CHAPTER ONE

1.0 INTRODUCTION

1.1 Introduction

Capital requirement in banking ranks pillar number one in the 3-pillar-based system of Basel based international capital standard. Several points may underscore the significance of this ranking. First, the unique natures of bank capital structure and the degree of Leverage allowed in banking have their link to excessive risk-taking that necessitates the need to regulate bank capital. Second, the impact of capital requirement on capital levels, risk and return in banking is a complex issue affecting the interest of diverse groups, hence the need for a careful assessment of the required capital. Third, the effect of a binding capital requirement on bank lending in the past and present has further highlighted the broader macroeconomic dimension of bank capital requirement. To date these issues are among the dominating concerns in bank capital regulation.

Yet, these concerns are not confined to bank regulators alone, but they are also a concern for others such as owners and managers of a banking firm as a going concern especially during crisis. Two recent episodes of banking and financial crisis, in both developed and developing countries demonstrate these facts: The Sub-prime[1] loans and related banking crisis that hit the United States in 2007/08 and quickly spread to parts of Europe has resulted in financial devastation that is symbolized by waves of mega and legendary[2] bank failures in these countries. Consequently, a massive amount of taxpayers' money in the form of rescue capital had to be injected rapidly into surviving

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[1] The term sub-prime crisis originated from the United States. It refers to a segment of bank loan market, where a systematic default on mortgage backed loans started; then quickly spread to other loan market segment as well as to other parts of the world financial system. Banks fail or become insolvent when their loss exceeds their capital, this highlights the importance of capital adequacy for banks
[2] For example, names like Bear Stearns, Lehman Brothers, Merrill Lynch, and Washington Mutual etc.

banks to support their capital base, keep them solvent[3], and prevent credit crunch. At the same time, shareholders of banks also continued to suffer huge amount of losses from both side of the book as bank share prices continue to tumble while more capital are being wiped out with every single write-down of bad investments. The sudden and urgent need of banking systems around the world for even a bigger dose of capital injection to keep them viable and to maintain the flow of credit,(as indicated in IMF, 2009,2010, FSF 2009 report estimates) became apparent; underscoring the critical role of capital requirement in banking regulation.

In a similar episode in East Asia, more than a decade ago, bank capital adequacy, and related issues became the first immediate concerns to address in order for banks to continue providing vital credit that are needed for quick recovery. In the opinion of many observers and banking analyst[4] the 1997-1998 banking and financial crisis in the East Asian countries (particularly in this study, Indonesia and, Malaysia), was precipitated partly due to a sudden deterioration on banking balance sheet. According to various accounts, the event followed an excessive lending boom in the early nineties amid financial liberalization initiatives couple with banking deregulation in this region. It is argued in many papers (e.g Mishkin 1999,Kane 2000) that the so-called Twin Liberalization that brought about intense competition in the banking sector had eroded bank charter value and led to excessive risk-taking, while bank capital levels at the time were seen as inadequate compared to the riskiness of the loans (Mishkin, 1999, 2001). As a result, in the aftermath, many banks in these countries had to be recapitalized in order to avoid potential "credit crunch" that could result due to "capital crunch" associated with losses on bank assets. The recapitalization process was

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[3]World Financial Stability Report April 2009 by IMF (page 17,28,34) provides estimates on the potential write-down as well as the potential capital needs for developed and developing countries banking systems from 2007-2010.
[4]Mishkin (2001) page 206 to 209 gave an account of the event with a fugues to illustrate and categorizing them into causes and their consequences. The initial low capital level has encouraged banks to try to magnify returns by increasing asset risk. As an economic shock *+-+-hit, there was less capital cushion to absorb the growing loan losses, more losses led to capital crunch which eventually led to credit crunch and economic contraction as some recent studies indicate such as Chiuri, Ferri and Majnoni (2002).

accomplished, mainly, via direct capital injection using billions of taxpayer money or by way of bank mergers and takeover as methods to consolidate banking system into stronger banking groups and strengthen their capital based.

The following excerpt and figures from World Bank IMF joint survey report highlight the associated economic cost of the 1997/1998 Asian financial crisis. The figures are significant in absolute term for whichever measure we look at. For example, the report shows (World Bank IMF) that at the peak of the 1997/98 Asian financial crisis, the share of nonperforming loans reached about 32.5% and 30% as percentage of total loan in Indonesia and Malaysia respectively. On the other hand, according to the same survey, the budgetary cost of the crisis for Indonesia and Malaysia was about 58.8% and 16.4% (percents) of the two countries' respective GDPs. The estimated potential output losses due to the crisis in Indonesia and Malaysia were reported to be about 67.9%, and 50%, of the two countries' respective domestic output respectively. Finally, the report highlighted how high growth rates, measured in terms of gross domestic output (GDP), took a complete reversal, in stark contrast to the high growth rate records of the booming years. Specifically, Indonesian and Malaysian economies were reported to have contracted with record falling GDP rates of -13.1% and -7.4% respectively at the peak of the crisis (Laeven and Valencia, 2008).

1.2 Theory and Empirical backgrounds: Economics of bank capital regulation

Undoubtedly, regardless of the tiny size of equity capital compared to other funding sources on the liability side of bank balance sheet, conventional wisdom in banking suggests that the prime economic function for bank capital is to protect against the risk of insolvency in an unexpected shock. It suits this function best because equity capital providers are essentially residual claimers (Merton and Bodie, 1993, Dowd,

1999). Ironically,[5] it may sound; yet quite consistent with the "Markowitzian" risk-return framework, constraining the amount of capital in bank's coffer has a limiting effect on the size of the residual claim (Koehn and Santomero, 1980 Rochet, 1992, Berger, 1995, Sheldon, 1996 and Mishkin, 2001).

Indeed, this fundamental economic premise seems to be what provides a guide for regulators on how to deal with moral hazard in banking when devising various regulatory capital formulas involving equity capital (more recently including equity-like hybrid instruments) to set-up a minimum capital standard. The aim is to help regulators, monitor, and control potential risk-shifting behavior of banks in their pursuit of higher returns (Furlong and Keeley 1991). In contrast, individual bank owners and managers' decision on how much of equity capital owners to deploy in a bank at any time involves a careful risk-return trade-off analysis (Pringle 1975, Mingo and Wolkowitz, 1977, Mishkin 2001). Technically, while more equity capital provide greater safety due to the cushioning effect of equity capital (Marcus 1983, Mishkin 2001), the corollary to that entails owners to accept a lower return on their equity capital (ROE) due to the well-known equity multiplier effect on the return[6] on equity capital (Mishkin 2001). This theoretical underpinning of the dual effect of capital on the risk-return frontier in banking has implication for optimising banks, for regulators, regulatory policies, and systems.

Accordingly, this topic has attracted a large number of academic inquiries in banking. However, for understandable reasons, a greater majority[7] of these academic

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[5] There is indeed an interesting irony here, investor normally invest more to get more but providing more equity capital in banking acts lowers the risk of insolvency. Accordingly, to the law of risk-return high capital should also lead to lower expected return for all investors including owner. Hence, this will lead to conclusion that high capital has a negative effect on equity returns. This can be demonstrated in many ways. Berger (1995) provides an illuminating discussion on this point as well as the opposite views i.e. a more capital may also have a positive effect on ROE. This will be discussed more in Chapter three on literature and Chapter four on methodology.

6 For this textbook technical illustration, see for example Mishkin S. F. (2001) sixth edition, page 225 to 228. for a very simple and excellent exposition on how level of bank capital may affects bank risk, and solvency and how it can also affect bank earning or the ROE to shareholder.

7 The empirical studies being referred to here are those studies reviewed in chapter 3 part 2 .

inquires, especially the empirical literature, have focused on examining mainly, the impact of bank capital requirements on bank capital levels and bank assets portfolio risk. (e.g. Jacques and Nigro, 1997, Aggarwal and Jacques 1997, Rime, 2001). In other words, how the amount of capital (in absolute term) prescribed by the regulator/ or held by a bank discretionally, affects bank solvency risk.

Our survey of literature shows that, the empirical literature on bank regulatory capital requirement by far and large has remained, until very recently[8], silent on how capital requirement impacts on bank profitability and how profitability may affect bank solvency, despite the fact that this is an important issue to bank owners and managers. This trend of incomplete analysis of capital and risk-return profile in banking and finance literature is likely to continue so long that the optimal capital structure theory for banking and financial firms remains, as Stolz (2002) described it, "underdeveloped" compare to mainstream corporate finance strand of capital structure theory. Additionally, a growing number of academic researchers in this area have shifted their attentions from examining bank absolute regulatory capital (e.g. Milne and Whalley 2001, Jokipii and Milne,2010) to examine bank regulatory capital buffer; arguing that the regulatory capital buffer is more relevant for bank managers' capital policy than the absolute regulatory capital. It is important to appreciate the critical role that capital and capital regulation play in curbing bank appetite for risk-taking especially in connection to recent banking and credit market events, and the new Basel III accord. Nevertheless, it is equally important to understand the impact of capitalization levels on bank performance measures that are of higher pertinent to shareholders such as the ROE.

8To the knowledge of this research, the only published papers with focus on this issue are Berger (1995), Hutchison and Cox (2006). These papers are closely related in how they approach and examined the impact of capital requirements on bank profitability. Berger (1995) discussed theoretical justifications for his model/findings and thus has provided a methodology, yet the issue has attracted little or no attention until now. With the new Basel capital buffer tie to profitability now, the issue may gain more prominence now with time.

To underscore the point further, we have seen that under the new Basel III capital system that the so-called "capital conservation buffer" requirement is attached directly to bank managers 'ability to allocate profit with free hands. Hence, one may correctly assume that banks are likely to start maintaining and managing a capital structure policy that will involve setting a target capital buffer above the regulatory minimum; if this policy was not already part of their capital structure policy before. Hence, the study of bank capital buffer management policy as envision in this study will be timely.

Meanwhile, understanding the impact of capital regulation in developing countries cannot be underestimated since banks are still the most important financier and the most important investor or bigger holder of the financial systems assets in these countries.

The theoretical framework for such an empirical study has been developing gradually over time as seen in Koehn and Santomero (1980), Kim and Santomero (1988),Furlong and Keeley (1989), Orgler and Targgat (1983), Sealey, Jr (1983), Marcus (1984), Keeley and Furlong(1990), Rochet,(1992), Flannery (1994), Blum (1999), Milne and Whalley (2001), Milne (2002), Blum(2008), Jeitschko and Jeung (2005), Harding, Liang and Ross (2007) and many others.

1.3 Institutional and Policy backgrounds:1997/98 Asian banking and financial crisis.

It is evidenced that much of the reforms measures including the restructuring and recapitalization of the banking institutions and banking systems and the ways the banking system's problems were generally solved in Malaysia and Indonesia come on the back of an intense academic debate during and in the aftermath of the 1997/1998 Asian financial crisis. These debates essentially, had evolved around two important

questions: what causes the Asian 1997/1998 banking and financial crisis and how to prevent or avoid future occurrence of its kind?

This section reviews briefly selected academic papers, on the 1997/1998 East Asian banking and financial crisis. We specifically look at, papers that pointed out implicitly or explicitly, to the role that moral hazard problems play in the 1997/1998 East Asian banking crisis. These problems, which were identified at both bank levels as well as at the levels of banking systems of the affected countries, have been partly blamed as one of the main underlying causes of the crisis. Since such conclusions might be drawn from variety of academic papers on the 1997/1998 Asian financial and banking crisis, only few papers are selected here as examples. This brief discussion, on moral hazard problem at banks and banking systems and its implication for bank capital and risk-taking and related issue, is aimed at providing background to the frameworks on which the empirical analysis and hypothesis testing in this study are built on.

In theoretical literature on bank capital requirement (see Chapter 4), the most widely used model to explain bank managers capital and portfolio risk decisions are those models that are built on the premises that there exist in banking operations, structures and systems environmental and policy factors that are prone to induce moral hazard behavior. These are explained often with reference to the nature of banking firm's contracts as well as the institutional setting of banks and the banking systems[9]. Most of these models also identify capital regulation as one such regulatory tool that can mitigate incentive for moral hazard behavior by restraining excessive risk-taking at banks if significant amount of it is required as a pledge to outsider funding agents. In

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[9] These institutional settings may be different from country to country but most countries regulate bank operations as well as provide what is collectively known as safety net. A safety net is a collection of various polices and regulatory measures that effectively insolate banks from largely market forces or provide net subsidy. Some see the safety net and subsidies as essential in many ways; and those are the pros of the safety net, while others, the cons would say that they could create bad incentives such as moral hazard..

the next few sections, we review and discuss the selected papers as briefly outlined in the next paragraph below.

The analysis and conclusion presented in Krugman (1998), Mishkin (1999**),** Corsetti et.al (1998), Kane (2000), and Hellmann et.al. (2000) are examples of papers that provide diverse perspectives on the sources of moral hazard in the affected banking systems. Corsetti et al,(1998) concisely summarized the sources of moral hazard problem to come from two main sources, distortions in (1) policies and (2) distortion in structures. The structural and policy moral hazard inducing elements provide incentives that can lead to risky lending at banks. Moreover, the structural and policy sources can be many and may be similar or different in various countries. Hence, we will focus on the above selected papers and will provide specific examples from their respective perspectives.

At the micro level, arguments put forward in Krugman (1998), Mishkin (1999), and Kane (2000) showed that incentives that led to the alleged moral hazard behavior in the pre- 1997/1998 Asian financial crisis period could be traced back to a mix of policy and structural sources. For example, Krugman (1998), after awhile thought concluded that some aspects of the 1997/1998 Asian financial crisis may be compared to that of saving and loan crisis of 1980s in the United States or (the 1980s S&L crisis in the U.S.). Krugman (1998) pointed out to the role that implicit and flat explicit deposit insurance systems play in both crises. The point made was that both kinds of insurance policy induce moral hazard behavior in banking, since the most important bank liability (deposit) is guaranteed fully without commensurate premium from banks. In addition to that, Krugman (1998) argued that, with such government guarantee coupled with lax regulation and supervision of banks as found in some of the affected countries, there could be less incentive for banks to borrow or invest prudently but to gamble with depositors money. This is because the game, as Krugman (1998) illustrates with

example, is a one-sided game in that bankers are always well off even in the worst-case scenario.

This illustrates the classic moral hazard story in economics; when someone guarantees the consequence of someone else decision, then the agent whose actions are guaranteed may be blinded by seeing only the potential positive side and thus, have less to care about the negative outcomes. Krugman (1998) then combines the effect of the two elements, the blanket guarantee of bank deposit and poor or inadequate regulation and supervision. Each of these two has the potential to induce moral hazard behavior.

