AN EMPIRICAL STUDY OF MALAYSIAN FIRMS' CAPITAL STRUTURE

By

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Dedication

In Loving Memory, My dad
(1938-2002)

My mom

My wonderful husband and son

And special dedication to my supervisor

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ABSTRACT

It is sometimes purported that one of the factors affecting a firm's value is its capital structure. The event of the 1997 Asian financial crisis was expected to affect the firms' gearing level as the firms' earnings deteriorated and the capital market collapsed. The main objective of this research is to examine empirically the determinants of the capital structure of Malaysian firms. The main additional aim is to study the capital structure pattern following the 1997 financial crisis. Empirical tests were conducted on two different data sets: the first data set is the published data extracted from Datastream and consists of: 572 companies listed on the Kuala Lumpur Stock Exchange (KLSE) between 1994 and 2000. The second data set comprises finance managers' responses to a questionnaire survey. Chi-square, Kruskal-Wallis, ANOVA, multiple regression, stepwise regression and logistic regression were utilised to analyse the data. The multiple regression analysis was employed to find the determinants of the capital structure using various account data items provided by Datastream. The gearing differences between the two boards and within the sectors were also analysed using ANOVA and Krukal-Wallis tests. The panel data were evaluated with regard to the gearing pattern following the 1997 currency crisis.

Overwhelming evidence on profit was found, with past profitability being the major determinant of gearing. In particular was the support for pecking order theory, in that finance managers had given internal funds the highest priority, followed by debt and equity as a last option. The statistical analysis found a strong negative correlation between liquidity and the gearing ratio for both boards, implying firms considered highly the excess current assets for funding, a conservative approach towards debt management policy. On the other hand, taxation items were not highly significant in capital structure decisions. The results indicate the existence of gearing differences between the main board and the second board gearing with high debt levels employed by second board companies. However, the second board's high gearing is dominated largely by short to medium term bank credit. Differences were also significant between different sectors of companies listed on the main board. Firms' gearing ratios increased significantly following the 1997 financial crisis, and the gearing tended to increase where the company's share prices were highly sensitive towards currency volatility. Also inflation is found to influence the changes in actual and target gearing ratios following the crisis. Recent emphasis on the development of private debt securities may affect the findings of this research in the near future.

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Abbreviations

Abbreviation		Full word
APEC	-	Asia Pacific Economic Cooperation
Agcc*	-	the actual d/e ratio change following the crisis
Agcf*	-	the actual d/e ratio change following the ringgit being fixed
BNM	-	Bank Negara Malaysia (Central Bank of Malaysia)
Capu*	-	capital allowances increases
CBL/Cbloan*-		Conventional bank loan
Cbond*	-	Conventional bond
Cdebt*	-	Conventional debt
COMMEX	-	Commodity and Monetary Exchange of Malaysia
CPI	-	Consumer Price Index
Cr	-	Current ratio, proxy for liquidity (quick ratio)
CRSP	-	Centre for Research in Security Prices
Curr	-	Currency (currency-price sensitivity)
Dep/tas	-	Depreciation/total assets, proxy for tax surrogate or exhaustion
EBITDA	-	Earning before interest, taxes, depreciation and amortisation
Flease/Fl*	-	Financial lease
Fau*	-	Fixed assets increase
FKLI	-	Kuala Lumpur Stock Exchange Composite Index Futures
Fod*	-	Fixed overhead cost decrease
FTSE	-	Financial Times Stock Exchange
GDP	-	Gross Domestic Product
Gvid*	-	Government incentive decreases
IBL/Ibloan*	-	Islamic bank loan

Ibond*	-	Islamic bond
Idebt*	-	Islamic debt
IDS	-	Islamic Debt Securities
Indu*	-	Industry average debt ratio increases
Infu*	-	Inflation increase
Intu*	-	Interest rates increase
KLIA	-	Kuala Lumpur International Airport
KLIBOR	-	Kuala Lumpur 3-month Interbank Offered Rates
KLOFFE	-	Kuala Lumpur Options and Financial Futures Exchange
KLSE	-	Kuala Lumpur Stock Exchange
KLCI	-	Kuala Lumpur Composite Index
Log(tas)	-	Logarithm of total assets, proxy for size
MGS	-	Malaysian Government Securities
MNCs	-	Multinational Companies
MSC	-	Multimedia Super Corridor
Mtbv	-	Market to book value ratio, proxy for investment opportunities or growth
Nfa/tas	-	Net fixed assets/total assets, proxy for tangibility
Npm	-	Net profit margin, proxy for profitability
OLS	-	Ordinary Least Square
Os*	-	Ordinary shares
PDS	-	Private Debt Securities
Pfd*	-	Profit decrease
Re*	-	Retentions
Rdu*	-	Research and development
RHB	-	Rashid Hussin Berhad (ejaan)

Risk	-	Standard deviation of EBITDA, proxy for business risk or operating risk
RM	-	Ringgit Malaysia
Roce	-	Return on Capital employed, proxy for profit from investment
SC	-	Securities Commission
Tax	-	Tax charge in percentage, proxy for tax advantage
Tdebt*	-	Total debt
Tie	-	Time interest cover, proxy for interest cover
Taxd*	-	Corporate tax rate decreases
Tgcc*	-	The target d/e ratio change following the crisis
Tgcf*	-	The target d/e ratio change following the ringgit being fixed
Wcr	-	Working capital ratio, proxy for liquidity (current ratio)

*This variable/factor begin with letter **D** in the thesis which stand for **Dummy** 1 or 0 in the Statgraphics statistical analysis.

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The following activities, pertaining to the programme of related study, have been undertaken:

I   Attendance and participation of staff seminars, PhD Symposium during which research work was presented.
II   Attendance at various Accounting and Finance conferences
III. Presented research work at South West accounting group annual conference, British Accounting Association (BAA) at University of West England, Bristol, 09/09/2002.

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CHAPTER 1
INTRODUCTION

1.1 Introduction

A firm's capital structure refers to the mix of its different securities. There are many methods which firms can use to raise its required funds, but the most basic and important financial sources are retentions, shares and debt. The different types of financing are also associated with different levels of costs. Capital structures research has a long history. According to Weston (1966), capital structure is one of the first areas to be observed and noted in the history of finance. It started in the beginning of the 20th century due to the mergers and acquisition wave which had caused capital structure problems in the management of finance large industrial firms. Since then, problems associated with capital structure have been renowned in the financial history and have undergone a great evolution along side other areas in finance.

Few other studies in finance have received as much attention as the 1958 paper by Modigliani and Miller ("MM" hereafter). Their proposition opposes the "traditional view" of capital structure which believes that the stockholders' wealth (value per share) can be increased by sensible use of debt. The MM proposition, however, states that, in the absence of taxes, the value of a firm is independent of the proportion of debt to equity. Their first view on capital structure created an early controversy and attracted the attention of many writers including Durand (1959), Schwartz (1959), and Solomon (1963), who had all reviewed, criticised and argued against the MM capital structure assumptions and proposition. The MM controversy had resulted in many researchers agreeing that the capital structure of the firms "does matter", it does affect the value of the firm. Since this early debate there have been a number of empirical

studies, and indeed further theoretical research (for example Miller (1977)). So, why is it important to examine capital structure in the late 20th century?

1.2 Research Concentration

This study focuses on Malaysia for several reasons. Firstly, extensive areas have been explored in the study of the capital structure in developed countries such as the UK, US and other G7 countries during the last two decades. However, not many studies have been conducted in the East Asian countries such as Malaysia, Indonesia and Singapore. Although Malaysia is now considered as a newly developed nation, less than 5 comprehensive studies on Malaysian capital structure have been published between 1990 and 2000.

Secondly, Malaysian economic and financial systems are different from other countries due to the uniqueness of its history and cultural background. The diversity and complexity of the society and the economic system has resulted in the establishment of two distinctive financial systems, conventional and Islamic financial systems. According to the Malaysian Central Bank, although the country's stock market has become fully developed, the private debt market is still undeveloped and, therefore, most of the Malaysian firms are highly dependent on banks for credit. These differences in the financial system and perhaps debt preference enable an extension to capital structure research findings.

Thirdly, the study covers two different groups of public listed companies: the first group of the companies are listed on the main board, while the second group is listed on the second board. The major difference between the two boards is their paid-up

capital required by the Kuala Lumpur Stock Exchange (KLSE), whereby companies need to have a higher paid-up capital to be listed at the main board. A comparative study of these two boards comprehensively covers most of the public listed companies in Malaysia, which makes this research distinctive and on a par with similar research.

Fourth, Malaysia has also been affected by the 1997 East Asian financial crisis which resulted in a short recession in 1998 (BNM, 1999). The crisis began with massive currency speculation on the Thai bhat which then spread to other countries in the region. Despite the government's interventions to keep the ringgit safe from depreciation, it eventually fell to a historic low of RM4.88 to the US dollar on 7 January 1998. This caused the government to introduce a drastic measure on 2nd of September 1998 to fix the ringgit at RM3.80 to the US dollar. Malaysian firms' market values fell to their lowest, especially those of the second board listed firms. The KLCI index was at its highest at 1200 points in the first quarter of 1997, yet had declined to its lowest at 286 points in the third quarter of 1998. Since then, many studies have been conducted to understand the reasons for the currency crisis that had eventually led to a financial crisis.

1.3 Research Objective

The centrality of this investigation addresses the following research question: *What are the determinants of capital structure of Malaysian firms?* Emphasis is given to this main objective, which takes the following into account:

1. The 1997 crisis event.

2. The differences between gearing of the main board and the second board companies.

3. The firms' financing priorities.

To achieve the objective, the study can be evaluated by examining the items in Diagrams 1.1 and 1.2. Diagram 1 covers the published account items including working capital ratio, market to book value ratio, return on capital employed, the proportion of fixed assets to total assets, total assets, the sensitivity of the share prices towards currency exchange and the volatility of the earnings. These variables are used as proxies for liquidity, investment opportunity, profitability, tangibility, size, price sensitivity and risk. The study focuses on the 357 companies listed on the main board and 215 companies listed on the second board of the Kuala Lumpur Stock Exchange (KLSE). The time frame of the study is concentrated on the following 3 periods relating to the crisis event: pre-crisis, 1997 and the post-crisis periods. Some of the statistical tests used to analyse the data are ANOVA, Kruskal-Wallis and multiple regression.

Diagram 1.1
Capital Structure Determinants I: Observed Responses
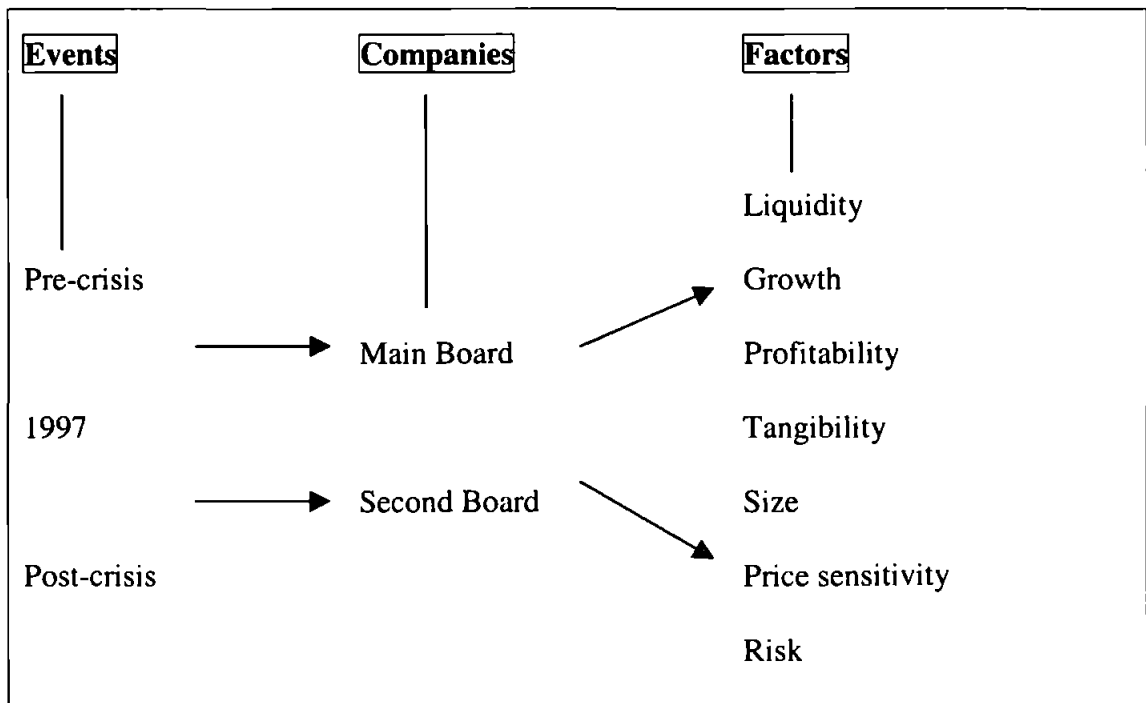
Diagram 1.2
Capital Structure Determinants II: Behavioural Responses

1. Financing Preference   **Finance Manager**

Retentions, ordinary shares and total debt
Islamic financing and conventional financing   ⟶   Priority response
Total debt, financial lease and overdraft

2. Gearing sensitivity Factors   **Finance Manager**

The increase in firms' fixed assets
The decrease in firms' fixed overhead costs
The decrease in firms' profit
The increase in firms' research & development
The increase in firms' capital allowances   ⟶   Debt-equity ratio response
The decrease in corporate tax rate
The increase in inflation rate
The increase in interest rate
The decrease in government incentives
The increase in industry debt average ratio

3. Target and Actual Ratio   **Finance Manager**

Due to the Crisis
Due to the ringgit being fixed   ⟶   Response to the effect of the crisis

Diagram 1.2 shows a brief snap-shot regarding the evaluation of capital structure
determinants, according to the behaviour of finance managers as indicated by their
response to survey questions. Three aspects of capital structure issues are reviewed:
financing preference, the sensitivity of debt to equity response due to certain factors
and the effect of the crisis on the target and actual gearing ratio. The choice of
financing includes retention, ordinary shares, total debt, Islamic debt, conventional
debt, financial lease and overdraft. The second part analyses the gearing response of

finance managers to the increase and decrease of certain factors: such as fixed assets, inflation and so on. The last part reviews their actual and target gearing ratio responses to the crisis. Chi-square, ANOVA, Kruskal-Wallis and logistic regression are used to test the impact of selected variables.

1.4 Research Outline

The thesis is divided into 7 chapters. Following this chapter, the next three chapters are devoted to: the Malaysian economic background, the literature review of capital structure and an introduction to data and the research methodology. The next two chapters focus on: the statistical analysis of Datastream data and questionnaire survey data. The final chapter is the conclusion.

Chapter 1 outlines the introduction to the thesis. Chapter 2 reviews the Malaysian financial background including the national economy. General issues such as location, population and cultural issues are briefly mentioned. The economics related issues cover the growth rate (Gross Domestic Product), inflation and interest rates. The financial background includes the stock market, bank credit and private debt securities. The interest-free Islamic financial system and the event of financial crisis are also covered in this chapter.

Chapter 3 discusses the literature review on capital structure. It discusses early studies on capital structure, followed by different theoretical views of capital structure: from the traditional view to the MM main proposition, the MM second proposition on tax, and Miller's tax advantage to debt and various issues forwarded by finance scholars. The review of the theories is cross referenced with the findings on

the capital structure empirical research.   Chapter 4 describes the method of data collection and the methodology employed to analyse those data. The Research hypotheses are stated in detail, followed by an overview of Malaysian accounts data in a form charts.

Chapter 5 covers the statistical analysis of the Datastream data. The data are divided into the following three periods relating to the crisis events: before the crisis, during the crisis and after the crisis.   The differences between the gearing of the companies listed on the main board and the second board are tested using the ANOVA and the Kruskal-Wallis statistical tests.   The same tests are used to test the differences between the main board's six sectors.   The determinants of the capital structure are modelled using multiple regression ordinary least square (OLS).   Finally, the accounts data were "pooled" to test if the gearing has increased following the crisis.   Each statistical test is followed by analyses and discussions of the results.

Chapter 6 focuses on the data obtained from the questionnaire and interview surveys. Chi-square, ANOVA, Kruskal-Wallis and logistic regressions are used to analyse the data from the questionnaire survey.   The questionnaire data are divided into three parts: i) the financing preferences of the finance managers, ii) sensitivity factors relating to debt to equity ratio and iii) the change in gearing following both the crisis and the ringgit being fixed to the US dollar.   The last part of the survey briefly discusses the interview transcripts which had given an additional dimension to the capital structure research in this thesis.

Chapter 7 is the concluding chapter for the thesis and includes a discussion of the research findings, followed by brief sections on limitations of the study and suggestions for further research.

CHAPTER 2
MALAYSIAN FINANCIAL BACKGORUND

2.1 Introduction

Chapter 2 presents the Malaysian economic and financial background. The history of the country as well as geographical and cultural background is briefly discussed. It also includes the economic and financial background which introduces the Malaysian growth and market performance. The chapter covers two distinct issues: the financial crisis and the Islamic Interest Free system. The discussions in this chapter will contribute to the understanding of the material in the later chapters concerning firms' behaviour towards capital structure. The chapter includes: Section 2.2 which briefly reviews the geographical and cultural background, Section 2.3 covers the economic background and Section 2.4 discusses the financial background. Section 2.5 reviews the Islamic Interest Free system, Section 2.6 reviews the 1997 financial crisis and Section 2.7 concludes the chapter.

2.2 Geographical Background and Culture

Malaysia is positioned at the centre of Southeast Asia, between the Indian and Pacific Oceans and lies entirely within the equatorial region characterised by a hot, wet and humid climate and green tropical rainforests. The country comprises two regions: West Malaysia (peninsula Malaysia) which represents the mainland of the country and East Malaysia which is comprised of the two states of Sabah and Sarawak. Much of Malaysia is mountanainous and sparsely inhibited, particularly in the eastern states of Sabah and Sarawak. The country is well endowed with natural resources including rubber, tin, palm oil, crude petroleum and natural gas.

Malaysia has always been pivotal to trade routes from India, China, the Middle East and Europe due to its strategic location at the centre of Southeast Asia. Its warm tropical climate and abundant natural blessings made it a congenial destination for immigrants as early as 5,000 years ago when ancestors of the indigenous peoples decided to settle in Malaysia. Around the first century BC, strong trading links were established between China and India and the Malaysian State of Malacca, and these had a major impact on the culture, language and social customs of the country. Evidence of a Hindu/Buddhist period in the history of Malaysia can today be found in most parts of the country. The spread of Islam by the Arab and Indian traders, brought the Hindu/Buddhist era to an end by the 13th century. Malacca was a major regional entry-port, where Malay, Chinese, Arab and Indian merchants traded precious goods, in particular spices. Drawn by this rich trade, European fleets started to arrive in 1500.

The arrival of the Europeans in Malaysia has brought a dramatic change to the country. In 1511, the Portuguese arrived and colonised the Malaysian State of Malacca. The Portuguese were in turn defeated in 1641 by the Dutch, who colonised Malacca until the advent of the British in the 1820s. The British arrived in 1786 in Penang and later acquired Malacca from the Dutch in exchange for the English occupancy in Sumatera (Indonesia) in 1824. The English, through their influence and power, began the process of political integration of the Malay States of Peninsular Malaysia. During the English reign, a well ordered system of public administration was established, public services were extended and large-scale rubber and tin production was developed. The mid of the 19th to 20th centuries witnessed the arrival of a large number of immigrants from China and India, encouraged by the British to labour the growing tin and rubber industries. After World War II and the Japanese occupation from 1941 to 1945, the British created the Malayan Union in 1946. This was eradicated in 1948 and the Federation of Malaya emerged in its place. The federation gained its independence from Britain on 31st August 1957. On 16th September 1963, Malaya, Singapore, Sarawak and Sabah, joined an expanded federation that was renamed Malaysia. On 9th August 1965, economic and political disputes led to Singapore's departure from the federation.

The current population of Malaysia is estimated at 23.3 million. The Malaysian government envisions is to expand the national population to 70 million by the year 2020. At present, over 80 per cent of the total population reside in Peninsular Malaysia, with more than 80 per cent of the people living in urban areas. Sabah and Sarawak are much less densely populated than the mainland, with the majority of people in these regions living in rural areas. The predominant ethnic groups in

Malaysia are: Malays (59 per cent), Chinese (32 per cent) and Indians (8 per cent). In addition, there are small numbers (less than 1 per cent of the total population) of Orang Asli, the aboriginal peoples whose ancestors pre-date the arrival of the Malays in the peninsula. The Orang Asli are comprised of a wide range of small tribal groupings, which are mainly found scattered across the rural areas of the Peninsula. The official language of Malaysia is Bahasa Malaysia which is derived from the native language of the indigenous Malays. Other widely spoken languages include English, Chinese (predominantly Cantonese and Hokkien dialect groups) and Tamil. These four major languages are used as the medium of teaching at the primary school level, with English as the compulsory second language for all ethnic groups in Malaysia.

2.3 Economic Background

Since achieving its independence, Malaysia has actively pursued policies to develop and modernise the country to reduce poverty amongst the population. Rapid development from the 1970s onwards is most obviously seen in urban expansion and in population growth. From an agricultural trade oriented economy, the economy has diversified through industrialisation. By the end of the 20th century, just over 40 years after independence, Malaysia was the world's 19th largest trading nation with its industrial exports surpassing agricultural produce.

2.3.1 Gross Domestic Product

Malaysia is essentially a trade-oriented economy based on agriculture, however, the attention of the authorities is increasingly focusing on industrial development. In 1957, the agriculture, forestry and fishing sector accounted for about 40 per cent of

the GDP and over 60 percent of total employment and export earnings (BNM, 1999).
However, the economy had become well diversified through the 1960s-1970s aiming
primarily at export diversification.

As shown in Table 2.1, the annual growth in the gross domestic product at constant
price had steadily increased from an average annual rate of 4.1 per cent in the 1950s
to 5.2 per cent in the 1960s and accelerated to 8.3 per cent in the 1970s. However, the
rate of the economic growth has slowed down considerably in the early 1980s on
account of the prolonged recession and structural problems in the domestic economy.

Table 2.1:
Annual Growth Rates of Gross Domestic Product (at Constant Price)

	Malaya* 1951-1960	Malaysia 1961-1970	Malaysia 1971-1980	Malaysia 1981-1990	Malaysia 1991-2000
1	-	1.4	10.0	6.9	9.5
2	-	6.9	9.4	6.0	8.9
3	-	5.5	11.7	6.2	9.9
4	-	5.8	8.3	7.8	9.2
5	-	5.6	0.8	-1.1	9.8
6	2.9	6.2	11.6	1.2	10.0
7	2.5	1.0	7.8	5.4	7.5
8	0.5	4.2	6.7	9.9	-7.5
9	4.5	10.4	9.3	9.1	5.8
10	9.9	5.0	7.4	9.0	8.5
Average	4.1	5.2	8.3	6.0	7.16
Average 1996-2000					4.86

Sources: (BNM, 1994) and (BNM, 1999)
*Peninsular Malaysia only
N.B. The rates are based on the real GDP (GDP are adjusted for inflation)
N.B. GDP is the measure of the size of the economy, it measures the value of all goods and services
newly produced in an economy during a specified period of time.

By 1987, the structure of the Malaysian economy had undergone significant changes, with the manufacturing sector surpassing the traditional mainstay of agriculture. By 1992, the manufacturing sector accounted for nearly 30 per cent of the total GDP, compared to 14 per cent in 1970. In contrast, the contribution of the agriculture and mining sectors were correspondingly reduced to 16 per cent and 9 per cent of GDP, respectively. Between 1987 and 1997, the Malaysian economy has been on a strong recovery path, with a real GDP growth averaging at 9.8 per cent. Nevertheless, the 1997 financial crisis has brought the country's growth down to the lowest in the history of its economy, at -7.5 per cent. The GDP recovered in 1999 and 2000 with the rates at 5.8 and 8.5 per cent, respectively.

Besides advancing from an agricultural to industrial based economy, privatisation has also played an important role in the growth of the economy. Since 1983, the Federal Government has privatised a total of 179 projects and as a results a total of RM21.5 billion had been raised from the sales of equity and assets from the privatised entities and projects. Some of many public entities that have been privatised are: railroads, telecommunications, power generation, education and training, roads and highways and waste disposal. Alongside with the manufacturing (industrial) and privatisation, the services sector has also developed significantly. The new focus is on the development of advanced communication services, financial and managerial services and computer related services. The share of the services sector as a percentage of GDP has increased to 51.8 per cent in 1997 compared with 45.3 per cent in 1987.

2.3.2 Consumer Price Index (Inflation)

As presented in Table 3.2, the average inflation of 1957 to 1970 was between 0.1 to

1.1, however, following the global oil crisis in 1973 and 1975, the inflation rate rose

to the highest at 10.5 per cent in 1973 and 17.4 per cent in 1974. The 1981 inflation

rate of 9.7 per cent was again due to the oil crisis which began in 1979 and ended in

1983. The rates were eventually averaged at 3.3 per cent throughout the 1980s.

In the last decade, Malaysia has experienced two relatively high inflation periods, the

first was in 1991-1992 and the second was in 1998 as shown in Table 3.2. The cause

of these two inflationary periods is totally different from those of the oil crises. The

pressure of the first inflationary period was realised when the annual growth rate of

CPI reached a high of 5.3 per cent in August 1991. This was largely due to an

extensive increase in domestic demand that was higher than the supply capacity.

Private consumer spending was increased by more than 14 per cent between 1988 and

1990. At the same time, private investment activities and bank liquidity were

increased substantially due to the capital inflows, and high growth of money supply

(M3). The M3 rose to a high of 20.6 per cent in 1989 but later was gradually

increased at an average of 19.5 per cent between 1989 and 1992 (see graph 1 in

Appendix A). Increase in M3 was partly due to the increase in the amount of fixed

deposits by finance companies from 64 per cent in 1989 to 76 per cent in 1993. The

high deposit rates were the main reason which attracted these finance companies.

According to Taylor (1995), the higher the supply of money in the economy, the

higher is the inflation. This is because too much money would generate excess

liquidity, which would later lead to the inflationary expectation. The supply of

money, demand aggregate and investment expansion imposed a strain on the existing

resources especially labour shortages and infrastructure which would later cause the CPI to increase.

Table 2.2:
Consumer Price Index (CPI)-Average Annual Growth Rate

	Malaya* 1951-1960	Malaysia 1961-1970	Malaysia 1971-1980	Malaysia 1981-1990	Malaysia 1991-2000
1	-	-1.0	1.6	9.7	4.4
2	-	1.0	3.2	5.8	4.7
3	-	4.0	10.5	3.7	3.6
4	-	0.0	17.4	3.9	3.7
5		-1.0	4.5	0.3	3.4
6	1.0	1.0	2.6	0.7	3.5
7	5.1	5.8	4.8	0.3	2.7
8	-1.0	-0.2	4.9	2.5	5.3
9	-2.9	-0.4	3.6	2.8	2.8
10	-0.2	1.9	6.7	3.1	1.6
Average	0.4	1.1	6.0	3.3	3.57
Average 1996-2000					2.77

Sources: (BNM, 1994) and (BNM, 1999)
*Peninsular Malaysia only
N.B Inflation is the percentage increase from year to year in the overall price level

The second inflationary period in 1998 was different from that of 1992, whereby the high price occurred when capacity was in substantial excess. The economic growth rate was high at the end of 1997, while inflation recorded low rates of 2.7 per cent. Measures have been taken by the government to address the supply constraints that caused the 1992 inflation. Therefore, the main factor of price increases in 1998 was not due to domestic factors, but the pressure was on excessive depreciation of the ringgit exchange rate. This is due to the speculative attacks on the ringgit towards mid 1997. Inflation, in terms of CPI, was at a peak of 6.2 per cent in June, 1998, and moderated thereafter. The CPI for 1998 had risen to 5.3 per cent, the highest increase

since 1982 (see Table 3.2). Due to contraction on domestic demand, the country had experienced mild inflation despite severe depression following the currency crisis.

Although it seems that depreciation of the ringgit was the main factor of the increase in inflation, Obiyathulla (1998b) in his study of the Asian financial crisis argued that although the government of the Asian countries has been prudent in their fiscal policy, the M1 and M2 of those countries have grown rapidly between 1990 and 1996 as compared to developed countries such as the US. The compounded annual growth rates for Malaysian M1 and M2 between 1990 and 1996 were 13.7 per cent and 15.5 per cent respectively, while the US had a compounded growth rate of 4.53 and 2.14 per cent, respectively. Therefore, there may be some similarity in the increase of inflation for 1992 and 1998, which to some extent may be due to the monetary supply. Besides the speculation attack, the excessive money had exposed the country to vulnerability of attaining greater inflation.

2.3.3 Comparison of Malaysian Economic Indicator with other Nations

Table 2.3 presents a comparison between Malaysian GDP and CPI with 5 other nations. The table shows a vast difference in GDP (except for Singapore) and CPI rates between developed and developing countries. The growth rates of the South East Asian countries were very high before the 1997 financial crisis, however, they dropped substantially following the crisis. On the other hand, the US and the UK revealed low growth rates during the 5-year period. Although Singapore is categorised as a developed country, its GDP was similar to those of the South East Asian countries. Following the 1997 crisis, the country which was affected the most is

Indonesia with its GDP at a low of −13.7 per cent while Singapore was the least affected country with 0.1 per cent GDP.

Table 2.3:
Comparison Between Malaysian 5-year GDP and CPI With Other Nations

	GDP (% change year over year)						CPI (% change year over year)				
	1995	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
1.Malaysia		10	7.3	-7.4	6.1	8.3	3.5	2.7	5.3	2.8	1.6
2. Thailand	8.6	5.9	-1.4	-10.8	4.2	4.4	5.9	5.6	8.1	0.3	1.6
3.Indonesia	8.2	7.8	4.9	-13.7	0.31	4.8	7.9	6.2	58	20.7	3.8
4. Singapore	8.0	7.6	8.5	0.1	5.9	9.9	1.4	2.0	-0.3	0.0	1.3
5.UK	2.90	2.62	3.44	2.92	2.41	3.08	-0.96	0.68	0.29	-1.86	1.37
6.US	2.7	3.6	4.4	4.3	4.1	4.1	2.9	2.3	1.5	2.2	3.4

Sources: UK-Datastream, Malaysia-Central bank of Malaysia, others-APEC Economy report
1-3 Developing countries, 4-6 Developed countries

The CPI rates of all the 3 developed countries were lower than the developing countries. On a 5-year average, the UK had the lowest inflation rate while Indonesia had the highest. The Indonesian inflation rate during the year of the crisis was 6.2 per cent, and was significantly increased in 1998 to 58 per cent and dropped to 20.7 per cent in 1999. Although Singapore's GDP was affected by the crisis, its inflation remained low at 2 per cent in 1997 and −0.3 per cent in 1998.

Researchers have different views and findings on the relationship between growth rates (GDP) and inflation. Studies by Wai (1959) and Bhatia (1960) have found little evidence which indicate that inflation causes damage to the economy. Many other studies such as Johnson (1967) and Pazos (1972), have shown that there was no conclusive empirical evidence to support positive or negative relationships between

inflation and economic growth. However, Fischer's (1991) Mundell-Tobin effect of inflation has found that an increase in expected inflation rates could lead to a higher income, hence resulting in economic growth. An empirical study by Zind (1993) on 83 less developed countries has found a positive relationship between money supply, growth rates and inflation rates. In contrast, Feldstein (1983) has found that a 2 per cent drop in inflation will raise the level of GDP by 1 percent. Consistently, studies by Jarett and Selody (1982) on inflation in Canada have found that a 1 per cent decline in inflation is associated with a 0.38 per cent permanent rise in productivity.

With regards to Malaysia, the first episodes of inflationary periods in 1992 occurred when the growth rate was high, implying a positive relationship between growth and inflation. However, there was evidence of excessive money supply during that period. That is consistent with the Zind findings of a positive relationship between money growth and inflation. On the other hand, the 1998 inflation rate occurred when the GDP was negative, suggesting a negative relationship between inflation and growth rates. This is supported by many of the negative relationship results argued above. Therefore, there are positive and negative relationships between the Malaysian growth rates and inflation with two different sources causing the inflation to rise.

2.4 Financial Background

The financial system in Malaysia is comprised of the financial institutions and the financial market. In the 1960s, the main objective of the government is to provide sufficient infrastructure for the financial institutions, mainly commercial banking. In the 1970s, finance companies and merchants banks were introduced. Due to the oil

crises in the 1970s, which damaged the Malaysian economy, much of the 1980s were characterised by regulation and re-regulate to strengthen the financial system. The 1990s have seen many changes in the financial market with new regulations, product innovations and technological advancements. The discussions presented in this section will only be focusing on the financial market, which is comprised of: i) the money & foreign exchange markets and ii) the capital and derivatives markets.

2.4.1 The Money and Foreign Exchange Market

The main difference between these two markets is that in the money market, financial assets are traded in the domestic market, dominated by the ringgit, whereas foreign exchange trading involves transactions in foreign currencies or against the ringgit. Both markets are essential for the functioning of the financial institutions. Through hedging and arbitraging activities, the foreign exchange market is able to influence the supply and demand of funds in the money market and thus influence interest rates in the money market. Securities traded in the money market includes treasury bills, bankers acceptances, negotiable certificate of deposit, Cagamas notes and bonds, Khazanah bonds and Malaysian Government Securities. The average monthly volume of funds transacted in the money market has increased significantly from RM3.6 billion in 1981 to RM17.8 billion in 1989, to RM36 billion in 1992 and was further increased to RM137.5 billion in 1998 (BNM, 1994) and (BNM, 1999).

The foreign exchange market is essentially a wholesale interbank market for the sale and purchase of foreign currencies from import and export activities, and also carries out transactions between travellers and money changers. The Kuala Lumpur foreign exchange market rose rapidly at an average annual rate of 25.4 per cent between 1993

and 1996 due to large inflows of short-term foreign funds. This is reflected in the figures released by the Central Bank of Malaysia (1999), which indicate a significant increase of RM356.9 billion in the annual transactions, rising from RM444.2 billion in 1993 to RM801.1 billion in 1996.

During the 1997 regional financial crisis, the Kuala Lumpur foreign exchange market recorded its highest annual volume of RM1,318.2 billion for the 10-year period. This was due to heavy speculation on the ringgit and panic selling activities in the mid-1997. According to the central bank, the normal/usual size of transaction under normal situation ranges between US$3 million and US$5 million, however, during the crisis, the size of each transaction was increased to between US$50 million and US$100 million. Some orders to buy US dollars against the ringgit reached US$200 million to US$500 million.

2.4.2 The Capital and Derivatives Market

The lengthy discussion for this section will only be focusing on the capital market as it relates directly to the capital structure study. The derivatives market, on the other hand, will only be reviewed briefly. Malaysia has become the fourth country in the Asian region after Japan, Hong Kong and Singapore to introduce financial derivatives on the 15th of December, 1995. The first product offer was the Kuala Lumpur Stock Exchange Composite Index Futures (FKLI) followed by the Kuala Lumpur 3-month Interbank Offered Rate (KLIBOR). FKLI contracts were traded on the Kuala Lumpur Options and Financial Futures Exchange (KLOFFE) and KLIBOR contracts were traded on the Commodity and Monetary Exchange of Malaysia (COMMEX).

The main components of the capital markets in Malaysia are the conventional and Islamic markets. The conventional market mainly deals with stock market for corporate stocks and shares, and medium and long-term public and Private Debt Securities (PDS). The Islamic market dealing, on the other hand, deals primarily with Islamic equity securities as well as public Islamic Debt Securities (IDS). The Kuala Lumpur Composite Index (KLCI) and Kuala Lumpur Emas Index are two major indices for the conventional securities. On the other hand, RHB Islamic index and KLSE Islamic index are the indices for the Islamic securities.

Both the Islamic and the conventional securities are traded in the primary and secondary markets. The primary market offers public and private securities to the individual and institutional investors, while the secondary market trades the existing public and private securities. Prior to 1989, funds raised in the capital market were generally dominated by the public sector to finance public expenditures. The expenditure of the government was substantially reduced due to the privatisation policies. The figures released by the Central Bank of Malaysia show that, in 1988, net funds raised by the public sector were RM7,534 million compared with net funds raised by the private sector which was RM2,811 million. However, between 1989 and 1997, the funds raised by the private sector have always been higher than those raised by the public sector.

Fund raised from the private equity market had risen to RM 18.4 billion in 1997 from RM0.93 billion in 1988. Meanwhile funds raised through private debt securities (PDS) markets rose to RM16.6 billion in 1997 from RM1.9 billion in 1988 (see Table 1 in Appendix A). The funds raised were significantly reduced following the 1997

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Asian financial crisis; however, as the economy worsened, the government had to increase public funds to revive the economy.

2.4.2.1 The Stock Market

Part of Malaysia's success story over the last decade is due to the rapid development of its stock market. According to the central bank of Malaysia, based on the performance of the 1996 market turnover of RM463 billion, the KLSE ranked 13th in the world, first in ASEAN[1] and fifth in Asia (BNM, 1999). The earliest transaction in shares in Malaysia was documented in the late 1780s as an extension to the British corporate presence in the rubber and tin industries. However, the stock market was formally established in 1930 as the Singapore Stockbrokers' Association, but was later renamed the Malaya Shares Brokers Association in 1938. It was re-registered as the Malayan Stockbrokers after the World War II and, in March 1960, the association changed its name again to the Malayan Stock Exchange, before being later changed to the Stock Exchange of Malaysia following the formation of Malaysia. The stock exchange had undergone another name change to the Kuala Lumpur Stock Exchange Berhad. However, following the full implementation of the Securities Act on 27th December 1976, the exchange was finally changed to the Kuala Lumpur Stock Exchange (KLSE) until the present day.

Besides the regulatory framework and structural reforms, the KLSE infrastructure has been significantly improved through the use of information technology to enhance trading activities. The KLSE launched its first market barometer in 1986 known as the Kuala Lumpur Composite Index (KLCI), which is comprised of 100 well-

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[1] ASEAN comprises of the following 10 countries in the South East Asia region: Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.

established companies listed on the KLSE. Prior to the introduction of KLCI, performance of the market could only be estimated through the New Straits Times Industrial Index and the KLSE's own Industrial, which are not sufficient. Then, in 1988, the KLSE launched its Second Board to enable small and medium sized companies with growth potential to be listed on the KLSE. In 1991, the KLSE introduced the EMAS Index as another barometer of the stock market. While KLCI is based on the stocks of 100 companies listed on the main board, the Emas index is based on all stocks listed on the main board of the KLSE. The Securities Commission (SC) was established in March 1993 primarily to regulate and monitor the movement of the capital market.

The last 10 years has witnessed a tremendous increase in the number of companies listed in the KLSE. As shown in Table 2 in Appendix A, the total number of companies listed on both boards at the end of 1999 stood at 757. The main board companies registered 474 companies in 1999, an increase of more than double from 295 companies registered in 1988. The second board companies had recorded an impressive increase within a 10-year period, from 2 in 1989 to 283 in 1999. The increase in the number of companies listed on the KLSE has also led to a corresponding increase in total market capitalisation as shown in Table 2 in Appendix A. Total market capitalisation was increased more than five-fold from RM98.7 billion in 1988 to RM552.7 billion in 1999.

Trading activities on the KLSE have also increased tremendously within the last 10 years. The annual trading volume has increased from 4 billion units in 1988 to 58.3 billion units in 1998 as shown in Table 2 in Appendix A, while the annual trading

value has increased to RM115.2 billion in 1998 compared with RM6.8 billion in 1988.

2.4.2.2 The Private Debt Market

The debt market consists of conventional and Islamic public and private debt securities. In the mid-1980s, the Malaysian Government Securities (MGS) fully dominated the debt market. The MGS amounted to RM48.8 billion, and accounted for 60.2 per cent of GDP, while the PDS only amounted to RM395 million, and accounted for 0.5 per cent of GDP. The popularity of private debt securities (PDS) only emerged in the late 1980s, when the government reduced its borrowing activities substantially to allow for privatisation activities. In line with new government policy and measurement to promote private debt securities, the PDS market has achieved a positive result both in the primary and secondary markets.

Total funds raised through private debt securities rose from RM395 million in 1987 to RM4.1 billion in 1992 and amounted to RM80 billion in 1999 (BNM, 1994 and 1999). Trading in government securities gradually decreased from RM8 billion in 1989, to RM5.5 billion in 1992. The rapid developments are due to the funding requirements of a privatised infrastructure and development projects, and increasing demand from the lender to save money in the financial assets. However, due to the crisis, many companies have faced difficulties in fulfilling their fixed interest obligations which have resulted in the downgrading of their debt rating.

As the trend in the conventional PDS market accelerates, funds raised from the Islamic debt market gradually increased. The Central Bank of Malaysia revealed that

the outstanding Islamic Debt Securities (IDS) totalled RM17.1 billion by the end June

1999. It is comprised of Islamic bonds (RM14.3 billion) and Islamic commercial

papers (RM2.8 billion) (BNM, 1999). The rapid growth of IDS is reflected in its

outstanding market share of 20.4 per cent of total public debt securities outstanding by

the end of June 1999.

Among the many incentives to promote the growth of the PDS are the following

government fiscal incentives:

- Interest income earned by individuals from corporate bonds (except convertible loan stocks) issued by public companies listed on the KLSE was exempted from income tax, with effect from January 1992;
- Interest income earned by individuals from corporate bonds (except convertible loan stock) issued by unlisted companies but rated by RAM or MARC was exempted from income tax, with effect from January 1993;
- The witholding tax rate on interest paid to non-residents was reduced from 20% to 15% with effect from October 1994; and
- Interest income earned by listed closed-end funds and unit trust funds from corporate bonds (except convertible loan stock) issued by public companies listed on the KLSE and unlisted companies but rated by RAM or MARC, was exempted from income tax, effective from January 1996.

(see BNM (1999), p.357)

The incentive and infrastructure provided by the government have resulted in a large

inflow of foreign capital into the country. Total short-term capital inflows into

Malaysia in 1993 were estimated at US$5.4 billion (RM13.9 billion). BNM (1999)

citing the survey by the International Finance Corporation on emerging stock markets

have indicated that one of the benefits for the United States-based investors to invest

in Malaysia is the advantage of tax exemption on both dividends and capital gains

taxes. The survey also confirmed the ease of entry and exit into the Malaysian capital

market, and the market was identified as having one the most liberal exchange control

systems.

2.4.2.2.1 Overview of Bank Credit

Consistent with most developing nations, companies in Malaysia are dependent on bank loans in order to develop. Although the government is encouraging the corporate sector to be less dependent on bank loans, the banking sector has remained dominant. According to the Central Bank of Malaysia, Malaysian commercial banks have provided loans totalling to RM285.1 billion by the end of August 1999. This amount is massive if compared with the total amount of RM80 billion raised from PDS within the same period. Graph 2.1 reveals the growth rate of bank credit as compared with the funds raised from the capital market between 1980 and 1998.

Graph 2.1:
Financing the Economy
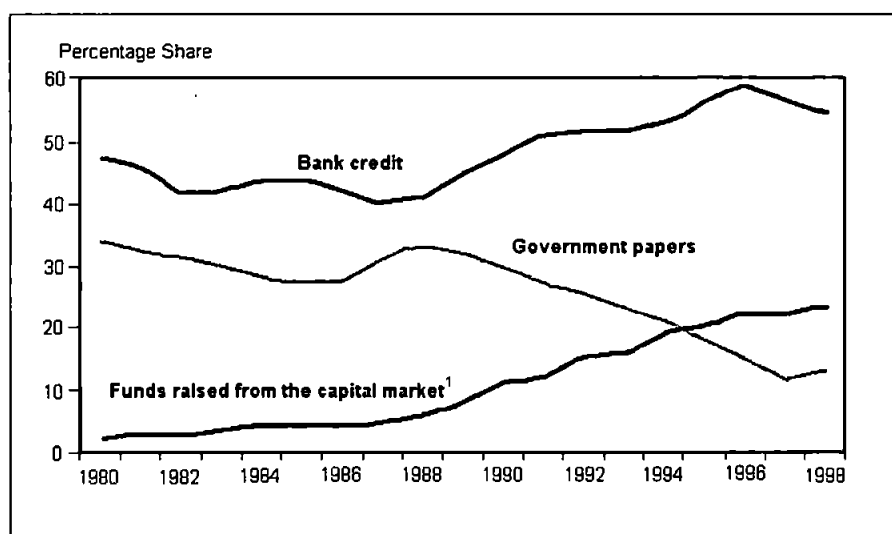
Source: Extracted from BNM, 1999 page 143
[1] Debt security plus equity

Table 3 in Appendix A presents the maturity structure of commercial bank loans. The ">5 to 10 years" loan provided by commercial banks had registered the highest percentage across a 6-year period, while ">1 to 3 years" had the lowest percentage. The percentages show evidence which indicate that the medium term loans are the most popular.

However, the listed percentage represents the total loan amount given to the companies as well as to the individual. The report on commercial bank loan direction figures revealed that more than 50 per cent of the commercial bank loans are channelled to the following sectors: manufacturing, properties and services. Constructions and agricultural sectors are among the lowest. Following the economic downturn in 1997, loans to the manufacturing and properties sectors have increased to more than 80 per cent while loans to the construction sector have increased to more than 60 per cent[2].

On the other hand, figures from Datastream showed that second board companies rely more on short-term debt rather than medium or long-term debt. Datastream classifies short-term debt figures as borrowing repayable within 1 year (including bank overdraft). Graph 2 in Appendix A illustrates the proportion of short-term debt to long-term debt of companies listed on the main board and the second board. The proportion of second board short-term debt to long-term debt is averaged at 75.36 per cent between 1994 and 2000, while the average for the main board companies is only 39.54 per cent within the same period.

The above discussions indicate that the second board companies rely more on short-term bank loans for financing while the main board companies tend to rely more on medium term loans. The conclusion for the main board is based on the higher number of companies listed at the main board and the high percentage of medium term loans as shown in Table 3 in Appendix A. PDS may be the least preferred in terms of gearing.

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[2] The figures calculated from the Table IV.7, Commercial banks :Direction of lending (BNM, 1999, p. 643)

2.5 Islamic Financial System

The Islamic Financial System was developed to enable Muslims to practice the Islamic principles in accordance to the Qu'ran (Muslims' sacred book) and Traditions (the prophet's deeds). A growing number of Muslim countries have expressed their desire to abide to the Islamic laws (Shariah) and principles as guidance for their social and economic welfare. Countries such as Iran, Pakistan and Sudan have converted their entire financial systems in accordance to the Islamic principles (Middle East Economic Digest, 1995). Nevertheless one should remember that Muslim countries vary greatly in the degree to which they adopt the Islamic teachings. Different religious bodies may have different opinions on the same topic because of their adherence to different schools of jurisprudence. For instance, Malaysia appears to be taking a liberal approach in addressing modern financial problems. The Malaysian approach may not necessarily be accepted by other schools of jurisprudence, which may rely more on a conservative approach.

The seriousness of adapting the Islamic laws and teachings have greatly influenced the Malaysian society as Muslims make up over half of the total population. The implications of Islamic principles to economic behaviour may affect the Malaysian firms in their financing decisions as large percentage of Muslims are active believers. One critical aspect of the teachings is the prohibition of the interest or usury. Maintaining the principle of not charging interest is the primary task facing the Islamic economists in a financial world where interest rates have assumed a supreme role. However, Islamic economists have clearly explained that the prohibition of usury is just one aspect of the economic philosophy on which Islamic banking is

based. Then again, interest is an important aspect for this research as capital structure deals directly with interest.

What is interest? Economists have given different definitions of interest with each trying to adapt their definition to their theory of justifying the payment of interest. Samuelson (1958) states that *"Interest is the price or rental of the use of money"*. J.M. Keynes did not define interest, but mentioned the rate of interest as *"Money rate of interest is the percentage of excess of sum of units of money contracted for forward deliver"*. The modern finance definition on interest is the excess of money paid by the borrower to the lender over and above the principal for the use of the lender's money over a certain period of time. While in Islam the "Traditions" (the prophet's deeds) have made it clear that *interest* or *usury* is any increase in money or in kind that the debtor is asked to pay over the amount originally borrowed (El-Ashker, 1987).

Islam was not alone or even first in prohibiting the payment of interest, the lending of money with interest have long been the subjects of religious contentions. Similar prohibition is found in the pre-Qur'anic scriptures, at least, to the Babylon of Hammurabi in 1775BC. The Torah instructed Jews that:

> *Thou shalt not lend upon interest to thy brother; interest of money, interest or victuals, interest of any thing that is lent upon interest. Unto a foreigner though mayest lend upon interest; but unto thy brother thou shalt not lend upon interest.*
> (Deuteronomy 23:20-21-cited in Lister (1988))

The Old Testament forbade the charging of interest between the Jews while the mediaeval Church has strongly opposed the practice by Christians. The Christian Church has long viewed interest-taking as a sin, and a council of bishops held in

France in 1312 hardened this into a threat of excommunication for those who practiced it, or even rulers who allowed the practice of interest taking,

> *put usurers amid the fiery sands of the seventh circle of hell.*
> (The Economist 1999)

A few relevant verses of The Holy Qur'an have explicitly forbade its believers from interest taking,

> *O you who believe! Be afraid of Allah and give up what remains (due to you) from riba (usury) (from now onward) if you are (really) believers. And if you do not do it, then take a notice of war from Allah and his messenger but if you repent, you shall have your capital sums. Deal not unjustly (asking more than your capital sums), and you shall not be dealt with unjustly (by receiving less than capital sum).*
> (Qur'an, 2:278-279)

and,

> *O you who believe! Eat not riba (usury) doubled and multiplied, but fear Allah that you may be successful*
> (Qur'an, 3:130)

Usury is committed when a lender charges more than the legal amount of interest permitted. In practice, as the economy develops progressively through time and technology, Muslims and Christians alike sidestepped these rules; the Jews happily lent, at interest, to both, as their own selective prohibition allowed. Yet as late as 1571 an English law had been introduced to ban interest taking, with special penalties for rates above 10%. The UK's usury laws were abolished in 1854, while South Africa and parts of the United States still administer usury laws (Edwardes, 1999).

According to the Islamic teachings, financial institutions may perform most, if not all, their functions provided that they avoid the payment and receipt of interest. This practice already exists and is being constantly refined and modified to meet the rapidly changing needs of ever more sophisticated businesses. The essential principle

of interest-free banking is profit/loss sharing. This means that both the supplier of the capital and the borrower share the risks; both prosper when the returns are favourable and both will suffer when the returns are low. This has resulted in what is known as the "interest-free system".

Although interest is the main factor, the money is to be invested only in worthy causes. This is largely equivalent to the western concept of socially responsible investing. Further to that, there are a few other rules that are compulsory for Islamic transaction activities such as: no profit is deemed "clean" in shariah law until zakat (tax) is paid to the poor, orphan and the needy[3]. The transactions have to be free from all forbidden elements such as alcohol or gambling. Muslims are not allowed to invest in a company dealing with any aspect of the forbidden elements.

Very few companies have practised the new interest-free system when it began in the early eighties, as they are regarded as a strange kind of institution which functions in unusual ways which can only be understood by certain groups of people. This however is now beginning to change as the institution has penetrated the western world. The evidence exists regarding two international giant banking corporations, Citibank and Hongkong Shanghai Banking Corporation (HSBC) which penetrated the Islamic banking world. Further to that, the Dow Jones Islamic Market Index has been established in the US in 1999. The indexes track Shariah compliant stocks from around the world, providing investors with comprehensive tools based on a truly global investing perspective. Some of the companies that comply to the shariah law

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[3] Zakat law is very broad which provides guidelines on maturity of zakat due, amount to be paid and etc.

are Microsoft, Coca-Cola and BP Amoco[4]. In the same year, the Financial Times Stock Exchange (FTSE) in London introduced its own Islamic indexes. Elnajjar (2002) cited the statement of the General Council for Islamic Banks and Financial Institutions (GCIBFI) that

> "The Islamic banking investment and financial
> management market is growing at a rate of 15 percent per
> year, currently operates in 75 countries and accounts for
> around US$200 billion".

Four basic methods of finance are sanctioned by Islam: *murabahah* is a form of sale whereby the seller expresses the cost of the sold commodity or goods that he/she has incurred before selling it to another person by adding some profit or mark up. The profit can be determined by mutual consent, by either a lump sum or a pre-determined ratio over the costs. All expenses incurred by the seller shall be in the cost price. Therefore, *murabahah* is originally a form of sale, not a financing mode. However, shariah scholars collectively allowed the use of *murabahah* as a mode of financing (subject to certain conditions). The reason for the approval is based on the current perspective of the economic set up, in which it is difficult to practice *musyarakah* and *mudarabah*-the true mode of financing. Nowadays, *murabahah* is widely practised by most of the Islamic financial institutions as a mode of short-term financing.

Second, is the *mudarabah*, a joint venture in which one party provides capital and another provides expertise or labour. The profits from the venture are shared according to an agreed ratio but losses are born entirely by the provider. According to the Islamic literature, *mudarabah* was practised even before the Qur'an was revealed and this was approved by the Prophet, as indicated by Islamic scholars (Mohamed,

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[4] http://www.getyourmoneyworking.com/2001/NOV/28

1985). An alternative is *musarakah*, a partnership in which all parties provide capital and share in the profits or losses of the venture depending on the investment ratio. These are regarded as the ethically strongest methods of finance and can be used to invest in medium or long term projects as well as stock markets. The final option is *Ijara* or leasing, which is basically the same as its conventional counterpart except that the price must be fixed in advance for a given period of time and must fluctuate in accordance with changes in the interest rates. Besides establishing Islamic banking institutions and penetrating the capital market with Islamic equity and debt securities, Malaysia is also promoting the Islamic insurance called *Takaful*.

As part of its initiative to assist in the development of Islamic debt, the government also announced a few measures in the recent Budget 2003 (Budget Speech 2003):

- Income tax exemption on interest income for bonds and debentures
- Tax deduction for IDS
- Review of stamp duty on financing facilities under Islamic banking
- Expenditure incurred on issuance of IDS is allowed tax deduction for 5 years commencing from 2003.

The incentives are aimed at promoting a more resilient capital market, whilst encouraging financing through private debt securities.

2.6 The 1997 Financial Crisis

Within the three decades of early economic development, Malaysia has witnessed at least four economic downturns. The first is identified as "the first oil crisis", which lasted between 1973 and 1975, for a period of two years. The second economic crisis, identified as the "second oil crisis", began in 1979 and lasted until 1983. The third economic crisis, identified as the "electronic or commodity crisis", lasted between

1985 and 1986. Finally, the fourth economic crisis, identified as the "financial or currency crisis", lasted between 1997 and 1998.

All crises have bought the growth rate to zero or a negative percentage except for the second oil crisis (see Table 2.1). The first and second crises were due to the oil crises. According to Okposin and Cheng (2000), although the second oil crisis had constrained the country, it was compensated by the profit of oil export and significant developments in the manufacturing sectors. The massive growth of the manufacturing sectors has not only contributed to the GDP growth, it also helps to decrease the unemployment percentage. However, during the third crisis, the high investments in the manufacturing sectors have caused problems to the economy. The world growth rate has been constantly decreasing since the 1960s and 1970s. The global decrease had affected many of the Malaysian international trading partners, causing a low demand for electronic and commodity products.

East Asia's financial crisis began with a speculative attack on the Thai baht in May 1997, which later spread to the entire region. The ringgit came under attack as speculators (currency traders) began placing bets on a depreciation of the ringgit in July 1997 (see Section 2.4.1 for the amount speculated). Between June 1997 and December 1998, the ringgit had lost close to 33.6 per cent of its value. The baht had fallen by almost 29.4 per cent, the Philippines peso about 32.8 per cent and the Indonesian rupiah by 70 per cent against the US dollar. The Malaysian ringgit was pegged against the US dollar, and as a result of the peg, the domestic currency becomes over or undervalued against other currencies as the peg currency fluctuates.

Overvalued currencies have encouraged imports by making them cheaper relative to domestic prices.

2.6.1 The Impact of the Currency Crisis

The immediate impact of the currency depreciation was on the stock market. Fund managers quickly withdraw funds from the market when speculators initiate their attacks on the ringgit. On the other hand, local investors have taken immediate actions of selling their securities while banks tightened their credit facilities, causing the stock market to be illiquid and collapse.

Table 2.4:
Stock Market Performance Immediately Following the Crisis

	1997- 2nd quarter	1997 3rd quarter	Differences
KLCI	1077.30	814.57	262.73 (24.76%)
EMAS Index	303.46	229.57	73.89 (24.35%)
Second Board Index	562.66	406.93	155.73 (27.68%)
Market Capitalisation (RM billion)	744	585	159 (21.37%)

Sources: BNM, Quarterly Bulletin
**differences between 2nd and 3rd quarter and percentage decrease

As shown in Table 2.4, immediately following the crisis in July 1997, the KLCI, the Emas index, the second board index and market capitalisation have declined to more than 20 per cent from the 2nd quarter of 1997 to the 3rd quarter of 1997 (April-June and July–September). The main index, (KLCI) further declined to 477.16 points on 12 January 1998, a decline of 41.4 per cent from the 3rd quarter of 1997. A year later, the KLCI felt to its lowest point ever at 262.70 on 1st September 1998, a drop of 79 per cent compared with the 1997 highest performance of 1,271.57 points on 25th February 1997. The market capitalisation declined by 53.4 per cent from RM806.8

billion in 1996 to RM375.8 billion in 1997 (see Table 2 in Appendix A). Based on the market turnover in 1988, Malaysia's rank dropped to 29th in the world, second in ASEAN and eight in Asia following the crisis (BNM, 1999).

Besides the sudden drop in the stock market, the total funds raised for new issues of capital were also affected. Table 2.5 presents the funds raised by the private sectors for the 2nd quarter and the 3rd quarter of 1997. Funds raised through shares issuance dropped by 11.2 per cent while funds raised by debt securities suffered a huge drop of 48.1 per cent. Table 1 in Appendix A presents the annual figures of funds raised by the private sectors. The total new issues of shares fell significantly from RM18,358.3 in 1997 to RM1,787.7 in 1998, a drop of 90.3 per cent. The debt securities fell by 62.8 per cent from RM16,588.4 in 1996 to RM6,175.4 in 1998.

Table 2.5:
Funds Raised in the Capital Market Immediately Following the Crisis

	1997p 2nd quarter	1997p 3rd quarter	Differences**
Shares (RM mil)	5,912	5246	666 (11.2%)
Debt securities* (RM mil)	6183	3209	2974 (48.1%)
Total net fund raised (RM mil)	12,094	8,454	3640 30.1%)

Sources: BNM, Quarterly Bulletin
p-preliminary
*Excludes debt securities issued by banking institutions and figures after minus redemption
**differences between 2nd and 3rd quarter and percentage decrease

Due to the currency devaluation, Malaysia's foreign debt rose by 75 per cent from RM97 billion at the end of 1996 to RM171 billion at the end of the crisis year (see Table 4 in Appendix A). As shown in the table, medium and long-term debt for the private sector has increased by 88 per cent from 1996 to 1997. The short-term debt for the private sector has increased by 36 per cent for the same period. However, the

private sector's short-term foreign debt was only at 6 per cent of the total external debt compared with the medium and long term debt, which accounted for 62 per cent.

The financial institution is the main provider of funds in Malaysia. As previously mentioned, commercial banks alone provide funds amounting to RM285.1 billion as of June, 1999. However, the biggest problem faced by the financial institutions following every crisis is the non-performing loans (NPL). As a result of the crisis, the corporate sector has experienced significant loss of wealth as a result of sharp falls in the value of their assets. Corporate incomes and cash flows also declined, causing some corporations difficulties in servicing their debt. The situation has led to a significant increase in the financial institutions' NPL's ratio. In November 1998, total NPLs for commercial banks increased to RM22.7 billion (7.9 per cent of total loan) from RM4.3 billion in 1996 (1.9 per cent of total loan). The NPLs for finance companies rose from 4.7 per cent of total loans by the end of 1996 to 12 per cent by the end of 1998. On the other hand, NPLs for merchant banks increased by 13.8 per cent in the second quarter of 1999.

The overall impact on the GDP is shown in the -7.5 per cent GDP in 1998-the lowest in the Malaysia economic history. The real GDP began to slow down in 1997, at 7.5 per cent compared with the 1996 percentage GDP of 10. According to Okposin and Cheng (2000), as a result of the crisis, Malaysia has lost its per capita income of USD40 billion annually (in GDP terms) from the ringgit devaluation and US$100 billion were wiped out from the stock market. Overall, Malaysia has lost a total of US$140 billion. Besides the reduction in GDP, the CPI rose at 6.2 per cent on an

annual basis in the half of 1998 compared with an average of 3.5 per cent in early 1997. Both food prices and producer price index (PPI) registered the largest increase.

2.6.2 The Management of the Currency Crisis

Following the speculative attacks on 10 July, 1997, the initial response from the authorities was to intervene in the foreign exchange market. This has resulted in the tightening of market liquidity and a sharp rise in interest rates; the overnight (inter bank) and 3-month rates rose to 40 per cent and 8.6 per cent from 7.5 and 7.9 per cent, respectively. Although the increase in interest rates would support the ringgit from further depreciation, it had an adverse effect on the real sector. To ease the liquidity tightening and to reduce the interest rates, the Central Bank had injected money to the banking institutions. Interest rates were reduced to their pre-crisis levels until September 1997. Nonetheless, the action caused inflation to rise as the ringgit depreciated further and credit grew significantly.

The interest rates had gradually risen to allow depositors to earn positive real returns. Such a situation creates a dilemma and chaos to the authorities; if liquidity is tightened, it will appreciate the ringgit but at the same time it will hurt the real economic sectors as interest rates rise. While at the same time, International Monetary Fund (IMF) advised the regional countries to increase interest rates. Finally, Malaysia decided to take the strategic action of fixing the exchange rate at RM3.80 to the US dollar on 2nd September 1998.

As a result of difficulties found by the financial institutions regarding the NPLs, the government established the Danaharta, Corporate Debt Restructuring Committee

(CDCR) and Danamodal in June, July and August 1998, respectively. Danaharta was established to purchase NPLs from the financial institutions and manage the NPLs in order to maximise their recovery value. The CDCR function is to deal with debt of the large corporations with the financial institutions so that the corporations will be able to continue with their normal operations. The Danamodal is involved in the recapitalisation of the financial institutions in which funds will be injected for smooth running of their operations.

The other policies were to reduce current account deficits and maintaining export competitiveness as well as monitoring the inflation. The government had also reduced its expenditure and certain infrastructure projects had been delayed. The budget allocations for health, education and basic amenities were maintained.

2.7 Conclusion

Since independence in 1957, the Malaysia economy has developed and diversified from rubber and tin into a more broad-based and export-oriented economy focusing on the production of a wide range of exports, namely rubber, tin, palm oil, timber, cocoa, crude oil and increasingly manufacturing and services. The development was initiated through the implementation of a number of medium and long-term development plans.

As a result of the rapid development, by the early 1980s, growth was accompanied by an increase in budget deficits and public debt. Measures were taken to reduce the budget deficit, including open trade to expand the export base. This action has resulted in a dramatic shift in the structure of the economy from agriculture and

mining to a growing reliance on manufacturing of electronics and other export-oriented industries. Investments were also targeted at non-tradable sectors, including capital-intensive infrastructure and the real estate sector. Liberalisation measures were introduced across the board and this helped improve competitiveness and productivity.

Despite the high growth and strong economic performance, the Malaysian economy shares the characteristics of the developing countries: it is heavily dependent on exports and open to foreign trade. Although in the early 1990s, the government investment strategy was successful in raising output and income, however, there were also signs of stress as exports decelerated and a large current account deficit developed. As shown in Table A. 21 in Appendix A1[5], the Malaysian current account balance showed negative figures from 1990 to 1997. This eventually led to major balance sheet weaknesses in the banking and corporate sectors, exposing the economy to the regional crisis. The Malaysian economic vulnerabilities intensified significantly following the crisis in mid-1997.

It started when currency traders began to speculate on the Malaysian ringgit, the market confidence increasingly diminished, large portfolio outflows took place, and equity and property values declined substantially. By 1998, the stock market had fallen to its lowest level in recent history together with the rest of the region. The contagion effects of the crisis and the associated economic contraction were far worse than anticipated. Anticipation of further devaluation of the ringgit intensified. Domestic imbalances shown as growth rates slowed and then turned negative in 1998.

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[5] Tables A.21 and A6 in Appendix A1 are obtained from CD-ROM of 1996 and 2000 Annual report of the Malaysian Central Bank.

Nevertheless, with the policy and structural changes undertaken, Malaysia's external vulnerability was relatively well controlled: the current account showed a large surplus in 1998 and 1999 (see Table A.6 in Appendix A1)[5]; short-term external debt was low; and reserves have remained adequate. Progress in the restructuring of the financial sector has also improved the capacity of banks to manage risks. Although the government continually stresses the need to minimise the dependency on bank loans, the banking sector has remained dominant. Given the fact that alternative financing sources have been limited and unstable due to the crisis, this suggests that commercial banks will continue to be the dominant financiers in the foreseeable future. Recently, many tax incentives were legislated on the Islamic debt securities to attract investors seeking for Islamic financing products (see Section 2.5). The lessons learned have shown the need for Malaysia to better protect itself from future crisis. The country is also consistently seeking for prudent macroeconomic policies to maintain financial stability and sustainable fiscal and external positions.

CHAPTER 3
LITERATURE REVIEW

3.1 Introduction

Chapter 3 presents the literature review on the capital structure theories and empirical studies. The chapter begins by examining the capital structure background, followed by the traditional and new approach to the capital structure. The theory is followed by the empirical research on capital structure, it integrates the theory and the results from the field research. Besides reviewing the literature on capital structure, the chapter also analyses the literature on the financial crisis and the Islamic financing. The chapter includes: Section 3.2 capital structure instigation, Section 3.3 capital structure and taxation, Section 3.4 factors determining the capital structure, Section 3.5 Islamic financing, Section 3.6 the 1997 financial crises, and Section 3.7 concludes the chapter.

3.2 The Beginning of the Capital Structure Debate

A classic study on capital structure began in 1914 when Professor Arthur Stone Dewing observed the major consolidation movement in the United States. The merger movement was associated with the emergence of national markets after the completion of the cross-continental railroad networks in the late 1880s. During that time, deflation plagued the US which resulted in expansionary policy and economic reforms through the constitutional power of Congress. The economic reforms resulted in 305 industrials being merged in the early 1900s. However, financing these large industrial aggregates had brought management to the capital structure problems. This is because the consolidation itself is too large in relation to the size of the economy. Reorganisation and consolidation development of the companies had greatly impressed Dewing. He started his research by studying the success and the failure of the companies prior to merging and found that the failure was due to the management flaw in managing their financial assets and liabilities. He commented:

> *They failed because their earnings were inadequate for the load put upon them. If the load was especially burdensome by reason of heavy fixed charges and unwarranted dividend payments, the failure was all the more certain. The direct cause of failures in every instance was the deflection of working capital to the payments of interest and dividends.*
>
> (Dewing (1930) cited in Weston (1966) p.24)

Therefore, the failure of the companies during that period was due to the insufficient earning and current assets to cover both fixed charges of interest. Then, he reviewed the financial structure of the companies and found that the choice of capital structure was seen to be of great significance. Dewing noted that companies with smaller debt burdens were in a stronger financial position than those with higher debt burdens. He wrote:

It is largely because of these clearly recognised fluctuations of trade, that a sound financial policy dictates the use of stocks rather than bonds. And it should be remarked at this point that strength of our so-called "industrial trusts" lies partly in the fact that the majority of them were promoted without bonds. But when foolish promoters had once over-loaded a corporation with liabilities bearing fixed charges, it became the duty of the subsequent management to get along as best it could. A default in bond interest payments was very disastrous to the credit of a corporation, as well as to the market price of its securities. It was disastrous to its trade as well.

(Dewing (1930) cited in Weston (1966) p.24)

He also acknowledged the financial distress of interest default to the company, as well as the effect on the share prices and business operation.

The study of capital structure and major financing movements by Dewing at the turn of the century marked the beginning of the era of systematic studies in the finance field. The problems of financial structure had prolonged to the next few decades as the economy deteriorated in the 1920s. According to Weston (1966), between 1920-21, and 1929-33, corporate management reacted irrationally towards debt in which firms only employed long-term debt when absolutely necessary and sought to retire debt as soon as possible. The aversion towards debt is due to the fear of a financial crisis which may lead firms to financial embarrassment. The central concern of financial management in the environment of the sharp economic crisis during that century was to protect the firms against bankruptcy and reorganisation.

3.2.1 The Traditional Approach to the Capital Structure

According to Weston (1966), Dewing's subsequent work on capital structure have set the pattern for what is now referred as the traditional view of the capital structure in many of the corporate finance text books. The capital structure traditional view advocates that with the presence of gearing, the firm's value will increase to a certain

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level before decreasing due to the expected risk as the debt level continues to increase. The firm's value is maximised at the point at which the cost of capital is minimised. Figure 3.1 illustrates the traditional view of gearing, and the expected rate of return for both the debtholders and shareholders. The line k_d represents the cost of debt, the line WACC is the weighted average cost of capital, and the line k_e is the cost of equity.

