CHAPTER 1

INTRODUCTION

1.1 Background

A standard principle of banking supervision is that excessive competition among banks could threaten the solvency of particular institutions and, at an aggregate level, hamper the stability of the entire banking system. Naturally, when confronted with increased competition, banks will rationally choose more risky portfolios. Competition arising from the liberalization of the banking system would erode the franchise value of a bank and encourage it to pursue riskier policies in an attempt to maintain its former profits.

Researchers have look into the hypothesis that increased in competition shall caused banks’ franchise value to decline, which, in turn, caused banks to increase the default risk through increases in asset risk and reductions in capital. Examples of riskier policies are taking on more credit risk in the loan portfolio, lowering capital levels, or both. These riskier policies would increase the probability of higher non-performing loan ratios and more bank bankruptcies. In contrast, restrained competition should encourage banks to protect their higher franchise values by pursuing safer strategies that contribute to the stability of the whole banking system.
This “franchise value” paradigm has been supported both theoretically and empirically over time in the banking literature. Franchise value is defined as the popularity of a particular brand or product with consumers. Examples are the concept of bleach and Clorox, tissue and Kleenex, soda and Coca-Cola, soup and Campbell's, are probably not different in many of the consumers mind. In fact, the franchise value of some businesses is so high that many people actually substitute the brand name for the item in every day conversation, for example in Malaysia, any and all toothpaste are referred to as "Colgate".

In recent years, some researchers, Boyd and De Nicolo (BDN, 2005) have proposed a very interesting and challenging view. In their model, they argue that less competition among banks could result in higher interest rates charged on business loans, which might raise the credit risk of borrowers as a result of moral hazard. This increase in firm default risk could lead to increased bank problem loans and greater bank instability. The authors argue that this loan market channel could eliminate the trade-off between competition and financial stability implied by the deposit channel of the franchise value paradigm; that is, the economic rents that banks earn from depositors provide the only incentives to carry out conservative asset side policies. Their proposed “risk-shifting” paradigm argues that more competition across the loan and deposit markets could decrease borrower credit risk and enhance financial stability.

In fact, Boyd, De Nicoló and Al Jalal (2006) as well as De Nicoló and Loukoianova (2007) have provided empirical evidence of a positive relationship between banking market concentration and bank risk-taking. However, Allen and
Gale (2000, 2004) show that different models can provide different results regarding the trade-off between banking competition and stability.

More recently in the Year 2007, Martinez-Miera and Repullo (MMR, 2007) extended the BDN model by allowing for imperfect correlation across individual firms’ default probabilities. They identify a risk-shifting effect accounting for more defaults when interest rates increase (i.e., a lower competition environment) but realize that, at the same time, there is a margin effect that generates more revenue for the bank coming from those non-defaulted borrowers that pay a higher interest rate. In their model, the relation between competition and stability can be U-shaped; that is, as the number of banks increases, the probability of bank default first declines but increases beyond a certain point.

One of the objectives of this paper is to examine empirically whether in Malaysian banking environment, the relationship between bank competition in terms of loans/deposits and risk is positive or negative, as suggested by both franchise value and risk-shifting models.

1.2 CONTRIBUTIONS AND SIGNIFICANCE OF THE STUDY

There are very few studies or research conducted to look at the relationship between bank competition and risk taking in Malaysia. This research is important for both the authorities and practitioners to know if excessive competition among banks could lead to high NPLs in certain banks and eventually on aggregate level could threaten the stability of the entire financial institutions. As such, it is important for
Bank Negara Malaysia (BNM) to know if it is better to liberalize the number of banks in Malaysia and let the market forces to determine the ideal number or the authorities should control the number of banks allowed to operate in Malaysia.

This study will give a guide to BNM whether Malaysia should reduce the number of local banks i.e. to reduce the competition or BNM should just liberalized the banking industry allowing market forces to determine the optimum number of banks operating in Malaysia.

With the impeding commitment by Malaysia to open up the banking industry to foreign banks, it’s important to understand how competition will impact the risk taking of banks as we do not want to have a situation where the Malaysian Banks take unnecessary additional risks due to competition and might hamper the stability of the entire Malaysian banking system.

1.3 OBJECTIVES OF THE STUDY

The main objectives of this paper are to examine empirically the relationship between;

1) Competition in terms of giving out loans by Malaysian banks and the bank’s risk-taking appetite.

2) Competition in terms of deposit taking by Malaysian banks and the bank’s risk-taking appetite.
In this paper, we also look into the relationships between the ratio of consumer loans over total assets (loan ratio), return on equity (ROE) and the asset size of Malaysian banks and how they impact the risk-taking appetites of Malaysian banks.

To do this, we examine this relationship between competition and bank risk by examining a sample of nine local banks and seven foreign owned banks incorporated in Malaysia.

1.4 SCOPE OF THE STUDY

This study focuses on how competition impacts the risk appetite of the selected nine local banks and seven foreign banks incorporated in Malaysia. This research paper investigates the relationship between market power in terms of loans, market power in terms of deposits, banks loan ratio, return on equity (ROE) and total asset and banks risk taking. The secondary data are extracted from the respective sixteen selected sample bank’s annual report from the Year 2003 to Year 2007.

1.5 LIMITATIONS OF THE STUDY

Firstly, this study is limited in its scope of study and the number of sampling. The factors affecting the bank risk-taking could be examined in many perspectives and in more details. This study only focuses on the relationship between market power in terms of loans, market power in terms of deposits, bank loans ratio, return on equity (ROE) and total asset size as independent variables and Bank Risk Taking as dependent variable.
Secondly, the data are extracted from the Annual Report of each of the individual respective banks. The Annual Reports that we reviewed and extracted the data from are confined to only five years from the Year 2003 to Year 2007. The number of banks is also limited to only sixteen banks that are incorporated in Malaysia. The small sample data collated might not represent the actual relationship that we are studying. As such, the findings of the research should be interpreted within the confines of the sample size. Despite the above shortcoming, the findings of this study are to provide insights into the impact of competition on Malaysian’s bank risk-taking.

1.6 ORGANIZATION OF THE STUDY

This study has been divided into five chapters:

**Chapter One-Introduction**

This is an overview chapter of the study. It started with general introduction including background, the purpose and significance of the study, followed by the research objectives. It does include scope of the study, limitation and organization of the study.

**Chapter Two – Overview of Malaysian Banking Sector**

This chapter provides an overview of the Malaysian banking sector from the Asian financial crisis in the year 2007 to the financial policies adopted by BNM in response to the crisis.
Chapter Three - Literature Review
This chapter contains related and relevant literature, which discusses the impact of competition on bank risk-taking. It also discusses the various propositions by different researchers on the possible impact competition has on risks.

Chapter Four - Research Methodology
This chapter explains the research methodologies used in the study. It also explains the theoretical framework, methodology, hypothesis, and selection of measures, data collection procedures and data analysis techniques.

Chapter Five - Research Results
This chapter presents the overall findings of the study. It summarizes the results of statistical analysis and discussion of the research results.

Chapter six - Conclusion and Recommendation
This is the last chapter of this study, which concludes the study by summarizing the findings and provides implications of the study. Some recommendations for future research are also presented in the study.
CHAPTER 2

OVERVIEW OF THE MALAYSIAN BANKING SECTOR

2.1 INTRODUCTION

The financial crisis in Asia that started in 1997 has shown that a robust financial system is one of the key components of economic progress. Without it, misallocation of investments could seriously disrupt development.

Giving a brief overview of the Malaysian banking sector from the early 1990s to 2007, the Malaysian banking system during the early 1990s, comprises monetary and non-monetary institutions. The monetary institutions are the central bank, BNM, and the commercial banks (including Bank Islam). The non-monetary institutions fall into two groups. The first group was supervised by BNM: finance companies, merchant banks, discount houses, foreign banks representative offices, and offshore banks in the International Offshore Financial Centre in Labuan. However, as explained later in this paper, the finance companies and discount houses are either closed down or merged into the commercial banks in 2000. The second group was under the supervision of various government departments and agencies such as development finance institutions, savings institutions, provident and pension funds, insurance companies, and other financial intermediaries.
In mid-1990s, the licensed banking system consists of 35 commercial banks, of which 22 are domestic banks and 13 are foreign-controlled (or 44 percent of total financial system assets), 39 finance companies (14 percent), 12 merchant banks (4 percent), 7 discount houses (2 percent), and money and exchange brokers. Among these banking institutions, only commercial banks can accept demand deposits from the public or engage in foreign exchange operations. Hire-purchase lending is the exclusive business of the finance companies and constitutes their main line of business; while merchant banks concentrate on investment banking. Banking institutions are closely connected through subsidiaries or parent company relationships. Several banks are subsidiaries of corporate conglomerates, while numerous finance companies and merchant banks are subsidiaries of commercial banks. In addition, some financial groups have securities trading subsidiaries and branches in offshore Labuan. Government and other public sector involvement in the banking sector is high—the Government owns Bank Bumiputra, the second largest commercial bank, and through an investment trust holds a controlling stake in Maybank, the largest commercial bank, among others.

The Malaysian Banking landscape started to change in the late 1990s and early 2000, where in mid 1997, among the 35 commercial banks operating in the country, the total number of branch offices of domestic banks was 1,480 and that of foreign-controlled banks was 144. As of the end of 1997, only 10 commercial banks have been accorded tier-1 status and allowed to undertake a number of activities subject to prudential limits and conditions determined by BNM. However, in early 2000, the tier system was abolished and with another round of bank mergers, the number of local
commercial banks has been further reduced. As at to date, the number of banks in Malaysia is as follows (Appendix 1):

- one universal bank.
- nine anchor banks (major/commercial banks).
- no finance companies as all have been acquired by their anchor bank.
- thirteen foreign owned commercial banks.
- fifteen investment banks
- no merchant banks as all has been previously converted or merged into investment banks.
- thirteen Islamic banks

During the years, banking institutions have shown remarkable growth (Appendix 2), but in common with banks of other Asian countries suffering in the financial crisis, there has been a surge in NPLs (Appendix 3) at the end of 1998, the ratio of NPLs to total loans was 10.3 percent. Direct reasons for the NPLs include downturn of the economy and collapse of property and stock markets. But more fundamental reasons for the large NPLs are state-directed loan policies, lack of competition, and lack of prudential regulations. Nevertheless, with proper risks management policies put in place by BNM and the recovering economy, the ratio of NPLs to total loans has improved to 2.5% in July 2008.