To give an example on that, in the case of Indonesia, Pangestu (2003) listed poor regulation and supervision record of BI (or Bank Indonesia, the central bank) following 1988 bank expansion in Indonesia as among three main vulnerability signs in the pre-crisis Indonesian-banking sector. Problem of lack of supervision were more acute in the case of State-owned banks in Indonesia as cited in Enoch et.al (2001).

Meanwhile, In the case of Malaysia, the blanket guarantee was implicit all the time until the establishment of the limited explicit deposit insurance scheme in 2005/2006. However, it was noted also that in October 2008 Malaysia quickly returned to a full blanket guarantee policy temporary. This came at a time as fears mounted for a potential spillover effect from the subprime crisis in the U.S. if Malaysian and Foreign incorporated banks in Malaysia are found to be seriously exposed to the so-called "toxic assets". The guarantee was jointly announced by Malaysian Finance Ministry and Bank Negara (the Sun, 2008) and was extended to the two banking sectors (commercial and investment banks) as well as to the development financial institutions. Liquidity facility was made available to insurance and other financial institutions. At the time, the protection was intended to last up to December 2010 under the administration of Perbadanan Insurans Deposit Malaysia (PIDM)) or Malaysian deposit Insurance Corporation.

Walker (2006), who acknowledged the legitimate need[10] for such a blanket guarantee during volatile periods, has cautioned that such measures should not be extended too long to avoid creating incentives for moral hazard behavior.

Mishkin (1999) on the other hand, traces moral hazard problem to come from insufficient information disclosure or poor information processing and screening at individual bank level. The existence of asymmetric information between a bank and its lenders/depositors is a recognized fact that is due, mainly, to the inherent opacity problem in banking. Nonetheless, banks are considered as superior information producers when they engage their customers in long-term relationship lending. Yet, the asymmetric information problem that Mishkin (1999) analysis of the 1997/1998 Asian financial crisis found to have had led to moral hazard and adverse selection problem at individual bank levels in the pre-crisis East Asia, comes from poor loan documentation by banks. The problem was more serious in the case of business loan portfolio or corporate borrowers loan cases. Mishkin (1999) attributed this problem to a lack of sufficient expertise among loan officers amidst stiff competition that comes with liberalization and deregulation policies. He added that the inelastic market for banking skill in the region has also worsened the problem. Hence, he argued that, banks in such a situation are susceptible to both adverse selection problem, (high probability to extend loan to risky borrowers), and moral hazard behavior, which will then lead to excessive risk-taking that may end in a banking crisis.

As an example in the case of Malaysia, Danaharta (2005), in its final report indicated that a big chunk of the non-performing loans the agency had managed had originally resulted from three kinds of problem companies. It is either that the companies in question had fundamental business problem, or their industry had a

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[10] The author is a Director of Policy and International Affairs for the Canada Deposit Insurance Corporation. The paper was written while he visits The South East Asian Central Banks Research and Training Centre or SEACEN in Kuala Lumpur.

problem or the companies' financial structure was problematic. From that report, one may infer what Mishkin (1999) would describe as poor loan origination process or screening and documentation, at work in that case.

Furthermore, the credit boom and boost narration of the Asian crisis is well documented in many papers (e.g. Corsetti et. al 1998). Besides, Mishkin considers the International Bailout program of IMF (a program taken up by all countries except Malaysia) as another source of incentive for moral hazard behavior that can aggravate financial indiscipline at sovereign level as well as induce careless investing from the side of international investors, if the facility is not properly structured.

Moreover, one can see the full picture of moral hazard story in action in Kane (2000)'s Agency-cost and Contestable market perspective of the 1997/98 Asian financial crisis. Kane (2000), particularly criticizes the pre-crisis industrial policy that involve directing banks to make loans or even favorable loans to selected industries and projects and the perceived government standby to shield off banks from the disciplinary action of depositors when banks mismanage their funds. In this context, we found a specific example for such government support in the case of Indonesia. For instance, Enoch et.al (2001) noted that the declaration by the Indonesian government during the crisis that all State banks were "Too Big to Fail" despite their poor financial conditions, has led depositors flight to safety by withdrawing their deposits from Indonesian and other private banks to place them at State-owned banks.

Equally, Kane (2000) showed how such policy combined with weak regulation and supervision of financial institutions could produce agency-cost when the agent engages in moral hazard induced risky lending knowing that someone else will shoulder the burden.

Yet, we have another example here in the case of Malaysian banks. We relate the example here to evidence that government or government agencies do sometimes set

target for bank loan they wish to see banks make for policy purpose. Specifically, Hawkins (1999) cited two incidents of such loan directives by Bank Negara Malaysia (BNM) in 1998. When the specific target for 1998 was not achieved, similar target was set again for 1999, but this time around, with BNM making it clear it wants to see banks fully comply by meeting loan target as it summons bank CEOs on the issue. He added at that time, the policy created among observers uneasiness about the effect of such policy on loan quality.

Hellman et.al., (2000) highlighted the impact of deregulation, especially, the freeing of interest rate that banks can pay and charge, on competition and on bank charter value to induce moral hazard behavior. This can happen if restriction on rate ceiling as well as the type of loan bank can extend are removed in a liberalized market environment where banks compete for market share in both loan and deposit market. A classic example of this was fully narrated in Enoch et.al., (2001) in the pre-crisis bank deposit and loan market in Indonesia where a sustained negative spread (the difference between lending and borrowing/deposit rates) was observed for an extended period in the run up to the crisis. Hellman et.al., (2000) argues that competition in a deregulated and liberalized bank market can erode bank franchise value and lead to moral hazard behavior in lending and borrowing. Hence, their policy prescription was a capital regulation coupled with caps on deposit rates to curb risky bank behavior.

What happened in the banking sectors of most East Asian countries was a sort of what some called as an "unbalanced" liberalization and deregulation, in the sense that the measures did not provide adequate protection of bank charter value through appropriate provisions in regulatory rules. This had led to unhealthy competition as seen in the Indonesian deposit and loan market (Enoch et.al., 2001).

In summary, a number of studies on the pre-crisis East Asian banking systems, show that blanket guarantee of bank liabilities, "policy directed lending" owner self-

financing; unbalanced liberalization and deregulation policies often combined with weak regulatory and supervisory systems in some countries had induced moral hazard behavior in banks which led to excessive risk-taking in the run up to the crisis. The presence of moral hazard inducing factors was blamed as one of the underlying root causes of the late 1997/98 East Asian financial and banking crisis. These incentives, which can lead to excessive risk-taking, are further found to be associated with banking structures and banking policies. Thus, finding ways to combat such moral hazard inducing elements in the said institutional structures and polices will be among the highest priority of leaders and financial authorities in these countries. Indeed that was exactly what the authorities in these countries have embarked on during and in the aftermath of the crisis. The efforts have involved a comprehensive reform of institutional structures and financial policies that include strengthening regulatory systems including capital regulation and supervisory tool. The efforts have been continuing until today. Many of the reforms measures have benefited from the broad outlines and recommendations from academic findings and prescriptions.

Micro-level analysis of banking operations with moral hazard models prescribe capital regulation, often in combination with other measures and tools, as a mean to reduce or eliminate moral hazard incentives for managers/owners. This is because capital requirement imposes some loss on the imprudent agent (the banker/owner in this case). However, the effectiveness of capital regulation per se to reduce moral hazard incentives is strongly contested (Furlong and Keely1989, Kim and Santomero, 1988).

We provide a review of such models with relevant illustrations in chapter four (4). Each model or theory has implication for how bank managers will make capital and portfolio risk/return decisions under capital regulation with or without other regulatory measures and tools. Therefore, building an empirical analysis on their frameworks can help explain or verify managers' capital asset portfolio risk decisions. Based on those

results, it can be verified also if the alleged moral hazard behavior incidents found in the pre-crisis banking system in countries under study has been restrained or has remained pervasive.

In the next section, the specific objectives of this study are outlined followed by another section that outlines our main research questions and provides a short discussion on them. In the section that follows next we discuss reasons that justify undertaking this research in the first place. The next section to that will discuss the significance of this research investigation. We then discuss the specific contributions of this research work to knowledge in the section that follows. Finally, we discuss briefly the plan and organization of chapters of this research.

1.4 Research Problem Statement

Bank capital comprises a tiny portion of bank liability, yet capital requirement is an important cornerstone in modern banking regulation as recent crisis and their resolutions have demonstrated. Moreover, the theoretical literature(e.g in Kim and Santomero 1988, Koehn and Santomero, 1980 Rochet, 1992, Blum, 1999) has long emphasized the significance of the dual effect of capital requirement on bank risk-return profile to the extent that bank managers' decision on capital, risk, and return was anticipated to be *simultaneous*. However, due to lack of a unifying theory for an optimal capital structure for a banking firm (Stolz,2002), empirical investigation on the impacts of bank capital requirement, in the past, were entirely devoted to examining the relationship between bank managers regulatory capital and assets portfolio risk decisions. Hence, little or insufficient research was directed to examine bank managers' decision on regulatory capital and portfolio return until very recently. Based on the information available to this research, the little available literature that closely examines

commercial banks simultaneous decision on regulatory capital and portfolio returns were conducted in developed countries.

Thus, to contribute to filling this gap in literature as well as in developing country cases, this study aims, in addition to examining bank managers' short-term capital and portfolio risk decisions, it also aims to examine bank managers' short-term capital and portfolio returns decisions separate and in parallel, in a *simultaneous modeling framework with partial adjustment*.

Short run capital and portfolio risk/return decisions analysis are particularly important because it is in the short run bank managers tactically workout how to achieve their long run optimal capital and assets portfolio risk/return targets. The short run decision involves how much capital/risk/return to assume and how quickly. Since full and immediate adjustment to the long run targets is not possible (Flannery and Rangan, 2008, Jokipii and Milne 2010) for reasons such as cost etc. then *partial adjustments* must take place in shorter periods toward the long run target levels. An important issue in the short-term partial adjustment models is the *speed of the adjustment*. Short run adjustment speed is important for managers as well as for regulators. A number of documented evidences on adjustment speed to target capital and assets portfolio risk/return and how their coordination is affected by external and internal factors in the case of banks in developed economies are available. This study aims to provide new evidences on these issues in the case of banks in selected developing economies.

In addition, previous empirical studies (e.g Shrieves and Dahl, 1992, Jacques and Nigro, 1997, Rime, 2001), on bank capital and portfolio risk choices have also based their empirical analysis of bank managers' capital decision on the minimum regulatory capital ratio (the absolute capital ratio) or use the Leverage ratio. Meanwhile, a number of recent theoretical models on bank capital and assets portfolio risk decisions are drawing attention to the significance of studying commercial banks excess

regulatory capital or the buffer capital that banks maintain above the minimum capital ratio and managed it regularly. This buffer capital is being argued to be more relevant to bank managers' capital and risk-return decisions than the absolute capital ratio (Milne and Whalley, 2001).The new international capital standard of Basel III has strengthened this argument with the capital conservation buffer being added now as part of regulatory tool to safeguard banks.

Therefore, this study aims to fill these gaps also, for the first time (according to our knowledge) in the case of developing countries, by examining bank managers' simultaneous regulatory capital buffer and portfolio risk and return decisions in separate models. In addition to that, the study also models bank managers' short-term Leverage ratio and assets portfolio risk/return decisions.

A review of selected literature on the institutional and policy backgrounds to this study found that most of the studies reviewed [e.g Krugman,(1998,),Mishkin 1999), Kane (2000)] have concluded that moral hazard plays a significant role in that crisis. Hence, it can be said that reform measures undertaken in the aftermath of the crisis, including imposing high regulatory capital requirement for banks, were designed partly to tackle the moral hazard problem. To date, a number of empirical studies (as presented and discussed in literature review chapter) have been conducted to evaluate the performance of banks and banking system in these countries. The current study aims to add to that body of literature its unique aspects in terms of design, analysis and findings. Therefore, this study aims, within the context of the analysis on bank short-term capital and portfolio risk decision models, to examine the impact of high capital requirement on moral hazard at banks in the two countries in the aftermath of the crisis. For that, the study aims to ascertain which of the two versions of moral hazard models best explain commercial bank capital and portfolio risk decision in the two countries.

1.5 Research Objectives

From the above problem statement, the following two main research objectives are identified as stated below.

(1) To examine bank managers short-term capital and portfolio risk decisions

(2) To examine bank managers short-term capital and portfolio return decisions

The specific aspects of these two objectives to be examined concerning bank managers' short-term capital and portfolio risk decisions and; bank managers' short-term capital and portfolio returns decisions are specified into five minor research objectives. Their related research questions are outlined in the section that follows. A short discussion on issues related to short-term bank capital and assets portfolio risk/returns decisions follows.

(3) Minor Research Objectives

Our five minor specific research objectives are stated as follows.

1) *To estimate and test the significance of short-term adjustment speed to bank target capital ratios (buffer capital ratio/ Leverage ratio).*

2) *To estimate and test the significance of short-term adjustment speed to bank target Portfolio risk or target risk-weighted asset ratio/target portfolio return/ROE.*

3) *To examine the nature of the relationship between short-term changes in bank target capital ratios (buffer capital /Leverage ratio) on bank target portfolio risk/returns/ROE measures and the visa-versa.*

4) *To test the capital buffer theory and regulatory pressure in the case of Malaysian and Indonesian commercial banks.*

5) *To control for selected exogenous and bank specific variables for their effect on capital and bank assets portfolio risk/returns decisions as suggested in literature.*

1.6 Research Questions

The above five minor research objectives from the original 2 major research objectives in this study will require answering several research questions.These research questions are stated as follows:

a) At what speed levels do commercial banks adjust their target capital ratios in the short run in Malaysia and Indonesia?

b) At what speed levels do commercial banks adjust toward their target portfolio risk-weighted asset ratio in the short run in the two countries?

c) Do banks in the two countries adjust their target capital ratios faster than their target asset portfolio risk level or adjust them at the same speed?

d) How did commercial banks responded, in terms of adjustments to their capital ratios (buffer capital), after the initial regulatory increase in the minimum absolute capital requirement in Indonesia and Malaysia?

e) Did they increase capital/ or reduce their portfolio risk-weighted asset level in order to comply with the new high capital requirement/or the initial increase in capital requirement?

f) Did they increase both capital and portfolio risk proportionally (positive).

g) Do banks with relatively low capital buffer adjust their capital and portfolio risk faster (in term of speed) compared to bank with higher capital buffer or vice-versa as suggested by capital buffer theory?

h) Do low capital buffer banks coordinate adjustment (changes) to capital and portfolio risk the same way compared to banks with relatively high capital buffer or vice-versa as suggested by capital buffer theory?

i) How do commercial banks coordinate the management of their capital ratios and portfolio return/ROE in Indonesia and Malaysia?

j) Did bank managers (in Indonesia and Malaysia) adjust their portfolio returns at speed faster than the speed at which they adjust their target capital ratios in the aftermath of regulatory increase in minimum capital requirement?

k) Did commercial banks cut back on their portfolio returns when they decide to increase their capital buffer level or when they want to reduce their Leverage?

l) What is the magnitude and significance of adjustment speed to target capital ratios and target portfolio return for banks in Indonesia and Malaysia?