Figure 3.1:
Rate of Return Under The Traditional View of The Capital Structure
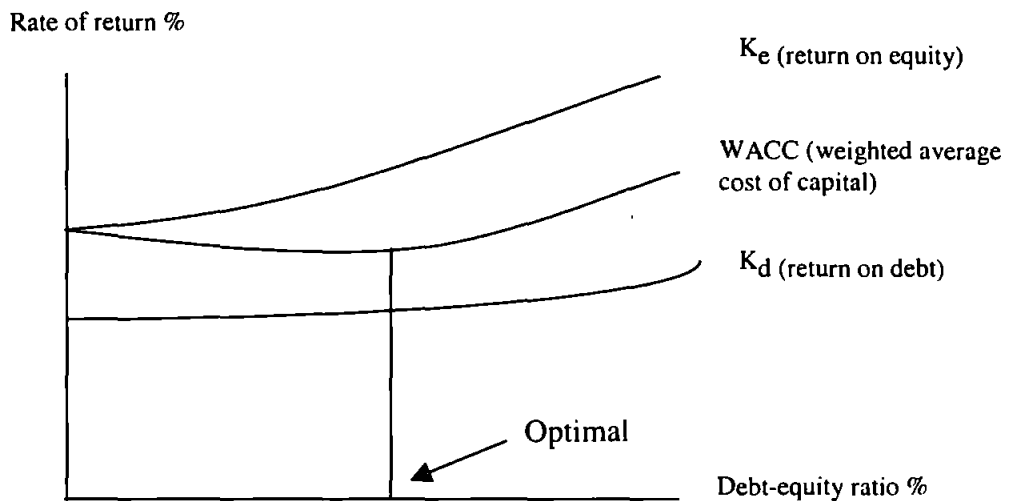
According to this view, firm moves from a zero debt position to small amounts of debt. At this point gearing increases the shareholders' risk but does not significantly increase the risk borne by debtholders. Similarly, k_e will not rise significantly until large amounts of debt are used. This is based on the argument that since debt is cheaper, combining equity with reasonable amounts of debt will result in a reduction in the firm's overall cost of capital or *WACC*. Therefore, the value of the firm is maximised at the lowest level of *WACC*.

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Firm's Value Under The Traditional View of The Capital Structure

Firm's value

Optimum debt/equity ratio

Debt-equity ratio %
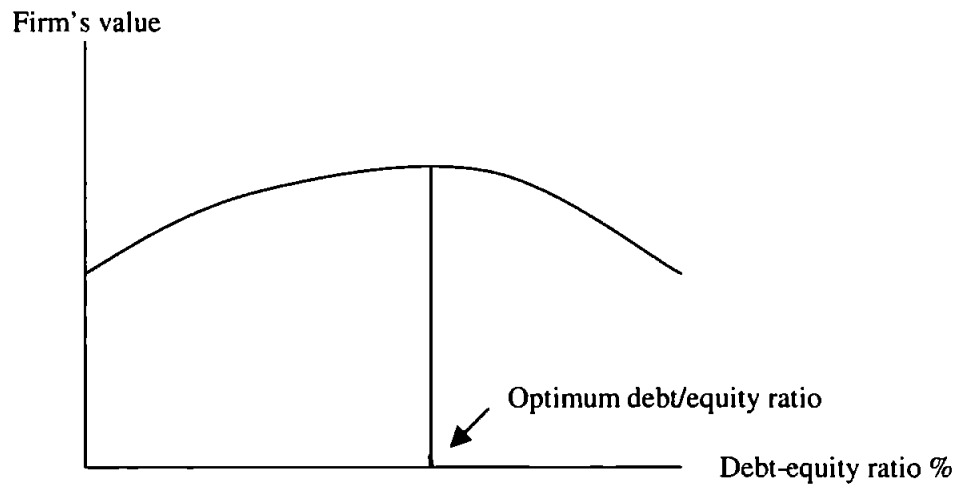
However, when too much debt is added to the firm's capital structure, the k_d will start to rise significantly, as shown in Figure 3.1. This is because firstly, debtholders demand a higher rate of return due to their concern over the firm's ability to generate enough income to avoid default on the interest payments. Secondly, at high debt levels, the cost of equity also rises quickly because high amounts of debt are accompanied by high amounts of fixed interest payments, which may reduce the equityholders' residual claims. This will cause the equityholders to increase their expected return, k_e, to offset the risk of gearing. The overall cost of capital of the firm begins to rise at high levels of debt, thus decreasing the firm's value as depicted in Figure 3.2.

3.2.2 The New Approach to Capital Structure

As finance researchers and academicians uphold to the traditional view of capital structure, two new propositions have been forwarded in the 1950s; Durand (1952) and Modigliani and Miller (1958). Durand presented two models, the Net Income Approach and the Net Operating Income Approach, while Modigliani and Miller

(hereafter MM) proposed the capital structure irrelevancy theory. The most famous and controversial are those of MM due to the assumption accompanying the models. Many critics were focused on the perfect market assumption which reflects the situation of the market with no taxes and no transaction costs.

3.2.2.1 The Net Income and The Net Operating Income Approach

Durand (1952) proposed the Net Operating Income (NOI) and the Net Income (NI) approach of capital structure. The basis of the NOI approach is that the total value of all debts and shares must be the same, regardless of their proportions, therefore, the firm's value remains constant. The reason is the total value of the firm is calculated by capitalising the net operating income (before interest) at certain rates which gives an amount equivalent to the total amount of debt plus equity value. Durand contrasted the NOI approach with the NI approach, which assumes that the firm's value does not remain constant, but increases with the proportion of debt in the capital structure. This is because the total value of the firm is based on the net income after deducting the amount of interest in which the amount of net income will vary according to the interest paid.

Under the NOI approach, the required rate of return, k_e, increases in direct proportion to the debt to equity ratio, whilst the weighted average cost of capital remains constant even as the debt to equity ratio increases. The argument is that the shareholder is asking for higher returns as the firm's financial risk increases. However, the value of the firm will be the same under the NOI approach.

The NI approach argues that the higher the debt levels, the lower is the cost of capital. If the cost of capital is low, the overall value of the firm will increase. This is based on the assumption that required rate of return, k_e, would remain constant. Under this argument, the cost of capital will further decrease due to fixed cheaper cost of debt paid and at the same time the cost of equity remains the same. Therefore, if the operating income increases, net income will increase because the same amount of interest will be deducted. As the net income increase is capitalised at a certain rate (equivalent rate as k_e which is assumed to be constant), it will increase the total value of the firm.

Durand provided a formal model on the capital structure issues by showing the impact of debt-equity preferences on the overall cost of capital, WACC. However, he provided no evidence for either the NI or NOI methods of determining the cost of capital. Furthermore, there were a number of ambiguities under both approaches, such as the cost of equity remaining constant under the NI approach. In reality, it will be difficult for the cost of equity to remain constant as it is subjected to other factors such as dividend policy, risk and etc.

3.2.2.2 Modigliani and Miller 1958 Model

Modigliani and Miller (MM) extended the work of Durand by providing a different capital structure model. The paper was famously known as the "MM irrelevance propositions". They proposed two propositions to explain their capital structure model. Propositions I and II state;

Equation 3.1

$$V_j \cong S_j + D_j = \frac{X_j}{\rho_k}, \text{ for any firm j in class k (proposition I)}$$

Equation 3.2

$$I_j = \rho_k + (\rho_k - r)\frac{D_j}{S_j}, \text{ for any firm j in class k (proposition II)}$$

Where,

V_j = Total market value of the firm

S_j = The market value of the firm's equity

D_j = The market value of the firm's debt

X_j = Expected average earning before interest

ρ_k = The expected return from an identical ungeared firm *(WACC)*

I_j = The expected rate of return on the stock *(K_e)*

r = the risk free rate of interest *(K_d)*

MM explained their proposition I:

> *"That is, the market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate ρ_k appropriate to its class."*

(MM (1958), p.375)

In other words, capital structure is irrelevant, and firm's value is equal to the present value of the free cash flow discounted at the relevant cost of capital. Accordingly, what is important to the firm's value is the risk of its operating cash flows, the financing decision on the cash flow is irrelevant. However, if the proposition does not hold, arbitrage will take place and will therefore restore the stated equalities. They demonstrated that an arbitrage opportunity exists if the market value of the geared

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firm differs from that of an identical ungeared firm. As arbitragers exploit this opportunity, the value of the overpriced shares will fall whereas the underpriced shares will rise, therefore, the price would converge in equilibrium.

Figure 3.3:
Cost of Capital Under MM 1958 Model
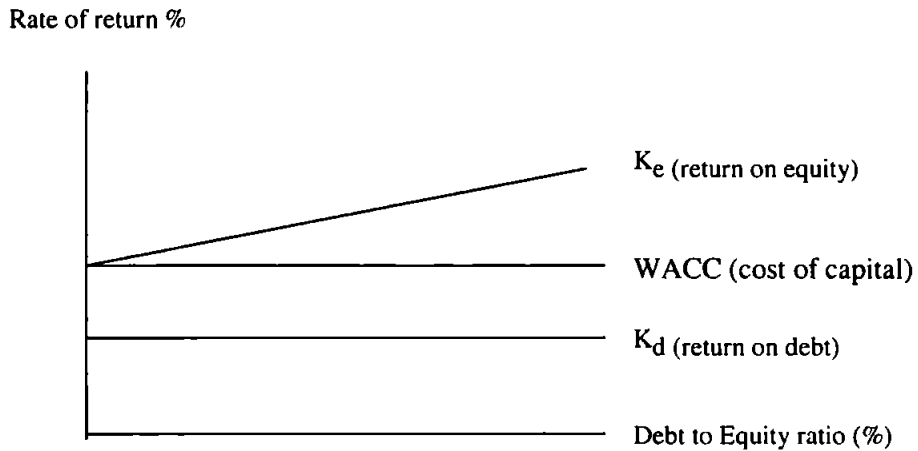
MM proposition II asserts that the expected return, k_e, on a geared firm is a linear function of gearing, in other words the cost of equity, (k_e), increases with financial structure and the slope being the difference between the company's WACC and k_d $(\rho_k\text{-}r)$. By retaining capital structure as irrelevant under proposition I, proposition II specifies what the expected return on the geared firm must be for total firm market value to be unchanged, and for the overall cost of capital to remain constant, as debt is added to the firm's capital structure. Figure 3.3 illustrates the Cost of Capital under this MM proposition.

3.2.2.3 Empirical Evidence on MM Model

MM (1958) improved their propositions by providing empirical evidence based on data studied by Allen (1954) and Smith (1955) on 43 electric and 42 oil companies, respectively. The former used a 2-year average figure between 1947 and 1948, while

the latter used a one-year period of company data, 1953. Both studies were originally designed to find the relationship between the securities return and the capital structure of the firms. According to their proposition I, the WACC should have the same value regardless of the gearing, therefore, if the traditional view was upheld, the correlation coefficient of WACC and gearing should be negative, however, if the views proposed by MM was right, then correlation should not be significantly different from zero. The MM empirical evidence clearly supports their proposition which suggest insignificant correlation between WACC and gearing. Their empirical test on proposition II was also proven to be correct as they found significant positive correlation between K_e (return on equity) and gearing (debt over equity). Both results had strengthened the irrelevance proposition that there is no correlation between the overall cost of capital and gearing, and the cost of equity increases as debt to equity ratio increases. The result of the study, nonetheless, is not consistent with the traditional view of the capital structure.

3.2.2.4 Criticism of MM Propositions

Since 1958, the MM model was constructively criticised by several prominent researchers, both theoretically and empirically. The most obvious flaw of the model is probably its unrealistic assumptions. To arrive at their irrelevance decision, there were a number of accompanying assumptions, either explicit or implicit, such as: the existence of efficient capital markets; all physical assets are owned by corporations; no corporate or personal income taxes; risk free interest rates for both lenders and borrowers; no bankruptcy and transaction costs; and all corporations can be classified into one of several "equivalent return classes", such that the returns on shares are perfectly correlated with all other firms within that class.

Durand (1959) indicated some of the difficulties of using MM's assumptions in the real world to support their propositions. According to him, MM restricted the freedom of the firm to arbitrage whenever the market deviates from equilibrium but instead allowed the investors to arbitrage without restraint. Also, MM had underestimated the difficulty of setting up an equivalent return class. Practically, it is impossible to postulate the existence of two or more different and independent firms with uncertain income streams and yet be perfectly correlated indefinitely. The concepts of an equivalent return class, derived from the ideas of static equilibrium, is not adaptable to a highly advanced market in which stock prices fluctuate unpredictably.

The point is further emphasised by Weston (1963) who stated that empirically that it would be very difficult to gather a sample of corporations capable of supporting the MM's equivalent class requirement and at the same time he questions some other unrealistic assumptions, such as finding samples that are reasonably homogeneous in most respects. However, Weston states that Durand's NOI approach and MM's proposition I are logically equivalent. Both state that the value of a corporation is determined by capitalising the firm's net operating income at the appropriate rate, giving the total market value to which the firm's capital structure must conform.

He criticises MM's empirical studies which have failed to investigate the nature of the relationship between gearing and other variables influencing a firm's cost of capital. Weston then conducted an empirical test on MM's model by adding growth in earnings per share as an additional factor, as he found this factor to be highly correlated with the cost of capital and the cost of equity. Nevertheless, when the

influence of growth is isolated, leverage is found to be negatively correlated with the cost of capital. The result explains that MM have found no correlation between the cost of capital and the leverage, because that leverage is correlated with other influences which change the gross relationship between cost of capital and leverage. Taking the influence of growth on both cost of capital and the cost of equity, Weston's evidence is consistent with the traditional approach as these variables are highly correlated.

3.3 Capital Structure and Taxes

In 1963, Modigliani and Miller wrote "a correction" paper; whilst maintaining the environment they introduced in 1958, but allowing for a tax benefit on debt. They did consider tax in their 1958 proposition but their analysis was flawed. The tax shield is simply the effective corporate tax rate multiplied by the market value of debt issued as shown,

<u>Equation 3.3</u>

Value of Geared Firm = Value of Ungeared Firm + $T_c D$

where T_c is the corporate tax rate and D is the amount borrowed. By integrating tax into their proposition, they discovered that gains accrue from interest deductibility and raised questions over their previous irrelevant model. Given that interest is tax deductible, the higher the debt, the higher is the tax shield and therefore the higher is the firm's value. Although the equity holders demand higher returns to compensate them for the higher risk as debt increases, the much cheaper interest after-tax outweighed this, and thus the overall cost of capital decreases as debt is added to the firm's capital structure as illustrated in Figure 3.4.

<u>Figure 3.4:</u>
<u>Cost of Capital under MM Model with Taxes</u>

Rate of Return %

K_e (return on equity)

WACC (cost of capital)

K_d (return on debt)

Debt-to-equity ratio
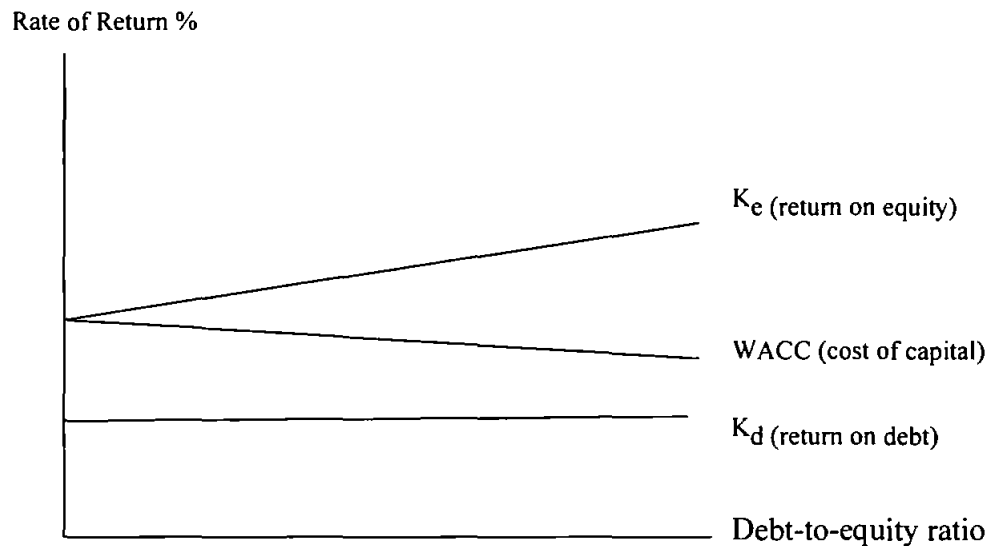
MM state that the tax shield is a valuable asset for the company. They elaborate: since the firm's debt is fixed and permanent, the company will receive a permanent cash flow from the tax shield. Additional borrowing decreases corporate income tax payments and increases the cash flows available to both debtholders and stockholders, thus increasing the firm's market value. However, the tax shield depends only on the corporate tax rate and the ability of the firms to generate sufficient earnings to cover interest payments. Nonetheless, in their concluding section, MM state that although the cost of debt is cheaper, persistently seeking a maximum amount of debt in capital structure is unnecessary, under some circumstances, and retained earnings could be cheaper.

3.3.1 Miller's Equilibrium Model

Later in 1977, Merton Miller proposed another theory regarding the tax advantage of debt by incorporating investors' tax rates and company tax rates into his equilibrium model. The equation is the extension of MM 1963 model, which gave $V_g = V_u + T_c D$

as discussed in Section 3.3 above. Miller arrives at the new model by adding tax levied on investors' equity and debt income. The equation expresses the value of the geared firm as being equal to the value of the ungeared firm plus the amount of debt multiplied by the value of the tax shield or tax advantage to debt. The tax advantage to debt is defined by the bracketed expression.

Equation 3.4

$$V_g = V_u + D \left[1 - \frac{(1 - T_c)(1 - T_{ps})}{(1 - T_{pd})} \right]$$

where,

V_g = value of geared firm

V_u = value of ungeared firm

D = debt of geared firm

T_c = corporation tax rate

T_{ps} = the personal tax rate on equity income

T_{pd} = the personal tax rate on interest income

In the original MM (1963) analysis with only the corporate tax, the $T_{ps} = T_{pd} = 0$, so, if the tax on equity income is equal to the tax on debt income, the tax advantage will only be $T_c D$. Thus, the higher the D or more debt added into the firm's capital structure, the higher is the value of the geared firm relative to the ungeared firm. Intuitively, if all tax rates are disregarded, there will be no tax advantage to debt either at corporate level or personal level. But, if $T_{ps} > T_{pd}$, the tax advantage to debt is higher, however, if $T_{ps} < T_{pd}$, the net advantage to debt is reduced. The model's predictions are plausible only if the effective tax rate on equity income is considerably

lower than the interest income, lower enough to offset the corporate interest tax shield.

Consequently, Miller's approach suggests that debt has both tax advantages and tax disadvantages. The tax advantages of debt are derived from the tax deductibility of interest at the corporate level, while the tax disadvantages of debt come from the fact that the personal taxes rates on interest income are typically higher than those rates levied on income on capital gains derived from equity, $T_{ps} < T_{pd}$. Hence, the tax advantage to debt could reduce or there will be no tax advantage to debt. The reason for higher tax on personal interest income received from debt than the personal income from equity (dividend plus capital gains) is mainly related to various capital gains exemptions. With that argument, the tax advantage to debt is lower than expected.

Although Miller have suggested that T_{ps} and T_{pd} can vary across investors, he then simplifies his model under the general equilibrium proposition by assuming that $T_{ps} = 0$, bonds are riskless and no transaction or issue costs are involved. With the presence of tax exempt bonds that require r_0 for their return, he determined the supply and demand of the corporate debt.

The initial suggestion is that bonds can be issued at r_0 to tax exempt investors. However, the interest rate must be higher than the r_0 to attract taxable investors to purchase bonds. The higher rate is to compensate for the taxes on interest income levied on them, hence their demand rate of interest will be $r_0 / (1 - T_{pd})$.

Figure 3.5
Miller Equilibrium in the Market for Bonds

Rate of Interest

$$r_d(B) = r_0 / (1 - T_{pd})$$

$$\dfrac{r_0}{(1 - T_c)}$$

$$r_s(B) = r_0 / (1 - T_c)$$

r_0

Quantity of bonds
outstanding

B*
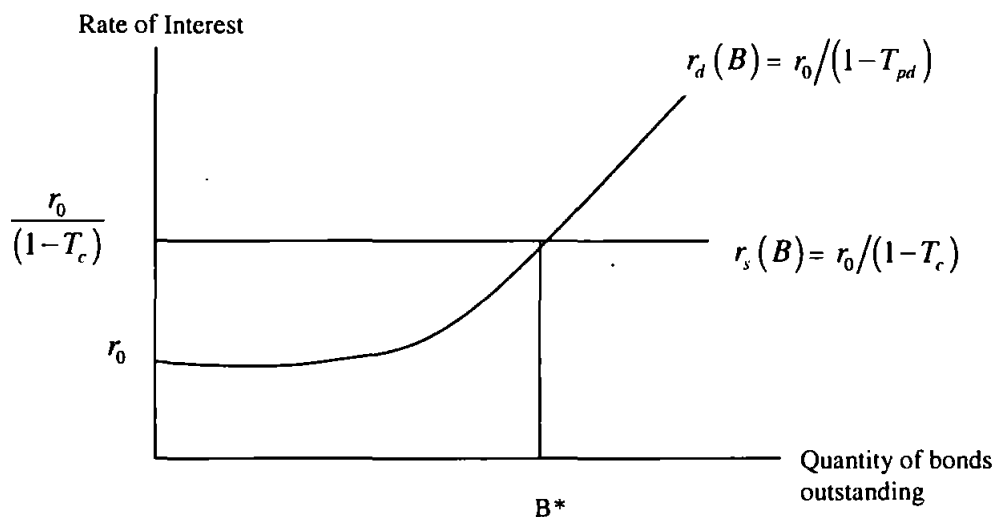
As shown in Figure 3.5 the $r_d(B)$ represents the investor demand for bonds at the

low rate, r_0 represents the demand of fully tax-exempt investors, as illustrated by the

flat section of the demand curve. A further increase in the curve illustrates high

demand for higher tax bracket investors in order to acquire the same return as the tax-

exempt investor. Nevertheless, companies are only willing to issue bonds

at $r_0 / (1 - T_c)$, thus the equilibrium will reach B*, the point where the marginal

personal tax rate on bonds is equal to the corporate tax rate. Miller argues that given

both the marginal personal tax disadvantage of debt and firms' adjustments on the

supply side, $r_s(B)$ will override the corporate tax advantage of debt causing market

prices to move to an equilibrium. The argument supports his (and Modiagliani's)

previous irrelevancy theory, $V_g = V_u$. Miller's model was intended to illustrate how

corporate and personal taxes could cancel out and leave firm value independent of

capital structure.

3.3.2 Tax Exhaustion Effect on Capital Structure

Following the Miller tax equilibrium in 1977, DeAngelo and Masulis (1980) highlighted the issues of tax exhaustion. By using existing evidence such as the MM 1963 empirical evidence, their models produced a number of testable hypotheses. According to them, positive non-debt tax shields substitute for debt shields and are capable of reversing Miller's equilibrium model. Positive tax shields imply that the expected marginal corporate tax benefits decline as debt is added to the capital structure.

He argued that borrowing is not the only way to shield income against tax and that firm's investment in tangible and intangible assets can be substituted for debt to benefit from tax advantage of depreciation deductions. Not only depreciation, investment tax credits will also reduce the tax advantage to debt. The more the firms shield income in these ways, the lower is the expected tax shield from borrowing. Therefore, firms will become tax exhausted if too much debt is added to the capital structure. However, he stated that corporate tax shields are worth more to some firms than others, and suggests that firms with many non-interest tax shields and uncertain future prospect should borrow less than consistently profitable firms with lots of taxable profits to shield. Firms with large accumulated tax-loss carry-forwards should not use debt. It is worthless for firms to issue debt if the firms are unable to gain benefit from interest tax shield.

De Angelo and Masulis (1980) extended their research on tax reform effect to the firms' capital structure. According to them, US's federal income tax code on the corporate tax rate and corporate investment tax deductions and credits have been

increasing significantly over the years. They reviewed the 1975 data from the US internal revenue services (IRS) which indicate investment tax shields in the amount of USD49.5 billion are almost the same with the interest tax shield of USD64.3 billion. Therefore, non-debt tax shield items are as significant as the tax shield from a capital structure perspective.

The following are empirical evidences supporting the relationship between gearing and tax shield, gearing and non-debt tax shield.

Based on DeAngelo's and Masulis's proposition, Titman and Wessels (1988) empirically studied the effect of non-debt tax shield on the gearing of US manufacturing firms. The three indicators of non debt tax shield are: the ratios of investment tax credits over total assets, depreciation over total assets, and a direct estimate of non-debt tax shields over assets. However, no evidence was found at all in the measurements, since all statistical results were not significant.

Rajan and Zingales (1995) included taxation reform in their study on the capital structure of the G7 countries. They stressed the importance of cooperating the "right" personal tax rates in computing the company tax advantage to debt. The tax advantage to debt is studied with respect to firms' retained earning and dividend advantage. The result showed, following the reform, that the US had the highest tax advantage, its share of the pre-tax dollar increased from $0.26 in 1982 –1984 to $0.40 in 1989-1991. In contrast, the retained earnings attracted the least tax advantage following the reform. Retained earnings' share declined from USD0.35 to USD0.21, between 1982-1984 and 1989-1991, respectively. The results also indicate an

increase in tax advantage for Canada and the UK but not for Japan, Germany, France, and Italy.

Booth et al. (2001) included taxation in their study on the capital structure of developing countries. Generally, the results indicate a weak negative significant relationship between gearing and tax across the countries except for Pakistan which had a result indicating a highly significant negative coefficient. The results for Malaysia are mostly insignificant except when gearing is measured by total-debt-to-total-debt-plus-equity (all book values) for the period of 1985-1987.

3.3.3 Tax System

The corporate finance literature has shown that the determination of corporate capital structure is also dependent on corporate taxes, due to the tax-deductibility of interest payments. However, different tax systems in different countries may have a different effect of the tax shield on debt. Therefore, the research is more effective by looking at the various tax systems in operation. Many hybrid tax systems are used in different countries to meet the regional requirement. This is based on domestic environmental factors, such as economic priorities, fiscal policy, administrative considerations, international influence and historical development. The majority of the countries worldwide operate their classical tax system with some modification, while others operate various forms of an imputation tax system.

The pure classical tax system imposed a flat tax rate to pre-distributed profits. This system allows the distribution of dividend to be taxed twice, once at the corporate level and then again at the personal level. The result is referred to as economic

double taxation. The modification of a classical tax system by most of the countries is to reduce the burden of double taxation either by imposing a different tax bracket on distributed income (dividend) or by giving a full or partial relief to shareholders.

According to Pointon and Spratley (1988), under the full imputation system, the full corporate tax liability is treated as an imputed tax credit to determine total personal taxable income; where the tax credit is attached to the dividends in the personal tax computation. The effective tax rate on the underlying profits (dividend and retention) represents the personal tax rate on investment income. Thus, the double taxation is eliminated and distributed profits (dividend) are subjected to taxation only once under the imputation system. They explained that a partial imputation system operates when the partial corporate tax liability is treated as an imputed tax credit to determine total personal taxable income, which means credit is given under the personal tax computation for part of the underlying corporation tax on profits paid out as dividends. Thus, under this system, there is still some remaining corporation tax that is imputed to shareholders.

Theories tend to favour an imputation system because, amongst others, it avoids economic double taxation. However, the major drawback to the imputation system is its complexity with regards to legislation, subsequent administrative burden and compliance costs, this is costly to society. For every dollar of tax collected, these costs can be quite significant, the result is not expended directly for consumption or wealth generating activities. It may appear that imposing tax when a shareholder receives a dividend is a rather simple approach and this would reduce compliance

costs. However, it is not the intention of this research to analyse the details of pros and cons of these two systems.

Previous studies on tax influences on capital structure are based on the classical tax system as most of the literature on this subject is derived from the United States, which operates under a pure classical tax system. However, analyses by Franks and Broyles (1979), Pointon (1981), Rutterford (1988), and Ashton (1989) have extended the MM tax advantage models for different tax systems. Most of these researchers conducted their study based on the UK's partial imputation system. Again, the system aims to alleviate the double taxation of corporate profits arising under the classical system by offering a tax credit to shareholders on receipt of a dividend for part of the tax paid by the company.

Franks and Broyles (1979) argued that a company is considered to act as an agent for the Inland Revenue authorities in collecting shareholder's tax; and hence the corporate tax rate in effect "includes" the shareholder's tax at the standard rate. They argued that the tax advantage to debt then becomes the difference between the corporate rate and the shareholder standard rate. They concluded that, due to the imputation system, the tax advantage is very much less in the UK.

Rutterford (1988) examined the impact of taxes on the UK, France, Germany and Japan by extending the major tax models of optimal capital structure on all of the following tax systems: classical, imputation and hybrid system. With the exception of the US, the other four countries have altered their tax systems since World War II to avoid double taxation under the pure classical tax system. According to her, tax

advantage to debt depends on both the type of tax system and tax rates imposed on the corporation and investors. Rutterford then compared the tax advantage to debt in each country by using a different tax system. Her findings indicate that the tax advantage of debt is highest for the US corporations and is lowest for German and Japanese firms, while UK and France were ranked in the middle. Surprisingly, the gearing ratios in the UK, France, Japan and German gradually increase over time although these countries moved further towards an imputation system.

3.3.4 Malaysian Tax System

The fiscal laws in Malaysia are based on the British system and have been developed progressively since independence. Corporation tax has been reduced gradually over the years from a high rate of 40 percent in 1984 to 32 per cent between 1995 and 1997, and to a low rate of 28 per cent as of 1998 to 2001 (Singh and Teoh, 2001). Similarly, the tax rates for individuals were reduced substantially between the range of 0 to 29 per cent in the year 2000 compared with 5 to 40 per cent in 1985. Malaysia operates under a full imputation system where shareholders receive credit for the income tax levied on companies, and thus ensuring that corporate profits are no longer taxed twice as in the classical tax system. However, capital gains and interest earned by individuals are exempted from tax, therefore, there is no personal tax rate on investor returns.

MM's (1963) and Miller's (1977) tax proposition are remodelled using the Malaysian full imputation system (adapted from the Pointon and Spratley (1988) imputation model). The tax advantage to debt under the MM 1963 classical tax system is:

$$V_g = V_u + T_c D \qquad \text{Referring to Equation 3.3}$$

where:

V_g = value of geared firm

V_u = value of ungeared firm

D = debt of geared firm

T_c = corporation tax rate

The Miller 1977 model is represented by:

$$V_g = V_u + D\left[1 - \frac{(1-T_c)(1-T_{ps})}{(1-T_{pd})}\right] \qquad \text{Referring to equation 3.4}$$

where:

T_{ps} = the personal tax rate on equity income

T_{pd} = the personal tax rate on interest income

Pointon and Spratley (1988) explain that $(1-T_{ps}) = \dfrac{(1-m)}{(1-s)}$, under the imputation

system, where,

m = the marginal rate of income tax on gross dividend income

s = the rate of imputed tax credit on gross dividends

T_{ps} = the personal tax rate on equity income

Therefore, the tax advantage to debt for the companies in Malaysia under the imputation system if all profits are paid out as dividends is,

Equation 3.5

$$Vg = Vu + D\left[1 - (1-Tc)\frac{(1-m)}{(1-s)}\right]$$

T_{pd} is taken off the equation since interest income for an individual is exempted under the Malaysian tax system (see Section 2.4.2.2 and Singh 2001). However, since there is a full imputation, $s = T_c$, therefore,

$$Vg = Vu + D[1 - (1 - m)] \text{ and so, } Vg = Vu + mD$$

This equation is applicable for firms with no capital gains induced retentions.

The scenario under the imputation tax system in Malaysia reveals that if the company retains all the profits and the shareholders sell the shares before a dividend is paid, this will be similar to MM's 1963 model since capital gains is exempted from tax. Under Miller's argument,

Equation 3.6

$$V_g = V_u + D\left[1 - \frac{(1 - T_c)(1 - T_{cg})}{(1 - T_{pd})}\right]$$

where:

T_{cg} = capital gains tax

Since capital gains tax (Singh, 2001 and Ernst & Young, 1998) and tax on personal interest income are exempted in Malaysia, the equation will be as follows: $V_g = V_u + T_c D$. In this instance, the valuation relationship holds for a firm with full retentions, i.e. for a growth firm paying no dividends. Since both m and T_c are likely to be positive under each model, $Vg > Vu$. Hence debt is preferred to equity and equity retentions would normally be preferred to new issues (i.e. for tax payers).

3.4 Factors Determining the Capital Structure

As studies on taxes and capital allowances progress, many other factors were found as determinants of the capital structure. The factors that influence the determination of a firm's capital structure have been examined extensively both in theoretical and empirical research, in particular, the corporate or firm specific factors that influence the capital structure ratio such as earnings and assets. Perhaps the finance managers' decision on capital structure is weighed more on these factors than the taxes and non-debt tax shield items. This chapter will be divided into two sections: i) firm specific factors which discusses the effects of corporate specific factors on capital structure which includes variables such as asset structure, size and growth, earnings volatility, risk and agency costs, and ii) non firm specific factors which discusses the external factors that may affect capital structure such as inflation, interest rates, industry norms and government incentives.

3.4.1 Firms Specific Factors

The finance managers' decisions on capital choices are usually based on the assessment of the firms' strengths and weaknesses. Factors such as fixed assets and interest coverage ratios are very important in determining how much debt to acquire. The factors include firms' liquidity, profitability, investment opportunity or firms' growth, tangibility, size, bankruptcy risk, interest coverage, agency costs, ownership, leasing and operational gearing.

3.4.1.1 Asset Structure - Liquidity

There are many indirect evidences indicating that the types of asset the firms hold would determine the level of debt. There are two types of assets; current assets and

fixed assets. The current assets are related to the liquidity while the fixed assets are related to tangibility. The higher the current assets, the higher is the firms' liquidity, while the higher the firm's fixed assets, the higher is the firm's tangibility (in terms of real assets). The next section will cover the relationship between gearing and fixed assets. The perception on the liquidity is that the higher the current assets, the better is the firms' position to service debt, therefore, implying a positive relationship between liquidity and debt.

The earliest study to include the liquidity in their empirical study is by Martin and Scott (1974). Their liquidity argument is based on Van Horne's (1974) statements that the greater the firm's projected liquidity posture, including its cash flow generating capacity, the greater is its debt capacity. They supported the statement by arguing that firms with high liquidity tend to issue debt rather than equity. In their multiple discriminant analysis of 112 US firms that issued either debt or equity in 1971, they found that high liquidity firms mostly issue equity rather than debt. The results support the notion that highly liquid firms prefer equity than debt but did not specify any causal relationship between liquidity and equity or debt.

Stonehill et al. (1975) surveyed the debt ratio determinants of 87 manufacturing firms in France, Japan, the Netherlands, Norway and the US over the period of 22 years (1972-73). They found that liquidity in Norway was ranked second after the financial risk as debt ratio determinants. They explained that the assets of the firms should be highly liquid to secure the high proportion of the firms' short-term debt. Thus, the evidence confirms a positive relationship between liquidity and the gearing ratio as perceived by the Norwegian finance managers. However, liquidity is not important

for the other 4 countries: France, Japan, the Netherlands and the US. Although the findings support the positive relationship between gearing and liquidity, their statistical tests are not strong enough to support the existence of such a relationship.

Ozkan (2001) suggests that liquidity could be related positively and negatively with gearing. According to him, a positive relationship would derive if the firms' liquidity is used to support the firm's short-term obligations which are interest and capital repayments. On the other hand, firms may use the highly liquid assets to finance their investments, which would result in a negative relationship between liquidity and gearing. In his sample of 390 UK firms from 1984 to 1996, Ozkan found that liquidity is highly negatively related to the firms' gearing. He further explained that the negative effect may be due to the potential conflict between debtholders and shareholders in which high liquidity of the firms' assets can be manipulated by shareholders at the expense of bondholders. This is because by selling secured debt, firms will increase the value of their equity by expropriating wealth[6] from their existing unsecured debtholders.

Generally, not many researchers would include liquidity in their capital structure studies. With the exception of Ozkan, the other two studies mentioned previously did not really produce conclusive evidence in relation to the association between gearing and liquidity. Although Ozkan found a statistical relationship between liquidity and gearing for the UK firms, the reason for such a relationship is still vague.

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[6] Expropriating wealth through i) investing in risky projects resulted in high discount rate, thus reduce the debt value ii) investing in risky projects and if the projects succeed, the shareholder will get higher return, but return for debtholders will remain the same, if the project fail, firm may default on both principal and interest payment.

3.4.1.2 Tangibility

Several theories have argued that the type of assets owned by a firm may indirectly affect its capital structure choice. As discussed previously in section 3.4.1.1, the higher the firm's fixed assets, the higher is the firms' tangibility. Firms with high tangible assets such as plant and equipment may use that as the collateral for their debt, therefore many researchers have agreed that tangibility is associated positively with gearing. The relationships between the two variables are examined below.

Based on his study on 748 debt and equity issues made by UK quoted companies between 1959 and 1970, Marsh (1982) argued that firms with a higher proportion of fixed assets should employ higher long-term debt. Using the ratio of fixed assets to total assets in his logit analysis, Marsh found evidence that the fixed asset ratio was a significant determinant of debt issue.

Rajan and Zingales (1995) stated that firms with a large proportion of fixed assets have sufficient collateral to reduce the agency costs of debt suffered by the lender, and tangible assets will retain more value in the event of liquidation. Therefore, the higher the fixed assets' proportion, the more willing the lenders would be to lend to the firms, and the higher is the level of firms' debt. In their regression analysis on the G7 countries, they found that gearing is positively related to tangibility in the US, Japan, Germany and the UK using book value gearing and gearing based on market value of equity. Tangibility is positively related to gearing for Canadian firms when gearing is measured using book value. Consistently, a positive coefficient is realised for Italian firms when gearing is measured using market value of equity.

Based on the Rajan and Zingales (1995) argument, Mansor and Mohamad (2000) in their study on three Asian countries' capital structure proposed a positive relationship between gearing and tangibility. Through their regression analysis, they found a significant positive relationship for Japan and Pakistan but no statistical evidence was found for the Malaysian firms.

Booth et al. (2001) studied the capital structures of developing countries which includes Malaysia in their sample. They employed the data of 96 firms between the periods of 1983 to 1990 and 1985 to 1987. Among the many variables studied are the relationship between tangibility and firms' gearing. The tangibility is computed by subtracting current assets from total assets and divided by total assets, while gearing is measured by the total book debt ratio, the long-term book debt ratio and the long term market debt ratio[7]. Their cross sectional regression of panel data produced mixed results between tangibility and the different measures used. When gearing is measured using the total book debt ratio, a negative relationship was found. However, when gearing is measured by long term debt book ratio and the long term market debt ratio, a positive relationship was found for the Malaysian companies.

3.4.1.3 Size

Several researchers have suggested that firm's size is positively related to firm's gearing. The larger the firm, the higher is the gearing which is due to the firm's capability of issuing debt. Larger firms have the advantage of using assets as collateral to employ debt, as well as reliability not to default on the interest and

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[7] All measurements used book value except for the long-term market debt ratio, debt is measured using the book value while equity is measured using the market value.

principal payment. In contrast, a few other findings have revealed that size is negatively related to gearing. Both positive and negative findings will be discussed.

Gupta (1969) studied the effect of size, growth and industry on the financial structure of 173,000 US manufacturing firms over the period of 1961-1962. In his statistical analysis, he found a negative relationship between gearing (debt-to-assets) and size (total assets). He explained that debt had a negative relationship with size because smaller firms would find outside equity issues very costly and therefore would be reluctant to share ownership with new equity owners if they issued equity. Hence, they relied heavily on debt financing more than the larger firms did. However, according to Gupta, much of the debt was short-term, as long-term debt would be difficult for the small companies to obtain.

Martin and Scott (1974) suggested a positive relationship between the firm's size and its gearing. They argued that larger firms are usually older and more mature, and therefore enjoyed a wider range of financing options. On the other hand, due to its size, it is not easy for smaller firms to market their long-term debt. In their multiple discriminant analysis of 112 US firms' issues (debt and equity) during 1971, they found size to have contributed the most in differentiation between groups (debt and equity). This indicates that larger firms are more likely to issue debt than equity. They further explained that firms with larger assets can provide more security to the bond buyer, thus it is easier for the larger firms to raise funds using long-term debt.

Taub (1975) studied the factors determining the firm's choice of a debt-equity ratio on 89 US firms over the period of 1960-69. He proposed a positive relationship between

the gearing and size of the firm. This is because larger firms have larger assets to back them up if they were to default on the interest payment due to their generating losses. He found evidence which supported his hypothesis of a positive relationship.

In his study of railroad companies' bankruptcy proceedings, Warner (1977) found that the ratio of direct bankruptcy costs to the firm's market value decreases as the value of the firm increases. The findings suggest that large firms are more diversified and less vulnerable to bankruptcy. Hence, larger firms should be able to use more debt than smaller firms.

Smith (1977) states that small firms pay higher costs to issue equity and debt compared with larger firms. Therefore, they would prefer short-term debt from the bank rather than issue long-term debt or equity. This suggests that small firms may be more leveraged than larger firms which have the advantage of issuing equity.

Both studies by Titman and Wessels (1988) and Rajan and Zingales (1995) hypothesised that larger firms tend to be more diversified and are less likely to fail than smaller firms, and thus the bigger the size of the firm, the less likely is the company to be led into bankruptcy. The arguments suggest that larger firms should be more highly geared than the smaller firms. Rajan and Zingales found evidence of a positive relationship for the US, Japan and Canadian firms. However, large firms in Germany tend to associate with low gearing. Although Rajan and Zingales have found a positive correlation between debt and size of US companies, Titman and Wessels instead found a negative result which suggests that smaller firms use more debt than larger firms. By citing Smith (1977), they explained that smaller firms tend to use

more short term financing than larger firms. The reason is due to the high transaction cost involved if they (small firms) were to use long-term debt or equity. The arguments are consistent with those of Gupta's (1969) that was previously discussed.

Qaizar's (1996) study on the capital structure of middle income countries has found that large Malaysian firms relied more on long-term debt than short-term as a ratio. However, a study by Booth et al (2001) on developing countries' capital structure found that size is positively related to gearing for Malaysian firms using the three measurements (see footnote 7 for the measurements). On the other hand, Mansor and Mohamad (2000) found weak evidence which indicates a firm's size is positively related to gearing for Malaysian firms.

Therefore, there are positive and negative relationships between size and gearing as found by various researchers. However, mostly positive relationships are associated with larger firms using long-term debt and smaller firms using short-term debt for financing. The larger the firms, the higher are the long-term debt while the smaller the firms, the higher is the short-term debt.

3.4.1.4 Profitability

Profitability of the firms was found to have a positive and negative significant relationship with gearing. As profit increases, one might expect the debt ratio will decrease due to the availability of retentions for financing. On the other hand, the higher the profit, the better is the position of the firm to meet interest payments, therefore, encouraging more debt to be used. The literature on both positive and negative arguments will be presented.

Toy et al. (1974) hypothesised that highly profitable firms, ceteris paribus, would maintain a low gearing ratio due to their ability to finance their investments using internal funds (retentions). They conducted a comparative study between 1966 and 1972 on 816 manufacturing firms in 5 industrialised countries. Using regression analysis, they estimated the correlation coefficient of the firm's gearing and its profitability. They found that profitability was significantly negatively related to the debt ratio in the following four countries: Norway, the US, Holland, and Japan. Although they found a negative relationship between the firm's gearing and profitability in France, the r-squared of 2.4 per cent is too low to have any explanatory power to explain the relationship.

Drury and Bougen (1980) suggested a positive and negative relationship between profitability and gearing. According to them, it is not easy for a low profit firm to get an affordable price of debt; therefore, the firm has to settle for equity financing. On the other hand, they argued that highly profitable firms prefer debt, which is cheaper in order to maximise the shareholders' earnings. Their arguments implied a positive relationship between gearing and profitability. However, they argued that a negative relationship is possible between profitability and gearing. With high profit, it is easier for the companies to attract investors by issuing equity due to the companies' high retentions, hence less debt is employed. On the other hand, investors may be reluctant to invest in a company with low profit. This leaves the company with debt as the sole new source of financing. Both situations seem to support a negative relationship between gearing and profitability. However, overall in their examination of 700 UK firms over the period 1968-77 they found that high profitability firms are more likely

to employ low gearing ratios, which confirms a negative relationship between gearing and profitability.

Titman and Wessels (1988) proposed a negative relationship between profitability and gearing using the argument of the pecking order theory, as proposed by Myers (1984) and Myers and Majluf (1984). The theory suggests that firms would prefer to use internal rather than external funds, and if they have to use external fund, debt will be the first choice as it is perceived safer than equity financing. In their factor analysis of 469 US firms over the period 1974-82, they found significant evidence of a negative relationship between profitability and gearing. They concluded that their findings support to the Myers (1984) pecking order theory.

Rajan and Zingales (1995) suggested that firms' gearing and profitability may either be positive or negative. They argued that although the Myers and Majluf (1984) theorem should lead to a negative relationship, managers of highly profitable firms may prefer to issue equity rather than debt to avoid the disciplinary role of debt (agency conflict between owner and manager) as proposed by Jensen (1986). In their study on the capital structure of the G7 countries, they found a very significant negative relationship between profitability and book value gearing, market value leverage (market value for equity only) for the US, Japan and Canada. While for the UK, only gearing measured by the market value of equity was found to a have negative relationship with profitability. No significant relationship was found for Germany, France and Italy.

Mohamad (1995) studied the Malaysian firms' capital structure between 1986 and 1990 by analysing 108 large companies listed on the Kuala Lumpur Stock Exchange (KLSE) using correlation and analysis of variance. He concluded that highly geared firms are more likely to earn higher profits than the less geared firms.

Krishnan and Moyer (1996) studied capital structure determinants of large industrialised countries and hypothesised a negative relationship between profitability and gearing based on the pecking order theory. Using operating income to sales as a measure of profitability, their ordinary least squares regression found that gearing is negatively related to the firm's profit.

Booth et al. (2001) included profitability in their study on the capital structures of developing countries. Profitability is measured by return on assets while gearing is measured by total book debt ratio, long term book debt ratio and long term market debt ratio (see footnote 7). Their cross sectional regression of panel data revealed a significant negative relationship between gearing and profitability for the Malaysian firms using all the three measurements of gearing.

There is a very strong negative relationship between profitability and the proportion of debt in the corporate capital structure. This may be because more profitable firms find it easier to resort to retentions rather than issue equity or debt, supporting Myers and Majluf's (1984) theorem (see Section 3.4.1.5 below) Thus, more profitable firms appear to prefer to finance internally, but if they do require external finance they will chose debt so that they do not prefer to extend their equity ownership.

3.4.1.5 Pecking Order Theory

The profitability of firms is closely related to the pecking order theory which has been briefly mentioned already. The most influential works in this area were those of Myers (1984) and Myers and Majluf (1984). Pecking order theory of capital structure states that firms have a preferred hierarchy for financing decisions. The first preference is to use internal financing, before resorting to any other forms of financing. If firms had to use external funds, the preference would be to use the following order of financing sources: debt, convertible securities, preferred stock and common stock. According to Myers, the preference is based on the safety ranking of the security as common stock is considered bearing the highest risk to the issuer.

However, according to Myers, the order of financing preference is not new as Donaldson (1967) has observed the financing hierarchy of large companies and noted:

> " *management strongly favoured internal generation as a source of new funds even to the exclusion of external funds except for occasional unavoidable 'bulges' in the need for funds*".
> (Donaldson (1961) P.67 cited in Myers (1984))

The pecking order is derived from the Myers and Majluf (1984) asymmetric information discussion. Literally the asymmetry information in capital structure is, where there is asymmetry of information, the firm's choice of capital structure sends signals to outside investors regarding the information of insiders. This is because the firm's managers or insiders are assumed to have better information regarding the firm's return or investment opportunities. Myers and Majluf (1984) proposed that high value firms can reduce the costs of informational asymmetries by choosing the external financing only if financing cannot be generated internally. If external funds

are required, the firms should issue debt before considering external equity. Myers and Majluf argued that firms would attempt to set target dividend payout ratios to ensure that the investment could be funded internally. However, firms may still issue debt as long as it is low risk; and if the internal funds and risk free debt is exhausted, risky debt and convertible debt would be issued before issuing new shares. Both researchers use informational asymmetries to justify their financing hierarchy approach. Therefore, the pecking order of financing hierarchy is suggested rather than choosing the optimal capital structure.

Kester and Mansor (1993) conducted a comparative study on Malaysian capital structure policy amongst the Chief Executive Officers (CEO) of companies listed on the Kuala Lumpur Stock Exchange (KLSE). The study utilised Pinegar and Wilbricht's questionnaire survey which was previously disseminated to the CEOs of US, Hong Kong and Singapore based firms. The attitudes of the Malaysian executives were then compared with the attitudes of their counterparts in Hong Kong, Singapore and the United States. The previous results confirmed that the CEOs of the US companies ranked internal equity as their first choice of long-term financing, followed by debt and finally common stock. Both CEOs in Hong Kong and Singapore ranked retentions as their highest priority but the priority for debt and common stock was different among the CEOs of these two countries. The CEOs of Hong Kong based firms ranked common stock slightly higher than debt while the CEOs of Singapore based firms had given mixed reactions. Although they ranked debt ahead of new common stock sold through initial public offerings, they ranked debt after new common stock sold through right issues.

A total of 361 questionnaires adapted from Pinegar and Wilbricht's methods were sent to the CEOs of the KLSE, however only 106 completed surveys were received. The results of the survey indicate that 77.9 per cent of the respondents preferred the hypothesised financing hierarchy; 81 per cent selected internal equity; however, mixed results were obtained for external financing which was similar to the Singapore findings. They ranked new ordinary shares sold to the public after debt, while they ranked new ordinary shares sold through rights issues ahead of debt. Therefore, the result revealed that only US firms had followed the pecking order theory as proposed by Myers. They explained that the reason for these differences may be due to the undeveloped debt market in the Pacific Basin countries, especially Malaysia and Singapore.

3.4.1.6 Firms' Growth or Investment Opportunity

A firm's opportunity to invest or a firm's growth should have some influence on its debt to equity ratio. A few different proxies for growth and investment opportunities have been used by researchers. Some of the proxies include the sales' growth rate, the assets' growth rate, research and development and the market to book value ratio. A different measure should lead to a different relationship between growth and gearing. For example, firms with a high market value relative to their book value are expected to a have high growth rate and are therefore capable of issuing more debt than those with a low market to book value. This implies a positive relationship between growth and gearing.

In the research as previously mentioned, Toy et al. (1974) also studied the growth rate effect on the corporate debt ratio for those 5 industrialised countries in four selected

industries. They hypothesised that a firm with a high growth rate of assets, ceteris paribus, should have high debt to equity ratios. Thus, assets are used as a proxy for firms' growth in their regression modelling. Their positive hypothesis was confirmed when they found a positive relationship between growth and the firms' gearing in Norway, the US, Holland and Japan. However, a negative relationship was found for France, but then, the model r-squared was too small (2.4 per cent) to draw any conclusive evidence.

Contrary to Toy et al.'s findings, Long and Malitz (1983) found a significant negative relationship between rates of investment in advertising and research and development (R&D) and the level of debt. However, the findings are consistent with Bradley et al.'s (1984) empirical results, indicating an inverse relationship between gearing and R&D and advertising expenditure of US firms.

Consistent with Long and Malitz and Bradlet et al., Titman and Wessels (1988) suggest a negative relationship between growth and gearing. The suggestion was based on the proposition that the agency cost associated with high growth rate firms is higher than that for low growth firms. This is due to equityholders' actions to invest suboptimally to expropriate wealth from bondholders (see footnote 6). Convertible debt may instead be used, to reduce the agency cost. Therefore, gearing is positively related to convertible debt but is negatively related to long term debt. They noted that growth opportunities are capital assets that add value to a firm but cannot be used as collateral and do not provide any income from taxation. With no collateral value and tax advantage, growth should be negatively related to gearing. In proving their proposal, three measures of growth were used, capital expenditures over total assets,

the percentage change in total assets and research and development over sales. However, their empirical tests were found to be insignificant for a growth and gearing relationship in any of the measurements.

On the other hand, Rajan and Zingales (1995) used market to book value as a proxy for growth opportunities. Their argument is based on Myers's (1977) suggestion that highly geared firms are more likely to forgo any investment opportunity if they were to use debt at present. The reason is high market to book value firms are very likely to experience high financial distress. Therefore, firms which expect high investment opportunities in the future should use equity at present and use debt in the future. Higher market to book value is associated with high growth rates, therefore, less debt should be used. This implies a negative relationship between growth and gearing. They found evidence of a negative relationship for all the G7 countries when debt is measured using book value of debt and market value of equity. When debt and equity is measured using book value, the same negative results are realised for all countries, except Japan and Italy which are not significant.

Booth et al.'s (2001) study on Malaysian companies found a positive relationship between gearing and growth opportunities when gearing is measured by book value equity. However, a negative relationship was found when gearing is measured using market value of equity.

3.4.1.7 Risk

There are two types of risk generally being studied under capital structure: i) bankruptcy risk and ii) business risk. Interest coverage and operating leverage are

usually used to proxy for these two risks; therefore, these subjects will be included in the following discussion.

3.4.1.7.1 Bankruptcy Risk/Cost

Since the first observations by Dewing (1930) on bankruptcy problems, many authors sought to determine the effect of possible bankruptcy into the capital structure model. Firms are forced into bankruptcy on the demands of debt holders when they can no longer meet the capital or interest payments due on debt. When bankruptcy occurs, the assets of firms are sold and the funds are distributed among the debtholders, and any residual of funds are distributed to the firm's equityholders. The following literature centred on the relationship between bankruptcy risk and the capital structure of firms, the bankruptcy cost magnitude and the trade off between bankruptcy cost and the tax advantage to debt.

Stonehill et al (1975) studied the capital structure determinants for 87 firms and found that financial risk ranked the most important determinant among firms in the Netherlands, Norway and the United States, using the interest coverage ratio. Using the same measure, Marsh (1982) found that bankruptcy risk was a significant capital structure determinant and that those with greater bankruptcy risks were more likely to issue equity than debt among UK companies between 1959 and 1974. By using various earnings variances as a measure for financial distress for a sample of 1,747 US issues (public offering) since 1977, Mackie-Mason (1990) found that financial distress variables were significantly negatively related to the probability of issuing debt. Thus, there is evidence that bankruptcy does significantly influence the capital structure.

In questioning the MM 1958 irrelevance proposition, Baxter (1967) argued that excessive use of leverage can be expected to raise the firms' cost of capital, which could increase the firm's "risk of ruin". From his study on bankruptcy statistics in the US in 1965, he revealed that 19.9 per cent of large US bankruptcy realisation values (exceeding $50,000) went to administrative expenses (trustee's fees, legal fees and referee's fees). He noted that although the costs seems to be relatively small, but not insignificant, firms suffer from financial embarrassment, i.e. poor reputation which affects future earnings, through the loss of sales.

Warner (1977) suggested that bankruptcy costs are: i) direct which include lawyers' and accountants' fees of other professionals, and the managerial time spent in administering the bankruptcy, and ii) indirect which include lost sales, profits shrink/ease and the increased difficulty of raising new funds for firms. Further to his suggestion of direct and indirect costs, Warner (1977) provide evidence of direct bankruptcy costs from his study on 11 US railroad firms which were in bankruptcy proceeding between 1933 and 1955. He found that bankruptcy costs represented on average of only 2.5 and 1 per cent of the value of the firm 3 years and 7 years prior to bankruptcy, respectively. Although he noted that the expected cost of bankruptcy is smaller than the tax advantage of debt during these periods, the issues of bankruptcy costs are not to be neglected in the study of capital structure policy.

Apart from the central issue of financial magnitude, researchers such as Stiglitz (1972) and Kraus and Litzenberger (1973) recognized the trade-off between the risk of bankruptcy and the tax advantage to debt. Their models suggest that an optimal

firm-level capital structure may be reached when the marginal benefit of the tax deduction is equivalent to the marginal costs related to the bankruptcy risk.

The first explain that as more debt is added to the capital structure, the cost of debt is increased, however the increase in bankruptcy cost counterbalance the tax advantage to debt. Kraus and Litzenberger (1973) noted from their model that:

> "The market value of a levered firm is shown to equal the unlevered market value, plus the corporate tax rate times the market value of the firm's debt, less the complement of the corporate tax rate times the present value of the bankruptcy costs."
>
> (Kraus and Litzenberger (1973), p.918)

Therefore, the consensus of academic opinion was that trade-off was indeed possible between the tax advantage to debt and the costs associated with bankruptcy.

3.4.1.7.2 Firms' Specific Risk or Business Risk

In studying the firms' specific risk, two proxies or measures were involved: earnings volatility (operating earnings or EBIT) and degree of operating leverage (fixed costs). The volatility of the firm's earnings provides additional risks to the firms, whereby the more uncertain the earnings are, the higher is the firm's risk. If the borrowing firms' earnings are uncertain, the lender would perceive that as very risky to invest in. This is due to the security of the fixed interest payment to be able to service the debt. The risk will result in a low rating and would burden the issuer with a high yield to compensate for the risk. Generally, the more uncertain the earnings are, the lower is the gearing.

Operating leverage on the other hand, refers to the ability of magnifying the uncertainty of operating income relative to the uncertainty of sales due to the added

fixed production costs. The financial leverage or gearing on the other hand, refers to the ability of magnifying the uncertainty of net income due to the added fixed interest costs. The usual perception of firms having both high operational gearing and high financial gearing is that they are too risky due to the commitment of paying fixed costs and fixed debt charges. Generally, the probability of default on debt is large when operating cash flows decrease due to the fixed production costs. Therefore, the amount of company's fixed production costs will affect the amount of gearing the firms can afford, so the firms will be able to avoid future financial distress or bankruptcy risk. Due to that reason, some researchers have suggested a trade off between the degree of operating leverage and the degree of financing leverage. Based on the discussions given above, both the earnings volatility and the degree of operating leverage measure the same factor, i.e. the firms' business risk. The only difference is when the earnings after tax (EAT) volatility is used, then both the fixed production cost and the fixed interest cost will be included.

Toy et al. (1974) hypothesised that firms with relatively high earnings variability, ceteris paribus, would settle for a low gearing ratio due to the bankruptcy risks and debt covenants imposed by lenders. They noted that operating income (EBIT) indicate a business risk while pre-tax earning (EBT) contain both business and financial risk. Both earnings measurements were used because different countries used different earnings measure. However, they found a positive relationship between firms' earnings volatility and the gearing ratio for Holland, Japan Norway and the US. Again, although the results indicate that France had a negative relationship between the earnings volatility and the gearing ratio, the r-squared of 2.4 per cent was too low to be considered for any meaningful relationship.

Bradley et al. (1984) empirically investigated the gearing behaviour of 851 firms during a 20-year period. A number of factors were studied against gearing, including earnings volatility (EBIT), non-debt tax shields and research and development. They found a negative relationship between gearing and the firms' earnings volatility in their ordinary least square regression.

Titman and Wessels (1988) hypothesised a negative relationship between operating risk and gearing based on past studies. By using the standard deviation of the percentage change in operating income in their logit analysis, they found no statistical evidence between earnings volatility and all their gearing measurements.

Annuar and Shamser (1993) studied the relationship between earnings volatility and gearing of 60 firms continuously traded on the Kuala Lumpur Stock Exchange (KLSE). Two measures of gearing were used: D/E (debt divided by equity) and D/A (debt divided by total asset). Earnings were measured using the variance of firms earnings per share. Although a negative coefficient was realised from the regression, the coefficients were not significant for both debt measures, suggesting no relationship between gearing and operating risk. To further validate their results, they conducted a causality test between earnings volatility and the gearing ratio. The relationship between earnings volatility and the debt/equity ratio was found to be significant. They suggested that the results are consistent with the practice of Malaysian firms in employing debt when earnings are stable. Part of the reason is due to the requirement of the financial institutions for firms to demonstrate stable earnings for loan approval.

Dwight (1974) conducted an investigation on whether low risk firms with zero gearing would employ more debt than high risk firms with gearing. To test such a relationship, he developed measures of risk before and after the leverage based on operating income (firms' risk) and market value (market risk) using a sample of 358 industrial companies between 1958 and 1965. The product moment cross-section correlation was employed to test the correlation between risk and the level of debt used by firms, and between the change in risk induced by leverage and the level of risk before leverage. The correlations were approximately zero or positive. However, he did acknowledge that his study has some conceptual and measurement flaws.

Prezas (1987) built a model to study the effects of debt on the degrees of operating (DOL) and financial leverage (DFL). He showed that DOL could increase or decrease with debt while DFL could increase, remain unchanged, or decrease with debt when there is interaction between investment and financing decisions. However, the changes in both variables are dependent on the relative size of the debt elasticities of the investment in capital and the contribution margin (the difference between the price and the variable costs).

Mansor and Mohamad (2000) included the degree of operating leverage (DOL) in their study on factors influencing capital structure in Japan, Malaysia and Pakistan. However, the result from the regression analysis on gearing and the DOL indicates no significant relationship for all three countries. Therefore, no relationship was found between DOL and the gearing for Japan, Pakistan and Malaysia.

3.4.1.7.3 Interest Coverage

The interest coverage ratio is a key credit-evaluation tool in analysing firms' credit worthiness. Default on interest for firms with a high interest coverage ratio would usually be low. Firms with a higher net income should have a higher interest coverage ratio which leads to more debt being employed. In contrast, heavy use of debt would result in a low interest coverage ratio even when the income is high. Therefore, a balance between income and interest would result in a good ratio of interest coverage. Firms with a high interest coverage ratio are usually given good ratings by the ratings agency and this would result in an increase in the firms' value.

Stonehill et al. (1975) interviewed the financial executives in four industries to study the cross-country differences in debt ratio determinants in 5 countries: France, Japan, the Netherlands, Norway and the United States. In France and Japan, the availability of capital was found to be more important than any other debt determinant, while Dutch, Norwegian and American executives rank fixed charge coverage as the most important debt ratio determinant, reflecting their consensus towards financial risk. These two factors outweighed other capital structure determinants, such as the tax advantage to debt, which were included in their survey.

In a recent survey on corporate finance practice, Graham and Harvey (2001) found that informal criteria such as financial flexibility and credit ratings were the most important debt policy factors. Although it was not directly related to the interest coverage ratio, to achieve a high rating, firms have to improve their interest coverage ratio.

Although the interest coverage ratio is an important consideration for debt evaluation, not many studies in the capital structure area have included raw data of the interest coverage ratio in their capital structure studies. Both the related studies cited above utilised survey-based rather than companies' account data.

3.4.1.8 Ownership and Agency Costs

Jensen and Meckling (1976) defined an agency relationship as:

> "A contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent."
>
> (Jensen and Meckling, p.308)

In a contracting relationship among interested parties each of them can be driven by the pursuit their own rational economic and other self interests. The owner manager who owns less than 100 per cent of residual claims on the firm will pursue to some extent his own goals such as maximising the level of perquisites or minimising his/her effort searching for new profitable projects, rather than pursuing the goal of maximizing equity holders' wealth. As the divergence between the goals of owner-manager and the equity holder increases, the equity holder sets up monitoring procedures and safeguards to minimise the divergence, the foresaid problem representing an agency's cost of equity.

Agency costs may also arise between debt holders and the owner-manager or the equity holders. The manager may raise funds using debt with the assumption to invest in a low risk project. After the funds were raised, the manager may choose to take the riskier projects, and has therefore essentially transferred the risk from equity holders to the debt holders.

However, according to Jensen (1986), debt is an effective substitute for dividends, as the firms would be obligated to pay fixed future cash flows (interest due). This is because without debt, the managers of firms with substantial free cash flow might invest in ineffective and unproductive projects rather than paying it out as dividends.

> "Thus, debt reduces the agency costs of the free cash flow by reducing the cash flow available for spending at the discretion of managers."
> <div align="right">(Jensen(1986), p.324)</div>

A few researchers confirmed the empirical result of this agency cost effect on the firm capital structure, such as Smith and Warner (1979) and Mackie-Mason (1990). Smith and Warner (1979) studied the effect of agency's conflict on the firm's value through 87 public issues in the US, randomly selected between the period 1974-75. They noted:

> 90.8 per cent of bond covenants contained restrictions on the issuance of additional debt; 23.0 per cent have restrictions on dividend payment, 39.1 per cent restrict merger activities; 35.6 per cent constrained the firm's disposition of assets.
> <div align="right">(Smith and Warner (1979), p.122)</div>

These restrictions imply that the cost of agency conflicts between debt holders and owner-managers and shareholders of the firms must be significant.

Mackie-Mason (1990) studied the investment inefficiencies' effect on the debt to equity choice due to the possibility of moral hazard committed by the owner manager. One of the variables used as a moral hazard measure was the **free cash flow** deficit used as a proxy for Jensen (1986). He found a negative coefficient for the cash flow deficit variable which implies a higher probability of choosing equity. This is consistent with Jensen's hypothesis in which firms with uncommitted cash (deficits) are more likely to issue debt, thus reducing the moral hazard costs of leaving free cash flows to the firm's manager. Therefore, both theory and empirical evidence show that agency costs significantly influence the firm's choice of capital.

3.4.1.8.1 Ownership of Firm in Malaysia

According to the KLSE official website, companies are required to have, upon listing, the following minimum number of public shareholders holding not less than 1,000 shares each, as follows:

Nominal value of issued and paid-up capital	Minimum number of shareholders
RM40 million to less than RM60 million	750
RM60 million to less than RM100 million	1,000
RM100 million and above	1,250

Source: KLSE Website, (2003)

In fulfilling the public spread requirements:-

o   the entire issued and paid-up capital of the company which is held by employees; and

o   up to 10% of the issued and paid-up capital of the company which is held by *Bumiputera* investors (or 15% if the shareholder falls under certain conditios) for the purpose of compliance with the National Development Policy can make up the 25% public spread.

(KLSE Website, (2003))

Ethnic share ownership has been an issue among the Malaysian community especially between *Bumiputera* and other races. During the post independence period, the Chinese community undoubtedly has a much stronger economic capability than other ethnic communities. Economic disparity was arguably the main factor causing racial violence in 1969 which resulted in the establishment of the New Economic Policy (NEP). NEP objectives include social restructuring and income redistribution. The following discusses a few items of literature that are relevant directly or indirectly to firms' ownership among different races and the role of government in trying to harmonize the scenario.

Osman (1998) conducted a survey on investment behaviour of 477 Malaysian investors by interviewing them in the trading galleries of stockbrocking companies. His study revealed that almost 70 per cent of shareholders were Chinese, followed by Malays (24 per cent) and Indians (7 per cent). Consistently, 31 years after achieving independence, the Chinese still play a dominant role in influencing the country's economic development.

Studies by Asmon I.E (2003) on the (ESOP) Employee Share Ownership Plan indicate that the Malaysian government diffuses ESOP by divesting state-owned estates to the Malay labor force, when privatizing state owned entities. Very few Chinese have been awarded privatization projects. The Chinese, however receives benefits in the form of their being minority partners or sub-contracters to the Malays who have majority stakes in the businesses, as revealed by Koon (1996).

On the other hand, Koon (1996), in his study of Chinese responses to Malay hegemony, states that successful Chinese entrepreneurs were those with powerful Malay patrons, by which Malay partners/patrons served as sleeping partners while the Chinese partner managed the business, the so called "Ali Baba" relationship. According to him, the Ali Baba relationship has helped the Chinese to pass NEP imposed hurdles and at the same time *Bumiputera* (Malay) has the access to Chinese economic capability, i.e. capital and skills. The Ali Baba relationship has resulted in a "win-win" situation between both ethnic communities in developing the country's economy. In this regard, he states that Malays leaders have regarded Chinese entrepreneurs as an asset rather than a liability in helping the country to develop.

3.4.1.9 Disclosure

From the observation of asymmetric information (signalling theory), Myers and Majluf (1984) derived their pecking order theory. The theory (asymmetric information) indicates that managers (insiders) know more about the companies prospects, risk and value than do outside investors (outsiders). Firm managers or insiders are assumed to have better information regarding the firm. Therefore, they often used the knowledge to send signals to the investor. For example, when a company announces an increase in regular dividend, stock prices would typically rise, because investors would interpret the increase as a sign of management confidence in future earnings. Changes in the capital structure policies would convey information to the stock market about the future performance of a firm.

With high corporate disclosure, the information asymmetry will reduce and this will enhance the transparency of information between the insiders and outsiders. A few studies have been documented studying the relationship between information asymmetry and capital structure; however, studies on the effect of disclosure on capital structure have yet to be found. However, a few research studies on the effect of disclosure on the cost of capital have been found. These studies may indirectly support the study of disclosure and capital structure.

Diamond and Verrenchia (1991) investigated the relationship between disclosure, liquidity and the cost of capital and suggest that reducing the asymmetry information would reduce the cost of capital. Therefore, public disclosure of companies' information is used as a means of changing information asymmetry. They have concluded that revealing public information to reduce information asymmetry will

increase the firms' securities' liquidity, thus leading to a low cost of capital for the firm. This is because when the investors have inside information, they would then be willing to take a larger position in the firm and this will therefore increase the demand for the firms' securities and raise the current share prices, thus reducing the cost of capital.

Based on past theoretical research, Botoson (1997) presented two streams of relationship between the cost of capital and disclosure. Firstly, the greater the disclosure, the higher is the stock market liquidity, thus reducing the cost of equity capital either through reduced transaction costs or increased demand for a firm's securities. Secondly, greater disclosure reduces the non-diversifiable risk; therefore, this reduces the cost of equity capital. She then empirically examined the association between the level of disclosure and the cost of equity capital using the 1990 annual reports from 122 manufacturing firms. From her regression, she found evidence suggesting that greater disclosure is associated with a lower cost of equity capital for the sample of companies, whose progress was monitored by only a small group of analysts.

Botoson also cited Ahmed's (1995) working paper examining studied the association between the level of disclosure and firm's characteristics. Ahmed found that a firm's size, exchange listing status, audit firm's size and leverage are statistically positively related to the level of disclosure. (No other conclusions can be drawn from Ahmed's study since the researcher was unable to obtain a copy of the study.)

Most of the studies discussed above indicate a negative relationship between disclosure and the cost of equity capital. This implies that the higher the disclosure, the higher is the equity cost. However, no direct studies have been found on the relationship between disclosure and the cost of debt capital. However, there is evidence from Ahmed's study which indicates that greater disclosure will result in a higher gearing ratio.

3.4.1.10 Leasing

Leasing has become popular in finance as a substitute for debt. Signing a contract for a financial lease is similar to borrowing money from creditors; hence, the cash flow of leasing and borrowing are similar. Also, tax benefits from leasing are found to be important consideration for leases. The lessor who owns the leased assets can deduct tax depreciation from taxable income. With the depreciation tax shields, the leasing company which owns the equipment, can contribute some of the tax benefits to the lessee in the form of low lease payments. Furthermore, leasing provides a few additional advantage such as convenience, a paperless facility, cancellation options, maintenance, low administration and transaction costs and tax advantages.

