterprises (SMEs) in Malaysia: in intellectual capital perspective. *International Journal of current research*, 3(6), 398-401.
- Krishnan, S. V. and Moyer, C.R. (1994). Bankruptcy Costs and the Financial Leasing Decision, *Financial Management* 23, 31-42.
- Langowitz, N. and Minniti, M. (2007). Entrepreneurial propensity of women. *Entrepreneurship Theory and Practice*, Vol. 31(3), pp. 341-364.
- Lasfer, M. and Levis, M. (1998). The determinants of the leasing decision of small and large companies. *European Financial Management*, Vol. 4 No. 2, pp. 159-184.
- Leiponen, A. (2012): The benefits of R&D and breadth in innovation strategies: a comparison of Finnish service and manufacturing firms, *Industrial and Corporate Change*, Vol. 21, No. 5, pp. 1255–1281
- Lerner, J. (2002a). 150 Years of patent protection. *American Economic Review Papers and Proceedings*, 92: 221-225.
- Lerner, J. (2002b). Patent protection and Innovation over 150 years. *NBER Working Paper* No. 8977.
- Lev, B., & Sougiannis, T. (1996). The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting and Economics*, 21, 107–138.
- Lewis, C., & Schallheim, J. (1992). Are debt and leases substitutes? *Journal of Financial and Quantitative Analysis*, 27, 497–511.
- Lim, S. and Envick, E. R. (2011). Gender and Entrepreneurial Orientation: A Multi Country Study. *International Entrepreneurship and Management Journal*, Vol. 9, pp. 465-482

- Lin S.L. (2009). A New two-stages Hybrid Approach of Credit Risk in Banking Industry. Expert System with Applicant 36(4),83333-8341.
- Long, W., and Ravenscraft, D. (1993). LBOs, Debt and R&D Intensity. *Strategic Management Journal*, (14), pp 119-135.
- Lopez, Jose A. and Saidenberg, Marc R. (2000). Evaluating Credit Risk Models. *Journal of Banking & Finance*, Vol. 24, Issue, 1-2 (January), pp. 151-165
- Lotti, F. Santarelli, E., Vivarelli, M. (2009). Defending Gibat's law as a long-run regularity. *Small Business Economics*, 32, 31-44.
- Ma, H. (2000). Of Competitive Advantage: Kinetic and Positional. *Business Horizons*, 43(1), 53-64.
- Macintosh, N. B. (1994). Management Accounting and Control Systems – An Organizational and Behavioural Approach. *Chichester: John Wiley & Sons*
- MacKie-Mason, 3. K. (1990). Do Taxes Affect Corporate Financing Decisions. *Forthcoming in Journal of Finance*.
- Malaysia Financial Service Agency (2003). Progress of Action Program for Strengthening Relationship-based Banking.
- Mansfield. (1988). Industrial R&D in Japan and the United States: A comparative study. *American Economic Review*, 78, pp. 223-228.
- Marston, F. and Harris, R. (1988). Substitutability of leases and debt in corporate capital structures. *Journal of Accounting, Auditing and Finance*, Vol. 3 No. 2, pp. 147-170.
- Mayer, S. and Blaas, W. (2002). Technology transfer: an opportunity for small open economies. *Journal of Technology Transfer*, 27 (3), pp.275-289.
- Mayes, D. and Nicholas, C. (1988). The Economic Impact of Leasing. *Macmillan Press*, London.
- Mehran, H., Taggart, R.A., Yermack, D. (1997). CEO ownership, leasing and debt financing, *Working Paper*.
- Mehran, H., Taggart, R. and Yermack, D. (1999). CEO ownership, leasing and debt financing – statistical data included, *Financial Management*, Vol. 28 No. 2, pp. 5-14.
- Meliciani, V. Meliciani. (2000). The relationship between R&D, investment and patents: A panel data analysis.
- Miller, M., and C. Upton (1976). Leasing, Buying, and the Cost of Capital Services. *Journal of Finance*, 31, 761-786.