Brief Discussion on research objectives and questions stated in (1-5, a---l)

Now we discuss the objectives and their related research questions together with issues related to mangers short-term capital and assets portfolio risk and returns adjustment decisions as follows:

Concerning research objectives and research questions on capital ratios and assets portfolio risk adjustment decision in the short run, we elaborate briefly, on relevant questions listed in points **(a-c)** first.

We know that the speed at which banks can add to their regulatory capital in the short term is important for regulators, as well as for the management, and/or bank owners. This is because equity capital is costly to raise. The faster a bank can raise capital the better and perhaps the less costly it will be for managers and owners to add promptly to capital in an unexpected shock. This is normally possible for large banks and hence we may find that some of them tend to carry less capital. On the other hand, short-run adjustment speed is important for regulators also. They need to know how to estimate a reasonable period within which they will allow a distressed bank to operate with capital level lower than the required capital and recover, instead of allowing the

bank to fail immediately. That is before they let the creditors liquidate the bank asset or the deposit insurance corporation. Similarly, adjustment speed to target assets portfolio or the risk-weighted asset ratio will be an indicator of how aggressive banks are in terms of altering their risk profile or portfolio risk in the short run.

The research questions listed in point (d-f) above, concern the nature of commercial banks response to the initial increase in regulatory capital requirement as seen in the aftermath of the 1997/1998 crisis. We look for evidence for answers to these questions in the way banks coordinate the adjustment to the two variables (capital ratio and risk-weighted asset ratio) during our sample periods.

To elaborate here, according to moral hazard models, on one hand, bank managers are said to engage in a pure moral hazard behavior (excessive risk-taking) if they coordinate the adjustment in their capital and assets portfolio risk negatively. On the other hand, managers whose capital and portfolio risk adjustment decision show a two-way positive relationships between change in capital and change in risk (i.e. when they increase capital ratio they also increase portfolio risk-weighted asset ratio simultaneously), are said to be operating under constrains or with restrain (hence the term constrained/restrained moral hazard).

This constrain can be due to various cost consideration of financial distress including managerial private-interest preservation motive or other factors such bankruptcy cost avoidance or due to the "unintended consequence high capital requirement" on bank behavior. The later means that requiring banks to hold capital level that a bank might consider as excessive, could lead the bank to increase portfolio risk also in conjunction to compensate for the opportunity cost of capital. Hence, a positive coordination in adjustment to capital and risk often observed could be a result of any of the above or due to other factors such as regulatory pressures.

The overall finding on these questions will make it clear to us how commercial banks in the two countries responded to the increased capital requirement imposed on them in the aftermath of then 1997/1998 Asian financial crisis and the reform measures introduced. The finding also may motivate further study to see if banks rely more or less on other methods in managing their capital ratios and risk-weighted asset ratio other than pure coordination between capital risk-weighted asset ratios.

Our fourth minor research objective is related to the capital buffer theory. The relevant questions are listed in points (g-h). This research attempts to look further at regulator's influence on bank capital decision by examining the adjustment behaviors of sample banks based on their relative holding of capital buffer. Here, the research tests the capital buffer theory [as explained in chapter four (4) & five (5)]. We test capital buffer theory in this study by conducting a difference test between two groups of banks in terms of their adjustment speed. We also conduct difference test between the two groups of banks in terms of the way they coordinate between adjustments (change) to their target capital ratios and change to their target assets portfolio risk. We give more explanation on how we design and conduct this test in chapter five (5) on methodology, and in chapter six (6) where we analyze, and interpret the results.

Finally, the research questions we ask in points from (i--l) are relevant to our second empirical model. Specifically these questions are related to minor objectives stated with regards to our second main research objective, or objective number two (2). The questions concern another important issue in capital and earning management problem in banking that bank managers have to decide on but the issue is also a concern to shareholders and regulators. The analysis is of special importance concerning the new Basel III capital standard. This is because the new Basel capital standard has attached capital conservation buffer to bank profit allocation decision in some ways.

Therefore, the findings of this study to research questions related the issue could be of special significance to various parties interested to know how banks are likely to respond to the new capital buffer requirement. It will also give insights on how maintaining high capital buffer by banks is likely to affect bank returns in the short run. The impact of this new capital requirement on returns to shareholders' fund or the ROE has been the subject of much speculation recently. We further discuss this issue at length in the coming sections (e.g. see section 1.7). There we look at the arguments that the "capital conservation buffer" requirement recently introduced in Basel III capital standard will exert downward pressure on bank portfolio returns, or the ROE. This will eventually affect bank valuation in turn. However, nobody knows yet how bank managers will respond and cope with such requirements in the context of capital regulation.

1.7 Justification of the research target

In this section, we present some of the arguments that make a case or provide justification for carrying out this research on the selected countries and then discuss some of the points that provide reasons for the final selection of banks from Indonesia and Malaysia for presentation in the final report.

Extensive literature exists on the 1997/1998 Asian financial crises since the onset. Now after more than a decade, studies have continued on pouring again to evaluate the performance of the economies and financial systems of the affected countries as well. These studies also make assessment about the effectiveness of the reform measures undertaken at various levels and dimensions since the end of the crisis. The main reasons for such academic and professional interest about the state of affairs of banks and banking systems in these countries in light of their historical experience of crisis and recovery is straightforward. First, there has been an accumulation of an

enormous amount of wealth in human experience over the years in these countries because of these crises. These wealth of experiences resulted from lessons learned from the crisis and from crisis resolution process in each country.

Furthermore, there is plenty of evidence that a significant amount of resources, including human intellectual capital, has been spent to accumulate such wealth of experience over the years in various data and information forms. Therefore, the individual cases deserve to be documented. This is, first, for the immediate benefit of the affected countries; and second, for the benefit of humanity and particularly for the special benefit of developing countries if not developed countries too. There are many ways to document such wealth of experience and information.

The research conducted in this thesis is one such unique way of doing that documentation. Hence, sample of banks from ASEAN4 were initially selected from the banking systems of the four most affected member countries in ASEAN (Indonesia, Malaysia the Philippine, and Thailand) for this study. However, due to a number constrains (including, but not only, the size of the project so as to keep it manageable within some specified time and space) only two countries are finally taken for the final analysis and discussion. These are Indonesia and Malaysia.

Any two-country combination for this study is as good as any other combination among the initial four countries. Yet the following technical issues make Indonesia and Malaysia more practical.

A- Before the crisis, only the Philippine has an explicit bank deposit insurance scheme and none of the other three countries has. After the crisis both Indonesia and Malaysia establish explicit bank deposit insurance scheme in 2005/2006 and Thailand has not yet established any explicit deposit insurance system yet. Deposit insurance is an important element in bank regulation and its impact on moral hazard behavior depends on its structure blanket coverage vs. limited coverage with

flat/variable premium). During the sample period, the banking systems of Malaysia and Indonesia both had experienced the implicit blanket guarantee as well as the explicit deposit insurance system at about exactly the same period. Thus, we may expect that capital requirement will be affected similarly by these changes in the deposit insurance policies during the sample period. As a result, the selection of Indonesia and Malaysia will appear more consistent and appropriate on this technical ground with our two country only constrain.

B- Among all other reasons that could support the selection of Indonesia and Malaysia for this analysis, the following one reason makes the most appealing case. We can recall that this study focuses particularly on analyzing bank managers' regulatory capital and portfolio risk and return decisions based on the International capital standard of Basel I that was adopted and strengthen in all ASEAN4 countries in the aftermath of the 1997/1998 Asian banking and financial crisis; with slight modification to it. Both Indonesia and Malaysia use Basel minimum required capital ratio of 8% as their benchmark minimum for the risk-weighted capital ratio requirement for commercial banks. On the other hand, the Philippine requires its banks to hold a modified minimum risk-weighted capital ratio of 10%, while Thailand requires it is banking institutions to maintain a minimum risk-weighted capital ratio of 8.5%. Therefore, it will appear that Indonesia and Malaysia make the right match up for any straightforward comparison of adjustments to buffer capital ratios and the speed of such adjustment. The minimum ratio in both the Philippine and Thailand are high and may imply that adjustments could involve, relatively, much higher cost for banks in these countries. Similarly, their buffer holding of capital will be that excesses capital above their respective regulatory minimum ratio of 10% and 8.5%. Hence, buffer capital ratios are not directly comparable across the four countries. In that case, capital buffer ratios are only comparable between

Malaysian and Indonesian banks. Thus, this study decided that this one reason may be sufficient enough to justify the selection of these two countries bearing in mind the aforementioned constrain.

1.8 Significance of this study

The significance of several issues in capital requirement (as listed and discussed in the three subsections below) has been highlighted in recent debates on capital regulation in banking under Basel capital standard especially under the new Basel II accord. The three issues are

a- New high quality equity capital requirement,

b- Capital conservation buffer requirement,

c- c-Leverage ratio limit requirement

The ongoing debate on these issues has motivated the specific kinds of investigations and analysis carried out on bank capital, risk-return decisions in this study. Moreover, the whole exercise of this research investigation is a worthwhile effort because performance of commercial banks is an important issue, especially in developing countries, due to their role in the previous crisis and their economic role, as main financiers and most important investors in the economy. The three issues are discussed in more details in three separate subsections to highlight their significance. There are active effort to find solutions and answers to questions that are raised in debating each of the issues.

Very recently, several regulatory issues have been highlighted among academic researchers and other interested parties within the broad areas of economics, finance, and banking. These issues range from uncertainty about the effect of the newly proposed increase in capital requirement for banks in the context of Basel III capital standard. These include, a question about the likely impact of high capital requirement,

the likely impact of a "capital conservation buffer" requirement for banks as well the impact of restriction or limit on Leverage in banking. Although, these specific capital requirement issues can be regarded as very tough compare to the 1988 Basel I capital standard (which is the focus of the current study). Yet we do know that they are tougher than the old standard such as Basel I/II.

However, similar tough regulatory capital requirement (in absolute terms) were introduced independently in the post-crisis period in Indonesia and Malaysia and they were considered, at that time, very touch[11]. Thus, this research carefully examines the impact of these past regulatory increase in capital requirement on bank capital and portfolio risk and return decisions, in Malaysia and Indonesia in the aftermath of the 1997/1998 crisis (A period between 2000-2007). As such, the findings from the analysis may help us anticipate the likely effect of the new Basel III capital standard on the specific issues of concern, as discussed here. Below I outline three main regulatory issues at the center of the analysis conducted in this study to highlight the emerging issues of concern and their significance.

The impact of high capital requirement on bank risk and returns profile

At global level, the frequency and severity of banking crisis in recent years (e.g. the 1997/98 financial crisis in Asia and in other emerging economies, as well as the ongoing banking crises in the developed world) have hardened sentiments toward bank owners and managers alike everywhere. This has led to a call for tougher banking regulation including, for the first time, the requirement that banks carry and maintain a capital buffer at ranges above the required minimum capital, together with a limit on

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[11] According to report in Enoch et.al.(2001) the initial response of president Suharto to the 1997/1998 crisis was the announcement of what some analyst called, at the time, the world's toughest capital requirement for commercial banks in Indonesia.. The president subsequently could not persuade the Governor of Bank Indonesia that such capital requirement is appropriate and the Governor was fired because of disagreement with the president.

level/degree of total leverage for banks and the adoption of a narrow and more stringent definition for capital in banking. The measures are outlined in Basel III capital standard scheduled to be gradually phase-in within a period stretching from 2011 to 2019 Basel committee on Banking supervision Dec.2009/Sept.2010).

Nevertheless, the new accord however, has generated a great amount of uncertainty and conflicting opinions among bankers, regulators, rating agencies, academics, banking analyst and among general observers alike. The uncertainty is not only about the exact time it can be implemented, but the uncertainty extends also to the likely immediate and long-term effect of the new capital standard[12]. On the one hand, while regulators seems to be highly optimistic and determined to work together [via G20, BIS, and the new FSB] to make sure that from now and onward banks will be concomitantly capitalized for the risk they are perceived to be undertaking. On the other hand, some bankers and bank managers, to some extent, are pessimistic or fearful about the new prospect for regulatory change and are mainly oppose to tougher capital rules and other regulatory restrictions. Bankers often cite higher cost impact of capital requirement on returns as well as the consequences of a binding capital requirement in distress times on lending and economic growth[13].

At present, theoretical models of bank capital regulation and bank capital and risk decisions are, in overall, described by main reviewers (e.g: see VanHoose 2007) as being contradicting. Opinions are divided on both the impact of higher capital

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[12] For example an analyst article that appeared in *The Edge Malaysia, Issue 792, Feb 8 – 14, 2010* has cited this as it quotes "On Jan 29, Fitch Ratings said it had downgraded 592 hybrid capital instruments issued by banks and non-bank financial **instruments** worldwide "The reason given was that the agency had immediately factored in, ahead, the new definition of capital by excluding old capital instruments that will no longer be counted as part of bank core capital or Tier1. The same article has also quoted PNB Paribas spokesperson citing bankers' expectation that the requirement to raise capital buffer will result in a fall in ROE and will affect bank valuation: "As capital buffers are being built up, ROE will fall, and this may, over time, have an impact on bank valuations."

[13] I have browsed through many of the commentaries on the proposed amendments to Basel II/III at BIS website and found several critical comments especially from some internationally active banks concerning the new amendments to the Basel Capital standard. For example I quote this from Deutsche Bank AG comment London, by Stefan Walter 16 April 2010." ...it is unrealistic to expect such significant capital raising to occur without a significant impact on lending, business and ultimately growth and employment". pp.1. similarly, a response by e-mail from the IBFed "the international Banking Federation'" to the Basel Committee's Consultation Document 2010 Strengthening the resilience of the banking sector (CD 164) on April 2010 has strongly urged Basel committee to extend the quantitative impact assessment to a broader scope that include the whole economy arguing that the scale of the proposed change could have significant impact on wide range of macro and micro elements and sector of the economy

requirement (either risk-based or none risk-based) on bank capital and risk-taking or even the need for a tougher capital rules or capital regulation at all. Hence, it may not be clear-cut to what extent to justify both the fear of the pessimist bankers about the negative effects of the new capital standards on returns/profitability and so on, and the seemingly jubilant mood among global regulators about the potential for the new Basel capital standard to be effective and stabilizing.