Bowman (1980) studied the relationship between capital leases and market risk (beta). The main objective of the investigation was to find whether certain leases are perceived to be a form of debt financing by market participant. The final list of 92 firms which had disclosed the present value of their capital lease commitments were selected for their multiple regression model. The following independent variables: debt to equity ratio and leases to equity ratio were regressed against the dependent variable of market risk (beta). None of the independent variables was found to be

significant; furthermore, both variables were highly correlated. To eliminate the presence of multicollinearity, two tests were conducted. Subsequently, both independent variables were found to be significant with a positive coefficient when regressed separately. Therefore, the higher the usage of lease financing, the higher is the market risk; similarly, the higher the gearing, the higher is the market risk.

According to Hull and Hubbard (1980), if the lessee and lessor are in an identical tax paying position, no benefit of leasing will materialise. However, leasing will be valuable if only the lessor is in a tax paying position, whereby the lessor is then able to contribute some of the benefits of the capital allowances to the lessee. However, from their survey, Hull and Hubbard concluded that the 'cash flow related' feature is the decisive reason for the firm's lease decision, rather than tax. They cited Fawthrop and Terry's (1975) interview survey findings which indicated tax advantages of leasing are irrelevant as indicated by the majority of the interviewees.

Drury (1989) used a questionnaire survey to study the leasing practice of the UK's firms. Drury concluded that larger firms, highly geared firms and non-tax paying firms were more likely to take on a leasing contract. Larger firms tend to stress the tax advantage of leasing while smaller firms tend to stress leasing as a source of finance.

Pointon and Welsh (1994) conducted a questionnaire survey on 400 quoted and unquoted firms in the UK. Firstly, they studied finance leasing as displacing debt. They hypothesised that there was a relationship between gearing and the sensitivity of the borrowing capacity to finance a lease contract. The chi-square test was significant

at the 5 per cent level which indicated there was a relationship between the level of gearing and whether finance lease contracts affects the firm's borrowing. Secondly, they considered the importance of the taxation to potential lessees. The chi-square result was only significant for UK quoted companies which implies that only quoted companies consider tax as an important factor for their leasing decision.

Leasing is found to be as important as debt replacement in some of the studies discussed above. Although leasing research emphasises taxation, mixed results were found on the importance of taxation as a leasing determinant.

3.4.2 Non-Firm Specific Factors

The combination of the domestic economic environment, fiscal policy, and social beliefs can contribute to the firm's behaviour in decision making. This section discusses the external factors that may influence the firms' capital structure decision. Factors such as macroeconomic variables, industry norms, and government fiscal policy may have influence on a firm's gearing decision. The section includes the literature on the influence of industry, government policy and the following three economic variables: inflation, interest rates and exchange rates.

3.4.2.1 Macroeconomic variables

Macroeconomics is the branch of economics that examines the workings and problems of the economy as a whole. It is the study of how the economy as a whole grows and changes over time. There has been relatively little research work which deals specifically with the macroeconomic effects on capital structure. However, pertinent issues dealing directly with the potential influence of individual aspect

within the macroeconomic environment on the capital structure determinant is important to incorporate into this research. Further to that, evidence was found relating the macroeconomics fundamental to the financial crisis events.

3.4.2.1.1 Inflation

Inflation is one of the most important macro economic indicators as it affects all real variables when valued in money terms (even when their real values are unchanged). Most researchers have agreed that inflation and the corporate debt to equity ratio are positively correlated. Corcoran (1977), Zwick (1977) and De Angelo and Masulis (1980) theoretically demonstrated that inflation generally leads to the increase use of debt because the real cost of debt declines during an inflationary period. On the other hand, Schall (1984) suggests a negative relationship between inflation and the corporate debt to equity ratio.

Corcoran (1977) argued that an increase in inflation would cause the real cost of debt to decline, thus encouraging more debt to be used. Corcoran's study on the US non-financial firms had found that the debt to debt plus equity ratios of those firms had increased from 22 per cent to 42 per cent between the 1965-74, during which time inflation had accelerated.

Zwick (1977) argued that inflation encourages firms to give priority to debt financing if the real cost of borrowing is reduced. However, he noted that the extent to which the decline in the real costs of borrowing is dependent on how nominal rates of interest react. Zwick found that the higher rate of inflation between 1968 and 1974 had caused US firms to significantly increase their debt to equity ratio.

The level of debt however, is negatively associated with the size of depreciation, which is consistent with the De Angelo and Masulis (1980) study. They state that inflation reduces the real value of investment allowances, and therefore increases the tax advantage to debt, encouraging more debt to be used in the high inflationary period.

While most researchers have agreed that the relationship is positive, Schall (1984) suggested a contrasting relationship between inflation and the firm's gearing. He explained that during inflationary periods, the real stockholder after-tax return becomes relatively higher than those of bonds. Consequently, bondholders will sell their bonds in exchange for stocks, thus, dropping the aggregate debt ratio.

Kim and Wu (1988) reconciled the arguments by simultaneously considering the effects of inflation on both the cost of capital and the return on debt. They explained that inflation decreases the demand for debt if the return on debt is smaller than the return on equity. However, the supply of debt will increase if the tax advantage to debt is large enough to offset non-debt tax shield variables. Hence, the net effect of supply and demand factors would determine the net effect of inflation. They incorporated non–debt tax shield items and inflation in their regression on 1,092 US firms' data over the period 1953 –1980. The coefficient of their regression model suggested that a 1 per cent change in inflation leads to a 0.7 per cent change in the corporate debt ratio. The result implies a positive relationship between gearing and inflation.

Tucker (1997) hypothesised a positive relationship between inflation and gearing based on evidence of previous majority findings. He ran time series models on the data of four European countries to test the existence of such a relationship. Different measures of inflation were used against the book value gearing of debt to debt plus equity. Although the majority of the results had indicated a positive relationship, however, all of the p-values were not significant.

Although the theory is somewhat mixed regarding the effect of inflation on firms' gearing, the evidence appears to support a positive relationship. The effect of inflation on the firms' capital structure may be a result of the demand and supply trade-offs as suggested by Kim and Wu.

3.4.2.1.2 Interest Rate Risk (Volatility)

A basic notion suggests that the higher the interest rate, the higher is the cost of capital, and therefore the less likely it is for companies to issue debt. Alternatively, the higher the interest rate fluctuation, the higher is the risk, which can lead to high financial distress, therefore less gearing should be employed. Both arguments imply a negative relationship between interest rates and gearing.

Corcoran (1977) on the other hand, stated that higher interest rates may lead to higher debt interest tax deductions stimulating a positive correlation between gearing and interest rates. On the other hand, Marsh (1982) suggested that a company would probably issue equity after a period of bull market performance and would probably issue debt when interest rates are low or are expected to rise.

Tucker (1997) hypothesised a negative relationship between debt to debt-plus-equity and debt interest rates in his study on European capital structure. His time series model had produced a mixture of weak positive and negative coefficient with low r-squared. France tends to have a negative relationship for all three measurements of short, medium and long–term interest rates. In contrast, the UK companies revealed a positive relationship for all three measurements of interest rates. The results for Holland and Germany are a mixture of negative and positive relationships between debt and three measurements of interest rates. Holland has a positive short term interest rate relationship with debt but a negative relationship is found between gearing and medium and long-term interest rates. Germany, on the other hand, had a negative relationship between gearing and short-term interest rate, but a positive relationship between gearing and medium and long-term interest rate measures.

Not many studies have been conducted, however, to investigate the relationship between gearing and interest rates. Although Tucker's (1997) investigation is the most extensive by far, his study had produced weak significant results. However, his results support both the Corcoran (1977) positive argument and Marsh's (1982) negative proposal.

3.4.2.1.3 Exchange Rates Risk (Volatility)

Exchange rate refers to the rate at which the currency value of one country can be changed for the currency value of another country, whereby the rate of exchange is based on the demand and supply of both currencies. If the demand for the ringgit goes up, then the price of ringgit in terms of foreign currency will rise. The movement of funds around the world to receive the highest return creates a link

between the interest rates and the exchange rates. Government may raise domestic interest rates using tight monetary policy to attract capital from abroad. Traders will then invest more of their funds in that particular currency to increase their interest income. The inflow of capital then creates a balance of payment surplus at the existing exchange rate and leads to an appreciation of a flexible rate. Thus, a higher interest rate would raise the value of the currency. Therefore, with the positive relationship between interest rates and exchange rates, one would expect an inverse relationship between exchange rate risk and the debt level as the interest rate rise leads to an appreciation of the cost of capital. Thus, the higher the exchange rate volatility, the higher is the risk and the lower is the target debt ratio.

An extensive study on the relationship between exchange rate and capital structure was conducted by Burgman (1996). He examined the effect of exchange rate, political risk and a few other variables on the capital structure of multinational companies (MNCs), as well as domestic companies. Burgman argued that exchange rate risk could either be positively or negatively related to the gearing level. His negative argument suggests that the more sensitive the firm is to exchange rate volatility, the higher is the expected bankruptcy cost which would later lead to a lower gearing ratio. His positive argument is based on the higher economic exchange rate exposure that eventually leads to higher gearing debt levels. This is done through exchange rate hedging. He explained that the MNC's income from foreign affiliation is usually denominated in foreign currency. The MNCs can hedge the exchange risk exposure on this income by raising foreign currency denominated capital, particularly debt. This is because debt is usually cheaper than equity in the foreign market. The hedging should reduce the currency exposure. But this hedging is not entirely perfect,

some risk is left unhedged. Due to MNCs' imperfect attempts to hedge all the risks, the residual (unhedged) exchange rate sensitivity could be argues, therefore have a positive relationship with gearing[4].

Besides hedging and foreign debt funding, he suggested several alternatives for MNCs to mitigate the exchange rate risk exposure, by shifting production to low cost areas, utilising transfer pricing and multilateral netting. Through the alternatives and diversification, MNCs would be less sensitive to exchange rate volatility.

The domestic companies on the other hand, faced competition from foreign companies in their local markets, thus exposing themselves to economic exchange rate risk. Burgman explained that if the U.S dollar appreciates, foreign competitors in the US will be able to reduce the price in dollars while maintaining profit in their local currencies. If the dollar depreciates, the price of imported input for the local companies in the US will increase.

In testing his argument, Burgman conducted regression analysis using MNC leverage as the dependent variable, and a few other independent variables including foreign exchange. The leverage is measured using long term debt divided by long term debt plus market value of equity. The exchange rate measure is based on Madura's (1983), Adler and Dumas's (1984) and Madura's (1995) research work which state that economic exchange rate risk exposure can be measured as a slope coefficient in a regression of company stock returns as a function of exchange rate returns. The

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[4] The researcher personally thinks the relationship should be negative if it is based on the residual of unhedged basis.

exchange rate sensitivity measure is computed as the absolute value of the b_2 coefficient in the following regression:

$$r_i = b_0 + b_1 r_{ew} + b_2 r_\$$$

where r_i is the return on the stock of firms i, r_{ew} is the return on the Centre for Research in Security Prices (CRSP) equally weighted index, and $r_\$$ is the return on the U.S.\$/SDR exchange rate. The foreign exchange rates variables are highly significant at the 99 per cent confidence level with a positive coefficient. It supports the notion that the positive relationship between leverage and exchange rate risk could be the evidence of MNCs' imperfect attempts to manage exchange rate risk.

3.4.2.2 Industry

There are two types of industry issues in the study of capital structures: i) industry differences, and ii) industry norms. The first investigates whether there is any difference between the capital structure of one industry and another. For example, the airline industry debt level should be higher than the debt level of the food industry. The latter investigates whether firms' debt to equity ratio decisions are based on their peer group or in popular terms "following the leader". For example, if Sainsbury increased their gearing ratio, will this prompt Tesco to do the same? However, both issues are interrelated, if all firms choose to follow the industry norms, then it will lead to gearing differences among the different industries.

Schwartz and Aronson (1967) studied the financial structure differences in the following four classes of the US industries: railroads, electric and gas utilities, mining, and industrials (manufacturing) between 1928 and 1961. They compared the sample means using an F-ratio to test the differences within and between the means of

the different industry equity ratios. The differences between industries were significant whereas the differences within the industries were not significant.

In his study of financial structure, Scott (1972) argued that firms are categorised according to their exposure to business risk. These clusters of risk determine to which group the firms belong in determining their capital structure ratios. In proving their assumption that a firm's capital structure is different based on the grouping, Scott (1972) studied 12 US industries consisting of 77 firms over the period of 1959-68. Consistent with Schwart and Aronson, he found a similar result of differences between the industry classes at the 1 per cent level of significance for each year during that 10-year period. Scott's study was more extensive compared with that of Schwart and Aronson who covered many industries and within a longer time period.

Scott and Martin (1975) argued that since there is no valuation formula for the firms to determine their best ratio of gearing, the firms' finance managers should rely instead on their analysis and judgement by examining the funding mixes of other firms within the same industry. To study whether firms' gearing are located within the same industry, they conducted a Kruskal-Wallis one way analysis of variance by ranks on 277 US firms from 12 industries over the period of 1967-72. They found industry class to be a significant determinant of the firms' financial structure.

Aggarwal (1981) studied international differences in capital structure norms. He examined 38 industries within 500 European industrial corporations in 13 countries. He found existence of industry effects on the capital structure. However, the results

indicate that the country factor is the most significant determinant of capital structure rather than industry classification among large industrial enterprises.

Annuar and Shamser (1993) used analysis of variance to test industry differences using a sample of 60 Malaysian firms from of 1975 to 1989. Differences in industrial, finance, properties, plantation and tin sectors gearing were analysed using debt-to-equity ratio and debt-to-assets ratio. Except for the finance sector, they found gearing of firms to differ significantly within and between industries. Both the industrial and finance sectors have recorded the highest gearing ratio while plantation had the lowest. According to them, one of the reasons the plantation sector recorded the lowest gearing ratio was due to the lack of reinvestment in this sector as the Malaysian government is providing more support to manufacturing (industry).

The same result was found by Mohamad (1995) in his study on the capital structure of large Malaysian companies. He found inter-industry differences among the companies. The latest study on industry differences on Malaysian companies was conducted by Mansor and Mohamad (2000) between 1986 and 1995. Again, they found evidence of industry differences in the Malaysian firms' gearing ratios. However, the differences were not consistent when different gearing measures were used. They concluded that a lack of industry effect in Malaysian companies may be due to the firms' heavy diversification activities.

Yam (1998) argued that firms within the same industry face similar supply and demand conditions and experience a similar technological environment, which leads to a similar risk exposure. Therefore, firms in the same industry should employ a

similar debt to equity ratio. Using analysis of variance and pairwise analysis, Yam sought to determine the gearing differences of 18 industries' classification from listed companies and 19 industry classifications from unlisted companies. The ANOVA analysis revealed significant differences in the gearing of both listed and unlisted industry classification. Their result confirms a previous study by Ariff et al. (1975-1985) on Singapore listed companies, showing that gearing levels of Singapore listed companies are industry-specific.

The previous literature had found significant gearing differences among industries implying the existence of "industry norms" or following the leaders. In contrast, the Remmers et al. (1974) and Collins and Sekely (1983) analyses on industry gearing differences findings were either partially significant or not significant.

Based on Scott's (1972) argument of gearing being industry specific due to the business risk clustering, Remmers et al. (1974) state that firms within the same industry face the same environmental and economic conditions and, therefore, should be grouped in the same business cycle. They studied Fortune 500 companies from 9 industries in the US, Norway, Japan, and Holland. They found that the debt ratio is determined by industry differences for the Japanese and French companies, but not for the US, Holland and Norway based companies.

In studying the country and industry effect on capital structure, Collins and Sekely (1983) employed data of 411 firms within 9 industries in 9 countries for the period of 1979 to 1980. Although they found support for the country effect, they did not find much support for the industry effect.

Therefore, the findings of industry differences that led to the industry norms are extensive. If firms target their capital structure on the "norm" for their industry then that may be the best level of gearing ratio. Finance managers often look for guidance from similar firms on financial structure decisions, as they recognise that similar firms will be exposed to similar environmental factors that may expose the firms to similar risk. They also realised that significant departure from published industry norms will be viewed with some suspicion by the investors. Drury and Bougen (1980) stated that any divergence from the industry norms is viewed with some suspicion by both lenders and investors.

3.4.2.3 Fiscal/Government Incentives

This section discusses the relationship between government incentives (policy) and the capital structure. Certain policies and incentives will induce the finance manager to increase or decrease the debt ratio. For example, incentives in tax, as noted in section 2.4.2.2 for PDS and Section 2.5 IDS, would probably result in the debt ratio rising. Besides tax, there is a number of other factors such as Central Bank intervention on interest rates and government credit policy. To this date, it was rather difficult to find the literature on government fiscal incentives' contribution to the capital structure decision. However, a few studies have been conducted on the country effect of capital structure that may include certain information related to the fiscal policy of a certain country.

Stonehill and Stitzel (1969) presented four environmental variables which establish a gearing country norm: tax regulations, inflation, development of the capital market and financial institutions, and national attitude towards risk. These four variables are

explicitly and implicitly influenced by government policy. Tax, for example, is definitely under government control.

Stonehill et al. (1975) in their study on corporate financial goals and debt ratio determinants in five countries found that international factors such as government incentives to raise funds abroad, hedging operation and repatriation of capital were found to be important as debt determinants in France, United States and the Netherlands.

In her study of the international capital structure puzzle, Rutterford (1988) compared the debt to equity ratios of US, UK, France, Germany and Japan. She mentioned that the accounting practices (such as differences in depreciation treatment) and legal factors of regional countries affect the variances in leverage ratios. Nevertheless, she found tax rates as not an important explanatory variable for capital structure.

Rajan and Zingales (1995) examined whether the capital structure in other countries is related to factors similar to those that appeared to influence the capital structure of the U.S. firms. Using different measures of gearing and narrowing down the main differences in accounting practices, they found that firms in the UK and Germany appeared to be substantially less leveraged than firms in other G7 countries. According to them, this is due to the regional differences, such as the tax system, bankruptcy laws, bank regulations, debt market development, and ownership pattern.

Mcclure et al. (1999) presented variables that affect a country's gearing in his study of the capital structures of the G7 countries. Among others are: political risk and government policies, financial institutions' policies and national cultural attitudes.

Although a number of studies on country differences have largely been found to contribute to capital structure, however, these differences are the result of the domestic economic behaviour which is largely influenced by government policy and regulation. One factor that seems to be important in most of the previous literature is tax, which is solely under the government's supervision.

3.5 Financial Crisis Literature Review

One of the objectives of this research is to examine the impact of the 1997 financial crisis on the capital structure of the Malaysian public listed firms. However, the discussion will begin by analysing the causes of the crisis in order to fully understand the event relating to the crisis. Perhaps, by evaluating individual factors that contribute to the crisis, the relationship between crisis and gearing would be more plausible.

3.5.1 The Cause of the Crisis

Researchers are still debating the real cause of the East Asian financial crisis which started with the speculative attack on the local currency. The question is what is so special about the East Asian crisis? According to Radelet and Sachs (1998) the crisis had hit one of the most rapidly growing economies in the world and it was the sharpest crisis to hit the developing countries and which prompted for the largest

financial bailouts in history. The following are the factors considered to have caused the crisis.

3.5.1.1 Flaws in the Economic Fundamental

Krugman's (1979) model of Balance-of-Payments crisis suggests that when the underlying fundamentals are inconsistent with a pegged exchange rate, this will result in speculative attacks. A country will become vulnerable to external risk when the economic fundamentals (budget deficit, reserve losses etc) are deteriorating. Krugman stressed that the decline in reserves is the most important factor which has caused governments to be helpless and are unable to defend their currency.

Ötker and Pazarbaşioğlu (1997) evaluated the role of macroeconomic fundamentals in contributing pressure on six currencies within the European Exchange Rate Mechanism (ERM) from 1979 to 1995. Their empirical study suggests that each speculative attack is associated with deterioration in the economic fundamentals. Factors such as widening credit policies and large government deficits appeared to generate speculative attacks and contribute to an increase in the probability of currency depreciation.

Contradictory to the Krugman theory and the Ötker and Pazarbaşioğlu investigation, Frankel and Kose (1996) found a slightly different result in their empirical study of currency crashes in emerging markets. They gathered data from more than 105 developing countries from 1971 to 1992 to examine the characteristics of a currency crash. They found several common features of countries experiencing crashes; low international reserve, low foreign direct investment (FDI) ratio, high levels of credit

(largely financed by commercial banks), increases in the international interest rates, and crash currencies were overvalued in the official rate by at least 10%. Nevertheless, they did not find current account and budget deficits to have any significant relationship with any crisis.

Although Malaysia has an impressive growth record over the years, it shares some of the fundamental flaws. The Malaysian International Reserve was high in 1997, but the reserve was low in 1994-95 and negative in 1996 (see Table A.21 in Appendix A1). Besides uncertain international reserves from year to year, Malaysia's current account balance has appeared in deficit from 1990 to 1997 (see Table A.6 in Appendix A1). The main factors are the large increase in private investment activities (especially manufacturing) which led to the increase in import content which is higher than the export content. Another factor contributing to the current account deficit was the large service deficit. The impressive economic growth has led to distinct labour shortages placing pressures on wages, having to rely more on foreign workers from Indonesia, Bangladesh and the Philippines (BNM, 1999).

Obiyathulla (1998b) computed the percentage of over-or under-valuation of crisis countries' currencies to determine the extent of exchange rate deviation from parity by using the standard Purchasing Power Parity (PPP) equation. He found that the ringgit was the least overvalued among the countries affected by the crisis, at 12.5 per cent overvaluation as of December 1996 (6 months before the crisis strike). The computed value supports the Frankel and Kose (1996) finding that crashes tend to occur when the exchange rate shows an indication of over-valuation.

3.5.1.2 Liberalisation and Moral Hazard

Liberalisation of the economy is a doctrine equated with laissez-faire economics, holding to free trade and minimum interference from the state government in activities (Webster, 1999). Hahm and Mishkin (2000) proposed that the first run-up to propagate a financial crisis is financial liberalisation. As a result of minimal restriction, especially on the lending activities, foreign capital flows in rapidly hence increasing domestic lending activities, but simultaneously exposing the country to external vulnerability.

Poret (1998), writing for the Organisation for Economic Co-operation and Development (OECD), states that countries which open themselves to capital inflows would be more vulnerable to large capital outflows especially when investor sentiment is reversed. According to him, to maximise the benefits of foreign investment and reducing the risks associated with capital liberalisation, it is important to have prudent macro economic policies, responsive exchange rate regimes, a robust domestic banking system and good corporate governance.

The large capital inflow which led to over investment among foreign investors is largely associated with moral hazard. According to the Central Bank of Malaysia (1999), foreign financial institutions' willingness to lend large amount of funds to local banks is due to their perceptions that the local governments would step in to bail out local financial institutions in the event of default or crisis. Therefore, the process of lending to domestic banks, mostly on a short-term basis, was done without the adequate appraisal of the risks involved. Besides the local government, the IMF had constantly provided balance of payments support to emerging markets.

Both liberalisation and moral hazard contribute to the large capital inflow into the Malaysian capital market. Likewise, Malaysia requires huge amounts of capital inflows to finance the investments to push for rapid growth. In portfolio investments, foreign funds carry both price risk and exchange rate risk. This is because in order to purchase financial instruments, fund managers must first convert their currency to local currency. All these factors will expose the country to external vulnerability and this will eventually lead to a crisis.

3.5.1.3 Excessive Investment

According to Miller and Luangaram (1998) in their study on the financial crisis in East Asia, some of the factors contributing to the crisis are related to the private-sector activities, the build-up of short-term foreign liabilities (on an unhedged basis), and the misallocation of uneconomic projects to non-productive sectors. Many researchers agree that investments in prestigious but uneconomic projects would bring serious imbalances to the economy.

In the case of Malaysia, prior to the crisis, the country had invested heavily on a few large scale investments which include the construction of the state-of-the art Bukit Jalil Sports Complex which was used for the 1998 Commonwealth Games, the massive Kuala Lumpur International Airport (KLIA), the Petronas Twin Tower, which is currently the tallest tower in the world, the impressive Putrajaya Government complex and the Multimedia Super corridor (MSC-Cyber city). For example, the KLIA was built on 10,000 hectares or 100 square kilometres of land at a cost of about USD3.5 billion (KLIA, 2003), while the MSC is estimated to cost in the region of USD4 billion and is built on 750 square kilometres of land (Chandler, 2003). These

developments have received criticisms from both local and foreign observers as a wastage of public funds which have been implemented at an inappropriate time.

3.5.1.4 Contagion Effect Following the Regional Panic.

Since the Mexican crisis at the end of 1994, followed by speculative attacks in some Latin American countries, there has been many studies conducted to explain why a crisis in one country might trigger a crisis in another. These studies have been conducted by researchers such as Gerlach and Smets (1995) and Masson (1997). Generally, the term 'contagion' occurs when a crisis in one country triggers a similar crisis elsewhere, due to 'panic' of losing money or perhaps psychological reasons among investors. Many researchers have extended the idea to explain that the elements of contagion clearly exist in East Asian countries, which started in Thailand and eventually spread across the entire region.

3.5.2 Crisis Effect on Gearing

One of the nearest findings on gearing pattern following the crisis was by Rudolf (1978). He studied the effect of the economic environment on balance sheet items and concluded that, as the economy shifts from a recession into a recovery period, firms should raise their debt. His suggestions imply an increase in the debt-to-equity ratio following the recession. However, his empirical results on US manufacturing firms between 1964-1974 contradict his suggestions. The results of his study instead indicate that as the economy recovers, the amount of debt tends to decrease. According to him, this is because firms use retained earning to replace debt during the recovery period.

Pomerleano (1998) reviewed and studied the financial practices and performances of corporations in Asian countries, Latin American and also developed countries. He reported an increasing trend in leverage among the Asian countries from the period of 1992 to 1996. Latin America and other developed countries indicated a moderate debt-to-equity ratio, while Thailand and Korea indicated a high debt ratio. The rest of the countries had a moderate ratio. Besides gearing, he observed the companies' tangible assets, liquidity, interest coverage ratio and profitability during the same period (1992- 1996). From the corporate balance sheet performance, he concluded that Thailand, Indonesia and Korea had a risky financial practice that made those countries vulnerable to the financial crisis. Hong Kong, Malaysia and Taiwan, on the other hand had shown prudent financial conducts, combine with progressive regulatory and supervisory practices.

Schmukler and Vesperoni (2001) studied the effects of liberalisation on the corporates' financing choices of Argentina, Brazil, Indonesia, Malaysia, Mexico and South Korea and concluded that profit is negatively related to long-term debt but is positively associated with retentions. This suggests that firms tend to employ less debt and rely more on internal funds. Financial liberalisation had a significant effect on Latin American countries which show the decrease in gearing following financial liberalisation. Firms trading globally in Latin America are associated with high gearing and a longer debt maturity structure. While in Asia, firms trading globally are associated with lower retained earnings. Also, during the crisis, the gearing ratio was found to have increased in East Asia (Malaysia, Thailand and Indonesia) but not in South Korea and Latin American countries.

Bris et al. (2002) studied the firms' gearing level in 17 countries before and after the crisis between 1985 and 2000. They found evidence that Asian firms are more fragile following the crisis compared with Latin America and Europe. They found that as the profit decelerated following the crisis, the firms' gearing increases further. The results also revealed that the firms which expect to benefit from currency depreciation during the pre-crisis will increase their gearing ratio more than the firms which expect to be affected by the currency depreciation.

Many studies have pointed out that when a country's economic fundamentals (budget deficit, reserve losses etc) are deteriorating, the country will be vulnerable to speculative attacks by foreign exchange investors. However, some studies suggest that the Asian financial crisis was the result of unbridled growth, which lead to unsustainable imbalances. Both factors, economic fundamentals and external factors (speculation that led to contagion) seemed to have played a role in the 1997 Malaysian financial crisis. With the destruction in the domestic economy, firms are expected to encounter difficulty in getting funds especially from equity financing due to the shrinking of the market. At the same time, financial institutions would tighten their credit facilities. Probably, the only option for the firm is to issue bonds or convertible bonds at higher discount rates to compensate for the risk involved. Therefore, this suggests that firms do expect to experience a high debt ratio during a financial crisis.

3.6 Islamic Financing

Islamic financing was previously introduced in Chapter 2, under Section 2.5. Its development is based on the Muslims' quest to rediscover the true meaning of Islam

and to find ways and means of translating the Islamic principles into socio-economic reality in accordance to the Qur'an (Muslims' sacred book – Qur'an) and Traditions (the prophet's deeds). This section covers the literature on Islamic financing based on the views given by a number of scholars and researchers. Nevertheless, different scholars tend to follow different religious boards, and, therefore have different opinions on the same subject matter following their adherence to different schools of jurisprudence. This is because the Qur'an provides a detailed code of conduct for every individual believer. The Qur'an provides precise instructions on every facet of everyday life such as inheritance, the conduct of business, relationship between genders, and the consumption of food and liquid. The Traditions, on the other hand, provide guidance for Muslims based on the deeds (speech, actions, instructions and etc) of the Prophet Muhamad. The Prophet Muhamad was not only said to be a messenger of God, but also played an important role as a legislator. Apart from his wisdom in theology, he also had knowledge in trade, contract law and economic affairs. The Prophet was raised and received some basic knowledge in business from his uncle who was a merchant. The Prophet then married a successful business widower, Khadijah. At a later stage in his life, the Prophet became the ruler of Madina and it was during this time that he had adjudicated disputes in trade and commerce. He made no distinction between theology and law or economics. Therefore, when a certain law was applied in all fields of social relations, that is believed to be the law of God.

3.6.1 Religion and Economy

Muslims believe Islam covers every aspect of life; therefore, there is no separation between spiritual and physical conduct. From the Muslims' point of view, the virtue

of economics should be based on the principle adherence to the religious code of law. Past historical events have revealed how the Islamic world prospered during the six centuries after the Prophet's death when the religious fervour was at its peak. Therefore, all Muslims believe that religion is positively related to the success of the economy. Although this relationship may not be statistically tested in this thesis, fundamentally, it attributes to the understanding of Muslim's priority towards the Islamic financial system. However, not only Muslims have positive views about religion and economy, some studies on Christianity also indicate a positive relationship between the two variables (religion and economy).

The most famous is the work of Weber (1958) entitled; "the Protestant Ethic and the Spirit of Capitalism". Max Weber's thesis was on the relationship between Protestant religious ethics and economic outcomes. According to Weber, the strengths of the Protestantism in a country was associated with the rise and success of industrial capitalism. Since the Weber Protestant ethic and the spirit of capitalism, there have been active debates on the impact of religion on people's economic attitudes. Many have dismissed the importance of the belief system in keeping up with today's technological advancement. For example, Rodinson (1974) has questioned the principles of Islam and the way of life which mitigates the change and development of the Muslim world.

Consistent with Weber, Wilson (1985) states that the success of Western capitalism is attributed to the Protestant ethic, which stresses the importance of the individual and the belief in the direct personal link with God.

A recent study by Guiso et al. (2003) found a positive result on the impact of religion on people's economic attitudes. Their study utilised the World Values Surveys to identify the relationship between intensity of religious beliefs and economic attitudes, controlling for country-fixed effects. The economic attitude variables cover cooperation, the government, working women, legal rules, thriftiness, and the market economy. They found that, in general, religious beliefs are associated with "good" economic attitudes, where "good" is defined as conducive to higher per capita income and growth.

3.6.2 Different Opinions on Usury (Interest)

The fundamental difference between the Islamic and the conventional economic principle is the prohibition of the usury or interest. Many studies have attempted to distinguish between usury (riba as reveals in the Qur'an) and interest. Mohamed (1988) states that there was an argument which suggests that riba is referred to as usury practised by petty money-lenders and not the interest charged by conventional banks. This suggests that no riba is involved when interest is imposed on productive loans. Another perspective on riba was pointed out by the Pakistani Finance Minister in 1992.

> "although riba is totally prohibited in Islam, unfortunately there is no universally acceptable definition of riba in the Muslim world according to which existing financial practices can be tested on the basis of Islamic law".
>
> (Sartaj Aziz, the Economist, 1992)

The comment was given when the Pakistani Federal Shariah court announced that interest is riba or usury and hence is illegal. The court gave the government an approximation of 6 months to amend all financial laws in accordance to the Islamic Shariah. It has taken the government by surprise. However, arguments which suggest

that conventional interest is permissible have been rejected. The general consensus among Muslim scholars clearly indicate that there is no difference between riba and interest. Therefore, it is prohibited for Muslims either to take or to give interest.

Interest is prohibited primarily to prevent the financial practice which may eventually create problems to society at large due to its injustice both to the providers and the receivers. For instance, it is unjust for the banks to give depositors interest from their savings if the banks had encountered losses. Consistently, it would be unjust for the borrower to pay the lender interest if their investment did not provide any return. Wilson (1982) agrees to the objection of interest by stating:

> *The objection to interest is also because of its adverse redistribution effects – not only does it make the more productive indebted to the less productive—but it can also result in the poor being indebted to the rich.*
>
> (Wilson 1982, p.109)

Due to this argument, most of the Islamic financing principles are therefore based on profit sharing between lender and borrower, whereby both parties will bear the risk and earn the profit. The Qur'an distinguishes between interest and trade and urges Muslims to receive only the principal sum loaned and that principal should only be taken back subject to the ability of the borrower to repay. The distinction between interest and trade allows various Islamic financial instruments of "mark up" for early payment discounts or deferred payment, trade financing commissions and leasing type transactions that fit neatly into conventional financial instruments.

3.6.3 Literature on Islamic Financing

Although the Islamic economy has developed rapidly during the past 2 decades, when compared with the traditional conventional economy, the Islamic economy is

relatively new. Therefore, at present, there are only a few studies on firms which used the Islamic financing principles in their capital structure decision. There are even fewer studies on the determinants of Islamic financing decisions. Substantial studies have been conducted focusing on the features of Islamic financial institutions and the Islamic financing features, and the issues relating to its compliance to the Islamic Shariah law. The following are some of the literatures related to the current practice of Islamic financing.

Although *Mudarabah* and *Musharakah* (both are long-term financing types) represent the desired forms of Islamic financing product, their current use is not significant. According to Syedain (1989), it is estimated that between 80 per cent and 95 per cent of Islamic businesses are based on the short-term *Murabahah* (cost-plus resale) finance. He suggested that the *Murabahah* is in high demand among the financial institutions because it presents the lowest risk of all the Islamic financing methods.

According to Mohamed (1988), the short-term trade financing has clearly dominated most Islamic banks regardless of their size. His view is based on the two studies of Islamic banks in South East Asia by Man (1988) on Bank Islam Malaysia Berhad (BIMB) and Mastura (1988) on the Philippines Amanah Bank (PAB). Man has found that the growth of BIMB has been remarkable with the opening of new branches and with a higher rate of return to the depositors compared with the conventional banks. However, 90 per cent of its deposits are short term with less than two years' maturity. *Mudarabah* and *Musyarakah* (long term financing), on the other hand, accounted for a small proportion of the total investment portfolio, while Ijarah (leasing) and Bai'muajjal (deferred payment sale) constituted a huge amount of the total investment

portfolio. Relatively, Mastura's study showed that PAB has also concentrated on the short-term debt of the *Murabahah* transaction, rather than *Mudarabah* and *Musyarakah*. The above arguments are consistent with Obiyathulla's (1995) study which indicates that Islamic financing is relying more on short term debt than long term debt. He explained that part of the Islamic banking hesitance is due to the moral hazards that were incorporated in the long term debt feature which Obiyathulla documented as an agency problem.

Therefore, the criticism on the Islamic financial institutions is that they failed to promote the development of the Islamic economy by being not willing to take risks of using long-term financing and investing in long-term projects (partnership in Musyarakah etc.). The financial institutions defended themselves by pointing out that since most of their liabilities are short-term (deposits), it would be imprudent to tie up funds in medium or long-term assets (Syedain, 1989). This is because there is no secondary market for Islamic financial instruments and it is not easy to find lenders that are willing to operate without taking interest, therefore there is no guarantee of extra liquidity in the event of a crisis.

However, if the long-term Islamic debt financing is widely exercised, both financing features may lead to monopolistic behaviour. Wilson (1985) argued that banks, by nature of their operations acquire direct financial stakes in the companies that they support. By holding shares in many businesses through *mudarabah* arrangements, and by acting as joint venture partners for many other enterprises through *musharakah*, the banks could become giant conglomerates. This would reduce competition and would

result in one enterprise supported by the bank being given preference in matters such as subcontracting involving another firm also supported by the bank.

As previously discussed in Section 2.6, Islamic financing features are based on profit sharing, therefore both the lender and the borrower will have to bear the risk as well as earn the profit. Since risk is divided equally, the risk proportion of the lender will be minimal, one would expect less collateral is needed for the investment using Islamic financing. UAE MONEYworks (2001) state that one of the main selling points of the Islamic financial practices is the size of the collateral. Yet it is concerned about the viability of the project and the profitability of the operation and not the size of the collateral. For instance high quality projects that were rejected by the conventional bank for lack of collateral would be financed by the Islamic banks on a profit sharing basis. Therefore, in this situation, the Islamic financial institutions play a major role in stimulating the economic development. However, collateral may not be large (at least in theory) for the Islamic financing instrument such as *musyarakah* as it is purely a profit based but it may be large for *mudarabah* financing. *Mudarabah* is a partnership whereby one partner provides the funds to the other for the purpose of investing in a commercial enterprise. Most of the Islamic bonds issuance and equity compliance stock are based on the principle of *mudarabah.*. Therefore, the collateral may contribute to the high gearing ratio if the firms were to use certain types of Islamic financing.

Besides collateral, another issue which should be addressed is tax which is very important under the conventional debt due to its advantage. The Islamic businesses are subjected to Islamic tax called 'zakat'. Zakat functions totally in a different way

compared with the normal tax system in which the zakat income should be channelled to the poor and needy. However, problems generally arise when a country does not practice the zakat system or is solely dependent on the zakat system as a form of collecting tax. Zakat is a religious obligation, therefore, Muslims who earned profit from non-Muslim countries (without the zakat system) are required to pay normal tax to the country where the business was conducted and to pay zakat elsewhere to fulfil his religious obligations. This is a double taxation on their business income. On the other hand, non-Muslims conducting business in Muslim countries which only abide to the zakat system are not required to pay zakat (Wilson, 1985). In Malaysia, companies will be able to get tax relief in the amount of zakat paid if the companies were to pay zakat, so there is therefore, no double taxation.

There are also problems with regards to capital gains. For example, title is transferred twice in Islamic trade financing in order to comply with the shariah law: one from seller to the banks and then from the banks to the buyer, hence twice taxed on this account which will diminish the profitability of the venture.

3.7 Conclusion

Although Dewing had started the work on capital structure, Miller and Modigliani were recognised as the pioneers in moving capital structure analysis from a static traditional view to a debatable and expendable perspective for further research. The study on capital structure has received numerous attention since MM proposed their irrelevancy theory. Every aspect of their 1958 model has been discussed, reviewed and criticised.

There are three different views of taxation effects upon capital structure: the first is unlimited use of debt due to the tax shields' advantage as proposed by MM 1958; the second is the equilibrium position due to the personal income tax effect of investors; and finally the existence of non-debt tax shield items, such as depreciation which can cause tax exhaustion. It is very difficult to determine which views would significantly contribute to optimal capital structure as different empirical works provide different results due to the different data and different methods of analysis.

On the other hand, the different types of tax systems may have different effects on a firm's capital structure in different countries. For instance, tax effects upon capital structure of Malaysian firms will be different from that of the United States as both countries practice different tax systems. The existence of the UK imputation literature helps to understand the Malaysian taxation.

Following the examination of taxation and capital allowance influences on gearing, the research was extended to many other variables that may be related to the firms' gearing. Similar to tax, other pioneer variables were gathered from the balance sheet and the income statement. Account items such as net income, fixed assets, total asset, earnings volatility were found to have an effect on influencing management decisions on capital structure. Although empirical results varied among researchers, however, the results tend to support various theories, such as the pecking order theory.

Besides, the internal influence of balance sheet and income statement items, the external environment has also affected firms' capital structure. The literature has covered external factors, including macroeconomics, industry and government

incentives. Despite the differences between the theory and the empirical results, most researchers are agreed on the industry differences.

Most studies on the currency crisis are focused on the domestic condition and macroeconomic factors leading to the crisis. Besides these factors, moral hazard perception and regional contagion also contributed to the crisis. Few studies indicate an increase in gearing of the East Asian countries following the 1997 currency crisis.

An Islamic economy is primarily an equity-based economy as most of the financing instruments are based on profit sharing. The emphasis on profit and loss sharing removes the distortion of the interest-based system which guarantees a return regardless of the efficiency of the investment. However, the trend of financing seems to emphasise more on short-term rather than long-term financing. More research is encouraged on the zakat and taxation effect on the capital structure of firms which employ Islamic financing.

CHAPTER 4
DATA AND RESEARCH METHODOLOGY

4.1 Introduction

The main purpose of chapter 4 is to introduce the data, the research hypotheses to be tested throughout the thesis and the methodology employed to test the hypotheses. There are two types of data collected and a few statistical techniques were applied to test those data. The chapter discusses the methodology, explains how the data have been retrieved, and provides on overview of the accounts data of the Malaysian companies.

Section 4.2 describes two sets of data used in this thesis: data from Datastream and data from the questionnaire and a brief telephone interview survey. Section 4.3 discusses the research hypotheses, the main hypotheses, and the supporting hypotheses. Section 4.4 examines the methodology used to test the hypotheses throughout the empirical research. Section 4.5 describes the various data sets that was prepared for analysis. Section 4.6 discusses the trends of the Malaysian firms' capital structure. Finally, Section 4.7 concludes the chapter.

4.2 Data Employed for the Research

Both the primary and secondary data are important in any research investigation. The primary data stress the originality of the research which has not been encountered before, whilst the secondary data provide a more reliable and precise source for the research investigation. There are two types of data employed in this thesis:

i)   Secondary data from Datastream database on-line, and

ii)   Primary data from a questionnaire survey.

4.2.1 Secondary Data from Datastream

The main advantage of using secondary data from Datastream is enormous resources can be collected within a short period of time. In addition, they are likely to provide higher quality than the primary data. The only disadvantage is that the service is very costly (to the university) and not easy to access. The secondary data has been retrieved from Datastream on-line for windows. It is simply a program that allows access and interaction with the Datastream International databases located in London. Although its primary user is the broker and financial analyst, many academicians are using it for their research due to the accuracy and extensive coverage of their database. It is designed specifically for navigating large amounts of data from it database. It provides data on most of the countries in the world and gives details of many financial accounts and economics items.

The program numbers and code numbers in Datastream represent methods of retrieving and displaying data that are available in their database. Finding these codes and program numbers is the most difficult aspect of Datastream search. An extensive amount of time have been spent to become familiarised with the program. Most of

the codes allow the users to specify precisely what they would like to obtain while the datatypes allow the users to retrieve different types of data within one series. Tables 1 and 2 in Appendix B, show the list of *program numbers, code numbers* and *datatypes* used to retrieve data for this research. The researcher has created some expressions/codes using the Datastream *user created program,* since the standard program is not available for Malaysian data.

The on-line databases provide information which includes company's account items, macroeconomics variables, equity and bond market prices and many other information. Most of the data retrieved for this research are the account items. Datastream provides a wide range of programs that can be used to display the accounts data of companies. Program 190V was used extensively for account data, supported by datatypes such as MV (market value) and user created expressions/codes. Program 900A, 900B, 100 were also used to retrieve economics and equity related information. The data were exported to a spreadsheet for cleaning and sorting before finally being transferred to the Statgraphics Verson 5.0. ANOVA, Krukal-Wallis and multiple regression were used to test the Datastream data. Chapter 5 covers the analyses of Datastream data including the statistical tests and their results.

4.2.2 Primary Data Using Questionnaire Survey

The researcher applied for a research grant at the beginning of the PhD programme from the Research Centre of the UIA, Malaysia. The grant was approved with a small amount of funds allocated for the administration of the self-administered questionnaire survey. The advantage of using questionnaire survey is to give the

researcher more control over the research and allows the collection of a large amount of data from a sizeable population at a reasonable cost. However, the biggest problems are the low response rate, contamination (consultation with others), and completion by unrelated people who may not be the finance manager.

Following a pilot study through email, the questionnaires were distributed by post in April 2001 to the finance managers of the main board and the second board of the public listed companies. The response rate for the second board was very low; therefore, the analysis was only based on the response collected from the main board respondents. Virtually all data collected by the questionnaires have been coded for the computer statistical package for analysis. The statistical analyses include chi-square, ANOVA, Kruskal-Wallis and logistic regression using spreadsheets, SPSS and Statgraphics version 5.0. By combining the data from the survey with the data from the questionnaire survey, the best possible results are expected to be achieved in this research investigation. Chapter 6 of the thesis covers a detailed analysis of the questionnaire survey.

A brief unstructured telephoned interview was conducted during the questionnaire survey dissemination stage. The main objective of the exercise was to obtain direct information from the finance managers regarding their capital structure decisions. The section for the interviews will be included in chapter 6.

4.3 Research Hypotheses

The research problem that has been identified is usually analysed by formulating a hypothesis. Silverman (1993) defines hypothesis as 'a testable proposition'. It is

regarded as a statement of an empirical relationship between a set of variables. A statistical hypothesis is a hypothesis about the parameters of a probability distribution. The probability distribution may be of the variables or the coefficient of relationships between the dependent and independent variable. Statistical hypotheses are generally investigated by specifying a null hypothesis (Ho), and an alternative hypothesis (H1) which is simply a negation of the null hypothesis.

The main objective of the research is to find the determinants of the capital structure of Malaysian listed companies. Therefore, all the hypotheses are related to the factors that may possibly determine the capital structure of the firms. A total of 22 hypotheses has been listed and will be tested and discussed in Chapters 5 and 6. All hypotheses are based on the central investigation enquiry which addresses the following research question: *What are the determinants of capital structure of Malaysian firms?* Hypotheses 18 to 22 are accompanied by supporting hypotheses that are listed in Appendix C. The following are the list of the hypotheses:

Central Investigation Enquiry:

Question: What are the determinants of capital structure of Malaysian firms?

Associated hypotheses:

H1: Firms' gearing vary significantly between two boards

H2: Firms' gearing vary significantly across sectors

H3: Firms' gearing is significantly related to the firms' liquidity

H4: Firms' gearing is significantly negatively related to the firms' investment opportunities

H5: Firms' gearing is significantly negatively related to the firms' profitability

H6: Firms' gearing is significantly positively related to the firms' tangibility

H7: Firms' gearing is significantly positively related to the firms' size

H8: Firms' gearing is significantly negatively related to the price currency sensitivity

H9: Firms' gearing is significantly negatively related to the firm's operating risk

H10: Controlling for variations in pre-specified factors (e.g. liquidity, investment opportunity, profitability, tangibility, size, price sensitivity and risk), there are gearing effects caused by the crisis (tested by dummy variables)

H11: There is an association between types of financing and the level of priority

H12: Retentions are the main financing priority

H13: Firms follow the financing hierarchy

H14: Conventional bank loan is preferred over Islamic bank loan

H15: Conventional debt is preferred over Islamic debt

H16: Debt finance and financial leases attract equal preference

H17: Firms' financial preferences (see list 4.1 for financing preference) are significantly related to firms' specific factors (see list 4.2 for firms' specific factors)

i.e. Firms' financial preference (e.g. retention, ordinary shares, total debt, Islamic debt, conventional debt, overdraft and financial lease) are related to firms' specific factors (e.g. liquidity, profitability, investment growth, interest coverage ratio, tax, non-debt tax shield, return on investment, tangibility, size, price sensitivity and operating risk). (see Box 1 in Appendix C for the lists of the hypotheses)

H18: Firms' financial preferences (see list 4.1 for financing preference) are significantly related to firms' sensitivity factors (see list 4.3 for firms' sensitivity factors)

i.e. Firms' financial preference (e.g. retention, ordinary shares, total debt, Islamic debt, conventional debt, overdraft and financial lease are related to firms' sensitivity factors (fixed assets increase, fixed overhead decrease, profit decrease, research and development increase, corporate tax rate decrease, capital allowances increases interest rates increase, inflation increases, government incentives decreases, industry debt average increases). (see Box 2 in Appendix C for the list of the hypotheses).

H19: Firms' sensitivity factors (see list 4.3 for firms' sensitivity factors) are significantly related to firms' specific factors (see list 4.3 for firms' specific factors).

i.e. Firms sensitivity factors (e.g. fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases) are related to firms specific factors (e.g. liquidity (cash), liquidity (working capital), (profitability, investment/growth, interest coverage ratio, tax, non-debt tax shield, return on investment, tangibility, size, price sensitivity and operating risk. (see Box 3 in Appendix C for the lists of the hypotheses)

H20: Firms' sensitivity factors (see list 4.3 for firms' sensitivity factors) are significantly related to other sensitivity factors (see list 4.3 for firms sensitivity factors)

i.e. Firms' sensitivity factors (e.g. fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases) are related to other firms' sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases). (see Box 4 in Appendix C for the list of the hypotheses).

H21: Financial crisis factors (see list 4.4 for financial crisis factors) are related to the firms' specific factors (see list 4.2 for firms' specific factors)

i.e. Financial crisis factors (e.g. actual and target debt to equity ratio following the crisis and following the ringgit being fixed) are related to the firms' specific factors (e.g. liquidity (cash), liquidity (working capital), (profitability, investment/growth, interest coverage ratio, tax, non-debt tax shield, returned on investment, tangibility, size, price sensitivity, operating risk). (see Box 5 in Appendix C for the lists of the hypotheses).

H22: Financial crisis factors (see list 4.4 for financial crisis factors) are related to the firms' sensitivity factors (see list 4.3 for firms' sensitivity factors).

i.e. Financial crisis factors (e.g. actual and target debt to equity ratio following the crisis and following the ringgit being fixed) are related to the firms' sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases). (see Box 6 Appendix C for the list of the hypotheses).

<u>List 4.1</u>:
<u>List of financing preference</u>

Re	=	Retention
Os	=	Ordinary shares
Tdebt	=	Total debt
Idebt	=	Islamic debt
Cdebt	=	Conventional debt
Flease	=	Financial lease

<u>List 4.2</u>:
<u>List of firms' specific factors</u>

Cr	=	Current ratio (proxy for liquidity)
Wcr	=	Working capital ratio (proxy for liquidity)
Npm	=	Net profit margin (proxy for profitability)
Mktv	=	Market to book value ratio (proxy for investment/growth)
Tie	=	Interest coverage ratio
Tax	=	Percentage tax charge
Dep/tas	=	Depreciation to total assets (proxy for non-debt tax shield)
Roce	=	Returned on Capital Employed (proxy for profitability)
Nfa/tas	=	Net fixed assets to total assets (proxy for tangibility –return on investment)
Log (tas)	=	Logarithm of total assets (proxy for size)
Curr	=	Stock prices and currency correlation (proxy for price sensitivity)
Risk	=	Standard deviation of Ebitda (proxy for risk)

<u>List 4.3</u>:
<u>List of firms' sensitivity factors</u>

Fau	=	Fixed assets increases (proxy for tangibility)
Fod	=	Fixed overhead decreases (proxy for operating costs)
Pfd	=	Profit decreases
Rdu	=	Research and development increases
Taxd	=	Corporate tax rate decreases
Capu	=	Capital allowances increases (proxy for non-debt tax shield)
Intu	=	Interest rates increase
Infu	=	Inflation increases
Gvid	=	Government incentives decrease
Indu	=	Industry debt average ratio increases

<u>List 4.4</u>:
<u>Financial crisis factors</u>

Agcc	=	Actual debt to equity ratio change following the crisis
Tgcc	=	Target debt to equity ratio change following the crisis
Agcf	=	Actual debt to equity ratio change following ringgit being fixed
Tgcf	=	Target debt to equity ratio change following ringgit being fixed

4.4 Research Methodology

This section introduces the empirical research methodology employed throughout the thesis to test the hypotheses. The methodology employed have been determined from the review of the literature. The methodology for the data includes bivariate analysis and multivariate analysis. For the Datastream, the bivariate analysis includes ANOVA and multivariate includes the multiple regression analysis. The methodology for the <u>survey data</u> includes bivariate and multivariate analyses. The bivariate analysis covers the chi square test and ANOVA test while the multivariate uses logistic regression.

The chi-square test is a hypothesis test that allows for investigation of statistical significance in the analysis of a frequency distribution. An observed distribution of categorical data from a sample may be compared with an expected distribution of the goodness of fit. The ANOVA is a hypothesis testing technique to determine whether statistically significant differences on means occur between two or more groups. Multiple regression analysis is an investigation that allows for simultaneous investigation of the effect of two or more independent variables on a single interval dependent variable. More comprehensive methods on data testing are presented throughout the report.

4.4.1 Chi-Square

The chi-square (χ^2) test reveals whether the collected data are close to the values considered to be typical and generally expected (*the goodness-of-fit test*) and whether two variables are related to each other (*the test of independence*). The data obtained in the survey (observed frequencies) are compared with the expected data (expected frequencies); their actual difference of observed and expected values determine the level of significance.

Equation 4.1:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

(see example, Sapsford and Jupp 1996)

where each observed frequency from the experiment is referred to by the symbol O and the corresponding expected frequency by the symbol E, the deviation from perfection is expressed by (O-E), which can either be positive or negative. The negative or positive signs are removed when each deviation is squared.

The chi-square value measures how different the set of the observed frequencies are from the expected frequencies. If the chi-square is equal to or larger than the critical value, the null hypothesis is therefore rejected. This means that if the differences in the data are significant, the observed differences represent differences in the population for the goodness-of-fit test. The *test of the dependence* means that the two variables (between row and column) are independent from each other or dependent on each other. The null hypothesis being tested is that the frequencies or proportions found in the cells of the contingency table is what is expected to be found if there was no association between row and column.

4.4.2 Analysis of Variance (ANOVA)

Analysis of variance is the statistical method used for testing the null hypothesis, that the means of several populations are equal. ANOVA uses a single-factor, fixed effects model to compare the effects of one factor on a continuous dependent variable. It partitions total variability into component parts and uses variances instead of standard deviation. In this model, each group has its own mean and values that deviate from the mean. The total deviation of any particular data may be partitioned into between-groups and within-groups variance. The differences of the means for between-groups imply that each group was treated differently, and the treatment will appear as a deviation of the sample mean from the grand mean.

On the other hand, the within-groups variance describes the deviations of the data points within each group from the sample mean. Therefore, the between-groups variance usually represents the effects of the treatment/factor, while the within-groups is usually referred to as a random error, as it shows the variability among subjects and from random variation. The viability of the null hypothesis begins to diminish as the variability attributable to the treatment exceeds the variability arising from error and random fluctuation. Conversely, the greater the deviations of the group means from the grand mean, the bigger are the differences between groups, the greater the size of the between group variance, and therefore the more different the groups are from each other. The test statistic for the ANOVA is the F ratio. It compares the variance of between-groups and within-groups:

Equation 4.2: F ratio

$$F = \frac{Between - groups \ var iance}{Within - groups \ var iance} = \frac{Mean \ square_{between}}{Mean \ square_{within}} = \frac{\dfrac{sum \ of \ squares_{between}}{\deg ree \ of \ freedom_{between}}}{\dfrac{sum \ of \ squares_{within}}{\deg ree \ of \ freedom_{within}}}$$

(see example, Cooper and Schindler, 1999, p.493)

If the population means are equal (null hypothesis is true), there should be no difference between the populations, and the F ratio should be close to 1. If the population means are not equal (null hypothesis is true), then the F ratio should be greater than 1. Therefore, the F distribution determines the size of the ratio necessary to reject or to accept the null hypothesis based on the level of significance.

However, if the ANOVA assumption is violated, for example, the assumption that the underlying variance of each group is equal, the Kruskal-Wallis test will then be used, which compares medians instead of the means. According to Cooper and Schindler (1999) the Kruskal-Wallis test is appropriate for data that are collected on an ordinal scale or for interval data that does not meet the F-test assumption. It assumes random selection and independence of samples, and an underlying continuous distribution. The data are prepared by converting ratings or scores of each evaluated observations to ranks. The ranks are then tested to decide if they are samples from the same population.

Equation 4.3: H-test

$$H = \frac{12}{N(N-1)}\left(\frac{\Sigma R_1^2}{N_1} + \frac{\Sigma R_2^2}{N_2} + ... + \frac{\Sigma R_k^2}{N_k}\right) - \{3(N+1)\}$$

((see, for example, Sarantakos (1993) p.403)

where,

H = Kruskal-Wallis test statistic

$N_1, \Sigma R_1{}^2$ = number of observations & the square of the sum of the ranks for sample 1

$N_2, \Sigma R_2{}^2$ = number of observations & the square of the sum of the ranks for

sample 2

N = Number of observations in all samples

$N_k = K_{th}$ sample

The null hypothesis in this test asserts that there are no differences among the samples, i.e. all the samples come from the same population. If the null hypothesis is true, this would mean: i) there is no significant difference between the median of the main board and the second board, and ii) there is no difference between the median of the six sectors under main board.

Hypothesis statement for ANOVA

Null hypothesis: all population means are equal

$$H_0 = \mu_1 = \mu_2 = \ .... = \mu_i$$

Alternative hypothesis: Not all population means are equal

$$H_1 = \mu_1 \neq \mu_2 \ and \ / \ or \ \mu_1 \neq \mu_3, and \ / \ or \ \mu_2 \neq \mu_3, ...$$

where, μ is the mean of book-values ratio or the mean of mixed-values ratio.

4.4.3 Multiple Regression

Statgraphics version 5.0 was used to build the multiple regression models to examine the twelve variables of capital structure determinants against the book-value ratios and the mixed-value ratios. Regression analysis is one of the statistical

methodologies which relate a response Y to a set of independent variables $\chi 1$, $\chi 2 ... \chi 3$. The goal is to build a good model, a prediction equation relating Y to the independent variables of $\chi 1$, $\chi 2 ... \chi 3$. The model should be constructed to allow for random error, which includes both a deterministic (χ) component and a random error (ε) component which is referred to as probabilistic model. Simple regression includes one independent variable in the model:

Equation 4.4

$$ y = \beta_0 + \beta_1 \chi_1 + \varepsilon \ , \text{(simple regression)} $$

where,

y = is the variable to be predicted or dependent variable

β_0, β_1 = Constant, Estimation/coefficient for χ_1

χ_1 = Independent variable

ε = Error

The random error will enable the researcher to estimate the magnitude of the error of prediction when the model is used to predict some value of Y to be observed in the future. Therefore, multiple regression models are probabilistic models that include more than one independent variable (χ).

Equation 4.5:

$$ y = \beta_0 + \beta_1 \chi_1 + \beta_2 \chi_2 + ... \beta_n \chi_n + \varepsilon \ \text{(multiple regression)} $$

where,

y = is the variable to be predicted or dependent variable

$\beta_0, \beta_1, \beta_2, \beta_n$ = Constant, Estimation/coefficient for χ_1, χ_2, χ_n

χ_1, χ_2, χ_n = Independent variable 1, variable 2, and variable n

ε = Error

β can be interpreted as the marginal effect of χ on y and is a measure of how much χ influences y, hence β measures how much y tends to change when χ is changed by one unit. A positive β notes that χ and y are positively correlated. The null hypothesis for the model is that $\beta_1 = 0$, i.e., that there is no relationship between the y and the χ. The alternative hypothesis is that $\beta_1 \neq 0$, i.e., that there is relationship between the y and the χ. It is appropriate to have some measures of the best fitting line of the regression model which is measured by R^2 (r-squared). It relates closely to the correlation between the dependent and the independent variables. Thus, R^2 measures the proportion of the total variance of the dependent variable that can be explained by the independent variables. $R^2 = 0$ implies a complete lack of fit of the model to the data, and $R^2 = 1$ implies a perfect fit, with *every model* passing through every data point. Hence, the closer the value of r-squared is to 1, the better the model fits the data. Adjusted r-squared occurs when the R^2 is adjusted to reflect the model's goodness of fit for the population. According to Cooper and Schindler (1998) the net effect of this adjustment is to reduce the r-squared slightly to make it comparable to other R^2 s from the equations with a different number of independent variables. The test statistic used to test the null hypothesis of these regressions is:

Equation 4.6:

$$F = \frac{SS(\text{mod}el)/k}{SSE/(n-(k+1))}$$

[see, for example Mendenhall and Sincich (1989)]

where,

n = is the number of data points

k = is the number of parameters in the model not including the constant β_0

SS(model) = Mean square for model

SSE = Mean square for error (residual)

Mendenhall and Sincich (1989) have shown that an equivalent form of equation 5.5 test statistic is:

Equation 4.7:

$$F = \frac{R^2/k}{(1 - R^2)/[n - (k + 1)]}$$

Therefore, the F-test statistic becomes larger as the coefficient of determination R^2 s becomes larger.

4.4.3.1 Stepwise Regression

The biggest problem in building a model to describe the dependent variable is choosing the important independent variables to be included in the model. According to Mendenhall and William (1989), a systematic approach to building a model with a large number of independent variables is to use a stepwise regression. It involves entering the independent variables into the discriminant function one at a time, based on the basis of their discriminating power. The single best variable is chosen first; the initial variable is then paired with each of the other independent variables, one at a time, and the second variable is chosen, and the process is repeated until the best fitted model is produced. A stepwise model contains only the main effects with t-values that are significant at the specified α level. Therefore, only several of the large number of independent variables will remain in the model. Nevertheless, Mendenhall and William (1989) point out that the results do not reflect the fact that all the independent variables that have been identified in the reduced model are important for predicting y (dependent variables). The important independent variables may have

been eliminated during the process. This is because this procedure only uses *sample estimates* of the true model coefficients *(β's)* to select the important variables. A large n umber o f s ingle *β* p arameter *t -test* w ill b e c onducted, a nd t he p robability i s typically very high that one or more errors have been included or excluded; that is, the probability of including some unimportant independent variables in the model (type I errors) and eliminating some important ones (Type II errors).

4.4.3.2 Multicollinearity

Prior to estimating the coefficient of the model using stepwise regression, the sample data are tested for the existence of multicollinearity among the independent variables. Koop (2000) explains that multicollinearity exists when some or all of the explanatory variables are highly correlated with one another. Therefore, the regression model has difficulty in explaining which explanatory variable(s) is influencing the dependent variable. Mendenhall and William (1989) explained that when serious multicollinearity is present in regression analysis, it will increase the likelihood of rounding errors in the calculations of the β estimates, standard errors, and others, and hence, the results may be misleading. For each model of the multiple regressions, Statgraphics produced a correlation matrix that shows the correlation among the twelve independent variables. According to Koop (2000), to resolve the multicollinearity existence, at least one of the highly correlated variables should be removed from the regression.

4.4.4 Logistic Regression

Logistic regression is used to fit a model to binary response (Y) data, such as whether a subject is successful or failed, increased or decreased. For each possible set of

values for the independent (X) variables, there is a probability (p) for a success to occur. The linear logistic model fitted by maximum likelihood is:

Equation 4.8:

$$Y = \beta_0 + \beta_1 \chi_1 + \beta_2 \chi_2 + ... + \beta_n \chi_n$$

where,

y = Dependent variable or logit transformation of P (the variable to be predicted).

$\beta_0, \beta_1, \beta_2, \beta_n$ = Constant, Estimation/coefficient for χ_1, χ_2, χ_n.

χ_1, χ_2, χ_n = Independent variable 1, variable 2, and variable n.

The logit transformation Y of a probability p of an event is the logarithm of the ratio between the probability that the event occurs and the probability that the event does not occur:

$$Y = \log(p/(1-p)).$$

A transformation of data value is done by applying the same function to each data value, such as by taking logarithms of the data. Therefore:

$$\log(p/(1-p)) = \beta_0 + \beta_1 \chi_1 + \beta_2 \chi_2, ..., + \beta_n \chi_n$$

(see example, Hutcheson and Sofroniou ((1999))

However, the above model does not predict a precise numerical value of a dependent variable, but rather the probability (p) of success, the latter labelled 1 rather than 0. Logit (p) is the log (to base e) of the odds or likelihood (probability) ratio that the dependent variable is 1. Whereas p can only range from 0 to 1, logit (p) ranges from negative infinity to positive infinity. On the other hand, similar to linear regression, logistic regression gives each regressor a coefficient, β which measures the regressor's independent contribution to variations in the dependent variable.

The fundamental equation for logistic regression suggests that with all other variables held constant, there is a constant increase of β_1 in logit (p) for every 1-unit increase in χ_1. However, because the logit transformation is non-linear, it does not mean a constant increase in p; so the increase in p is associated with a 1-unit increase in χ_1 changes with the value of χ_1. However, it corresponds to a constant multiplication (by $\exp(\beta)$) of the odds that the dependent variables take the value of 1 rather than 0. Thus, the $(\exp(\beta))$ is the effect of the independent variable on the "odds ratio" (p/(1-p)). The measure of odds and probability provides similar information with a slight distinction.

For instance; if there is a 50/50 chance that a firm's increase in debt is due to the factor such as fixed assets, the probability of debt ratio increase is 0.5 whereas the odds of debt ratio increase is 1.0 (0.5/0.5). This means that for every firm which increases its debt ratio, one is expected to decrease. If the probability of debt ratio increase is 0.25, the odds of increase is 0.33 (0.25/0.75) and for every 0.33 firm which increases its debt ratio, one firm is expected to decrease its debt ratio. If the probability of increasing debt ratio is 0.9, the odds of increase d/e is 9 (0.9/0.1), which means for every 9 firms which increase their debt ratio, 1 firm will decrease, thus making it an odds of 9 in favour of increase. Therefore, an odds ratio of 1 indicates that changes in the explanatory variable do not lead to changes in the odds of p. A ratio of less than 1 indicates that the odds of p decreases as χ increases, and a ratio of greater than 1 indicates that the odds of p increases as χ increases.

Logistic regression also tests the hypothesis that a coefficient is different from zero (zero means that the odds ratio does not change and the probability is not affected).

The test that a coefficient is 0 can be based on the Wald statistic, which has a Chi square distribution. Logistic regression uses the Chi square with their p-values to provide the statistical significance for each estimated coefficient to test the hypothesis. The parameters of the model are estimated using the maximum-likelihood method that is the coefficients that make the observed results most "likely" are selected. The logistic regression also shows the percentage deviance and the adjusted percentage deviance. According to the Statgraphics Version 5.0 StatAdvisor, this statistic is similar to the usual R-squared and adjusted R-squared. Therefore, the percentage deviance is the proportion of the variance in the dependent variable which is explained by the variance in the independent variable.

Throughout the analysis of the logistic regression, the first consideration is the percentage deviance of more than 10 per cent followed by the significance of the model p-value at least at 90 or 95 or 99 per cent confidence level. However, for the discussion, the emphasis is given to the coefficient estimation or the relationship between the factors/variables.

As noted earlier, if β_1 is positive, its transformation (antilog) will be greater than 1, and the odds ratio will increase. This increase occurs when the predicted probability of the event's occurring increases and the predicted probability of its not occurring is reduced. If β_1 is negative, the antilog is less than one and the odd will be decreased. Hence, a positive coefficient increases the probability, whereas a negative value decreases the predicted probability. If the predicted probability is greater than 0.5, then the prediction is yes, otherwise no. A coefficient of zero equates to a value of 1.0, resulting in no change in the odds.

The methods utilised reflect the rich data used in this thesis and the diversity of hypotheses to be tested. More than one statistical technique is sometimes used to test the same hypothesis to enhance the testing procedures. Throughout the thesis, three levels of significant statistical tests are reported at the 90 or 95 or 99 per cent confidence level.

4.5 Data

This section introduces the data employed throughout the thesis which have been identified from the review of the literature. Two measurements of the dependent variables, and 12 independent variables were selected using Datastream. On the other hand, a total of 9 questions have been prepared for the questionnaire survey.

4.5.1 An Overview of Datastream Data

The data source from Datastream provides accounting data for the firms. Only firms with at least 4 continuous time series observations between 1994 and 2 000 for the main board and 3 time series observations between 1995 and 2000 for the second board h ave b een chosen f or t his s tudy. T he t otal n umber o f f irms chosen f or t his study is 572, which is comprised of 357 from the main board and 215 from the second board. The main difference between the two boards is the requirement of their paid-up capital to be listed on the KLSE, i.e. RM60 million for firms listed in the main board and RM40 million for firms listed in the second board. Therefore, the main board consists of large and mature companies, while the second board consists of small and newly listed companies.

There is no common measure of capital structure that was used in most of the literature. Different researchers and authors use different sets of capital structure measures, based on their own argument and theoretical standpoint. However, most of the measures would definitely serve the objective of measuring the gearing ratio.

Stonehill et al. (1975) state that corporate treasury usually prefer book values measure over market values measure. Their findings are supported by Myers (1977), who suggested that such measures were strongly related to the firms' "assets-in-place". Marsh (1982) proposed the use of market values rather than book values to calculate debt. However, he employed both methods as he found it very difficult to calculate the market value of firms' debt. Ironically, he found similar results for both measurements.

Titman and Wessels (1988) used both methods to measure equity and used book value to measure debt. They argued that they did not suspect the cross-sectional differences between the market values and book values of debt to be correlated with any of the capital structure determinants in their study. Therefore, the use of both methods are acceptable. One of Harris and Raviv's (1990) measurements is book value of debt to the market value of equity plus the book value of debt. Rajan and Zingales (1994) also used a total debt to total debt plus market value of equity.

Clearly, many authors used a book value measure for debt and either book value or market value measure for equity. The gearing measurement in this thesis is consistent with the Harris and Raviv (1990) and Rajan and Zingales (1994) studies: i) **"Book value ratios"** for book value of debt to book value of debt plus book value of equity.

ii) **"Mixed value ratios"** for book value of debt to book value of debt plus market value of equity. The codes and the formulas for the dependent and independent variables are listed in the Appendix D.