- Mohammad, H.K. (2007). A shariah analysis of issues in Islamic Leasing. *Journal of Islamic Economic*, Vol. 20 No. 1, pp. 3-22.

- Muller, E. Zimmermann, V. (2009). The importance of equity finance for R&D activity. *Small Business Economics*, 33, 303-318.
- Myers, S., Dill, D. and Bautista, A. (1976). Valuation of financial lease contracts. *Journal of Finance*, Vol. 31 No. 3, pp. 799-819.
- Myers, S. C., and N. S. Majful (1984). Corporate financing decisions when firm have investment information that investors do not have. *Journal of Financial Economics*, 13,187–221.
- Nahar, N. (2001). Information Technology Supported Technology Transfer Process: A Multi-site Case Study of High-tech Enterprises. *University of Jyvaskyla, Jyvaskyla*.
- Norlida Abdul Manab, Ng Yen Theng and Rohani Md-Rus (2015). The Determinants of Credit Risk in Malaysia. *Procedia - Social and Behavioral Sciences* 172 (2015) 301 – 308.
- Pakes, A. and Griliches, Z. (1984). Patents and R&D at the Firm Level; A First look. In: Patents and productivity, ed. Z. Griliches. Chicago: *University of Chicago Press*, 55-72.
- Porter, M.E. and S. Stern (2000). The New Challenge to America's Prosperity: Findings from the Innovation Index. *Washington (DC): Council on Competitiveness*.
- Rajan, R. (1992). Insiders and Outsiders: The Choice Between Informed and Arm's Length Debt. *Journal of Finance*, 47, 1367-1400.
- Rajan R. G., Zingales L. (1995). What Do We Know about Capital Structure? Some Evidence from International Data. *The Journal of Finance*, 50(5), 1421-1460.
- Rampini, A., & Viswanathan, S. (2009). Collateral and capital structure. *AFA 2011 Denver meetings paper*.
- Romer, Paul M. (1986). Increasing Returns and Long Run Growth. *Journal of Political Economy*, Vol. 94, PP.1002-37.
- Romer, P. (1990). Endogenous Technological Change. *Journal of Political Economy*, 98(5), S71-102.
- Ross et.al. (1998). Fundamentals of Corporate Finance. *Irwin /McGraw-hill Coy, USA*.
- Santarelli, E., Sterlacchini, A. (1990). Innovation formal vs informal R&D, and firm size: some evidence from Italian manufacturing firms. *Small Business Economics*, 2, 223-228.
- Schumpeter, J A. (1934). The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle. *Cambridge, MA.: Harvard University Press*
- Sharpe, S. (1990). Switching costs, market concentration, and prices: the theory and its empirical implications in the bank deposit market, *Finance and Economics Discussion Series* 138, Board of Governors of the Federal Reserve System (U.S.).

- Sharpe, S., & Nguyen, H. (1995). Capital market imperfections and the incentive to lease. *Journal of Financial Economics*, 39, 271–294.
- Shashua and Y. Goldschmidt (1974), An Index for Evaluating Financial Performance. *The Journal of Finance*, Vol. 29, No. 3 (Jun, 1974), pp. 797-814, DOI: 10.2307/2978593.
- Shen and Hassan (2012). Asymmetric benchmarking in bank credit rating. *Journal of International Financial Markets, Institutions & Money*, Elsevier, 22 (1), 171-193.
- Shi, C. (2003). On the trade-off between the future benefits and riskiness of R&D: A Bondholders' perspective. *Journal of Accounting and Economics*, 35(2), 227–254.
- Shleifer, Andrei, and Robert Vishny (1986). Large Shareholders and Corporate Control, *Journal of Political Economy* 94, 461-488.
- Simon Cornee (2012). The Relevance of Soft Information for Predicting Small Business Credit Default: Evidence from a Social Bank, University of Rennes, *CREM Working Paper* 2012-26.
- Small and Medium Enterprise Agency (2004). *White Paper on Small and Medium Enterprise 2004*.