Therefore, an empirical that focuses on specific issues that are of immediate concern to various stakeholders in bank regulation is needed. Such a research is important and should be able to contribute by giving an early insight into the possible impact of the new changes in capital requirement on some pressing local priorities such as credit extension for regulators as well as issues related to banking performance and valuation that concern investor in the banking sector. It should also ascertain bank readiness for tough capital rules such as the new buffer capital requirement and leverage restriction.

Buffer capital requirement to mitigate cyclical problem in capital requirement

Several amendments made to Basle III capital accord that were finalized lately were aimed at mitigating a potential cyclical behavior for bank regulatory capital levels due to the increased risk-sensitivity of the new accord (Basle Committee on banking supervision press release 12 Sept, 2010). Among these measures is a new capital buffer rule that requires banks to maintain a capital buffer within a specified ranges above the minimum required ratio (0 - 2.5). The impact of this new requirement is under intense debate now.

For one thing, before these changes, many theoretical models (Kim and Santomero (1988), Koehn and Santomero (1980), and Rochet (1992) have highlighted the need to make capital ratios more risk-sensitive in order for capital regulation to be

effective. Yet at the same time other models (e.g Blum and Hellwig, 1995, Yılmaz, 2009) as well as some recent empirical evidence (e.g Chiuri and Majnoni 2001) have shown that capital regulation or a more risk-based capital requirement for banks could amplified the inherent cyclicality in bank lending with potential negative macroeconomic consequences. Since variation in credit quality of borrowing entities over the business cycle can lead to (increase) decrease in both risk weighting/default rates during (downturn) upturn of the business cycle, which in turn (increases)decreases bank regulatory capital requirement. The ultimate impact could be negative/positive on lending. In this case, there is a clear need to balance between the desire for risk sensitivity and the stability of capital requirement. Hence, the "capital conservation" buffer was proposed among other measures, to mitigate the binding effect of the minimum capital requirement during distress times.

Another reason that has been put forward by regulators was the need for banks to conserve on capital in general, as a prudent business practice. This was argued partly to highlight what many commentators have termed[14] as a "collective action problem" seen during recent financial crisis. Many reporters and commentators noted that some banks that were receiving bailout money to support their capital level have been actually distributing generous bonus and paying dividend to shareholders at the same time in an attempt to signal strength, even though their capital level and the outlook for the economy were not strong. Regulators described these phenomena as unacceptable and do not represent best corporate practice. Thus, the requirement for banks to maintain a capital conservation buffer was justified (see Basel Committee on banking supervision Dec-2009).

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[14] See for example comments by various organizations (international banks, rating agencies etc) on the consultative papers of Basle Committee on banking supervision on the new amendments and various papers by Basel Committees itself on this event that lead to the new amendments.

Finally, some bankers and many analysts have suggested that this new capital requirement could have a negative impact on returns (footnotes at the beginning of section 1 of research motivators). Yet, no clear evidence has been presented to support this claim.. Thus, from the above discussion, several things should motivate an empirical investigation.

1) The impact of adjustment in regulatory capital buffer on adjustment to bank target capital portfolio risk and returns/profitability measures are not clear.

2) Banks, from now and onward, will be expected to manage their buffer capital if they have not been doing some sort of that adjustment in the past.

3) The fact that capital buffer requirement will place a new constrain on management's discretionary distribution of profit has led some analyst and commentators[15] to conclude that banks will now hold much higher capital than the minimum plus the buffer capital. This is because managers would try to avoid any restriction on their discretion on profit distribution. How much buffer capital banks will maintain above conservation buffer now; and at what rate or speed banks will perform such adjustments?

The Leverage limit restriction and its possible impacts on risk and returns

Despite the heighten concern raised with regards to the risk-sensitivity of the new capital accord and its potential negative impact on bank lending during economic downturns, several facts and arguments have been advanced lately to stress the need for additional capital requirement to further strengthen the risk-based standard. The views have highlighted a number of potential weakness and incentives that could likely impair

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[15] See for example Standard and Poor analyst commentary "Basel III for Global Banks: Third Time's The Charm? "and several related articles listed therein.

the effectiveness of the risk-based capital standard. On one hand, regulators cited the followings:

Risk measurement error and model problem could affect the accuracy of the risk-based system in capturing the true risk of individual banks

a) The potential for regulatory arbitrage through the off-balance sheet activities is still a real possibility as suggested by documented evidences on excessive Leverage build up before the eruption of the most recent banking crisis and also before some past banking crisis through the off-balance means.

Thus, a Leverage ratio was introduced to serve two purposes 1) to put a floor to limit the risk of unchecked excessive Leverage in banks 2) to mitigate the possible model or measurement error in risk calculation at individual bank levels.

On the other hand, some recent theoretical works by Blum (2008) and others, have shown that Leverage limit requirement is indeed essential under the risk-based system were banks are to perform self-risk-reporting under the IRB and advance IRB frameworks. This is to precaution mainly against the potential adverse selection incentive problem that could be at work. Arguing within a combined framework of information asymmetry and adverse selection, Blum (2008) modeled a profit-maximizing bank's self-risk reporting behavior and concluded that the potential for cheating is real and present. This is because under the risk-based system that relies on bank self-risk reporting, and given supervisors limited ability to know the true risk of the bank asset portfolio ex-ant, it is likely that the situation will create an incentive for a profit-maximizing bank to underreport their true risk. Such assumption is reasonable because reporting higher "true risk" (assuming that the bank could potentially assume that other banks would not do the same) will lead to higher capital requirement and results in lower ROE. In this case, Blum argued, that incentive compatible rules would suggest that supervisors armed themselves with additional none risk-based capital ratio

limit such as the leverage limit to enhance the true-risk reporting behavior as well as strengthen ex-post penalizing ability of supervisor for banks that underreport risk.

The work of Gjerde and Semmen (1995) earlier has reached very similar conclusions with regard to the effort to make the risk-based system more effective. Blum (2008) predicted that the impact of such Leverage restriction would be a reduction in both the overall portfolio risk as well as the return. Indeed many other commentators have predicted that the introduction of Leverage limit restriction would not be costless because of some obvious advantages and disadvantages associate with such capital rules[16]. The pressing empirical problem in this case is to examine how the introduction of a Leverage restriction couple with risk-based system would bring about the intended benefit of reducing excessive Leverage as well as undue portfolio risk at the same time. Moreover, how these changes will affect bank portfolio return, asset growth, as well as cost of intermediation and overall capital levels at banks is yet to be known.

In summary, major concerns that have been raised recently regarding the implementation of the new Basel I &II capital accords and the current amendment to them, known as Basel III come from experience as well as from recent empirical research findings on the impact the 1988 risk-based capital standard. For one thing, some recent empirical research findings have partly supported some major concerns that were raised pertaining to the potential impacts of Basel II implementation and the new amendments to it such as its impact on credit availability during economic down turns. Specifically, in the case of emerging economies for example, on the macroeconomic concern of risk-based capital standard, Chiuri, Ferri and Majnoni (2002) found that the implementation of the 1988 Basel capital requirement in some 15 developing countries

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[16] See for example a short commentary notes by Standard and Poor The Basel III Leverage Ratio Is A Raw Measure, But Could Supplement Risk-Based Capital Metrics (2010), and another notes tiled: Background Notes: Banking and the Leverage Ratio" prepared by the Financial Systems Department of the World Bank's FPD Vice Presidency (undated), this later document has listed several advantages and disadvantages of leverage restriction on banks and discuss their impact.

in the 1990s has had an adverse effect on bank credit extension in those countries. As a result, they recommended these countries to take a cautious approach to the new Basel capital standard.

On the effectiveness of the capital standard in a developing country, Ahmad et.al (2008) found that the imposition of capital requirement in the case of Malaysia before and after the crises of 1997/98 was not effective in curbing bank risk-taking in the intended manner. Specifically, their study, which covered a period from 1995 to 2002, found some Malaysian banks to behave like portfolio utility maximizer; given the fact that they responded to capital requirement by increasing capital in relation to increase in portfolio risk.

Yet, on the cost of capital adequacy requirement, a similar single country case on the impact of capital requirement on bank performance was provided in Naceur, Ferri and Kandil (2009). The authors found that, the implementation of the 1988 Basel capital standard in the Egyptian banking system has led increased in the cost of intermediation for banks; though it has enhanced management efficiency by improving ROA yet it shifted the bearing of higher cost risk to shareholder with lower ROE.

However, the above study contrasted sharply with Berger (1995), (an example of developed world case) whereby increasing regulatory capital ratios for banks were found to have a positive impact on bank profitability measures. That is a higher return to shareholder equity. Berger (1995) apparently attributed this phenomenon to a reduction in funding cost for uninsured funds.The reduced fund rate was due to investor perception that higher bank equity capital level has effectively reduced the likelihood of bankruptcy (Berger1995). The conclusion that, higher regulatory capital ratio may in fact reduced bank cost of funding for uninsured debt instead of increasing it is supported by Keeley (1990). Keeley (1990) found that a 1% percent increase in banks' CAR (capital to asset ratio) was associated with a reduction in interest rate on certificates of

deposit (CD) by 14 basis points, and that a 1 percent increase in bank market-to-book asset ratio (an indicator for market power) reduced the average CD cost by 16 - 18 basis points.

1.9 Contribution of this Research

This thesis contributes to knowledge in many ways. Below I outline and discuss some important contributions to banking literature in general, and to empirical methodology.

Contribution to knowledge in bank capital and risk/return analysis literature

This study is the first to examine bank managers' regulatory *capital buffer* and portfolio risk management for a sample of banks from developing countries in a simultaneous equation modeling and partial adjustment frameworks. This is important because almost all previous studies (from developing countries) on bank capital and risk decision use a single equation model with main variables in their levels. There is enough evidence (as studies from developed economies indicated) that managers make capital and portfolio risk decisions simultaneously. Moreover, we found very few studies on capital buffer in general. Among these few studies, two studies on bank regulatory capital buffer and portfolio risk adjustment that are closely related to our study here; are those of Jokipii and Milne (2010) and the study of Stolz (2007).

This study found new evidence on specific aspects of bank managers' short-term capital and portfolio risk decisions from these two developing countries Indonesia and Malaysia. These evidences can be contrasted in many ways to the findings of previous studies on bank capital and risk decision analysis from developed countries. The findings are presented and discussed in chapter six.They include findings on adjustments speed of commercial banks to capital (buffer capital as well as their

Leverage ratio) and assets portfolio risk. Some aspects of our findings concerning the nature of coordination between changes to capital buffer and Leverage ratios on one hand, and change to assets portfolio risk for commercial banks in these two countries were also new. More on that can be found in Chapter 6& 7.

Similarly, finding from our analysis on bank managers' regulatory *capital buffer*/ Leverage ratios and their target assets *portfolio return (ROE)* decisions have added new contribution to knowledge. This includes new insights into how bank managers' decisions on various capital elements and portfolio return/ROE interact under different economic, financial and regulatory environments in a developing country.The new findings include the speed of adjustment to target capital buffer/Leverage ratios and target assets portfolio return ROE as well as the nature of coordination in adjustment to these ratios. For example, fears of a negative impact or a downward pressure of increase in capital requirement or maintenance of a capital buffer above the minimum required capital on bank portfolio return (e.g. the return to shareholders equity, ROE) are not found or supported in this study.

These findings on capital and portfolio return (ROE) adjustments and their coordination are new and they represented new evidences not only the first of their kind but also the first to come from developing countries. In that regards also, our findings in this study .are the first finding of this kind in the context of this strand of literature in terms of design and analysis style.

Contribution to Methodology

To the knowledge of this research, this is the first study to investigate bank managers' capital buffer/leverage ratios and bank portfolio return (ROE) decisions in one research setting using a simultaneous equation model with partial adjustment. This methodology was first developed in Shrives and Dahl (1992) to study bank managers'

capital and asset portfolio risk adjustment decisions.This study extended this methodology and modified it to analyze bank managers' capital (regulatory capital buffer and Leverage ratio) and bank portfolio returns (ROE) adjustment decisions.

Thus, the new contribution comes mainly from the fact that the use of this methodology has enable us to better understand managers capital and risk/return decision from different perspective that is based on examining active incremental changes managers make to their target capital ratios and target returns. This will contrast with other studies that use variables in levels, as they will represent passive rather than active management decision to manage capital and returns (ROE). The insight gained from these models should be richer compare to findings obtained from the used of single equations models with variables at levels and in a non-partial adjustment framework.

1.10 Organization of the Thesis

This thesis is organized in seven chapters including the introductory chapter: the Introduction discusses issues related to capital requirement in banking. The chapter presents theoretical and empirical background to the research. It also discusses some institutional and policy background to Asian financial crisis of 1997/1998 with relevant to this study. Sections from 1.4- 1.10 presents issues as follows: section 1.4 summaries the background reviews make the problem statement. Section 1.5 outlines two main research objectives for the study. It then details the two objectives into five minor research objectives Section 1.6 list the 12 related research questions and subsequently discusses issues related to managers' short-term capital and portfolio risk-return decisions. Section 1.7 discusses the justification of this research. Section 1.8 discusses the significance of issues examined in this study. Sections 1.9 discuss the contributions of this study to literature. Finally section 1.10 present the organization of this thesis.

Chapter Two is a brief overview of the banking system in Indonesia and Malaysia. This includes discussion of the main features of the structural changes in the commercial banking sector of the banking system in the two countries since the end of last banking and financial crisis. It discusses related regulatory and supervisory reforms undertaken over the years during and in the aftermath of the crisis.

Chapter three presents the reviews on literature. It is of two main parts, the first part, discusses definition, functions of capital in banking, and then examines the concept of risk and returns in banking, their definitions, and related issue. The second part conducts an extensive but selected review of published empirical studies closely related to this study.

Chapter Four provides the theoretical framework for this study and formulates the main research hypothesis.

Chapter Five explains the methodology, and drives the simultaneous equation models in a partial adjustment framework. The chapter explains the estimation method, discusses data sources sample selection, data screening and cleaning.

Chapter Six presents and discuss the analysis in two parts. First part present analysis results and discusses findings on bank managers' short-term capital and portfolio risk decisions models with summaries. The second part present and discuss findings from analysis results on bank managers' short-term capital and portfolio ROE decision models.

Chapter Seven Provides summary findings, conclusion, and their implications, for policy and for future research.