There are twelve independent variables extracted for each company under the main board and the second board.

4.5.1.1 Current Ratio

Current ratio is defined as total cash and equivalents divided by current liabilities. Cash and equivalents include fixed term and bank deposits, short-term investments/trading securities, cash balances with a financial company, loans to associates and cash assets of subsidiaries engaged in financial activities. This attempts to measure the ability of the company to use cash, and its equivalents, to meet the financial obligations that are due within one year. Current ratio is expected to have a positive or a negative relationship with gearing as discussed in the literature review.

4.5.1.2 Working Capital Ratio

Working capital ratio is defined as total current assets divided by total current liabilities. Current assets include cash and cash equivalents, stocks, debtors and short term investment. Attempts are made to measure the ability of the company to use current assets to meet its financial obligations that are due within one year. Usually, it is expected that firms with a higher liquidity ratio will be able to borrow more, particularly short-term debt as the risk of defaulting is low. Positive and negative liquidity relationships are hypothesised, similar to the current ratio.

4.5.1.3 Net Profit Margin

Net profit margin is the profit after tax divided by total sales. It gives an indication of the average profit margin achieved by a company per ringgit of sales. A lower profit margin may indicate a decrease in profit. Martin and Scott (1974) suggest a positive and negative relationship between profitability and gearing. Higher profit will result in high cash flows, therefore firms will be able to support interest payments on debt. Alternatively, profitable firms may prefer to use the accumulated earnings for financing as suggested by Myers (1977), therefore resulting in a negative relationship between debt and gearing. The profitability is hypothesised to have a negative relationship with debt.

4.5.1.4 Market to Book Value Ratio

Market to book value ratio is defined as market value divided by the equity book value. The market to book value ratio shows the extent to which the market value of a company exceeds the book value of equity. The ratio provides an indication of the company's financial position as perceived by the market. The market to book value is usually thought as a proxy for growth or investment opportunities as proposed by Rajan and Zingales (1995). Firms with high investment opportunities will use debt in the future, therefore market to book value ratio is expected to have a negative relationship with gearing.

4.5.1.5 Interest Coverage Ratio (RICBT-reported interest cover before tax)

Time interest earned is defined as pre-tax profits plus net interest charge divided by net interest charge. Net interest is the difference between interest paid and the interest received. It is a measurement of the number of times a company could make its

interest payments with its earnings before tax. According to Kennon (2003), investors are usually advised not to buy the company's shares if the company has an interest coverage ratio of under 1.5. An interest coverage ratio of below 1.0 indicates as equal amount of earnings and the interest that firms will have to pay, suggesting that the business is having difficulties generating the cash necessary to pay its interest obligations. While there is no general rule, a ratio of net income to interest of 2:1 is usually considered safe since it suggests that the debtor can earn twice as much in a year as it can afford to pay in interest charges. Interest coverage ratio is expected to have a positive relationship with gearing.

4.5.1.6 Tax

Tax charge is the annual differences of taxes being paid in the form of percentage. Interest on debt is one of the many tax shields available to firms. As the corporate tax rate is raised, firms may substitute debt for equity financing. Alternative views were discussed in the literature reviews. This suggests that firms that are subjected to lower corporate tax rates will employ less debt in their capital structures. Therefore it is expected that the higher the tax rate, the higher is the debt in the company's capital structure.

4.5.1.7 Depreciation to Total Assets

Depreciation to total assets refers to provisions for depreciation and amortisation of tangible fixed assets divided by the total assets. It is the process by which a company gradually records the loss in value of fixed assets. The purpose of recording depreciation as an expense over a period of time is to spread the initial purchase price of the fixed assets over its useful life. Depreciation to total assets is used as a proxy

for allowable investment related tax shields. Depreciation would represent the best alternative shield available and should capture any substitute effect of other tax shields. Decreases in allowable investment-related tax shields (e.g. depreciation deductions or investment tax credits) which reduces the real value of tax shields should increase the amount of debt that firms employ. It has been argued that firms with a high non-debt tax shield have lower debt ratios, (Angelo and Masulis (1980)).

4.5.1.8 Return on Capital Employed (Roce)

Return on capital employed is defined as pre tax profit plus net interest divided by total capital employed plus short term debt, payable within a one year period. It is one of the profitability ratios which measure the returns of a company from its capital. The resulting percentage/ratio represents the efficiency with which capital is being utilised to generate revenue. Profit before interest and taxes are used because Roce is usually used to measure general management performance, while interest and taxes are controlled externally. Capital employed is fixed assets plus current assets minus current assets. The correlation between debt and return on capital employed can be either negative or positive, and is similar to the argument of the net profit margin. However, the research-hypothesised negative relationship between profit and debt is based on the Kester and Isa (1993) findings, that Malaysian companies prefer retentions over external financing, therefore less debt is required if the profit is high.

4.5.1.9 Net Fixed Assets to Total Assets

Net fixed assets to total assets is defined as the total tangible fixed assets, property, plant and equipment used in the business net of accumulated depreciation and amortisation divided by the total assets. Fixed assets are one of the most important

categories of loan collateral. It is commonly suggested as a variable in the trade-offs models whereby the costs of financial distress are lower on collateralised loans. Myers (1977) argued that assets in place increase a firm's debt capacity. Therefore, net fixed assets are expected to have a positive coefficient in the capital gearing model.

4.5.1.10 Logarithm of Total Assets

Total assets are the total assets employed by the company. They represent the total of tangible and intangible fixed assets, other long-term assets, investment and the current assets. In other words, it is the sum of current and non-current assets or total assets employed plus current liabilities. The logarithm of total assets is used as the proxy for size. Warner (1977) and Ang, et al. (1982) suggested that larger firms should be able to borrow more because the potential bankruptcy costs value is smaller for larger firms. Therefore, size is expected to have a positive relationship with gearing.

4.5.1.11 Price-Currency Sensitivity

One of the factors that triggered the Asian financial crisis in July 1997 is the currency speculation that had severely affected the stock market. Price sensitivity is the measure of how sensitive the share prices are towards ringgit movements. Datastream produces the correlation between the two variables for the companies under the main board and the second board. The company share prices are regressed against the ringgit (US $ to Malaysian Ringgit, i.e. RM1 = 0.26) to get the correlation coefficient for capital structure modelling. The more sensitive the stock prices to the ringgit movement, the more vulnerable the share price is to the currency risk. The currency appreciates and depreciates according to economic variables, such as interest rates and

inflation, thus exposing the firms to risk. This suggests that firms with high price-currency sensitivity are expected to have low gearing ratios. Therefore, a negative coefficient is hypothesised between gearing and currency correlation.

4.5.1.12 Risk (Operating Risk)

Business risk is the standard deviation of EBITDA-earning before interest and taxes and depreciation – or operating income. For the main board, the standard deviation of three years, two years and three years is used to represent before the crisis, during the crisis and after the crisis, respectively (see Section 5.3 in Chapter 5 for period of study). While for the second board, the two-year period is used to represent the three different states. The standard deviation is used as a measure of volatility of risk. Higher operating risk implies a higher probability of financial distress and therefore higher bankruptcy costs. Therefore, this suggests that risk is expected to have a negative relationship with gearing.

The focal point of the study of capital structure is to incorporate the 1997 financial crisis event into the data. Therefore, the cross sectional data discussed previously were divided into 3 time-periods: pre-crisis, during the crisis, and post-crisis. Any changes in the results within those 3 periods will be analysed to determine the cause of the change. Besides the cross sectional study, the same data were also treated as pooled data in which dummy 0 represents the pre-crisis period and dummy 1 represents the crisis period. If the dummies were significant, the results proved that gearing is affected by the 1997 financial crisis.

4.5.2 An Overview of Questionnaire Data

As previously mentioned, the questionnaire survey consisted of 9 questions, comprised of dependent and independent variables in the hypothesised relationships. The gearing measurement for the questionnaire is referred to as debt to equity ratio, in which book value of debt is divided by book value of equity. The first question covers the financing choice and the level of preference. Questions 2 to 5 cover the sensitivity factors and questions 6 to 9 cover the changes of gearing ratio following the crisis.

Question 1 includes the priority towards retentions, ordinary shares, Islamic bond, Islamic bank loan, conventional bond, conventional bank loan, overdraft and financial lease. F irms a re e xpected t o f ollow t he f inancing h ierarchy a s s uggested b y M yers (1984). Therefore, retention may be the first option, followed by debt which is the safest form of external funding, and lastly ordinary shares. It is also expected that conventional financing is preferred over Islamic financing. The reason is Islamic debt is relatively new to firms in Malaysia, while conventional debt has already been established since the establishment of the first foreign commercial bank, the Hong Kong and Shanghai Banking Corporation in 1884 (BNM, 1994, p.142). Debt and financial leases are expected to have equal preferences, because both form of financing are tax deductible in the profit and loss account, and leasing obligations should use up debt capacity.

Questions 2 to 5 relate to the debt to equity response to the: increase in the firms' fixed assets, decrease in the firms' profit, increase in the firms' research and development, d ecrease i n t he c orporate t ax r ate, i ncrease i n t he c apital a llowances,

increase in the interest rates and inflation, decrease in government incentive and increase in industry average debt ratio. Questions 6 to 9 cover the actual and target gearing ratio responses following the 1997 financial crisis and following the ringgit being fixed to the US dollar. The above factors are expected to have a significant relationship with the variables being tested.

4.6 Overview of the Malaysian Data

This section provides evidence of Malaysian firms' capital structure from the observation of the data extracted from Datastream. Data were extracted from Datastream and transferred to spreadsheets to generate charts. The figures in the graphs indicate the annual average of each item calculated by Statgraphics. The data of the main board companies are for the period of 7 years (1994-2000) and 6-year period (1995-2000) for second board listed companies. The following charts represent both the dependent and independent variables employed in the thesis.

Graph 4.1 shows the gearing of the main board based on book value ratios and mixed value ratios. Although the debt ratio is constantly rising from 1994 to 1999, the figures are maintained below the 40 per cent for both assessments for the 7-year period. It confirms the Sekely and Collins (1988) study of the low debt ratio of Malaysian firms using the Kruskal-Wallis test. Booth et al. (2001) placed Malaysia in the low-debt-group in their study on the capital structure of developing countries. It is obvious that gearing based on the book value ratio is higher than that on the mixed value ratio from 1994 to 1997, but immediately following the 1997 crisis, the mixed value ratios rise slightly higher than the book value ratios. The crisis did not raise the ratio of the main board companies above the 50 per cent level.

Graph 4.1

Main Board Firms' Gearing

book value ratio

mixed value ratio

D/D+E

year

Graph 4.2

Second Board Firms' Gearing

mixed value ratio

book value ratio

D/D+E

Year
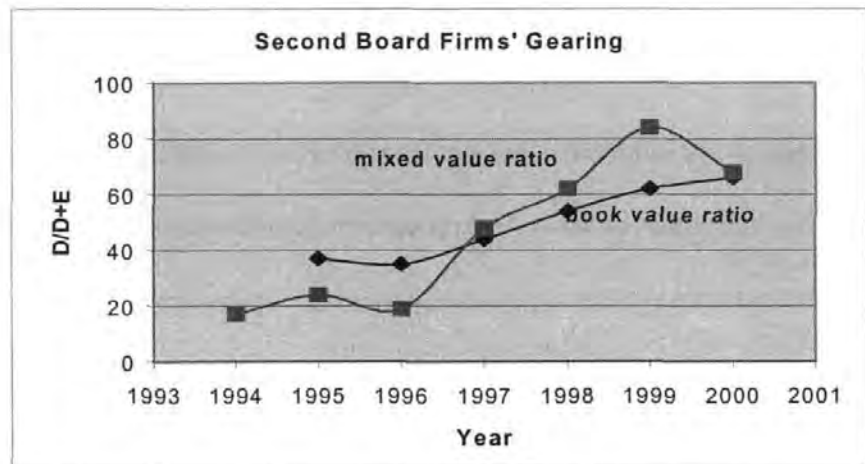
Graph 4.2 illustrates the second board gearing based on the book value ratios and mixed value ratios. A similar trend exists for the second board in which the book value ratios are higher than the mixed value ratios before the crisis and substantially increased following the 1997 financial crisis. Whether at the book value or mixed value ratios, the second board ratios are always higher than those of the main board. From 1994, the average book value ratios of the second board are 31 per cent as compared to 22 per cent for the main board. In 1994, the mixed value ratio of the main board was 11 per cent, while the second board figure was close to 20 per cent.

Immediately following the crisis, the main board companies were able to maintain their gearing ratio with little increase. However, the second board mixed value gearing surpassed its book value ratios almost double from 40 per cent in 1997 to 60 per cent in 1998 and finally to 80 per cent in 1998.

The rise in gearing using the mixed value ratios may be due to the decrease in the market value of equity following the collapse of the Malaysian stock market. When the market value of equity shrinks, the debt ratio will automatically rise in the computation of the mixed value ratio. The main board equity value is not affected as badly due to their size and stability. Small companies would probably have applied for bank loans due to the unavailability of funds in the market as a result of the crisis, causing the debt ratio of the second board companies to accelerate.

The first capital structure determinant extracted was liquidity, which was proxied by current ratio (cash and equivalents) and working capital ratio (current assets). As shown in Graphs 4.3 and 4.4, the main board liquidity ratios are always higher than the second board ratios. The main board current ratio ratios fell to 0.5 during the crisis, otherwise the figures are between 0.8 and 1.5. The second board ratios have always been below 0.5 from 1994 to 2000. A similar pattern is observed for the working capital ratio, where the average for the main board ratios was between 1.5 and 2.5 within that 7-year period. The average of the second board ratios was between 1.0 and 1.5 from 1995 to 2000. Thus, both results illustrate that the main board companies are in better position in terms of liquidity as compared to the second board companies. From the figures, liquidity based on working capital ratios are in a better position than liquidity based on the current ratio for both boards.

Graph 4.3
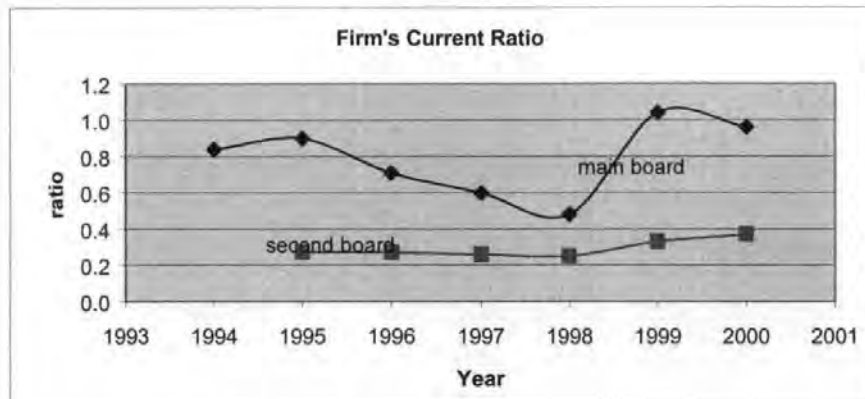
Graph 4.4
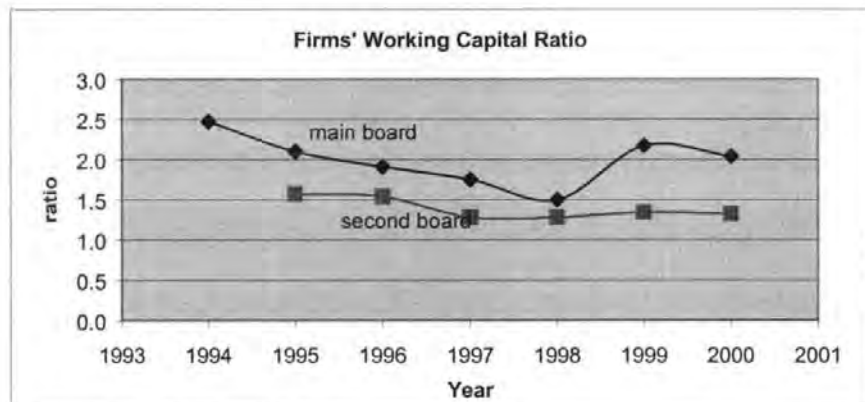
Graphs 4.5 and 4.6 show the net profit margin and the return on capital employed for both boards. Net profit margin measures the net profit from the sales, while return on capital employed measures the return on investment. The main board profit margin is always h igher t han t he second b oard except i n 1 997 w hen b oth b oards had a lmost similar figures. In 1998, both boards had negative profit. While the main board profit margin was improved in 1999 and 2000, the second board profit margin maintained its negative figures for that same period. Both boards had almost similar returns from the investment. The companies listed under the main board and the second board achieved almost similar high returns on investment from 1994 to 1997, however in

mid 1997 and early 1998, companies under both boards suffered a rather high negative return. While main board recovers from negative profit and return in mid-1998, second board companies continued to experience negative ratios until 2000.

Graph 4.5

Firms' Net Profit Margin

main board

second board

Year

Graph 4.6

Firms' Returned on Capital Employed

main board
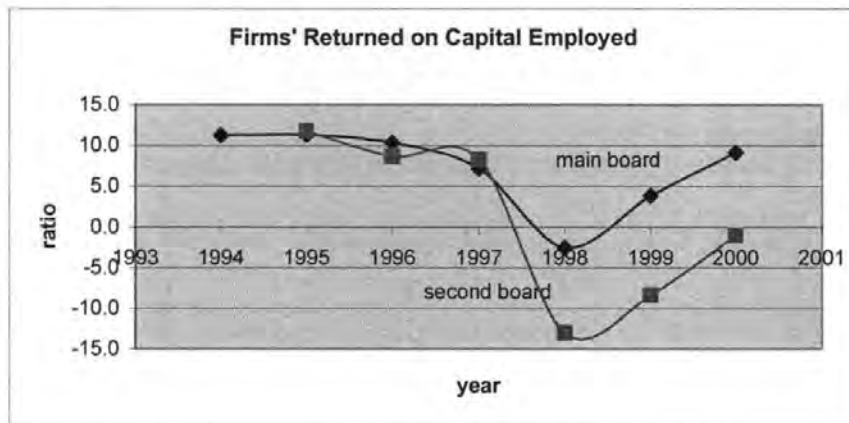
second board

year

The market to book value ratio is the proxy for investment opportunity or growth of the firms. As shown in Graph 4.7, the main board growth shows a fairly constant declining trend over that 7-year period. Although the second board shows a significant increase in growth from 1995 to 1996, it fell substantially following the crisis in 1997. The results indicate that the share prices of the small companies are

very sensitive towards the economic downturn as compared with the companies on the main board.

Graph 4.7

Firms' Market to Book Value Ratio
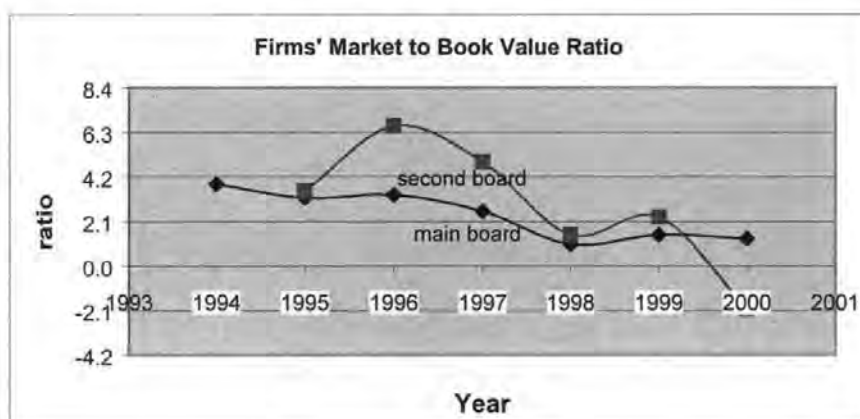
Both the main board and the second board interest coverage ratio were constantly fluctuating even before the crisis as shown in Graph 4.8. While the main board had a negative ratio in 1994, the second board experienced a negative ratio in 1995 and 1996. Both boards had a positive ratio in 1997 and a negative ratio in 1998. However, the ratios have been improved since 1999 especially for companies under the second board. It is not surprising to have high fluctuation in the ratios since the earnings fluctuate as shown in Graph 4.5, especially following the crisis.

The annual change (growth) in tax paid are almost similar for both the main board and the second board as shown in Graph 4.9, although the second board figures indicate a small fluctuation over the years. Both boards had a low percentage change in 1998 and 1999. This is due to the Income Tax Amendment Act (1999), relating to the waiver of tax for income earned in 1999, and this tax-exempt income is subject to agreement by the Inland Revenue Board. The reason behind the exemption is partly as a fiscal incentive in respond to the crisis. However, not all companies are given the

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exemption, it depends on the rules and conditions set by the Inland Revenue Board. Singh and Teoh (2001) provide some details of the tax exemption for a corporation.

Graph 4.8

Firms' Interest Coverage Ratio

Graph 4.9

Firms' Tax Charge
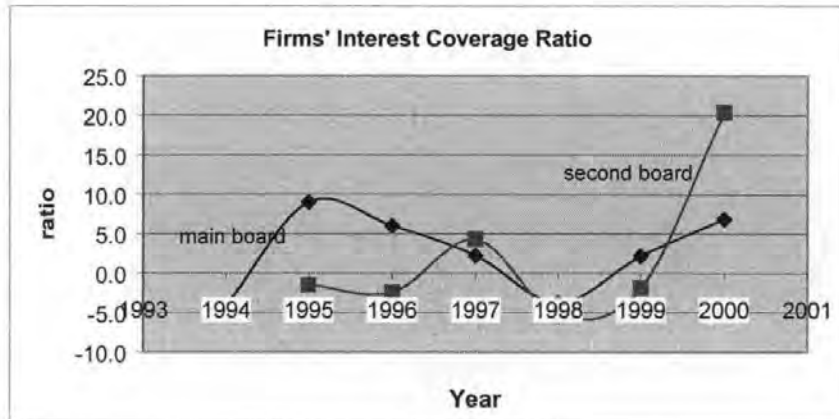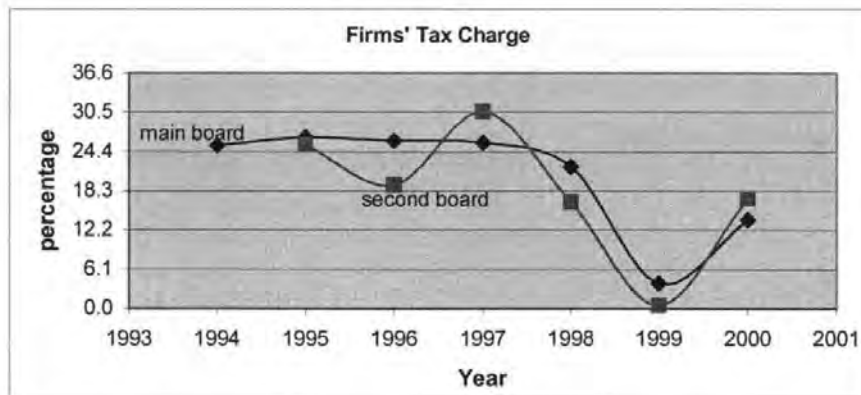
Graph 4.10 shows the depreciation to total assets of main board and second board companies. Depreciation is used as a tax surrogate in this study or proxy for the non-debt tax shield item. The main board depreciation ratios were very small and are almost non-existent on the graph. The reason is the numerator value (Depreciation) is very small, while the denominator values (Total assets) are very high, resulting in 0.01 to 0.02 ratios in the computation of depreciation over total assets for that 7-year period. It reflects that large companies have large amount of assets as compared to

their fixed assets. The second board depreciation ratio ranges from 0.03 to 0.61, considerably higher than the main board companies. However, the proportion is still below the ratio of 1. The result is consistent with the amount of the fixed assets owned by the companies on both boards. Graph 4.11 shows that the second board has a high proportion of net fixed assets to total assets as compared with the main board companies which is very small and is slightly above 0. The amount of fixed assets in place is reflected in the computation of the depreciation ratio.

Graph 4.10
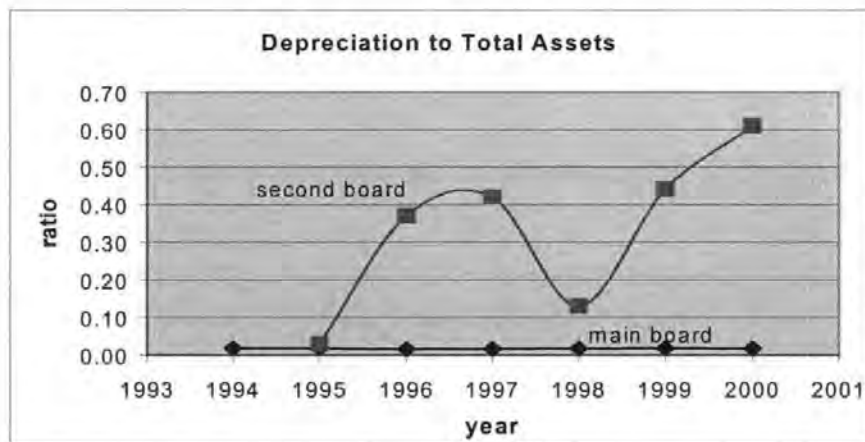
Graph 4.11 depicts a higher proportion of second board net fixed assets in relation to the total assets compared with the main board net fixed assets' proportion to total assets. The main board had an average ratio of 0.3 from 1994 to 2000. The second board ratio ranged from 0.4 in 1995 to 8.5 in the year 2000. Generally, the large companies would expect to have a larger amount of fixed assets than the small companies. Large companies may have a higher proportion of current assets and intangible assets than the fixed assets in the total assets' computation.

Graph 4.11

Firms' Net Fixed Assets to Total Assets
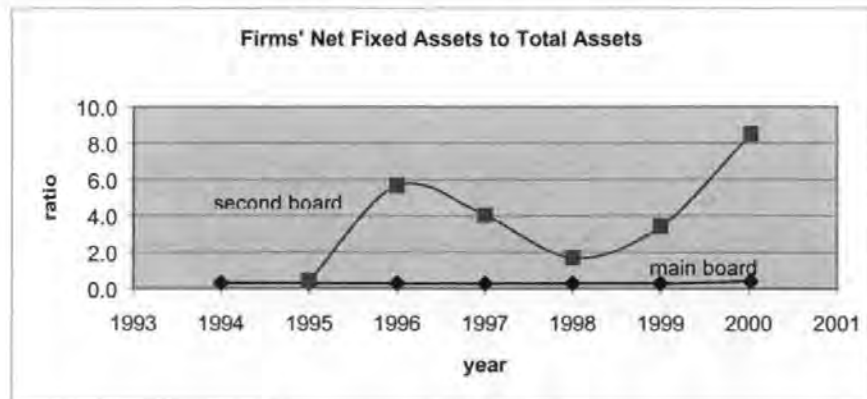
Due to the apparent differences between the two boards' net fixed assets as shown in Graphs 4.11, the main board net fixed assets ratio is much lower compared with the second board net fixed assets ratio. Therefore, the nature of the assets for both boards are further investigated. The absolute figures of current assets, fixed assets and total assets were extracted from Datastream. The current assets and fixed assets were summed using a formula in Excel, however these figures are different from the total assets' figures obtained using Datastream 392 code. There are large discrepancies of values especially for the main board. The reason is because Datastream only reported the figures of total assets, fixed asset and current assets as indicated in the company's annual report. A few items such as goodwill, and R&D were not available for Malaysian companies for the researcher to access using Datastream. For the purpose of this research, the discrepancies between total assets and current assets plus fixed assets are referred to as *investment*.

The ratio of current assets, fixed assets and *investment* assets to total assets were then calculated using Excel for both boards. The results are depicted in Graphs 1 and 2 in Appendix E for both the main board and the second board, respectively. The ratio of

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current assets to total assets ranges between 0.42 to 0.45 for the main board and 0.58

to 0.50 for the second board for the period between 1995 and 1999. On the other

hand, fixed assets to total assets varies between 0.35 to 0.36 for main board and 0.38

to 0.40 for the second board. The ratio of *investments* to total assets varies between

0.20 to 0.21 for the main board and 0.05 to 0.08 for the second board.

Obviously, both boards have a high ratio of current assets compared with fixed assets.

The investment assets ratio for the second board of companies are so much lower than

for the main board. Although the differences in the fixed assets and current asset

ratios are very small, it raises the question as to why the companies hold high current

assets over fixed assets. This is because, conventionally, companies in general regard

high fixed assets as better for the company especially established companies in the

main board. Further to that, from the investors' point of view, companies with high

fixed assets tend to lower their (investors) risk of investing especially during a

liquidation. Should *investment* figures be considered as part of the fixed assets? If

the answer is yes, by combining the fixed assets and investments figures, this will

raise the ratio of fixed assets above the current ratio figures especially for the main

board companies.

Further to that, the 1998-2000 annual reports of 17 and 4 companies listed under main

board and second board respectively, were analysed, particularly regarding the

investment figures. The selection is based on the availability of companies' annual

reports in the KLSE web site. The second board has a lesser number as only 5

companies were selected due to the availability of these companies' annual reports on

the web site. All the 17 companies listed in the main board are individually labelled

as company 1, company 2 and so on, and the same process is repeated for the 5 companies listed in the second board.

Apparently, companies listed in the main board usually had three extra items on the assets side of the balance sheet (other than the common entry of current assets, goodwill, research and development and fixed assets). These include investments in subsidiary companies, associate companies and other companies quoted in terms of the shares' value.

The ratio of current assets, fixed assets and investment (the sum of 3 types of investments) were calculated. As shown in Table 1 of Appendix E, the current assets to total assets (ca/ta) of 17 companies had the highest ratio (0.384), followed by fixed assets to total assets (fa/ta) with a ratio of 0.302. The lowest, however, is the investment to total assets with a ratio of 0.27. To facilitate an understanding of the high current assets' nature of the companies, various analyses were conducted on the following current assets items: stock, trade or receivables, deposits with the financial institutions, cash and short term investments. The ratio to total current assets of all these 5 items were computed using Excel. As shown in Tables 2 and 3 in Appendix E, trade and receivables had the highest ratio for both main board and second board companies with a ratio of 0.542 and 0.410, respectively, representing 50 per cent of current assets. Why do these firms have such a high amount of account receivables? Further study may be required to answer this question. Studies by Tucker and Moore (2000), for example, found evidence indicating that account receivables are a valuable source of cash to pay creditors in a bankruptcy situation, and that trade creditors may be more supportive of a liquidation compared with other creditors.

Three types of investment ratio to total investment ratio were also calculated. As shown in Table 1 in Appendix E, investment in associated companies (ass/tinv) had the highest ratio, 0.404, followed by investment in subsidiary companies (sub/tinv) with a ratio of 0.317, while investments in other company (oinv/tinv) had generated a ratio of 0.279. Table 3 in Appendix E shows a different scenario for the second board companies, whereby the fixed assets ratio is higher than current assets ratio whilst the investment to total assets figures almost do not exist. As mentioned earlier in the thesis, the companies listed under the main board are comprised of large and established companies, therefore it was no surprise for these companies to have subsidiaries, associates and investments in other companies. However, since only five companies h ad b een c hosen t o r epresent companies l isted i n t he s econd b oard, t he results may be biased. As a conclusion, the three types of investments are considered as p art o f t he c ompanies a ssets, h owever, t hey should b e c onsidered s eparate f rom fixed assets, as the subsidiary, associate and other company share values are subjected to greater uncertainty.

Graph 4.12 shows that the main board companies' total assets are much higher than the total assets of the second board companies. However, the amount of assets for both boards is fairly constant from 1994 to 2000. The assets amounted to between 10 and 11 million each year for the second board companies and 14 to 16 million for the main board companies. The comparisons made between Graphs 4.11 and 4.12 indicate that small companies have a relatively high level of fixed assets while large companies have a relatively high level of current assets.

Graph 4.12

Firms' Log(Total Assets)
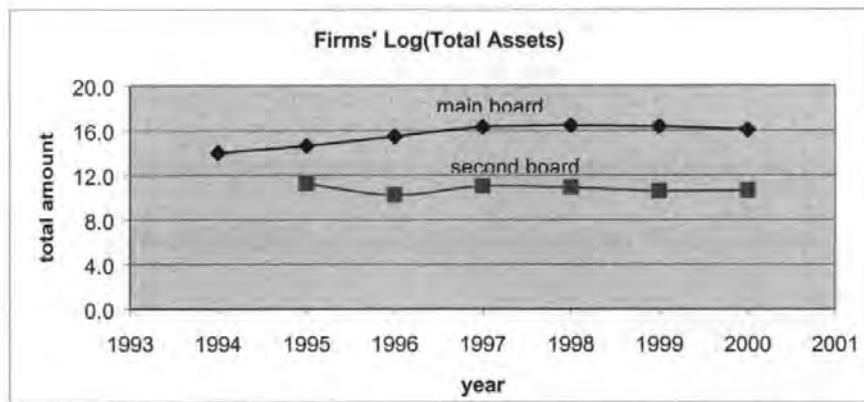
Graph 4.13

Earning Before Interest, taxes, Depreciation and Amortisation
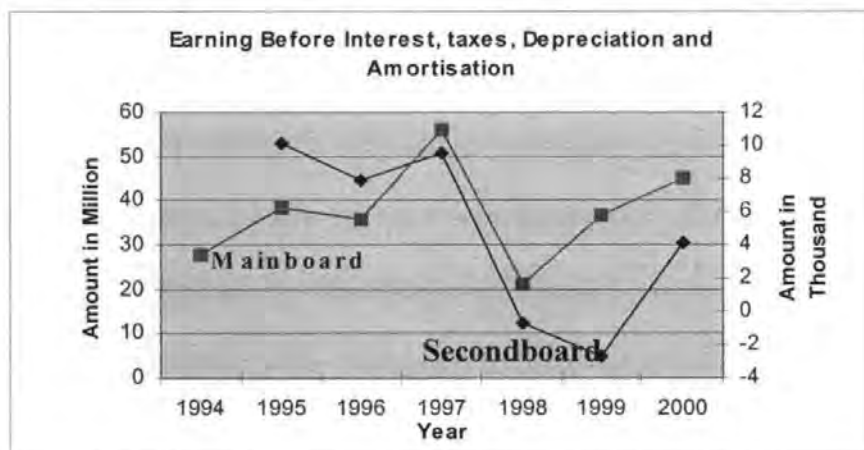
Earning before interest, taxes, depreciation and amortisation for both boards were continuously fluctuating between 1994 and 2000 as shown in Graph 4.13. The gap of the earnings between the main board and the second board is huge. The total amount of the main board is shown in million ringgit (left y-axis) while the total amount of the second board is shown in the thousand ringgit (right y-axis). The highest amount of earnings achieved by the main board was in 1997 (RM56 million) while the lowest was in 1998 (RM21 million). The highest for the second board was in 1995 in the amount of 10 thousand ringgit while the lowest was in 1999, in the amount of -RM2.76 thousand ringgit (-2760). The fluctuation of earnings within that 6 and 7 year period, implied great uncertainty. Therefore, both boards were exposed to

substantial business risk, which got worse immediately after the 1997 as firms were exposed to macroeconomics effects.

Graph 4.14 and 4.15 depicts the relationship between share prices and the ringgit movement from the period of 1994 to 2000. The first graph (4.14) shows high positive correlation of ringgit and the Kuala Lumpur Composite Index (KLCI) at 0.9095 of coefficient. The ringgit in the graph is obtained from the Datastream Global Treasury Information Service (GTIS) code of *MALAYUS* (US $ to Malaysian Ringgit, i.e. RM1 = 0.26 USD) from 1994-2000, using monthly frequency. It was intended to run the correlation between ringgit and each of the 357 companies under the main board, however, unlike the second board, the Datastream code for all the listed companies under main board was not valid to use with this program (correlation program), therefore KLCI was used. KLCI is the index of weighted market capitalisation in which current aggregate market capitalisation is divided by base aggregate market capitalisation multiplied by 100 using 1977 as a base year. Graph 4.14 shows that share prices are highly positively correlated with the ringgit movement. Therefore, if the ringgit is appreciated, the share prices will tend to go up and vice versa.

To cover each company price-currency sensitivity, a series of Graphs for the main board sectors are attached to the Appendix E1 for the observation, Graphs 1, 2, 3, 4, 5, 6 are for the six sectors listed under main board, construction, consumer product, industrial product, plantation, properties and services. All sectors show a high positive correlation of share prices and the ringgit fluctuation, with 0.9477 being the highest score for the industrial product and 0.8092 the lowest for the consumer product.

Therefore, it is fair to conclude that companies listed under the main board are highly positively sensitive to the ringgit fluctuation.

Graph 4.14
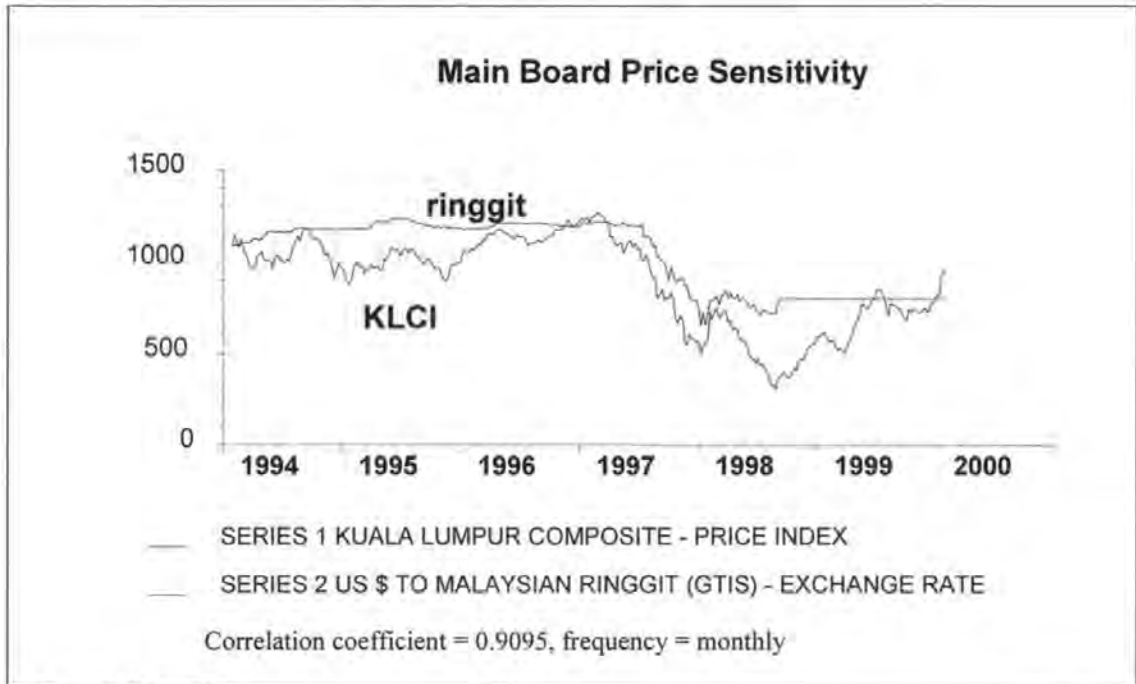
Source: DATASTREAM

The second graph, Graph 4.15 shows the correlation between ringgit and share prices of the companies listed under the second board. Although the share prices of the companies listed under the second board have a positive relationship with the ringgit movement at a 0.709 coefficient, the correlation is not as high as for the main board. From the graph (4.15), it can be observed that the ringgit has a constant movement from 1994 to 1997, subsequently the ringgit depreciated as well as the price index of the second board companies in 1996 and 1997. The conclusion for the second board is that the companies are not really sensitive toward the movement of the ringgit as compared with companies listed on the main board, particularly when the market was optimistic during 1996 and mid 1997.

Graph 4.15

Second Board Price Sensitivity

SERIES 1 KUALA LUMPUR SE SECOND BOARD - PRICE INDEX
SERIES 2 US $ TO MALAYSIAN RINGGIT (GTIS) - EXCHANGE RATE
Correlation coefficient =0.7097, Frequency = monthly
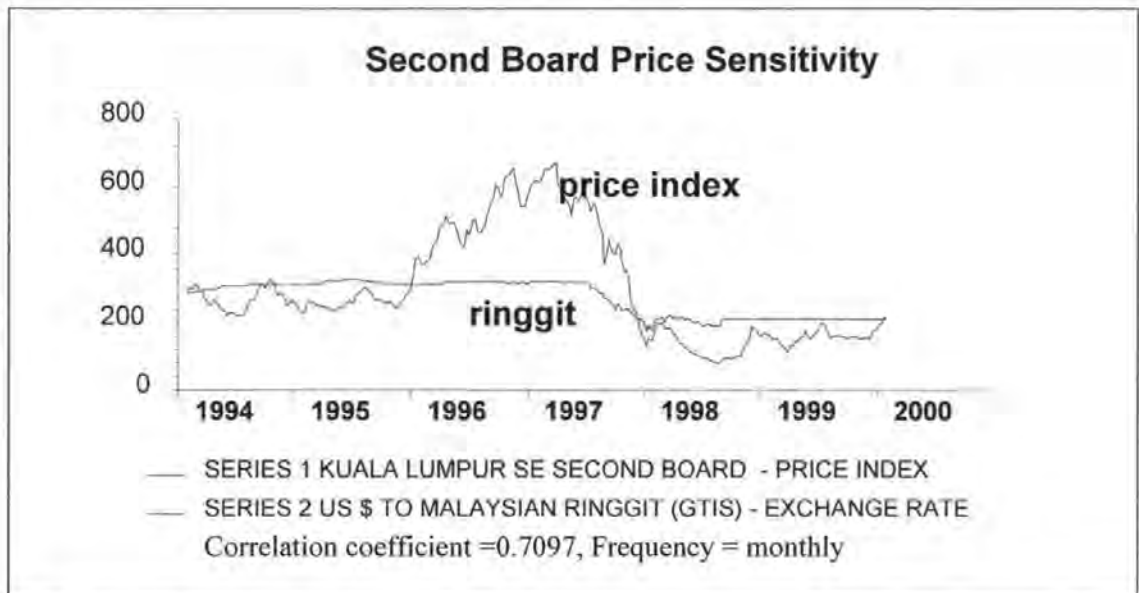
Source: DATASTREAM

4.7 Conclusion

Chapter 4 has provided a detailed discussion on the data and the methodology that will be used in the subsequent chapter to analyse the data. The data include primary data from a questionnaire survey and the secondary data from Datastream. The chapter reviews each variable that is used for data extraction from Datatstream for subsequent analyses. The formulas utilised by Datastream are appended and the program was discussed. Each hypothesis statement is given in section 4.3. There are 22 hypotheses to be tested.

An overview of the Malaysian data was presented in Section 4.5 in charts presentation to give some ideas of the companies' performance based on their ratios and figures. The graphs show that Malaysian gearing ratios gradually increased over time, the main board companies maintain their 40 per cent or less ratios under the book value

and mixed value ratios' assessment. The second board gearing is always higher than the main board; it is even higher following the 1997 financial crisis.

It is found that the main board (large companies) has high liquidity, high profitability, but low fixed assets, low depreciation to total assets and share prices are highly positively sensitive to the currency movement. There are a few items that experiences gradual decline over the period of study, such as the tax ratio and the market to book value ratio. The profitability ratios, interest coverage ratios and operating risk showed few fluctuations, especially immediately after the 1997 financial crisis.

The s econd b oard (small c ompanies) h ave h igh fixed a ssets, h igh d epreciation a nd share prices are positively correlated to the ringgit. Nevertheless, the second board liquidity and total assets are low. Similar to the main board, the second board tax ratio is gradually reduced over the years. However, its profitability and EBITDA are very uncertain, as well as its market to book value ratio and interest coverage ratios.

CHAPTER 5
ANALYSIS OF MALAYSIAN CAPITAL STRUCTURE FROM PUBLISHED DATA

5.1 Introduction

Chapter 5 includes the discussion on published data that were collected from the online Datastream financial database. The database consists of large and accurate information which includes account items, macro economic variables, equity and bond prices and many other variables that will be used to support this research on capital structure. The events of the 1997 financial crisis have been taken into consideration in the analysis of the Datastream data. The chapter consists of the following sections: Section 5.2 reviews the Datastream sample, Section 5.3 discusses the period of the study, Section 5.4 provides a summary of the data analysis. Section 5.5 shows the results and analysis of the ANOVA statistical test, Section 5.6 covers the Multiple Regression analysis, Section 5.7 focuses on the Pool Data and Section 5.8 concludes the chapter.

5.2 The Datastream

The data used in chapter 5 mainly comes from Datastream. The sample covers publicly listed companies in the Kuala Lumpur Stock Exchange (KLSE). The main board and the second board companies' financial and accounting data were extracted from Datastream database on-line. The main difference between the two boards is on the requirement of their paid-up capital by the Malaysian Security Commission. As of January 2001, the KLSE (KLSE website, 2001) requires all companies that are listed on the main board to have a minimum issued and paid-up capital of RM60 million comprising of ordinary shares of RM1.00 per share. The second board listing is also required to have a minimum issued and paid-up capital of RM40 million comprising of ordinary shares of RM1.00. The second board is relatively new, launched in 1988 to enable smaller companies which are viable and have strong growth potential to be listed. Therefore, companies listed on the main board are usually large and mature while the second board companies are smaller, immature and very volatile.

Each board is further classified by sectors, which reflect the core business of these companies. The main board consists of six different sectors which include construction, consumer products, industrial products, plantation, properties and services. The second board consists of a few groups, but is treated as one sector or one board for this thesis because there are too few companies that are listed under each sector.

When the data were first collected in September 2000, information on more than 700 companies were available on Datastream on-line. However, a number of problems were encountered in the attempt to extract the data from over 700 companies due to

the inconsistency of the listed number of companies. For example, in 1990, a total of 285 companies were listed in both boards, however by 1995, the number doubled to 529 companies. Therefore, the data of the companies will only be available starting from the year in which they were listed. Only companies that have been listed for a minimum of 4 years or more will have their data included in this survey. A final list of 572 companies was extracted from Datastream, in which the data of 357 companies were obtained from the *main board*, while the data of 215 companies were obtained from the *second board* of the KLSE.

5.3. Period of Study

The p eriod o f s tudy w as i nitially i ntended t o b e f or t en years, f rom 1 991 t o 2 000. However, due to the problems of inconsistency and insufficient data in the early nineties, t he d ata t hat w ere o btained f rom t he p eriod o f 1 991 to 1 993 a nd 1 991 to 1994 had to be disregarded for the main board and second board companies, respectively. Therefore, for a 7-year period account items were gathered from 1994 to 2000 for the companies listed on the main board. For a 5-year period account items for the companies on the second board were gathered from 1995 to 1999. For the purpose of studying the effects of the 1997 financial crisis on the capital structure of Malaysian firms', the data have been divided into the following 3 time periods: pre-crisis, crisis and post-crisis. For the main board, for a 3-year period data have been averaged pre-crisis and post crisis, while for a 2-year period data have been averaged for the second board pre-crisis and post crisis. Both boards used the 1997 data for the crisis period.

The total number of companies and their data are constantly changing due to listing and de-listing, therefore, it affects the consistency of the data in the spreadsheet. Some companies that have been listed in the second board may instead be listed in the main board after some years due to the increase in their paid-up capital. The problem is resolved by considering the length of time they were listed under each board. For instance, if a company was listed in the second board from 1994 to 1997 and was then promoted to the main board in 1998 to 2000, the company will remain under the second board throughout the analysis. This is because the length of time the company was listed under the second board weighed more than the time it was listed under the main board.

5.4 The Data

The thousands of types of data that are maintained by Datastream are used through program numbers, codes and datatypes. Account items such as financial ratio, profit and loss and balance sheet were the main items used in the capital structure research. Besides account items, macroeconomics items and shares prices were also collected. The raw data collected from the Datastream were then transferred to spreadsheets. A considerable amount of time was spent in cleaning and sorting the data to match the rows and columns for each company. The cleaning and sorting process resulted in the deletion of some of the companies from the spreadsheet, including any unwanted information before finally being imported to the Statgraphics version 5.0 for statistical analysis.

The review of the literature together with discussion held with the research supervisor have resulted in 2 dependent and 12 independent variables being chosen for the study.

Most of the data collected are <u>cross-sectional data</u> except for the share prices and the ringgit. The two dependent variables are the capital gearing based on the *book value ratio* and the *mixed value ratio*. Book value ratio comprises total debt over total debt plus book value of equity while mixed value ratio comprises total debt over total debt plus market value of equity. Datastream defines total debt as the sum of preference capital, long term debt and short-term debt. A high debt simply indicates that a company has placed a greater reliance upon debt than equity to finance its operations. Too much debt may expose the company to uncertain future conditions which may eventually result in the company experiencing difficulty in continuing debt finance in the future.

5.5 Analysis of Variance (ANOVA)

5.5.1 Introduction

Analysis of variance is the statistical method used for testing the null hypothesis, that the means of several populations are equal. ANOVA is used to test if there is any difference between and within the means of the main board and the second board. It is also used to test if there is any difference between the means of six sectors selected under the main board.

The following hypotheses (H1 and H2) are from Section 4.3, Chapter 4:

H1: Firms' gearing vary significantly between two boards

H2: Firms' gearing vary significantly across sectors

The hypotheses are adjusted in accordance with the three time periods.

Null hypotheses:

H0: There is no difference between main board and second board firms' gearing before, during and after the crisis.

H0: There are no differences between gearing ratios among firms in the same sectors on the main board before, during and after the crisis.

Alternatively Hypotheses:

H1: There is a significant difference between main board and second board firms' gearing before, during and after the crisis.

H2: Alternative hypothesis: There are significant differences between gearing ratios among firms in the same sectors on the main board before, during and after the crisis.

5.5.2 ANOVA – Mean and Median Analysis

As was previously explained, there is a *book value ratio* of debt to book value debt plus book value of equity, and a *mixed value ratio* of book value debt to book value debt plus market value equity for the statistical analyses. As shown in Table 5.1 of the Statgraphics one-way analysis of variance, the differences between the means were found to be significant for the book-value ratio of the pre-crisis with a p-value of the F-test less than 0.10 (0.0867). The post-crisis book-value ratios are also significant at the 99 per cent confidence level with a 7.32 F ratio. The 1997 book-value ratio is statistically not significant and violates the ANOVA assumption with a significant Cochran's statistic. Thus, based on the book value ratios, there is a significant difference between the gearing of large and small companies at the 90 and 99 per cent confidence level before and after the crisis. As indicated by the mean scores of both periods, the second board companies gearing is higher than the main board gearing (29.0456 > 25.6148) during the pre-crisis and (50.9003 > 35.8393) during the post-crisis period. The post-crisis period has given a stronger level of difference with

the p-value of less than 0.05. However, the standard deviation of the post crisis mean

score is so much higher than the pre-crisis period. The deviation indicates a large

deviation of certain firms from the average group gearing.

Table 5.1:
Gearing Differences Between The Main Board and the Second Board
Analyse Using ANOVA and Kruskal-Wallis

Group	Book value ratios			Mixed-value ratios		
	Pre- crisis	1997	Post-crisis	Pre crisis	1997	Post crisis
Main board	25.6148 (20.1481)	33.5908 (35.5104)	35.8393 (64.216)	13.5248 (13.6032)	27.9872 (25.2012)	36.4108 (26.631)
Second- board	29.0456 (21.269)	36.3284 (29.8707)	50.9003 (64.8309)	16.9983 (16.4212)	40.0936 (30.3792)	54.0876 (70.7932)
ANOVA F-ratio	2.95	0.87	7.32	5.65	24.55	16.97
Prob-value	0.0867*	0.3513	0.0070***	0.0178	0.0000	0.0000
COCHRAN'S TEST Prob-value	0.3998	0.0041***	0.8724	0.0045***	0.0025***	0.0000***
KRUSKAL-WALLIS Mainboard	236.845	269.854	275.794	219.664	239.958	253.907
Secondboard	259.471	295.731	302.90	252.383	309.447	298.580
H-Statistic	2.7223	3.3616	3.6188	6.0365	25.531	10.4377
Prob-value	0.0989*	0.0667*	0.0571*	0.0140**	0.0000***	0.0012***

*, **, ***Significant at the 10, 5, and 1 per cent confidence level, respectively.
Reported standard deviation are in parenthesis
Book value ratio-book value of debt to book value of debt plus book value of equity
Mixed value ratio-book value of debt to book value of debt plus market value of equity

Although significant results are found for the mixed-value ratio across three periods,

Cochran's test shows a significant p-value which indicates the standard deviations are

not equal, therefore violating the ANOVA assumption that the populations should

have equal variances. For any p-value with a significant standard deviation, i.e., with

a p-value of less than 0.05 from the Cochran test, the Kruskal-Wallis test will then be

applied to validate the hypothesis based on the median. This is a one-way analysis of

variance b y r ank. T able 5 .1 s hows b oth t he b ook-value r atios a nd t he mixed-value

ratios, where the p-values of the Kruskal-Wallis test are less than 0.1, 0.05 or 0.01,

and are significant at the 90, 95 or 99 per cent confidence level across the three

periods. The null hypothesis of the Kruskal-Wallis test states that the medians of the dependent variable within each level of factor are the same. Since all the p-values are significant at the required level, there is a difference between the main board and the second board companies' gearing before, during and after the crisis based on the book value and the market value of equity. The second board median rank is always higher than the main board median rank across the three periods. Based on the book-value ratios, the test also revealed that the 1997 median rank of both boards was higher than the pre-crisis values and the values of the post-crisis period were ranked even higher. The same result is evident for the mixed-value ratio, indicating the increase in gearing following the 1997 crisis.

It is essential to note that another important assumption of the ANOVA is that the sample must be randomly selected from normal populations. According to the Statgraphics statistical summary of ANOVA, the standardised skewness of the main board and the second board is outside the range of -2 to $+2$ for two levels of gearing for all periods at both gearing measurements. This indicates some significant non-normality in the data, which violates the assumption that the data come from normal distribution. Although this has distorted the means, the distortions are identical for most groups. According to Roberts and Russo (1999), it is still meaningful to see which means differ if the skewed data are roughly by the same degree in the same direction. However, it is meaningless to interpret differences between the means if some groups are skewed positively while the others are skewed negatively. Table 5.2 shows the skewness of the groups based on the previous ANOVA test showing all the data being skewed in the same positive direction (see Table 5.1).

Table 5.2:
The Main Board and The Second Board Skewness

	Book value ratios			Mixed value ratios		
	*Pre-crisis	1997	*Post-crisis	Pre-crisis	1997	Post-crisis
Main board	4.2232	51.2017	12.7036	12.5777	5.5436	1.5908
Second board	2.2505	9.5136	19.7808	12.0208	8.1908	2.4669

*The asterisks refer to the test with significant F-ratio
N.B. The shaded figures are therefore ignored.
Book value ratio-book value of debt to book value of debt plus book value of equity
Mixed value ratio-book value of debt to book value of debt plus market value of equity

The similar tests are applied to the following different sectors on the main board: construction, consumer products, industrial products, plantation, properties and services. Although there are more than six sectors listed on the Kuala Lumpur Stock Exchange, a few of the sectors are excluded due to the small number of the companies listed in those sectors. Using a one-way analysis of variance, the differences between the means of the six sectors are found to be significant during the pre-crisis period using the book-value ratios. The differences are also found to be significant using the mixed-value ratios during the 1997 and post-crisis period. The F ratio in Table 5.3 shows a p–value of less than 0.05 for the book-value ratio during the pre-crisis period with a gearing ratio of 20 to 30 per cent among all sectors except for plantation which had the lowest score of 12.615 per cent. The mixed value ratio of the 1997 and post-crisis period shows a high ratio for construction, at 37.555 and 45.381 per cent respectively, whilst the plantation is still the lowest with a score of 23.3756. Hence, there were differences between the book-value ratios for construction, consumer products, industrial products, plantation, properties and services during the pre-crisis period. There were also differences of the six sectors' mixed value ratios gearing during the 1997 and post-crisis period.

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Table 5.3:
Gearing Differences Between The Main Board 6 Sectors
Analyse using ANOVA

Variables	Book-Value Ratios			Mixed-Value Ratios		
	Pre crisis	1997	Post crisis	Pre crisis	1997	Post crisis
Construction	29.3836	39.6821	20.4669	13.2004	37.5453	45.3814
	(14.4306)	(21.087)	(116.706)	(8.5676)	(26.8071)	(25.0051)
Consumer Products	25.4863	30.6098	37.9246	12.2141	23.2639	30.742
	(21.9837)	(25.0994)	(49.6834)	(12.2884)	(21.8046)	(26.1153)
Industrial Products	28.7059	38.9093	36.9386	15.1171	26.5026	34.6435
	(22.1687)	(56.7383)	(59.1739)	(16.8883)	(25.031)	(27.1031)
Plantation	12.6146	21.9126	16.745	6.5362	17.8825	23.3756
	(16.4476)	(27.6052)	(50.6714)	(9.6406)	(23.2979)	(25.9291)
Properties	24.9114	28.9596	41.0588	13.2579	29.4643	40.8217
	(16.4566)	(17.8359)	(80.3403)	(9.7305)	(23.6588)	(23.2151)
Services	27.5321	36.3878	43.0886	16.4619	33.1413	41.4421
	(20.8921)	(25.3175)	(32.4101)	(15.1046)	(27.2947)	(27.6282)
F-ratio	3.81	1.75	1.28	2.88	3.00	3.84
Prob-value	0.0023***	0.1232	0.2719	0.0147**	0.0116**	0.0021***
COCHRAN'S TEST						
P-value	0.1486	0.0000***	0.0000***	0.0000***	0.6575	1.0

*, **, *** Significant at the 10, 5, and 1 per cent level, respectively.
Reported standard deviations are in parenthesis
Book value ratio-book value of debt to book value of debt plus book value of equity
Mixed value ratio-book value of debt to book value of debt plus market value of equity

Many statisticians have suggested a follow-up test for the one-way analysis of variance if the factors are at more than two levels. The test is intended to compare every possible pair of means. The two common tests are Newman-Keuls and Tukey HSD (Honestly Significant Difference). According to Roberts and Russo (1999), the former is suitable when comparing the means of up to and including three groups while the latter is more suitable to compare the means of a group of 5 or more. Both tests are suitable with roughly equal sized groups, with similar variances and normally distributed data. Due to the difference in the number of observations at each level of the sectors, Statgraphics Version 5.0 has suggested a Bonferroni test instead of the

Tukey HSD test. Statgraphics has produced the Bonferroni's multiple comparison procedure to determine which means are significantly different from others. An asterisk, '*', has been placed next to the pair indicating that these pairs have shown statistically significant differences at the 95 per cent confidence level.

Table 5.4:
Gearing Differences Between The Main Board 6 Sectors
Analyse Using Bonferroni Multiple Range Tests

Variables	Book-value ratios			Mixed-value ratios		
	Pre crisis	1997	Post crisis	Pre crisis	1997	Post crisis
1.Construction	*1,4				*1,4	*1,4
2. Consumer Products						
3. Industrial Products	*3,4					
4. Plantation	*4,5 & 4,6				*4,6	*4,5 & 4,6
5. Properties	*4,5					*4,5
6. Services	*4,5				*4,6	*4,6

* significant at 95 per cent confidence level
N.B. The shaded figures are therefore ignored, F-ratio is not significant.
Book value ratio-book value of debt to book value of debt plus book value of equity
Mixed value ratio-book value of debt to book value of debt plus market value of equity

The above Bonferroni table was prepared based on the ANOVA test in Table 5.3. Based on the book-value ratios of the pre-crisis period, the mean scores of the plantation sector is different from the mean of the other sectors (p-values < 0.05) except the consumer products. Therefore, the plantation sector gearing is significantly different from the gearing of construction, industrial products, properties and services. Mixed-value ratios of both the 1997 and the post-crisis periods show almost similar results in which plantation differs from construction and services during the 1997 crisis while plantation differs from construction, property and services following the 1997 crisis. Following the ANOVA post-hoc test (Bonferroni test), the only sector that is statistically different from other sectors is plantation.

As was discussed previously, any skewness in the sample probability will invalidate the ANOVA statistical test. A similar tendency of skewness was found for the six sectors of main board companies as shown below.

Table 5.5:
The Main Board 6 Sectors Skewness

	Book-value ratios			Mixed-value ratios		
	*Pre-crisis	1997	Post-crisis	Pre-crisis	*1997	*Post-crisis
Construction	0.1151	-0.3860	-0.3943	1.4376	0.6171	-0.0464
Consumer Products	2.0254	2.1747	7.9089	2.9889	1.9949	1.6551
Industrial Products	2.4655	23.9205	-4.5947	7.9219	3.6207	1.8488
Plantation	3.4072	3.4771	-3.9517	4.4462	3.5526	2.3523
Properties	0.6611	0.7388	18.3237	1.6608	2.3892	-0.1661
Services	1.0412	0.3264	3.1072	3.6060	1.6405	-0.0732

The asterisks refer to the test with significant F-ratio
N.B. The shaded figures are therefore ignored, the F-test is not significant
Book value ratio-book value of debt to book value of debt plus book value of equity
Mixed value ratio-book value of debt to book value of debt plus market value of equity

As shown in Table 5.5, the pre-crisis skewed values are all positive at 2.0254, 2.4655 and 3.4072 while the 1997 skewed are all at positive, 3.6207, 3.5526 and 2.3892. The only post-crisis skewed figure with an absolute value exceeding 2 is 2.3523. The negative values here are rather small and therefore are relatively unimportant.

5.5.3 ANOVA-Median Analysis

The Kruskal-Wallis H-test is used to find if there is any difference between the medians of the six sectors. The test results support the previous ANOVA test which had a significant Cochran's test. The H-statistic in Table 5.4 shows significant p-values of less than 0.01 across three periods at the 99 per cent confidence level both using the book-value ratios and the mixed-value ratios. Either at the book-value ratios or mixed-value ratios, the construction sector ranked the highest in the following 4

periods: i) the pre-crisis and the 1997 of book value ratios, ii) the 1997 and the post-crisis period of mixed-value ratios. However, the plantation sector ranked the lowest across the three time periods. Both the ANOVA and the Kruskal-Wallis tests have indicated that the plantation sector has the lowest mean and median score. On the other hand, the Bonferroni multiple range tests proved that only the gearing of the plantation sector is significantly different from the gearing of most of the other sectors.

Table 5.6:
Gearing Differences Between The Main Board 6 Sectors
Analyse Using Kruskal-Wallis

Variables	Book-Value Ratios			Mixed-Value Ratios		
	Pre crisis	1997	Post crisis	Pre crisis	1997	Post crisis
Construction	192.946	213.839	181.0	171.875	204.917	201.68
Consumer Product	163.276	167.44	172.41	148.457	151.181	145.17
Industrial Products	180.282	179.44	181.117	162.160	160.40	161.151
Plantation	97.771	122.443	122.167	96.971	118.514	116.139
Properties	168.336	167.493	180.043	167.45	178.315	185.553
Services	176.229	193.096	202.955	175.368	183.513	186.399
H-Statistic	22.5019	16.8952	15.4616	20.1892	17.74	21.3463
Prob-value	*0.0004	*0.0047	*0.0086	*0.0012	*0.0033	*0.0007

* P-values significant at least 1 per cent confidence level
Book value ratio-book value of debt to book value of debt plus book value of equity
Mixed value ratio-book value of debt to book value of debt plus market value of equity

5.5.4 Discussion

The analysis of variance found the differences between both boards book value ratios gearing during pre-crisis and post-crisis periods. The differences of the gearing are marginally significant during the pre-crisis stage (significant at 90 % confidence

level) but strongly significant following the crisis (significant at 99 per cent confidence level). Therefore, there are small differences in gearing between large and small companies when the economy is growing but large differences are found when the economy is in trouble.

The second board gearing ratios surpassed the main board ratios at both periods. One of the reasons high debt ratios for small companies increased substantially following the crisis may be due to the financial assistance in the amount of 1.5 billion ringgit provided by the government to the financial institution to aid small and medium-sized companies following the collapse of the financial market (BNM, 1999). Titman and Wessels (1988) state that small firms may be more geared than large firms and may therefore prefer to borrow short term debt (through bank loans) rather than issue long-term debt because of the lower fixed costs associated with using short term debt. The evidence in Graph 2 in Appendix A reveals a higher proportion of short-term debt to long-term debt for the second board companies. The proportion had an average of 75.36 for the 7 year period (1994 to 2000). The differences in the financing practice between large and small firms are probably reflected in the high transaction costs that small firms face when they issue long-term debt or equity. By borrowing more short-term debt, these firms are particularly sensitive to temporary economic downturns, which have less effect on larger firms that are less geared.

The null hypothesis of no difference between the six sectors of the main board was rejected for i) the pre-crisis period of the book-value ratios, ii) the 1997 and the post-crisis of the mixed value ratios. The strong differences between the sectors when the economy was stable are consistent with many studies on the industrial differences of

Malaysian capital structure such as Annuar and Shamser (1993) and Mohamad (1995). The Annuar and Shamsher (1993) study of the five sectors traded under the KLSE found that Malaysian firms' capital structure differ significantly within and between industries. Using analysis of variance, Mohamad (1995) found that there are significant inter-industry differences in capital structure among large Malaysian companies.

Mansor and Mohamad's (2000) study on Malaysian firm's capital structure found that heavy industries such as construction, chemical and electrical (industrial products) tend to have higher debt ratios than other industries. Light industries such as food (consumer products) and services tend to have low gearing. Their proposition on high debt level in the heavy industries is due to the proportion of fixed assets held by this industry as collateral for debt. However, they concluded that there was lack of significance in industry classification between the industries due to substantial diversification among listed firms in their activities. The results of the Bonferoni multiple range test in Table 5.5 show that only plantation is significantly different from the other sectors for all the three tests that are significant. Mansor and Mohamad's argument on the lack of significance would support this finding as most of the companies in those five sectors are linked to each other as they diversified. For example, the parent company is listed under services while the subsidiary is listed under construction and properties. However, that may not be the case for the plantation sectors. Further to that, the crisis had a minor effect on the plantation sector especially on the cost of production. The costs of imported inputs such as fertilisers, pesticides and machinery were higher due to the depreciation of the ringgit (BNM, 1999). However, palm oil and saw log had both benefited from the

depreciation of the ringgit due to the sharp increase in the export earnings because the transaction for these two items was quoted in the US dollar. Due to that reason, the profit of the firms related to these sectors were not as badly affected as those in the other 5 sectors, therefore, profitable firms would require less debt for their investments. The situation explains why the plantation had the lowest gearing

The strong differences are also consistent with the international study by Errunza (1979), who found a strong industrial classification on the capital structure of developing nations in Central American Common. However, the weak and no differences between gearing are consistent with the studies conducted by Sekely and Collins (1988), Ferri and Jones (1979) and Gupta (1969). Sekely and Collins (1988) found little industry impact on the gearing ratios of the 9 industries in 23 countries including Malaysia. Ferri and Jones (1979) concluded that the dependence between capital structure and industry classification is weak. Gupta (1969) who studied 173,000 manufacturing companies found no significant relationship between gearing and industry classification.

5.6 Multiple Regression Analysis

The independent and dependent variables were modelled using multiple regression analysis to examine the influence of capital structure determinants on the gearing ratio. In achieving the best possible model, the models were re-run for stepwise regression and the existence of multicollinearity was validated. Section 4.4.3 in Chapter 4 discusses the methodology employed in detail.

5.6.1 Preliminary Modelling of Multiple Regression Analysis

Table 5.7 illustrates the main board's first and second multiple regressions, while Table 5.12 provides the second board's first and second multiple regressions. The initial multiple regressions each regresses a measure of gearing against 12 variables and is repeated for different time periods: during the pre-crisis, during 1997 and post-crisis.

The main board's first multiple regression indicates r-squared of 30.53 %, 57.19% and 33.92 % for the pre-crisis, 1997 and post crisis, respectively. Not much difference was found for the second multiple regression of the main board's r-squared which had a percentage of 30.37 % for the pre-crisis model, 57.05% for the 1997 model and 31.10% for the post-crisis model. The only variable that is significantly related to gearing at the 99 per cent confidence level across three periods is Roce, for both the first and second multiple regression. Mixed significant results were found for other variables.

As shown in Table 5.12, the r-squared for the second board's first multiple regression are 46.47 %, 43.10 % and 34.31 % for the pre-crisis, 1997 and the post-crisis, respectively. During the second multiple regression, the pre-crisis had an r-squared of 43.90 % and the post crisis had an r-squared of 33.32 %. Not many variables are significant across the three time periods except the Wcr which is significant during the first multiple regression.

However, the results from the first multiple regression for both boards were disregarded as some of the variables were highly correlated with one another. As

shown in Tables 5.8, 5.9 and 5.10 (correlation matrix of pre-crisis of the book-value ratios), the current ratio is highly correlated with the working capital ratio at −0.772. Current ratios were then removed from the second multiple regression analysis across the three time periods. Another variable to be removed from the second multiple regression is the depreciation to total assets which is correlated at 0.509 with the Log(total assets) during the post-crisis period.

The second multiple regression was followed by stepwise regression as shown in Table 5.11, in which the working capital ratio (Wcr) and the return on capital employed (Roce) were significant across the three periods. Tables 5.13, 5.14, 5.15 demonstrate the three periods' second board correlation matrices. The working capital ratio, (*Wcr*) was highly correlated with the current ratio (Cr) at −0.711 during the pre-crisis and post-crisis periods. Depreciation to total assets (D*ep/Tas*) was correlated above 0.5 with net fixed assets to total assets (N*fa/Tas*) and Log(total assets) (*Log(Tas)*) during the pre-crisis and post-crisis periods. Eventually, both the current ratio and the depreciation to total assets were removed from the second multiple regression as shown in Table 4.12. Cooper and Schindler (1998) explained that there is no definite answer on how high can the acceptable correlation be between the independent variables. However, Statgraphics rules out any variable with a correlation of 0.5 and above as it is considered to have a presence of multicolleniarity.