Confronting increasing globalization, the future operating environment for the banking industry was expected to be more dynamic and competitive. So banking institutions were encouraged to increase their competitiveness by enhancing
operational efficiency and being more innovative in developing competitively priced financial products. The need to serve the increasingly diverse and sophisticated needs of consumers and businesses was also realized. In an effort to contain the impact of the Asian financial crisis, the main focus of recent financial policy has been on improving the soundness of the financial system through strengthening preemptive and prudential regulations. The Government has not sought rescue funds from international financial institutions, and therefore has not come under direct pressure to implement specific economic reforms. But since early 1997, BNM has taken a series of measures to help strengthen prudential regulation and transparency. Basically in line with International Monetary Fund (IMF) packages forced on Indonesia, Korea, and Thailand, the measures concern NPL classification and provisioning standards, capital adequacy ratio (CAR), lending to the property sector and for the purchase of stocks and shares, single customer limits, disclosure and monitoring, and establishment of asset management company. These measures, on the one hand, have greatly contributed to stabilizing financial markets. On the other hand, they brought about an extremely passive attitude to the management of banking. Such a financial policy may cut the long-term profits of the banking institutions.

The events or reforms that occurred in the Malaysian banking sector can be summarized and divided into the following three sub-periods:


3) Post merger (2005 to 2007)
2.2 ASIAN FINANCIAL CRISIS (1997 to 2001)

The Malaysian banking sector, in the late 1990s, has played a leading role in indirect financing and similar to those banking sectors of other Asian countries suffered a financial crisis in 1997 that started in Thailand. The direct reasons for the problems include a downturn of the economy and collapse of the property and stock markets. However, more fundamental reasons are state-directed loan policies, lack of competition, and lack of prudential regulations. Arising from the financial crisis, BNM took additional measures to improve the soundness of banking institutions. Each measure falls roughly into one of the three categories below:

- improvement in credit allocation,
- strengthening of prudential regulations, and
- resolution of nonperforming loans (NPLs) and recapitalization and consolidation of the banking sector.

As the crisis escalated and began to infect the economy, BNM relaxed monetary policy on 27 August 1998. On 1 September 1998, the authorities announced capital control measures with two primary objectives:

- elimination of speculative flows, and
- allowance of a progressive reduction in interest rates.

BNM took additional banking measures to promote economic recovery on 23 September 1998. The Malaysian banking sector was fairly healthy at the onset of the regional financial turmoil. However, finance companies have been particularly overexposed to broad property and consumption credit. Banks have also overextended themselves to politically well-connected corporate entities backed by volatile assets in
the form of shares and real estate. The share of substandard loans in NPLs for these financial institutions has risen, with substantial increased for finance companies and merchant banks as compared to that for commercial banks. The Government has taken the right steps by establishing asset management company, Pengurusan Danaharta Nasional Berhad (Danaharta) and special purpose vehicle, Danamodal Nasional Berhad (Danamodal) to deal with NPLs and recapitalization. In this regard, recourse to BNM financing or lending to insolvent banks was avoided.

In response to the financial crisis, many policy measures were taken to limit the amount of credit to the more volatile sectors of the economy, moderated the high credit growth, put in place more stringent prudential requirements, and enhanced financial disclosure by financial institutions. In particular, stringent prudential measures were imposed to foster quicker recognition of asset quality problems, and to allow for appropriate and timely actions to be taken by bank management.

2.3 MALAYSIAN BANKING SECTOR REFORM (2002 to 2004)

In Malaysia, it was widely believed that authorities exhibited caution in opening the banking sector. The difficulty of putting in place a concrete strategy plan for liberalization was also recognized. Before the 1997 Asian financial crises, foreign equity investment in financial institutions was limited to 30 percent, and there are restrictions on the activities of the 13 locally incorporated foreign banks (these account for 22 percent of total assets of banking institutions) operating in Malaysia. Foreign banks were only allowed to extend loans only in partnership with domestic banks. Since 1983, no new foreign (as well as domestic) bank licenses have been
granted and foreign banks was restricted in their ability to open branches. The rationale of the measure was to protect domestic banks. This policy has been maintained for more than 10 years and has forced foreign banks to get used to the restrictive business environment.

The authorities were aware that opening the banking sector has potential risks. They include an increase in capital volatility and encouragement of excessive borrowing, which could eventually destabilize the domestic financial markets. However, these were the same factors that have been blamed as the prime causes of the Asian financial crisis. On the other hand, if domestic banks were to compete with more advanced foreign banks, they would likely strive to work for more efficient management and financial innovation. At the same time they would introduce and develop a better supervision and regulation system. These factors will contribute to improving financial services, economic growth, and a sound banking system. Whether the positive or negative effects would prevail, particularly in the long run, remains an open question. However, empirical studies supported the view that liberalization of banking will have favorable results. Effective and rapid improvement requires a certain goal and counterparts to compete against. Self strengthening of the banking institutions has a limit. Therefore, banking institutions in Malaysia are considered to be paying high implicit costs by delaying their internal reforms and neglecting financial innovations. Banking institutions tend to regard competition as a factor that causes profits to decline. Instead, the value of competition has to be evaluated from the point of view of customers who cannot influence the market individually. However, since it is doubtful that banking institutions can achieve international
competitiveness without a strong external stimulus, foreign banks are being utilized as a catalyst in developing the banking sector.

In the Year 2001, BNM unveiled a 10-year blueprint to strengthen the financial sector that includes opening up the banking industry to new foreign players after 2007 and lifting the cap on foreign equity in the insurance sector by 2010. In detailing the Financial Sector Masterplan, Bank Negara Governor Zeti Akhtar Aziz has said that new foreign competition would be introduced in the banking sector only after the seventh year to give time for domestic banking groups to enhance their capability and capacity to withstand competition.

The plan, covering 2001 to 2010, comes in three phases. Phase one is to strengthen domestic banking institutions along with steps to create the necessary infrastructure for a more market-based consumer protection framework. By the fourth year, domestic banking institutions are expected to be strong enough for competition. Phase two will see the playing field for incumbent foreign banks will be leveled. Some restrictions set upon incumbent foreign banks will be removed, such as allowing them to share automated teller machines (ATM) networks with local banks. Phase three begins in the seventh year when Malaysia will open up its banking industry to new foreign players in line with the World Trade Organization (WTO) liberalization program.

To strengthen the local financial institutions, a massive merger exercise was launched to reduce the number of banking institutions to 10 giant banking groups, each with a commercial bank, a finance company and a merchant bank. Malaysia's commitment under the WTO agreement currently limits foreign equity in insurers to
30% for new foreign shareholders. To promote the development of new product offerings and technical skills in the industry over the long term, the foreign equity limit for new entrants will be relaxed. The plan also lays out strategies to enhance Malaysia's Islamic banking and insurance sectors, venture capital firms, international offshore financial center and supporting institutions, in its aim to promote a well-diversified financial sector.

2.4 POST MERGER PERIOD (2005 to 2007)

As explained earlier, the Asian Financial Crisis in 1997 and Malaysia’s commitment to World Trade Organisation (WTO) to open up the banking industry to new foreign players in 2007 and lifting the cap on foreign equity in the insurance sector by 2010, has led to Bank Negara Malaysia (BNM) embarking on an exercise to strengthen the local financial institutions. In their quest to strengthen the local financial institutions, BNM launched a massive merger exercise to reduce the number of banking institutions and since the early 2000s, there has been a steady decrease in the importance of small banking institutions that focus on traditional banking operations and an expansion of larger universal banks. With the fewer but larger banks in Malaysia, local banks are expected to be financially stronger to compete among the foreign banks when they (the foreign banks) are allowed the same privileges as of a Malaysian bank.

As seen in this recent decade, the Malaysian banking sector has been significantly transformed and reinvented. The restructuring, consolidation and rationalisation efforts that were undertaken in the banking sector have placed the
financial sector on a stronger foundation. This decade has also been a period of favourable performance and increased resilience. This has been achieved with the successful integration of business processes and the redeployment of resources to support new areas of growth. Financial reforms have also changed the environment. Progressive deregulation and liberalization have increased the flexibility to financial institutions, while also resulting in new business opportunities and increased competition. These developments have also further strengthened the incentives for improved performance. Significant structural changes during this period have also reshaped the landscape. The introduction of capital market intermediaries, investment banks, an increasing presence of new international players in Islamic finance, and a significantly more developed bond market, has resulted in a significantly more diversified financial system.

The resulting payoffs for the financial system and the economy generally, have clearly been positive. Today, the financial sector has evolved from being an enabler of growth to become an important source of growth in its own right. As at 2007, the banking and insurance industries provides employment to more than 123,000 Malaysians. Despite conditions that have remained challenging for a large part of the decade, the banking system remained consistently on solid financial ground in the year 2007, with a risk-weighted capital ratio of over 13%, low NPL ratios, and continued profitability for eight consecutive years. Substantial progress has been made towards consumer retail finance and access to banking services. Such consumer lending has increased from RM134 billion to RM343 billion while loans disbursed to small and medium enterprises have increased from RM71 billion in 2000 to RM108 billion in 2007. Domestic banking institutions are also building on their
strong domestic performance to expand beyond Malaysian borders. Today, six domestic banks have presence in 10 countries around the region.

(Source: Keynote address by Dr Zeti Akhtar Aziz, Governor of Central Bank Malaysia, at the 11th Malaysian Banking Summit “The Malaysian Banking Industry Reinvention and Transformation”, Kuala Lumpur, 19 July 2007.)

In summary, the Malaysian banking sector has gone through three sub-period, the Asian Financial Crisis (1997 to 2001) where banks suffered huge increased in substandard loans in NPLs due to downturn of the economy and collapse of the property and stock markets. In the year 2002 to 2004, Malaysian banking sector started the merger exercise in anticipating of eventual liberalization of the banking industry, where foreign owned banks are accorded the same privileges as the local banks. The post merger period from 2005 to 2007 is seen as a period where local banks are more resilient to any unexpected adverse economics environment and started to expand beyond the Malaysian borders.
3.1 LITERATURE REVIEW

The “franchise value” paradigm for bank risk-taking, both with and without government regulation, is well established in the banking literature. The idea is that banks limit their risk-taking in order to protect the quasi-monopoly rents granted by their government charters. Increased competition would erode these rents and the value of the charters, which would likely lead to greater bank risk-taking and greater financial instability.