1.11 DEFINITION OF TERMS

This study used several technical terms that have some special subject and context meanings or discipline related term and may need some explanations.

Minimum capital requirement = a minimum capital requirement is the minimum amount of capital fund that regulators required banks to carry on at least. It may be estimated in absolute term (e.g. 1billion ringgit, or 3 trillion rupiah or in dollar amount such as $ 100 million) it can also be estimated as a ratio as in the context of the international capital standard of Basel (8% of risk-weighted assets) with some countries having their own sovereign designated ratio.

Capital buffer: In the context studies on bank, capital requirement is the excess capital above the required minimum capital requirement. In the context risk-based capital standard, the Basel accord = absolute capital –minimum required capital (e.g if bank X has a capital ratio of 20% his/her capital buffer is equal to: 20%-8% = 12%)

Leverage ratio: this ratio is normally calculated in banking as Equity capital/total asset. Other formulas exist.

Target capital buffer: In the context of bank capital studies, it refers to the internally determined capital buffer to maintain above the minimum required capital level. Similarly, banks may have **target Leverage level.** On the other hand, **Optimal Target capital/leverage** is an internally determined/estimated amount of long run capital and risk/return mixed levels that balanced between the associate cost and benefits.

Risk-weighted asset ratio: In bank capital requirement, this variable is calculated by assigning risk weights to various asset types on bank balance sheet and then adding up the total, after multiplying weights by assets types and dividing on/total assets. (RWA/TA).

CHAPTER TWO

BANKING PROFILE AND THE POST CRISIS REFORMS IN INDONESIA

AND MALAYSIA

2.1.Introduction:

This chapter presents and discusses some of the changes that occurred in the commercial banking sectors. It also examines some aspects of the new regulatory and supervisory systems there were established in Indonesia and Malaysia in the aftermath of the 1997/1998 Asian financial crisis. The discussion is not comprehensive to cover all changes, as the aim here is to provide some institutional, regulatory and supervisory backgrounds to this study that may be useful in reading the analysis results and findings of this study in a manner that supports a coherent flow of the thesis. Therefore, the following elements are selected for discussion in the sections in the rest of this chapter.

First, we Present and discuss some of the changes that had occurred in the commercial banking profile in the countries over the eight years period that the study covers and beyond to the latest available data to this study. The selected profiles elements include several aspect of banking structure such as the category of institutions involved in commercial banking activities, the changes that occurred in the scale of the banking system in terms of changes in the number of banks, the nature of ownership concentration and ownership structure that includes government, private and foreign ownership). Changes in specific elements of the banking system (such as government and foreign ownership in banking etc.) are then selected for further discussion to highlight their significance in the context of changing institutional structure for the renew of liberalization and deregulation effort. We make an update to the above information by providing the latest available information on changes in the banking systems and structures.

Second, we discuss the regulatory and supervisory reform measures that were introduced over the years in the banking system of the two countries. This includes among other things changes made to the capital regulations rules over the years (as given in Tables), as well as changes made to the supervisory systems and tools. Brief information on measures undertaken concerning the developments in the adoption and introduction of international capital standards of Basel I, II and III is given. A short summary is at the end of the chapter.

2.2. Changes in the commercial banking sector profiles

2.2.1. Indonesia

The recent histories of developments in Indonesian commercial banking sector have shown two distinguishing changes at a large scale. The first change was a big expansion and the second change was a sharp contraction, both in terms of number of commercial banking institutions operating in the banking sector. During the first phase, (extending between 1988 and 1997), the number of commercial banks grew rapidly from just 111 in 1988 to about 240 banks by 1996 (Enoch, et al.2001). Then, in the second phase, the banking sector witnessed a sharp contraction in the number of commercial banking units (from 1997 to 2007) with further reduction occurring in progress between 2007 and 2010 as consolidation continues see Table 2.1. According to some banking experts several factors contributed to the explosive growth of commercial banks of all categories in Indonesia during the first decade of its recent history (1988 to 1996) (Pangestu and Habir 2002). The subsequent disappearance of many of these banks in the following decade (between 1997 to 2007 has to do with multiple factors that are discussed in some detail in Enoch, et.al.,(2001). and in Pangestu,(2003).They

include the past deregulation of interest rate and credit limits or ceiling. In addition, Pangestu,(2003) listed and discussed factors that includes the lifting restriction on branching for all types of banks, the reduction in statutory reserve requirement for state owned banks and, freeing of state owned companies to place about 50% of their funds in deposit accounts with other private banks. All these led to intense competition in various segments of the sector.

In addition, Indonesian regulators also allow conglomerates firms to establish their own banks (Enoch, et. al., 2001). The measures not only motivate many businesses to open new banks, but have also let to increase in branching. With limited regulatory capacity in terms of human resources, it led to weak or less regulatory and supervisory control. These and other factors resulted in bad banking practice (Enoch, et. al., 2001).

Meanwhile the shrinking of the Indonesian commercial banking sector in terms of number of banks in the aftermath of the 1997/1998 was generally blamed on the so-called "unbalanced" deregulation and liberalization initiatives. It was argued that Liberalization and deregulation measures were taken before establishing proper regulatory and supervisory systems to monitor a rapidly increasing number of banks (Pangestu and Habir 2002, Pangestu, 2003). The necessary capacity to monitor and coordinate for both proper entry and exit rules for such large number of banks as well as the enforcement of regulatory rules were lacking according to Enoch, (2001). The relaxation policies resulted in the entry of many small banks that would not have been able to enter banking business if proper fit rules are applied on them. As a result, many of these small banks ran very quickly into liquidity problem when depositors discovered their precarious situation and started withdrawing their deposits (Enoch, et.al 2001). By the time the 1997/1998 financial crisis arrives, many of these banks failed and were closed or merged with other banks over the years (Batunanggar and Budiawan, 2006, Pangestu, 2003, and Enoch et.al, 2001).

Tables 2.1 (adopted from Batunanggar and Budiawan,2006) shows the composition of various segments of the commercial banking sector in Indonesia; composing of State owned Banks, Regional Development Banks, Private Foreign Exchange banks, Private Non-Foreign Exchange Banks; Joint Venture Banks and Foreign Bank.

Table 2.1 Structure of the Indonesian commercial Banking sector

Years	2002	2003	2004	2005	2006	2007	2008	2009	2010
State Owned Banks									
Total Banks	5	5	5	5	5	5	5	4	4
Total Bank Offices/branches	1885	2072	2112	2.171	2.548	2.765	3.134	3.854	4.189
Foreign Exchange Banks									
Total Banks	36	36	34	34	35	35	32	34	36
Total Bank Offices/branches	3565	3829	3947	4.113	4.395	4.694	5.196	6.181	6.608
Non-Foreign Exchange									
Total Banks	40	40	38	37	36	36	36	31	31
Total Bank Offices/branches	528	700	688	709	759	778	875	976	1.131
Regional Development Banks									
Total Banks	26	26	26	26	26	26	26	26	26
Total Bank Offices/branches	909	1003	1064	1.107	1.217	1.205	1.31	1.358	1.413
Joint Venture Banks									
Total Banks	24	20	19	18	17	17	15	16	15
Total Bank Offices/branches	53	57	59	64	77	96	168	238	263
Foreign Owned Banks									
Total Banks	10	11	11	11	11	11	10	10	10
Total Bank Offices/branches	61	69	69	72	114	142	185	230	233
Totals									
Total Banks	141	138	133	131	130	130	124	121	122
Total Bank Offices/branches	7001	7730	7939	8.236	9.11	9.68	10.868	12.837	13.837
Updates Statistik Perbankan Indonesia, Vol. 9, No.1, Desember 2010, others form Batunanggar & Budiawan, (2006),									

As can be seen from the Table 2.1, the Indonesian commercial banking sector, unlike the current Malaysian commercial banking sector, is more fragmented. The above categorization of banks indicates that many of these banks operate in specific areas/ regions or conduct only special banking acuities. For example, Indonesian commercial banks are prohibited from engaging in several fee based banking activities such as securities and insurance or real estate lending simultaneously. These activities are allowed in the Malaysian case under one roof, though, with specific restrictions. Hence, the commercial banking sector in Indonesia can be described as fragmented and specialized, while the Malaysian commercial banks operate more like universal banks.

Table 2.1 provides number of banks, the ownership structure of the banking system based on the nature of their operation or whether they are public (State and regional banks), or Private (Foreign Exchange bank, on-Foreign Exchange Banks, Joint Venture Banks) and Foreign owned banks. The table provides also the number of branch offices of these banks.

2.2.2. Malaysia

Table 2.2 shows the old composition of the financial system in Malaysia. The left hand side shows the financial institutions sector of the financial system and the institutional types; and the right hand side of the table shows the financial market sector and the market types. The two sectors of the financial system are regulated by four different financial and market regulatory authorities and bodies. These are the Central Bank of Malaysia or Bank Negara Malaysia, which is in charge of the regulating the financial institutions sectors as a whole. The Securities Commission is the primary regulator of Malaysia's capital market, both conventional and Islamic finance sectors of the capital market. The Labuan Offshore Financial Authorities is in charge of the offshore financial activities. Finally, Bursa Malaysia regulates its shareholders and the listed companies. This study is concerned with commercial banking sector of the financial institutions sector of the financial system.

As indicated, Bank Negara Malaysia, the central bank, is a statutory body of the Government of Malaysia and is responsible for Malaysia's monetary and financial sector policies. This body also governs the Islamic banking, takaful and re-takaful sectors. The most important recent development in the area of central banking that will have significant impact on how the commercial banking sector and other sectors will

operate and be regulated is the new Central Banking Act 2009. This new Act has given sweeping powers to the central bank or Bank Negara.

Table 2.2 Structure of the Malaysian Financial System and Banking Sectors

Central Bank-Bank Negara Malaysia	Securities Commissions-SC
Banking institutions	**Financial Markets**
Commercial banks	Money and Foreign Exchange Markets
Finance companies	Capital Markets
Merchant banks	Derivative Markets
Islamic banks	Commodity futures
Discount houses	KLSE CI Futures
Foreign banks branches	KLIBOR Futures
Non-bank financial institutions	Offshore market*
Development financial Institutions	
Insurance companies	
Provident and Pension Funds	
Unit trust funds	

In the aftermath of the 1997/1998 crisis, the Malaysian commercial banking system has undergone a significant change at two levels. The first level involves rationalization of and consolidation of large number of individual financial institutions. For example, finance companies and their parent commercial banks are consolidated into single banking units, while the core businesses of merchant banks, stock broking companies, and discount houses are turned into new investment banking companies in a first stage. The subsequently creation of 10 domestic banking groups marks the second stage. Hence, the initial 36 finance companies are merged into 11 and the 12 Merchant banks into 10 new merchant banks.

After this rationalization as well as after the merger programs of all domestic banks completed at the second level of change, the new structure and profile of the Malaysian banking sector up to the end of year 2010, (the latest data available at time of writing this chapter) is shown in Table 2.3. The sector now, in more detail, in terms of

number of banks comprises of almost half of number of banks in 1997. The various sectors and their numbers are listed in Table. 2.3.

Table 2.3 Structure and profile of Malaysia banking sectors

Year	Total Number of Banks	Commercial Banks	Domestic Banks	Foreign Banks	Finance Companies	Merchant Banks	Investment Banks	Islamic Banks
1997	**88**	35	22	13	39	12	0	2
1998	**82**	35	22	13	33	12	0	2
1999	**70**	33	20	13	23	12	0	2
2000	**64**	31	17	14	19	12	0	2
2001	**49**	25	11	14	12	10	0	2
2002	**47**	24	11	13	11	10	0	2
2003	**46**	23	10	13	11	10	0	2
2004	**41**	23	10	13	6	10	0	2
2005	**43**	27	10	17	0	0	10	6
2006	**42**	22	10	12	0	0	10	10
2007	**47**	22	10	12	0	0	14	11
2008	**54**	22	10	12	0	0	15	17
2009	**54**	22	10	12	0	0	15	17
2010	**55**	23	9	14	0	0	15	17

Sources: RIETI Discussion Paper Series 07-E-039 and Bank Negara website www.bnm.gov

The followings are notable from Table 2.3; the new banking sector does not include finance companies and merchant banks as a separate entity or stand alone. The number of foreign commercial banks has fallen from 17 banks in 2005 to just 12 banks as at the end of 2007. The numbers of Islamic banks grew from only 2 banks throughout 1997 to 2004, to 17 Islamic banks as at the end of 2010. The banking system as a whole, in terms of numbers of banks has actually contracted (88 banks as at 1997 compare to now 55 banks as at the end of 2010), despite the emergence of the new investment banks and the growth in the number of Islamic banks. In the next section I summarize some important changes in the banking sectors of Indonesia and Malaysia. These changes are basically related to the liberalization and deregulation policies that have been undertaken in the two countries on a gradual base since the end of the crisis.

2.3. Some important changes in the characteristics of the banking profiles

The following summaries some important structural changes in the Indonesian and Malaysian commercial banking sector in the aftermath of the banking crisis of 1997/1998 and their implication. Some of these changes are directly observable from Tables 2.1, 2.2, or from 2.3 as well as some other changes adopted from other sources.

2.3.1.   Changes in the scale of the banking system

In both country cases the commercial banking sector, in terms of number banks, has actually contracted significantly. For example as of 1997, the number banking units in the Industry in Indonesia and Malaysia are respectively, 238 and 82 banks. These numbers have been reduced substantially over the years to about 130 and 47 banks units in the two countries respectively as end of 2007. The reductions in the number of banks are directly part of the restructuring exercise that naturally eliminates insolvent banks either by closing them or merging them with big banks to create stronger ones. For example in the case of Malaysia, the consolidation of the banking system as a whole was aimed at improving the efficiency and resilient of the domestic banking institution. That goal was part of an initial broader and long term three stage plan for the whole financial system. The central bank had introduced a high minimum capital requirement for banks in absolute term (RM 2.0 billion). Small banks may not easily achieve this sum in the short run on a standalone based and therefore one can see some logic for bank merging activity that took place during the period under study. As it help banks to leverage on the resulting economy of scale in capital funds, and fund raising ability. Henceforward one can think that the consolidations resulting from mergers and acquisition was also meant to help increase bank capitalization indirectly as we noted in chapter one.