Table 5.7:
Factors Determined the Main Board Firms' Book Value Ratio
Analyse Using Multiple Regression

Variables	First multiple regression (book-value ratios)			Second multiple regression (book-value ratios)		
	Pre-crisis	1997	Post-crisis	Pre-crisis	1997	Post-crisis
Constant	30.9754 (5.5473)	1.2817 (0.1283)	42.6485 (2.3700)	31.3951 (5.6546)	2.1004 0.2112	18.9544 (1.2391)
Cr	-0.5636 (-0.7631)	-2.4725 (-0.9220)	*** 10.0582 (3.4903)			
Wcr	** -1.2551 (-2.5116)	-0.9545 (-0.6724)	*** -11.0825 (-3.915)	*** -1.5496 (-4.883)	*** -2.0762 (-2.8379)	-1.4116 (-2.1517)
Npm	-0.0028 (-0.7103)	-0.0055 (-0.6537)	0.0059 (0.4230)	-0.0031 (-0.8006)	-0.0058 (-0.6872)	0.0041 (0.2940)
Mtbv	0.3868 (1.3419)	** 0.8722 (2.2827)	0.8632 (1.0489)	0.3876 (1.3458)	** 0.8600 (2.2526)	1.1092 (1.3289)
Tie	* 0.0376 (1.9680)	0.0004 (0.0136)	0.0193 (0.8564)	** 0.0382 2.0075	-0.0004 (-0.0158)	0.0229 (1.0041)
Tx	0.0016 (0.0327)	0.0062 (0.1923)	-0.0504 (-0.6697)	0.0012 (0.0245)	0.0052 (0.1636)	-0.0514 (-0.6723)
Dep/tas	0.0105 (1.1671)	*** 627.22 (7.4909)	-173.746 (-0.9298)	0.0105 (1.1678)	*** 631.254 (7.5516)	
Roce	*** -0.7591 (-7.757)	*** -1.2662 (-13.885)	*** -0.7730 (-10.895)	*** -0.7604 (-7.778)	*** -1.2645 (-13.873)	*** -0.7866 (-10.911)
Nfa/tas	** -9.3014 (-2.0155)	*** -18.1708 (-2.7196)	2.1024 (0.1704)	** -9.4222 (-2.0445)	*** -18.4488 (-2.7648)	1.0996 (0.00975)
Log(tas)	0.4642 (1.6099)	*** 2.1716 (4.9079)	0.8308 (1.0169)	0.4542 (1.5779)	*** 2.1415 (4.8545)	** 1.4555 (2.0432)
Curr	-5.3208 (-0.8079)	11.172 (0.7301)	-9.2292 (-0.5246)	-5.4946 (-0.8355)	12.2906 (0.8060)	-9.2306 (-0.5161)
Risk	** 3.6566 (2.2545)	0.3138 (1.0207)	0.0195 (0.1409)	** 3.7318 (2.3071)	0.3250 (1.0582)	0.0060 (0.0424)
R-squared	30.53%	57.19%	33.92%	30.37%	57.05%	31.10%

*,**,***Significant at the 10, 5, and 1 per cent level, respectively.
Reported t-statistics are in parenthesis
Book value ratio-book value of debt to book value of debt plus book value of equity
Cr-current ratio, Wcr-Working capital ratio, Npm-Net profit margin, Mtbv-Market to book value ratio, Tie-Interest coverage ratio, Tx-Tax, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

Table 5.8:
The Main Board Pre-crisis Correlation Matrix (see Table 5.7)

	cr	wcr	npm	mtbv	tie	tax	dep	roce	nfdtas	log(tas)	curr	risk
cr	1.000											
wcr	**-0.772**	1.000										
npm	-0.111	0.025	1.000									
mtbv	0.004	0.002	-0.013	1.000								
tie	0.047	-0.014	-0.017	0.014	1.000							
tax	-0.011	0.017	0.018	0.075	0.006	1.000						
dep	-0.000	0.014	0.003	0.016	0.106	-0.009	1.000					
roce	-0.017	0.034	-0.006	-0.366	-0.017	-0.164	-0.046	1.000				
nfdtas	-0.034	0.140	0.036	-0.050	0.003	0.041	0.049	0.061	1.000			
log(tas)	-0.046	0.139	-0.128	0.118	0.018	-0.037	0.058	0.008	0.375	1.000		
curr	-0.035	0.039	0.015	-0.069	-0.046	-0.093	0.003	0.133	-0.098	-0.061	1.000	
risk	0.061	-0.115	0.018	-0.069	-0.007	0.032	0.000	0.149	0.007	-0.056	-0.016	1.000

Notes : current ratio was highly correlated with working capital ratio
Cr-current ratio, Wcr-Working capital ratio, Npm-Net profit margin, Mtbv-Market to book value ratio, Tie-Interest coverage ratio, Tx-Tax, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

Table 5.9:
The Main Board 1997 Correlation Matrix (see Table 5.7)

	cr	wcr	npm	mtbv	tie	tax	deptas	roce	nfdtas	log(tas)	curr	risk
cr	1.000											
wcr	**0.857**	1.000										
npm	-0.036	0.005	1.000									
mtbv	-0.035	0.074	0.010	1.000								
tie	-0.032	0.000	0.001	-0.025	1.000							
tax	-0.031	0.027	-0.016	0.037	0.022	1.000						
deptas	0.052	0.002	-0.011	-0.010	-0.059	-0.030	1.000					
roce	0.021	-0.066	-0.115	-0.090	-0.002	-0.107	0.193	1.000				
nfdtas	-0.045	0.073	0.043	0.085	0.004	-0.058	-0.350	-0.040	1.000			
log(tas)	-0.074	0.158	-0.095	0.155	-0.150	-0.061	0.381	0.032	0.202	1.000		
curr	0.079	-0.026	-0.058	-0.057	0.063	-0.012	-0.091	0.038	0.072	0.074	1.000	
risk	0.039	0.003	-0.007	0.035	-0.015	0.000	0.015	-0.021	-0.008	0.061	0.020	1.000

Notes: current ratio was highly correlated with working capital ratio.
Cr-current ratio, Wcr-Working capital ratio, Npm-Net profit margin, Mtbv-Market to book value ratio, Tie-Interest coverage ratio, Tx-Tax, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

Table 5.10: The Main Board Post-Crisis Correlation Matrix (see Table 5.7)

	cr	wcr	npm	mtbv	tie	tax	dep/tas	roce	nfa/tas	log(tas)	curr	risk
cr	1.000											
wcr	-0.974	1.000										
npm	0.061	-0.076	1.000									
mtbv	-0.079	0.078	-0.018	1.000								
tie	-0.030	0.015	0.008	0.000	1.000							
tax	0.013	-0.012	-0.058	-0.020	-0.001	1.000						
dep/tas	-0.027	0.048	0.101	0.031	0.070	0.039	1.000					
roce	0.057	-0.065	-0.007	-0.110	0.017	-0.005	0.006	1.000				
nfa/tas	-0.080	0.098	-0.031	0.013	-0.066	-0.052	-0.429	0.030	1.000			
log(tas)	-0.098	0.133	0.083	-0.009	0.053	0.078	0.509	0.043	0.080	1.000		
Curr	0.011	-0.009	-0.011	0.125	-0.039	0.014	0.044	0.061	0.046	0.101	1.000	
risk	0.031	-0.033	0.000	-0.002	0.007	-0.050	0.011	-0.013	0.021	0.014	0.058	1.000

Notes: Currency ratio and depreciation to total assets are found to have a high correlation with working capital ratio and total assets, respectively.
Cr-current ratio, Wcr-Working capital ratio, Npm-Net profit margin, Mtbv-Market to book value ratio, Tie-Interest coverage ratio, Tx-Tax, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

Table 5.11: Factors Determined the Main Board Firms' Book Value Ratio Analyse Using Stepwise Regression

Variables	Book Value Ratios		
	Pre-crisis	1997	Post-crisis
Constant	39.1595 (17.113)	7.2719 (0.8605)	16.2295 (1.5007)
Wcr	-1.6570 (-5.2929)***	-2.2013 (-3.0506)***	-1.3644 (-2.1261)**
Mtbv		0.8605 (2.2729)**	
Roce	-0.7080 (-7.9010)***	-1.2701 (-14.1936)***	-0.7747 (-10.9111)***
Dep/tas		635.82 (7.6961)***	
Nfa/tas	-11.7145 (-2.7730)***	-18.5501 (-2.8105)***	
Tas		2.0587 (4.8072)***	1.5091 (2.3233)**
Curr			
Risk	4.0064 (2.4778)**		
R-squared	27.87%	56.70%	30.26%

*,**,***Significant at the 10, 5, and 1 per cent level, respectively.
Reported t-statistic is in parenthesis
Book value ratio-book value of debt to book value of debt plus book value of equity
Wcr-Working capital ratio, Mtbv-Market to book value ratio, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income

Table 5.12

Factors Determined the Second Board Firms' Book Value Ratio
Analyse Using Multiple Regression

Variables	First multiple regression (book-value ratios)			Second multiple regression (book-value ratios)		
	Pre-crisis	1997	Post-crisis	Pre-crisis	1997	Post-crisis
Constant	-83.0906 (-3.7555)	53.4099 (3.9636)	134.486 (3.9633)	-49.1478 (-3.5363)		133.037 (4.0019)
Cr	-3.2249 (-0.5823)	** -7.5575 (-2.0396)	19.1019 (1.6281)			
Wcr	*** -6.2520 (-2.844)	*** -11.4761 (-5.232)	*** -28.9204 (-5.1076)	*** -7.6763 (-5.042)		*** -21.717 (-6.306)
Npm	0.0471 (0.6160)	0.0836 (0.7635)	*** -0.2700 (-4.4137)	0.0527 (0.6900)		*** -0.2808 (-4.6123)
Mtbv	** 1.0004 (2.1725)	0.2586 (1.1772)	* -0.9796 (-1.7352)	* 0.8631 (1.9040)		* -0.9701 (-1.7149)
Tie	0.0124 (0.3451)	-0.0092 (-0.3709)	0.0583 (0.3776)	0.0124 (0.3509)		0.0446 (0.2887)
Tax	0.1073 (0.8957)	-0.0112 (-0.4658)	-0.0315 (-0.3854)	0.1071 (0.9012)		-0.0338 (-0.4131)
Dep/tas	19.0501 (1.5013)	-1.6644 (-1.5236)	2.7710 (0.2341)			
Roce	-0.3994 (-1.486)	*** -0.5311 (-5.763)	*** -0.3685 (-4.137)	-0.4230 (-1.6205)		*** -0.3804 (-4.277)
Nfa/tas	-0.3331 (-0.3766)	-0.0397 (-0.3915)	* -2.2911 (-1.8219)			** -2.1106 (-2.5631)
Log(tas)	*** 11.0512 (5.641)	0.1227 (0.1142)	* -5.2392 (-1.887)	*** 8.2255 (6.254)		-5.5707 (-2.041)
Curr	0.0114 (0.0007)	9.4994 (0.6181)	15.9376 (0.6494)	-0.0379 (-0.0026)		15.683 (0.6379)
Risk	0.5655 (0.9005)	-0.0412 (-0.0966)	-0.0143 (-0.2450)	0.6040 (0.9639)		-0.0143 (-0.2443)
R-squared	46.47%	43.10%	34.31%	43.90%		33.32%

*,**,*** Significant at the 10, 5, and 1 per cent level, respectively.
Reported t-statistics are in parenthesis
Book value ratio-book value of debt to book value of debt plus book value of equity
Cr-current ratio, Wcr-Working capital ratio, Npm-Net profit margin, Mtbv-Market to book value ratio,
Tie-Interest coverage ratio, Tx-Tax, Dep/tas-Depreciation to total assets, Roce-Return on Capital
Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-
currency sensitivity, Risk-Standard deviation of operating income.

Table 5.13:
The Second Board Pre-crisis Correlation Matrix (see Table 5.12)

	cr	wcr	npm	mtbv	tie	tax	dep	roce	nfa/tas	log(tas)	curr	risk
cr	1.000											
wcr	**-0.711**	1.000										
npm	-0.020	-0.028	1.000									
mtbv	0.072	-0.095	0.026	1.000								
tie	0.166	-0.032	-0.016	0.061	1.000							
tax	0.101	-0.055	0.040	-0.022	-0.015	1.000						
dep	-0.021	0.095	-0.040	0.109	0.019	0.019	1.000					
roce	-0.064	-0.113	-0.164	0.026	0.005	-0.281	0.170	1.000				
nfa/tas	0.058	-0.053	0.021	-0.018	0.024	-0.026	**-0.768**	-0.220	1.000			
log(tas)	0.089	0.006	-0.082	0.134	0.068	-0.146	**0.605**	0.037	-0.209	1.000		
curr	0.096	-0.084	0.107	0.001	-0.058	0.071	0.148	0.122	-0.213	-0.102	1.000	
risk	-0.011	-0.010	0.025	-0.234	0.001	0.005	0.011	0.209	-0.040	-0.067	0.002	1.000

Notes: Current ratio is found to have high correlation with working capital ratio, and depreciation to total assets is found to have high correlation with net fixed assets to total assets and log (total assets). When multiple regression is run again, the net fixed assets are found to have high correlation with total assets.
Cr-current ratio, Wcr-Working capital ratio, Npm-Net profit margin, Mtbv-Market to book value ratio, Tie-Interest coverage ratio, Tx-Tax, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

Table 5.14:
The Second Board 1997 Correlation Matrix (see Table 5.12)

	cr	wcr	npm	mtbv	tie	tax	dep/tas	roce	nfa/tas	log(tas)	curr	risk
cr	1.000											
wcr	-0.471	1.000										
npm	0.165	-0.178	1.000									
mtbv	-0.021	0.096	-0.087	1.000								
tie	-0.011	-0.039	-0.062	-0.013	1.000							
tax	-0.005	0.091	-0.019	-0.016	-0.017	1.000						
dep/tas	-0.040	0.003	-0.054	-0.222	-0.009	0.028	1.000					
roce	-0.118	-0.042	0.060	-0.026	0.062	-0.025	0.167	1.000				
nfa/tas	0.010	0.100	-0.014	0.042	-0.120	0.020	-0.288	-0.023	1.000			
log(tas)	-0.033	0.113	-0.040	-0.031	0.009	-0.020	0.267	0.139	0.402	1.000		
curr	-0.016	-0.027	0.035	0.046	-0.032	-0.209	-0.033	0.177	-0.082	-0.014	1.000	
risk	0.081	-0.162	0.092	0.025	0.023	-0.036	0.005	-0.025	-0.001	0.029	-0.027	1.000

Notes: There is no correlation with absolute value greater than 0.5 (not including the constant term).
Cr-current ratio, Wcr-Working capital ratio, Npm-Net profit margin, Mtbv-Market to book value ratio, Tie-Interest coverage ratio, Tx-Tax, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

Table 5.15: The Second Board Post-Crisis Correlation Matrix (see Table 5.12)

	cr	wcr	npm	mtbv	tie	tax	dep/tas	roce	nfa/tas	log(as)	curr	risk
cr	1.000											
wcr	**-0.793**	1.000										
npm	0.093	-0.079	1.000									
mtbv	-0.010	0.046	-0.025	1.000								
tie	0.051	-0.027	0.047	0.019	1.000							
tax	0.014	-0.082	0.012	0.025	0.026	1.000						
dep/tas	-0.066	0.107	0.067	-0.002	0.015	0.014	1.000					
roce	0.083	-0.157	0.133	-0.038	-0.146	-0.022	-0.009	1.000				
nfa/tas	0.071	-0.051	0.068	0.013	-0.017	-0.018	**-0.757**	0.009	1.000			
log(as)	0.034	0.075	-0.014	-0.031	-0.024	-0.054	0.187	0.042	0.107	1.000		
curr	0.001	0.078	0.041	0.134	0.135	-0.046	0.026	-0.112	0.019	0.041	1.000	
risk	-0.010	0.045	-0.043	0.002	-0.003	-0.023	0.046	-0.003	-0.052	0.077	0.062	1.000

Notes: Currency ratio is found to have a high correlation with working capital ratio, and depreciation to total assets with total assets.

Cr-current ratio, Wcr-Working capital ratio, Npm-Net profit margin, Mtbv-Market to book value ratio, Tie-Interest coverage ratio, Tx-Tax, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

Table 5.16: Factors Determined the Second Board Firms' Book Value Ratio Analyse Using Stepwise Regression

Variables	Book Value Ratios		
	Pre-crisis	1997	Post-crisis
Constant	-53.0347 (-3.9398)	57.7688 (18.2004)	71.1653 (11.2048)
Cr		-7.9693 (-2.2084)**	
Wcr	-8.333 (-5.7613)***	-11.398 (-5.4808)***	-20.3642 (-6.0080)***
Npm			-0.2665 (-4.43)***
Mtbv	1.0156 (2.3296)**		
Roce		-0.5245 (-0.5245)***	-0.3704 (-4.1813)***
Log(tas)	8.507 (6.8823)***		
Curr			
Risk			
R-squared	41.39%	40.78%	28.90%

*,**,***Significant at the 10, 5, and 1 per cent level, respectively,
Reported t-statistic are in parenthesis
Book value ratio-book value of debt to book value of debt plus book value of equity
Wcr-Working capital ratio, Mtbv-Market to book value ratio, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

Following the multicollinearity identification and stepwise regression, the following seven independent variables were selected for capital gearing model for both boards: working capital ratio (Wcr), market to book value ratio (mtbv), return on capital employed (Roce), net fixed assets to total assets (Nfa/tas), total assets (log(tas)), currency correlation (currency) and standard deviation of EBITDA(Risk).

Tables 5.17a and 5.17b present descriptive statistics of the dependent and independent variables for 357 companies on the main board and 215 companies on the second board across three different periods. As indicated in the tables, the mean book value figure ranges from a low of 25.69 per cent to a high of 36.13 per cent based on book value ratios for the companies in the main board. However, the mixed value measure ranges from a low mean score of 13.59 per cent to a high score of 36.71 per cent. The second board scores for the book value ratios range from 28.71 per cent to a high of 61.09 per cent while mixed value gearing scores range from 16.97 per cent to 63.15 per cent.

As shown in the ANOVA analysis in Section 5.5.2, the average of second board gearing is higher than the average of the main board gearing across the three periods. The results also show a significant increase in gearing following the crisis for both boards. The main board had a huge increase in the gearing of the mixed value ratios during post-crisis, from 13.59 per cent to 36.71 per cent. The second board had a huge increase during the post-crisis for both measurements, book value ratios and mixed value ratios. The increase in mixed value ratios may be due to: the trading losses during the crisis suffered by many companies at large, which reduces the book value of the equity-based denominator, and a fall in share values, reducing the equity

in the mixed-value denominator. Therefore, in this situation the debt ratio may increase without increasing debt in absolute terms. However, the increase in book value ratios of second board companies may reflect the actual increase in debt ratios of small companies.

Table 5.17a:
The Main Board Dependent and Independent Variables Descriptive Statistic

Variables	Main board (book-value ratios)		
	Pre crisis	1997	Post crisis
Book-value ratios	25.6882 (20.1662)	33.6255 (36.2178)	36.1351 (66.3116)
Mixed-value ratios	13.5897 (13.7111)	28.3748 (25.548)	36.7148 (26.8354)
Wcr	2.1383 (3.4386)	1.7799 (2.2007)	1.9960 (4.2609)
Mtbv	3.5379 (4.7983)	2.5217 (4.2056)	1.3272 (3.3943)
Roce	11.8807 (12.0072)	7.9288 (17.5211)	4.7484 (39.5309)
Nfa/tassets	0.2961 (0.2490)	0.2859 (0.2583)	0.2975 (0.2657)
Log(tassets)	14.6949 (3.9645)	15.7399 (4.3670)	15.9874 (4.3926)
Curr	-0.0248 (0.4760)	0.8146 (0.2328)	0.4446 (0.2339)
Risk	0.2743 (0.6244)	0.6631 (6.0202)	-1.0340 (19.5391)

Reported Standard deviation are in parenthesis
Book value ratio-book value of debt to book value of debt plus book value of equity
Mixed value ratio-book value of debt to book value of debt plus market value of equity
Wcr-Working capital ratio, Mtbv-Market to book value ratio, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

Many of the independent variables' mean scores are stable across three periods for both boards, except for the return on capital employed (Roce). This has been expected since most of the companies' profit has been reduced substantially following the 1997 financial crisis. As shown in Table 5.17a, the mean score for main board Roce reduces substantially from 11.88 before the crisis to 4.74 following the crisis. The second board had an even lower score for Roce as shown in Table 5.17b; from a high score of 8.98, the mean fell to as low as −7.29 following the 1997 crisis.

Table 5.17b:
The Second Board Dependent and Independent Variables Descriptive Statistic

Variables	Second board (book-value ratios)		
	Pre crisis	1997	Post crisis
Book-value ratios	28.713 (21.1934)	41.5632 (31.3983)	61.0884 (72.9496)
Mixed-value ratios	16.9686 (16.4705)	46.2281 (31.5758)	63.1458 (81.4094)
Wcr	1.2789 (1.0457)	1.2548 (0.8565)	1.2639 (1.2385)
Mtbv	4.1295 (3.6656)	4.2398 (9.6274)	1.6487 (5.8795)
Roce	8.9786 (7.0698)	9.1138 (20.3516)	-7.2941 (59.5399)
Nfa/tassets	2.3174 (15.8621)	7.9446 (40.7925)	1.1083 (2.8837)
Log(tassets)	10.6014 (1.5025)	10.7234 (2.1922)	11.0285 (1.7032)
Curr	-0.0510 (0.2918)	0.8465 (0.2714)	0.3658 (0.1807)
Risk	0.5027 (2.3491)	0.2003 (4.3704)	0.3809 (10.6455)

Reported Standard deviations are in parenthesis
Book value ratio-book value of debt to book value of debt plus book value of equity
Mixed value ratio-book value of debt to book value of debt plus market value of equity
Wcr-Working capital ratio, Mtbv-Market to book value ratio, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

Wcr, Log(tas) and Risk have a stable mean across three periods for both boards. However the standard deviation of Risk shows a very significant increase following the crisis. Risk is formulated by standard deviation of EBITDA, a proxy for earnings volatility. As profit (Roce) showed a significant decrease in value following the crisis, the EBITDA would expect to suffer under the same circumstances. Therefore, the volatility of the companies' earnings will be reflected in EBITDA's variance or standard deviation.

There is a slight decrease in Mtbv of both boards following the crisis as this may be due to the decrease in the market value of the equity following the crisis. Although the main board had stable figures for Nfa/tas across three periods, the second board

had a very high Nfa/tas figure during 1997. However, the high figure was also followed by a very high standard deviation. Therefore, there is high variance of Nfa/tas in 1997. The main board and second board Curr correlation changed from a weak negative correlation before the crisis to a high positive correlation in 1997 and moderate positive correlation after the crisis. Graphs 4.14 and 4.15 in Chapter 4 depicts that from early 1996 towards the end of 1997, there has been small discrepancy between stock prices and the currency movement, therefore, this resulted in negative relationship between shares prices and the ringgit within that period. However, when the ringgit depreciated considerably in the late 1997 and thereafter, the stock market steadily collapsed. Eventually, the companies share prices on both boards dropped considerably in the last quarter of 1997 resulting in high positive correlation with the ringgit in 1997 and moderate positive correlation following the crisis.

5.6.2 Modelling for Multiple Regression Analysis and Cross Sectional Result

The multiple regression models expresses the capital gearing as a linear function of potential capital structure determinants;

Equation 5.1

$$Gearing_{pre-crisis} = \alpha + \beta_1 Wcr + \beta_2 mtbv + \beta_3 Roce + \beta_4 Nfa/tas + \beta_5 Log(tassets) +$$
$$\beta_6 currency + \beta_7 Risk + \varepsilon$$
$$H_A : \beta_1 > 0; \beta_2 > 0; \beta_3 < 0; \beta_4 > 0; \beta_5 > 0; \beta_6 < 0; \beta_7 < 0$$

$$Gearing_{1997} = \alpha + \beta_1 Wcr + \beta_2 mtbv + \beta_3 Roce + \beta_4 Nfa/tas + \beta_5 Log(tassets) +$$
$$\beta_6 currency + \beta_7 Risk + \varepsilon$$
$$H_A : \beta_1 > 0; \beta_2 > 0; \beta_3 < 0; \beta_4 > 0; \beta_5 > 0; \beta_6 < 0; \beta_7 < 0$$

$$Gearing_{post-crisis} = \alpha + \beta_1 Wcr + \beta_2 mtbv + \beta_3 Roce + \beta_4 Nfa/tas + \beta_5 Log(tassets) +$$
$$\beta_6 currency + \beta_7 Risk + \varepsilon$$
$$H_A : \beta_1 > 0; \beta_2 > 0; \beta_3 < 0; \beta_4 > 0; \beta_5 > 0; \beta_6 < 0; \beta_7 < 0$$

where,

$Gearing_{precrisis, 1997, postcrisis}$ = total debt as a percentage of total debt plus equity

Wcr: Working capital ratio, (current assets divided by total current liabilities)

Mtbv: Market to book value ratio, (market value divided by the equity book value)

Roce: Return on capital employed, (pre tax profit plus net interest divided by total capital employed plus short term debt)

Nfa/tas: Net fixed assets to total assets, (fixed assets divided by the total assets)

Log (tas): Log of total assets employed by the company

Curr: Correlation coefficient of ringgit against the stock prices of the company.

Risk: The standard deviation of operating income, EBITDA

Hypothesis:

Null hypothesis $(\beta=0)$ Alternative hypotheses $(\beta \neq 0)$

The following hypotheses H4 to H10 are derived from Section 4.3 in Chapter 4:

H0: Firms' capital gearing stay the same   Alternatively,   H3: Firms' gearing is significantly related to firms' liquidity   H4: Firms' gearing is significantly negatively related to firms' growth/investment opportunities   H5: Firms' gearing is significantly negatively related to the firms' profitability   H6: Firms' gearing is significantly positively related to the firms' tangibility   H7: Firms' gearing is significantly positively related to the firms' size   H8: Firms' gearing is significantly negatively related to the price currency sensitivity

H9: Firms' gearing is significantly negatively related to the firm's operating risk

N.B * H4 does not state a positive and negative relationship, (see the literature review or Sections 4.5.1.1 & 4.5.1.2 in Chapter 4)

5.6.2.1 Cross Sectional Result

Table 5.18 shows the six models built using the multiple regression for both boards across three periods of time. The models are based on the book value ratios in which total debt is divided by total debt plus equity. A separate discussion on the mixed value ratios will be presented later in Section 5.6.7. Since the p-values are less than 0.01 across six models, there are statistically significant relationships between the dependent and the independent variables at the 99 per cent confidence level. The adjusted r-squared shows a percentage of 25.95, 44.91 and 28.77 for the main board pre-crisis, 1997 and post-crisis periods, respectively. The second board figures are 40.69 per cent during the pre-crisis, 31.20 per cent during 1997 and 23.48 per cent during the post-crisis. Therefore, the main board 1997 model is the best fitted model with the highest r-squared, 44.91 per cent and a 39.90 F-statistic ratio. On the other hand, the least fitted model is the second board post-crisis period with an r-squared of 23.48 per cent and a 9.55 F-statistic ratio.

Working capital ratio (Wcr) and return on capital employed (Roce) are statistically significant at either 95 or 99 per cent confidence level across six models with negative coefficients. The former is the proxy for liquidity and the latter is the proxy for profitability. The size proxy, Log(tas) shows a significant p-value with a positive sign for all three periods of the main board, while the second board shows a shift in trend from a positive coefficient before the crisis to a negative coefficient after the crisis. The rest of the independent variables show mixed results.

The second board Nfa/tas are positively significant before and after the crisis at 95 and 90 per cent confidence level, respectively. The main board Mtbv has a positive significant sign in 1997 and the second board Mtbv has a negative significant sign during the post crisis period. The main board risk has a positive significant relationship with debt before the crisis. The correlation coefficients of currency and share prices are not significant at all across the six models. In general, it appears that crisis does not have any effect at all on Wcr and Roce as these variables are significantly related to debt across three periods for both boards.

Section 5.6.3 will discuss the findings of each independent variable separately. The results are based on the pre-crisis, 1997 and post-crisis models in Table 5.18, page 199 for both the main board and the second board. The discussion will be followed by the comparison of using gearing based on book value ratios and mixed value ratios in Section 5.6.4. Finally, the cross sectional data were "pooled" together in Section 5.6.5 for the panel data regression. The multiple regression of the panel data is to compare the results between gearing using cross sectional data at three different time periods and the results of gearing using time series and cross-sectional data together.

5.6.3 Discussion

5.6.3.1 Liquidity (proxied by Working Capital Ratio, Wcr)

Working capital ratios are a proxy for liquidity. Liquidity has a negative coefficient across three periods for both boards either at the 95 per cent or 99 per cent confidence

Table 5.18:
Factors Determined the Main Board and the Second Board Firms' **Book Value Ratio** Analyse Using Multiple Regression

	Main board (book value ratios)			Second board (book value ratios)		
	Pre-crisis	1997	Post-crisis	Pre-crisis	1997	Post-crisis
Constant	29.6893 (5.896)	27.0771 (3.114)	27.9755 (1.860)	-44.8696 (-3.754)	60.4368 (4.495)	146.106 (4.222)
Wcr	-1.5609 (-5.328)***	-3.0280 (-4.521)***	-1.5122 (-2.254)**	-6.9711 (-4.664)***	-14.4092 (-6.576)***	-22.2087 (-6.241)***
Mtbv	0.1344 (0.6098)	0.7267 (2.0497)**	0.9691 (1.1269)	0.3239 (0.8021)	0.1095 (0.4879)	-1.8798 (-2.2272)**
Roce	-0.7566 (-8.212)***	-1.3807 (-15.311)***	-0.8334 (-11.265)***	-0.5912 (-2.545)**	-0.5813 (-5.613)***	-0.3234 (-3.567)***
Nfa/tas	-6.1539 (-1.4391)	1.1007 (0.1831)	-3.8971 (-0.3445)	0.2377 (2.4043)**	-0.0928 (-0.8654)	-1.4431 (-1.7110)*
Log(tas)	0.6086 (2.280)**	0.9304 (2.494)**	1.1814 (1.687)*	8.2917 (7.510)***	0.0940 (0.091)	-6.1342 (-2.164)**
Curr	-3.9337 (-0.622)	19.0885 (1.362)	-15.6948 (-0.877)	-1.7477 (-0.128)	0.7131 (0.044)	13.8788 (0.546)
Risk	3.5136 (2.187)**	0.0515 (0.215)	-0.0007 (-0.005)	0.7465 (1.194)	-0.0041 (-0.008)	-0.0265 (-0.436)
R-squared	27.59%	46.07%	30.25%	43.96%	33.78%	26.22
Adj. R-squared	25.95%	44.91%	28.77%	40.69%	31.20%	23.48%
F-statistic	16.77	39.90	20.38	13.44	13.12	9.55
(P- value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Book value ratio of debt = Total debt over total debt plus book value equity
*,**,***Significant at the 10, 5, and 1 per cent level, respectively.
Reported t-statistic are in parenthesis
Book value ratio-book value of debt to book value of debt plus book value of equity
Wcr-Working capital ratio, Mtbv-Market to book value ratio, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.

level. Therefore, the more liquid the firm is, the lower is the gearing. Obviously, a ratio of one and above is usually considered as reasonably possible in meeting current obligations. S tudies o f b ankruptcy h ave e mphasised t he i mportance o f l iquidity for immediate solvency, which suggest that the higher the liquidity, the lower is the bankruptcy cost or financial distress. Hence, debt would be expected to rise with the increase in liquidity, resulting in a positive coefficient. Nevertheless, an inverse relationship is found from the regression analysis of Malaysian firms. Intuitively, if

short-term debt increases, ceteris paribus, the working capital ratio will decrease, and the gearing ratio will increase. The reason is due to the presence of short-term debt in the gearing measurement, whereby any increase in the short-term debt, ceteris paribus, will increase the amount of gearing. Therefore, this results in a negative relationship between gearing and the working capital ratio.

Table 5.18a shows the mean of short-term debt over a 7-year period for both boards. The short term debt of the main board companies increased substantially from 1994 to 1997, but decreased in 1998, while second board companies' short term debt increased throughout the whole period. Bris et al. (2002), Claessens et al. (1998) and Pomerleano (1998) also documented the rapidly increasing short-term debt ratios in the Asian countries from 1992 to 1996.

Table 5.18(a):
The Main Board and the Second Board Average Short-term Debt

Year	1994	1995	1996	1997	1998	1999	2000
Main board	75731 (165328)	144434 (253852)	223048 (982195)	306910 (1.5E6)	257445 (495053)	261380 (566251)	264552 (645277)
Second board	31686 (119002)	76003 (338264)	118720 (607093)	198429 (1.0E6)	248862 (1.3E6)	263712 (1.4E6)	266718 (1.5E6)

Reported standard deviation is in parenthesis

Ozkan (2001) proposed a positive and negative relationship between gearing and firms' liquidity. The positive stance is due to a greater ability to meet short-term debt obligations reflected in more liquidity and a negative relationship may be due to the reason that firms may use current assets to finance their investment, therefore less debt is needed for the investment. Using UK companies' panel data, Ozkan found a negative relationship between gearing and liquidity. He explained that firms with high

liquidity may use the assets to finance their investment. Therefore, the firm's liquidity position should exert a negative impact on its gearing ratio.

The negative sign of liquidity is evidence of building up "financial slack" by storing excess funds by managers until they are needed. The agency perspective would suggest that firms should use less debt to afford more financial slack; i.e hold asset with a low return. The argument is based on Myers and Majluf (1984) who advocate that managers do not distribute free cash flows but rather invest them in alternative venues. These cash flows will be retained in a form where they are readily accessible; i.e. as cash or short-term financial assets (current assets). By doing so, the companies ensure that they have sufficient financial slack so financing is readily available for good investment. The suggestion is to follow the conservative style of financing, which uses less debt and relies more on capital investment and operating decision rather than financing. In this case, the agency costs are lower, and managers do not feel pressurised and the potential lender perceives the company's debt as a safe investment. The argument on financial slack supports the negative relationship between debt and liquidity for Malaysian companies.

5.6.3.2 Investment Opportunities (proxied by Market to Book Value Ratio-Mtbv)

As suggested by Myers (1977), market to book value (Mtbv) is used as proxy for investment opportunities or growth. Most of the p-values for the market to book value are not significant except for the 1997 of the main board and post-crisis of the second board. The 1997 main board market to book value is positively related to gearing while the post-crisis second board is negatively related to gearing, a contrast between the large and the small companies. Titman and Wessels' (1988) empirical

research found that growth is positively related to LTD/BVE (long term debt divided by book value of equity) and negatively related to LTD/MVE (long term debt divided by market value of equity). Thus, the findings of the main board are therefore consistent with the findings of their book-value ratios.

On the other hand, the second board negative coefficient is consistent with Myers' (1977) argument that highly geared firms are more likely to forgo profitable investment opportunities; therefore, firms that expect high growth rates in the future should use more equity to finance their projects. The negative results for the second board are in line with his views as second board companies were highly geared following the crisis (table 5.17b). Therefore, if the firms are forecasting a high prospect in the near future, they will more likely use equity than debt, resulting in a negative relationship between debt and investment opportunity.

Myers's suggestion is supported by Rajan and Zingales' (1995) empirical work on the capital structure of the G7 countries. According to them, a negative correlation is expected between gearing and market to book value ratio as firms with high market to book value ratios have higher costs of financial distress. Their empirical study found that all market to book value ratios (Mtbv) of G7 countries are negatively related to gearing for both the debt to book value measure and the debt to market value measure. Chung (1993) and Barclay et al. (1995) found a similar negative correlation between growth opportunities and gearing.

Despite the controversy of the positive and negative signs of the market to book value ratio and gearing, Kester (1986) did not find any support for the predicted negative

relationship between growth opportunities and gearing. This is similar to the other four models in Table 5.18 (main board-pre-crisis and post-crisis, second board-pre-crisis and 1997).

5.6.3.3 Profitability (proxied by Return on Capital Employed, Roce)

A consistent negative correlation of return on capital employed (Roce) is shown in Table 5.18 for both boards before, during and after the crisis. The results of a negative coefficient are consistent with the findings of many empirical works such as Toy et al. (1974), Long and Malitz (1985), Kester (1986), Rajan and Zingales (1995) and Krishnan et al. (1996). Myers (1984) suggests that most firms follow pecking order theory in capital structure decisions in which a retention is preferred over the use of debt and new equity. If his suggestion is right, past profits are expected to have a negative relationship with gearing. In this sense, profitability allows the firms to use retained earnings rather than an external source and therefore a negative association between gearing and profitability would be expected.

A survey by Kester and Mansor (1994) on 104 Malaysian companies found that Malaysian finance managers preferred internal sources of funds over external funding. Their survey outcomes are consistent with the negative coefficient found in this research. Thus, the negative sign of Malaysian firm's profitability is consistent with the *pecking order theory* forwarded by Myers (1984) and Myers and Majluf (1984). The financial crisis would be very unlikely to have any affect on the role of profitability in relation to gearing, since negative coefficients are realised across the three periods. The reason may be due to the preference for retained earnings; if the firms' past profit is already high, the firms will use the retained earnings to finance

their investment during the 1997 and following the 1997 financial crisis. Another possible explanation is that not many investments were carried out after the crisis; as a result, the past profit will be enough to fund any profitable investment.

5.6.3.4 Size (proxied by Total Assets, Log(tas))

Log(tas) is a proxy for size as used by many past studies. A positive coefficient of size in relation to gearing was found for the companies listed at the main board before, during and after the crisis period at 95, 95 and 90 per cent confidence level, respectively. For the second board, the company's size is positively related to gearing before the crisis at 99 per cent confidence level. The results indicate no significant relationship during the crisis and are negatively correlated at 95 per cent confidence level after the crisis.

Martin and Scott (1974), Ferri and Jones (1979), Crutchley and Hansen (1989), Rajan and Zingales (1995) found a positive relationship between capital structure and size in their studies. Many of those studies proposed that a positive relationship exist between gearing and size with the arguments that larger firms should be able to borrow more due to their low financial distress and bankruptcy costs. Rajan and Zingales (1995) argued that size may be proxy for the probability of default, where the bigger the size, the lower is the probability of defaulting in debt, therefore the higher is the debt capacity. Their empirical evidence has proven that size is positively related to gearing for US, Japan and Canada using the measure of book value ratios and the mixed value ratios.

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The main board results are consistent with past studies, which show that gearing will increase with the increase in size. Therefore, the presence of the financial crisis does not change the on-going relationship of gearing and size of the main board companies given that the size is positively significant across the three periods. However, the second board companies are mostly small and new, suggesting that the probability of default would be higher. Therefore, this indicates a positive relationship during the pre-crisis period whereby the smaller the size of the firm, the lower is the debt. There is no statistical relationship derived during the 1997 as most of the companies were in a state of uncertainty in trying to deal with the collapse of the financial market.

Following the crisis, the probability of default was expected to be higher for those companies under the second board because they were new and immature with small and unstable assets in place. However, Gupta (1969) argued that smaller US manufacturing firms would find external equity very expensive and by selling shares, they will have to share the ownership of the firms. Therefore, smaller firms would settle for debt. But this does not explain the change in sign following the crisis.

Another possible explanation for the reverse sign is the establishment of a number of funds by the government to the financial institutions in relation to the financial crisis to provide credit to the priority sectors including small businesses (this was mentioned in section 5.5.4). Funds to the amount of 1.5 billion Malaysian ringgit were allocated to the small and medium industries (BNM, 1999). With such amount of funds, the debt level of the smaller companies will increase regardless of the higher probability of default. The situation is a lot better for the companies on the main board as they are more diversified with stable assets, and are less prone to bankruptcy.

5.6.3.5 Tangibilty (proxied by Net Fixed Assets/Total Assets)

The proportion of net fixed assets to total assets is the proxy for tangibility. None of the statistical tests on the main board net fixed assets to total assets proved any significant results across the three periods. Hence, tangibility of the main board firms does not have any effect on their gearing. Many studies, including Jensen and Meckling (1976), Titman and Wessels (1988) and Rajan and Zingales (1995) proposed a positive result between gearing and tangibility. The underlying reason for hypothesising a positive relationship is that the tangible assets are easy to collateralise, may increase the company's debt capability and at the same time will reduce the agency's costs of debt. Graph 4.11 in chapter 4 and Table 5.17(a) show a very low average of main board net fixed assets to total assets ratio of 0.2961, 0.2859 and 0.2975 for the pre-crisis, 1997 and post-crisis periods, respectively. With the low figures shown and the low variation of the mean, net fixed assets may not be an important factor with regard to gearing, and, therefore, no significant relationship would be realised from the regression analysis.

Conversely, the second board pre-crisis and post-crisis net fixed asset ratios are significant at the 95 and 90 per cent confidence level. The former shows a positive relationship while the latter is negatively correlated to gearing. The pre-crisis positive coefficient is consistent with the studies previously cited. With reference to Table 5.17 (b), the proportion of second board net fixed assets to total assets is definitely higher than that of the main board at 2.3174 during the pre-crisis, 7.9446 in 1997 and 1.1083 following the 1997 crisis. The firms may use net fixed assets as collateral as suggested by previous studies discussed earlier which would have resulted in a positive sign between the firm's gearing and tangibility before the crisis. No

significant results were obtained for the 1997 model. The results are almost similar to the findings of the second board Log(tas), which indicate a significant positive relationship before the crisis, in which no statistical evidence was found during the crisis and a negative coefficient found after the crisis.

Meanwhile, the negative sign of the post crisis modelling asserts that the higher the tangibility, the lower is the gearing. Titman and Wessels (1988) pointed out that the tendency of the managers to consume more than the optimal level of perquisites may produce the opposite relation between collateralisable capital and gearing levels. To overcome the problem, they cited the Grossman and Hart (1982) suggestion of increasing the debt level to increase the bankruptcy threat and thus reducing the managers' inclination to increase their perk. Furthermore, the debt-holder will closely monitor any excessive perquisite received by the manager.

Although their suggestions are highly viewed, the researcher feels that the negative sign of gearing and tangibility is due to the crisis effect on the increase in the second board book value gearing. The reason is there was a decrease in the proportion of net fixed assets to total assets following the crisis as compared with the before the crisis proportion (2.3174 to 1.1083), and the book value ratio of gearing was increased substantially following the crisis (28.713 to 61.0884). Therefore, while the firms' net fixed assets were reducing, the firms' gearing was increasing even faster. The increase in debt was therefore not supported by the collateral position of the company in the crisis situation. The increase in gearing of small companies is due to the loans provided by the financial institutions as discussed in the previous section related to size (5.6.6.5). Therefore, in this situation, tangibility has very little influence.

5.6.3.6 Price-Currency Sensitivity (Curr)

Given that very few studies have established significant relationships between economic variables and capital structure, this research attempts to discover whether currency plays an important role in influencing the determinants of capital structure. Furthermore, the East Asian 1997 financial crisis was initiated by the currency speculation. However, no statistical evidence has shown any relationship between the price sensitivity and the gearing for both the main board and the second board before, during and after the crisis.

Although the sensitivity of the share prices and ringgit does not statistically influence the gearing, the correlation between those two variables is probably related to the equity which eventually may have an affect on the debt ratio, explicitly. As shown in Table 5.17a, the main board Curr mean correlation is –0.0248 during the pre-crisis, 0.8146 during the crisis and 0.4446 after the crisis, (with an average standard deviation of between 0.2 to 0.4 across the three periods of time.). Although the pre-crisis correlation reveals a negative correlation between share prices and the ringgit, the correlation coefficient is too small to make any constructive conclusion on the relationship between the two variables. However, the correlation of ringgit and share prices was very high during the crisis. As the currency was badly depreciated in 1997, the company share prices also fell, as implied by their strong positive correlation of 0.8146. If the funding through equity is impossible during that period, the debt ratio will be expected to rise. However, for the firms with high past profit (retentions), debt will not be needed for capital investment, therefore there is counter balancing effect on the debt ratio (remain constant). While the stock market was still low following the crisis, in September 1998, the government had taken measures to

fix the ringgit to the US dollar. This has resulted in the correlation to remain moderately positive after the crisis.

Table 5.17b of the second board depicts Curr figures of –0.0510, 0.8465 and 0.3658 for before, during and after the crisis, respectively with a standard deviation of 0.2 for all the figures. The situation is almost similar to the main board companies in which share prices have a low negative relationship with gearing before the crisis; high positive relationship during 1997; and moderate positive correlation after the crisis. Although the mean of the second board and the main board are almost identical, Graph 4.15 in Chapter 4, illustrates some large discrepancy between the ringgit and share prices of the second board companies as compared with the main board before the crisis period. During that optimistic period (pre-crisis), the ringgit moderately appreciated, b ut t he se cond b oard companies' sh are p rices were c onsiderably h igh, thus less debt was needed for financing. On the other hand, when Malaysia was hit with the financial crisis, the ringgit depreciated substantially and share prices of the small second board companies fell, resulting in a positive correlation between the ringgit and share prices. In this situation, debt will be a high priority for small companies especially when past profit was scarcely available. The situation may change following the ringgit being fixed to the US dollar, however debt was still accelerating between 1998 and 2000 as shown in Graph 4.1 in Chapter 4.

5.6.3.7 Risk (Business Risk, proxied by Standard Deviation of EBITDA)

As shown in Table 5.18, the risk is only significant for the main board companies before the crisis with a positive coefficient at the 95 per cent confidence level. Therefore, the business risk has no effect on the main board gearing companies during

and after the crisis. The risk also has no effect on second board companies before, during and after the crisis.

The significant results of the main board pre-crisis period suggest that the higher the risk, the higher is the gearing. T he results imply t hat d uring t he p re-crisis p eriod, when the market w as optimistic, firms exhibiting a greater earnings volatility were more highly geared. The findings are not consistent with many of the traditional finance textbooks which suggest that firms with a high degree of business risks will be associated with high financial risk, thus less capacity to borrow more. However, the notion of an indirect relationship is consistent with a study by Bradley et al. (1984) which found a statistically significant negative relationship between gearing and earnings volatility. Studies by Ariff et al. (1990) on the capital structure of Singapore firms' found a similar positive relationship between gearing and earnings volatility. Ariff et al. (1990) explained that the Bradley et al (1984) findings were based on the higher costs of financial distress, which might contribute to low gearing if the operating income was uncertain. Singapore firms nevertheless had low financial distress, hence providing a positive relationship between gearing and operating risk.

By observing Table 5.17a of the main board's risk during the pre-crisis, the mean and standard deviation of the risk are not very high, 0.2743 and 0.6244, respectively, hence a low probability of financial distress would be expected for the Malaysian companies. The Ariff et al. (1990) arguments would therefore support the direct relationship of gearing and risk of the Malaysian companies when the economy is performing well. Furthermore, the direct relationship found between gearing and risk

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is also consistent with the study of Kim and Sorenson (1986), where their book-value ratios and mixed-value ratios of gearing increases with the increase in operating risk. To support their findings, they cited Myers (1977) proposition that firms with high business risk may have a lower agency cost of debt, hence would be able to borrow more. High variance in operating income may reduce the agency cost of debt, rather than increase it.

5.6.4 The Difference between Book-Value Gearing and Mixed-Value Gearing

Mixed-value ratios are derived from the computation of the book value of debt divided by the book value of debt plus the market value of equity. As shown in Table 5.19, the results of the main board are not much different between book-value ratios and mixed-value ratios except for the significant p-value of the 1997's Curr and Mtbv negative sign. The main board's working capital ratio, return on capital employed and logarithm of total assets are all significant across three periods of time. Similar results were achieved for the second board; working capital ratio and return on capital employed were both significant before, during and after the crisis. The second board size was found to influence gearing before the crisis period; the other two periods were not significant.

The studies by Rajan and Zingales (1995) support the similarity of the results achieved between book-value ratios and mixed-values ratios. They studied the factors that affected the capital structure of the G7 countries by using the book value of equity and the market value of equity as a debt measurement. They found that all the coefficient of the regressions retained their same expected sign using the book value

of gearing as when using the market value of the equity in the gearing ratio as a dependent variable.

The 1997 market to book value (mtbv) of the main board shows a contrasting sign between the use of the measure of book-value ratios and mixed-value ratios. The negative relationship between debt and growth under mixed value measures are consistent with Booth et al. (2001) findings for Malaysia and Titman and Wessels's (1988) findings discussed previously under investment opportunity of book-value ratios. Based on a book value weighting, the earnings are not anticipated using accounting conventions. Based on a market value weighting, the earnings are anticipated, thus firms that expect high growth rates in the future should use more equity to finance their projects through retentions, resulting in a negative correlation between investment opportunities and gearing.

Since no relationship was found when gearing was measured using the book-value ratios (see Table 5.18), it is therefore unexpected to have a positive coefficient of the main board Curr (price sensitivity) during the 1997 based on mixed-value ratios. The gearing and price sensitivity positive relationship was found significant during an uncertain and chaotic economic environment, which implies that the higher the price sensitivity, the higher is the gearing. Therefore, gearing is proven to be affected when the share prices and the currency are highly sensitive. The result is significant when the mixed value ratio was used to measure the gearing. During this period, both currency and share prices were very low due to the depreciation of the ringgit and the deterioration of the market value of equity, resulting in a highly positive correlation (see Graph 4.14 and Table 5.17a). In the mathematical expression, the debt ratio will

increase if the market value of equity falls. In reality, however, debt may be the only option due to the falling share prices and companies' profit as a result of the crisis.

Table 5.19:
Factors Determined the Main Board and the Second Board Firms' **Mixed Value Ratio** Analyse Using Multiple Regression

Variables	Main board (Mixed-value ratios)			Second board (Mixed-value ratios)		
	Pre-crisis	1997	Post-crisis	Pre-crisis	1997	Post-crisis
Constant	5.9360 (1.6074)	5.1113 (0.6889)	10.1869 (1.3696)	-22.8133 (-2.3744)	56.5238 4.4082	82.5053 (2.2654)
Wcr	-0.7174 (-3.394)***	-1.9809 (-3.538)***	-1.5793 (-4.889)***	-4.627 (-3.687)***	-16.1293 (-7.709)***	-18.9646 (-5.068)***
Mtbv	0.0159 (0.0961)	-1.0577 (-3.511)***	0.0662 (0.1575)	-0.4162 (-1.3130)	0.0156 (0.0729)	-0.9786 (-1.1041)
Roce	-0.3569 (-5.180)***	-0.4910 (-6.461)***	-0.1266 (-2.824)***	-0.3456 (-1.898)*	-0.5964 (-6.055)***	-0.6875 (-7.217)***
Nfa/tas	-1.9273 (-0.6223)	-0.7345 (-0.1452)	0.1690 (0.0309)	0.1417 (1.8224)*	-0.0782 (-0.7645)	-0.5613 (-0.6335)
Log(tas)	0.9049 (4.687)***	1.5274 (4.846)***	1.5879 (4.655)***	4.7367 (5.380)***	1.0493 1.0548	0.3044 (0.1020)
Curr	-0.6164 (-0.1347)	32.0472 (2.6609)***	13.6892 (1.5585)	16.3685 (1.5320)	3.9673 (0.2524)	-15.4736 (-0.5780)
Risk	3.4729 (2.902)***	0.5221 (2.488)**	-0.0593 (-0.8503)	-0.2166 (-0.4417)	-0.1785 (-0.1519)	-0.0141 (-0.2199)
R-squared	23.22%	29.34%	17.99%	34.47%	40.82%	33.68%
Adj. R-squared	21.38%	27.76%	16.18%	30.62%	38.48%	31.18%
F-statistic	12.62	18.51	9.91	8.94	17.44	13.49
(P value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

*,**,***Significant at the 10, 5, and 1 per cent level, respectively.
Reported t-statistic are in parenthesis.
Mixed value ratio-book value of debt to book value of debt plus market value of equity
Wcr-Working capital ratio, Mtbv-Market to book value ratio, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.
N.B. multicollinearity of mixed value ratios are similar to book value ratio (independent variables of both measurement are similar).

The main board risk has shown a positive sign for both pre-crisis and the 1997 period using the mixed-value ratios measurement. As previously discussed under the book-value ratios, Kim and Sorenson's (1986) views would support the findings of a positive coefficient between debt and risk at book-value ratios and mixed-value ratios as they found a similar result for both measurements.

5.6.5 Panel Data

5.6.5.1 Introduction

A l ongitudinal o r p anel data i s a d ata s et t hat c ombine b oth t ime-series a nd c ross-sectional data. The multiple regressions in Section 5.6.3 only predict using cross sectional data for three periods of time. The process of combining cross-sectional and time-series data to form a panel is called pooling. By pooling the data together, it is possible to study the determinants of the firms' capital structure over a period of time. The panel data set allows the studying of both the changes in gearing of a single firm over t ime a nd t he v ariation i n t he g earing o f m any firms a t a given p oint i n t ime. There are three techniques to treat panel data using the regression analysis. The first technique is to simply combine, or pool all the time-series and cross-section data and then estimate the underlying model by utilising OLS (ordinary least square) method. The second and third techniques involve a dummy (Υ) that represents the value of the dependent variable for individual i at time t. If the Υ is treated as a constant, then the model is called a *fixed effects* models which includes the recognition that omitted variables may lead to changes in the cross-section and time-series disturbances. If the Υ is treated as a random variable, then it is called a *random effects* model, which improves the efficiency of the OLS (first technique) estimation process by accounting for cross-section and time-series disturbances.

The researcher utilises the *fixed effect* model which uses dummy 1 and dummy 0. These dummy variables implicitly classified the gearing in the data set into three different groups:

i)   If D_1 = 1 and D_2 = 0, pre-crisis is identified;

ii)   If D_1 = 0 and D_2 = 1, 1997 is identified;

iii)   If $D_1 = 0$ and $D_2 = 0$, post-crisis is identified (default)

Multiple regression is used to predict the coefficient of the panel data. The dummies were treated as D_1 and D_2 in the OLS analysis. The following is the panel data fixed effects model:

Equation 5.2:

$$Y = \alpha + \alpha_1 D_1 + \alpha_2 D_2 + \beta_1 \chi_1 + \beta_2 \chi_2 + ... + \beta_n \chi_n + \varepsilon$$

(see, for example, Koop (2000))

where,

Y = represents the dependent variable

D_1, D_2 = see earlier

α_1, α_2 = estimation / coefficient for D_1, D_2

$\alpha, \beta_1, \beta_2, \beta_n$ = Constant, estimation / coefficient for χ_1, χ_2, χ_n

χ_1, χ_2, χ_n = Independent variables; variable 1, variable 2 and variable n

ε = error

The coefficients of the dummy variables, α_1 and α_2 measure additional value associated with gearing due to the pre-crisis and crisis period. The coefficients of the non-dummy variables β_1 and β_2 are interpreted as the marginal effects of other independent variables on gearing (y). The model with dummy variables allows for different intercepts in the regression line, but the slope of the regression line is always the same unless dummy and non-dummy were allow for interacting, [Koop (2002)].

The hypothesis for panel data:

H10: Controlling for variations in pre-specified factors (e.g. liquidity, investment opportunity, profitability, tangibility, size, price sensitivity and risk), there are gearing effects caused by the crisis (tested by dummy variables)

5.6.5.2 The Panel Data Analysis

Both the book-value ratios and mixed value ratios were regressed against the 7 independent variables that were previously discussed in Section 5.5. The existence of multicollinearity was also tested. The D_1 (pre-crisis) of all models were correlated above 0.5 with the Curr (see Tables 1 to 4 in Appendix F). Although Statgraphics suggests removing one of the variables, both variables are retained as the figure is still below 0.8. Cooper and Schindler (1998) suggested removing one of the independent variables if it was correlated at 0.8 or greater. Since the correlation of pre-crisis dummy and Curr is less than 0.8 for the second board and the main board, the multicollinearity is not serious, therefore, it would not mislead the results of which explanatory variable(s) are explaining or influencing the dependent variable.

As shown in Table 5.20, both the main board book-value ratio and the mixed-value ratio pool data models are significant at the 99 per cent confidence level. The second board book value ratio is significant at the 99 per cent confidence level while the mixed–value model is not significant. The main board book value ratios had the highest r-squared with a percentage of 32.69 while the lowest is the second board mixed value ratios with a percentage of 2.52. Although three models are significant, only the mixed value ratios model of the main board has a significant coefficient of D_1 (pre –crisis) and D_2 (1997).

5.6.5.3 Discussion of Panel Data Analysis

The discussion will only emphasise the mixed value model since both D_1 and D_2 of this model is significant. The other independent variables under this model are significant at least at the 90 per cent confidence level except Risk which is not

significant. Pre-crisis (D_1) and post-crisis (D_2), Wcr, Roce, and Log(tas) are all significant at 99 per cent confidence level, whilst Mtbv and Nfa/tas are both significant at 95 per cent confidence level and finally the Curr is significant at the 90 per cent confidence level.

The pre-crisis coefficient figure of –16.7449 is lower than the crisis year (1997) with a coefficient value of –7.2878. The coefficient figures reflect a small gearing ratio during the pre-crisis as compared to the post-crisis. There are two different regression lines depending on whether the gearing is predicted before the crisis or during the crisis. If the lines were prepared for the period before and during the crisis, the intercept for the gearing based on the 1997 dummy will be higher than the pre-crisis y intercept. The results imply a shift in gearing ratio following the crisis. However, since they have the same slope, the marginal effects of other independent variables are still the same whether the gearing is predicted for the pre-crisis or in 1997. The second board book value model has a weak significant D_2 (1997). Therefore, if the dummy coefficient were added to the constant, it will increase the gearing ratio during the crisis.

Table 5.20:
Factors Determined the Main Board and the Second Board Firms' Book Value and
Mixed Value Ratio-Panel Data
Analyse Using Multiple Regression

Variables	Main Board		Second Board	
	Book-value ratios	Mixed-value ratios	Book-value ratios	Mixed-value ratios
Constant	26.7685 (4.1986)	14.7252 (3.9456)	60.1785 (4.1543)	-122.471 (-0.8874)
Pre-Crisis	-5.2064 (-1.4468)	-16.7449 (-7.971)***	-7.9807 (-1.1627)	-60.2772 (-0.9224)
1997	-1.0700 (-0.3586)	-7.2878 (-4.1989)***	-7.8470 (-1.7422)*	38.9653 (0.9085)
Wcr	-1.7498 (-5.0662)***	-1.2776 (-6.4815)***	-14.2213 (-7.8103)***	8.2057 (0.4680)
Mtbv	0.5875 (2.0408)**	-0.3348 (-1.9865)**	-0.2578 (-0.9546)	0.4337 (0.1695)
Roce	-0.9020 (-19.2911)***	-0.2000 (-6.2532)***	-0.2987 (-4.8845)***	-1.3320 (-2.2963)**
Nfa/tas	0.5695 (1.0879)	0.7281 (2.4453)**	-0.1400 (-1.0162)	1.0014 (0.7663)
Log(tas)	1.1615 (3.4941)***	1.4233 (7.3681)***	0.1480 (0.1258)	18.6208 (1.6619)*
Currency	-7.0667 (-0.8289)	9.6900 (1.9565)*	20.4609 (1.4985)	-249.79 (-1.9247)*
Risk	0.0307 (0.3072)	-0.0137 (-0.2394)	-0.0140 (-0.3160)	0.0604 (0.1433)
R-squared	32.69%	29.39%	19.60%	2.5210
Adj. R-squared	32.00%	28.65%	18.16%	0.7523
F-statistic	48.29	39.36	13.57	1.43
Prob. F-statistic (P value)	0.0000***	0.0000***	0.0000***	0.1741

*,**,***Significant at least at 10%, 5% and 1% respectively.
Reported t-statistic are in the parenthesis
Book value ratio-book value of debt to book value of debt plus book value of equity
Mixed value ratio-book value of debt to book value of debt plus market value of equity
Wcr-Working capital ratio, Mtbv-Market to book value ratio, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income.
N.B correlation matrixes for pool data are in the Appendix F (Tables 1,2,3 and 4).

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5.7 The Results of the Hypotheses

This section covers the outcome of the hypotheses from the statistical tests performed in Chapters 5. Statisticians recommend either "rejecting" or "not rejecting" hypotheses, to avoid accepting a hypothesis that is not true. However, in this thesis the term "accept" a hypothesis, strictly means "do not reject". The hypotheses are accepted based on the alternative hypotheses, hence, if the alternative hypothesis is true, the result is "accept", however, if the alternative hypothesis is not true, the result is "reject". Alternatively, if the alternative hypothesis was false, the result is rejected.

5.7.1 Hypotheses on Gearing Differences

Two differences in gearing have been studied: i) between the main board and the second board, ii) between six sectors listed on the main board. There are two hypotheses formulated to test the differences in gearing:

H1: There is a significant difference between the main board and the second board firms' gearing in each selected time period (i.e. before, during and after the crisis)
H2: There are significant differences between the gearing ratios in different sectors on the main board in each selected time period (i.e. before, during and after the crisis)

ANOVA and the Kruskal-Wallis techniques were used to test statistically the statement of the null hypothesis. The ANOVA is a one-way analysis of variance by mean, while the Kruskal-Wallis is one-way analysis of variance by median ranks. Based on the book value ratios of gearing, both hypotheses are accepted across three time periods as shown in Table 5.21. Therefore there are differences in gearing: i) between main and second board, ii) between six sectors at the main board. The results are significant across three periods of time using the Kruskal-Wallis (median) test as compared to ANOVA (mean) which is only significant before the crisis for H1

and H2 and after the crisis for H1. However, at the 0.01 significance level, the ANOVA shows strong differences for H1 post-crisis and H2 pre-crisis. In conclusion, there are differences in book value gearing of the main board and the second board and there are differences between the book value gearing of the six sectors at the main board.

Table 5.21:
Gearing Differences Hypotheses Results (Based on Book Value Ratios)

	Pre-crisis	1997	Post-crisis
H1	Accept ANOVA Kruskal-Wallis	AcceptKruskal-Wallis	Accept ANOVA* Kruskal-Wallis
H2	Accept ANOVA* Kruskal-Wallis	Accept Kruskal-Wallis	Accept Kruskal-Wallis

All tests significant at least at 10 per cent level, * significant at 1 per cent level

Table 5.22:
Gearing Differences Hypotheses Results (Based on Mixed Value Ratios)

	Pre-crisis	1997	Post-crisis
H1	Accept Kruskal-Wallis	Accept Kruskal-Wallis*	Accept Kruskal-Wallis*
H2	Accept Kruskal-Wallis	Accept ANOVA Kruskal-Wallis	Accept ANOVA* Kruskal-Wallis

All tests are significant at least at 10 per cent level, * significant at 1 per cent level

Similar results have been achieved for gearing based on mixed value ratios. The Kruskal-Wallis tests were significant for both H1 and H2 across three periods of time. The ANOVA tests were significant for H2 during 1997 and post-crisis period. Therefore, there are differences between mixed value gearing of the main board and the second board with or without the crisis. At the 99 per cent confidence level, the 1997 and post-crisis periods have the strongest differences. There are differences between the six sectors' mixed value gearing with or without the crisis, and the post-

crisis period showed the highest differences with a p-value of less than 0.01.

5.7.2 Firms' Specific Factors Hypotheses

Seven independent variables that are possibly associated with gearing were selected to find the determinants of the capital structure of the Malaysian companies. Seven hypotheses were prepared and multiple regression analysis was used to test the hypotheses. The statistical tests used were identified in Sections 5.6.3 and 5.6.4. The hypotheses were applied to both the book value gearing and the mixed value gearing. The r elated d iscussions o n e ach v ariable a re p resented i n C hapter 4, S ection 4.4.1. The following are the hypotheses related to each board for each time period:

H3: Firms' gearing is significantly related to the firms' liquidity*

H4: Firms' gearing is significantly negatively related to the firms' investment opportunities

H5: Firms' gearing is significantly negatively related to the firms' profitability

H6: Firms' gearing is significantly positively related to the firms' tangibility

H7: Firms' gearing is significantly positively related to the firms' size

H8: Firms' gearing is significantly negatively related to the currency sensitivity

H9: Firms' gearing is significantly negatively related to the firm's operating risk

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N.B * the word related without the negative and positive relationship is due to both positive or negative relationships present in the arguments in the literature review

Table 5.23 illustrates the results of the hypotheses for the main board book value ratios and the mixed value ratios based on multiple regression analysis. The hypotheses are rejected if the alternative hypotheses are not true. The alternative hypotheses H3, H5 and H7 have been accepted across the three periods of time based on both measurements. The H4 and H9 of 1997 and post-crisis period book value ratios have been rejected, and the H8 of 1997, H9 of 1997 pre-crisis and 1997 have

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also been rejected. Therefore, the liquidity, profitability and size have a strong influence over gearing as shown in the results. All three variables are at least significant at 95 per cent confidence level, suggesting a strong relationship between the variables and gearing.

Table 5.23:
The Main Board Gearing Hypotheses Results

	Book Value Ratios			Mixed Value Ratios		
	Pre-crisis	1997	Post-crisis	Pre-crisis	1997	Post-crisis
H3	accept	accept	accept	Accept	accept	accept
H4	reject	reject*	reject	Reject	accept	reject
H5	accept	accept	accept	Accept	accept	accept
H6	reject	reject	reject	Reject	reject	reject
H7	accept	accept	accept	Accept	accept	accept
H8	reject	reject	reject	Reject	reject*	reject
H9	reject*	reject	reject	Reject*	reject*	reject

All tests are significant at least at 10 per cent level, *significant at 1 per cent level

As shown in Table 5.24, the results for H3 and H5 of the second board are similar to the main board, both hypotheses are accepted across three periods at both measurements. There is a strong influence of profitability and liquidity over the gearing of the second board companies as shown by the significance results. H7 and H8 show a similar trend of results: the hypotheses are accepted during pre-crisis and rejected after the crisis for book value ratios, and accept during pre-crisis for mixed value ratios. Many of the second board alternative hypotheses were rejected as compared with the main board. None of the hypotheses was accepted for H4, H8 and H9.

Table 5.24:
The Second Board Gearing Hypotheses Results

	Book Value Ratios			Mixed Value Ratios		
	Pre-crisis	1997	Post-crisis	Pre-crisis	1997	Post-crisis
H3	accept	accept	accept	accept	accept	accept
H4	reject	reject	reject	reject	reject	reject
H5	accept	accept	accept	accept	accept	accept
H6	accept	reject	reject*	accept	reject	reject
H7	accept	reject	reject*	accept	reject	reject
H8	reject	reject	reject	reject	reject	reject
H9	reject	reject	reject	reject	reject	reject

All tests are significant at least at 10 per cent level, * significant at 1 per cent level

The panel data were discussed in Section 5.6.5. The study was looking at the time series effect on the gearing. The following is the hypothesis for the panel data:

> H10: Controlling for variations in pre-specified factors (e.g. liquidity, investment opportunity, profitability, tangibility, size, price sensitivity and risk), there are gearing effects caused by the crisis (tested by dummy variables in multiple regression)

Table 5.25 shows the results of the hypothesis of the panel data in which two models have a significant dummy result: mixed value ratios of main board and book value ratios of second board. However, for the second board book value ratios, only one dummy is significant, dummy 0 which represents 1997. Based on the results, the alternative hypothesis for the main board mixed value model is accepted and the second board book value ratios is partially accepted or qualified, while the other two hypotheses are rejected, the main board book value ratios and the second board mixed value ratios.

Table 5.25:
The Panel Data Hypotheses Results

	Main board		Second Board	
	Book value ratios	Mixed value ratios	Book value ratios	Mixed value ratios
H10	reject	Accept	qualified accepted	Reject

All tests are significant at least at 10 per cent level

5.8 Conclusion

The Kruskal-Wallis test shows significant differences between the main board and the

second board gearing ratios both at the book value ratios and mixed value ratios

across three time periods.   However, the ANOVA test indicates a significant

difference between book value gearing ratios of both boards only during the pre-crisis

and post-crisis. Therefore, differences in gearing exist between the large and small

firms.   The results also indicate that small firms are highly geared compared with

large firms using both measurements at three different time periods.

The Kruskal-Wallis test shows a weak (90 per cent confidence level) significant

difference between median gearing of the six sectors of firms listed at the main board

using both measurements. However, the ANOVA test shows a significant difference

between mean gearing of the six sectors when using mixed value ratios measurement.

The Bonferrani test on the sector differences has revealed that out of the six sectors

tested, only plantation sector's gearing is statistically different from the gearing of

other sectors.   The result also shows that construction has the highest gearing ratio at

the book value ratio and mixed value ratio while plantation has the lowest.

Based on the multiple regression analysis, not many differences were found between gearing using book value and mixed value ratios. Profitability and liquidity of both boards have the same effects on gearing across three time periods either using book value ratios or mixed value ratios. Size on the other hand has the same positive effect on gearing through three periods using both measurements but <u>only</u> for the main board companies. For the second board companies, size has an effect on book value gearing during the pre-crisis and the post-crisis, and when measured by mixed value ratios, the results indicate that second board firms' size is only positively significant during the pre-crisis period. For the rest of the independent variables, mixed results were found.

The mixed value ratios of panel data found that profitability, liquidity and size, the investment opportunity, tangibility and currency are related to gearing. The statistical results of the mixed value model reveal that gearing ratio of 1997 is higher than gearing ratio of the pre-crisis period, implying an increase in gearing due to the 1997 financial crisis. The second board book value ratio model has a significant dummy during 1997. Therefore, gearing is shifting up during this period, but no comparison can be made with the pre-crisis period as the dummy for that period is not significant. The dummies of other two models of panel data are not significant, therefore, no conclusion can be drawn from that analysis.

CHAPTER 6
MALAYSIAN CAPITAL STRUCTURE: BEHAVIOURAL REACTIONS

6.1 Introduction

Chapter 6 mainly covers data from the questionnaire mail survey. The purpose of the questionnaire survey is to examine the behavioural response of finance managers to the assessment on the capital structure. It is considered appropriate for this research to study and analyse both the secondary data from Datastream and the primary data from the survey. A more constructive and comparable result will be achieved as a result of studying two different sets of data from the same population.

A number of statistical tests have been employed on the questionnaire surveys, consisting of the chi-square test, analysis of variance and logistic regression analysis. The chapter is organised as follows: Section 6.2 briefly describes the pilot study, Section 6.3 provides an overview of the questionnaire which includes the response rate of the survey and frequency distribution of the responses provided by the respondents. Section 6.4 and Section 6.5 each outlines a comprehensive data analysis using chi-square and the ANOVA, respectively. Section 6.6 reviews the logistic regression analysis while Section 6.7 discusses the results of the hypotheses. Section 6.8 summarises the telephone interview and finally, Section 6.9 concludes the chapter.