Marcus (1984) used a one period model to show that franchise value declines as a bank engages in riskier policies. Dermine (1986) extended the Klein-Monti model to incorporate bankruptcy risk and deposit insurance and found a negative relationship between the level of bank credit risk and its deposit market power. Chan, Greenbaum and Thakor (1986) also found that increased competition erodes the surplus that banks can earn by identifying high quality borrowers. The reduction in value leads banks to reduce their screening of potential borrowers and, thus, overall portfolio credit quality declines. Broecker (1990) explained that increased competition, measured as an increased number of banks had a negative effect on the average credit-worthiness of the banking system. In the paper by Besanko and Thakor (1993), the authors presented the argument that increased competition erodes informational rents.
originated from relationship banking and enhances risk-taking by banks. In a context of asymmetric information, Marquez (2002) illustrated in his paper that an increased in the number of banks in a market disperses the borrower-specific information and will result in higher funding costs for low-quality borrowers but also in a higher access to credit for low-quality borrowers.

Using a dynamic optimization model with an infinite horizon, Suárez (1994) explained the trade-off between market power and solvency. If the market power of the bank decreases, the incentive to engage in riskier policies increases significantly. As the franchise value of the bank is a component of bankruptcy costs, it should encourage the bank to carry out prudent policies that increase the solvency of the bank. Matutes and Vives (1996, 2000) in a framework of imperfect competition (i.e., product differentiation) illustrated that higher market power reduces a bank’s default probability. Hellmann, Murdock and Stiglitz (2000) in a dynamic model of moral hazard explained that competition can have a negative impact on prudent bank behavior. Capital requirements are not enough to reduce the gambling incentives and they need to add deposit rate controls as a regulatory instrument. Building on the former paper, Repullo (2004) used a dynamic model of imperfect competition in banking to show that in the absence of regulation, more competition (i.e., lower bank margins) leads to more risk. Risk-based capital requirements were found to effectively control the risk-shifting incentives.

As an important challenge to the franchise value paradigm, BDN develop a model, modifying one presented by Allen and Gale (2000), where an increase in the bank market power both in the loan and deposit markets translates into higher loan
rates charged to borrowers. In a moral hazard environment (as in Stiglitz and Weiss, 1981), entrepreneurs facing higher interest rates on their loans would choose to increase the risk of their investment projects, a practice that would lead to more problem loans and a higher bankruptcy risk for banks. They find a monotonic declining relationship between competition, measured as the number of banks lending in a market, and bank risk; that is, as the number of banks and competition increases, the level of bank risk would decline.

BDN argued that there exist two fundamental risk-incentive mechanisms that operate in exactly the opposite direction, causing banks to become more risky as their markets become more concentrated. The first mechanism exists on the asset side of banks balance sheets and has been undetected in widely cited studies that concentrate on deposit market competition. Ceteris paribus, as competition declines, banks earn more rents in their loan markets by charging higher loan rates. In themselves, higher loan rates would imply higher bankruptcy risk for bank borrowers. This effect is further reinforced by moral hazard on the part of borrowers who, when confronted with higher interest costs, optimally increase their own risk failure. The second mechanism is equally striking in its implications for competition risk in banking noxious. It allows for a fixed, out-of-pocket cost that is realized by banks if they go bankrupt. Under reasonable assumptions, when the number of banks in a market increases, deposits, assets and profits per bank decline. Thus the (constant) cost of bankruptcy increases relative to everything else. This act as a disincentive to risk taking that is ever increasing as the number of competitor increases.
However, in a recent paper, MMR propose a way to reconcile the franchise value paradigm and the insights of the BDN model. They show that the former monotonic relationship might become a U-shaped relationship if there is imperfect default correlation across firms. Under the assumption, the risk-shifting effect (i.e., higher risk of firm failure as loan interest rates increase) has to be balanced against the effect of the higher margins obtained from firms that are able to repay even at the higher interest rates. Depending on the degree of default correlation across firms and the intensity of the risk-shifting effect, it is possible to find an initial decline in risk as the number of banks increases (i.e., as bank competition increases), but an eventual increase in risk as the number of banks operating in a market keeps growing.

### 3.2 EMPIRICAL LITERATURE

The empirical literature that we address in this paper focuses on the relationship between competition in banking markets and bank riskiness in the Spanish banking environment. The extent of previous studies use different measures of bank competition, which often highlight the deposit market competition, and bank risk exposures. Keeley (1990) measured the degree of bank competition using banks’ market power using Tobin’s q, which is defined as the ratio of a bank’s equity market valuation to its book value. First, he showed that liberalization measures eroded Tobin’s q, controlling for macroeconomic variables and bank characteristics. Secondly, he related two measures of bank risk to his measures of market power finding that: (1) a bank’s solvency ratio, defined as the market value of capital divided by the market value of assets, has a positive relationship (i.e., a higher market power means a larger solvency coefficient), and (2) funding costs for certificates of deposit
(CD) have a negative relationship (i.e., as the market power declines the perceived bankruptcy risk of the bank increases and so does the cost of uninsured large CD’s). On aggregate, these results support the franchise value paradigm.

Demsetz, Saidenberg and Strahan (1996) showed that U.S. banks with greater market power also have the largest solvency ratios and a lower level of asset risk. Saunders and Wilson (1996), for a sample of U.S. bank and a period of a century, found support for Keeley’s results in the period from 1973 to 1992. For a sample of publicly traded U.S. thrifts, Brewer and Saidenberg (1996) found a negative relationship between franchise value and risk measured as the volatility of their stock prices. Hellmann, Murdock and Stiglitz (2000) had the view that financial-market liberalization in the 1990s increased competition and reduced the profitability and franchise value of domestic banks, which, jointly with other factors, lead to the East Asian financial crisis and a weaker financial system in Japan. Salas and Saurina (2003) replicated Keeley’s work for Spain, finding a very significant and robust relationship between Tobin’s q and the solvency and non-performing loan ratios of Spanish banks. Greater market power was found to be correlated with higher bank solvency ratios and lower credit risk losses. For Italy, Bofondi and Gobbi (2004) found that a bank’s loan default rate increases as the number of banks in a market increases.

In contrast, Jayaratne and Strahan (1998) argued that bank performance, measured using return on assets, return on equity, and several indicators of credit quality, improve significantly after restrictions on banks’ geographic expansion were lifted in the U.S. Moreover, loan losses decreased sharply after statewide branching
was permitted. Thus, an increase in competition seems to have had the opposite effect of the franchise value paradigm. Nevertheless, Dick (2006) provided evidence of a positive and significant relationship between banking deregulation and increases in loan losses, while Hannan and Prager (1998) showed that liberalization of interstate branching and operations increased competition in the deposit market and reduced profitability, ceteris paribus. Moreover, the literature focusing on new bank entrants finds that increases in loan market competition may lead to increase loan losses due to the winner’s curse arising from larger degrees of asymmetric information (see Shaffer, 1998).

In the above-mentioned studies, differences in the degree of bank competition were either cross-sectional or caused by key changes in regulation within one country. Several studies have examined this relationship in a cross-country setting. Beck, Demirgüç-Kunt and Levine (2006) examined banking data for 69 countries over a 20 year period, and they found that more concentrated national banking systems were subjected to a lower probability of systemic banking crisis and hence are more stable. However, they cast doubts on the appropriateness of the share of assets of the three largest banks in the banking system of each country (i.e., their C3 measure) and related measures as proxies for competitiveness in a national banking system. In their paper, Claessens and Laeven (2004) demonstrated a positive and significant relationship between bank concentration measured as C5 and the H-statistic, a measure of the intensity of competition in a market according to Panzar and Rosse (1987). Robustness analyses of this result showed that the relationship between concentration and the H-statistic could also be insignificant, and they concluded that bank concentration is not a good summary of the bank competitive environment. Also
using the H-statistic as the measure of competitiveness, Levy-Yeyati and Micco (2007) found an increase in bank risk as bank competition increased in for eight Latin American countries. Overall, there seems to be a significant amount of literature supporting the franchise value paradigm.

In contrast, Boyd, De Nicoló and Al Jalal (2006) provided empirical evidence supporting the risk-shifting model using several measures of bank risk – namely a z-score measure based on bank returns on assets (ROA), its dispersion measured as $\sigma$ (ROA), and the ratio of equity to total assets and bank competition measured using a Herfindahl-Hirschmann index. They examined two data samples: a cross section of around 2,500 small, rural banks operating in only one market area within the U.S and a panel of about 2,700 banks from 134 countries, excluding Western countries. In both samples, they found a negative and significant relationship between the bank concentration index and z-score; thus, more concentrated banking markets (i.e. less competition) are associated with greater risk of bank failures. Moreover, De Nicoló and Loukoianova (2007) found that the former result is stronger when bank ownership is taken into account. Also in a cross-country setting, Schaeck, Cihák and Wolfe (2006) found that more competitive national banking systems are less prone to systemic crises based on their analysis of 38 countries over the period from 1980 to 2003 again using the H statistic.

In summary, most of the literature supported the franchise value paradigm, that is increased competition will lead to banks engaging in riskier policies. However, this franchise value paradigm has been challenged by BDN (2005) where the authors argued that an increased in the bank market power both in the loan and deposit markets will translate into higher loan rates charged to borrower that leads to riskier
investment projects and eventually increases problem loans and higher bankruptcy risks for banks. Meanwhile MMR combined both franchise value paradigm and BDN model and proposed that the monotonic relationship might become a U-shaped relationship if there is imperfect default correlation across firms.
CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

There have been several studies on this topic and different variables were chosen and compared to measure the performance. This paper is mainly based on the article “How Does Competition Impact Bank Risk-Taking?” conducted by Gabriel Jimenez, Banco de Espana, Jose A. Lopez and Jesus Saurina (2007) on Spanish banks.

In this paper, we use Lerner index to measure the bank market power in terms of loans and deposits and to test whether there is a positive or negative relationship between bank competition and bank risk-taking measured using NPL. In directly, we are studying although with limitations, whether the franchise value paradigm or the risk-shifting paradigm applies to the Malaysian banking system.

In our analysis, we use the accounting data from the respective Bank’s Annual Report to control for individual bank characteristics, such as return on equity (ROE), log of total asset and loan ratio. Our period of analysis is from 2003 to 2007 and we basically focus on commercial banks that represent almost 95% of the credit market to firms in Malaysia.
4.2 STATEMENT OF HYPOTHESIS

By reviewing the studies conducted on “How Does Competition Impact Bank-Risk Taking?” by Gabriel Jimenez, Banco de Espana, Jose A. Lopez and Jesus Saurina (2007) on Spanish banks, we have chosen five variables affecting Bank Risk Taking. The variables are: market power in terms of loans, market power in terms of deposits, bank loan ratio, return on equity (ROE) and log of total asset size.