2.3.2. Changes in State Ownership and Foreign ownership of banks

The change in the size of banking asset ownership by governments of Indonesia and Malaysia as provided, by IMF-World bank surveys conducted between 2000 and 2007 has shown some contrasting differences between the two countries in terms of the nature and scale of government ownership in banking business before and after the crisis. For example, banks that are 50% owned by Indonesian government or banks that the state is the majority shareholder have been reported to be holding about 44% of the banking system asset as of 2000 IMF-World Bank survey. By 2005 Indonesian state banks asset holding as percentage of total banking asset dropped to about 38.48%. On the other hand, in the case of Malaysia no such government ownership in terms of scale existed, and thus based on such criteria the figures were recorded as zero. But that does not meant the government is not involved in banking business. It is just not on the same criteria. Nonetheless, in the case of Malaysia, this may still be calculated by knowing the share of banks that are called government link banks or government affiliated banks. Based on that particular criteria or classification of banks Pangestu, (2003) reported that such banks in Malaysia held about 30% of the banking system.

The nature of changes in foreign ownership of banking asset in Indonesia and Malaysia in the past and present has also differed. For example, according to the same survey results by IMF and World Bank, foreign asset ownership in banks in Indonesia in the 2000 survey was about 7% of the banking asset, the percentage has then seen a dramatic increase in the aftermath of the crisis increasing to about 39.7% of banking asset. A similar but slow growth of foreign asset in Malaysia was witnessed during the periods. As reported in the INF-World banks survey, foreign share of the banking asset as of 2001 and 2005 were 19% 21.4% respectively for 2000 and 2005.

Indonesian government has in the past, owned substantial number of banks directly as figures in the 2000 IMF-World Bank regulatory survey indicated. However, by 2007, there was a substantial reduction in the State ownership of banks in Indonesia. For example, according to the survey, the government owns about 34 banks in the pre-crisis 34 compare to only 5 State banks in the after math of the crisis or throughout 2002 to 2007 period. In the Malaysian case the government ownership took different form, the affiliation form as we have noted above.

With regard to changes in the foreign ownership, according to numbers from Tables 2.1 and 2.3 for Indonesia and Malaysia respectively, the number of foreign owned banks in the two countries are very close to each other the past and present time. For example, in 2002 there were about 10 Foreign owned banks in Indonesia compare to 13 Foreign owned banks in Malaysia, and as of 2007 there were 11 Foreign owned banks in Indonesia compare to 12 foreign owned banks in Malaysia. In general, apart from very recent years (2007-2011), the growth in the number of foreign owned banks in both countries was slow. This could be explained partly due to the fact that the two countries are moving slowly in terms of liberalising their financial sector since the end of the crisis.

Changes in state ownership as well as foreign ownership of commercial banks are important features of liberalization that work to increase efficiency and reduce the chance for overinvestment (Dickinson and Mullineux, 2001). It also enhances governance and strengthens market discipline. For example, when state banks are privatized and more investors buy into these banks the market discipline should improve as public shareholders are expected to monitor banks and improve governance. While increase in foreign ownership of banks or shares would additionally bring more direct

capital funds and potential expertise in management as well as increase the role of market discipline in regulatory systems.

2.4.1   Regulatory Reforms and Changes in the Capital Requirements

2.4.2   Indonesia

2.4.2.1   Regulatory reform measures from 2000-2010

The policy and reform measures listed in Table 2.4 are part of a broader effort by the Indonesian authorities. They involve, in general, finding solution to the 1997/1998 banking and financial crisis first. In addition, to the short-term recovery goals, the reform measures were also designed to achieve strategic long-term goal for banking system resilient to shocks as well as prepare the domestic banking system for more and renew deregulation and liberalization to be undertaken in the aftermath of the 1997/1998 financial crisis and beyond.

2.4.2.2   Initial and early reform measures 1997/1998

Indonesia introduced a series of regulatory reform in the aftermath of the 1997/1998 financial crisis that affects various part of the banking system in Indonesia. Some of the important reforms and changes that affect the banking system are listed in Table 2.4. However, as can be seen from Table 2.4, none of the key reforms measures and changes listed involves a direct announcement of a significant change in bank regulatory capital requirement in Indonesia. This could be because of the way the 1997/1998 banking crisis had unfolded in Indonesia and the extent of severity of banking problem in Indonesia. Between January 1998 and December 1998, at least

Indonesian authorities, including the president himself, have made three successive high profile announcements about minimum capital requirement in absolute terms as well as the minimum ratio (Enough et.al.2001).

The first was on February 12 were President Soeharto announced that Indonesian banks will be required to hold 1 Trillion in Rupia (roughly $120 million at prevailing Forex) as the new absolute minimum capital by the end (end 1998). In roughly five years, time from the initial the minimum absolute capital requirement will be raised again by 3times of the new size or to 3 Trillion rupiah. However, as discussed in Enough et.al.,(2001) this was considered unprecedented at the time, and in April 1998, the central bank governor announced a modified new minimum absolute capital requirement for banks to be Rp250 billion by end of the year. Furthermore, as evidence emerged with regards to the capitalization status of Indonesian banks, the central bank made another announcement in November 1998. This time a modification was made to the minimum ratio requirement (the minimum risk-weighted capital ratio) by reducing the requirement to about half of the Basel based minimum of 8%. This was on condition that banks make a proper and acceptable business plan to achieve a minimum CAR of 8% by end of year 2001.

Now after these temporary revisions in policies, the authorities, and private bank owners can focus on restructuring and stabilizing issues. Those efforts have initially suffered a lot of delays due to many factors including mainly political uncertainty, as well as lack of knowledge about the extent of the financial distress in the banking system.

Once the international and local auditors completed their assessment of the financial status of individual banks and presented their findings, it was revealed that Indonesian banks were really in a dire distress financial situation (Enoch, et.al, 2001).

Tables: 2.4 Regulatory and Supervisory Reforms Indonesia

Period Post-Crisis 1998 present	Initiative	Key Policy measures taken
1998	Reorganization of Banking Supervision Units	• Reorganisation of the banking supervision units from "dedicated teams" to a separate structure of on-site and off-site supervision units. The rationale of this change was a belief, under the previous structure; the bank supervisor was too close to the bank, that it could create moral hazard.
1999-2000	Bank Restructuring	Bank restructuring programme, including closure of unviable insolvent banks and recapitalisation of "systemically important "and viable insolvent banks.
2000-present	Prudential Regulations	Introduction of prudential measures included bank business plan, fit and proper test for bank's management and controlling shareholders, improvement of bank's asset quality classifications and provisioning, financial disclosures, legal lending limit, capital adequacy requirement and bank exit policy.
2000	Intensive Surveillance on Major Banks	Intensive surveillance on major or "systemically" important banks by placing On-site Supervisory Presence Team at each bank to assess and monitor bank's risks as part of the efforts in maintaining banking system stability.
2003	Risk Management	Introduction of risk management for banks to ensure that bank's 'business is conducted in a safe and sound manner.
	Risk-based Supervision(RBS)	Development of RBS framework, risk assessment system and guidelines. Improvement of supervisory CAMELS rating.
	Capacity Building for Bank Managers and Supervisors	Introduction of a compulsory risk-management-certification programme for bank's managers and supervisors.• Training and certification programme for bank supervisors and bank researchers.
2004-present	Indonesian Banking Architecture (IBA)	Set direction and framework for the banking industry over the next five to ten years. It is aimed in building a sound and efficient banking system to create financial system stability for the promotion of national economic growth.
2005-present	Preparation of Basel-II Implementation	Development of implementation plan, consultative papers and regulations, performing Quantitative Impact Studies, and formation of Working Groups with banks. Gradual implementation by all banks, starting 2008 with the simplest methods.
2006	Investigation Unit	Establishment of Investigation and Mediation Directorate responsible for investigating indication bank's criminal cases, e.g. fraud.
2006	Reorganization of Banking Supervision Units	The separate on-site teams and off-site teams were integrated back into "dedicated teams" to improve coordination, resource allocation and supervisors' understanding of bank. A group of Specialist Bank Supervisors responsible for examining specific areas, such as market risk, credit risk, and IT.
2007-2013	Basel II/III	Phase implementation of international best practices (udder Pillar II) of the Indonesian banking Architecture a.) 25 Basel Core Principles for Effective Banking Supervision: 2004-2013 b.) Basel II, the implementation, beginning 2008
Sources :Bank Indonesia (various reports) and Batunanggar (1996),Batunanggar and Budiawan,(2006)		

Accordingly, banks were classified into three groups 1) Sound banks, with capital ratio above 4%. 2) Viable banks, with capital ratio less 4% and above -25% and 3) unsound banks with capital ratio less than -25% and these last groups of banks were order to close. This situation has forced the authorities to practice what is called in regulatory terms "capital forbearance"; that is by allowing banks to operate with minimum capital ratio of 4% or lower.

The relaxation on the 8% minimum risk-weighted capital ratio requirement, as mentioned above, requires banks to present a plan to raise their minimum risk-weighted capital ratio to the 8% within three years (Enoch, et. al.,2001, Hawakin, 1999).

Meanwhile, in 2002, due to slow progress from the side of some banks to achieve the 8% minimum ratio on time, there was a policy change according to Asia Economic Monitor (2002).

This involved the central bank or BI announcement that the minimum capital ratio will be reset at 8% and that any bank that fail to meet this standard will be transferred to the Indonesian Bank Restructuring Agency or IBRA for further action.

Thus, after the short term as well as the long-term regulatory capital requirement issues are settled as discussed, we see that in Table 2.4 most of the measures involve rearrangement of supervisory works and activities to achieve specific objectives.

Therefore, the restructuring of banks now focus on addressing operational and capacity building issues such as risk management. Then thereafter, the Indonesian Banking Architecture (IBA) program became the new umbrella under which the rest of the reform programs and policies were coordinated. For example, the first item listed in Table 2.4 was about Reorganization of Banking Supervision Units into separate teams one will be on-site and off-site of two. The reason given for this change was that the former structure, as perceived at that time, was prone to fostering Moral hazard in that bank managers were alleged to be too close to the members of the dedicated supervisory team.

We may recall that most writers on the last Asian financial crisis of 1997/1998 (e.g Kane 2000) put part of the blame for the crisis on structure and policies that induce moral hazard in the system. Nevertheless, it is interesting to note that, this particular arrangement, which had been considered bad in the early years of the reform process in

1998, is being adopted again as listed in the later year's (see last row of Table 2.4). Now the two separate teams are put together to work closely as the previous arrangement was now perceived to represents rather inefficient use of resources. It has been seen also as ineffective as it led to poor understanding of supervisors about operation of the supervised banks.

In the meanwhile, a number of other important reforms measures that are relevant to bank capital requirement are listed in Table 2.4. For example, two of the three reforms measures initiated in 2003 as well as in 2005, involve introduction of risk management programs at banks as a measure to strengthen capital standards. The subsequent development of RBS (Risk-based System) framework, risk assessment system guidelines, improvement of supervisory CAMELS rating system and capital adequacy requirements are seen as part of broader bank risk management improvement initiatives under taken by regulatory authorities.

Another important reform measures introduced in 2006 is the Investigation Unit, the aim of which is to fight corruption, fraud, and other criminal activities that can increase risk in banking operation as loss. Reform measures from 1999-2000 as listed in Table 2.4 that involved "Bank restructuring programme, including closure of unviable insolvent banks and recapitalization of "systemically important "and viable insolvent banks" are of direct interest. So far the most important reform process initiated in 2000 and is an ongoing according to Table 2.4 are the prudential regulatory measures.

These measures involve a long series of reform that include strengthening supervisory standards as well as bank corporate governance measures. It also involves as listed in Table 2.4 "bank business plan, fit and proper test for bank's management and controlling shareholders, improvement of bank's asset quality classifications and provisioning, financial disclosures, legal lending limit, capital adequacy requirement

and bank exit policy". These reforms are significant as many of them were aimed to tackle problems that were blamed for last banking crisis.

The Indonesian Banking Architecture announced or initiated in 2004 is the strategic plan for the entire commercial banking sector. It involves a long-range plan of 10 years to transformation of Indonesian banking sector into what it would look in 10years time. It is an ongoing process and that most of the other reform measures will naturally come under it. It has the aim of creating efficient and stable banking system that supports growth as indicated in Table 2.4.

2.4.2.3   Preliminary implementation of Basel II and III in Indonesia

As can be seen from Table 2.4, some reform measures undertaken at some earlier stages involve elements of preparation or exercise activities for Basel-II Implementation as scheduled by the authorities. The Indonesia regulatory authorities had initially set 2008 for introduction Basel II. The preparation exercise for Basel II has begun in 2005. They involve self-assessment activities such as performing quantitative impact analysis of the Basel II risk-based capital requirement on banks' balance sheet. It also involves the development of Basel II implementation strategy by choosing the risk-weighting methods.

The real implementation of Basel II in 2008 was short live before the crisis in the develop world led to significant change in the thinking about bank capital requirement. The developments have led G20 to negotiate over the years 2008-2010 on a new capital standard known as Basel III. Basel III was a fundamental change in capital requirement. It is significantly different from its predecessors Basel I & II on its new stringent capital requirements in term of quality and quantity. Incidentally, Indonesia a developing country is now part of the G20 that spearheaded the debate and formulation of the new Basel III capital standard. Thus, this is an opportunity for the developing

countries that their point of view on International standard could be better represented now.

Therefore, there is a need for a better understanding of matters that are important or relevant in the financial system of developing countries. There is a need to heighten awareness not only among academics but also among community of regulators and policy makers in these countries so that they can make the right representation at international decision-making bodies on regulation. This study aims to contribute to such efforts by enhancing understanding of the behavior of agent, bank, at micro levels in some of these countries as done here for Indonesia and Malaysia.

2.4.3 Malaysia

2.4.3.1 Regulatory reform measures from 2000-2010

In the Malaysian case unlike measures taken in the Indonesian reform case, we have seen, several reform measures listed in Table 2.5 that involves a direct or indirect targeting of bank capital to increase it. Some indirect and other measures, such as introduction of the deposit insurance in 2005 that may have some effect on bank capital may be discussed if time and space allow. In the meanwhile, for a series of measures that directly targeted bank capital, we examine Table 2.5 below.

In the run up to the 1997/1998 crises there were actually serious efforts going on from the side of the central bank to get banks to scale up their capital levels. This was evidenced in the enticing elements found in the incentive scheme of the Two-Tier (TTRS) Regulatory System first introduced for commercial banks in 1994 and later expanded to include other banking and financial institutions. However, by 1998 the bank shareholders were blamed to have undermined the scheme by re-routing the funds (which were supposed to accumulate to build up the capital base for banks,) back into

servicing their own short-term borrowings in what was term as "double gearing"(BNM,1999). Hence, in the midst of the 1997/1998 crisis the first step taken by BNM or Bank Negara Malaysia, -- after two government mandated companies were set up to clean up and recapitalize trouble banks in 1998-- was to subsequently abolished the TTRS in 1999.