6.2 Pilot Study

A pilot study is a small-scale trial before the main investigation is carried out, it is intended to test the research instrument and avert any problems or ambiguity. Bourque and Fielder (1995) and Saunders et al. (1997) emphasise the importance of employing representative members of the target population in the pilot, even though these results may not then be included in the overall findings, as they may contribute to the necessity for changes to the main questionnaire or its administration. Sauders et al. (1993) coded Bell's (1993) advice on the importance of the pilot test:

> *"however pressed for time you are, do your best to give the questionnaire a trial run as, without a trial run, you have no way of knowing that your questionnaire will succeed"*
> (Bell (1983, p.84 cited in Sauders (1993), p.269)

The first draft of the questionnaire was disseminated via email to the finance managers of the 200 companies listed under the KLSE for a pilot test. Email was chosen as the medium of distribution for the pilot questionnaire due to its speed and minimal cost. However, there are a few drawbacks to the method used because (i) not all companies have their own web-site which makes it very difficult to obtain the email addresses of the finance managers, (ii) not all finance managers have email accounts and (iii) email is still considered as an inappropriate delivery method for official business-related correspondence. A total of 20 valid responses were received, representing 10 per cent of total sample sent.

After the questionnaire had been piloted satisfactorily, it was decided to proceed with the main survey. The main questionnaire was developed after considerable changes and improvements have been made based on the feedback obtained from the pilot study. Significant changes were made to the Likert scales of questions 1 and 2. The

response option of "During the next 12 months" and "in the longer term" for Question 1 has been changed to "high, medium and low priority". For Question 2, the response option has been changed to "Large, Medium and No Change". Question 2 has been divided into a few sub-questions. A few additional questions were also included in the revised version of the questionnaire. A copy of the pilot and postal survey questionnaire are attached in Appendixes I and J.

6.3 Postal Surveys

The postal survey questionnaire was sent from the United Kingdom to the companies listed under the main board of the KLSE in April 2001. The addresses were obtained from the KLSE web-site which is linked to the companies' web-site. A total of 357 questionnaires were sent to the following sectors listed under the main board of the KLSE: construction, consumer products, industrial products, trading and services, plantation and properties. These sectors have been categorised by the KLSE and are available online from the Datastream. The same sectors were used in chapter 5 under the Datastream data analysis.

The questionnaire was numbered individually by hand on the top right corner. It was intended to facilitate the counting of the questionnaire during the administration of the survey. The respondents were requested to mail the completed questionnaire back to the researcher in the self-addressed stamped envelope provided. This was also to encourage a high response rate as it was felt that finance managers were more likely to reply.

A few minor problems were encountered during the process of administration of the questionnaire. These included problems with addresses of the finance managers where in most cases, the questionnaire was sent to the secretary's office of the companies, instead of the office of the finance managers. Considerable hours had to be allocated to contact the companies by phone to get their correct mailing addresses. Despite all the follow-up efforts a low response rate of 10 per cent was obtained. To improve the rate of return and as a form of a second reminder, the questionnaire (see Appendix K) was sent out again to the companies which have yet to return the completed questionnaire back to the researcher. These companies have been identified and singled out from the number on the top right corner of the questionnaire. According to Cooper and Schindler (1998), follow-ups or reminders are very successful in increasing the response rates of the questionnaire survey.

6.3.1 Response Rate

The completed survey forms were returned back to the researcher in the sealed envelopes provided. A number of the completed survey forms received had had the individual serial numbers intentionally removed by the respondents. Despite giving complete assurance of confidentiality on the cover letter attached to the survey forms, it was obvious that some finance managers had tried to avoid detection. A number of the participants had given valuable feedback to the researcher by providing additional comments as well as their personal business cards. Nevertheless, a majority of the target population had satisfactorily completed and returned the questionnaire back to the researcher.

Following the reminder, a total of 71 valid completed questionnaires had been received from the sample of 357 companies listed on the main board. The computation of the response rate differs from one statistician to another. The simplest method of calculation is to divide the total number of respondents in the sample by the total number of questionnaire sent. In this case, a total of 19.89 per cent has been obtained by dividing 71 by 357. However, deVaus's (1991) approach is to subtract the 'unreachable' or 'non-response' from the total sample in the calculation. Sauders et al. (1993) define 'unreachable' or 'non response' as refusal to respond, ineligible to respond and cannot be contacted. Approximately 65 companies have been identified as non-response in this survey, therefore the response rate is equivalent to 24.32 per cent $[71/(357\text{-}65)]$[9].

The accepted percentage for the survey response varies among statisticians. Dillman (1978) recorded a response rate of 50 to 92 percent for questionnaire survey, while Owen and Jones (1990) and Cooper and Schindler (1998) considered 30 per cent response as reasonable. However, Saunders et al. (1997) reviewed the latest business survey response rates and have found rates as low as 15 to 20 percent. Therefore, a response rate of 24.32 per cent obtained for this study is considered satisfactory when compared with other similar studies with similar or even much lower rates. This includes Kester and Mansor (1993), Trahan and Gitman (1995) and Graham and Harvey (2001), whom had obtained a response rate of 28.8 per cent, 12 percent and 9 per cent, respectively.

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[9] (total number of responses/(total number in sample-non-response))

Table 6.1 illustrates the percentage response for each sector. A large number of responses was obtained from trading and services, whilst the smallest number of response was from the construction sector.

Table 6.1:
The Questionnaire Survey Response Rate According to the Sectors

Sector	Number sent	Number received	% response rate from each sector
Constructions	29	3	0.8
Consumer product	50	9	2.5
Industrial product	95	10	2.8
Properties	69	10	2.8
Plantation	36	6	1.7
Trading and services	78	33	9.2
Total	357	71	19.89

6.3.2 Questionnaire Analysis

In general, the questionnaire surveys were divided into *three parts* throughout the analysis.

1. Financing priority (Question 1).

2. Factors that influence the finance manager's decision (Questions 2 to 5).

3. The effects on D/E following the 1997 crisis and following the ringgit being fixed (Questions 6 to 9).

Question 1 covers the financing priority, questions 2 to 5 focus on the factors affecting the debt to equity ratio and questions 6 to 9 mainly deal with the effects of the 1997 financial crisis on the actual and the target ratio of capital structure decision.

Tables 6.2, 6.3 and 6.4 have been prepared to show the frequency distribution for question 1, questions 2 to 5, and questions 6 to 9, respectively. Frequencies of individual sources were computed using SPSS version 9.0.

The frequency distribution in Table 6.2 for question 1 shows retentions as the highest priority among firms in terms of financing preference, accumulating a total of 70.8 per cent, while preference shares obtained the lowest scores under high priority at 1.7 per cent. Under the medium priority of financing preferences, overdraft scores the highest at 47.7 per cent while 'others' had the lowest score of 11.1 per cent. Under the low priority column, the results were just the opposite, preference shares had the highest score of 74.1 per cent while retention had the lowest score of 12.3 per cent.

Table 6.2:
Frequency Distribution for Question 1 (in percentage)

Sources of funds	High priority	Medium priority	Low priority	Total
Internal equity (retentions)	70.8	16.9	12.3	100
Ordinary shares	31.3	31.3	37.5	100
Preference shares	1.7	24.1	74.1	100
Islamic bonds	10	33.3	56.7	100
Conventional bonds	22.2	38.1	39.7	100
Islamic bank loan	12.1	41.4	46.6	100
Conventional bank loan	42.4	43.9	13.6	100
Overdrafts	26.2	47.7	26.2	100
Finance leases	17.5	22.8	59.6	100
Others (please specify)	55.6	11.1	33.3	100

Table 6.3 shows the frequency distribution for questions 2 to 5. The questions are related to debt to equity response due to the certain factors that may determine the firms' capital structure. The increase in fixed assets had the highest score of 24.6 per

cent referring to the *Large Increase in D/E* column, while the significant increase in profit shows the highest score of 30.4 referring to the *Large Reduction in D/E* column. As for *No Change in D/E*, the highest score is 88.1 per cent which is the response to the increase in public disclosure of accounting. A significant decrease in profit scores the highest for the *Moderate Increase in D/E*, accumulating a total score of 55.1 per cent, while a significant decrease in fixed overhead costs scores the highest for *Moderate Reduction in D/E*.

Table 6.3:
Frequency Distribution for Questions 2 to 5 (in percentage)

Questions 2 to 5	Large Reduction in D/E*	Moderate Reduction in D/E	No change in D/E	Moderate Increase in D/E	Large Increase in D/E	Total %
A significant increase in fixed assets as a proportion of total assets	5.8	10.1	17.4	42	24.6	100
A significant decrease in fixed overhead costs	5.8	60.9	29	4.3	0	100
A significant increase in the company's profit	30.4	55.1	11.6	2.9	0	100
A significant decrease in the company's profit	1.4	10.1	15.9	55.1	17.4	100
A significant increase in research and development expenditure	0	1.5	63.1	33.8	1.5	100
A significant increase in public disclosure of accounting information beyond minimum statutory requirement	1.5	4.5	88.1	6.0	0	100
Annual decrease in corporate tax rate similar to those experienced in recent years	4.3	52.2	37.7	5.8	0	100
A significant increase in capital allowances on assets (for tax purposes)	5.9	50	33.8	10.3	0	100
Temporary tax losses (if applicable)	1.7	20.3	61.0	16.9	0	100
An increase in long-term interest rates by 2 percentage points	2.9	7.2	31.9	43.5	14.5	100
A decrease in long-term interest rates by 2 percentage points	10.1	46.4	34.8	7.2	1.4	100
An increase in inflation by 2 percentage points	1.4	7.2	53.6	31.9	5.8	100
A decrease in inflation by 2 percentage points	2.91	35.3	57.4	4.4	5.8	100

An increase in government incentives	2.9	47.1	45.6	4.4	0	100
A decrease in government incentives	0	5.9	55.9	38.2	0	100
An increase in industry average debt ratio	0	1.5	69.7	28.8	0	100
A decrease in industry average debt ratio	0	30.3	69.7	0	0	100

Table 6.4:
Frequency Distribution for Questions 6 to 9 (in percentage) .

Questions 6 to 9	Yes	No	Total
If the actual gearing changed due to crisis	54	46	100
If the target gearing changed due to crisis	42	58	100
If the actual gearing changed due to ringgit being fixed	21	79	100
If the target gearing changed due to ringgit being fixed	15	85	100

Table 6.4 shows the breakdown of scores obtained for the 'YES' and 'NO' response

to questions 6 to 9. For questions 6, 7, 8, and 9, the total percentage of respondents

answered 'YES' are 54, 42, 21 and 15, respectively.

6.3.3 Coding and Analysing Questionnaire

As previously noted, a total of seventy-one valid responses have been received. The

responses were eventually coded into the spreadsheet before being transferred to the

Statgraphics version 5.0 and the Statistical Package for Social Scientists (SPSS)

version 9.0. The codes, using numbers 1 to 5 to represent the scoring scale of the

Likert Scale questions in the questionnaire. Numbers 1, 2 and 3 have been used to

represent high, medium and low priority, respectively for question 1. Numbers 1, 2,

3, 4 and 5 have been used to represent *"large reduction in debt to equity ratio,*

moderate reduction in debt to equity ratio, no change in debt to equity ratio, moderate increase in debt to equity ratio, and *large increase in debt to equity ratio,* respectively. Questions which have not been answered were considered missing and were coded as 9 in SPSS and left blank in Statgraphics.

The coding were later changed again to dummy 1 for high priority and dummy 0 for low priority, and dummy 1 for the increase in debt-equity ratio and dummy 0 for the decrease in debt-equity ratio. For the neutral response *(medium and no change in d/e)*, each neutral Likert category has been allocated optimally into dichotomous groups to avoid small responses. For example, the medium priority response to question 1 is 16.9 percent, it was allocated to dummy 0 as the total of dummy 0 allocation is very small. This means that retentions were classified simply as high priority or not. A similar approach was used for questions 2 to 5, where large and moderate increases in debt were coded as 1, and large and medium reduction in debt were coded as 0. The re-coded is relevant for the ANOVA analysis and logistic regression in Sections 6.5 and 6.6.

6.4 Chi-square

6.4.1 Introduction

As previously reviewed in Section 4.4.1 in Chapter 4, the chi-square value measures how different the set of the observed frequencies are from the expected frequencies. Thus, the test is based on the differences between the actual observed frequencies and the frequencies which would be expected if the null hypothesis was true. The chi-square test is used only to test question 1 of the questionnaire to find the association between the financing type and the financing priority.

The alternative hypotheses, H11 to H16 are from Section 4.3, Chapter 4.

H11: There is an association between types of financing and the level of priority

H12: Retentions are the main financing priority

H13: Firms follow the financing hierarchy

H14: Conventional bank loan is preferred over Islamic bank loan

H15: Conventional bond is preferred over Islamic bond

H16: Debt finance and financial leases attract equal preference

6.4.2 Chi-square Analysis

The results in Table 6.5 are comprised of two outputs: calculations using Microsoft Excel (spreadsheet) and Statgraphics version 5.0. Both methods have obtained the same values of chi-square, however, only Excel provides the critical value figures while Statgraphics provides the p-value. With the only exception of Ibond versus Cbond, most of the p-value results are significant, which suggest that the null hypothesis can be rejected due to no association between types of financing and the levels of priority.

Table 6.5:
Chi-square Analysis

Sources	Chi square	Degree of freedom	*Critical value	P-value
Re * Os * Tdebt	49.73	4	9.49@5%	0.0000
Os * Tdebt	8.99	2	5.99@5%	0.0112
Idebt * Cdebt	14.49	2	5.99@5%	0.0007
Ibloan *Cbloan	21.65	2	5.99@5%	0.0000
Ibond *Cbond	4.87	2	5.99@5%	0.0878
Tdebt, Ov and Flease	22.38	4	9.49@5%	0.0002

p-value significant at least at 95 % or more level
* spreadsheet calculation is shown in the discussion
Re-retentions, Os-Ordinary shares, Tdebt-total debt, Idebt-Islamic Debt, Cdent-Conventional debt, Ibloan-Islamic bank loan, Cbloan-Conventional bank loan, Ibond-Islamic bond, Cbond-Conventional bond, Ov-Overdraft, Flease-financial lease

6.4.3 Discussion of the Chi-Square Results

6.4.3.1 Retentions (Re), Ordinary Shares (Os) and Total Debt (Tdebt)

The chi-square calculation value between the retentions, ordinary shares (Os), total debt (Tdebt) and the three level of financing priority is 49.73. The p-value result of 0.0000 suggests that the result is significant at the 99 per cent confidence level. This shows that there is an association between the three types of financing and the three levels of priority.

From the observed and expected value figures in Table 6.6, it is obvious that retention obtained the highest observed (O) value of 46 at the high priority. This figure is significantly higher than the high priority expected (E) figure of 25.54. On the other hand, the observed (O) figures for the ordinary shares and total debt are lower than the expected (E) figures (20 < 25.14 and 11 < 26.3214), respectively at the high priority. However, when compared between the observed (O) and expected figures at medium priority, only debt observed (O) figures exceed its expected value (38 > 23.59), hence debt is preferred over ordinary shares. However, at the low priority, ordinary shares' observed and expected figure difference of 8 is higher compared with the total debt difference of 1. The observed results show that companies prefer retention at high priority, debt at medium priority and ordinary shares at low priority.

The result is consistent with Myers (1984) pecking order theory that firms follow a certain hierarchy when acquiring funds. According to him, retentions are the first choice, followed by debt and ordinary shares as the last option. Myers explains that most profitable firms generally borrow less as they do not need external financing as retentions will be sufficient for any financing need to fund new projects. If the

retentions are not available, the firms will seek funds in order of the riskiness, thus debt will be issued before ordinary shares.

However, the result is not consistent with the Kester's and Mansor's (1993) survey of Malaysian companies' financing hierarchy. Their survey showed that finance managers select retentions as their first choice, followed by ordinary shares and debt. The differences between the findings may be due to the differences in the periods of the survey. Their study was conducted in 1993 while the survey for this research was distributed in April 2001. The result is despite the fact that the Malaysian capital market has developed significantly and has undergone considerable changes within that 8-year period.

Table 6.6:
Chi-square Analysis for Retention (Re), Ordinary shares (Os) and Total debt (Tdebt)

observed(O)	Re	Os	Tdebt	Total	Expected(E)		
High	46	20	11	77	25.536	25.143	26.321
Medium	11	20	38	69	22.883	22.531	23.587
Low	8	24	18	50	16.582	16.327	17.092
Total	65	64	67	196			
Missing	6	7	4	17			
Grand total	71	71	71	213	(O-E)^2/E		
					16.400	1.052	8.918
					6.171	0.284	8.808
					4.441	3.607	0.048

Re: retention
Os: ordinary shares
Tdebt: total debt

Chi square   49.729
Df(3-1)(3-1)   4
Critical Value   9.49 @5%

6.4.3.2 Conventional Debt (Cdebt) and Islamic Debt (Idebt)

Tables 6.7 and 6.8 show the analysis of bank loan and bond pertaining to the Islamic and conventional financing type. As shown in Table 6.5, Islamic and conventional bank loans are associated at the 99 per cent confidence level. However, there is no association between Islamic and conventional bonds as the p-value is larger than 0.05 (Table 6.5) and the chi-square value is smaller than the critical value (Table 6.8).

Table 6.7:
Chi-square Analysis of Islamic Bank Loan (IBL) and Conventional Bank Loan (CBL)

Observed(O)	IBL	CBL	Total	Expected(E)	
High	7	28	35	16.371	18.629
Medium	24	29	53	24.790	28.210
Low	27	9	36	16.839	19.161
Total	58	66	124		
Missing	13	5	18	(0-E)^2/E	
Grand total	71	71	142	5.364	4.714
				0.025	0.022
				6.132	5.389
				Chi Square	21.646
IBL: Islamic Bank Loan				Df(column-1)*(row-1)	
CBL: Conventional Bank Loan				Df=(2-1)*(3-1)	2
				Critical value	5.99@5%

Table 6.8:
Chi-square Analysis for Islamic Bond (Ibond) and Conventional Bond (Cbond)

Observed(O)	IB	CB	Total	Expected(E)	
High	6	14	20	9.756	10.244
Medium	20	24	44	21.463	22.537
Low	34	25	59	28.780	30.220
Total	60	63	123		
Missing	11	8	19	(0-E)^2/E	
Grand total	71	71	142	1.4461	1.3772
				0.0998	0.0950
				0.9466	0.9015
				Chi Square	4.8662
IB: Islamic Bond (Ibond)				Df(column-1)*(row-1)	
CB: Conventional Bond				Df=(2-1)*(3-1)	2
(Cbond)				Critical value	5.99@5%

The conventional bank loan is preferred over Islamic bank loan both at high priority and medium priority. As shown in Table 6.7, the observed figure of conventional bank loan is higher than the expected figure, (28 > 18.629) at high priority and (29 > 28.21) at the medium priority. Conversely, at low priority, the observed figure of Islamic bank loan is so much higher than the expected figure (27 > 16.82), and both high priority and medium priority observed figure of Islamic bank loan are lower than their expected figures. Therefore, the firms have given the highest priority to the conventional bank loan and lowest priority to the Islamic bank loan.

To conclude the preference of conventional and Islamic securities, the following two new variables have been created: the total conventional debt financing and total Islamic debt financing. This was done by observing the responses of conventional and Islamic bond and bank loans provided by the respondents. The total of both Islamic and conventional financing are tested using chi-square.

The chi-square test for total Islamic debt (Islamic bond plus Islamic bank loan) and the total conventional debt (conventional bank loan plus conventional bond) is significant at the 99 per cent confidence level. Therefore, there is an association between both types of financing and the level of priority. As shown in Table 6.9, conventional debt is preferred over Islamic debt as the observed value is higher than the expected value (7 > 5.2), however the observed figure of 7 is too small to be considered as a high priority choice.

At medium priority, the conventional debt is again preferred over Islamic debt with the observed figure being higher than the expected figure (42 > 33.26) while the

expected figure for Islamic debt (Idebt) is higher than the observed figure of 22 <

30.74. At low priority, the Islamic debt is preferred over the conventional debt.

Based on the observation of observed and expected figures of high, medium and low

priority, the Malaysian companies have given highest priority to the conventional debt

and lowest priority to the Islamic debt.

Table 6.9:
Chi-square Analysis of Total Islamic Debt (Idebt) and Total Conventional
Debt (Cdebt)

Observed(O)	Idebt	Cdebt	Total	Expected(E)	
High	3	7	10	4.803	5.197
Medium	22	42	64	30.740	33.260
Low	36	17	53	25.457	27.543
Total	61	66	127		
Missing	10	5	15	(O-E)^2/E	
Grand total	71	71	142	0.677	0.626
				2.485	2.297
				4.367	4.036
				Chi Square	14.487
Idebt: Islamic debt				Df(column-1)*(row-1)	
Cdebt: Conventional debt				Df=(2-1)*(3-1)	2
				Critical value	5.99@5%

It has been expected for firms to prefer conventional debt over Islamic debt due to the

unfamiliarity of many companies with the Islamic financing products because Islamic

financing is relatively new. Furthermore, many researchers have constructively

criticised many Islamic financing products in Malaysia which have been derived

from conventional products but with a few adjustments to comply with the Islamic

syariah (law)[10]. This practice has been strongly criticised by Ahmad (1992) as he

considers this as merely renaming the interest. These adjustments have revealed

many weaknesses such as relying on secondary modes (short-term) of financing such

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[10] This seems to be general feeling and was expressed by Rodney Wilson September 1996, in the
following words " Often it has been a case of adapting and modifying conventional instruments so that
they can be seen to be Islamically legitimate". Cited from Tlemsani and Mathews (2003), p.4.

as *murabahah*, *Baithamal ajil* and leasing as discussed by Obiyathulla (1995). The reason is to reduce risk of enterprise failure and moral hazards if they were to use long term financing modes such as <u>*musharakah*</u> and <u>*mudarabah*</u>.

Al Harran (1995) documented that <u>*mudarabah*</u> financing represents less than 1 per cent of the Bank Islam Ma*laysia Berhad (BIMB) total loan throughout the 1985-1991 period, while* <u>Musyarakah</u> shows a rate ranging from 0.01 to 2.2 per cent. According to Al Harran, some of the customers of BIMB had been cheated because these customers (borrowers) did not declare their profit and they also lack the ability to understand the projects to finance[11].

Whilst Obiyathulla (1995) argues on the features of *mudarabah* and *musharakah* contract in which the borrowers have nothing to lose if they take unprofitable projects, because the lenders will bear all the costs. This phenomenon called 'moral hazard' where the borrowers (firms) have an incentive to switch to riskier projects that may either give high returns or may be unprofitable after receiving their loans. The reason is because the creditors do not share (beyond interest and principal payments) the returns from highly successful projects. This situation will result in the reluctance of the lender to provide long term financing modes.

6.4.3.3 Total Debt, Overdraft and Financial Lease

The null hypothesis of no association between the above three types of financing and the level of priority is rejected, as the chi-square value is larger than the critical value

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[11] Mudarabah for example; is a profit sharing partnership whereby the lender (first partner) is the sole provider of the fund and the borrower (the other partner) who is exclusively responsible for management and investment of the fund provided.

(22.384 > 9.49) and the test is significant at the 99 per cent confidence level. Table 6.10 shows that at high priority, overdraft is preferred over the other two methods of financing with the observed value is higher than the expected value (17 > 13.069).

Table 6.10:
Chi-square Analysis of Total Debt (Tdebt), Overdraft (OV) and Financial Lease (Flease)

Observed(O)	Tdebt	OV	FLease	Total	Expected(E)		
High	11	17	10	38	13.471	13.069	11.460
Medium	38	31	13	82	29.069	28.201	24.730
Low	18	17	34	69	24.460	23.730	20.810
Total	67	65	57	189			
Missing	4	6	14	24			
Grand total	71	71	71	213	(O-E)^2/E		
					0.453	1.183	0.186
					2.744	0.278	5.564
					1.706	1.909	8.361
Tdebt: total debt							
OV: overdraft					Chi square	22.384	
Flease: Financial lease					Df(3-1)(3-1)	4	
					Critical Value	9.49 @5%	

At medium priority, both debt and overdraft observed figures are higher than the expected figures, (38 > 29.069, 31 > 28.201), the difference of observed and expected value of total debt is higher than the overdraft difference, thus, debt is preferred over overdraft. At low priority, only financial lease observed figure is higher than expected figure, 34 > 20.810, hence financial lease is preferred over debt and overdraft. Therefore, overdrafts would be the first choice of financing, followed by debt and the financial lease as the least preferred method of financing.

The long term debt market, especially for bonds is still new in Malaysia, therefore a bank loan is still favourable over any other types of debt financing. Graph 2.1 from Chapter 2 illustrates the financing tendency of Malaysian firms in which bank credit

scores the highest. Furthermore, firms prefer short-term debt because its transaction cost is lower than the long term debt and equity (Titman and Wessels (1988)).

6.5 Analysis of Variance (ANOVA)

6.5.1 Introduction

ANOVA test has been described thoroughly in Section 4.4.2 in Chapter 4 and has been used for the Datastream data analysis in Section 5.5. The same test is used to test the questionnaire survey data in this section. The test is between the <u>continuous</u> data from Datastream and <u>dichotomous</u> data from the postal survey. The continuous data were the account data averaged for seven years and dichotomous data was between dummy 1 and dummy 0. Tables 1 and 2 in Appendix G, show the results of the ANOVA test and Cochran test for question 1 (financing priority) and 12 independent variables from Datastream. While Tables 4 and 5 in Appendix G shows the results of the ANOVA test and Cochran test for questions 2 to 5 on the postal survey and the 12 independent variables from Datastream.

The mean score of many variables are significantly different for the ANOVA test, however the same variables had a significant Cochran's test (standard deviation). Therefore, the results have to be disregarded for discussion and instead, had to rely on the Kruskal-Wallis test. Tables 3 and 6 in Appendix G show the results of the Kruskal-Wallis tests for question 1 and questions 2 to 5, respectively.

The alternative hypotheses (H17 and H19) are from Section 4.3, Chapter 4.

Null hypothesis: $\mu = \mu$

Alternative hypothesis: $\mu \neq \mu$

6.5.2 Summary of the Mean Test Results

Table 6.11 summarises the results of Table 1 in Appendix G which shows only the significant mean results for question 1. The mean results are between Dos and the log(tas) which are significant at the 95 per cent confidence level with a p-value of 0.0111. The 0 dummy which represents a low priority of ordinary shares (Dos) has a mean of 15.1614 whilst dummy 1 which represents high priority of ordinary shares

has a mean of 12.7854. This implies that smaller companies have a high priority for ordinary shares, while bigger companies have a low priority for ordinary shares.

Table 6.11:
ANOVA for Question 1

Factors Variables		Log(tas)
Dos	0	15.161**
	1	12.785

(dummy 0-low priority, dummy 1-high priority)
*, **, ***Significant at least at 10%, 5% and 1 % level critical values
Log(tas)-Logarithm of total assets, Dos-dummy for Ordinary shares

6.5.3 Summary of Median Test Results

Table 6.12 shows the results of the Kruskal-Wallis median test on the responses obtained from question 1 (the financing preferences) and the Datastream data of capital structure determinants. The median scores of many Datastream capital structure determinants are significantly different from the financing priority, especially Mtbv, Dep/tas and Nfa/tas.

The Wcr and Idebt median test is significant at the 99 per cent confidence level. The mean for Wcr dummy 0 is 32.543 while the figure for dummy 1 is 24.870. Therefore, this shows that low liquid firms prefer Islamic debt as compared to highly liquid firms. Npm is significantly different from Dos, in which the mean score of dummy 0 is higher than dummy 1; 36.000 > 27.316; thus, firms with high profit margin tend to give low priority to ordinary shares.

Mtbv, proxy for investment opportunity or growth are significantly related to Dtdebt, Didebt, Dcdebt, related to all types of debt financing. Table 6.12 reveals that dummy 0 figures are higher than dummy 1. Thus, low investment growth firms give high

priority to total debt, Islamic debt, and conventional debt. The Idebt is also related to the tax in which the dummy 0 of both types of financing are lower than dummy 1; 27.361 < 35.208 for Islamic debt. Therefore, high tax bracket firms prefer Islamic debt.

The Dep/tas is related to the Dos, Dtdebt, Didebt, and Dfl. The two types of debt have achieved the same results, whereby the median rank for dummy 0 is higher than dummy 1. Hence, this implies that firms with low non-debt tax shield give high priority to the total debt and Islamic debt. However, firms with high non-debt tax shield give high priority to ordinary shares and financial lease. The dummy 0 results of both ordinary shares and financial lease are lower than dummy 1; 26.583 < 36.050 for ordinary shares and 25.029 < 34.870 for financial lease.

The median rank of dummy 0 is higher than the dummy 1 for Nfa/tas and Didebt. This suggests that low tangibility firms prefer Islamic debt. Nevertheless, firms with high tangibility have given high priority to ordinary shares and financial lease as shown by the dummy figures. Log(tas) is related to Dos, with a median rank of 38.737 for dummy 0 and 23.243 for dummy 1, suggesting that, smaller firms give high priority to ordinary shares.

The risk is significant with Dos and the Dcdebt at 90 and 95 per cent confidence level with median rank dummy 1 is higher than dummy 0 for ordinary shares (26.688 < 35.269) and dummy 0 is higher than dummy 1 for the conventional debt (42.177 > 29.000). Therefore, high-risk firms prefer ordinary shares while low-risk firms prefer conventional debt.

Table 6.12:
Kruskal-Wallis for Question 1

Variables Factor		Wcr	Npm	Mtbv	Tax	Dep/tas	Nfa/tas	Tas	Risk
Dos	0		* 36.000			** 26.583	* 27.458	*** 38.737	* 26.688
	1		27.316			36.050	35.525	23.243	35.269
Dtdebt	0			** 40.912		** 42.778			
	1			29.457		30.021			
Didebt	0	* 32.543		*** 34.214	* 27.361	*** 36.111	*** 37.056		
	1	24.870		22.326	35.208	22.083	20.667		
Dcdebt	0			* 38.719					** 42.177
	1			29.713					29.000
Dfl	0					** 25.029	** 24.941		
	1					34.870	35.000		

(dummy 0-low priority, dummy 1-high priority)
*, **, ***Significant at least at 10%, 5% and 1 % level critical values
Wcr-Working capital ratio, Npm-Net profit margin, Mtbv-Market to book value ratio, Tx-Tax, Dep/tas-Depreciation to total assets, Nfa/tas-Net fixed assets to total assets, Tas-Logarithm of total assets, Risk-Standard deviation of operating income. Os-Ordinary shares, Tdebt-total debt, Idebt-Islamic Debt, Cdebt-Conventional debt, Flease-financial lease
N.B. Some factors in the above Table beginning with the letter D represent the Dummy

6.5.4 Discussion of the Mean and Median Test Result for Question 1

Tables 6.11 and 6.12 along with the previous summary illustrate the behaviour of the Malaysian firms with regards to their financing preferences and factors that determine their choice of financing. Low liquid firms have given high priority to Islamic debt, implying that firms with either high current liability or low current assets tend to choose Islamic debt for financing. The results are consistent with the results from the previous chapter using multiple regression analysis in which a negative coefficient was found between liquidity and gearing, although the gearing in Chapter 5 does not specifically refers to Islamic debt. As the liquidity position declines, firms may need higher amount of short-term debt to support their high current liability or to improve their current assets. By using Islamic debt financing to finance their liquidity, firms reduce the interest rates variation risk by using short term Islamic debt. Sudin (2003)

in his comparative study of Islamic banking practices in 11 countries has found that Bank Islam Malaysia Berhad (BIMB) has the highest percentage of *bai bithaman ajil* (short-term financing), which was 68 per cent of total financing. While *musyarakah* (long-term financing) represents only 2 per cent of total financing.

Firms with a low market to book value ratio gave high priority to all types of debts financing including total debt, Islamic debt, and conventional debt. As was previously discussed in chapter 4, the market to book value ratio is a proxy for investment opportunities or growth for the firms, thus implying that high growth firms consider debt as low priority for financing and vice versa. The results implied a negative relationship between debt and growth opportunity, consistent with the Myers (1977) and Rajan and Zingales (1995) discussions presented in the previous chapter. Their main reason is that firms with a high growth rate will forgo profitable projects in t he future i f t hey c hoose t o c ontinue u sing d ebt (either t ypes o f d ebt w ould n ot make any difference in this relationship).

Tax is positively related to the Islamic debt whereby high tax shield firms give high priority to the Islamic debt at the 99 per cent confidence level. There are many theories and studies of the relationship between debt and taxes because of the tax advantage on debt due to the interest deductibility. It is expected that high tax rates will result in a low cost of debt and hence more debt can be used, resulting in a positive relationship between tax and gearing. The positive results of debt and tax is consistent with MM (1963) proportion of tax advantage of debt and the positive result of tax and debt is consistent with the Rajan and Zingales (1995) findings of the G7 countries capital structure. The findings are however not consistent with the Booth et

al. (2001) findings on Malaysian firms in which they found a negative relationship between tax and gearing. However, their study did not utilise survey-based data and did not specifically referred to Islamic debt.

Although the proposition by MM (1963) and the Rajan and Zingales (1995) study support the above findings, their studies were not specifically related to Islamic financing. Under the conventional system, interest is the main issue and tax advantage of debt is due to the interest deductibility. In the Islamic financial system, interest is prohibited, therefore, the question arises as to why tax is positively related to Islamic debt in the absence of interest? As being noted previously, interest is prohibited, therefore, interest is effectively replaced by either dividend or profit in the financing transaction to comply with Shariah law. A transaction to provide Islamic debt financing to a company is through the sale or leaseback method, by which a company requiring financing sells some or all of its tangible or intangible assets to the financier who in turn leases them back to the company for periodic *rental* payments. The purchased assets would be recognised in full based on the cash price and the mark-up portion of each instalment paid would be documented as accrued expenses. Thus, the mark-up portion of each instalment paid would be debited to profit and loss as expenses and credited to the accrued expenses on each due date. Therefore, the expenses are taxable in the financial statement similar to the costs of the conventional fixed interest. Hence, the higher the tax rate the higher is the advantage to use either conventional or Islamic debt.

On the other hand, the high Dep/tas (depreciation to total assets, proxy for non-debt tax shields) firms give a low priority to the total debt and Islamic debt but high

priority to the ordinary shares and financial lease. The negative relationship between non-debt tax shield and debt were consistent with the empirical findings of Titman and Wessels (1988) on 469 firms in the USA. The argument of non-debt tax shields were put forward by DeAngelo and Masulis (1980). They argued that tax deductions for depreciation and investment tax credits are substitutes for the tax benefits of debt financing. Therefore, firms with high non-debt tax shields relative to their expected cash flow will use less debt in their capital structure. The low debt priority given by the high non-debt tax shield firms, obtained from the Kruskal-Wallis test. The test results support the DeAngelo and Masulis (1988) proposition.

The results show that high non-debt tax shield firms are more likely to give high priority to the ordinary shares and financial lease. Firms will tend to use ordinary shares for external financing if financing using debt was not giving any advantage to firms with a high non-debt tax shield. High non-debt tax shield firms have given high priority to the financial lease, which may be due to the generous benefit from depreciation and investment allowances that the borrowers (lessor) of the fund effectively pass on to the lessees on the form of a reduced leasing rental.

High tangible asset firms have given a high priority to ordinary shares and financial lease and a low priority to the Islamic debt. The basic conception in the study of capital structure suggests that firms with high fixed assets will be able to use the tangible assets as collateral for debt, hence the higher the tangibility, the higher is the debt. It is not surprising for the high fixed asset firms to give high priority to financial lease, as most of the leases need collateral.

However the results of the negative relationship between tangibility and Islamic debt is the opposite of that positive basic assumption between debt and tangibility. Tangibility is derived from high fixed assets over the total assets, if the tangibility is low, perhaps the current assets is high[12]. Since there is evidence that short term Islamic financing is more favourable than long term among the companies that use Islamic financing, the high current assets is important to support the short term fixed costs. However, if the firms use long term debt rather than short term Islamic debt, the reason for the negative relationship may be due to the feature of Islamic debt itself. This was noted in Section 3.6 in Chapter 3 and Section 6.4.3.2 in this chapter which imply collateral is less needed for long term Islamic debt concern. Nevertheless, for instance for *mudharabah* long term financing, a collateral may be added to be used only in case of loss resulting from Mudhareb's (borrower) negligence or violation of conditions of contract (Kahf, 1999).

Both the mean and median tests confirmed that smaller firms have given high priority to the ordinary shares and larger firms have given low priority to the ordinary shares. There are a few reasons for small firms to use ordinary shares rather than debt: i) smaller firms are very fragile and are constantly exposed to the business and market risk. Therefore, it is not a good option for small firms to employ debt, as debt is always associated with high financial distress, while equity financing does not increase the probability of financial distress. ii) with low asset position, smaller companies will not be able to use it as a collateral for debt whilst equity finance does not require the firms to post collateral, iii) shareholders do not share in the upside

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[12] tangibility=fixed assets/total assets, ∴ tangibility = (total assets-current assets)/Total assets = 1- (current assets/Total assets).

returns of the firms profit, therefore giving the small firms the chance to use the profit for capital investments or any other purpose.

High risk firms have given high priority to ordinary shares while low risk firms have given a high priority to conventional debt. As previously mentioned, equity financing does not increase the probability of financial distress, therefore it is wise for the high risk firms to use ordinary shares for financing as debt will add the distress to the firms and this will make it more risky. On the other hand, low risk firms will be able to cope with additional risk by adding more debt. Bradley et al. (1984) support the findings of a negative relationship between gearing and risk. According to them, if the operating income is uncertain, the firms will avoid debt due to a perceived high cost of financial distress and vice versa.

6.5.5 Summary of the Mean and Median Test Results for Questions 2 to 5

Table 6.13 summarises the results of the ANOVA test for questions 2 to 5 which is significant at least at the 90 per cent confidence level. It summarises the results of the ANOVA test from Table 4 in Appendix G. The first significant figures are Dfau and Tie. The 0 dummy shows a mean of -12.2791 for the Tie while dummy 1 shows a mean of 4.8398. Thus, companies with high interest coverage will increase their debt ratio if the fixed assets are increased while companies with negative interest coverage ratio (i.e. caused by losses) will decrease their debt ratio if the fixed assets are increased.

A significant result was also found for the Tie and Dintu. The dummy 1 had a mean score of 4.5285 and dummy 0 had a mean score of -8.7775. The results imply that

when interest rates are increased by 2 percentage points, the companies with high coverage ratio will increase their debt ratio while companies with a low negative coverage ratio (i.e. caused by losses) will reduce their debt ratio.

Table 6.13:
ANOVA for Questions 2 to 5

Variables Factor		Tie	Roce	Tas
Dfau	0	-12.279**		
	1	4.840		
Dintu	0	-8.778*		
	1	4.529		
Dinfu	0		6.278*	
	1		11.901	
Dgvid	0			14.536*
	1			12.934

(dummy 0-large reduction in debt ratio, dummy 1-large increase in debt ratio)
*, **, ***Significant at least at 10%, 5% and 1 % level critical values
Tie-Interest coverage ratio, Roce-Return on Capital Employed, Tas-Logarithm of total assets, Fau-Fixed assets increase, Intu-Interest rates increase, Infu-Inflation increase, Gvid-Government incentive increases
N.B. Some factors in the above Table beginning with the letter D represent the Dummy

The third significant result is between Roce and Dinfu. The dummy 0 shows Roce's mean score of 6.2779 while the dummy 1 shows Roce's mean score of 11.9008. Thus, during a high inflation period, companies with a high return on capital employed will increase their debt ratio while the companies with low return on capital employed will decrease their debt ratio. Since it has already been demonstrated that Malaysian companies prefer retention over debt, it is expected that a high return on capital employed may suggest a potentially high retention ratio, thus using less debt. This suggests that the firms are following the pecking order hierarchy. However, the added dimension here is that if inflation becomes high, the pecking order theory may change.

The final significant result of the mean test is the Log(tas) (proxy for size) and the Dgvid. The results are significant at the 90 per cent confidence level. A mean score of 14.5361 was found for dummy 0 and a mean score of 12.934 was found for dummy 1. Therefore, when government incentives are low, larger companies will reduce their debt ratio while smaller companies will increase their debt ratio.

Table 6.14 demonstrates the results of the Kruskal-Wallis test for questions 2 to 5 which are significant at the 99, 95 or 90 per cent confidence level. It summarises the result of the Kruskal-Wallis test from Table 6, Appendix G. The figures in the first row are the significant results for Dfau and the Risk at the 90 per cent confidence level. The median rank of 0 dummy figure is lower than the dummy 1 figure, 28.34 < 36.77, therefore, high risk firms will increase their debt ratio if their fixed assets are increased.

The Dpfd and the Cr are significant at the 95 per cent confidence level, indicating dummy 0 median rank is higher than dummy 1, 43.18 > 31.12. Thus, low liquidity firms will increase their debt ratio if there is a decrease in the firm's profit. The Dcapu and Risk are significant at the 90 per cent confidence level. The Dcapu dummy 0 median rank figure is higher than dummy 1 figure, 37.42 > 28.50, suggesting that low risk firms will increase their debt ratio if the firms non-debt tax shield increases.

Both Cr and Wcr are significant with Dintu (interest rate increase) at the 99 and 90 per cent confidence level. Both liquidity measures have lower median rank at dummy 0 than dummy 1; 29.11 < 42.20 for current ratio, and 30.04 < 38.50 for working

capital ratio. Hence, with the increase in interest rates, low liquid firms will increase their debt ratio.

The Dinfu are related to Roce and Curr. Both Roce and Curr have a high median rank at dummy 1 than dummy 0; 30.52 < 40.92 for Roce and 29.39 < 37.36 for Curr. Hence, if the inflation increases, the high roce firms will increase their debt level. Apart from high Roce's firms, firms which are sensitive to the currency movement will also increase their debt ratio if the inflation is increased.

Many factors are related to the Dgvid at the 90, 95 or 99 per cent confidence level. The factors are Npm, Tax, Nfa/tas, Log(Tas) and the Risk . The factors with higher median rank at dummy1 as compared to dummy 0 are Tax (30.43 < 40), Nfa/Tas (30.98 < 39.08), and Risk (28.57 < 41.58). Therefore, with the decrease in government incentives, the firms with high tax bracket, high proportion of fixed assets and high risk will increase their debt ratio. The factors with higher dummy 0 than dummy 1 are Npm/Tas (26.27 < 35.07), and Log(Tas) (24.78 < 34.05). Thus, with the decrease in government incentives, small and low profit margin firms will increase their debt level.

The Dindu is related to Cr, Dep/tas and Log(Tas). The median rank of Cr and Dep/tas dummy 0 is higher than dummy 1; (35.58 > 26.76) for current ratio, and (35.52 > 26.90) for Dep/tas, while Tas dummy 0 is lower than dummy 1 (26.76 < 36.12). Therefore, with the increase in industry debt level, high liquidity firms and high non-debt tax shield firms will decrease their debt ratio, and large firms will increase their debt ratio.

Table 6.14:
Kruskal Wallis for Questions 2 to 5

Variables Factor		Cr	Wcr	Npm	Tax	Dep tas	Roce	Nfa tas	Log (Tas)	Curr	Risk
Dfau	0										* 28.34
	1										36.77
Dpfd	0	** 43.18									
	1	31.13									
Dcapu	0										* 37.42
	1										28.50
Dintu	0	*** 42.20	* 38.50								
	1	29.11	30.04								
Dinfu	0						** 30.52			* 29.39	
	1						40.92			37.36	
Dgvid	0			* 35.07	* 30.43			* 30.98	** 34.05		*** 28.57
	1			26.27	40.00			39.08	24.78		41.58
Dindu	0	* 35.58				* 35.52			* 26.76		
	1	26.76				26.90			36.12		

(dummy 0-large reduction in debt ratio, dummy 1-large increase in debt ratio)
*, **, ***Significant at least at 10%, 5% and 1 % level critical values
Cr-current ratio, Wcr-Working capital ratio, Npm-Net profit margin, Tax-Tax, Dep/tas-Depreciation to total assets, Roce-Return on Capital Employed, Nfa/tas-Net fixed assets to total assets, Log(tas)-Logarithm of total assets, Curr-price-currency sensitivity, Risk-Standard deviation of operating income. Fau-Fixed assets increases, Pfd-profit decreases, Capu-capital allowances increases, Intu-interest rates increases, Infu-inflation increases, Gvid-Government incentives decreases, Indu-Industry average debt ratio increases
N.B. Some factors in the above Table beginning with the letter D represent the Dummy

6.5.6 Discussion of Mean and Median Test Results for Questions 2 to 5

The negative interest coverage ratio mean score of -12.279 implies that the firms incurred losses while the positive interest coverage ratio mean score of 4.840 suggests that the firms are making profit. The increase in fixed assets will increase the firms' collateral position, therefore, profitable firms (positive interest cover) tend to use more debt as they can cover the interest payment and secured the debt using fixed assets. On the other hand, firms which incurred losses (negative interest cover) will

use less debt, as it is too risky to use more debt even with the increase in fixed assets as collateral. The collateral may not be sufficient to cover the risk of income losses. The Kruskal-Wallis test reveals that high risk firms tend to increase their debt ratio when the firms' fixed assets are increased. With the increase in the fixed assets as collateral, firms will be inclined to increase their debt ratio even when the operating income is uncertain. The positive relationship between gearing and risk was also found in the regression analysis in Chapter 5, the results therefore support the median test result that high risk firms use more debt.

The median test for profit decreases (Dpfd) and current ratio (Cr) is significantly different at the 95 per cent confidence level. It suggests that low liquid firms will increase their debt ratio when the firms profit decreases, suggesting a negative relationship between liquidity and debt ratio. The results are consistent with the analysis of the regression results presented in chapter 5, which suggest that liquidity are negatively related to gearing across three periods. Although the liquidity analysis presented in chapter 5 was without the influence of profitability, the same negative coefficient results were found for the profit (measured by returned on capital employed), before, during and after the crisis. Hence, this supports the median test where low liquid firms will increase their debt ratio when the firms' profit decreases.

A weak significant result was found between the increase of capital allowances (Dcapu-proxy for non-debt tax shields) and the Risk. This implies that the less risky firms will tend to increase their debt ratio if their non-debt tax shields increases. The findings in Section 6.5.4 have indicated that high non-debt tax shield firms have given low priority to the debt financing. Although the findings in Section 6.5.4 is consistent

with the DeAngelo and Masulis (1980) argument, but the result in this section is conflicting because the firms with high non-debt tax shield tend increase their debt to equity ratio. The decision to increase debt may be influenced by the low operating risk rather than the increase in non-debt tax shield. The low earnings variability averts firms from financial constraints and the risk of bankruptcy. A negative relationship between debt and risk is consistent with Taub (1975) empirical work on the US firms between 1960 and 1969. Therefore, low risk firms will increase their debt to equity ratio despite the increase in non-debt tax shield.

The increase in interest rates by two percentage points (Dintu) is significant with the mean of interest coverage ratio (Tie), the median of current ratio (Cr) and working capital ratio (Wcr). The mean of interest coverage ratio scored a negative result for dummy 0 (-8.778) and a positive result for dummy 1 (4.529). It implies that firms experiencing losses will use less debt while firms making profit will use more debt. The increase in interest rates will result in greater interest payments on variable rate debt and on new fixed rate of debt finance, however, this is not applicable to firms which are making profit as they can quite easily absorb the debt interest. However, the increase in interest rates will accelerate losses even more for firms already experiencing losses. This is because the profit margin is shrinking due to the high selling price to cover the financial cost, forcing firms to react by reducing the gearing ratio. The results also show that low liquid firms use more debt when the interest rates are increased by two percentage points. Firms may increase debt to equity ratio to finance current assets, therefore increasing the firms' liquidity. The negative relationship between debt and liquidity was found in the discussion on regression analysis presented in chapter 5 across three periods for the companies listed under the

main and second board of the KLSE. Thus, the results remain the same with or without the increase in interest rates.

Both the <u>mean</u> and <u>median</u> test results are found to be significant for the increase in inflation (Dintu) and return on capital employed (Roce) at the <u>90</u> and <u>95</u> per cent confidence level, respectively. With the increase in inflation, the firms would expect to reduce their debt ratio as the cost associated with issuing debt will be very high, suggesting a negative relationship between debt and inflation. Instead, the opposite was found, as this may be due to the high profit (Roce) of the firm. High profit firms would be able to cope with the increase in cost of financing because the profit will absorb the cost, thus enabling the firms to use more debt. The results also revealed a positive relationship between price sensitivity (Curr) and debt when inflation rises by two percentage points (Dintu). As illustrates in Graph 4.14, share prices and currency are positively correlated, therefore, as the currency depreciates, stock prices will depreciate too, forcing firms to use debt for financing. Therefore, as the inflation increases, debt will be the only option for highly sensitive firms. Thus, as the inflation rises, firms with high Roce (return on capital employed) and with stock prices sensitive to currency movements will increase their debt ratio accordingly.

The net profit margin (Npm), tax, net fixed assets to total assets (Nfa/tas), total assets (Log(tas)) and operating risk (Risk) are all significantly related to the decrease in government incentives (Dgvid). Martin and Scott (1974) argued that greater profitability creates a higher cash flow which will enable firms to use more debt. However, firms with low profit margin should use less debt because there is the possibility that the firms may not be able to cover the interest especially when the

government decreases its incentives. On the other hand, high tax shield firms have the capacity to increase their debt ratio even with minimal aid from the government. This may be due to the advantage of tax shields surpassing the government incentives. High tangibility firms use more debt even with less incentive from the government. Studies by Rajan and Zingales (1994) found a positive relationship between tangibility and gearing for US, Japan, Germany and Canada. Firms with high collateral require less incentives and the decrease in government incentives will not affect the firms' financing decision.

Smaller firms and high risk firms will increase their debt ratio despite the decrease of incentive from the government. The researcher had expected a decrease in debt ratio for the smaller and riskier firms especially with the decreased in the government incentives. This is because smaller firms usually have high risk due to their price and earnings fluctuation and little assets as a back up in the event of liquidation. Therefore smaller firms and high risk firms may not be able to cover the interest and may eventually require more incentives in order to use debt in their financing. However, as previously found in Section 5.5.4 in Chapter 5, smaller firms prefer to use short term debt especially bank loans because it costs more for smaller firms to raise funds using equity or long term debt as compared to larger firms. Therefore, if there was no other option for the firms to acquire the fund, it is possible for these firms to continue to seek more short-term loan from the bank even with less incentives from the government.

The current ratio (Cr), depreciation to total assets (Dep/tas-proxy for non debt tax shield) and size (Log(Tas) are all significant at the 90 per cent confidence level when

the industry average debt ratio increases (Dindu). Low liquid firms choose to reduce their debt ratio as the industry debt ratio increases, suggesting a positive relationship between liquidity and debt ratio when the industry debt average ratio increases. The results are inconsistent with the previous findings in chapter 4 which show that liquidity had a negative relationship with gearing. If the firms liquidity ratio is related negatively with the firms financial distress (see 5.6.3.1 in Chapter 5), even if other firms in the industry increase their debt ratio, it is still sensible for the firms to decrease their debt ratio when the firms liquidity are low.

On the hand, low non-debt tax shield firms will increase their debt ratio as the industry average increases. The negative relationship between non-debt tax shield and debt have been mentioned earlier, when discussing the arguments presented by De Angelo and Masulis (1980) on tax advantage of debt and how it would be exhausted with the increase in non-debt tax shield items. With the increase in industry average ratio, low non-debt tax shield firms will be more inclined to use debt in their capital structure. Finally, larger firms will increase their debt ratio as the industry average increases. It is expected that large firms will increase their debt ratio especially when the industry debt ratio increases. A positive relationship between debt and size has been previously found in Chapter 5 and is supported by many studies as indicated in the literature review.

6.6 Logistic Regression

6.6.1 Introduction

Logistic regression techniques are similar to the ordinary linear models that were previously discussed in Chapter 5. However, a limitation of ordinary linear models is

the requirement that the dependent variables are continuous data rather than reflect categorical data. A range of techniques have been developed for analysing data with categorical d ependent v ariables, f or i nstance: d iscriminant a nalysis, p robit a nalysis, loglinear regression and logistic regression. As noted from the previous ANOVA test, most of the debt to equity response using Likert scales from the survey data have been converted to the dichotomous data or dummy 0 and dummy 1. Therefore, the same categorical data is used for the logistic regression analysis. A Detail discussion on methodology for logistic regression is presented in Chapter 4.4.4.

The hypotheses is from Section 4.3, Chapter 4, H17 to H22

Hypothesis:

Null hypothesis $(\beta=0)$
Alternative hypothesis $(\beta\neq0)$

Alternatively,

Null Hypotheses:

H17: Firms' financial preferences (see list 4.1 for financing preferences) are not significantly related to firms' specific factors (see list 4.2 for firms' specific factors)

H18: Firms' financial preferences (see list 4.1 for financing preferences) are not significantly related to firms' sensitivity factors (see list 4.3 for firms' sensitivity factors)

H19: Firms' sensitivity factors (see list 4.3 for firms' sensitivity factors) are not significantly related to firms' specific factors (see list 4.2 for firms' specific factors)

H20: Firms' sensitivity factors (see list 4.3 for firms' sensitivity factors) are not significantly related to other firms' sensitivity factors (see list 4.3 for firms' sensitivity factors)

H21: Financial crisis factors (see list 4.4 for financial crisis factors) are not significantly related to the firms' specific factors (see list 4.2 for firms' specific factors)

H22: Financial crisis factors (see list 4.4 for financial crisis factors) are not significantly related to the firms' sensitivity factors (see list 4.3 for firms' sensitivity factors).

Alternative hypotheses:

H17: Firms' financial preferences (see list 4.1 for financing preferences) are significantly related to firms' specific factors (see list 4.2 for firms' specific factors)

i.e. Firms' financial preferences (e.g. retention, ordinary shares, total debt, Islamic debt, conventional debt, overdraft and financial lease are significantly related to firms' specific factors (e.g. liquidity, profitability, investment growth, interest coverage ratio, tax, non-debt tax shield, return on investment, tangibility, size, price sensitivity and operating risk). (see Box 1 in Appendix C for the lists of the hypotheses).

H18: Firms' financial preferences (see list 4.1 for financing preferences) are significantly related to firms' sensitivity factors (see list 4.3 for firms' sensitivity factors)

i.e. Firms' financial preferences (e.g. retention, ordinary shares, total debt, Islamic debt, conventional debt, overdraft and financial lease are significantly related to firms' sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases). (see Box 2 in Appendix C for the list of the hypotheses).

H19: Firms' sensitivity factors (see list 4.3 for firms' sensitivity factors) are significantly related to firms' specific factors (see list 4.3 for firms' specific factors)

i.e. Firms' sensitivity factors (e.g. fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases) are significantly related to firms specific factors (e.g. liquidity (cash), liquidity (working capital), (profitability, investment/growth, interest coverage ratio, tax, non-debt tax shield, return on investment, tangibility, size, price sensitivity and operating risk. (see Box 3 in Appendix C for the list of the hypotheses).

H20: Firms' sensitivity factors (see list 4.3 for firms' sensitivity factors) are significantly related to other sensitivity factors (see list 4.3 for firms' sensitivity factors)

i.e. Firms' sensitivity factors (e.g. fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases) are significantly related to other firms' sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases). (see Box 4 in Appendix C for the list of the hypotheses).

H21: Financial crisis factors (see list 4.4 for financial crisis factors) are significantly related to the firms' specific factors (see list 4.2 for firms' specific factors)

i.e. Financial crisis factors (e.g. actual and target debt to equity ratio following the crisis and following the ringgit being fixed) are significantly related to the firms' specific factors (e.g. liquidity (cash), liquidity (working capital), (profitability, investment/growth, interest coverage ratio, tax, non-debt tax shield, returned on investment, tangibility, size, price sensitivity, operating risk). (see Box 5 in Appendix C for the list of the hypotheses).

H22: Financial crisis factors (see list 4.4 for financial crisis factors) are significantly related to the firms' sensitivity factors (see list 4.3 for firms' sensitivity factors).

i.e. Financial crisis factors (e.g. actual and target debt to equity ratio following the crisis and following the ringgit being fixed) are related to the firms' sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases). (see Box 6 in Appendix C for the list of the hypotheses).

6.6.2 Logistic Regression Analysis

Based on the questionnaire survey, analyses for logistic regressions were divided into

three parts:

1. Financing priority (Question 1).

2. Factors that influence the finance manager's decision (Questions 2 to 5).

3. The effects on D/E following the 1997 crisis and following the ringgit being fixed (Questions 6 to 9).

The three parts were considered as dependent and independent variables, interchangeably. The data from the Datastream were included in the analysis as the continuous independent variables.

As previously mentioned, the questionnaire survey data were changed to dummy 0 and dummy 1, given that logistic regression involves categorical data. Dummy 1 represents the high priority for financing type for question 1, the large and moderate increase in debt to equity ratio for questions 2 to 5 and the "YES" answer to questions 6 to 9. Dummy 0 represents low priority for question 1, the large and moderate decrease of debt to equity ratio for questions 2 to 5 and the "NO" answer to questions 6 to 9.

Every model of logistic regression consists of a large number of independent variables. All *three parts* of the survey regression were regressed against a total of 17 independent variables, comprising of 7 continuous independent variables and 10 categorical independent variables. Due to a large number of independent variables, stepwise regression was used following the logistic regression result, and at the same time, a correlation matrix was produced for the purpose of checking the existence of multicollinearity among the independent variables. Based on the stepwise regression and correlation matrix output for multicollinearity, more concise and simple models were produced.

The results for logistic regression for all three parts are shown in Appendix H, Tables 7, 9 and 11, while the results for stepwise logistic regression are shown in Appendix H, tables 8, 10, and 12. Tables 6.15, 6.16 and 6.17 were produced as a result of simplifying the stepwise regression tables in the appendix. All tables show the chi-square figures and the p-values, the estimation of the coefficient (in the parenthesis), the model's p-value, percentage deviance and the adjusted percentage deviance.

6.6.3. Modelling Result for Question 1

Table 6.15 shows the more simplified results of logistic regression modelling taken from Table 8 in Appendix H. The table illustrates: (i) the models' deviance percentage which ranges from 10.91 per cent to 32.40 per cent, (ii) the models' p-values which are all significant at the 99 per cent confidence level, (iii) the variables Chi square figures with its significance level (asterisk), and (iv) the coefficient between the independent and dependent variables (figure in the parenthesis).

The first model is the dummy for the ordinary shares (Dos) related to three variables at the 99 per cent confidence level with 25.76 per cent of percentage deviance. The variables are Roce, Dcapu and Dindu. Return on capital employed (Roce) is negatively related to the priority of the ordinary shares, while the increase in the capital allowances (Dcapu- non debt tax shields) and the increase in industry debt to equity average ratio (Dindu) have a positive effects on the priority of the ordinary shares.

The second model shows a negative relationship between the Dtdebt and the Dpfd with a 95 per cent confidence level and 10.91 percent of deviance. The third model shows the largest percentage deviance which is 32.40 per cent with negative

coefficients between Didebt and Dintu, and Didebt and Dindu. The last model shows a positive coefficient between Dcdebt and Curr as well as a negative coefficient between Dcdebt and Dpfd. The model percentage deviance is 17.82 per cent.

Table 6.15:
Logistic Regression for Question 1

	Dos	Dtdebt	Didebt	Dcdebt
Constant	(-1.320)	(1.139)	(1.266)	(-0.360)
Roce	7.730*** (-0.136)			
Curr				4.564** (2.622)
Dpfd=0		6.709** (-1.727)		7.186*** (-1.914)
Dcapu=0	11.573*** (2.438)			
Dintu=0			4.777** (-2.261)	
Dindu=0	6.853*** (2.237)		7.720*** (-2.524)	
Analysis of deviance				
Model p-value	0.0000	0.010	0.001	0.0061
% of deviance	25.76%	10.91%	32.40%	17.82%

*, **, ***Significant at least at 10%, 5% and 1 % level critical values
The value in the parenthesis is the coefficient of the parameter
Os-Ordinary shares, Tdebt-total debt, Idebt-Islamic Debt, Cdebt-Conventional debt
Roce-Return on Capital Employed, Curr-price-currency sensitivity, Pfd-profit decreases,
Capu-capital allowances increases, Intu-interest rates increases, Indu-Industry average debt ratio increases
N.B. Some factors in the above Table beginning with the letter D represent the Dummy

6.6.4 Discussion of Question 1 Logistic Regression

All three independent variables (Roce, Dcapu and Dindu) under the first model (Dos) show a very strong significant relationship with all the p-values significant at the 99 per cent confidence level. The negative coefficient of return on capital employed suggests a negative profit that results in high priority to ordinary shares. In contrast, a positive Roce would result in a low probability to ordinary shares. If the profit was positive or high, the firms would prefer to use retention over external financing such

as debt and ordinary shares as suggested by Myers (1984). However, a low profit would result in low retentions for the firms. Without the internal fund, the companies will therefore opt for external financing, in this instance it is the ordinary shares. Study by Kester and Mansor (1993) on Malaysian companies showed that Malaysian firms prefer retentions as a first financing choice, followed by ordinary shares and debt as a last option. The findings therefore support the discussion on high priority to ordinary shares due to the insufficiency of internal funds.

For the second variable there is a positive relationship between (i) the debt to equity response to the increase in capital allowances and (ii) the priority of the ordinary shares. The result suggests that any increase in non-debt tax shield would lead to a lower debt ratio (as indicated by the predominance of a zero dummy) and therefore would result in a high priority to the ordinary shares due to their positive relationship. The result is consistent with the De Angelo and Masulis (1980) argument that high non-debt tax shield firms should reduce debt as the tax shield of debt is diminishing. In this instance, ordinary shares will be at a high priority to meet the financing needs.

The same positive sign was depicted for the relationship between the priority of the ordinary shares (Dos) and the debt to equity ratio response to the increase in industry debt to equity average ratio (Dindu). The relationship suggests that the companies that decide to decrease their debt ratio as the industry average debt ratio increases will give a high priority to ordinary shares. A large number of respondents, totalling 71.21 per cent, have chosen to decrease their debt ratio if the industry debt ratio increases. Therefore, as the industry debt ratio increases, firms would decrease their debt ratio and choose the ordinary shares for financing.

A negative relationship was found between the priority of the total debt (Dtdebt) and the debt to equity response to any decrease in the firms' profit (Dpfd). This relationship suggests that as the profit decreases, firms which choose to decrease their debt ratio will therefore have a low priority to the total debt. On the other hand, firms which choose to increase their debt ratio as the profit decreases will give a high priority to the total debt ratio. The results of the completed questionnaire collected for this study show that a total of 72.46 per cent of respondents have indicated that they would increase their debt ratio if the profit were to decrease, which therefore supports the negative relationship found for this model. The findings were consistent with most of the previous tests in this thesis which show that high profit firms would prefer a retention while low profit firms would prefer external financing such as ordinary shares or debt. In this case, debt is preferred, consistent with the argument of financing hierarchy given by Myers (1984).

The Islamic debt priority is negatively associated with the debt to equity response to the increase in interest rates (Dintu) and debt to equity response to the increase in the industry average debt ratio (Dindu). This implies that as interest rates increase, firms which reduce their debt ratio will give low a priority to the Islamic debt. However, if these firms choose to increase the debt ratio when interest rates increases by two percentage points, a high priority is given to the Islamic debt. A majority of the firms choose to increase their debt ratio if the interest rates rise, therefore a high priority is given to the Islamic debt for this analysis. This may be due to the interest rates variation that does not directly affect the Islamic debt as much as it affects the conventional debt. This is because the Islamic debt is based on the interest free

economic system. Therefore, it is comprehensible if the finance managers of the firms choose to ignore the impact of the rise of the interest rates on the cost of debt.

A negative coefficient was found between Islamic debt and the debt to equity response to an increase in the industry average debt ratio. With a negative coefficient found, firms which choose to decrease their debt due to the increase in industry average debt ratio will give a low priority to the Islamic debt. As mentioned earlier, the majority response of the survey choose to decrease the firms' debt to equity ratio if the industry debt ratio increases, therefore, the majority firms' action will lead to a low priority on Islamic debt should the industry debt ratio increases.

There is a positive relationship between the conventional debt propensity (Dcdebt) and stock price sensitivity to currency movements (Curr). The firms with stock prices highly positively correlated with the ringgit have given a high priority to the conventional debt. The strong ringgit usually leads to high stock prices in a stable market. When the stock prices are high, the interest rates are usually low, partly because moderate and low interest rates generally boost stock prices up. From the perspective of firms, lower interest rates would reduce the cost of capital for capital investment, hence the companies can take advantage of cheaper cost of capital by issuing debt. Therefore, the ups and downs of the ringgit and stock prices are one of the factors considered by firms to determine their debt priority. The test confirms that the firms will give high priority to the conventional debt if the stock prices and the ringgit are highly correlated (positively correlated).

The final significant relationship is a negative relationship between the conventional debt (Dcdebt) and profit decreases (Dpfd). A similar result was previously found between profit decreases (Dpfd) and the total debt (Dtdebt). Therefore, a similar conclusion can be made for this relationship, where the majority of the firms will choose to increase their debt ratio as the profit decreases and the firms will also give high priority to the conventional debt.

6.6.5 Modelling Results for Questions 2 to 5

Table 6.16 shows the coefficients of the logistic regression modelling for questions 2 to 5, summarising the results of the stepwise logistic regression of Table B10 in Appendix H. The p-values of all the models are significant at the 99 per cent significant level and the percentage deviance ranges from 10.79 to 35.66 per cent.

The first model, Dfod (dummy for the increase in fixed overhead) is positively related to Drdu (dummy for the increase research and development). Dpfd (dummy for the decrease in profit) is negatively related to Dintu (dummy for interest rates increase). Drdu (dummy for the increase in research and development) is positively related to Dfod (dummy for the decrease in fixed overhead costs).

Dcapu (dummy for the increase in non debt tax shields) is positively related to Dfau (dummy for the increase in fixed assets but negatively related to Dtaxd (dummy for the decrease in annual corporate tax). Dtaxd (dummy for the decrease in annual corporate tax) is negatively related to Dcapu (dummy for the non debt tax shields) but positively related to Dinfu (dummy for the increase in inflation rates).

Table 6.16:
Logistic Regression for Questions 2 to 5

	Dfod	Dpfd	Drdu	Dcapu	Dtaxd	Dintu	Dinfu	Dgvid	Dindu
Constant	(-16.57)	(1.75)	(-16.57)	(0.682)	(0.295)	(-0.04)	(-1.26)	(4.539)	(-4.75)
Roce							*** 7.293 (0.115)		*** 8.018 (-0.13)
Nfa/tas							** 4.200 (3.098)		
Log(tas)								*** 7.484 (-0.34)	*** 10.429 (0.353)
Dfau=0				** 4.663 (1.780)					
Dfod=0			*** 9.885 (16.20)						
Dpfd=0						** 6.475 (-1.75)		** 4.767 (-2.01)	*** 7.205 (-3.08)
Drdu=0	*** 9.885 (15.83)								
Dtaxd=0				*** 20.666 (-3.18)		** 5.025 (1.408)	*** 7.747 (2.152)		
Dcapu=0					*** 15.333 (-2.72)			*** 8.667 (2.338)	
Dintu=0		** 6.593 (-1.66)							
Dinfu=0					** 5.410 (1.799)			** 6.161 (-2.03)	
Dindu							*** 12.244 (-3.48)		
Analysis of Deviance									
p-value	0.002	0.010	0.002	0.000	0.000	0.003	0.000	0.000	0.000
% deviance	18.76	10.79	15.77	34.90	35.66	16.84	37.56	37.93	34.49

*, **, ***Significant at least at 10%, 5% and 1 % level critical values
The value in the parenthesis is the coefficient of the parameter.
Fau-Fixed assets increase, Fod-Fixed overhead decreases, Pfd-Profit decreases, Rdu-Research and development increases, Taxd-Corporate tax rate decreases, Capu-capital allowances increases, Intu-interest rates increases, Infu-inflation increases, Gvid-government incentives decreases, Indu-industry debt average increases, Roce-Return on capital employed, Nfa/tas-Net Fixed Assets to total assets, Log(tas)-Logarithm of total assets
N.B. Some factors in the above Table beginning with the letter D represent the Dummy

Dintu (dummy for the increase in interest rates) is negatively related to Dpfd (dummy for the decrease in profit) but positively related to Dtaxd (dummy for the decrease in annual corporate tax). Dinfu (dummy for the increase in inflation rates) is positively related to Roce (return on capital employed), Nfa/tas (net fixed assets to total assets), and Dtaxd (dummy for the decrease in annual corporate tax) but negatively related to Dindu (dummy for the increase in industry d/e ratio). Dgvid (dummy for the decrease in government incentives) is negatively related to Log(tas), Dpfd, and Dindu but positively related to Dcapu. Dindu is negatively related to Roce and Dpfd but positively related to Log(tas).

6.6.6. Discussion of Questions 2 to 5 Logistic Regression

Due to the complexity of Table 6.16, a diagram on firms' debt to equity ratio sensitivity factors (figure 6.1) has been created to provide a simplified explanation on the relationship between the dependent and the independent variables. The diagram in Figure 6.1 illustrates all positive and negative relationships that are depicted from Table 6.16. For the dummy variable regressed against another dummy variable, the positive regression coefficient implies an uncertain effect on debt to equity ratio. The reason for this can be explained by a simple illustration.

Suppose there is a positive relationship between (i) the (zero) dummy for capital allowance increases (Dcapu) being associated with a reduction in the debt-equity ratio, and (ii) the dummy for the fixed assets increases (Dfau) being associated with an increase in the debt-equity ratio. The combined outcome may be an overall increase or decrease in the debt-equity ratio.