Thus, the hypotheses are defined as below:

H1. High market power in terms of loans of a bank reduces bank risk-taking.

H2. High market power in terms of deposits of a bank reduces bank risk-taking.

H3. High ratio of consumer loans over total assets (loan ratio) of a bank increases bank risk-taking.

H4. High return on equity (ROE) of a bank reduces bank risk-taking.

H5. Large total asset size of a bank reduces bank risk-taking.

4.3 CONCEPTUAL FRAMEWORK

Literature review in Chapter 3 is our attempt to study the relationship between franchise value and its role in limiting bank risk-taking. As mentioned in the Statement of Hypothesis, five variables have been chosen to measure bank risk-taking of Malaysian Banks. A conceptual framework will be introduced to investigate the relationship between these factors and Bank Risk-Taking. The independent variables adopted will be market power in terms of loans, market power in terms of deposits, bank loans ratio, return on equity (ROE) and total asset size; meanwhile the
dependent variables will be the Bank Risk-Taking, measured in terms of non-performing loans.

We suggest the following framework to investigate the relationship among the variables and effect of these factors on Bank Risk-Taking of Malaysian Banks

**Figure 1**  
Conceptual Framework

4.4 MODEL DESCRIPTION

This model is to examine the hypotheses regarding the franchise value paradigm and the risk-shifting hypothesis of the BDN model. That is whether NPL has a positive or negative relationship with bank competition. We estimate the general regression as follows:

\[ NPL_{it} = f(LOANS \text{ COMPETITION INDEX}_{it}, DEPOSITS \text{ COMPETITION INDEX}_{it}, LOAN \text{ RATIO}_{it}, RETURN \text{ ON EQUITY}_{it}, ASSET \text{ SIZE}_{it}) \]
where the $i$ subscript refers to a bank and the $t$ subscript refers to the year. The model sets the relationship between the specified bank risk measure and the specified bank market competition measure in terms of loans and deposits. We control the specialization in commercial lending of the bank, its profitability and its size using its percentage of total assets that represents commercial loans (LOAN RATIO), its contemporaneous ROE and its total assets (ASSET SIZE) respectively. The actual model specification we examine is as follows:

$$NPL = \alpha + \beta_1 LL + \beta_2 LD + \beta_3 LR + \beta_4 ROE + \beta_5 SIZE + \varepsilon$$

The dependent variable is the bank’s risk measured by the bank’s NPL ratio. As for the independent variables they are represented by LL for Lenner Index for Loans, LD for Lenner Index for Deposits, LR for percentage of total assets that represent commercial loans, ROE for return on equity, SIZE for market share in terms of total loans respectively and $\varepsilon$ is a random error that has a normal distribution.

Our dependent variable measure of risk-taking is the bank’s commercial non-performing loan (NPL) ratios, which is an ex-post measure of credit risk. We focus on commercial credit risk for two reasons. First, the BDN and MMR models are based importantly on the borrowing behavior of commercial firms, and second, credit risk is the primary driver of risk for most banks, although other risks exist. The NPL ratios for Malaysian banks and foreign banks incorporated in Malaysia are obtained from the respective published annual accounts. As discussed previously, various measures of the degree of bank competition have been used in the banking literature. While many papers have used concentration measures as proxies for bank competition, we
share the concern expressed by Claessens and Laeven (2004) regarding the meaning of these concentration variables, where they concluded that bank concentration is not a good summary of the bank competitive environment.

For our paper, for each of the sample bank selected, we have computed its average interest rate and marginal cost for Loans and Advances for the year 2003 to 2007. Using this interest rate and marginal cost computation, we can produce a Lerner index for Loans and Advances for each of the selected bank in our sample. The Lerner index is a commonly used measure of market power that captures the degree to which a firm can increase their marginal price beyond their marginal cost. The Lerner Index, named after the economist Abba Lerner, describes a firm's market power. Mathematically, it is measured with the following formula: \( L = \frac{(P-\text{MC})}{P} \), where \( L \) is the Lerner Index, \( P \) is the selling price and \( \text{MC} \) is the marginal cost. The index ranges from a high of 1 to a low of 0, with higher numbers implying greater market power. For a perfectly competitive firm (where \( P=\text{MC} \)), \( L=0 \); such a firm has no market power.

The Lerner index is a more accurate measure of market power than the standard concentration measures. However, the computation of the Lerner index requires a proper estimation of the marginal cost of the product, which for bank loans requires a measure of the risk premium charged. Failure to take the risk premium into account would result in significant biases in measuring bank market power. If the interest rate on a loan is denoted as \( R_l \), the Lerner index (or gross profit margin relative to the market price) is defined as \( (R_l - R) / R_l \), where \( R \) is the marginal cost of the loan. If we introduce the realistic assumption that the marginal operating costs of
loans is fixed in the very short term, we assume that banks have marginal cost for their loans equal to the interest rate offered in the interbank market. We compute R1, the interest rate on a loan by dividing Interest income (including recoveries from NPLs) from Loans and Advances with the outstanding balance of the Loans and Advances at the balance sheet date. As for the marginal cost R, we use the annual average of the daily interbank rate as the risk free interest rate r and Probability of Default is computed as Net NPL (where no specific provision has been made) divided by Net Loans and Advances (after deducting specific allowances).

Banks must also introduce a risk premium into their prices to account for credit risk. Let PD be the probability that a loan, with a normalized face value of one, will default over a specified horizon, and let LGD be the amount of the loan’s value that the bank cannot collect in case of default. If the interbank interest rate r is assumed to be risk-free, the marginal opportunity cost of the loan for a risk-neutral bank will be the interest rate R that satisfies the condition that the risk-free value of the loan equals the expected value of the loan, given the PD and LGD parameters.

From this simple identity, the marginal cost \( R = \frac{(r + PD \cdot LGD)}{(1 - PD \cdot LGD)} \).

For our calculations, the risk-free interest rate r is the annual average of the daily interbank rate. The bank-specific, not borrower-specific, PD for a given bank at the end of year t, is computed from the respective Bank’s Annual Report. PD is equal to the bank’s ratio of Net NPL not provided for divided by Net Loan and Advances outstanding (after deducting specific allowances). Since we do not have bank-specific information regarding LGD, We use the value 45% set by the Basel Committee of Banking Supervisors in its new capital framework.
For our analysis, we calculate the Lerner indexes for Loan and Advances of the nine Malaysian commercial banking and seven foreign owned banks incorporated in Malaysia. The Loans and Advances includes Overdrafts, Term loans (Housing loans/financing, Syndicated term loans, Hire purchase receivables, Lease receivables, Factoring receivables, Other term loans/financing), Bills receivable, Trust receipts, Claims on customers under acceptance credits, Staff loans, Credit card receivables, Revolving credits and Share margin financing.

We also compute Lerner indexes for Deposits by assuming separability between loan and deposit pricing and that the interbank rate acts as upper bound for deposit rates. The Bank’s average deposit rate is computed by dividing Interest expenses paid to customers with Total deposits from customers. The Lerner index for a deposit product is calculated as \((r - R_d)/r\), where \(R_d\) is the bank’s offered rate on that deposit product.

In our model specification, positive and significant values for \(\beta_1\) and \(\beta_2\) would provide evidence in support of the risk-shifting paradigm; that is, as the bank market power increase (i.e. less competition), bank riskiness as measured by NPL ratios would also increase. In contrast, if these parameters were negative and significant, increase in market power (i.e. less competition) would lead to lower bank risk or NPL ratio, which is supportive of the franchise value paradigm.

We do not have clear expectations for the bank characteristics. In general, there should be a positive, long-term relationship between risk and return, but banks with high NPL ratios might experience significant losses in a particular year. The
specialization of a bank should be indicative of improved monitoring and screening of borrowers, while, at the same time, specialized banks might be willing to take more risks. Finally, there is no general support for a certain relationship between the size of the bank and its risk level. A larger bank benefits from risk diversification but, at the same time, bank managers could take advantage of that in order to push further the risk profile of the bank. It is also possible that unobservable bank characteristics are correlated with the bank NPL ratios; for example, the risk aversion of bank managers and/or shareholders.

4.5 DATA GATHERING METHOD

The data gathering method in this research is by secondary data collection through the selected Annual Reports of each of the nine Malaysian commercial banks and seven foreign owned banks incorporated in Malaysia. By compiling and computing the data from the five years Annual Report, Year 2003 to Year 2007 of the selected sample banks and analyzing the gathered data by SPSS software, we examine the relevance and reliability of the hypotheses and the presented model.

Analysis of the Annual Reports from the Year 2003 to Year 2007 of this sixteen selected sample banks, permits us to construct the appropriate data variables. We have also taken advantage of the BNM interest rate database that contains the daily interbank rate, to compute the annual average of daily interbank rate for the Year 2003 to Year 2007. Using the annual average of daily interbank rate information, we compute the Lerner index for commercial loans and Lerner index for deposits as a
measure for market power in order to examine the relationship between bank competition and bank risk taking.

Relevant secondary data is extracted from the Financial Statements of the respective banks and the relevant ratios are computed accordingly. The secondary data is gathered mostly from the respective bank’s websites.

Collecting the research data through the Annual Reports is most appropriate way as the Financial Statements in the Annual Reports have been audited and as such verified by an independent third part on its accuracy. In addition, the cost of gathering data through Annual Reports and websites questionnaires is much lower and the respond time is faster compare to other data collection method. The information extracted from the Five Years Financial Statements from Year 2003 to Year 2007, for the purpose of this study is as follows:

1) Non Performing Loan Ratio
2) Gross Receivable Outstanding
3) Annual Interest Income
4) Profit Before Taxation
5) Total Assets
6) Total Shareholder Funds
7) Total Loans and Advances for consumers
8) Interest expenses paid to depositors
9) Deposits received from customers

The above data were than used to compute the relevant ratio such as;

1) Lerner Index for Loans
2) Lerner index for Deposits
3) Return on Equity (ROE)
4) Loan Ratio measured (by consumer loans divided by total assets)
5) Loan size (measured by log of total assets)

The above ratios computed for the nine Malaysian commercial banking and seven foreign owned banks incorporated in Malaysia, for five financial year-ends (Year 2003 to Year 2007) provide us with seventy-seven data for analysis. This number of data collected is reasonably adequate for the purpose of this research.