Since then, the reform measures continued to evolved over the years as seen Table 2.5 to address issues seen to be important factors related to the 1997/1998 banking and financial crises. The measures taken concerning bank capital requirement after the abolishment of the Two-Tire were swift and strong. For example, as shown in Table 2.5, a number of measures were introduced in series to affect, directly or indirectly, bank capital level positively. First, the central bank, Bank, or Bank Negara had initially increased CAR (the capital asset ratio) to 10 % by end of 1999 and before it was set at 9 % end of 1998). Increase in capital size (in absolute terms) for Finance companies' was gradual. It was first increase to RM 300 million in 1999 and in the second round in 2000; it was rise to RM 600 million. The introduction of new frameworks (NLF) for assessing and complying with liquidity requirement was also introduced in 1999. In same year the government made its first announcement for banking consolidation that will involve mergers. So far, the most significant announcement of a change in bank capital requirement in the whole period was made in the year 2000, when as indicated in Table 2.5, On November 15 regulatory authorities specify the new capitalization level that the 10 domestic banking groups have to raise their capital level to as well as the foreign banks.

Table 2.5 Major regulatory reforms affecting the Banking System Malaysia

Year	Key Policy measures taken
1998	A blanket guarantee for all depositors was announced and the Government says that it will set up an agency to buy non-performing loans. Legislation was passed to launch Danaharta. Recapitalization fund, called Danamodal, was set up with a RM3.9 billion program.
1999	TTRS was abolished. CAR was increased to 10 % by end of 1999 (9 % end of 1998). Finance companies' capital funds increased to RM 300 million and RM 600 million by end of 1999 and 2000 respectively. In January 1999, the new liquidity framework (NLF) was introduced which all banks have to comply with by the end of 2000.
	On July 28 the first announcement of government's merger proposal for the whole banking sector, the selection of 6 acquirers and their respective partners.
2000-	On February 14 the government's approval granted for the formation of 10 banking groups, the selection of the anchor banks and their respective partners.
2003	On November 15 an announcement was made requiring the 10 domestic banking groups and foreign banks to increase their minimum capital funds to RM2 billion and RM 300 million, respectively by December 31, 2001.
2004-	The announcement of a new interest rate framework on 23 April 2004. In April 2004, BNM announced the implementation approach and timeline of the new Basel Capital Accord (Basel II). In July 2004, BNM issued the Guidelines on Minimum Security Standards for Cheques which specify the minimum requirements with regard to the role of banking institutions in payment and collection of cheques drawn by or paid in by customers.
2006	The introduction of the market risk capital adequacy framework in September 2004. The commercial banks, merchant banks, finance companies and discount houses are now required to incorporate their market risk positions into the risk-weighted capital ratio (RWCAR) and comply with the minimum RWCR (remains at 8 %) by the second quarter of 2005. BNM issues, in November 2004, a concept paper to the banking industry on the introduction of a Deposit Insurance System in Malaysia. Effective December 2004, licensed institutions are allowed to issue innovative Tier-1 capital Instruments for inclusion in Tier-1 capital under the RWCR framework. Other reforms have taken place since 2005 and many other changes in the industry Implementation of Basel II, Risk-based Capital Framework and Enhancements to Capital Adequacy Standards (financial stability report 2006)
2007---2009	Guidelines on Investment in Shares and Interest-in-Shares(issued in February 2007) Guidelines on Stress Testing (issued in March 2007) Revised Risk-Weighted Capital Adequacy Framework(issued in April 2007, implementation from January2008)
2010-	The planning process for the implementation of Basel III in Malaysia. In Bank Negara Annual report 2010 an assessment of the implication of the implementation of Basel III and its impact are outlines as well as the announcement
2011	The Bank intends during the course of 2011 to issue an implementation strategy for the incorporation of the enhanced capital and liquidity rules into the domestic regulatory framework. This will take into account, where appropriate, the need to provide more granular parameters under the new rules to reflect the specific c characteristics of the domestic market and relevant transitioning arrangements. Work will also be directed towards operationalizing objective and robust framework for the implementation of the counter-cyclical capital buffers required under Basel III.

Sources: The Bank Negara Statistical Monthly and Quarterly Bulletin of 1998/1999/2000 until 2010

The new capital requirement that domestic and foreign banks need to fulfill as their new minimum capital funds are: RM2 billion and RM 300 million, for domestic and foreign banks respectively, by December 31, 2001. This particular announcement is important for the current study because its impact would be over the entire period of the years from 2001 onward. In the same year, the final approval for the domestic banking system to consolidate themselves into 10 banking groups through mergers was made in 2000.

Several other reforms were introduced over the years; most of the measures come starting from 2004 to date. Table 2.5 details these measures. They include a new

framework for interest rate made public on 23, April 2004.The announcement of a plan to conduct consultation with financial institutions to prepare them for the gradual implementation of Basel II reform measures scheduled to begin in 2008 was made in 2006.

Another significant announcement as can be seen from Table 2.5 is the announcement of the introduction and incorporation of market risk factors into the calculation of their risk-weighted assets ratio or their risk-weighted capital ratio (RWCAR). In addition to that, the minimum ratio will remain as 8% par Basel standard ratio. This is an important change, which directly affect bank capital. Finally, as listed in Table 1.5, the introduction of deposit Insurance in 2005 is an important development for bank capital requirement as well as bank risk-taking. These are the most important reforms that are of most interest to this study and it objectives.

As shown in the lower part of Table 2.5, reform efforts have continued over the years after the completion of the restructuring and initial mergers between banks that resulted in the 10 domestic banking groups and further down to 9 domestic banking groups in 2007. Between 2007 and 2011, more reform measures have been introduced with some implication for bank capital or capital requirement issues. The most relevant are listed in Table 2.5 as follows:

(1) The issuance of Guidelines on Investment in Shares and Interest-in-Shares (issued in February 2007).

(2) The issuance of Guidelines on Stress Testing (issued in March 2007)

(3) The announcement of a Revised Risk-Weighted Capital Adequacy Framework (issued in April 2007, implementation from January2008).

Preliminary implementation of Basel II and III in Malaysia

Finally, in 2008, the central bank introduced the reform measures that were initially agreed upon under the negotiated international capital standard of Basel II. The conventional commercial banking institutions were initially all required to adopt the standardized approach to comply with the new Basel II. Similarly, two other groups of financial institution, the Islamic banking institutions as well as the insurance and Takaful industry sectors were also subjected to similar capital requirement that are designed specifically to suit the nature of their product and operational characteristics.

After this modest starting with Basel II implementation in 2008, the central bank, BNM, has further moved, in 2009 to allow about 11 commercial banks to start using their own IRB models (Internal Rating Base Models) to comply with Basel II risk-weighted capital measurement as indicated in the 2009 financial stability report. This comes after the supervisory reviews show satisfaction with these banks. Among the 11 banks are three of Malaysia's largest banking institutions by asset size.The 11 banks are given approval in principle to adopt the IRB Approach for implementation to begin in 2010 according to the banks report.

With regard to the implementation Basel III, the central bank has indicated that it has started impact assessment of Basel III. Table 2.6 shows one such assessment of how the various capital positions will be affected by the adoption Basel III.

Table 2.6 shows the results of one such impact assessment of Basel III implementation in Malaysian banks' case. The figures are highlighted further in Chapter seven (7) to draw attention to our findings, conclusion and their implications.

Table 2.6 Impact Assessment of Global Reforms on Capital on Banking Institutions as of 2011

	Common Equity Ratio	Tier-1 Capital Ratio	Total Capital Ratio	Leverage Ratio
Minimum requirement	4.50%	6.00%	8.00%	3.00%
Conservation buffer	2.50%	2.50%	2.50%	2.50%
Minimum requirement plus conservation buffer	7.00%	8.50%	10.50%	−
Current Basel II position	12.30%	13.00%	14.80%	−
Estimated Basel III position	9.50%	11.10%	14.80%	5.90%
Source: Bank Negara Malaysia and internal computation				

2.5 Chapter Summary

This chapter presents discusses changes that occur in the profile of the commercial banking system in Indonesia and Malaysia since the pre-crisis up-to-date. The presentation started with the Indonesian banking system then the Malaysian one. The chapter discusses some key changes in the two countries commercial banking sector to highlight their significance with regards to effort to liberalize and deregulates more of the banking market and banking operations while highlighting their link to capital requirement issues. The chapter then traces several regulatory and supervisory reform measures undertaken since the early days of the crisis to-date and discusses their relevance to the current study. Finally, the chapter briefly refers to the latest regulatory developments in the two countries that are related to the gradual transition to Basel II systems as well as the ongoing impact assessment of the new international capital standard of Basel III by central banks.

CHAPTER THREE

LITERATURE REVIEW

3.1. Introduction

This chapter reviews literatures related to bank capital, and bank performance measures (bank risk and return) and their relationship with bank capitalization measures. Therefore, the chapter is divided into two main parts**: First part** in the first we discuss definitions and functions of capital in banking, and then define and explain the nature of risk and returns in banking in the context of bank regulation. **The second part** in the second part we review and present empirical literatures and make brief commentary on individual studies. This part essentially consists of two main sections. The firsts section reviews empirical studies on the relationship between bank capital and bank portfolio risk proxies. In this, section studies on the impact of capital requirement on bank capital level and asset portfolio risk are reviewed with brief comments. The second section presents and discusses empirical findings on the relationship between bank capital and bank profitability measures of ROE. Finally, short summary of all parts is given followed by a brief discussion on how the current study fits into this literature and where it aims to contribute to this literature.

3.2. Definitions and Functions of Capital in Banking:

Standard financial economic and accounting textbooks generally define capital for any business firm, including banks, as owners' equity or net worth. It includes paid up capital consisting of common shares brought into the business in the form of owners' initial subscriptions. As the business becomes a going concern, a more precise accounting/economic definition of capital takes a formula form, and is estimated as a residual claim, in the following famous balance sheet equation that states that: Equity capital/Net worth = Asset − Liabilities. Capital in this sense, particularly in the case of

banks, increases mainly by ways of additional issuance of various forms of common shares (in private or public) and through various forms of partial retention of the undistributed profit or through reserves or provisions when the later is allowed etc.

Looking from firm or managerial perspective, many functional/role definitions, if not all, of bank capital in literature can be grouped fairly under two major functions: 1) Funding function and 2) Protection function. Within these two basic functions, however, it is uncommon to come across papers that differ in terms of number of roles prescribed as function for bank capital to perform. The need for such detailing arises because of different emphasis and approaches to the analysis from various point of views[17]. This study emphasis highlighting both the elements, that is, the funding and protection functions elements for two main reasons. First, it will help in relating bank capital functions to the two other major issues examined in this study, the risk, and return in banking. As such, this approach is consistent with the views of those who take bank capital as a form of entrepreneurial resource that mangers employ to generate more returns for owners and in due course must assume risk of loss.

Second, any other functions for bank capital no matter how unique it may be can be easily placed within one of these two major functions. The funding function is discernible into two types according to an illustrations given in Mingo (1970), Short (1978), and Mitchell (1984). The, first one involves financing the full cost that will be incurred at the initial setting up of the bank, which should also include some funds for purchasing part of earning asset at the starting and additional capital as a pledge for outsider investor. The second function has to do with subsequent capital injections to

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[17] Mingo (1975) considers bank capital funds as an input into production. Berger et.al(1995) discussed varieties of capital instruments and their specific functions.-Mitchell (1984) discusses how definitions of capital in banking were expanded historically based on functional performance of instruments. Short (1978) has identified almost 6 different functions for bank capital from various perspective. Pringle (1975) highlighted that most traditional definitions of the role of bank capital centers on its bearing of risks which is of two types "(a) protecting depositors of individual banks against loss and (b) guaranteeing the banking system as a whole against general banking panics" page 545. This study argues that all these functional definitions/categories can be easily grouped under two basic functions discussed in the body text.

finance any addition or maintenance to the long-term asset of the bank. Short (1978), argued that no bank should be allowed to use borrowed funds to establish itself. The logic given is that these costs represent only a tiny fraction of bank's asset. In practice, however, a recent survey of regulatory systems around the world by the World Bank (2007) found that majority of countries, surveyed (over 100 countries), do not allowed banks to use borrowed funds as part of the entry capital requirement to cover the establishment cost. Only a handful of countries in the World Bank survey were found to allow banks to use borrowed funds for this purpose (World Bank, 2007).

The function/role of bank capital from regulatory perspective, on the other hand, centers mostly from the risk bearing function of capital. The function is performed in two ways: to used owner's capital to insulate bank depositors/ creditors adequately from losses when a bank fails or by maintaining solvency at the first place (to build confidence). The protection function of equity capital has been widely cited, in literature, as one of the most important raison d'être for regulatory capital requirement from regulators point of view (Short 1978).

Allen and Herring (2001) listed capital requirement among sixteen regulatory tools, which are devised to achieve four main regulatory objectives including protection. Allen and Herring (2001) specifically cited two main reasons for the imposition of capital requirement on banks, which are to prevent systematic risk associated with bank failure and to protect investors. Similarly, Mishkin (2001) listed capital requirement among eight regulatory tools that are meant to limit bank excessive risk-taking and to protect investors.

The protection functions which economist argued is the principal function of banks' equity capital consists of protection against losses that otherwise would be borne by other investors. Capital requirement is assumed to achieved this end either by reducing the incentive for banks to engage in risky behavior (Moral Hazard) at the first

place and thus, eliminating the chance of loss or/and by providing loss coverage when loss occurs eventually. In the eventual loss situation, the definition of loss is distinguished into two types, predictable losses by some approximate and unpredictable losses. Short (1978) pointed out to an apparent haziness in this distinction simply because it is difficult to foretell with exactness the expected loss from the unexpected. Yet according to him, prudent business rules dictate that banks used a wide range of conventional risk mitigating tools to deal with all predictable losses and equity capital be spared only for the unpredictable losses.

Nevertheless, the difficulty that arises here is how to know forefront how much capital to hold for loss that is not predictable? While general observation of business practices will show that on average, banks tend to do a good job in estimating and making provision for the losses (they expected by approximation) more than adequate without the need to use equity. At times, the discretionary nature of the provisioning activity has led some researchers to fine-tune alternative explanations for them when provisions systematically exceed the expected losses (Dye (1988)[18] in some consistent way. Since it is impossible for banks to predict the unpredictable losses ex-ant, therefore, it would also be practically impossible to know and estimate ex-ant, the amount of equity capital that would be adequate for such unpredictable losses. Therefore, both bankers and regulators face the same dilemma; that is the inability to specify accurately the adequate amount of capital to hold. One can infer this situation from the intense debate on the new Basel accord, with the fact that bankers' tend to dislike the prospect of having to raise equity promptly.