Figure 6.1 Firms' Debt to Equity Ratio Sensitivity Factors
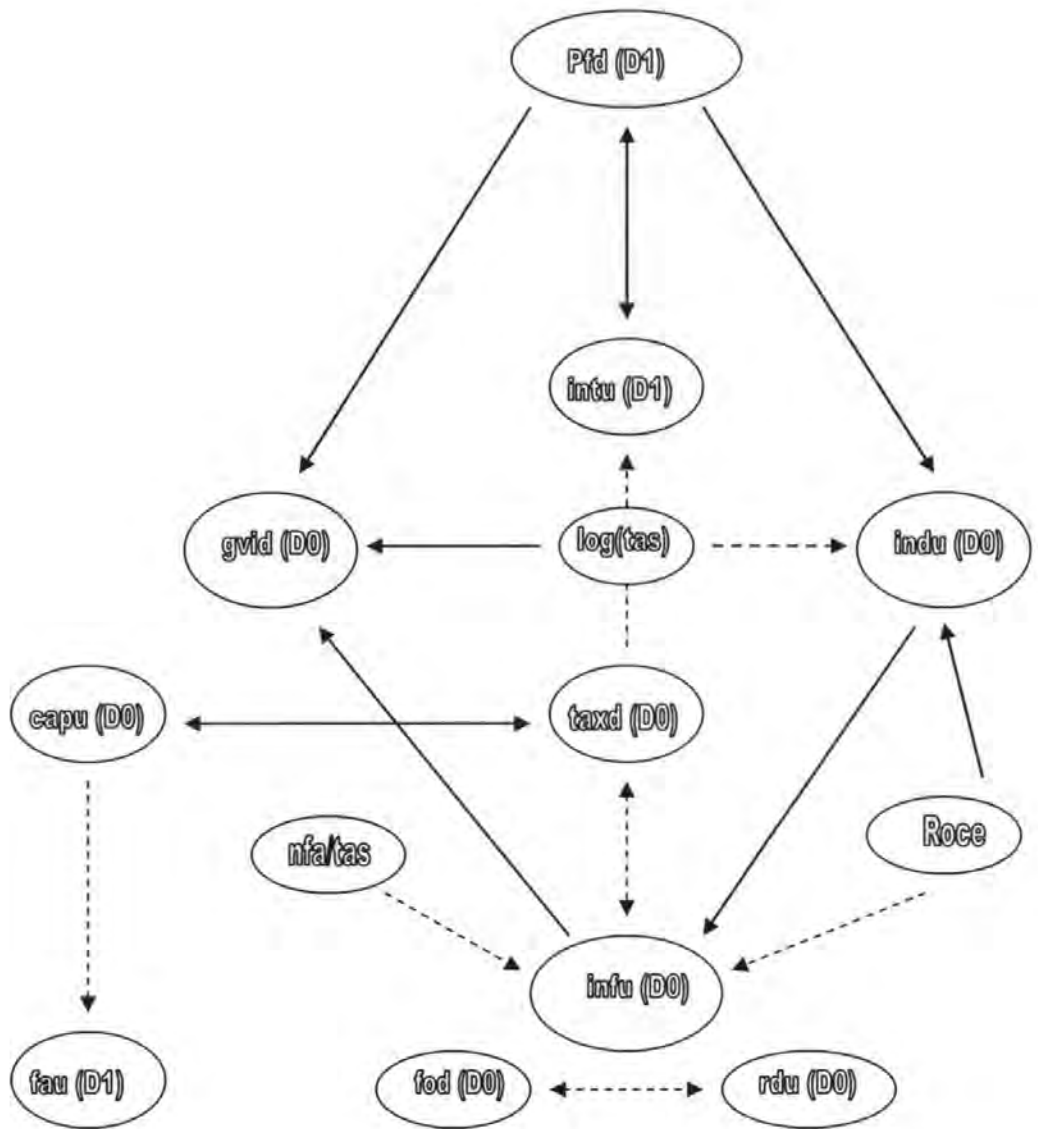
——	Negative coefficient
- - - -	Positive coefficient
——►	From X (independent) to Y (dependent)
◄——►	Both Direction
D1	Dummy 1> 55 per cent
D0	Dummy 0 > 55 per cent

In the event when the debt ratio of the dependent and independent variable contradict each other, they are omitted from the discussion. The reason for the contradiction is because Statgraphics has chosen dummy 0 for the x variable and dummy 1 for the Y log probability. Nonetheless, the end results of the negative relationship show either an increase or decrease in debt ratios for both sides of dependent and independent variables. Following the findings of negative and positive relationship between the factors, diagrams 6.1, 6.2 and 6.3 were prepared on the basis of a negative relationship found and are based on the frequency responses of more than 55 per cent for dummy 1 and less than 55 per cent for dummy 0.

Diagrams 6.1, 6.2 and 6.3 were prepared on the basis of a negative relationship coefficient as previously described, and are based on the frequency responses of more than 55 per cent for dummy 1 and less than 55 per cent for dummy 0.

Diagram 6.1: An Increase in Debt to Equity Ratio
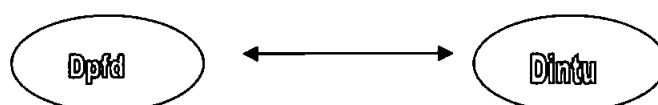
The above diagram shows the negative relationship between the debt to equity response to the decrease of the firms' profitability and the debt to equity response to the increase in the interest rates. Both directions for both factors are significant as either dependent or independent variables. The debt ratio tends to increase as the interest rates increases as indicated by the majority response of the Dintu, and as a result of negative regression coefficient, and the choice of a 0 dummy rather than a dummy of 1 for X variable, the debt ratios will increase as the profit decreases. Since both directions have negative coefficients and both variables have a majority response

to increase the debt to equity ratio, it suggests a consistent relationship of debt to equity ratio for Dintu and Dpfd. Therefore, as the profit decreases and the interest rates are increased by two percentage points, the firms will increase their gearing ratio.

The profitability is related to the pecking order theory in which low profitability firms were forced to seek external financing, preferably debt, followed by equity. Therefore, the result is consistent with the pecking order which suggests that as the profit decreases, the firms will increase their debt ratio. In general, the firms will reduce their debt ratio as the interest rates rise; this is due to the high cost of debt associated with the increase in interest rates. Therefore, the results above are very unexpected, and may suggest that as the firms are faced with financial difficulty, they will increase the borrowing ratio to pay the interest.

<u>Diagram 6.2 & 6.3: A Decrease in Debt to Equity Ratio</u>

Diagram 6.2

Diagram 6.3
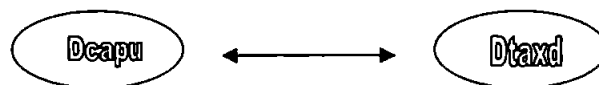
Diagrams 6.2 & 6.3 illustrate negative relationships between the independent and dependent variables. It is similar to diagram 6.1 except under each variable scenario for these two diagrams, more than 55 per cent of the respondents choose to decrease

their companies' debt ratio. The arrows from left to right in Diagram 6.2 represent the direction of x (independent variable) to y (dependent variable) for Dindu, Dinfu and Dgvid. While the arrow in Diagram 6.3 shows the direction from x to y, interchangeably.

Diagram 6.2 includes Dindu, Dinfu and Dgvid, all three with a response of debt decreases due to the increase in industry debt ratio, inflation rates and decrease in government incentive. The decrease in debt ratio due to the increase in the industry average debt ratio is contradictory to many previous notations of industry norm and debt. Although researchers such as Scwartz and Aronson (1976) and Scott and Martin (1975) had put forward a positive relationship between debt and industry average capital structure, Stonehill et al. (1975) did not find industry norms to be an important debt ratio determinants in their survey of manufacturing companies in 5 countries. Although most of the results reported the existence and non-existence of the industry norms, the results did not conclude a direct relationship between debt and the industry norm itself.

The increase in inflation causes firms to decrease their debt ratio, showing a macroeconomics risk leading to a more prudent debt ratio. As the inflation accelerates, the interest rates will rise, causing a high cost of debt, hence resulting in firms reducing their debt ratio. The findings confirmed Schall's (1984) argument that in an inflationary environment, investors will sell debt in exchange for equity because the real after tax return on equity becomes relatively higher than the return on debt. However, studies by Zwick (1977) and Corcoran (1977) on the relationship between

inflation and capital structure found that firms tend to increase their debt to equity ratio during which time inflation accelerated.

A decrease in government incentives will result in a decrease in the debt to equity ratio according to the responses. As expected, the firms will reduce their debt level if the government reduces its incentives. The Malaysian government provides many fiscal incentives in order to enhance the growth of PDS (private debt securities) to both lender and borrower as was discussed in Section 2.4.2.2 in Chapter 2. Besides tax exemption to the lender and cost reduction for the borrower side before the 1997 financial crisis, following the 1997 financial crisis, the government also established the "**Danaharta**" and "**Danamodal**". The "Danaharta" was established to purchase NPLs (non performing loans) from banking institutions and to manage these NPLs to maximise their recovery value. The "Danamodal" was established to facilitate the re-capitalisation of banking institutions by providing capital into viable banking institution (BNM, 1999). If firms are deprived of all of these incentives, it is then sensible for the companies to reduce their debt ratio because it would otherwise be difficult for the companies to acquire loans or to issue debt.

Diagram 6.3 presents the Dcapu and Taxd, both variables representing the increase in firms' non-debt tax shield and the decrease in corporate annual tax rates. The higher the capital allowances and the decrease in tax rates, the lower is the debt to equity ratio according to the results. The findings on the increase in capital allowances leading to a decrease in debt ratio are consistent with the non-debt tax shield views on capital structure. The argument is that as the non-debt tax shield items increase, it reduces or eliminates the tax advantage of debt, therefore, causing the advantage of

using debt because of tax to decrease. The findings are supported by the De Angelo and Masulis (1980) proposition that the greater the level of non-debt tax shields of a firm, the lower is the gearing ratio.

Tax is the most debatable item for reducing the cost of debt, due to the interest deductibility. Although the tax advantage may be significantly less than that proposed by the MM (1963), it would still be expected that an increase in any tax advantage would increase the debt ratio of the firm. King (1977), Norton (1991) and Rajan and Zingales (1994) have found evidence to support this important relationship. Therefore, a constant decrease in the corporate tax in Malaysia would result in firms decreasing their debt ratio as found in this research.

As shown in Figure 6.1, the logistic regression analysis have found three Datastream data of the capital structure determinants (x variables) affecting the y probability of the dummy variable. Roce has a positive relationship with Dinfu and a negative relationship with Dindu. While Log(tas) is positively related to Dindu and negatively related to Dgvid, the Nfa/tas is positively related to Dinfu. Datastream variables do not in themselves imply a gearing response, while the survey dummy variables which came from questions phrased in such a way that a gearing response was noted.

There is a positive relationship between Roce and the Dinfu. Therefore, profitable firms will increase their debt to equity ratio if inflation is increased. Previously, profit was found to have negative association with gearing (see 5.6.6.3), thus a contrasting relationship is found in the present of inflation. However, Martin and Scott (1974) and Drury and Bougen (1980) argued that profitability may be positively related to

debt over equity. According to them, profitable firms create a higher cash flow which should support more fixed-interest of debt, while low profitable firms may find it difficult to obtain debt capital compared with equity. Therefore, although inflation is increased, profitable firms would still increase their debt to equity ratios.

On the other hand, Roce has a negative relationship with Dindu. Any increase in profitability will decrease the debt to equity response to Dindu, implying a decrease in the debt ratio. The findings of a negative correlation between debt and profit are supported by the previous suggestion that high profit firms usually use less debt. The negative relationship with the presence of industry norms here is consistent with the previous suggestion.

Log(tas) is negatively related to the Dgvid. Therefore, any reductions in government incentives would be associated with larger firms decreasing their debt ratio or smaller firms increasing their debt ratio. The negative relationship between size and debt ratio is unexpected as size is usually positively correlated with gearing. The previous multiple regression analysis in Chapter 5 found positive results and have proven its consistency with a few past empirical studies such as by Rajan and Zingales (1994) and Titman and Wessels (1988). However, Gupta (1969) found evidence of a negative relationship between debt and firm size in his study on 173,000 US manufacturing firms. According to him, smaller firms would find external outside equity issues very costly and thus would be reluctant to share ownership with new equity owners, and therefore would tend to use more debt than the larger firms. With the decline in government incentives, larger firms would use less debt while smaller firms will use

more debt. Therefore, incentives are important to large firms but not as important to small firms.

Size is also positively related to Dindu, so, larger firms are likely to increase their debt to equity ratio as the industry debt ratio increases. Therefore size is positively related to debt, confirming many previous findings which found that the bigger the size, the higher is the debt. Since a similar positive argument relates to industry norms and debt-equity ratio, industry capital structure should have a significant impact upon individual firm's capital structure. Drury and Bougen (1980) suggest that any deviation from the industry average ratio would be regarded as suspicious by investors and lenders. Further to that, Scott and Martin (1975) argued that the finance managers' judgement on the capital structure decision will improve by examining the funding mixes of other firms in the same industry.

A positive result was obtained for the Nfa/tas and Dinfu, whereby any increase in tangibility will increase debt ratio as inflation increases. This is because tangibility increases the firm collateral position to obtain more debt for financing although the general notion is that when the inflation rate increases, the debt ratio would decrease. With the increase in interest rates due to the increase in inflation, the required return for the investment is higher and at the same time the collateral secures the lender's investment with the firms.

6.6.7 Modelling Result for Questions 6 to 9

Table 6.17 summarise the stepwise regression of Table 12, and Appendix H. It shows the coefficient results for questions 6 to 9 on the logistic regression modelling. All

models are significant at the 99 per cent confidence level. The highest percentage deviance is 61.63 per cent while the lowest is 13.12 per cent. All dependent variables are related to the events of the 1997 financial crisis. Two issues are involved in this instance: whether *actual* and *target* debt to equity ratio has been changed following the 1997 crisis and following the ringgit being fixed.

Table 6.17:
Logistic Regression for Questions 6 to 9

	Dagcc	Dtgcc	Dagcf	Dtgcf
Constant	(1.674)	(0.773)	(-0.318)	(-3.783)
Roce				5.028** (0.197)
Risk				8.289*** (3.691)
Dintu				14.780*** (-52.496)
Dinfu	12.980*** (-2.367)	8.927*** (-1.829)	9.345*** (-2.356)	10.041*** (-4.856)
Analysis of Deviance				
p-value	0.003	0.0028	0.0022	0.0000
% Deviance	19.16%	13.12%	18.67%	61.63%

*, **, ***Significant at least at 10%, 5% and 1 % level critical values
The value in the parenthesis are the coefficient of the parameter.
Dagcc - dummy if the actual d/e ratio changed following the crisis
Dtgc - dummy if the target d/e ratio changed following the crisis
Dagcf - dummy if the actual d/e ratio changed following the ringgit being fixed
Dtgcf - dummy if the target d/e ratio changed following the ringgit being fixed
Intu-interest rates increases, Infu-inflation increases, Roce-Return on capital employed, Risk-Standard deviation of operating income
N.B. Some factors in the above Table beginning with the letter D represent the Dummy

Dagcc is the dummy if the actual d/e ratio has been changed following the crisis. Dtgc is the dummy if the target d/e ratio has been changed following the crisis. Dagcf is the dummy if the actual d/e ratio has been changed following the ringgit being fixed and Dtgcf is the dummy if the target d/e ratio has been changed following the ringgit being fixed. Dagcc, Dtgcc and Dagcf are negatively related to Dinfu. Dtgcf is positively related to roce and risk but negatively related to Dintu and Dinfu

6.6.8 Discussion for Questions 6 to 9 of Logistic Regression

Negative coefficients were found between Dinfu and all the four dependent variables. As the inflation increases, the debt to equity ratio decreases as chosen by the 0 dummy. As implied by the negative relationship, any increase in the inflation will cause no effect on the actual and target gearing ratio following the crisis and following the ringgit being fixed to the US dollar. However, if the dummy 1 was chosen, the debt ratio will increase due to the increase in inflation, resulting in companies having to change their actual and target debt ratio following the 1997 financial crisis and following the ringgit being fixed. However, the majority of the respondents had chosen to decrease their debt ratio if the inflation is increased by two percentage points, suggesting that debt ratio is expected to decrease when the inflation is increased. Thus, the actual and target gearing ratio would be less likely to have any effect from the financial crisis and the fixed ringgit.

The last model is related to roce, risk and Dintu at the 95 or 99 per cent confidence level. The positive coefficient was shown by roce, where any increase in roce or profitability will increase the likelihood of firms changing their target gearing ratio following the ringgit being fixed to the US dollar. A similar conclusion was achieved for the risk, which suggests that any increase in business risk will encourage the firms to change their target gearing ratio following the ringgit being fixed to the US dollar.

The final variable is between the Dintu and the Dtgcf, where any increase in interest rates will have no effect on target gearing ratio if the dummy 0 is chosen for the Dintu. Nevertheless, if dummy 1 was chosen, any increase in interest rates will cause a change in the firm's target gearing ratio following the ringgit being fixed to the US

dollar. The majority of the responses obtained suggest that firms will increase their debt to equity ratio if the interest rates were increased by two percentage points. Therefore, if the interest rates were increased, firms' target gearing ratio will be affected following the ringgit being fixed.

6.7 The Results of the Hypotheses

6.7.1 The Financing Priority Hypotheses

The hypotheses in this section are used to test the association between financing preferences and the level of priority. The financing types include: retention, ordinary shares, total debt, total Islamic debt, total conventional debt, Islamic bond, conventional bond, Islamic bank loan, conventional bank loan, overdraft and financial lease. The statements for the hypothesis are based on the discussion in Chapter 4, Section 4.4.2. All hypotheses are tested using chi-square, and are presented in Section 6.4. The following are the alternative hypothesis statements:

H11: There is an association between types of financing and the level of priority

H12: Retentions are the main financing priority

H13: Firms follow the financing hierarchy

H14: Conventional bank loan is preferred over Islamic bank loan

H15: Conventional bond is preferred over Islamic bond

H16: Debt finances and financial leases attract equal preference

Table 6.18 reveals that all alternative hypotheses are accepted except for H15 and H16 which were both rejected. There is no association between the preference of Islamic bond and the conventional bond, and debt finances and financial leases do not attract equal preference.

The Financing Priority Hypotheses Results

Hypotheses	Alternative hypothesis	Test
H11	accept	Chi-square
H12	accept	Chi-square
H13	accept	Chi-square
H14	accept	Chi-square
H15	reject	Chi-square
H16	reject	Chi-square

6.7.2 The Firms' Financing Preference Hypotheses

This section discusses the hypothesis statements of factors affecting the financing preference. There are two factors tested against the financing preference: the firms specified factors (Datastream data) and the firms' sensitivity factors (survey data). The ANOVA, Kruskal-Wallis and logistic regression were used to test the hypotheses. Detail tests were performed and are presented in Sections 6.5.2 and 6.6.3. Hypotheses 17 represent the financing preferences, followed by hypotheses 18.

Hypotheses 17

H17: Firms' financial preferences (see list 4.1 for financing preference) are significantly related to firms' specific factors (see list 4.2 for firms specific factors)

i.e. Firms' financial preferences (e.g. retention, ordinary shares, total debt, Islamic debt, conventional debt, overdraft and financial lease are significantly related to the firms' specific factors (e.g. liquidity, profitability, investment growth, interest coverage ratio, tax, non-debt tax shield, return on investment, tangibility, size, price sensitivity and operating risk). (see Box 1 in Appendix C for the lists of the hypotheses)

Table 6.19 shows the results of hypotheses 17. Three different tests were used to test these hypotheses. For retentions and overdraft, Hypotheses 17 is rejected, since no significant firms specific factors are related to it. However, for ordinary shares, total

debt, Islamic debt, conventional debt, and financial lease, there are some significant firms specific factors, therefore hypotheses 17 are partially accepted.

Table 6.19
The Financing Preferences and Firms' Specific Factors Hypotheses Results

Financial preference	Significant firm's specific factors
Retentions	None
Ordinary shares	Profitability (k), non-debt tax shields (k), return on investment (l), tangibility (k)size (a, k)
Total debt	Investment opportunity (k), non-debt tax shields (k)
Islamic debt	Liquidity (k), investment opportunity (k), tax (k), non debt tax shield (k), tangibility (k)
Conventional debt	Investment opportunity (k), price sensitivity (l), risk (k)
Financial lease	Non-debt tax shield (k), tangibility (k)
Overdraft	None

a- ANOVA,   k – Kruskal-Wallis,   l – Logistic regression

A similar conclusion is applied to Table 6.20 for H18, for retention, financial lease and overdraft. The hypothesis was rejected, because there is no significant firms' sensitivity factors related to it. However, some firms' sensitivity factors of hypotheses 18 are significantly related to ordinary shares, total debt, Islamic debt and conventional debt, hence hypotheses 18 is partially accepted for theses factors.

Hypotheses 18

H18:   Firms' financial preferences (see list 4.1 for financing preferences) are related to firms' sensitivity factors (see list 4.3 for firms' sensitivity factors)

i.e. Firms' financial preferences (e.g. retention, ordinary shares, total debt, Islamic debt, conventional debt, overdraft and financial lease are significantly related to the firms' sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases). (see Box 2 in Appendix C for the list of the hypotheses).

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Table 6.20

The Financing Preferences and Firms' Sensitivity Factors Hypotheses Results

Financial preference	Significant firm's sensitivity factors
Retentions	None
Ordinary shares	Capu (*l*), Indu(*l*)
Total debt	Pfd(*l*)
Islamic debt	Intu (*l*), Indu(*l*)
Conventional debt	Pfd(*l*)
Financial lease	None
Overdraft	None

a- ANOVA,   k – Kruskal-Wallis,   l – Logistic regression

6.7.3 The Firms' Specific and Sensitivity Factors Hypotheses

The following two hypotheses are related to firms' specific factors and firms' sensitivity factors: H19 and H20. Both hypothesis tests are presented in Sections 6.5.5 and 6.6.5. Section 6.6.5 details the ANOVA and Kruskal-Wallis test for the related hypotheses while section 6.6.5 performed the logistic regression analysis. The following are the firm's specific factors and sensitivity factors hypotheses:

Hypotheses 19

H19:   Firms' sensitivity factors (see list 4.3 for firms' sensitivity factors) are related to firms' specific factors (see list 4.3 for firms' specific factors)

i.e. Firms' sensitivity factors (e.g. fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases) are significantly related to firms' specific factors (e.g. liquidity (cash), liquidity (working capital), (profitability, investment/growth, interest coverage ratio, tax, non-debt tax shield, return on investment, tangibility, size, price sensitivity, operating risk are related to debt to equity response due to the firms). (see Box 3 in Appendix C for the lists of the hypotheses)

Table 6.21 reveals the results of hypotheses 19, which indicate that none of the firms'
specific factors are significantly related to the Fod (Debt-equity response to fixed
overhead decreases), Rdu (Debt-equity response to research development increases)
and Taxd (Debt-equity response to the corporate tax decreases). Therefore,
Hypotheses 19 for Fod, Rdu and Taxd are rejected.

Table 6.21:
The Firms' Sensitivity Factors and Firms Specific Factors Hypotheses Results

firm's sensitivity factors	Significant Firms' Specific Factors
Fau	Interest coverage ratio (a), Risk (k)
Fod	None
Pfd	Liquidity, Cr (k),
Rdu	None
Taxd	None
Capu	Risk (k)
Intu	Interest coverage ratio (a), liquidity, Cr and Wcr (k),
Infu	Profitability (a), Profitability (k, l), Price sensitivity (k), tangibility (l)
Gvid	Size (a), profitability (k), Tax (k), Tangibility (k), size (k, l), Risk (k)
Indu	Liquidity Cr (k), Non-debt tax shield (k), size (k, l), profitability (l)

a- ANOVA,   k – Kruskal-Wallis, l – Logistic regression

On the other hand, hypotheses 19 for Fau, Pfd, Capu, Intu, Infu, Gvid and Indu are
partially accepted because some of the firms' specific factors are significantly related
to those variables.

The following hypotheses are between the firms' sensitivity factors and "*other*" firms'
sensitivity factors.

Hypotheses 20

H20:   Firms' sensitivity factors (see list 4.3 for firms' sensitivity factors) are related
to other sensitivity factors (see list 4.3 for firms sensitivity factors)

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i.e Firms' sensitivity factors (e.g. fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases) are significantly related to other sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases). (see Box 4 in Appendix C for the list of the hypotheses).

Table 6.22:
Firms' Sensitivity Factors and Firms Sensitivity Factors Hypotheses Results

Firms' sensitivity factors	Significant firms' sensitivity factors
Fau	None
Fod	Rdu (l)
Pfd	Intu (l)
Rdu	Fod (l)
Taxd	Capu, Infu (l)
Capu	Fau, Taxd (l)
Intu	Pfd, Taxd (l)
Infu	Taxd, Indu (l)
Gvid	Pfd, Capu, Infu (l)
Indu	Pfd (l)

a- ANOVA,   k – Kruskal-Wallis, l – Logistic Regression

As illustrated in Table 6.22, hypotheses 20 indicate that all firms' sensitivity factors are partially accepted except for Fau. Some of the firms' sensitivity factors are significantly related to the other firms' sensitivity factors.   The related factors are Fod, Pfd, Rdu, Capu, Taxd, Intu, Infu, Gvid, and Indu. Since none of the factors are significantly related to Fau, the alternative hypotheses are rejected.

6.7.4 The Financial Crisis Hypotheses

The following two hypotheses are related to financial crisis: hypotheses 21 and 22. The first hypothesis relates the firms' specific factors to gearing while the second

hypothesis relates the firms' sensitivity factors to the crisis. The logistic regression is used to test the hypotheses and the detail tests are presented in Section 6.6.7.

The following is hypothesis 21, followed by hypothesis 22.

Hypotheses 21

H21: Financial crisis factors (see list 4.4 for financial crisis factors) are related to the firms' specific factors (see list 4.2 for firms' specific factors)

i.e. Financial crisis factors (e.g. actual and target debt to equity ratio following the crisis and following the ringgit being fixed) are significantly related to the firms specific factors (e.g. liquidity (cash), liquidity (working capital), (profitability, investment/growth, interest coverage ratio, tax, non-debt tax shield, return on investment, tangibility, size, price sensitivity, operating risk). (see Box 5 in Appendix C for the lists of the hypotheses)

Table 6.23:
Financial Crisis and Firms' Specific Factors Hypotheses Results

Financial crisis factors	Firms' specific factors
Actual gearing change following the crisis	None
Target gearing change following the crisis	None
Actual gearing change following ringgit being fixed	None
Actual gearing change following ringgit being fixed	Profitability (l), Risk (l)

a- ANOVA,   k – Kruskal-Wallis,   l – Logistic regression

As shown in Table 6.23, none of the hypotheses 21 are accepted except for "actual gearing change following the ringgit being fixed". This hypothesis is partially accepted as profitability and risk are significantly related to it.

Hypothesis 22 is stated as follow:

Hypotheses 22

H22: Financial crisis factors (see list 4.4 for financial crisis factors) are related to the firms' sensitivity factors (see list 4.3 for firms sensitivity factors).

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i.e. Financial crisis factors (e.g. actual and target debt to equity ratio following the crisis and following the ringgit being fixed) are significantly related to the firms sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases). (see Box 6 in Appendix C for the list of the hypotheses).

The results in Table 6.24 reveal that all hypotheses related to the financial crisis are partially accepted because Infu is the firms' only sensitivity factors that is significantly related to the financial crisis factors.

Table 6.24:
Financial Crisis and Firms' Sensitivity Factors Hypotheses Results

Financial crisis factors	Significant firms' sensitivity factors
Actual gearing change following the crisis	Infu (*l*)
Target gearing change following the crisis	Infu (*l*)
Actual gearing change following currency being fixed to the US Dollar	Infu (*l*)
Actual gearing change following currency being fixed to the US Dollar	Infu (*l*)

a- ANOVA, k – Kruskal-Wallis, l – Logistic regression

6.8 Interview Survey

According to Kahn and Cannel (1957), an interview is a purposeful discussion between two or more people. It can help gather valid and reliable data that are relevant to the research questions and objective. Due to the short duration of the field study (3 months), the researcher had decided to conduct telephone interviews. It was conducted as an alternative to the face-to-face interviews because the majority of the field research time was spent on the process of collecting questionnaire data, i.e., sending reminders to the finance managers, calling the companies to get the correct mailing address for the questionnaire and etc.

Due to its informality, the interview was classified as semi-structured interview. For this study, the researcher had a list of thematic questions to enable the finance managers to provide their personal and professional opinions and views in the areas of capital structure. The telephone interviews which each lasted between 30 minutes to one hour, were conducted in July 2001 with 8 finance managers from 5 main board and 3 second board listed companies.

Due to the informal nature of the phone interviews, the discussions were generated based on the flow of conversation and therefore differed substantially among the 8 telephone interviewees. The advantage of the interviews is to give the finance managers the freedom to express themselves without having to write their thoughts on the paper. The opinions and views of the interviewees were recorded by note taking. To upheld confidentiality, the researcher has assured the phone interviewees that their personal information will not be mentioned in the thesis. Therefore, when discussing the information obtained from the phone interviews, the interviewees will instead be referred to as Interviewee 1, Interviewee 2 and so on.

6.8.1 Interview Analysis and the Discussion

The following are the four questions that were asked during the phone interviews:

1. Does your company have target debt to equity ratio?

2. How do you measure debt to equity ratio?

3. What are the main factors considered in gearing/leverage decision?

4. How did the financial crisis affect your company?

The discussions in this section mostly focus on the information obtained from the phone interviews and are cross-referenced with a few comments that were received from the questionnaire survey. The discussions generated from the phone interviews show that 4 out of the eight companies had a target debt to equity ratio. These four established firms are main board listed companies. The firm of Interviewee 2 has a ratio of 30:70 of internal and external funding rate with a debt to equity ratio of 1:1. Two other companies had maintained an internal and external ratio of 40:60, of which the ratio of debt to equity is maintained at 1:1. Interviewee 6 had a conservative approach of debt, with the internal and external ratio of 50:50, in which 10 per cent of external financing is debt and 90 per cent is equity. According to the finance manager, due to the interest incurred on debt, the firm is obligated to pay fixed interest payment and may be subjected to financial distress if the obligations are not fulfilled.

> *"Using debt will put this firm at risk especially when the firm's profit is low, we are obligated to pay the interest and we do have many other obligations".*
>
> (Interviewee 6)

On the contrary, the company affiliated with Interviewee 5 does not have target debt to equity ratio and had maintained that the company does not use debt at all because the company is always in a surplus situation. Therefore any short-term project is financed using profit while long-term project would only require external equity. Although equity has a high risk, it is however regarded as safer by Interviewees 6 and 5 as there is no risk of bankruptcy when using equity since they are not subjected to financial distress.

In response to interview question 2 on the measurement of debt to equity ratio, none of the four firms had indicated having any specific formula or computation to measure their ratio. However, one of the managers specified that the ratio that they used is based on the effective cost of capital. According to that manager, the company would settle for the lowest financing costs for any project as a determinant of the financing sources and gearing ratio. On the other hand, the key factor for debt to equity ratio determinants for the company affiliated with Interviewee 2 is to observe the interest coverage ratios. According to the manager, the higher the interest coverage ratio, the better it is for the firm. One of the reasons to consider interest coverage ratio is due to the private debt securities rating by Rating Agency Malaysia (RAM). One of the rating criteria outlined by RAM for the independent power producers is as follow:

> *"Cash generating ability to cover debt-servicing obligations is of the rating methodology"*
>
> (RAM (2002)).

Therefore, interest coverage ratio is very important for utility companies for debt to equity ratio determinants.

In response to interview question 3, five of the interviewees had mentioned collateral as the most important aspect of getting loans from banks.

> *"The higher the value of your collateral, the faster and the bigger the amount of cheque the bank will produce"*
>
> (Interviewee 3)

However, according to one of the interviewees, although the banks require the collateral as part of the security arrangement, they do take into considerations other factors such as the firms' profit. Interviewees 7 and 8 had given a very interesting point regarding the title[13] of the company's board of directors do account for the

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[13] The title of Tan Sri, Datuk and others are given by Royal Figure or the states ruler (equivalent to the title of Sir)

credit assessments. The higher the title of the firm's board of directors, the more considerate the banks would be towards credit approval.

In response to the last question, the gearing of only two companies were directly affected by the crisis while the other five were indirectly affected due to weak performance of the stock market which had reduced the market value of their equity. According to Interviewee 8, the equity market was really low due to the crisis, causing top management to change their gearing decision accordingly, based on the development of the market. Interview 8 also said that while the company's profit was deteriorating, the share prices also fell and at the same time, the financial institutions tightened their credit. The company would therefore have to seriously consider these factors in deciding their financing sources to minimise the company's cost of capital.

Interviewee 5 who had previously stated that the company did not intend to use debt is now considering using debt for financing if the market does not recover soon because the company's profit is gradually falling due to the low sales volume. The finance manager specified that their previous policy on financing was to use profit for short-term projects and to issue shares for long-term projects. However, the manager explained that it is not advisable to raise funds through external equity to finance any investment following the crisis. The financial crisis may have changed their financing policy, which left with the option of using debt for both short-term and long-term financing. The company did use debt in 2002, as shown in their financial statement of the 2002 annual report.

The final response on the financial crisis was based on the feedback obtained from interviewee 8, who was the finance manager of a small listed company on the second board. The crisis and the contraction of the economy had caused the company to experience severe financial difficulties, therefore forcing the company to be dependent on the government's assistance through financial aid and fiscal policies. Bank Negara indicated that the financial crisis had caused a significant increase in the number of business closures and cases of companies filing for court-sanctioned restraining orders from their creditors (BNM, 1999).

One of the questionnaire respondents had written the following comments on the questionnaire, suggesting that the actual and target gearing of the company has changed following the financial crisis:

> "Prior to the depreciation of RM against foreign currencies, the D/E ratio was 1:1. The impact of the depreciation which reduced the value of the ringgit against other currencies by about 50 per cent, had led to an increase in D/E ratio by about 62-64 per cent of debt at the end of August, 1998 which was in foreign currencies".

The above quote implies an increase in gearing following the ringgit depreciation due to the debt denominated in the US dollar and the Japanese Yen. In response to the currency depreciation, the company has changed the foreign debt policy ratio of 62:38 percent of foreign to local debt on 31st August 1998 to a ratio of 50:50 per cent on 31st August 2001. Therefore, the use of foreign denominated debt has been reduced. One of the reasons of reducing debt denominated in foreign currencies is to minimize future fixed interest rates which may create future problems for the firms (i.e., the firm will have to pay the interest due in the Malaysian ringgit).

6.9 Conclusion

The chi-square test proves that majority of the companies have given high priority to retentions, however, none of the ANOVA and Kruskal-Wallis test on retention give any significant result between and any other factors or variables in the analysis. Therefore, with the exception of the high priority given to retentions, no other conclusions can be drawn on retentions.

Based on the chi-square analysis, ordinary shares are the last priority chosen by firms listed under the main board. Nevertheless, the Kruskal-Wallis test have shown that firms with high tax surrogate (Dep/tas), high tangibility and high risk have given high priority to ordinary shares, while firms with low profit (Npm) and small in size have given low priority to ordinary shares. The ANOVA test has revealed similar results indicating that small size firms give low priority to the ordinary shares. The logistic regression modelling shows that the decrease in non-debt tax shield and industry average ratio are positively related to ordinary shares while profitability (Roce) is negatively related to ordinary shares.

The chi-square test proves that firms have given medium priority to the debt financing. On the other hand, the Kruskal-Wallis assessments have shown that low growth and low non-debt tax shield firms have given low priority to debt. Logistic regression, however, shows that the increase in debt to equity ratio due to the response of the profit decreases (Pfd) has resulted in high priority given to the total debt financing.

The chi-square analysis clearly shows that all types of conventional debt are given higher priority over Islamic debt. The Kruskal-Wallis test shows that firms with high price-currency sensitivity have given high priority to conventional debt; however, high-risk and high investment opportunity firms have given low priority to the conventional debt. Nevertheless, logistic regression shows that the increase in debt to equity ratio, due to the response of a profit decrease (Pfd) has resulted in high priority given to the conventional debt financing.

On the contrary, liquidity, investment opportunity, non-debt tax shield, and tangibility are negatively related to Islamic debt using the median test, but the same test has resulted in a positive relationship between tax and Islamic financing. Based on the logistic regression, however, an increase in the debt to equity ratio due to the response of an interest rate increase has resulted in high priority given to the Islamic debt, but the decrease in debt to equity ratio, due to the response of the increase in the industry average debt ratio, has given low priority to the Islamic debt.

The ANOVA, Kruskal-Wallis and logistic regression analyses have found that with an increase in inflation, high profit firms are likely to increase their debt to equity ratio. The Kruskal-Wallis and logistic regression have also proven on increase in the industry average debt ratio has resulted in large firms increasing their debt to equity ratio. The Kruskal-Wallis median test has found that despite low incentives given by the government, firms with high tangibility, high risk and high tax brackets will increase their debt to equity ratio. The same test has proven that with the increase in fixed assets, high risk firms will increase their debt to equity ratio. Finally, both the Kruskal-Wallis and the logistic regression show on the increase of two percentage

points in inflation would result in firms with high tangibility, price-currency sensitivity and high profit increasing their debt to equity ratio.

All three tests have confirmed that with a decrease in government incentives will result in larger firms decreasing their debt to equity ratio. Highly liquid firms will decrease their debt to equity ratio if interest rates are increased by two percentage points, as shown by the Kruskal-Wallis median test. The same test verifies that highly liquid firms tend to decrease their debt to equity ratio with a decrease in profit and an increase in the industry average debt ratio. With the decrease in government incentives, the median test shows that high profit margin firms will decrease their debt-equity ratio, while logistic regression confirms that an increase in inflation and lack of government incentive will result in firms having to decrease their debt to equity ratio. Using the ANOVA, the result shows that low profit firms will decrease their debt to equity ratio if interest rates are increased or even if the firms' fixed assets are increased. However, the logistic regression has shown that highly profitable firms will decrease their debt to equity ratio if the industry average debt ratio is increased. The same result was achieved for high non-debt tax shield firms which indicate that these firms would decrease their debt ratio should the industry average debt ratio be increased.

The test has revealed that the increase in inflation will not have any effect on the firms actual and target gearing ratio following the 1997 financial crisis and the ringgit being fixed. However, a high return on investment and increase in risk has influenced firms to change their target debt to equity ratio following the ringgit being fixed to the US dollar.

The interview summary shows that only large and established companies have target debt to equity ratios. Although their debt to equity ratios vary, the companies maintained a debt ratio of less than 50 per cent. Between 30 to 50 per cent of the funding was targeted from internal funds. Many companies consider fixed assets as the most important factor in debt determination, while others refer to interest coverage ratio and the influence of the board of directors. Most of the interviewees agreed that the crisis did affect their capital structure either implicitly or explicitly. The companies which had debt denominated in foreign currencies would experience a direct effect of the crisis on their capital structure. However, the crisis had an effect indirectly on the balance sheets of some of the companies through decline profitability and financial distress.

The interviewees had different perceptions towards the crisis. The finance managers of the companies in the main board tended to emphasise changing their debt management policy, while the finance managers of the second board companies stressed the damaging extent of the crisis and feared that their companies may not survive. However, since only 8 respondents had participated in the phone interviews, the number is too small to represent the views of the entire population of the companies listed in the KLSE.

CHAPTER 7
CONCLUSION

7.1 Introduction

Chapter 7 discusses the overall findings of the research study which include the review of gearing differences between the main board and the second board companies, the finance managers financing preference, and finally factors which are positively or negatively related to debt. A short discussion on the effects of the crisis on gearing is also included. The discussions on the limitations and recommendations for further research conclude the thesis. The chapter is comprised of the following sections: Section 7.2 summarises the research findings, Section 7.3 discusses the crisis effect on the firms' gearing, Section 7.4 states the limitations of the research and Section 7.5 provides a direction for further research.

7.2 Summary of the Research Findings

The ANOVA and the Kruskal-Wallis have shown that there are differences between the main board and the second board companies' gearing using book value ratios and mixed value gearing across three time periods. The observations of the mean scores and median ranks have indicated evidence that the gearing ratio for both boards gradually increases from the pre-crisis to post-crisis period. The figures were even higher when measured by the mixed value ratio. The ANOVA and the Kruskal-Wallis results are further supported by the multiple regression results on the panel data. The mixed value model of the panel data have statistically proven that the main board companies gearing are increased following the crisis.

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The similar tests have proven that there are statistical differences between the book value gearing of the main board's six sectors, the differences are highly significant during the pre-crisis. The mean scores reveal that except for plantation, the gearing of the other five sectors have increased even more following the crisis. The Bonferroni mean test also reveals that the gearing of the plantation sector is the only sector that is statistically different from all the other sectors. The evidence shows that the plantation sector had gained from the depreciation of the ringgit as the profit from the exported commodities was quoted in US dollars. Due to this reason, the profit of the firms related to these sectors were not as badly affected as those in the other 5 sectors, therefore, less debt is required for the investment. The situation explains why the plantation had the lowest gearing before and after the crisis.

The chi-square result has statistically proven that there is an association between the financing p reference a nd t he p riority p reference. T he r etention i s r egarded a s t he highest priority, followed by debt and ordinary shares as a last option. This shows that Malaysian firms follow the financing hierarchy as suggested by Myers' pecking order theory. Consistently, studies by the Malaysian Central Bank on sources of finance of industrialisation in Malaysia between 1994 and 1996 have found that 48.8 per cent of companies' financing are realised from internal funds, 37.3 from debt and 13.9 from external equity (BNM, 1996).

The same test shows that conventional debt is preferred over Islamic debt. Clearly the Islamic financing is the least preferred financing compared with conventional financing. Putting aside all the comments that were noted in the earlier discussions in Chapter 6 on the current practice of the Islamic financing, is it possible for the interest

free economic system to replace the interest based system in Malaysia? The Malaysian economy develops and progresses based on a very complex cultural background due its multiracial society. The significant developments on the "interest free economic system" in Malaysia are due to the strong commitment from the Muslim community, which represents the majority population of the country. There are few evidences showing that the user of Islamic financing did not suffer the impact of the high interest rates following the crisis. The positive effects of the crisis to the Islamic financing participants would encourage further use of Islamic financing in the future. However, it would be difficult to predict the changes in the future economy as any changes in world economy would have an effect on the local economy. At present, both systems allow the community to choose the ideal methods in accordance to their needs and religious belief.

7.2.1 Factors That Positively and Negatively Related to Gearing

The statistical analyses have indicated that a few factors are positively and negatively related to gearing. Size were found positively related to the main board and the second board gearing measured by book value ratios and mixed value ratios. Therefore, the larger the size of the firms, the higher is the gearing ratio of that particular firm. On the other hand, tangibility was found to have a significant positive relationship with the gearing for the companies listed at the second board. However, no relationship is found between the tangibility and the gearing of the main board companies. Tangibility is therefore very important for the small companies compared with large companies with regard to debt financing. The other variable to have a positive influence on gearing is risk. However, only firms listed on the main board have a positive significant risk influence on their book value gearing ratio. Therefore,

the higher the risk of the large firms, the higher is the gearing. The price sensitivity or the correlation between companies' share prices and the ringgit movement shows a significant positive result, when the gearing is measured using mixed value ratios. The falling of share prices due to the ringgit depreciation has reduced the market value of equity, thus, increasing the debt ratio of the firms.

Firms' gearing based on the book value ratios and the mixed value ratios are found to be highly negatively related to profit. Besides the findings of negative relationship between profitability and gearing using firms' account data, a few other evidences show that Malaysian firms prefer internal funds over external funds. The response of the finance managers shows that retentions are their highest priority compared with debt and equity. Further to these findings, target gearing ratios of internal to external funds were from 30 to 50 per cent, as indicated by the finance managers during the interviews. This implies an emphasis on a high ratio of internal funds over debt and external equity mixture. The overwhelming evidence indicates that less debt is required if the firms' profit is high, resulting in a negative relationship between profit and gearing.

Besides profitability, liquidity was also found to have a negative relationship with the book value ratios and the mixed value ratios gearing. The negative relationship between liquidity and gearing are related to the "financial slack", whereby firms with a conservative approach to debt will ensure that they have sufficient readily available current assets for financing investment, resulting in a negative relationship between liquidity and debt.

Other than the above individual factors relating to the gearing ratio, there are a few additional combining factors causing the gearing ratio to increase or decrease. This conclusion is drawn based on the combination of i) the firms' account data obtained from Datastream and ii) the finance managers' response obtained from the questionnaire.

As discussed above, size is positively related to debt, it is also found that larger firms would increase their debt-equity ratio if the industry average debt ratio increases. However, larger firms tend to decrease their ratios if the government incentives are reduced. High tangibility firms are found to have a positive relationship with gearing even if the government reduces its incentives or when the inflation rises.

The statistical analysis also reveals that high risk firms tend to increase their debt to equity ratio if the firms' fixed assets are increased or even when the government incentives are reduced. However, high risk firms will reduce their debt to equity ratio if the non-debt tax shield is reduced. On the other hand, firms with high price-currency sensitivity will increase their debt to equity ratio when inflation rises.

Profitability, as previously mentioned, having a negative relationship with gearing, would imply profitable firms using less debt. However, it is also found that an increase in inflation would result in profitable firms using use more debt. The test also reveals that <u>low interest coverage firms</u> use less debt even if the firms' fixed assets are increased or when interest rates are increased. Low interest coverage is associated with low profit; in other words, low profit firms use less debt if interest

rates are increased. The low profit firms would even reduce their debt to equity ratio although the fixed assets are increased to back the debt.

Liquidity is negatively associated with gearing: the combined data revealed that highly liquid firms will decrease their debt to equity ratio when interest rates are increased, when the profit is decreased and even when the industry average debt ratio is increased.

7.3 Does the Crisis Affect the Firms' Gearing?

Section 7.2 discusses the significant differences between the gearing of the main board and second board companies. Although the analysis of the mean has shown a substantial increase in the gearing ratios from the pre-crisis to the post crisis, the ANOVA and the Kruskal-Wallis methods only test the difference between the gearing of companies on the main board and second board one period at a time. The panel data regression is the only statistical test that indicates the increase in gearing following the crisis. The result shows a significant increase in mixed value ratios of panel data from pre-crisis to 1997. Therefore, the gearing has increased following the crisis.

Although a few studies have categorised Malaysia under the low-debt country group, gearing has increased over the last few years, even before the 1997 crisis. A study by Claessens et al. (1998) has indicated a significant increase in Malaysia's annual gearing ratio from 1988 to 1996. Therefore, any increase in gearing following the crisis may be due to either one of the following reasons: a general trend of increasing the debt ratio, or firms do indeed employ more debt due to the crisis.

If the increase in gearing is due to the crisis, the following are a few possible explanations for the increase in gearing ratio following the crisis; i) it could partly be just an accounting entry of accumulated losses resulting in a low book value of equity; ii) as the share prices fell due to the crisis, the market value of the equity was also reduced, causing the debt ratio to increase; iii) in reality, following the crisis, the only choice for financing is to use debt if the firms' shares and retentions are unavailable. Graph 3 in Appendix A shows and increase in private debt securities issuance over the equity issuance following the 1997 financial crisis in Malaysia. Immediately following the crisis, both capital sources issued by corporations were very low as indicated in the graph for the year 1998, however, debt issuance surpassed the equity issuance during that year and the subsequent years (compared with 1996 and 1997 proportions). The evidence supports the third explanation for the scarce equity sources due to the crisis.

The statistical analyses have found a number of factors associated with the crisis. The high risk and profitable firms were found to change their target gearing ratio following the ringgit being fixed to the US dollar. The conducted test also found that managers will change the actual and target gearing ratio following the crisis and following the ringgit being fixed to the US dollar if inflation rises. The multiple regression tests of three different periods found certain factors such as investment opportunity, tangibility and size (for second board) has changed from positive to negative, and vice versa from one period to another. Therefore, the crisis may have had some impact, perhaps more pronouncedly upon opportunities. Companies which employed foreign denominated debt were found to change their debt policy by

reducing their foreign denominated debt to avoid paying a high fixed cost in depreciated ringgit when the interest is due.

7.4 Limitations of the Research

There are inevitable limitations and weaknesses associated with some aspects of the research, such as the way in which the research was designed. There are also some external factors which may have influenced the way in which the research was conducted. Some of the limitations of the project are described below.

The comparability of results between Malaysia and the US/UK firms is probably not fully valid. This is because Malaysian firms are categorised under the developing country as compared to the US and UK firms which are categorised under developed countries. There is a huge difference between the economic and political aspects of developing and developed countries.

Other limitations include the inconsistency of the firms' data in Datastream whereby a substantial n umber o f d ata w ere n ot a vailable i n c ertain years w ithin t he p eriod o f study. Therefore, many companies have to be excluded from the study. This had significantly reduced the number in the research sample, especially for the second board companies. Further to that, many companies' data had to be disregarded due to extreme figures (outliers).

Another limitation to the study worth mentioning is time. Although it was felt that time was managed and spent effectively during the process of conducting the research, a number of barriers had prevented the researcher from being able to fully

concentrate on the research. A large amount of time was spent in sorting and cleaning the data obtained from the Datastream.

The method of collecting data is another aspect of the study which had caused some problems for the researcher. For example, the process of disseminating the research questionnaire to the finance managers had resulted in a large number of the questionnaires having been sent by mistake to the company's secretary, instead of to the finance managers. This is primarily due to the inability of the researcher to obtain the full mailing address of the finance managers. Due to the time constraints of the field research, the researcher had to cancel face to face interviews to accommodate for the time spent in having to contact the companies for the correct mailing address. The reason is the researcher only had 3 months to collect the completed questionnaire, to interview the finance managers, to collect relevant research materials from various libraries and government institution such as The Central Bank of Malaysia before departure back to the UK.

It is also worth mentioning that since this research study was predominantly conducted in the United Kingdom, it was rather difficult for the researcher to obtain further useful information relating to this research such as on Malaysian taxation, Islamic Banking Act and the latest economic development report. Some of these problems have been minimised through kind assistance from friends and family members in Malaysia.

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7.5 Future Research Suggestions

Although this research can be considered a comprehensive study on the capital structure of Malaysian firms, the findings have introduced a number of areas which could be further explored in future research. This study has also revealed that there are numerous avenues to be studied on the Malaysian capital structure by future researchers.

There are a few other factors that may have influenced the gearing of Malaysian firms that are not included in this thesis such as agency conflict, bankruptcy cost, asymmetric information and dividend policy. The Malaysian markets have overwhelming preferences for callable or bond with warrants and convertible securities (see Table 1 in Appendix A for the 1996 and 1997 figures), therefore further studies on these areas are highly recommended. Further to that, a few other factors that related to the crisis may be encompassed in the model, to extend the scope of the study on the crisis effects on gearing to include economic factors such as money growth (M1, M2 and M3), foreign direct investment and foreign denominated debt.

Another consideration is to use different measurements for the gearing. As indicated in the results of the study, Malaysian companies prefer medium sized debt. Instead of using the total debt (short-term plus long-term debt) to measure gearing, it may be worth using short-term debt or medium-term debt or long-term debt. Some of the gearing measurements that have been used by previous researchers are: the ratio of long term debt over total debt, the ratio of short term over total debt and income gearing. Titman and Wessels (1988) have used long term debt, short-term debt and

convertible debt over book value and market value of equity in their capital structure studies.

A few other methodologies may also be used to study the time series effect on gearing such as the regression with time lags. As to the questionnaire survey, different methods such as the Mann-Whitney U test may contribute to slightly different findings on the survey.

Further analyses on the financing are also recommended because there are many related issues which are rather vague and would require extensive analysis in the area. Islamic banking has emerged as a new market in the international financial scene side by side with the conventional system. The Central Bank of Malaysia has reported that there are about 177 Islamic financial institutions operating around the world, managing assets estimated at US$90 billion. As for Malaysia, the total assets of the Islamic banking system, as at the end of 1999, stood at RM34.1 billion while deposits and financing amounted to RM26.1 billion and RM 11.7 billion respectively. Another major development is the establishment of the Islamic money market in 1994 with one of the functions being the trading of Islamic financial instruments. With such development, future research in this area is highly recommended.

Besides questionnaire survey and interview, small scale case studies may be appropriate to get direct results from companies. Very few studies on the capital structure area have been conducted using the case study approach. By focusing on a few companies, the researcher will gain a rich understanding of the context of the research and its research process. The case study approach also has the ability to

generate answers to specific questions, such as what and why and how. According to Emory and Cooper (1991), a simple, well-constructed case study can enable a researcher to challenge an existing theory and provide a source of new hypotheses.

Another potential suggestion is to conclude comparative study of the effects of the financial crisis on the firms' gearing in other countries that were affected by the crisis. The study may be extended to include South East Asian countries such as Thailand, Indonesia, Singapore and even Hong Kong and South Korea for gearing comparisons. Similar to Malaysia, not many studies on capital structure have been conducted on those countries. Therefore, not only the crisis effects on gearing are recommended but many other capital structure related issues may also be explored for comparative study.

GLOSSARY OF TERMS[1]

Arbitrage
Purchase of one security and simultaneous sale of another to give a risk-free profit.

Adjusted R-Squared
A statistic that is suitable for comparing models that have different numbers of independent variables; indicates the percentage of variability for which the model accounts.

Bai al Salam
Contract of sale of goods, where the price is paid in advance before the goods are delivered.

Bai bithaman ajil (Bai' muajjal)
This contract refers to the sale of goods on a deferred payment basis. Equipment or goods (the assets) requested by the client are bought by the bank, which subsequently sells the goods to the client at an agreed price (the sale price), which includes the bank's mark-up (profit). The client may be allowed to settle payment by installments within a pre-agreed period, or in a lump sum. Similar to the *murabahah* contract, this is also a credit sale.

Balance of Payments
The record of all the transactions between a country and the rest of the world; it includes information on the value of trade in goods and services as well as transfer payments.

Bhat
The unit of currency of Thailand

Cagamas
The securitisation process of mortgage by the National Mortgage Corporation known as Cagamas Berhad. In the securitisation process, Cagamas purchases loans from major primary lenders such as banks, insurance companies and pension funds. The purchase is funded through the issuance of Cagamas debt securities. Cagamas, therefore, converts a long-term illiquid asset (example property loans) into liquid debt securities which can be traded in the secondary market. This process enables investors to earn an income from Cagamas debt securities which is basically derived from the interest paid by borrowers on their loans.

Ceteris Paribus
All other things being equal; refers to holding all other variables constant or keeping all other things the same when one variable is change

Correlations
A measurement of the strength of the linear relationship between random variables.

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[1] The glossary of terms extracted from: BNM (1999), Taylor (1995), Brealey et al. (2000) and Statgraphics (2000).

Correlation Matrix
A table of the Pearson correlation coefficients for the estimated coefficients in a model.

Consumer Price Index (CPI)
A price index equals to the current price of a fixed market basket of consumer goods and services in a base year.

Current Account Balance
The value of export minus the value of imports plus net factor income from abroad plus net transfer from abroad

Danaharta
Main function is to purchase NPLs from the financial institutions and manage the NPLs in order to maximise their recovery value.

Danamodal
Main function is to re-capitalise the financial institution by injecting funds to enable them to operate efficiently.

Developing Country
A country that is poor by world standards in terms of real GDP per capita.

Gearing
Leverage: Use of debt to increase the expected return on equity.

Gross Domestic Product (GDP)
The measure of the size of the economy, it measures the value of all goods and services newly produced in an economy during a specified period of time.

Hedging
Buying one security and selling another in order to reduce risk

Ijara
A contract under which a bank buys and leases out for a rental fee equipment required by its client. The duration of the lease and rental fees are agreed in advance. Ownership of the equipment remains in the hands of the bank. The contract is a classical Islamic financial one, now in increasing use worldwide.

Imputation Tax System
Arrangement by which investors who received a dividend also receive a tax credit for corporate taxes that the firm has paid.

Inflation
An increase in the overall price level

Inflation rate
The percentage increase in the overall price level over a given period of time.

International Monetary Fund (IMF)
An international agency, established after World War II, designed to help countries with balance of payments problems and to ensure the smooth functioning of the international monetary system.

Keynesian
A thought concern with pursuing demand –side macroeconomic policies, primarily fiscal policies to reduce unemployment and encourage economic growth. Shaped by the Great Depression and the work of John Maynard Keynes.

Khazanah Bonds
Treasury Bonds

Lessee
User of leased assets

Lessor
Owner of a leased asset

Moral Hazard
The risk that the existence of a contract will change the behaviour of one or both parties in accordance to the contract; e.g., an insured firm may take fire precautions lightly.

Mudarabah (Trust Financing)
This is an agreement made between two parties: one which provides 100 per cent of the capital for the project and another party known as a *mudarib*, who manages the project using his/her entrepreneurial skills.   Profit arising from the project are distributed according to a pre-determined ratio.   Any losses accruing are borne by the provider of capital.   The provider of capital has no control over the management of the project.

Murabahah (cost-plus financing)
This is a contract sale between the bank and its client for the sale of goods at a price which includes a profit margin agreed by both parties.   As a financing technique it involves the purchase of goods by the bank as requested by its client.   The goods are sold to the client with a mark-up.   Repayment, usually in instalments, is specified in the contract.

Musharaka (partnership financing)
This Islamic financing technique involves a partnership between two parties, both providing capital towards the financing of a project.   Both parties share a pre-agreed ratio, and losses are shared on the basis of equity participation.   Management of the project may be carried out by both the parties or by just one party.   This is very flexible partnership arrangement where the sharing of the profits and management can be negotiated and pre-agreed by all parties.

M1
Currency in circulation and demand deposits of the private sectors

M2

M1 plus fixed and saving deposits of the private sector placed with BNM and commercial banks, net negotiable instruments of deposit issued by the banks and repurchase agreements (repos) done by banks.

M3

Currency in circulation plus all private sector deposits (including repos) with BNM, commercial banks (including Bank Islam), finance companies, merchant banks and discount houses; excludes placements among these financial institutions.

Negatively Related

A situation in which an increase in one variable is associated with a decrease in another variable; also called inverse related.

Positively Related

A situation in which an increase in one variable is associated with an increase in another variable; also called directly related.

Private Debt Securities

All types of debt issued by corporations

Public Debt Securities

All types of debt issued by government

Purchasing Power Parity

The theory that exchange rates are determined in such a way that the prices of goods in different countries is the same when measured in the same currency (Taylor, (1995), p.1047)

Repo

Repurchase agreement-Purchase of treasury securities from a security dealers with an agreement that the dealer will repurchase them at a specific price.

Riba

Literally, an increase or addition. Technically it denotes, in loan transaction, any increase or advantage obtained by the lender as a condition of the loan. In a commodity exchange it denotes any disparity in the quantity or time of delivery.

Ringgit

The unit of currency of Malaysia

Shariah

Islamic canon law derived from three sources – The Qur'an, the Hadith (sayings of Prophet Muhammad) and the Sunnah (practice and the traditions of the Prophet Muhamad).

Skewness

A value used to measure the symmetry or shape of the data

Tax Bracket
A range of taxable income that is taxed at the same rate

Trade Credit
Account receivable

Zakat (tax)
There are two types of zakat: i) zakat al-fitr, which is payable by every Muslim who are able to pay at the end of Ramadhan (the month of fasting). ii) zakat al maal is an annual levy on the wealth of a Muslim (above a certain level). The rate paid differs according to the type of property owned. This tax is earmarked, among others, for the poor and needy.

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APPENDIX A

Table 1:
Net Fund Raised by the Private Sector (RM million)

	1988	1996	1997	1998	1999
1. Shares					
Ordinary shares					6,096
Initial public offers	169.0	4,099.2	4,781.0	684.6	-
Right Issues	668.0	5,268.5	8,524.9	722.0	-
Private Placements	-	4,554.4	3,233.6	320.1	-
Special issues	94.2	2,002.3	1,818.8	61.0	-
Preference shares	-	-	-	-	-
Total new issues of shares	931.2	15,924.4	18,358.3	1,787.7	6,096
2. Debt Securities					
Straight Bonds	559	2,675.4	4,209.0	10,238.0	18,182
Bonds with Warrants	-	5,563.7	2,950.3	150.0	947
Convertible Bonds	121.7	1,794.6	2,018.9	98.8	1,269
Islamic Bonds	-	2,350.0	5,249.7	345.0	1,734
Cagamas Bond	1,200	4,665.0	5,169.0	3,320.0	4,425
Total New Issues of debt Securities	1,880.7	17,048.7	19,596.9	14,151.8	26,557
Less: redemptions					
Private debt Securities*	-	1,765.0	1,368.5	2,964.4	6,280
Cagamas Bonds**	-	750	1,640.0	5,012.0	6,470
Net Issue of Debt Securities	1,880.7	14,533.7	16,588.4	6,175.4	13,807
Net fund Raised By Private Sector	2,811.9	30,458.1	34,946.7	7,963.1	19,904

Source: BNM, 1999 except for the year 1999 which extracted from CD ROM of BNM 2000 Annual Report
+ Excludes bonds issued by the banking institutions
* Includes all straight bonds,
**issued by the National Mortgage Corporation-to promote the secondary mortgage market in Malaysia.

Table 2:
KLSE Selected Indicators

	1988	**1996**	**1997**	**1998**	**1999**
Prices Indices					
Composite	357.4	1,238.0	594.4	586.1	812.3
Emas	98.9	347.7	151.2	146.9	206.4
Second Board	-	576.3	162.9	158.4	180.6
Total Turnover					
Volume (billion units)	4.0	66.5	72.8	58.3	90.1
RM (billion)	6.8	463.3	408.6	115.2	199.6
Market Capitalisation					
Main Board	98.7	746.0	375.8	353.4	527.6
Second Board*	-	60.8	21.6	21.1	25.1
Total (RM billion)	98.7	806.8	375.8	374.5	552.7
Number of Companies listed					
Main Board	295	413	444	454	474
Second Board	-	208	264	282	283
Total	295	621	708	736	757

*starts in 1989 with two companies listed

Table 3:
Commercial Banks: Terms Loan by Maturity

As at end of	1994	1995	1996	1997	1998	1999*
Up to 1 year	14.5	13.4	14.7	13.6	11.5	12.0
> 1 to 3 years	9.2	10.2	9.6	11.1	10.6	9.5
> 3 to 5 years	12.7	12.1	11.8	12.1	13.2	13.3
> 5 to 10 years	26.6	26.7	26.7	27.2	27.7	26.6
>10 to 15 years	20.7	21.1	21.1	19.4	20.4	20
> 15 years	16.3	16.5	16.2	16.6	16.7	18.6
Total %	100.0	100.0	100.0	100.0	100.0	100.0
Total value (RM Million)	68,623.8	84,472.5	104,863.1	108,785.6	118,351.3	128,225.1

Sources: The Central Bank of Malaysia (1999)
N.B The figures are as a percentage of total loan
*as at end of June

Table 4:
Malaysian Foreign Debt (RM million)

	1996	1997	1998
Medium to Long-term debt			
Federal Government	10,470	12,952	14,924
Private Sector	32,973	62,081	62,717
Others (NFPEs)	29,239	52,467	53,232
Short-term debt			
Banking	17,053	32,276	20,339
Non bank Private Sector	8,098	10,981	11,810
Total	97,833	170,757	163,022

Sources: Bank Negara Malaysia

Graph 1:
Annual Percentage Growth of M3

Source: BNM, 1999, page 140

Graph 2:
The Short-Term Debt to Long-Term Debt Ratio

Short-term to Long-term Debt Ratio

second board

main
board

Percentage

100.00
80.00
60.00
40.00
20.00
0.00

1993 1994 1995 1996 1997 1998 1999 2000 2001

Year
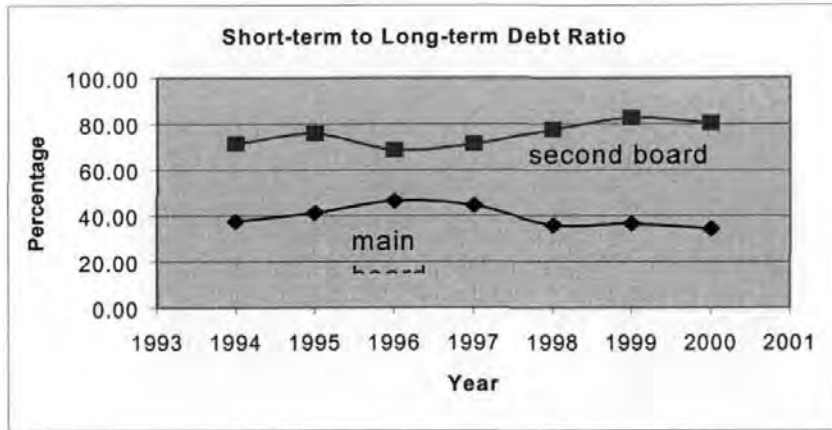
Graph 3:
Fund Raised by the Private Sector in the Capital Market

RM million

40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

1996 1997 1998 1999 2000

■ Bond Market   Equity Market
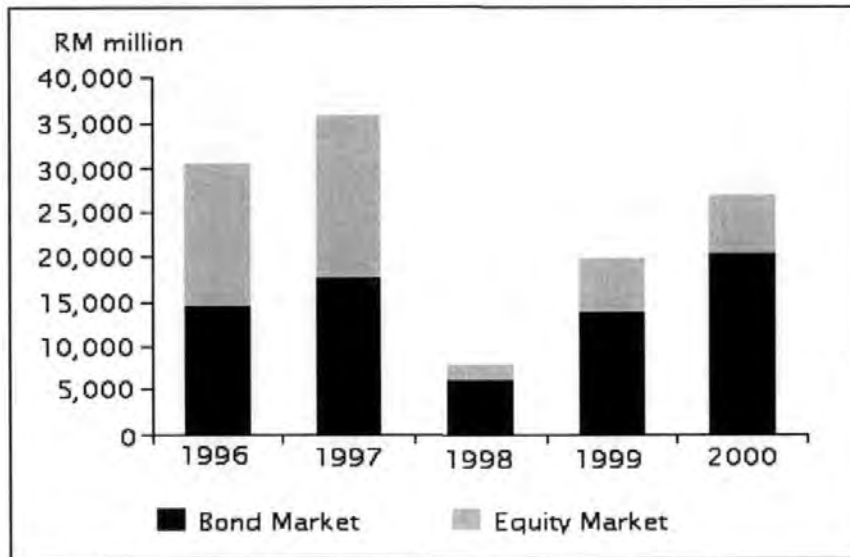
Source: (BNM, 2000) CDROM

Table A.21
Balance of Payments

	1992			1993		
	+	-	Net	+	-	Net
			RM million			
Merchandise balance (f.o.b.)[1]	100,910	92,301	8,609	18,383	110,152	8,231
Freight and insurance	1,860	6,125	-4,265	1,927	6,817	-4,890
Other transportation	2,741	3,096	-355	2,876	3,072	-196
Travel	5,166	4,509	657	5,638	4,732	906
Investment income[2]	3,709	11,629	-7,920	4,714	12,888	-8,174
Government transaction n.i.e.[3]	277	223	54	302	374	-72
Other services	3,589	6,328	-2,739	6,851	11,095	-4,244
Services balance	17,342	31,910	-14,568	22,308	38,978	-16,670
Balance on goods and services	118,252	124,211	-5,959	140,691	149,130	-8,439
Transfers (net)	753	416	337	1,207	694	513
Balance on current account	119,005	124,627	-5,622	141,898	149,824	-7,926
Official long-term capital[4]			-2,876			979
Federal Government	734	3,904	-3,170	1,220	4,354	-3,134
Market loans	0	2,859	-2,859	708	2,532	-1,824
Project loans	734	918	-184	512	1,710	-1,198
Suppliers' credit	0	127	-127	0	112	-112
NFPEs	2,901	2,512	389	6,682	2,405	4,277
Guaranteed	752	1,125	-373	654	1,000	-346
Non-guaranteed	2,149	1,387	762	6,028	1,405	4,623
Others[5]			-95			-164
Corporate investment			13,204			12,885
Balance on long-term capital			10,328			13,864
Basic balance			4,706			5,938
Private short-term capital (net)			11,957			13,931
Commercial banks[6]			9,249			10,875
Others[7]			2,708			3,056
Errors & omissions			81			9,370
Overall balance (surplus +/deficit -)			16,744			29,239
Allocation of SDRs			0			0
IMF resources			0			0
Net change in international reserves of						
Bank Negara Malaysia[8]			-16,744			-29,239
SDR holdings			275			-31
IMF reserve position			-148			9
Gold and foreign exchange			-16,871			-29,217

[1] Adjusted for valuation and coverage to the balance of payments basis. Imports include military goods which is not included in trade data.

[2] Include undistributed earnings of foreign direct-investment companies. The counterpart of these earnings is shown as an inflow of direct reinvestment capital under "Corporate investment".

[3] Include transactions of foreign military and diplomatic establishments.

[4] Prior to 1996, data on external borrowings of NFPEs differs from data shown in the External Debt table. Data shown here reflects the preliminary data published by the Department of Statistics.

[5] Refer to changes in overseas assets of the Government and statutory authorities and subscriptions to international institutions and international commodity arrangements.

[6] Refer to the change in net external assets/liabilities.

[7] Refer to the change in net external assets/liabilities of finance companies, merchant banks and other identified financial transactions.

[8] Accumulation of reserves is indicated as a minus (-) sign.

Source: Department of Statistics and Bank Negara Malaysia.