4.6 PLANS FOR DATA ANALYSIS

For the purpose of analyzing the collected data, descriptive and empirical methods were employed. Statistical Package for Social Science (SPSS) were used to analyze the data gathered from the Annual Reports of the sample banks. Data collected from the financial statements were coded in numerical number, where necessary and keyed into the statistical program of SPSS to be analyzed by the software.

4.7 LIMITATION OF DATA COLLECTION

Ideally, the data should be collected by writing and interviewing the financial controllers of the respective banks. However accessing to all managers with this specialty is almost impossible; therefore the survey has been conducted by just obtaining the Annual Reports of the banks through their respective bank’s websites. Some limitations of the data collected including not able to obtain the financial
statements of some foreign banks including Bangkok Bank Bhd, Bank of Tokyo-Mitsubishi UFJ (M) Bhd, Citibank Bhd, JP Morgan Chase Bank Bhd, Bank of America (M) Bhd. Another issue encountered in the collecting of the data is the unavailability of financial statements for the Year 2003 for three banks, namely Deutsche Bank (M) Bhd, The Bank of Nova Scotia Bhd and HSBC Bank (M) Bhd.

By looking at the limitation of time and access, the sample size are deemed to be sufficient for the generalization of the research, though a larger sample size is more desirable and may lead to more optimum results.

4.8 SUMMARY

Chapter 4 presented the research methodology and exhibited how does competition impacts the Bank Risk-Taking in Malaysian banks. The model includes a set of five factors used to measure the impact on Bank Risk-taking. By reviewing the paper by Jimenez, Banco de Espana, Jose A. Lopez and Jesus Saurina (2007) on “How Does Competition Impact Bank Risk-Taking?” and various literatures, the extended model was presented and illustrated in this chapter under Conceptual Study and Model Description.

The data collected and collated were highlighted in this chapter where we seek to determine their relationships by conducting this research. Subsequently the research Hypotheses are presented and discussed. The data gathering method is by secondary data collection through the Annual Reports of the nine Malaysian commercial banking and seven foreign owned banks incorporated in Malaysia
selected for this survey. The financial information was mainly obtained from the respective bank’s website.

From the data collected and collated, the hypotheses are tested and examined. Data gathered from the exercise will be analyzed by SPSS and discussed in next chapter. The data gathering method has limitations such as time, cost, and access to the respective banks Financial Statements in particular and the Banks’ website in general. By considering these limitations, we believe that the gathering of the data have been reasonably conducive and successful.
CHAPTER 5

RESEARCH RESULTS

5.1 EMPIRICAL RESULTS

This chapter presents the findings of the study. The secondary data collected and collated for the research were discussed and analyzed. Also the author discusses on the results from running the SPSS software from the gathered data. These results are compared with the proposed hypotheses of the research and new propositions are presented according to the optimum research findings.

5.2 DATA SCREENING AND TRANSFORMATION

Data screening and transformation techniques are used in this research to ensure that data have been correctly entered and that the distribution of variables that are to be used in analysis are normal and reliable.

To ensure the validity of the data and to avoid error data inputted-in, data files have been screened carefully. By looking into frequencies result, we can detect missing values, if any. Frequency analysis also used for checking whether the observed distribution values are adequate for each variable.
5.3 DATA ANALYSIS

SPSS software has been employed as a tool to investigate the data by using multiple regression method after checking the normality and reliability of the data.

Normality is first step of data screening, wherein the characteristics of the data are explored. Assumption of normality is a pre-requisite for many inferential statistical techniques. There are a number of ways to explore this assumption graphically namely histogram, box plot, stem and leaf plot etc. Normality refers to the ‘shape’ of the distribution of the data. Consider a histogram of values for one variable. By drawing a line across the ‘tops’ of the bars in the histogram, we are able to see the ‘shape’ of the data. For testing the normality, factors related to each variable are grouped together and analyzed. The first conformity for our Normality is Kolmogorov-Smirnov test. Note that for this analysis we use Kolmogorov-Smirnov test because it is to test data larger than 50, ours is 77. In this test if the significance level is greater than 0.05, then normality is assumed. But if we look at our results (Table 1), we can conclude that the variables are not normally distributed. The distribution can be statistically viewed as non-symmetrical. This shows that one tail of the distribution is longer than the other (skewed), or the distribution of the data is too flat or too peaked, that is the tails are too short or too long (kurtosed).
### Table 1
Test for Normality

**Tests of Normality**

<table>
<thead>
<tr>
<th></th>
<th>Kolmogorov-Smirnov&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>Df</td>
</tr>
<tr>
<td>NPL</td>
<td>.139</td>
<td>77</td>
</tr>
<tr>
<td>Lerner index – Loan</td>
<td>.171</td>
<td>77</td>
</tr>
<tr>
<td>Lerner index – Deposit</td>
<td>.109</td>
<td>77</td>
</tr>
<tr>
<td>ROE</td>
<td>.104</td>
<td>77</td>
</tr>
<tr>
<td>Loan Ratio</td>
<td>.235</td>
<td>77</td>
</tr>
<tr>
<td>Log of Total Asset</td>
<td>.153</td>
<td>77</td>
</tr>
</tbody>
</table>

<sup>a</sup> Lilliefors Significance Correction

Though the Kolmogorov-Smirnov result is not normal, we will have to look at the actual distribution graphical graph in Appendix 4 for confirmation. From the distribution tables and our Skewness and Kurtosis test, it can be concluded that except for NPL and Lerner Index for loan where the Kurtosis is 4.369 and 7.244 respectively, we could roughly guess that the rest of our data is normally distributed (i.e. skewness less than 2 and kurtosis less than 3).
5.4 DESCRIPTIVE STATISTICS

Table 2 below presents the descriptive statistics for the variables. We have 77 bank-year observations for 16 commercial banks over a period of 5-year sample.

Table 2  
Descriptive statistics for bank-year observations

<table>
<thead>
<tr>
<th></th>
<th>NPL</th>
<th>Lerner index - Loan</th>
<th>Lerner index - Deposit</th>
<th>ROE</th>
<th>Loan Ratio</th>
<th>Log of Total Asset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>8.5108</td>
<td>.0083</td>
<td>.1544</td>
<td>17.8084</td>
<td>.5296</td>
<td>7.5444</td>
</tr>
<tr>
<td>Median</td>
<td>7.2500</td>
<td>.0800</td>
<td>.1800</td>
<td>16.0700</td>
<td>.5700</td>
<td>7.5600</td>
</tr>
<tr>
<td>Mode</td>
<td>4.68&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.24</td>
<td>.01</td>
<td>14.47&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.56</td>
<td>7.37</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>5.98256</td>
<td>.37455</td>
<td>.18545</td>
<td>9.47905</td>
<td>.17307</td>
<td>.49065</td>
</tr>
<tr>
<td>Variance</td>
<td>35.791</td>
<td>.140</td>
<td>.034</td>
<td>89.852</td>
<td>.030</td>
<td>.241</td>
</tr>
<tr>
<td>Range</td>
<td>33.32</td>
<td>2.61</td>
<td>.85</td>
<td>56.97</td>
<td>.66</td>
<td>1.97</td>
</tr>
<tr>
<td>Minimum</td>
<td>.86</td>
<td>1.75</td>
<td>-1.40</td>
<td>-14.47</td>
<td>.06</td>
<td>6.44</td>
</tr>
<tr>
<td>Maximum</td>
<td>34.18</td>
<td>.86</td>
<td>.45</td>
<td>42.50</td>
<td>.72</td>
<td>8.41</td>
</tr>
<tr>
<td>Percentile 25</td>
<td>4.2100</td>
<td>-.1000</td>
<td>.0550</td>
<td>11.3750</td>
<td>.5100</td>
<td>7.3700</td>
</tr>
<tr>
<td>50</td>
<td>7.2500</td>
<td>.0800</td>
<td>.1800</td>
<td>16.0700</td>
<td>.5700</td>
<td>7.5600</td>
</tr>
<tr>
<td>75</td>
<td>10.8850</td>
<td>.2400</td>
<td>.3050</td>
<td>24.0600</td>
<td>.6300</td>
<td>7.8750</td>
</tr>
</tbody>
</table>

<sup>a</sup> Multiple modes exist.
The smallest value is shown.

The average NPL ratio is 8.51% with a large degree of dispersion across banks; ranging from 0.86% to a high of 34.18%. The median of the NPL distribution is 7.25%. As shown in Figure 2, there is a significant reduction of NPL percentage over time in this variable with the average NPL ratio at around 5.26% in recent years and around 13.23% at the beginning of the sample period. These time dynamics are tied to the Malaysian business cycle, which experienced a deep recession around end of nineteen nineties and beginning of year two thousand before recovering in the
middle and end of year two thousand. The recovery can be seen from real interest rates that have been significantly increasing steadily from average of 4.20% to 5.90% for the period 2003 to 2007 as the Malaysian economy recovers.

Figure 2
Average Non Performing Loan

The average Lerner index for loan is positive, although relatively small; loan margins are only about 0.01% of the marginal cost of the loan. The range for Lerner index for loan is from negative 1.75% to 0.86%. This shows that there is a huge disparity in terms of individual banks quotes their loan interest rates. There is a possibility that due be competition, banks are quoting their products based on the profitability of a “basket” of various products rather than comparing profitability based on single product.

The average Lerner index for deposits is positive and 0.15% above the interbank interest rate. The dispersion across banks is smaller than the Lerner index
for loans, ranges from negative 0.40% to a high of 0.45%. The median of the Lerner index for deposits is 0.18%.

Table 2 also shows that commercial banks in Malaysia have an average ROE of 17.81% for the period analyzed, with a high degree of heterogeneity. There is vast difference between both end of the scale where, the minimum ROE is negative 14.47% and the maximum is 42.50%. The median ROE is 16.07%.

In the sample, we measure bank size using the Log of total asset of that the bank. The mean value is 7.54 with a range of 1.97, from the lowest of 6.44 to the highest at 8.41. The median value for Log of total asset is 7.56.

Finally, there is a significant difference in degrees of specialization in the commercial lending as some banks concentrate on commercial lending (as high as 72%), while others almost do not operate in that market segment (as low as 6%). This could be explained by the fact that most of the Malaysian commercial banks are more active in commercial loans lending compared to foreign banks incorporated in Malaysia. The average loan ratio is 53% with a median of 57%.