- SME Bank: Annual Report (2014). www.smebank.com.my
- SMECorp Malaysia (2011). SME Annual Report 2011 Report, Kuala Lumpur, Malaysia.
- Smith, C., & Wakeman, L. (1985). Determinants of corporate leasing policy. *Journal of Finance*, 40, 895–908.
- Sougiannis, T. (1994). The accounting based valuation of corporate R&D. *Accounting Review*, 69(1), 44–68.
- Spiceland, J. D., Sepe, J. F., & Tomassini, L. A. (2007). *Intermediate Accounting* (4th ed.). United State: McGraw-Hill Professional Publishing.
- Stulz, R. and Johnson, H. (1985). An analysis of secured debt. *Journal of Financial Economics*, Vol. 14 No. 4, pp. 501-521.
- Su-Jane Hsieh, & Yuli Su (2015). The economic implications of the earnings impact from lease capitalization.
- Tether, B. (2005): Do Services Innovate (Differently)? Insights from the *European Innobarometer Survey*. *Industry and Innovation*, Vol. 12, No. 2, pp. 153–184.
- Thomson, S. (2005). The role of leasing in UK corporate financing decisions. *Working paper, Series in Accountancy and Finance*, Heriot-Watt University, Edinburgh, August.
- Timmer, M.P. Timmer (2003). Technological development and rates of return to investment in a catching-up economy: The case of South Korea.
- Titman, S., & Wessles, R. (1988). The determinants of capital structure choice. *Journal of Finance* 43(1), 1-19.

- Tosi, H., Werner, S., Katz, J., and Gomez-Mejia, L. (2000). How Much Does Performance Matter? A Meta-Analysis of CEO Pay Studies. *Journal of Management*, (26:2), p 301.
- Treacy, William F. and Mark S. Carey (1998). Credit Risk Rating At Large U.S. Banks. *Federal Reserve Bulletin*, November, pp. 897-921.
- Tsay, W. (2003). Residual risk in the lease-or-buy analysis. *Journal of the Academy of Business and Economics*, Vol. 1 No. 1, pp. 87-94.
- Usmani, M. T. (2002). An Introduction to Islamic Finance. The Hague: Kluwer Law International.
- Vakhitov Damir R., Zamaletdinov Aidar (2015). Leasing as a Factor of Economic Growth. *Procedia Economics and Finance* 23(2015) 839-845.
- Veskaisri, K., Chan, P., & Pollard, D. (2007). Relationship between strategic planning and SME success: empirical evidence from Thailand. *International DSI/Asia and Pacific DSI*, 13.
- Wakelin, K. (1998) The Role of Innovation in Bilateral OECD Trade Performance. *Applied Economics*, Vol. 30(10), 1335-1346.
- Whited, T. (1992). Debt, Liquidity Constraints, and Corporate Investment: Evidence from Panel Data. *Journal of Finance*, 47, 1425-1460.
- Wieser, R. (2005): Research and development productivity and spillovers: empirical evidence at the firm level, *Journal of Economic Surveys*, Vol. 19, No. 4.
- Williamson, O. (1988). Corporate finance and corporate governance. *Journal of Finance*, Vol. 43 No. 3, pp. 567-591.
- Wilson, P. (2000). The Export Competitiveness of Dynamic Asian Economies 1983-1995. *Journal of Economic Studies*, 27(6), 541-565.
- Yan, A. (2006). Leasing and debt financing: Substitutes or complements? *Journal of Financial and Quantitative Analysis*, 41, 709.
- Yasuda, T. (2005). Firm growth, size, age and behaviour in Japanese manufacturing. *Small Business Economics*, 24, 1-15.
- Yeh, M-L. Chu, H-P. Sher, P. Chiu, Y-C. (2010): R&D intensity, firm performance and the identification of the threshold: fresh evidence from the panel threshold regression model. *Applied Economics*, Vol. 42, pp. 389-401
- Yoon, E. & Jang S. (2005). The Effect of Financial Leverage on Profitability and Risk of Restaurant Firms. *Journal of Hospitality Financial Management*.