	1994			1995			1996	
+	−	Net	+	−	Net	+	−	Net
				RM million				
148,506	143,945	4,561	179,491	179,258	233	192,586	183,957	8,629
2,054	9,421	-7,367	2,552	11,580	-9,028	2,873	11,371	-8,498
3,681	3,240	441	4,443	3,697	746	5,619	3,915	1,704
8,835	5,232	3,603	9,939	5,796	4,143	11,381	6,525	4,856
5,745	15,214	-9,469	6,259	16,821	-10,562	6,266	17,872	-11,606
316	352	-36	319	342	-23	321	333	-12
10,692	14,889	-4,197	12,191	16,508	-4,317	17,140	22,350	-5,210
31,323	48,348	-17,025	35,703	54,744	-19,041	43,600	62,366	-18,766
179,829	192,293	-12,464	215,194	234,002	-18,808	236,186	246,323	-10,137
1,079	691	388	944	826	118	1,827	4,667	-2,840
180,908	192,984	-12,076	216,138	234,828	-18,690	238,013	250,990	-12,977
		480			5,834			721
1,293	6,050	-4,757	442	2,077	-1,635	749	2,926	-2,177
776	5,104	-4,328	0	1,101	-1,101	342	1,016	-674
517	946	-429	442	976	-534	407	1,910	-1,503
0	0	0	0	0	0	0	0	0
8,659	3,286	5,373	11,310	3,853	7,457	8,128	5,284	2,844
1,829	1,842	-13	1,824	1,183	641	589	2,375	-1,786
6,830	1,444	5,386	9,486	2,670	6,816	7,539	2,909	4,630
		-136			12			54
		11,394			10,347			11,270
		11,874			16,181			11,991
		-202			-2,509			-986
		-8,485			2,412			11,201
		-13,306			229			8,562
		4,821			2,183			2,639
		425			-4,306			-3,970
		-8,262			-4,403			6,245
		0			0			0
		0			0			0
		8,262			4,403			-6,245
		-23			-41			-37
		-184			-701			-15
		8,469			5,145			-6,193

Table A.6
Balance of Payments

Item	1997			1998		
	+	-	Net	+	-	Net
	RM million					
Merchandise account (f.o.b.)[1]	217,713	207,439	10,274	281,669	212,453	69,216
Trade account	*220,891*	*220,936*	*-45*	*286,563*	*228,124*	*58,439*
Balance on services	51,526	74,321	-22,795	51,555	73,794	-22,239
Freight and insurance	3,297	12,377	-9,080	4,161	12,609	-8,448
Other transportation	6,249	4,579	1,670	6,782	5,062	1,720
Travel and education	10,523	7,286	3,237	9,342	7,004	2,338
Investment income[2]	6,443	21,082	-14,639	5,308	20,125	-14,817
Government transactions n.i.e.[3]	321	458	-137	338	567	-229
Other services	24,693	28,539	-3,846	25,624	28,427	-2,803
Balance on goods and services	269,239	281,760	-12,521	333,224	286,247	46,977
Unrequited transfers	2,781	6,957	-4,176	2,975	12,558	-9,583
Balance on current account	272,020	288,717	-16,697	336,199	298,805	37,394
% of GNP			-6.3			13.9
Official long-term capital			4,645			2,137
Federal Government	462	2,145	-1,683	4,001	2,182	1,819
Market loans	0	697	-697	2,435	1,324	1,111
Project loans	462	1,448	-986	1,566	858	708
Non-financial public entreprises	9,372	3,006	6,366	4,705	4,344	361
Other assets and liabilities[4]			-38			-43
Private long-term capital			14,450			8,490
Balance on long-term capital			19,095			10,627
Basic balance			2,398			48,021
Private short-term capital (net)			-12,913			-20,633
Errors and omissions			-377			12,913
of which						
Exchanges revaluation gains/loss			-			24,542
Overall balance (surplus + / deficit -)			-10,892			40,301
Bank Negara Malaysia international reserves, net (RM million)			59,123[5]			99,424[e]
Bank Negara Malaysia international reserves, net (US$ million)			21,704			26,164
Reserves as months of retained imports			3.4			5.7

[1] Adjusted for valuation and coverage to the balance of payments basis. Imports include military goods which are not included in trade data.

[2] Include undistributed earnings of foreign direct investment companies. The counterpart of these earnings is shown as an inflow of direct reinvestment capital under "Private long-term capital".

[3] Include transactions of foreign military and diplomatic establishments.

[4] Refer to changes in overseas assets of the Government and statutory authorities and subscriptions to international institutions and commodity arrangements.

e   Estimate

Source: Department of Statistics, Malaysia and Bank Negara Malaysia

	1999			2000e			2001f	
+	−	Net	+	−	Net	+	−	Net

RM million

318,946	232,411	86,535	372,778	293,256	79,522	389,170	318,005	71,164
321,560	*248,477*	*73,083*	*373,307*	*312,427*	*60,880*	*391,519*	*338,664*	*52,855*
53,250	85,384	−32,134	60,721	101,345	−40,624	63,253	104,591	−41,338
4,964	14,402	−9,438	5,698	18,548	−12,850	6,480	19,986	−13,506
6,695	4,816	1,879	7,901	5,913	1,988	8,752	6,287	2,465
13,634	7,499	6,134	17,716	7,978	9,738	18,408	8,166	10,241
6,385	26,660	−20,275	6,907	34,892	−27,985	7,181	35,401	−28,221
349	396	−47	363	384	−21	381	407	−26
21,223	31,611	−10,388	22,136	33,629	−11,493	22,052	34,344	−12,292
372,196	317,795	54,401	433,499	394,601	38,898	452,423	422,597	29,826
3,148	9,647	−6,499	3,229	10,964	−7,735	3,440	11,200	−7,760
375,344	327,442	47,902	436,728	405,565	31,163	455,863	433,796	22,066
		17.1			10.0			6.8
		6,697			3,961			5,743
4,763	1,841	2,922	4,767	3,902	865	6,105	782	5,323
4,164	1,108	3,056	4,381	3,267	1,114	5,115	212	4,903
599	733	−134	386	635	−249	990	570	420
6,080	2,230	3,850	6,933	3,782	3,151	5,580	5,108	472
		−75			−55			−52
		5,901			7,510			5,895
		12,598			11,471			11,638
		60,500			42,634			33,704
		−37,750			−36,000			
		−4,931			−10,337			
		−1,345			−5,335			
		17,819			−3,703			
		117,244⁵			113,541⁶			
		30,854			29,879			
		5.9			4.5			

⁵ In 1997, the foreign exchange gain on the balance sheet date was not recognised in the Bank's account in view of volatility of the exchange rate during the year.

⁶ Arising from the fixing of the ringgit/US dollar exchange rate in September 1998, all assets and liabilities in foreign currencies have been revalued into ringgit at rates of exchange ruling on the balance sheet date and the gain/loss has been reflected accordingly in the Bank's current year account.

e Estimate
f Forecast

Source : Department of Statistics, Malaysia and Bank Negara Malaysia

APPENDIX B

<u>Table 1:</u>
<u>Datastream codes the main board and second board listed companies</u>

Datastream codes	Main board sectors
LKLSECON	Construction
LKLSECOP	Consumer product
LKLSEINP	Industrial product
LKLSEPLN	Plantation
LKLSEPRP	Property
LKLSETAS	Services and trading
Datastream codes	**Second board**
LKLSE2BD	Second board

<u>Table 2:</u>
<u>Datastream program types used and datatypes</u>

Using Program 190V	Explanation
Item number:	
731 $\infty((306+1301)/1301+306+305))$	Capital gearing (%) – book value ratios
$*\infty((306+1301)/(1301+306+MV)$	Capital gearing (%) – mixed value ratios
743	Current ratio
741	Working capital ratio
717	Net profit margin
*D030 (MV/305)	Market to book value ratio
1503	Reported Interest cover before tax
*D018 $\infty((154-623)/154)*100$	% change in tax charge
707	Returned on Capital employed
136	Depreciation
339	Total net fixed assets
392	Total assets
1502	Earning before interest, tax, depreciation and amortisation

*expressions are created using the item numbers in the parentheses.

∞ 1301= loan term debt + short term debt, 306 = preference capital

    305 = book value of equity, MV= market value of equity

    154 = pre-tax profit, 623 = Associates after tax profit

APPENDIX C

Box 1

Hypotheses 17

H17: Firms' financial preference (see list 4.1 for financing preference) are significantly related to firms' specific factors (see list 4.2 for firms specific factors)

i.e. Firms' financial preferences (e.g. retention, ordinary shares, total debt, islamic debt, conventional debt, overdraft and financial lease are related to firms' specific factors (e.g. liquidity, profitability, investment growth, interest coverage ratio, tax, non-debt tax shield, returned on investment, tangibility, size, price sensitivity and operating risk).

H17.A. Firms' financial preference are significantly related to liquidity (current ratio)

H17.B. Firms' financial preference are related significantly to liquidity (working capital ratio)

H17.C. Firms' financial preference are significantly related to profitability

H17.D. Firms' financial preference are significantly related to investment/growth

H17.E. Firms' financial preference are significantly related to interest coverage ratio

H17.F. Firm' financial preference are significantly related to tax

H17.G. Firms' financial preference are significantly related to non-debt tax shield

H17.H. Firms' financial preference are significantly related to return on investment

H17.I. Firms' financial preference are significantly related to tangibility

H17.J. Firms' financial preference are significantly related to size

H17.K. Firms' financial preference are significantly related to price sensitivity

H17.L. Firms' financial preference are significantly related to operating risk

Box 2

Hypotheses 18

H18: Firms' financial preference (see list 4.1 for financing preference) are significantly related to firms' sensitivity factors (see list 4.3 for firms' sensitivity factors)

i.e. Firms' financial preferences (e.g. retention, ordinary shares, total debt, islamic debt, conventional debt, overdraft and financial lease are significantly related to firms' sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases).

H18.A   Firms' financial preference are significantly related to the response of debt-equity ratio due to the increase in the firms' fixed assets.

H18.B   Firms' financial preference are significantly related to the debt to equity response due to the decrease in firms' operating costs

H18.C   Firms' financial preference are significantly related to the debt-equity response due to the decrease in firms' profit

H18.D   Firms' financial preference are significantly related to the debt-equity response due to the increase in firms' research and development

H18.E.   Firms' financial preference are significantly related to the debt-equity response due to the decrease of corporate tax

H18.F.   Firms' financial preference are significantly related to the debt to equity response due to the increase in firms' corporate allowances

H18.G.   Firms' financial preference are significantly related to the debt to equity response due to the increase in interest rates by two percentage points.

H18.H.   Firms' financial preference are significantly related to debt to equity response due to the increase in inflation by two percentage points

H18.I.   Firms' financial preference are significantly related to the debt to equity response due to the decrease in government incentive

H18.J.   Firms' financial preference are significantly related to the debt to equity response due to the increase in industry debt average ratio

A7

Box 3

Hypotheses 19

Hypotheses 19

H19:   Firms' sensitivity factors (see list 4.3 for firms' sensitivity factors) are significantly related to firms' specific factors (see list 4.3 for firms' specific factors)

i.e. Firms' sensitivity factors (e.g. fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases) are significantly related to firms' specific factors (e.g. liquidity (cash), liquidity (working capital), (profitability, investment/growth, interest coverage ratio, tax, non-debt tax shield, returned on investment, tangibility, size, price sensitivity, operating risk are related to debt to equity response due to the firms).

H19.A   Firms' sensitivity factors are significantly related to liquidity (current ratio)

H19.B   Firms' sensitivity factors are significantly related to liquidity (working capital ratio)

H19.C   Firms' sensitivity factors are significantly related to profitability

H19.D   Firms' sensitivity factors are significantly related to investment/growth

H19.E.   Firms' sensitivity factors are significantly related to interest coverage ratio

H19.F.   Firms' sensitivity factors are significantly related to tax

H19.G.   Firms' sensitivity factors are significantly related to non-debt tax shield

H19.H.   Firms' sensitivity factors are significantly related to return on investment

H19.I.   Firms' sensitivity factors are significantly related to tangibility

H19.J.   Firms' sensitivity factors are significantly related to size

H19.K.   Firms' sensitivity factors are significantly related to price sensitivity

H19.L.   Firms' sensitivity factors are significantly related to operating risk

Box 4

Hypotheses 20
H20: Firms' sensitivity factors (see list 4.3 for firms' sensitivity factors) are significantly related to other sensitivity factors (see list 4.3 for firms sensitivity factors)
i.e Firms' sensitivity factors (e.g. fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases) are significantly related to other sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases).
H20.A   Firms' sensitivity factors are significantly related to the response of debt-equity ratio due to the increase in the firms' fixed assets.
H20.B   Firms' sensitivity factors are significantly related to the debt to equity response due to the decrease in firms' operating costs
H20.C   Firms' sensitivity factors are significantly related to the debt-equity response due to the decrease in firms' profit
H20.D   Firms' sensitivity factors are significantly related to the debt-equity response due to the increase in firms' research and development
H20.E.   Firms' sensitivity factors are significantly related to the debt-equity response due to the decrease of corporate tax
H20.F.   Firms' sensitivity factors are significantly related to the debt to equity response due to the increase in firms' corporate allowances
H20.G.   Firms' sensitivity factors are significantly related to the debt to equity response due to the increase in interest rates by two percentage points.
H20.H.   Firms' sensitivity factors are significantly related to debt to equity response due to the increase in inflation by two percentage points
H20.I.   Firms' sensitivity factors are significantly related to the debt to equity response due to the decrease in government incentive
H20.J.   Firms' sensitivity factors are significantly related to debt to equity response due to the increase in industry debt average ratio.

Box 5

Hypotheses 21
H21: Financial crisis factors (see list 4.4 for financial crisis factors) are significantly related to the firms' specific factors (see list 4.2 for firms' specific factors)
i.e. Financial crisis factors (e.g. actual and target debt to equity ratio following the crisis and following the ringgit being fixed) are significantly related to the firms specific factors (e.g. liquidity (cash), liquidity (working capital), (profitability, investment/growth, interest coverage ratio, tax, non-debt tax shield, returned on investment, tangibility, size, price sensitivity, operating risk).
H21.A. Financial crisis factors are significantly related to liquidity (current ratio)
H21.B. Financial crisis factors are significantly related to liquidity (working capital ratio)
H21.C. Financial crisis factors are significantly related to profitability
H21.D. Financial crisis factors are significantly related to investment/growth
H21.E. Financial crisis factors are significantly related to interest coverage ratio
H21.F. Financial crisis factors are significantly related to tax
H21.G. Financial crisis factors are significantly related to non-debt tax shield
H21.H. Financial crisis factors are significantly related to return on investment
H21.I. Financial crisis factors are significantly related to tangibility
H21.J. Financial crisis factors are significantly related to size
H21.K. Financial crisis factors preference are significantly related to price sensitivity
H21.L. Financial crisis factors are significantly related to operating risk

Box 6

Hypotheses 22
H22: Financial crisis factors (see list 4.4 for financial crisis factors) are significantly related to the firms' sensitivity factors (see list 4.3 for firms sensitivity factors).
i.e. Financial crisis factors (e.g. actual and target debt to equity ratio following the crisis and following the ringgit being fixed) are significantly related to the firms sensitivity factors (fixed assets increase, fixed overhead decreases, profit decreases, research and development increases, corporate tax rate decreases, capital allowances increases, interest rates increases, inflation increases, government incentives decreases, industry debt average increases).
H22.A Financial crisis factors are significantly related to the response of debt-equity ratio due to the increase in the firms' fixed assets.
H22.B Financial crisis factors are significantly related to the debt to equity response due to the decrease in firms' operating costs
H22.C Financial crisis factors are significantly related to the debt-equity response due to the decrease in firms' profit
H22.D Financial crisis factors are significantly related to the debt-equity response due to the increase in firms' research and development
H22.E. Financial crisis factors are significantly related to the debt-equity response due to the decrease of corporate tax
H22.F. Financial crisis factors are significantly related to the debt to equity response due to the increase in firms' corporate allowances
H22.G. Financial crisis factors are significantly related to the debt to equity response due to the increase in interest rates by two percentage points.
H22.H. Financial crisis factors are significantly related to debt to equity response due to the increase in inflation by two percentage points
H22.I. Financial crisis factors are significantly related to the debt to equity response due to the decrease in the government incentives
H22.J. Financial crisis factors are significantly related to debt to equity response due to the increase in industry debt average ratio.

APPENDIX D

<u>Computation of variables provided by Datastream for Malaysia</u>

1. Capital Gearing   =   ((306 +1301) / 1301+306+ 305)

    (book value ratios) =   <u>(Preference shares + total debt)</u>

    (Total debt + preference shares + book value equity)

2. Capital Gearing   =   ((306 +1301)/ 1301+306 +MV)

    (mixed value ratios) =   <u>(Preference shares + total debt)</u>

    (Total debt + preference shares + market value equity)

3. Current ratio   =   375/38

    =   Total <u>cash and equivalent</u>/current liabilities

4. Working Capital   =   376/389

    ratio   =   Total <u>current assets</u>/total current liabilities

5. Net profit margin =   (623/104)*100

    =   (After tax profit/total sales)*100

6. Market to book   =   MV/305

    value ratio   =   Market value of equity/book value of equity

7. Reported Interest =   (154+2408)/2408

    Cover before tax =   (pre-tax profit + Net interest charge)/net interest charge

8. Tax charge   =   ((154-623)/154)*100

    =   <u>((pre-tax profit + associates after tax profit)</u>

    pre-tax profit)*100

9. Returned on   =   (154 + 2408)/(322 + 309 + 344)

    capital employed =   (Pre-tax profit + Net interest charges)

    Total capital employed + short term debt + intangibles)

10. <u>Depreciation</u>   =   136/392

    Total assets   =   <u>Depreciation</u>

    Total assets

11. <u>Net fixed assets</u> =   339/392

    Total assets   =   <u>Net fixed assets</u>

    Total assets

12. Log(Total assets) =   392

    =   logarithm(total assets)

13. Standard   =   1502

    Deviation of   =   <u>STDEVP (1502 for selected years)</u>

    EBITDA   Average (1502 for selected years)

APPENDIX E

<u>Graph 1:</u>
<u>Main Board Assets Structure</u>
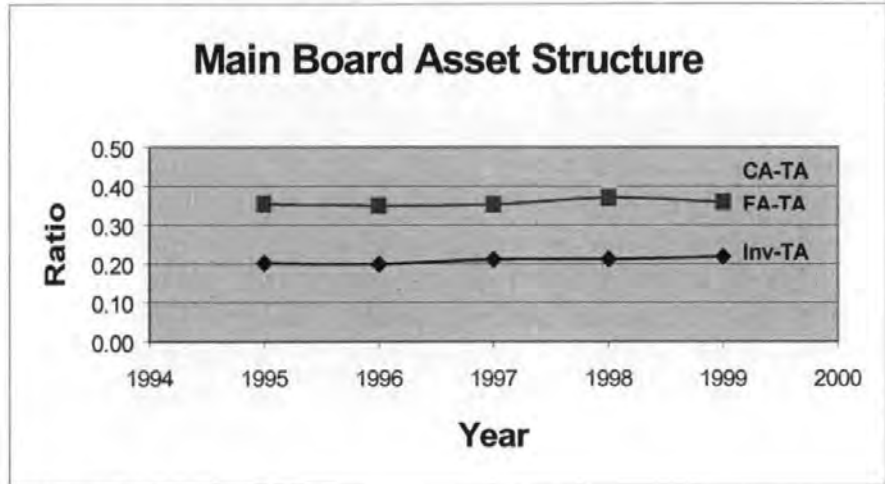
Main Board Asset Structure

CA-TA = Current Assets /Total Assets
FA-TA = Fixed Assets /Total Assets
Inv-TA = Investments/Total assests

<u>Graph 2:</u>
<u>Second Board Asset Structure</u>
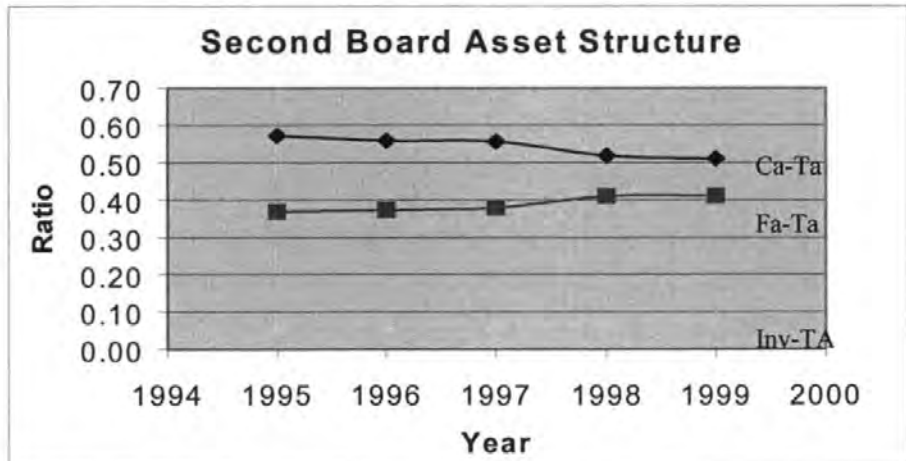
Second Board Asset Structure

CA-TA = Current Assets /Total Assets
FA-TA = Fixed Assets /Total Assets
Inv-TA = Investments/Total assests

Table 1:
Asset Structure of the 17 Companies Listed on the Main Board

	ca/ta	fa/ta	inv/ta	sub/tinv	ass/tinv	oinv/tinv
company 1	0.644	0.000	0.356	0.138	0.862	0.000
company 2	0.462	0.119	0.419	0.376	0.624	0.000
company 3	0.704	0.001	0.295	0.922	0.035	0.043
company 4	0.473	0.171	0.356	0.993	0.000	0.007
company 5	0.238	0.762	0.000			
company 6	0.072	0.907	0.021	0.290	0.275	0.435
company 7	0.036	0.001	0.963	0.565	0.229	0.207
company 8	0.217	0.019	0.764	0.982	0.016	0.002
company 9	0.306	0.018	0.676	0.664	0.315	0.020
company 10	0.209	0.774	0.017	0.000	0.025	0.975
company 11	0.446	0.499	0.000	0.000	1.000	0.000
company 12	0.589	0.242	0.110	0.067	0.286	0.647
company 13	0.743	0.249	0.004	0.000	0.515	0.485
Company 14	0.090	0.893	0.008	0.000	0.531	0.469
company 15	0.243	0.046	0.194	0.074	0.653	0.273
company 16	0.626	0.357	0.001	0.000	0.915	0.085
company 17	0.437	0.075	0.399	0.000	0.183	0.817
average	0.384	0.302	0.270	0.317	0.404	0.279

Table 2:
Current Assets Structure of the 17 Companies Listed on the Main Board

	stock/tca	rec/tca	depos/tca	cash/tca	stinv/tca
company 1	0.000	0.999	0.001	0.000	0.000
company 2	0.043	0.839	0.000	0.008	0.111
company 3	0.000	1.000	0.000	0.000	0.000
company 4	0.000	0.149	0.115	0.012	0.725
company 5	0.335	0.436	0.000	0.104	0.126
company 6	0.111	0.571	0.019	0.216	0.082
company 7	0.000	0.732	0.266	0.002	0.000
company 8	0.000	0.996	0.000	0.004	0.000
company 9	0.291	0.182	0.000	0.464	0.063
company 10	0.529	0.442	0.016	0.013	0.000
company 11	0.251	0.348	0.321	0.037	0.044
company 12	0.132	0.499	0.060	0.021	0.287
company 13	0.012	0.776	0.066	0.035	0.110
Company 14	0.258	0.499	0.014	0.225	0.003
company 15	0.033	0.532	0.392	0.043	0.000
company 16	0.435	0.148	0.000	0.381	0.036
company 17	0.052	0.063	0.080	0.367	0.439
average	0.146	0.542	0.079	0.114	0.119

Table 3:
Asset Structure of the 5 Companies Listed on the Second Board

	ca/ta	fa/ta	inv/ta	sub/tinv	asso/tinv	oinv/tinv
Company 1	0.268	0.732	0.000			
Company 2	0.268	0.732	0.000	1.000	0.000	0.000
Company 3	0.214	0.786	0.000			
Company 4	0.674	0.024	0.302	1.000	0.000	0.000
Company 5	0.242	0.736	0.022	0.000	0.000	1.000
average	**0.333**	**0.602**	**0.065**	**0.667**	**0.000**	**0.333**

	stock/tca	rec/tca	depos/tca	cash/tca	stinv/tca
Company 1	0.473	0.416	0.031	0.005	0.075
Company 2	0.473	0.416	0.031	0.005	0.075
Company 3	0.345	0.224	0.000	0.431	0.000
Company 4	0.000	0.995	0.000	0.005	0.000
Company 5	0.000	0.002	0.007	0.000	0.990
average	**0.258**	**0.410**	**0.014**	**0.089**	**0.228**

APPENDIX E1

Graph 1:
Main Board Construction Sector (Price-Currency) Sensitivity

PRICE SENSITIVITY

SERIES 1 KUALA LUMPUR SE CONSTRUCTION - PRICE INDEX
SERIES 2 US $ TO MALAYSIAN RINGGIT (GTIS) - EXCHANGE RATE
CORRELATION COEFF=0.9211 FREQUENCY=MONTHLY
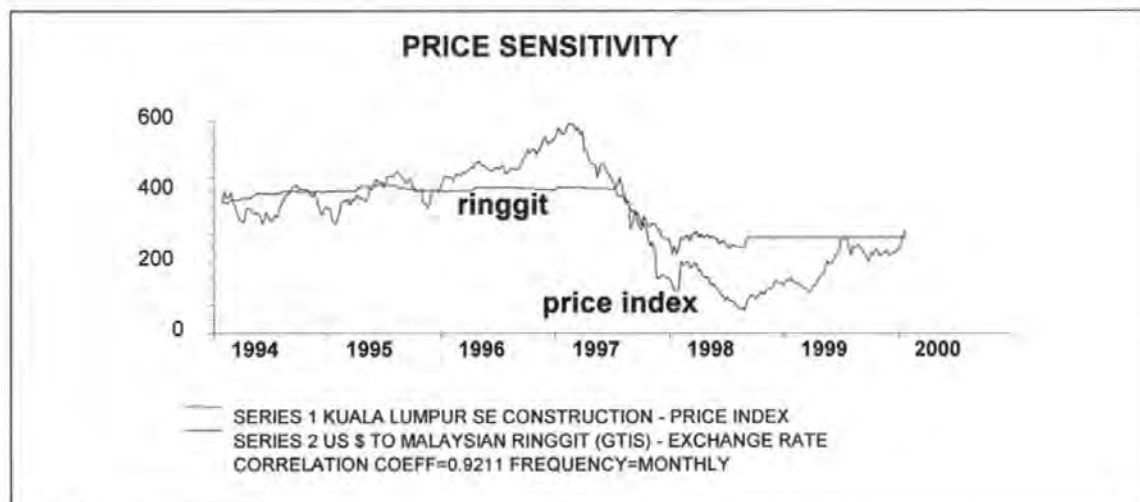
Source: DATASTREAM

Graph 2:
Main Board Consumer Products Sector (Price-Currency Sensitivity)

PRICE SENSITIVITY

SERIES 1 KUALA LUMPUR SE CONSUMER PROD. - PRICE INDEX
SERIES 2 US $ TO MALAYSIAN RINGGIT (GTIS) - EXCHANGE RATE
CORRELATION COEFF=0.8092 FREQUENCY=MONTHLY

Source: DATASTREAM

A16
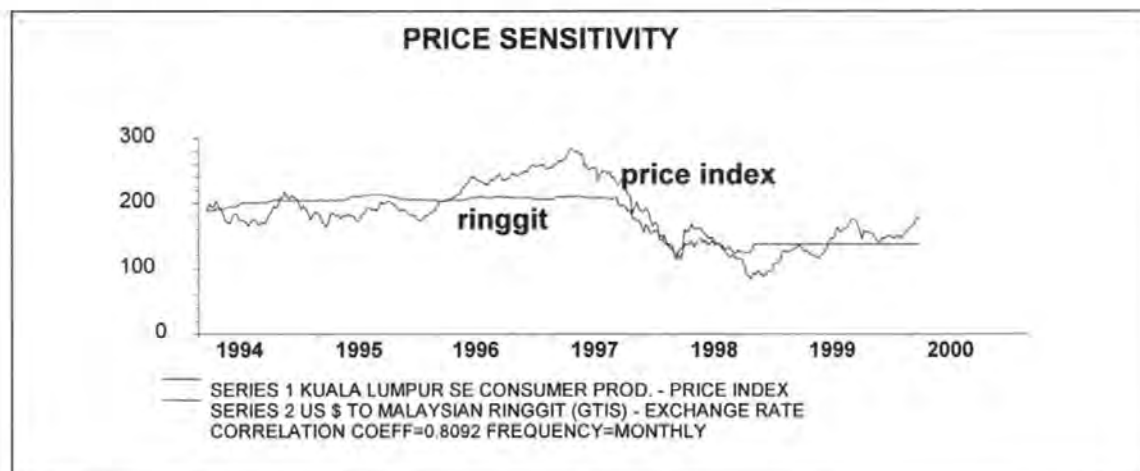
Graph 3:
Main Board Industrial Product (Price-Currency Sensitivity)

PRICE SENSITIVITY

ringgit

price index

SERIES 1 KUALA LUMPUR SE INDUSTRIAL PROD. - PRICE INDEX
SERIES 2 US $ TO MALAYSIAN RINGGIT (GTIS) - EXCHANGE RATE

CORRELATION COEFF=0.9477 FREQUENCY=MONTHLY
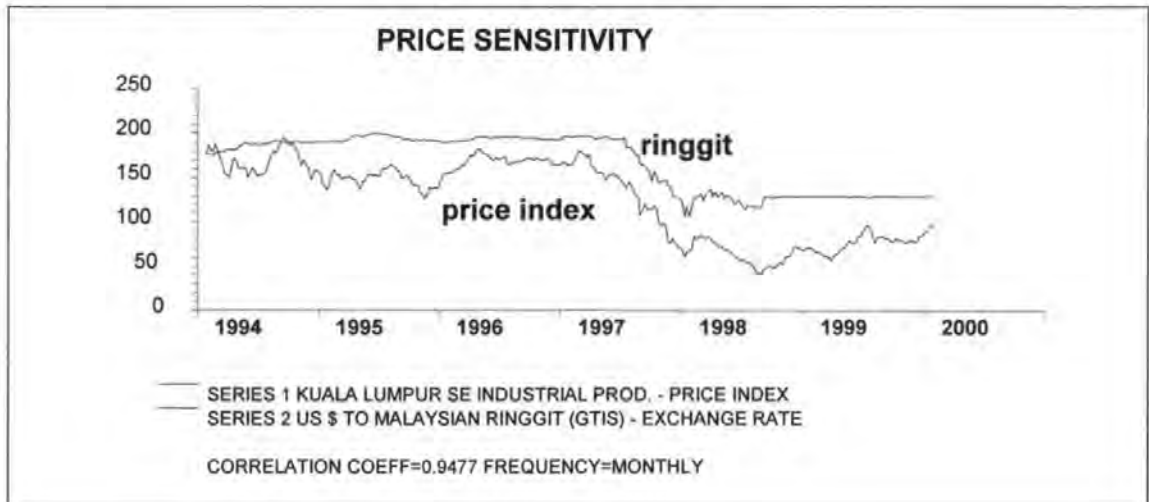
Source: DATASTREAM

Graph 4:
Main Board Plantation Sector (Price-Currency Sensitivity)

PRICE SENSITIVITY

ringgit

price index

SERIES 1 KUALA LUMPUR SE PLANTATIONS - PRICE INDEX
SERIES 2 US $ TO MALAYSIAN RINGGIT (GTIS) - EXCHANGE RATE

CORRELATION COEFF=0.8947 FREQUENCY=MONTHLY
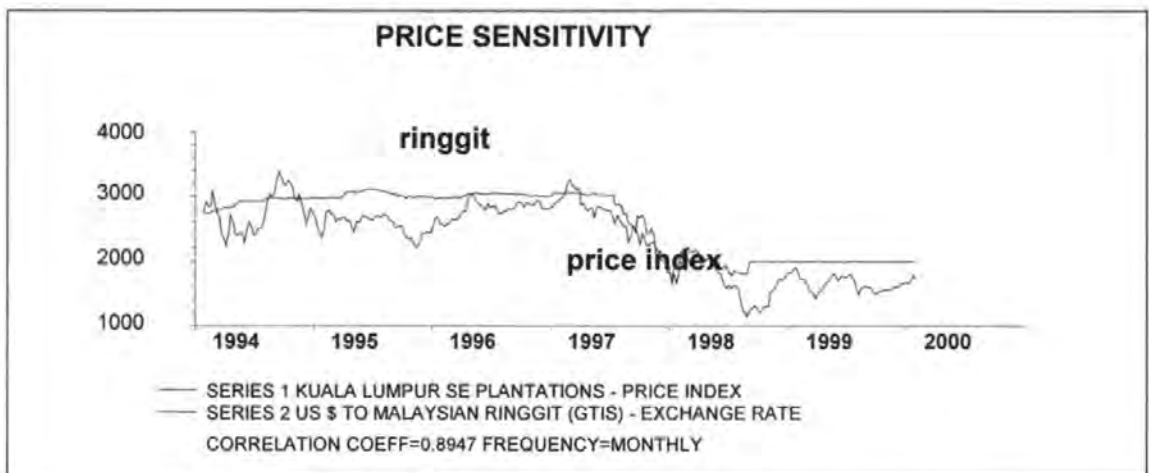
Source: DATASTREAM

Main Board Properties Sector (Price-Currency Sensitivity)
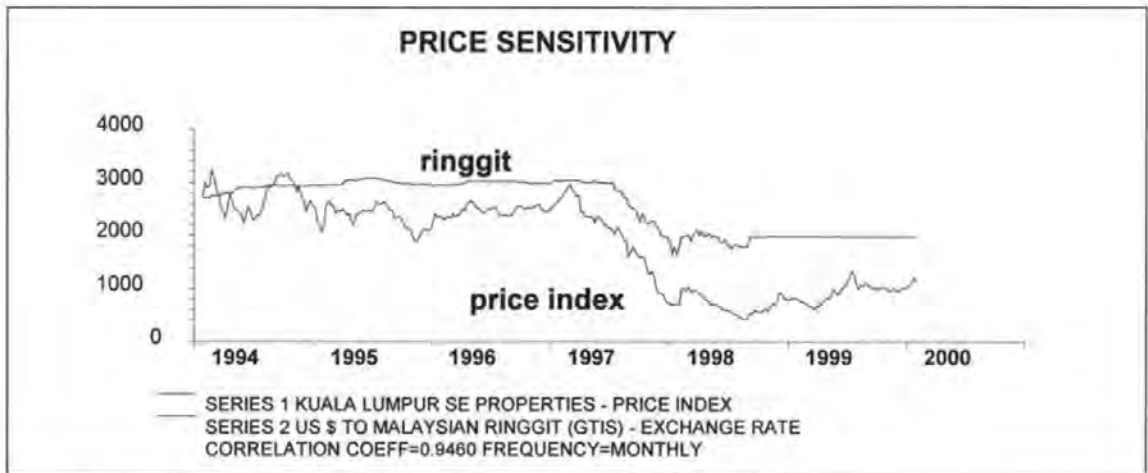
PRICE SENSITIVITY

Source: DATASTREAM

Graph 6:
Main Board Services Sector (Price Sensitivity)

PRICE SENSITIVITY
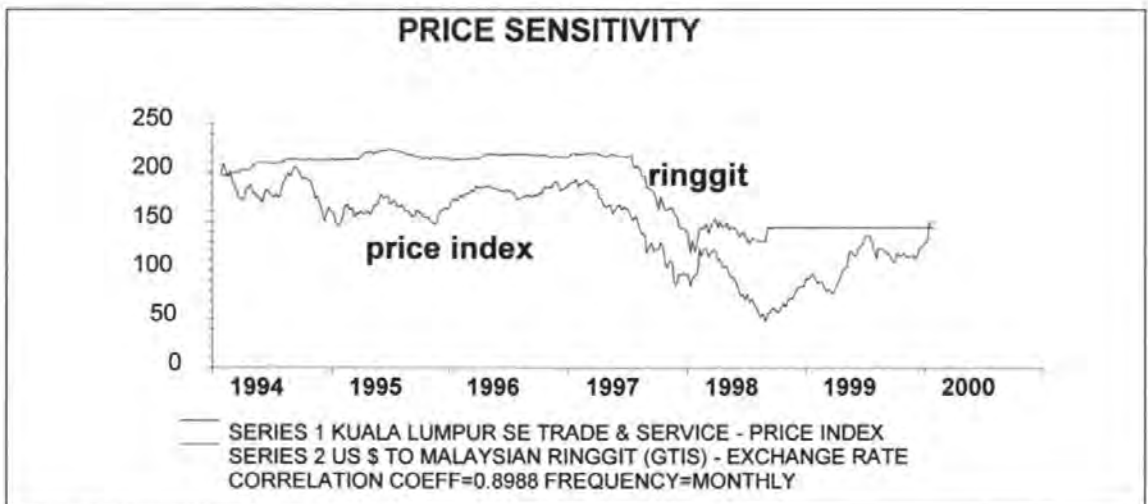
Source: DATASTREAM

APPENDIX F

Table 1:
Correlation Matrix for Main Board Panel Data (Book Value Ratio)

	Pre-crisis	1997	Wcr	mtbv	Roce	Nfa/tas	Log(tas)	Curr	Risk
Pre-crisis	1.000								
1997	0.4729	1.000							
Wcr	0.0286	0.0530	1.000						
Mtbv	−0.1548	−0.1227	−0.0893	1.000					
Roce	−0.0437	−0.0312	−0.0286	−0.1026	1.000				
Nfa/tas	0.0734	0.0514	0.0285	−0.0070	0.0219	1.000			
Log(tas)	0.1157	0.0594	0.0928	0.0719	−0.0093	0.0516	1.000		
Curr	**0.5380**	0.0909	0.0085	0.0093	0.0635	0.0543	0.0599	1.000	
Risk	−0.0170	−0.0509	−0.0080	0.0016	−0.0167	0.0078	0.0100	0.0365	1.000

Notes: Pre-crisis was correlated with Curr above 0.5
N.B. (see table 5.20)

Table 2:
Correlation Matrix for Main Board Panel Data-Mixed Value Ratios

	Pre-crisis	1997	Wcr	mtbv	Roce	Nfa/tas	Log(tas)	Curr	Risk
Pre-crisis	1.000								
1997	0.4687	1.000							
Wcr	0.0337	0.0567	1.000						
Mtbv	−0.1364	−0.1051	−0.0897	1.000					
Roce	−0.0762	−0.0488	−0.0364	−0.1320	1.000				
Nfa/tas	0.0742	0.0516	0.0294	−0.0071	0.0234	1.000			
Log(tas)	0.1241	0.0701	0.0983	0.0720	−0.0302	0.0514	1.000		
Curr	**0.5396**	0.0886	0.0116	0.0123	0.0488	0.0563	0.0718	1.000	
Risk	−0.0160	−0.0465	−0.0080	0.0017	−0.0219	0.0080	0.0074	0.0322	1.00

Notes: Pre-crisis was correlated with Curr above 0.5
N.B. (see table 5.20)

Table 3:
Correlation Matrix for Second Board Panel Data (Book Value Ratios)

	Pre-crisis	1997	Wcr	mtbv	Roce	Nfa/tas	Log(tas)	Curr	Risk
Pre-crisis	1.000								
1997	0.4218	1.000							
Wcr	0.0679	0.0243	1.000						
Mtbv	-0.0317	-0.1041	0.0512	1.000					
Roce	-0.1461	-0.2123	-0.1312	-0.0177	1.000				
Nfa/tas	-0.0147	-0.0922	0.0782	-0.0231	0.0092	1.000			
Log(tas)	0.0100	-0.0066	0.0850	-0.0094	0.0510	0.4414	1.000		
Curr	**0.6977**	0.1261	0.0511	0.0761	-0.0227	-0.0184	-0.0243	1.000	
Risk	0.0596	0.0527	0.0313	0.0013	0.0083	0.0099	0.0443	0.0411	1.00

Notes: Pre-crisis was correlated with Curr above 0.5
N.B. (see table 5.20)

Table 4:
Correlation Matrix for Second Board Panel Data (Mixed Value Ratios)

	Pre-crisis	1997	Wcr	mtbv	Roce	Nfa/tas	Log(tas)	Curr	Risk
Pre-crisis	1.000								
1997	0.4189	1.000							
Wcr	0.0680	0.0237	1.000						
Mtbv	-0.0325	-0.1047	0.0495	1.000					
Roce	-0.1489	-0.2135	-0.1351	-0.0178	1.000				
Nfa/tas	-0.0155	-0.0918	0.0836	-0.0232	0.0093	1.000			
Log(tas)	0.0067	-0.0029	0.0924	-0.0109	0.0521	0.4421	1.000		
Curr	**0.6975**	0.1207	0.0509	0.0755	-0.0227	-0.0191	-0.0258	1.000	
Risk	0.0584	0.0501	0.0348	0.0012	0.0084	0.0105	0.0435	0.0392	1.00

Notes: Pre-crisis was correlated with Curr above 0.5
N.B. (see table 5.20)

Table 1: ANOVA – Question 1

Variable Factor	Cr	Wcr	Npm	Mtbv	Tie	Tax	Dep tas	Roce	Nfa tas	Log (tas)	curr	risk
Re												
Os									(**)	**		
Tdebt												
Idebt						(*)			(***)			
Cdebt												
Ibond						(**)			(***)			
Cbond									(**)			(*)
Ibl									(*)			
Cbl				(**)								
Fl									(**)	(**)		
OV					(*)							

The asterisks in parenthesis indicate the cochran's test of standard deviation is significant
*, **, ***Significant at least at 10%, 5% and 1% level critical values

Table 2: Cochran's Test (Standard Deviation Test) of Question 1

Variables Factor	Cr	Wcr	Np m	Mtbv	Tie	Tax	Dep tas	Roce	Nfa/ tas	Tas	C ur	Risk
Dre				***	**		***	**				***
Dos		***	***	***			***	**	***			***
Dtdebt			**	***	**		***		***			***
Didebt	**	***		***			***		***			**
Dcdebt			***	**	**		***		***			***
Dibond	*	***		***		*	***		***			***
Dcbond		***					***	***	**			***
Dibl	*			***			***	**	***			***
Dcbl		***	**	***	***	**	***		***			***
Dfl		**			***	***	***		**	***		**
OV		**			*						**	**

*,**,***Significant at least at 10%, 5% and 1% level critical value

Table 3: Kruskal-Wallis – Question 1

Variable Factor	Cr	Wcr	Npm	Mtbv	Tie	Tax	Dep tas	Roce	Nfa tas	Tas	curr	risk
Re												
Os			*				**		*	***		*
Tdebt				**			**					
Idebt		*		***		*	***		***			
Cdebt				*								**
Ibond			**	***		**	**		***			
Cbond			*	*			***		**	*		
Ibl				**			**		**			
Cbl				**								
Fl							**		**			

*, **, ***Significant at least at 10%, 5% and 1 % level critical values

Table 4: ANOVA-Questions 2-5

Variable Factor	Cr	Wcr	Npm	Mtbv	Tie	Tax	Dep tas	Roce	Nfa tas	Tas	curr	risk
Dfau					**						(*)	(**)
Dfod			(*)								(*)	
Dpfd												
Drdu	(*)											
Dtaxd												
Dcapu												
Dintu	(**)				*							
Dinfu								*				
Dgvid										*		(**)
Dindu							(*)			(**)		

The asterisk in parenthesis indicate the cochran's test of standard deviation is significant
*, **, ***Significant at least at 10%, 5% and 1 % level critical values

Table 5: Cochran's Test (Standard Deviation) of Questions 2-5

Variables Factor	Cr	Wcr	Npm	Mtbv	Tie	Tax	Dep tas	Roce	Nfa tas	Tas	R
Dfau	**	*					***	***	***		***
Dfod		***	**	***	***		***				***
Dpfu						*	***		***		***
Drdu	***	*	**	**	***		***		***		**
Dcapu	***	***	***		***	**	***		***		*
Dtaxd	*	*	***	***	***	*	***				
Dintu	**	***	***			**	***	*	***		
Dinfu	**	***	***	***	***	*	***				*
Dgvid	***	***		***	***	*	***	***			*
Dindu	***	**		***	***		***	***		*	***

*,**,***Significant at least at 10%, 5% and 1% level critical value

Table 6: Kruskal-Wallis (Median Test) _Questions 2-5

Variable Factor	Cr	Wcr	Npm	Mtbv	Tie	Tax	Dep tas	Roce	Nfa tas	Tas	curr	risk
Dfau												*
Dfod												
Dpfd	**											
Drdu												
Dcapu												*
Dtaxd												
Dintu	***	*										
Dinfu								**		*		
Dgvid			*		*				*	**		***
Dindu	*					*				*		

*, **, ***Significant at least at 10%, 5% and 1 % level critical values

APPENDIX H

Table 7: Logistic Regression (Question 1)

	Dre	Dos	Dtdebt	Didebt	Dcdebt	Dfl	Ov
Constant	(3.3721)	(7.176)	(-4.681)	(21.298)	(-10.895)	(18.519)	(-12.956)
Wcr	0.094 (0.111)	3.029* (3.363)	0.118 (0.152)	11.558*** (-15.511)	0.045 (0.124)	28.985*** (-2.558)	0.000 (-0.023)
Mtbv	1.974 (-0.299)	60.595*** (0.834)	0.022 (-0.024)	18.075*** (-16.184)	0.113 (-0.063)	-2.466 (-1.666)	0.998 (0.700)
Roce	0.215 (-0.035)	24.134*** (-0.873)	0.15 (-0.008)	-0.188 (-0.015)	0.083 (0.022)	26.325*** (0.569)	0.187 (-0.046)
Nfa/tassets	0.009 (-0.157)	60.595*** (2.711)	0.359 (0.664)	0.684 (-4.250)	4.386** (6.659)	8.724** (9.961)	0.658 (-1.112)
Log(tas)	0.510 (0.111)	7.471*** (-0.958)	0.000 (0.002)	57.927*** (1.936)	1.324 (0.236)	24.865*** (-3.275)	0.779 (0.164)
Curr	0.791 (-2.673)	60.600*** (4.284)	4.981** (4.322)	21.414*** (41.23)	6.628 (5.427)	5.156** (15.036)	1.090 (2.95)
Risk	0.002 (0.016)	0.117 (0.164)	0.227 (0.154)	-0.006 (-0.288)	0.001 (0.026)	-1.843 (-3.092)	6.556** (1.869)
Dfau	0.821 (0.979)	3.119* (3.643)	2.734* (1.917)	13.057 (31.6)	0.723 (0.991)	11.592*** (2.943)	0.160 (-0.597)
Dfod	0.151 (-0.584)	0.072 (-0.647)	0.157 (-0.452)	-0.176 (4.865)	0.395 (-1.060)	0.688 (4.633)	1.353 (1.978)
Dpfd	0.325 (0.655)	0.507 (1.480)	9.628*** (-3.135)	21.504*** (-37.90)	11.668*** (-4.165)	8.341*** (-10.665)	0.000 (-0.022)
Drdu	0.816 (1.054)	0.150 (0.651)	1.169 (-1.141)	0.579 (-6.193)	0.000 (-0.029)	1.677 (4.216)	0.223 (0.675)
Dtaxd	0.265 (0.560)	-0.150 (-5.501)	0.661 (1.040)	17.215*** (-12.070)	2.609 (1.975)	-1.797 (-9.550)	0.343 (1.620)
Dcapu	1.317 (-1.437)	19.302*** (11.049)	1.292 (1.460)	0.063 (-18.235)	1.781 (2.235)	-2.119 (12.081)	1.329 (2.468)
Dintu	0.036 (0.192)	60.600*** (1.041)	0.174 (-0.427)	20.475*** (9.768)	0.669 (-0.944)	2.293 (-12.512)	6.302** (-4.311)
Dinfu	0.219 (-0.692)	60.600*** (-7.734)	1.547 (1.923)	0.603 (7.665)	1.095 (1.942)	11.720 (-3.225)	2.203 (2.856)
Dgvid	2.475 (-1.949)	60.600*** (-2.304)	1.011 (1.180)	12.796*** (-36.96)	0.356 (0.804)	25.504*** (20.340)	7.021*** (4.758)
Dindu	0.548 (0.992)	60.600*** (4.733)	0.033 (0.244)	Linear	0.807 (1.501)	0.523 (3.023)	1.202 1.841)
Analysis of deviance							
Model p-value	0.8490	0.0000	0.2980	0.0001	0.1385	0.0000	0.080
% Deviance	21.57%	90.47%	31.78%	99.35%	40.77%	92.36%	44.80%
Adjusted %	0	32.78%	0	25.61%	0	29.60%	0

*, **, ***Significant at least at 10%, 5% and 1 % level critical values
The value in the parenthesis is the coefficient of the parameter.

Table 8 : Stepwise Logistic Regression (Question 1)

	Dre	Dos	Dtdebt	Didebt	Dcdebt	dfl	Ov
Constant		(-1.320)	(1.139)	(1.266)	(-0.360)		
Wcr							
Mtbv							
Roce		7.730*** (-0.136)					
Nfa/tassets							
Log(tas)							
Curr					4.564** (2.622)		
Risk							
Dfau							
Dfod							
Dpfd			6.709** (-1.727)		7.186*** (-1.914)		
Drdu							
Dtaxd							
Dcapu		11.573*** (2.438)					
Dintu				4.777** (-2.261)			
Dinfu							
Dgvid							
Dindu		6.853*** (2.237)		7.720*** (-2.524)			
Analysis of deviance							
Model p-value		0.0000	0.010	0.0012	0.0060		
% deviance		25.76%	10.91%	32.40%	17.82		
Adjusted %		14.68%	4.40%	19.23%	7.34%		

*, **, ***Significant at least at 10%, 5% and 1 % level critical values
The value in the parenthesis is the coefficient of the parameter.

Table 9: Logistic Regression (Questions 2 to 5)

	Dfau	Dfod	Dpfd	Drdu	Dtaxd	Dcapu	Dintu	Dinfu	Dgvid	Dindu
Constant	(-1.83)	(0.0)	(8.71)	(-28.9)	(1.79)	(5.59)	(3.33)	(11.62)	(1.33)	(-17.3)
Wcr	1.38 (0.39)	-52.48 (0.0)	0.47 (-0.21)	0.54 (0.64)	0.87 (-0.34)	4.62** (1.26)	1.16 (0.48)	2.02 (-2.02)	3.50 (-1.36)	-3.20 (-0.17)
Mtbv	0.22 (0.12)	-37.25 (0.0)	0.18 (0.06)	2.34 (-0.48)	1.08 (0.19)	0.26 (0.07)	0.90 (0.12)	0.39 (-0.38)	49*** (0.39)	0.20 (-0.36)
Roce	0.01 (-0.01)	-51.95 (0.0)	0.10 (-0.02)	7.3*** (-0.46)	0.78 (0.06)	5.56** (0.28)	1.33 (0.06)	10.4*** (0.32)	49*** (0.18)	20*** (-0.81)
Nfa/tas	1.03 (1.91)	-57.63 (0.0)	0.08 (-0.42)	5.01** (-5.39)	0.14 (0.71)	3.92** (6.48)	1.54 (1.38)	2.51 (2.19)	0.03 (-0.17)	9.7*** (-4.78)
Log(tas)	0.02 (-0.02)	-53.44 (0.0)	0.11 (0.05)	3.51* (0.97)	0.02 (-0.02)	4.21** (-0.66)	0.95 (-0.16)	0.86 (-0.29)	8.3*** (-0.53)	11*** (1.30)
Curr	4.36** (3.68)	0.0 (0.0)	2.37 (-3.52)	14.3*** (-24.31)	0.01 (-0.28)	5.09** (9.17)	0.08 (0.44)	0.49 (1.96)	8.9*** (7.76)	-3.24 (6.65)
Risk	1.51 (0.88)	-46.67 (0.0)	0.23 (0.12)	3.20* (-4.05)	0.63 (-0.22)	3.05* (-2.78)	3.39* (-0.41)	6.9*** (-0.85)	12.4 (4.64)	25*** (1.59)
Dfau	Linear	-68.14 (0.0)	0.68 (-0.81)	1.13 (2.43)	2.37 (-1.98)	11.3*** (8.23)	0.36 (-0.56)	0.00 (-0.02)	0.02 (0.30)	-3.28 (1.25)
Dfod	1.44 (-1.78)	Linear	1.68 (1.77)	23.9*** (49.44)	0.03 (-0.34)	7.6*** (-6.81)	1.44 (-1.43)	6.9*** (-4.72)	3.11* (-2.92)	0.31 (0.93)
Dpfd	0.45 (-0.72)	-51.24 (0.0)	Linear	4.27** (5.98)	0.37 (0.69)	1.30 (-2.52)	3.84** (-1.83)	0.10 (0.58)	6.9*** (-3.55)	-3.01 (-7.54)
Drdu	0.20 (0.53)	-44.51 (0.0)	0.01 (-0.13)	Linear	0.46 (-0.97)	0.05 (0.27)	2.37 (-1.47)	3.93** (-3.65)	49*** (-3.60)	2.63 (4.02)
Dtaxd	4.08** (-3.02)	-68.96 (0.0)	0.01 (0.11)	3.30 (-5.08)	Linear	15.6*** (-9.44)	4.52** (2.20)	2.53 (3.45)	1.79 (1.84)	0.04 (0.10)
Dcapu	9.11*** (3.97)	-51.92 (0.0)	3.57* (-2.76)	1.19 (2.58)	8.6*** (-3.65)	Linear	0.19 (-0.54)	0.00 (0.00)	49*** (2.53)	-0.16 (1.12)
Dintu	0.92 (-1.15)	-45.43 (0.0)	3.05* (-1.69)	8.46 (-5.15)	1.80 (1.44)	-0.12 (1.88)	Linear	0.57 (1.19)	0.07 (0.17)	-3.17 (-1.88)
Dinfu	0.13 (0.44)	-43.36 (0.0)	0.62 (-1.19)	6.64 (-5.79)	3.08 (2.86)	0.55 (1.40)	0.48 (0.76)	Linear	0.40 (-0.84)	19*** (-13.3)
Dgvid	0.08 (0.33)	-47.88 (0.0)	3.33* (-2.20)	5.70 (-8.02)	0.86 (1.16)	2.29 (2.39)	0.44 (-0.64)	0.51 (-1.20)	Linear	0.72 (4.37)
Dindu	0.44 (-0.97)	-46.18 (0.0)	1.43 (-2.05)	0.09 (0.55)	0.76 (-1.52)	3.63* (-6.9)	1.30 (-1.61)	5.23** (-5.24)	-0.07 (0.49)	Linear
Analysis of deviance										
p-value	0.386	1.000	0.185	0.001	0.005	0.001	0.133	0.000	0.000	0.000
% deviance	27.11	-31.55	34.11	61.64	49.80	69.33	32.38	64.18	69.79	90.44
Adjusted %	0.0	0.0	0.0	7.40	0.69	19.76	0.0	12.98	19.81	31.10

*, **, ***Significant at least at 10%, 5% and 1 % level critical values
The value in the parenthesis is the coefficient of the parameter.

Table 10: Stepwise Logistic Regression (Questions 2 to 5)

	dfau	Dfod	Dpfd	drdu	dcapu	dtaxd	dintu	dinfu	dgvid	dindu
Wcr										
Mtbv										
Roce								7.29*** (0.115)		8.02*** (-0.13)
Nfa/tas								4.20** (3.10)		
Log(tas)									7.48*** (-0.34)	10.4*** (0.353)
Curr										
Risk										
Dfau					4.66** (1.780)					
Dfod				9.89*** (16.20)						
Dpfd							6.48** (-1.75)		4.77** (-2.01)	7.21*** (-3.08)
Drdu		9.89*** (15.83)								
Dtaxd					20.7*** (-3.18)		5.025** (1.408)	7.75*** (2.152)		
Dcapu						15.3*** (-2.72)			8.67*** (2.34)	
Dintu			6.59** (-1.66)							
Dinfu						5.41** (1.799)			6.16** (-2.03)	
Dgvid										
Dindu								12.2*** (-3.48)		

Analysis of deviance

		dfau	Dfod	Dpfd	drdu	dcapu	dtaxd	dintu	dinfu	dgvid	dindu
p-value		0.002	0.010	0.002	0.000	0.000	0.003	0.000	0.000	0.000	
% deviance		18.76	10.79	15.77	34.90	35.66	16.84	37.56	37.93	34.49	
Adjusted %		11.17	4.24	9.39	26.15	26.99	8.14	22.50	23.23	20.53	

*, **, ***Significant at least at 10%, 5% and 1 % level critical values
The value in the parenthesis is the coefficient of the parameter.

Table 11: Logistic Regression (Questions 6 to 9)

	Dagcc	Dtgcc	Dagcf	Dtgcf
Constant	(1.799)	(7.254)	(2.906)	(27.55)
Wcr	6.819*** (-1.197)	2.482 (-0.732)	0.003 (-0.064)	23.517*** (2.818)
Mtbv	0.207 (0.150)	1.180 (-0.169)	1.576 (-1.067)	15.177*** (-0.043)
Roce	3.666 (0.144)	0.053 (0.014)	0.229 (0.076)	0.225 (0.079)
Nfa/tas	0.267 (0.968)	2.185 (1.606)	0.195 (0.770)	0.300 (1.286)
Log(tas)	1.058 (-0.205)	4.417** (0.370)	0.919 (0.323)	15.712*** (0.202)
Curr	0.665 (1.721)	0.277 (-0.881)	0.021 (-1.007)	64.360*** (-26.793)
Risk	0.986 (0.332)	1.100 (-0.270)	2.051 (-1.990)	15.245*** (0.598)
Dfau	0.441 (-0.742)	1.194 (1.024)	0.119 (0.811)	-0.881 (-2.600)
Dfod	0.001 (-0.051)	0.037 (0.220)	0.010 (-0.212)	23.495*** (-3.248)
Dpfd	1.431 (-1.596)	1.504 (-1.334)	1.430 (2.671)	23.882*** (1.510)
Drdu	0.612 (-1.064)	0.492 (0.747)	0.026 (0.321)	-0.075 (-2.750)
Dtaxd	1.261 (1.918)	0.091 (-0.341)	0.160 (-1.321)	23.489*** (-5.536)
Dcapu	0.008 (0.162)	0.652 (1.012)	1.757 (-4.357)	16.187*** (-2.538)
Dintu	1.747 (-1.761)	0.081 (0.267)	1.695 (-2.828)	13.320*** (-6.591)
Dinfu	2.583 (-2.406)	3.441* (-2.045)	6.456** (-5.793)	-1.000 (-13.716)
Dgvid	11.122*** (4.620)	0.649 (0.910)	5.937** (-5.254)	-2.684 (-9.042)
Dindu	0.036 (0.331)	1.003 (-1.466)	1.049 (1.914)	15.266*** (-0.401)
Analysis of Deviance				
p-value	0.0070	0.2130	0.0475	0.0018
% deviance	51.07%	31.32%	55.53%	88.73%
Adj. %	0%	0%	0%	6.85%

*, **, ***Significant at least at 10%, 5% and 1 % level critical values
The value in the parenthesis is the coefficient of the parameter.

Table 12: Stepwise Logistic Regression (Questions 6-9)

	Dagcc	Dtgcc	Dagcf	Dtgcf
Constant	(1.674)	(0.773)	(-0.318)	(-3.783)
Wcr				
Mtbv				
Roce				5.028** (0.197)
Nfa/tas				
Log(tas)				
Curr				
Risk				8.289*** (3.691)
Dfau				
Dfod				
Dpfd				
Drdu				
Dtaxd				
Dcapu				
Dintu				14.780*** (-52.496)
Dinfu	12.980*** (-2.367)	8.927*** (-1.829)	9.345*** (-2.356)	10.041*** (-4.856)
Dgvid				
Dindu				
Analysis of Deviance				
p-value	0.003	0.0028	0.0022	0.0000
% deviance	19.16%	13.12%	18.67%	61.63%
Adj. %	13.26%	7.24%	10.68%	38.89%

*, **, ***Significant at least at 10%, 5% and 1 % level critical values
The value in the parenthesis is the coefficient of the parameter.
Dagcc - dummy if the actual d/e ratio change following the crisis
Dtgc - dummy if the target d/e ratio change following the crisis
Dagcf - dummy if the actual d/e ratio change following the ringgit being fixed
Dtgcf - dummy if the target d/e ratio change following the ringgit being fixed.

APPENDIX I

PILOT STUDY QUESTIONNAIRE

Sharifah Raihan Syed Mohd Zain
Research Office
Plymouth Business School
University of Plymouth
Plymouth PL4 8DW
United Kingdom

Dear Sir/Madam,

Re: Questionnaires Survey for PhD Research

I am currently pursuing a PhD degree at the University of Plymouth, in the United Kingdom. As part of this research exercise, I am conducting a short questionnaire survey on the topic of the capital structure of Malaysian companies. I would appreciate very much if you could spend a few minutes to read the term of reference and complete the questionnaire survey.

Please be advised that information gathered in this survey will be treated with the strictest confidence and will only be used for the purpose of this research study. Names of individual people or companies will not be revealed in the dissemination of this research. An executive summary of results will be sent to participants.

Thank you in anticipation your reply.

Yours sincerely,

(Sharifah Raihan Syed Mohd Zain)

Instructions on how to complete the questionnaire:

1. Please double click on the attachment file below, complete the questionnaire, **SAVE IT**. Please email the **SAVED** attachment file (completed questionnaire) back to me. **OR**

2. Please print the attachment file, complete the questionnaire and mail it through regular mail (post office) using the above address.

Thank you.

Terms of Reference

As you will no doubt already know, capital structure refers to the appropriate mix of debt and equity of a firm. This is usually measured by the ratio of debt to equity or the ratio of debt to total assets, using book or market values. The factors that influence the determination of a firm's capital structure have been examined extensively both in theoretical and empirical research. However, most of the studies are centred on countries such as the United States, United Kingdom and Japan. Therefore, this research is very important for Malaysian companies, as very little research has been conducted in this area.

Questionnaire

1. Please indicate how you intend your long-term capital projects to be financed? (please indicate the percentage of financing)

Source of finance	During the next 12 months (%)	In the longer-term (%)
Internal equity (retentions)		
Ordinary shares		
Preference shares		
Islamic bonds		
Conventional bonds		
Islamic bank loan		
Conventional bank loan		
Overdrafts		
Other(please specify)		

2. Please indicate the extent to which the following factors are important in the determination of the firm's capital structure (debt as a proportion of total long-term financing). Please indicate ("X") to important factors only.

Factors	During the next 12 months	In the longer term
Level of fixed overheads		
Ratio of fixed assets to total assets		
Total assets employed		
An increase in your company's profit		

Reductions in corporate tax rate		
Capital allowances on assets (for tax purposes)		
Research and development expenditure		
Inflation		
Interest rates		
Exchange rates		
Views of market commentators		
The use of usury(RIBA)/interest rates		
Mix of short and long-term debt		
Degree of political risk exposure		
Government incentives (e.g. subsidiaries)		
Following the industry norm		
Lease as a substitute for debt		
Mergers, acquisitions and divestments		
Debt as a substitute for equity to avoid equity dilution		
Public disclosure of accounting information beyond minimum statutory requirement		

4. Would it be possible to have a formal interview about this survey in the future? (between July 2001 to October 2001), please indicate ("X").

Yes		No	

The following information is optional:

Your name:
Your position:
Your company:

APPENDIX J

QUESTIONNAIRE USING POSTAL MAIL

Finance Manager,

Address

24/04/2001

Dear Sir/Madam,

Re: Questionnaire Survey for Ph.D. Research

I am currently pursuing a Ph.D. Degree at the University of Plymouth, in the United Kingdom. As part of this research, I am conducting a questionnaire survey on the capital structure of Malaysian companies. I would very much appreciate if you could spend a few minutes to read the terms of reference and complete the questionnaire attached.

Please be advised that information gathered in this survey will be treated with the strictest confidence and will only be used for the purpose of this research study. Names of individual persons or companies will not be revealed in the dissemination of this research. An executive summary of results will be sent to respondents.

Thank you in anticipation of your reply.

Yours sincerely,

Sharifah Raihan Syed Mohd Zain

Research Office
Plymouth Business School
University of Plymouth
Plymouth PL4 8AA
United Kingdom

Email: pbsresearch@hotmail.com, szain@plymouth.ac.uk

Terms of Reference

As you will no doubt already know, capital structure refers to the appropriate mix of debt and equity of a firm. This is usually measured by the ratio of debt to equity or the ratio of debt to total assets, using book or market values. The factors that influence the determination of a firm's capital structure have been examined extensively both in theoretical and empirical research. However, most of the studies are centred on countries such as the United States, the United Kingdom and Japan. Therefore, this research is very important for Malaysian companies, as very little research has been conducted in this area.

1. Please indicate your firm's priorities in raising additional funds to finance new investment. (Please tick the appropriate box, where applicable).

Sources of funds	High priority	Medium priority	Low priority
Internal equity (retentions)			
Ordinary shares			
Preference shares			
Islamic bonds			
Conventional bonds			
Islamic bank loan			
Conventional bank loan			
Overdrafts			
Finance leases			
Other (please specify)			

2. Please indicate the likely impact of the following company factors upon your firm's leverage (i.e. debt-to-equity) ratio. (Please tick the appropriate box).

Company's factors	Large Reduction in D/E*	Moderate Reduction in D/E	No change in D/E	Moderate Increase in D/E	Large Increase in D/E
A significant increase in fixed assets as a proportion of total assets					
A significant decrease in fixed overhead costs					
A significant increase in the company's profit					
A significant decrease in the company's profit					
A significant increase in research and development expenditure					
A significant increase in public disclosure of accounting information beyond minimum statutory requirement					

* D/E = debt/equity ratio (book value of debt/book value of equity)

3. Please indicate the likely impact of the following tax factors upon your firm's leverage (i.e. debt-to-equity) ratio. (Please tick the appropriate box).

Tax factors	Large Reduction in D/E*	Moderate Reduction in D/E	No change in D/E	Moderate Increase in D/E	Large Increase in D/E
Annual decrease in corporate tax rate similar to those experienced in recent years					
A significant increase in capital allowances on assets (for tax purposes)					
Temporary tax losses (if applicable)					

* D/E = debt/equity ratio (book value of debt/book value of equity)

4. Please indicate the likely impact of the following macroeconomic factors upon your firm's leverage (i.e. debt-to-equity) ratio. (Please tick the appropriate box).

Macroeconomic factors	Large Reduction in D/E*	Moderate Reduction in D/E	No change in D/E	Moderate Increase in D/E	Large Increase in D/E
An increase in long-term interest rates by 2 percentage points					
A decrease in long-term interest rates by 2 percentage points					
An increase in inflation by 2 percentage points					
A decrease in inflation by 2 percentage points					

* D/E = debt/equity ratio (book value of debt/book value of equity)

5. Please indicate the likely impact of the following specific factors upon your firm's leverage (i.e. debt-to-equity) ratio. (Please tick the appropriate box).

Specific factors	Large Reduction in D/E*	Moderate Reduction in D/E	No change in D/E	Moderate Increase in D/E	Large Increase in D/E
An increase in government incentives					
A decrease in government incentives					
An increase in industry average debt ratio					
A decrease in industry average debt ratio					

* D/E = debt/equity ratio (book value of debt/book value of equity)

6. Please indicate whether your firm's ACTUAL leverage ratio (book value of debt/book value of equity) changed directly following the 1997 currency crisis. (Please tick the appropriate box).

yes		no	

If yes, please indicate the impact. (Please tick the appropriate box).

Large Reduction in D/E*	Moderate Reduction in D/E	No change in D/E	Moderate Increase in D/E	Large Increase in D/E

*D/E = debt/equity ratio (book value of debt/book value of equity)

7. Please indicate whether your firm's TARGET leverage ratio (book value of debt/book value of equity) changed immediately following the currency crisis. (Please tick the appropriate box).

yes		no	

If yes, please indicate the impact. (Please tick the appropriate box).

Large Reduction in D/E*	Moderate Reduction in D/E	No change in D/E	Moderate Increase in D/E	Large Increase in D/E

*D/E = debt/equity ratio (book value of debt/book value of equity)

8. Please indicate whether your firm's ACTUAL leverage ratio (book value of equity/book value of debt) changed as a result of the ringgit being fixed to the US dollar. (Please tick the appropriate box).

yes		no	

If yes, please indicate the impact. (Please tick the appropriate box).

Large Reduction in D/E*	Moderate Reduction in D/E	No change in D/E	Moderate Increase in D/E	Large Increase in D/E

*D/E = debt/equity ratio (book value of debt/book value of equity)

9. If you have a TARGET leverage ratio, please indicate whether your firm's TARGET changed as a result of the ringgit being fixed to the US dollar. (Please tick the appropriate box).

yes		no	

If yes, please indicate the impact. (Please tick the appropriate box).

Large Reduction in D/E*	Moderate Reduction in D/E	No change in D/E	Moderate Increase in D/E	Large Increase in D/E

*D/E = debt/equity ratio (book value of debt/book value of equity)

10. Would you agree to a brief informal interview on this subject if requested? (Please tick the appropriate box).

yes		no	

Please provide the following information (optional):

Name of Respondent:

Position:

Company's Name and address:

Telephone and Fax number:

Email address:

THANK YOU FOR YOUR CO-OPERATION

PLEASE RETURN THE COMPLETED QUESTIONNAIRE USING THE ENCLOSED SELF ADDRESSED ENVELOPE

APPENDIX K

COVER LETTER FOR THE QUESTIONNAIRE REMINDER

Finance Manager,
Address

15/08/2001

Dear Sir/Madam,

Re: A Kind Reminder for Ph.D. Research Questionnaire Survey

I am writing to kindly inquire if you have received a copy of the questionniare which I sent from the United Kingdom in May 2001. This questionnaire is crucial and very important for my Ph.D. study. Without your assistant in this matter, my analysis in this field of study will not be **complete.**

Please be advised that information gathered in this survey will be treated with the **strictest** confidence and will **only** be used for the purpose of this research study. Names of individual persons or companies **will not be revealed** in the dissemination of this research. An executive summary of results will be sent to respondents.

If you have not completed the questionnaire, I am attaching a second copy for your convenience. However, if you have already completed and sent the questionnaire to me, please kindly ignore this letter.

Your kind assistance and attention in this matter is very much appreciated.

Thank you.

Yours sincerely,

Sharifah Raihan Syed Mohd Zain
Department of Business Administration
KENMS, IIUM
Jalan Gombak
53100 Kuala Lumpur
Malaysia

Email: pbsresearch@hotmail.com, szain@plymouth.ac.uk

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