5.5 CORRELATION COEFFICIENT

Table 3 presents the pairwise correlations between the variables. We find a negative relationship between all our measures of bank market power in both, the loan and deposit markets and bank’s commercial NPL ratios, our measure of bank risk. The correlations for the loan Lerner indexes with NPL ratios is quite strong at -0.534,
whereas, the correlations for deposit Lerner indexes is -0.236 indicating a reasonable strong reverse relationship between the two independent variables with NPL ratios, the ex-post credit risk. Therefore, simple correlation analysis suggests a negative relationship between market power and bank risk, supporting the franchise value paradigm.

### Table 3
**Correlation coefficient**

<table>
<thead>
<tr>
<th></th>
<th>NPL</th>
<th>Lerner index – Loan</th>
<th>Lerner index - Deposit</th>
<th>ROE</th>
<th>Loan Ratio</th>
<th>Log of Total Asset</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPL</td>
<td>1</td>
<td>-0.534(**)</td>
<td>-0.236(*)</td>
<td>-0.492(**)</td>
<td>0.275(*)</td>
<td>0.023</td>
</tr>
<tr>
<td>Lerner index – Loan</td>
<td>-0.534(**)</td>
<td>1</td>
<td>0.109</td>
<td>0.273(*)</td>
<td>-0.488(**)</td>
<td>-0.255(*)</td>
</tr>
<tr>
<td>Lerner index – Deposit</td>
<td>-0.236(*)</td>
<td>0.109</td>
<td>1</td>
<td>0.113</td>
<td>-0.070</td>
<td>0.250(*)</td>
</tr>
<tr>
<td>ROE</td>
<td>-0.492(**)</td>
<td>0.273(*)</td>
<td>0.113</td>
<td>1</td>
<td>0.070</td>
<td>0.237(*)</td>
</tr>
<tr>
<td>Loan Ratio</td>
<td>0.275(*)</td>
<td>-0.488(**)</td>
<td>-0.070</td>
<td>0.070</td>
<td>1</td>
<td>0.571(**)</td>
</tr>
<tr>
<td>Log of Total Asset</td>
<td>0.023</td>
<td>-0.255(*)</td>
<td>0.250(*)</td>
<td>0.237(*)</td>
<td>0.571(**)</td>
<td>1</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Pearson Correlation - These numbers measure the strength and direction of the linear relationship between the two variables. The correlation coefficient can range from -1 to +1, with -1 indicating a perfect negative correlation, +1 indicating a perfect positive correlation, and 0 indicating no correlation at all. (A variable correlated with itself will always have a
correlation coefficient of 1.) We can think of the correlation coefficient as telling us the extent to which we can guess the value of one variable given a value of the other variable.

ROE like both the Lerner Indexes for loans and deposits has a strong negative relationship of -0.492. This suggests that current problem loans have a negative impact on current profitability. Specialization in commercial lending, indicated by Loan ratio is positively correlated with NPL ratios at 0.275. This strong positive relationship is probably due to specialized banks are willing to take more risks. The other variable of Log of total assets has a positive relationship of 0.023, indicating a low and almost negligible relationship with NPL ratios. This indicates that larger banks do not actually benefits from risk diversification as bank managers probably took advantage of their larger portfolio to push further the risk profile of their banks.

Within the Lerner measures of market power, the positive correlations between the Lerner index for loans and Lerner index for deposits is not very strong at 0.109, indicating that a bank that is strong in loans market might not necessary be strong in the deposits market. The other worth mentioning correlation is the strong positive relationship of 0.571 between Specialization and Size. This finding suggests that bank that has a large asset size will have high specialization in commercial loans.

5.6 MULTIPLE REGRESSION

Multiple Regression is an extension of bivariate correlation. The result of regression is an equation that represents the best prediction of a dependent variable from several independent variables. Regression analysis is used when independent
variables are correlated with one another and with the dependent variable. In the other words, multiple regression analysis is a method for explanation of phenomena and prediction of future events. In multiple regression analysis, a set of predictor variables is used to explain variability of the criterion variable.

Table 4
Multiple Regression

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2099.208</td>
<td>5</td>
<td>419.842</td>
<td>48.008</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>620.910</td>
<td>71</td>
<td>8.745</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2720.118</td>
<td>76</td>
<td>36.625</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Log of Total Asset, Lerner index - Loan, Lerner index - Deposit, ROE, Loan Ratio

b. Dependent Variable: NPL

Table 4
Multiple Regression

<table>
<thead>
<tr>
<th>Model Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Log of Total Asset, Lerner index - Loan, Lerner index - Deposit, ROE, Loan Ratio

b. Dependent Variable: NPL

ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2099.208</td>
<td>5</td>
<td>419.842</td>
<td>48.008</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>620.910</td>
<td>71</td>
<td>8.745</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2720.118</td>
<td>76</td>
<td>36.625</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Log of Total Asset, Lerner index - Loan, Lerner index - Deposit, ROE, Loan Ratio

b. Dependent Variable: NPL
<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>6.768</td>
<td>6.135</td>
<td>1.103</td>
<td>.274</td>
</tr>
<tr>
<td>Lerner index - Loan</td>
<td>-11.923</td>
<td>1.068</td>
<td>-.746</td>
<td>-11.167</td>
</tr>
<tr>
<td>Lerner index - Deposit</td>
<td>-6.337</td>
<td>1.977</td>
<td>-.196</td>
<td>-3.206</td>
</tr>
<tr>
<td>Loan Ratio</td>
<td>.624</td>
<td>2.590</td>
<td>.018</td>
<td>.241</td>
</tr>
<tr>
<td>ROE</td>
<td>-.124</td>
<td>.041</td>
<td>-.196</td>
<td>-3.038</td>
</tr>
<tr>
<td>Log of Total Asset</td>
<td>.622</td>
<td>.931</td>
<td>.051</td>
<td>.668</td>
</tr>
</tbody>
</table>

The goal of linear regression is to find the line that best predicts Y from X. Linear regression does this by finding the line that minimizes the sum of the squares of the vertical distances of the points from the line. Linear regression does not test whether our data are linear (except via the runs test). It assumes that the data are linear, and finds the slope and intercept that make a straight line best fit our data.

The result from the multiple regressions will be an equation which shows the relationship between independent variable and the factors affecting it:

\[ y = a + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n. \]

Where \( \beta_n \) is the regression coefficient, representing the amount the dependent variable (y), changes when the corresponding independent changes. The a is the constant, where the regression line intercepts the y axis, representing the amount the dependent y will be when all the independent variables are 0. The standardized
version of the β coefficients is the β weights, and the ratio of the β coefficients is the ratio of the relative predictive power of the independent variables. Associated with multiple regression is $R^2$, multiple correlation, which is the percent of variance in the dependent variable explained collectively by all of the independent variables.

In order to run the regression test, factors related to each variable are grouped together and analyzed versus independent variable namely Non Performing Loans. Table 4 presents the regression results that are summarised below:

- R is the multiple correlation coefficients between predictors and performance. $R = 0.878$, which is acceptable and favorable.

- R square shows how much variability in loyalty is accounted by the independent variables. $R^2 = 0.772$ shows that 77% of the Non Performing Loans (NPL) is explained by the independent variables i.e. Lerner Index for Loans, Lerner Index for Deposits, Loan Ratio, Log of Total Assets and Return on Equity (ROE), which is highly significant, as indicated by the F-value of 48.008.

- According to the table of the coefficients of regression model, the sig. column shows the validity of the data; the data is valid if the sig. amount is less than 0.005, therefore only Lerner index for loans, Lerner index for deposits and ROE variables are accepted as a predictor.
According to the above findings, the regression model can be presented as follows:

\[
Y_{\text{NPL}} = 6.768 - 0.746 X_{\text{Lerner index loans}} - 0.196 X_{\text{Lerner index deposits}} + 0.018 X_{\text{loan ratio}} - 0.196 X_{\text{ROE}} + 0.051 X_{\text{log of total assets}}
\]

The result indicates high negative correlation between Non Performing Loans and independent variables such as Lerner index for loans, Lerner index for deposits and return on equity (ROE), the findings are favorable to support the hypotheses. The negative signs of the Lerner index for loans and deposits, suggesting that an increase in market power brings about a decline in credit risk, which is in line with the franchise value paradigm. As for ROE, the negative sign shows that banks that have a high NPL ratio would have a low return on equity (ROE) as provisions will have to be made for doubtful loans. The result also shows that specialized banks and banks that have large assets size do not have a significant impact on the NPL ratios.

In general, our empirical results suggest a negative relationship between market power and risk-taking: as banks’ market power increases (i.e. competition decreases), banks’ NPL ratio decline. These results do not support the risk-shifting paradigm in the BDN model. In summary, our empirical results for the Malaysian banking system provide evidence in support of the franchise value paradigm that has guided much bank supervision over the past decades.
CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 SUMMARY AND CONCLUSION

Chapter Six draws conclusion and presents recommendations derived from the study. In this chapter, we will look at the hypothesis regarding the outcome of the data analysis. Moreover, limitations of the study will be discussed as well as the critical issues and areas in order to conduct further researches. This chapter will summarize the study and point out the conclusion of the research paper.

In the academic literature and in the actual supervision of banking systems worldwide, the dominant paradigm is that franchise value plays a key role in limiting the riskiness of individual banks and hence of banking systems more broadly (e.g., Keeley, 1990). That is, as a bank’s franchise value increases, its management and shareholders will typically limit and/or reduce its risk exposure to preserve this value. The underlying source of franchise value is typically assumed to be market power and, hence, reduced competition or, equivalently, market concentration has been considered to promote banking stability.

BDN challenge the traditional view through what we call the “risk-shifting” paradigm. They argue that market concentration could impact bank stability in
different ways, depending on the net effect across deposit and loan markets. In particular, they claim that the current consensus has ignored the “loan market channel” and hence may lead to incorrect conclusions. Specifically, the authors suggest that concentration in the loan market could lead to increase lending rates that both raise the borrowers’ debt loads and default probabilities as well as their incentive to engage in riskier projects (via moral hazard as in Stiglitz and Weiss (1981)).

Using secondary datasets extracted from the Annual Reports of the nine Malaysian commercial banking and seven foreign owned banks incorporated in Malaysia, we explicitly examine the relationship between bank competition and risk. Our dependent variable is the bank’s non-performing commercial loans ratio, which is the variable addressed directly in the BDN and our independent variables are market power in terms of loan, market power in terms of deposits, bank loan ratio, return on equity (ROE) and log of total asset size.

From the data obtained from the individual bank’s Annual Financial Statements, we are able to construct market power measures for loans and deposits based on Lerner indexes using bank-specific marginal interest rates on the loans and deposits products. Our empirical results show that Lerner index measures of loan and deposit market powers do have a significant negative relationship with bank risk; that is, as market power increases for both loans and deposits, bank NPL ratios decreases. This result is direct evidence support of the franchise value paradigm. Our results do not support the existence of the risk-shifting effects permitted in the BDN model.
By considering the results of the data analysis in support of or against the research hypotheses, the hypotheses can be divided in two categories; Accepted and Rejected Hypotheses:

Accepted Hypotheses:

**H1.** *High Market Power in terms of loans of a bank reduces Bank Risk-Taking.*

**H2.** *High Market Power in terms of deposits of a bank reduces Bank Risk-Taking.*

**H3.** *High ratio of consumer loans over total assets (loan ratio) of a bank increases Bank Risk-Taking.*

**H4.** *High return on equity (ROE) of a bank reduces Bank Risk-Taking.*

Rejected Hypotheses:

**H5.** *Large total asset size of a bank reduces Bank Risk-Taking.*

Rejecting hypotheses illustrates that the data gathered from the Annual Financial Reports of the Malaysian banks are not supporting the hypotheses. The reason why H5 is rejected could be because even though the bank has a large asset size but the quality of the portfolio can be questionable due to bank managers taking advantage of their larger portfolio to push further the risk profile of their banks, leading to a high non-performing loan ratio.
6.2 LIMITATIONS OF THE STUDY

In order to conduct a research on the impact of competition on bank risk taking in the Malaysian banking landscape, a more comprehensive and effective survey on relationships among different variables in bank risks and competitions need to be conducted. Larger pools of primary and secondary data could be collected from all commercial banks in Malaysia to have a better representation of our conclusions.

The limitations of this research paper can be pointed out as follows:

- The secondary data obtained is only for a short period of five years, from the Year 2003 to Year 2007.
- Not all Malaysian banks or foreign banks incorporated in Malaysia are included in the study due to limitation in accessing the financials information.
- In computing the relevant ratios and indexes, a certain degree of assumption at the discretion of the author is applied as the data obtained from the respective banks are not consistent.
- Information obtained for this study are all secondary data, as such it may not represents the actual relationships of the various variables identified at this current situation.

6.3 RECOMMENDATIONS FOR FUTURE STUDY

Based on the previous chapters, the debate is still very relevant on whether the relevant authorities should allow market forces to determine the number of banks in a country or should the authority predetermined the optimum numbers so as to reduce the level of competitions among banks. There is limited documentation and research
made in this subject, especially in Malaysia. That is why there is a need for further research and investigation on this subject as excessive competitions among banks could threaten the solvency of particular institutions and, at an aggregate level, hamper the stability of the entire banking system in the country.

This paper provides an initial analysis on the impact of competition on bank risk taking in the Malaysian banking landscape. In an effort to decrease the bias and error, the following suggestions for future research should be examined. A larger sample size should be researched interviews with the key personnel of the various banks are to be conducted for a more holistic view on the subject.

6.4 CONTRIBUTION OF THE STUDY

The contribution of our paper is to perform a limited (i.e., Malaysian banks) but rather precise, test of bank competition versus bank risk in order to provide guidance for banking regulation policies related to competition and financial stability. Our empirical results for the Malaysian market provide additional support for the franchise value paradigm. While our study is limited to a single country, the closeness of the empirical variables to the theoretical constructs should weaken the empirical standing of alternative market power paradigms.
REFERENCES


Jayaratne, J. and P. E. Strahan, 1998. “Entry restrictions, industry evolution, and
dynamic efficiency: evidence from commercial banking”, *Journal of Law and
Economics*, XLI, April, 239-273.


American banking sectors: Impact on competition and risk”. *Journal of Banking
and Finance*, 31, 1633-1647.

8, 557-565.

Marquez, R., 2002. “Competition, adverse selection, and information dispersion in the

failure? Unpublished manuscript, CEMFI.


banking”, *European Economic Review* 44, 1-34.


Soo-Nam Oh. “Towards a Sustainable Banking Sector – Malaysia”, *A study of
Financial Markets.*
Repullo, R., 2004. “Capital requirements, market power, and risk-taking in banking”, 

Salas, V. and J. Saurina, 2002. “Credit risk in two institutional regimes: Spanish 
203-224, 2002.

Salas, V. and J. Saurina, 2003. “Deregulation, market power and risk behavior in 
Spanish banks”, European Economic Review, 47 pp. 1061-1075.

diversification effects”, Working Paper S-96-52, New York University Salomon 
Center.


Intermediation, 7, 359-392.


Appendix 1: List of Banking Institutions (as at 31 August 2008)

*Universal Bank*
1. CIMB Group (CIMB Bank + CIMB Investment Bank + CIMB Islamic Bank)

*Anchor Banks (Major/ Commercial Banks)*
1. Affin Bank Berhad
2. Alliance Bank Malaysia Berhad
3. AmBank (M) Berhad
4. CIMB Bank Berhad
5. EON Bank Berhad
6. Hong Leong Bank Berhad
7. Malayan Banking Berhad
8. Public Bank Berhad
9. RHB Bank Berhad

*Foreign owned Commercial Banks*
1. Asian Finance Bank (M) Berhad
2. Bangkok Bank Berhad
3. Bank of America Malaysia Berhad
4. Bank of Tokyo-Mitsubishi UFJ (Malaysia) Berhad
5. Citibank Berhad
6. Deutsche Bank (Malaysia) Berhad
7. HSBC Bank Malaysia Berhad
8. J.P. Morgan Chase Bank Berhad
9. OCBC Bank (Malaysia) Berhad
10. Standard Chartered Bank Malaysia Berhad
11. The Bank of Nova Scotia Berhad
12. The Royal Bank of Scotland Berhad
13. United Overseas Bank (Malaysia) Berhad

*Investment Banks*
1. Affin Investment Bank Berhad
2. Alliance Investment Bank Berhad
3. AmInvestment Bank Berhad
4. Aseambankers Malaysia Berhad
5. CIMB Investment Bank Berhad
6. ECM Libra Investment Bank Berhad
7. Hwang-DBS Investment Bank Berhad
8. KAF Investment Bank Berhad
9. Kenanga Investment Bank Berhad
10. MIDF Amanah Investment Bank Berhad
11. MIMB Investment Bank Berhad
12. OSK Investment Bank Berhad
13. Public Investment Bank Berhad
14. RHB Investment Bank Berhad
15. Southern Investment Bank Berhad
Islamic Banks
1. Alliance Islamic Bank Berhad
2. AmIslamic Bank Berhad
3. Affin Islamic Bank Berhad
4. Al Rajhi Banking & Investment Corporation (Malaysia) Berhad
5. Bank Islam Malaysia Berhad
6. Bank Muamalat Malaysia Berhad
7. CIMB Islamic Bank Berhad
8. EONCAP Islamic Bank Berhad
9. HSBC Amanah Malaysia Berhad
10. Hong Leong Islamic Banking Berhad
11. Kuwait Finance House (Malaysia) Berhad
12. Maybank Islamic Berhad
13. RHB Islamic Bank Berhad

Source: Bank Negara Malaysia
### Appendix 2: Commercial Banks: Statement of Assets

<table>
<thead>
<tr>
<th>End of period</th>
<th>Cash and Repos</th>
<th>Amounts due from Central Bank of Malaysia</th>
<th>Commercial banks</th>
<th>Other banking institutions</th>
<th>Negotiable instruments of deposit held</th>
<th>Malaysian Securities</th>
<th>Loans and advances</th>
<th>Other assets</th>
<th>Total assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>34,261</td>
<td>2,183</td>
<td>9,537</td>
<td>15,100</td>
<td>20,777</td>
<td>31,696</td>
<td>217,876</td>
<td>18,792</td>
<td>360,127</td>
</tr>
<tr>
<td>1997</td>
<td>50,289</td>
<td>2,931</td>
<td>20,040</td>
<td>26,225</td>
<td>24,322</td>
<td>40,702</td>
<td>276,285</td>
<td>24,907</td>
<td>480,248</td>
</tr>
<tr>
<td>1998</td>
<td>15,227</td>
<td>17,234</td>
<td>12,552</td>
<td>24,812</td>
<td>22,006</td>
<td>46,014</td>
<td>285,676</td>
<td>26,597</td>
<td>453,492</td>
</tr>
<tr>
<td>1999</td>
<td>17,733</td>
<td>41,231</td>
<td>12,212</td>
<td>23,079</td>
<td>5,739</td>
<td>50,722</td>
<td>284,622</td>
<td>45,091</td>
<td>482,738</td>
</tr>
<tr>
<td>2000</td>
<td>15,388</td>
<td>38,366</td>
<td>15,282</td>
<td>27,888</td>
<td>4,692</td>
<td>56,908</td>
<td>303,367</td>
<td>47,817</td>
<td>512,715</td>
</tr>
<tr>
<td>2001</td>
<td>16,346</td>
<td>29,821</td>
<td>14,041</td>
<td>29,891</td>
<td>7,090</td>
<td>61,798</td>
<td>324,922</td>
<td>43,867</td>
<td>529,736</td>
</tr>
<tr>
<td>2002</td>
<td>15,528</td>
<td>39,854</td>
<td>11,251</td>
<td>27,828</td>
<td>6,718</td>
<td>70,050</td>
<td>337,995</td>
<td>51,538</td>
<td>563,254</td>
</tr>
<tr>
<td>2003</td>
<td>17,119</td>
<td>62,631</td>
<td>14,322</td>
<td>21,557</td>
<td>6,745</td>
<td>81,869</td>
<td>355,610</td>
<td>57,484</td>
<td>629,975</td>
</tr>
<tr>
<td>2004</td>
<td>37,798</td>
<td>84,852</td>
<td>8,220</td>
<td>36,554</td>
<td>6,554</td>
<td>74,096</td>
<td>447,453</td>
<td>64,812</td>
<td>761,255</td>
</tr>
<tr>
<td>2005</td>
<td>43,818</td>
<td>110,692</td>
<td>14,531</td>
<td>32,142</td>
<td>10,093</td>
<td>74,751</td>
<td>524,723</td>
<td>73,043</td>
<td>884,599</td>
</tr>
<tr>
<td>2006</td>
<td>52,411</td>
<td>143,514</td>
<td>11,582</td>
<td>48,871</td>
<td>12,037</td>
<td>83,087</td>
<td>580,356</td>
<td>95,956</td>
<td>1,027,813</td>
</tr>
<tr>
<td>2007</td>
<td>57,417</td>
<td>150,951</td>
<td>20,633</td>
<td>89,417</td>
<td>22,764</td>
<td>113,022</td>
<td>631,896</td>
<td>59,711</td>
<td>1,145,813</td>
</tr>
<tr>
<td>2008 (Aug)</td>
<td>64,366</td>
<td>185,236</td>
<td>25,871</td>
<td>55,753</td>
<td>18,888</td>
<td>122,670</td>
<td>699,318</td>
<td>78,140</td>
<td>1,250,240</td>
</tr>
</tbody>
</table>

Source: Bank Negara Malaysia
### Appendix 3: Commercial Banks: Non Performing Loans

<table>
<thead>
<tr>
<th>End of period (RM million)</th>
<th>Non-performing loans</th>
<th>Interest-in-suspense</th>
<th>Specific provisions</th>
<th>General provisions</th>
<th>Non-performing loans/Total loans(%)</th>
<th>Total provisions/Non-performing loans(%)</th>
<th>General provisions/Net total loans(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>8,163</td>
<td>1,993</td>
<td>1,838</td>
<td>4,198</td>
<td>3.6</td>
<td>98.4</td>
<td>1.9</td>
</tr>
<tr>
<td>1997</td>
<td>14,159</td>
<td>1,805</td>
<td>3,268</td>
<td>6,216</td>
<td>3.2</td>
<td>254.7</td>
<td>2.2</td>
</tr>
<tr>
<td>1998</td>
<td>44,916</td>
<td>4,199</td>
<td>11,469</td>
<td>6,541</td>
<td>10.3</td>
<td>149.9</td>
<td>2.3</td>
</tr>
<tr>
<td>1999</td>
<td>40,877</td>
<td>4,738</td>
<td>11,572</td>
<td>6,398</td>
<td>8.8</td>
<td>166.1</td>
<td>2.3</td>
</tr>
<tr>
<td>2000</td>
<td>42,241</td>
<td>5,673</td>
<td>12,018</td>
<td>6,472</td>
<td>8.3</td>
<td>185.3</td>
<td>2.2</td>
</tr>
<tr>
<td>2001</td>
<td>53,136</td>
<td>6,666</td>
<td>14,583</td>
<td>6,126</td>
<td>10.5</td>
<td>174.1</td>
<td>2.0</td>
</tr>
<tr>
<td>2002</td>
<td>49,890</td>
<td>6,828</td>
<td>13,407</td>
<td>6,633</td>
<td>9.3</td>
<td>195.0</td>
<td>2.1</td>
</tr>
<tr>
<td>2003</td>
<td>39,138</td>
<td>6,206</td>
<td>11,276</td>
<td>6,019</td>
<td>6.4</td>
<td>211.0</td>
<td>1.8</td>
</tr>
<tr>
<td>2004</td>
<td>48,360</td>
<td>6,604</td>
<td>12,629</td>
<td>8,427</td>
<td>6.8</td>
<td>221.8</td>
<td>2.0</td>
</tr>
<tr>
<td>2005</td>
<td>48,444</td>
<td>6,462</td>
<td>13,340</td>
<td>8,854</td>
<td>5.6</td>
<td>228.6</td>
<td>1.7</td>
</tr>
<tr>
<td>2006</td>
<td>48,983</td>
<td>6,709</td>
<td>15,471</td>
<td>9,387</td>
<td>4.8</td>
<td>252.0</td>
<td>1.7</td>
</tr>
<tr>
<td>2007</td>
<td>40,763</td>
<td>5,787</td>
<td>15,316</td>
<td>10,379</td>
<td>3.2</td>
<td>294.8</td>
<td>1.7</td>
</tr>
<tr>
<td>2008 (July 08)</td>
<td>35,977</td>
<td>5,114</td>
<td>14,020</td>
<td>11,301</td>
<td>2.5</td>
<td>313.6</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Source: Bank Negara Malaysia
## Appendix 4: Performance Normality

### Descriptive - NPL

<table>
<thead>
<tr>
<th>Statistic</th>
<th>NPL</th>
<th>Statistic</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPL Mean</td>
<td>8.5108</td>
<td>95% Confidence Interval for Mean</td>
<td>7.1529</td>
</tr>
<tr>
<td>95% Confidence Interval for Mean Lower Bound</td>
<td>7.1529</td>
<td>9.8687</td>
<td></td>
</tr>
<tr>
<td>95% Confidence Interval for Mean Upper Bound</td>
<td>9.8687</td>
<td>7.9196</td>
<td></td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td>7.9196</td>
<td>Median</td>
<td>7.2500</td>
</tr>
<tr>
<td>Variance</td>
<td>35.791</td>
<td>Std. Deviation</td>
<td>5.98256</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>5.98256</td>
<td>Minimum</td>
<td>.86</td>
</tr>
<tr>
<td>Minimum</td>
<td>.86</td>
<td>Maximum</td>
<td>34.18</td>
</tr>
<tr>
<td>Maximum</td>
<td>34.18</td>
<td>Range</td>
<td>33.32</td>
</tr>
<tr>
<td>Range</td>
<td>33.32</td>
<td>Interquartile Range</td>
<td>6.67</td>
</tr>
<tr>
<td>Interquartile Range</td>
<td>6.67</td>
<td>Skewness</td>
<td>1.749</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.749</td>
<td>Kurtosis</td>
<td>4.369</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>4.369</td>
<td></td>
<td>.541</td>
</tr>
</tbody>
</table>

### Histogram

![Histogram](image)

- Mean = 8.51
- Std. Dev = 5.983
- N = 77
<table>
<thead>
<tr>
<th>Statistics</th>
<th>Statistic</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lerner index - Loan</td>
<td>Mean</td>
<td>.0083</td>
</tr>
<tr>
<td></td>
<td>Std. Error</td>
<td>.04268</td>
</tr>
<tr>
<td>95% Confidence Interval for Mean</td>
<td>Lower Bound</td>
<td>-.0767</td>
</tr>
<tr>
<td></td>
<td>Upper Bound</td>
<td>.0933</td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td></td>
<td>.0472</td>
</tr>
<tr>
<td>Median</td>
<td></td>
<td>.0800</td>
</tr>
<tr>
<td>Variance</td>
<td></td>
<td>.140</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td></td>
<td>.37455</td>
</tr>
<tr>
<td>Minimum</td>
<td></td>
<td>-.175</td>
</tr>
<tr>
<td>Maximum</td>
<td></td>
<td>.86</td>
</tr>
<tr>
<td>Range</td>
<td></td>
<td>.261</td>
</tr>
<tr>
<td>Interquartile Range</td>
<td></td>
<td>.34</td>
</tr>
<tr>
<td>Skewness</td>
<td></td>
<td>-2.095</td>
</tr>
<tr>
<td></td>
<td>Std. Error</td>
<td>.274</td>
</tr>
<tr>
<td>Kurtosis</td>
<td></td>
<td>7.244</td>
</tr>
<tr>
<td></td>
<td>Std. Error</td>
<td>.541</td>
</tr>
</tbody>
</table>

### Histogram

- Mean = 0.01
- Std. Dev = 0.375
- N = 77
### Descriptive – Lerner Index Deposit

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Mean</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lerner index - Deposit</td>
<td>.1544</td>
<td>.02113</td>
</tr>
<tr>
<td>95% Confidence Interval for Mean</td>
<td>.1123</td>
<td>.1965</td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td>.1669</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>.1800</td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>.034</td>
<td></td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.18545</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>-.40</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>.45</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>Interquartile Range</td>
<td>.25</td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>-1.085</td>
<td>.274</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>.998</td>
<td>.541</td>
</tr>
</tbody>
</table>

**Histogram**

- Mean = 0.15
- Std Dev = 0.185
- N = 77
### Descriptive – ROE

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Mean</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROE Mean</td>
<td>17.8084</td>
<td>1.08024</td>
</tr>
<tr>
<td>95% Confidence Interval for Mean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Bound</td>
<td>15.6570</td>
<td></td>
</tr>
<tr>
<td>Upper Bound</td>
<td>19.9599</td>
<td></td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td>17.9200</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>16.0700</td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>89.852</td>
<td></td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>9.47905</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>-14.47</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>42.50</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>56.97</td>
<td></td>
</tr>
<tr>
<td>Interquartile Range</td>
<td>12.69</td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>-.134</td>
<td>.274</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>.791</td>
<td>.541</td>
</tr>
</tbody>
</table>

### Histogram

- Mean: 17.08
- Std. Dev: 9.479
- N: 77
### Descriptive – Loan Ratio

<table>
<thead>
<tr>
<th>Loan Ratio</th>
<th>Statistic</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>.5296</td>
<td>.01972</td>
</tr>
<tr>
<td>95% Confidence Interval for Mean</td>
<td>Lower Bound: .4903</td>
<td>Upper Bound: .5689</td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td>.5459</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>.5700</td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>.030</td>
<td></td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.17307</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>.72</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>.66</td>
<td></td>
</tr>
<tr>
<td>Interquartile Range</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>-1.839</td>
<td>.274</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.451</td>
<td>.541</td>
</tr>
</tbody>
</table>

### Histogram

- Mean = 0.53
- Std Dev = 0.173
- N = 77
### Descriptive – Log of Total Asset

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Statistic</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log of Total Asset</td>
<td>Mean</td>
<td>7.5444</td>
</tr>
<tr>
<td>95% Confidence Interval for Mean</td>
<td>Lower Bound</td>
<td>7.4331</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>7.6558</td>
</tr>
<tr>
<td></td>
<td>Upper Bound</td>
<td>7.5608</td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td>7.5608</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>7.5600</td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>.241</td>
<td></td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.49065</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>6.44</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>8.41</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>1.97</td>
<td></td>
</tr>
<tr>
<td>Interquartile Range</td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>-.663</td>
<td>.274</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>.099</td>
<td>.541</td>
</tr>
</tbody>
</table>

### Histogram

- Mean = 7.54
- Std Dev = .491
- N = 77