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[18] Most of research in this area is concerned with what is called "earning management, capital management and signaling behavior of banks". papers by Anandarajan, et al.,(2003) and Ahmed et.al., (1999) argued that future credit loess are unpredictable and that the whole exercise of provisining for losses are subjected to manipulation for many other managerial objectives. Managers have a host of incentives to smooth earning as well as manage capital requirement etc.

On point such as this, a case was made, according to Mitchell (1984) for the definition of bank capital to be based on what capital does or expected to do. Hence, selected bank provision items were then, allowed to be counted as capital based on those criteria. Many academics have long expressed skepticism with regards to the prospect for equity capital alone to be sufficient or adequate to prevent bank failure, according to Pringle (1974) in light of accumulated empirical evidence for a lack of significant correlation between equity levels and previous bank failure episode in many studies. Thus, the search for an expanded functional definition of bank capital continued.

In this regards, Berger et. al., (1995) detailed three broader criteria, which, he argued, that any instrument would need to fulfill in order to be considered as capital from functional efficiency point of view. These criteria require that the prospective capital instrument takes a lower class to all other claims or be "junior", and the prospective instrument must be relatively stable or it must be "patient money" and more importantly, its contract characteristics must have the quality to dissuade corporate "moral hazard". Berger et.al., (1995) then listed and discussed a number of instruments whose contract characteristics enable them to satisfy all the three requirements at least at some varying degrees. Other papers elsewhere have debated most of the items he discussed therein theoretically and many of those instruments have been integrated into the regulatory capital system now. They includes pure equity capital (in all the forms of common shares), quasi- equity (Undisclosed reserve, retained earnings, disclosed reserves,) hybrid or innovative capital instruments (includes all forms of preferred shares) and finally long-term debt instruments (subordinated debt, debentures and capital notes).

3.3. Capital and capital instruments in the Basel capital standards (I,II.III)

In practice, the definition of bank capital requirement under the international capital standard of Basel Accord has included all of the instruments cited in Berger et.al. , (1995). Specifically, under the current Basel capital standard, capital instruments are grouped into two tier groupings. There is also a third Tier capital group, known as Tier3, and this new grouped has been suggested or proposed to be included into the new Basel II standard, but in the ongoing discussion on the so called Basel III this category, may be dropped all together under the new standard.

Currently the main Tier categories and their specific items are: **Tier1** capital or core capital, defined as the sum of common stock, retained earnings, capital surplus, and capital reserve and Non-cumulative preferred stock. **Tier 2** or supplementary capital, it consists of Loan loss allowances, cumulative Preferred stock with maturity greater than 20years, subordinated debt with original maturity of at least 7 years, undisclosed/hidden capital reserves (relevant to Japanese banks and some countries), revaluation reserve and hybrid capital instrument. Total regulatory capital: this is the sum of **Tier1** capital plus Tier2 capital[19]. The third category is known as **Tier3** capital, consisting of short-term subordinated debt to cover market risk. Finally, a Leverage ratio limit requirement is being proposed also under the new Basel II system.

It should be noted here that the ongoing discussion on Bank capital by the Basel committee and their renew emphasis on equity may be described as a flight to quality. Recent banking crisis have shown that capital and the way it has been defined and expanded in the past based on role that particular asset or security can play need to be narrowed down again to strengthen the quality of capital. The Tier 3 capital category has been dropped from the final capital standard discussion at least for now as we write

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19 This definition follows closely the Basel Committee on Banking supervision, found in the International convergence of Capital Measurement and Capital Standard, Basel, July 1988. This definition and classification standard is left largely unchanged under the new Basel Capital standard

this thesis. Regulators now demand a higher quality Tier one capital to represent a significant part of the regulatory minimum capital.

Beside the above standard definition of regulatory capital under the international capital standards, individual regulatory authorities in various countries have been allowed to modify the standard to suit their systems. This can be in terms of specific details designation of instruments of choice for inclusion or degree of adjustments (deductions and additions) as well as provisions and revaluation rules made in assessing the minimum regulatory capital to cover expected and unexpected losses. In this respect, important variations may exist among various jurisdictions concerning many aspect of capital standard that could have important implication for potential differences in bank capital levels as well as their impact on performance and risk measures. Thus, this study has noted some degree of differences, among the countries under study concerning various aspects of their regulatory capital standards and its determination. Some of these issues are presented and discussed in a separate chapter, on "profile of the banking system" in the ASEAN (here in the case of Indonesia and Malaysia).

3.4. Risk

The preceding section defines capital, discusses two broad functions of bank capital, and list important capital instruments for regulatory capital requirement. This section focuses on examining the definition, nature, and sources of risk that could result in loss and may threaten bank solvency. Understanding the nature and sources of risk in banking is fundamental because it is the focus of regulatory authorities when devising capital requirement for banks. One material fact to emphasis here is that the way in which risk is assessed and perceived by various parties will affect, directly, the estimation and allocation and even the effectiveness of regulatory capital for solvency protection.

The above fact becomes obvious as one examine the evolution of regulatory capital standard closely. It can be seen that the first Basel accord of 1988 (the most widely adopted internationally) had conceived solvency risk to be mainly associated with default risk on the asset side of bank balance sheet. Hence, under the old Basel I/II capital accords, amount of required capital is estimated after assessment of the amount of risk of losses on various loans categories. A simple arbitrary risk weight approximates are assigned to different assets types and then the sum of all those risk-weighted assets categories used as a denominator in the capital ratio formula. This may be a reasonable assumption when banking operations are of a pure intermediation process[20].

As banks expand into other non-traditional banking activities, regulators have come to recognize the need for the inclusion of new sources of risk- with potential to affect bank solvency risk- into the calculation. Indeed, in the subsequent 1996 amendment to Basel I, some additional sources of loss were identified to come from bank market activities and from the nature of bank operations and from other general systematic type sources. Consequently, these three sources of risk in banking (Credit risk, Market risk, and Operational risk) have become the corner stone in the new upcoming Basel II/III for regulatory capital estimation. Thus, it is crucial for both regulators and managers to be interested to explore the sources of risk and examine the nature of the potential losses that could arise from them.

The term risk refers to an event, situation, or outcome that has some unwanted effect, but a precise definition depends on the context, while the common element in all definitions of risk is "uncertainty" (Rejda, 2005). Since the concern of capital regulation

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[20] Pure intermediation process refers to the traditional banking operations in which a bank is defined as an institutions that accept deposit and make loan. This process of converting short time liabilities "deposit" into a long term earning asset subject banks to two major risk one on each side of their balance sheet: Liquidity risk, and is managed mainly through reserve requirement, insurance or discount window etc., and insolvency risk which is main concern of capital requirement.

is about losses that are associated with a risky situation; therefore, the definition of risk based on chance/possibility of loss is appropriate here[21] and hence this study define risk as a chance of loss. According to Rejda (2005), the chance of loss is estimated based on probabilities. The probability values may be arrived at using a mixed of subjective or objective assessment of the nature of the risk event and the chance of loss (Rejda 2005). In this case, it is important to note that differences in personal perception/attitude or experience will have influence on the judgment about risk as well as the losses that may be expected. At the same time, the definition of risk, as chance of loss, has given a clue as to why there could exist some losses that may be unexpected. The unexpected loss is the most important concern of the capital requirement rules.

Short (1978) discussed, with examples, 8 important sources of risk that can result in expected and unexpected losses in banking from the risk classifications he adopted from Butler(1975),Ravell(1975) and Vojta (1973). The list include (credit risk, Investment risk, earning risk, liquidity risk, operating risk, fraud risk, fiduciary risk and spillover risk). Because business cycle fluctuation is a leading indicator for credit risk, Investment risk, earning risk, liquidity risk due to their close link to fluctuations in wider macroeconomic factors on (e.g. GDP growth, unemployment etc.). Short (1978) predicted that the unexpected losses from these four sources of risk is likely to fluctuate cyclically. That is increasing during recession and easing in boom times. Hence, Short (1978) argued that the most appropriate policy design for bank capital requirement as I quote Short (1978) "*should not be required to vary counter-cyclically*". This mean that, due to its design such system will require banks to raise more capital during recession when risk increase and materialize and relax this rules during business upturns when outlooks in the economy improves. However, for states with credible macroeconomic

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[21] Rejda (2005) provides a list of 5 alternative definition of risk given literature and chance of loss is among one of those definition of risk. This definition has been chosen here because the aim of capital regulation has been concerned with losses that threaten bank solvency of expose investors to loss.

stability programme, pro-cyclicality in the behavior of sources of risk may not be a relevant issue in capital adequacy policy (Short (1978).

Indeed, many theoretical models (e.g. see Chapter 5) and empirical analysis have found that this was exactly the case under Basel I capital accord (Ayuso 2004, Heid 2007). Nevertheless, the consensus view is that this outcome is not desirable because raising capital under adverse economic condition in the market is costly process. Bank would tend to avoid these costs by choosing the least costly alternatives, such as cutting on new lending, to boost capital levels. This particular action could have significant negative macroeconomic impact during depresses time resulting in a vicious cycle.

The problem with cyclicality in bank capital requirement is because it means during downturn capital requirement will increases while capital levels actually fall as default and write-off increases. Since banks will be forced to raise capital as they come near to the required minimum capital level or violet the minimum capital requirement. Therefore, when a system of bank capital requirement such as that of Basel I/II fluctuates in this manner it can be shown that during downturn banks with low capital levels near the minimum required ratio would be unable to make new loans if they cannot raise new capital cheaply sufficiently and quickly. This is so because, in making new loans assessment, default risk estimates are likely to be higher for new loans in distress time so is the relative risk weighting assigned to various loans will be during downturns; particularly, under Basel II's internal rating systems. Accordingly, this will lead to a higher capital requirement in overall. When bank are unable to meet a binding capital requirement then they may cut on lending and this will exasperate the economic conditions.

Now, capital buffer requirement is one of the proposed solutions in the latest Basel III accord (Basel committee on banking press released September 2010). Another measure to solve this problem was a new accounting method for provisioning; and it is

called "Forward Looking provisioning". In Short (1978) however, the significant of the need to synchronize between business-cycle swings and capital buffer level is de-emphasized if there is a credible safety net (represented by various governmental subsidies including discount windows, deposit insurance etc.) system in the country.

Yet, in contrast that suggestion by Short (1978), Calomiris (2007) survey of theoretical and empirical works on bank failure worldwide, since the great depression in the U.S., concluded that must studies have associated government's commitment to providing safety net with greater banking instability. Furthermore, the very nature of the last four sources of risk, (Operational risk, Fraud risk, and Fiduciary risk and spillover risk), indicate that the likelihood of unexpected loss arising from these sources is likely to be a random event. Most probably, some of those events would be unrelated to business cycle.

From the practical side of the issue, Santomero (1997) presented another taxonomy of risk sources that views the sources of risk more closely from the point of view of bank managers as they conduct the daily risk management activities. The classification is a generic one that closely resembles the Basel risk categorization nomenclature, yet with some categories and items renamed. The six lists sources of risk includes: Systematic risk, Credit risk, Counter party risk Operational risk and legal risk. Here systematic is often identifies as market risk, while counterparty normally arise when there is a contract, this contract can be credit contact then a credit risk or trading position in the market though may not involve lending and borrowings.

Beyond the identification of types of risks and classifying them into various categories, is the ultimate aim of measuring the risk and to managing it.This is accomplished by finally providing the required capital for some imprecise specified amount of loss due to that risk. However, at the center of risk management strategy is the decision on the amount of risk a particular business (bank) is ready to assume for a

specified amount of return (Santomero 1997). Therefore, the next section examines the nature of return in banking and measures of return.

3.5. Returns

The term return here is pertinent to all measures of performance, which generally refer to an extra/margin, or profit that is earned above the initial input or investment. In this sense thus, the term return is interchangeable with profitability and earnings. Return in banking is measure in varieties of ways and each measure has its own merit and objectives. The study utilized two popular accounting return measures, ROA and ROE. ROA measures total return performance with consideration of all financing source; it is an efficiency metric. While ROE gives, the overall performance measures with respect to what equity owners have provided.

Managerial behavior with regard to returns is well documented in economic literature. Returns information and data are important input in managerial decision. Banking literature, documented various hypotheses that characterized profit maximization/or shareholder wealth maximization as the cornerstone in managerial operation (Pringle 1974). The models often depict this optimization process as a trade-off in which return and risk preferences are the most important variables in the decision equations[22]. In the case of banks, earning is the first source of fund for protection (Pringle 1974). Earning forecast and prospect is an important source of information for public investors; market analysts often compete to form their own estimate of it ahead of corporate announcement. Thus, both earning forecast and actual data can affect firm's securities variability as well as performance. Bank earnings performance is also a signaling flag for creditors whose primary focus rest on the adequacy of cash flow

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[22] Pringle (1974), and many more will be given here depending on the model use

streams when they have to decide on rolling over the credit to the next period or to liquidate their investment (Short 1978).

Dye (1988) built a model to demonstrate that corporate earning management practices is part and parcel of shareholder value–maximization process and with another intended purpose being to attract new fund. More importantly earning is a major source of capital for bank in normal circumstances. To add more emphasis to this, it is noted that regulators in the latest regulatory change in the international capital standard of Basel III has finally and practically recognized the significant of enlisting the potential in bank profit to beef up capital buffers. It has, for the first time, made capital buffer requirement directly related to managerial profit distribution discretion. Thus, it may be stated that capital buffer has the first call on bank profit under the new Basel III system.

Despite the fact that return/earning have been so important in managerial decision and from the view point of investors in banking, yet the traditional treatment of return/profitability issue in the context of capital regulation has been none existence (in exception to the recent change) or marginal; often catching, only, the attention of bank owners and managers[23].

As the recent and previous banking episodes have shown, some observers have come to the view that there is an urgent need for regulators to consider integrating return/profitability concern into the designing of capital adequacy standard explicitly. Hale (1991) first exposed the urgency of this issue to the G-7 a decade ago; yet the spirit of his message is lively once again, and very timely as quoted below:

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[23]Some proposal were reported in literature suggesting to use/or the use of earnings multiples as indicators of bank solvency and for that to become regulatory requirement (Short 1978), even if this suggestion were implemented it will not satisfied the need of a change that is suggested by Hale (1991) quoted above. In fact, as Short (1978) concluded that implementing such polices could be counterproductive. As banks will need to pass it on to consumer in order to fulfill such earning targets. Thus, some suggest limiting competition in banking and allow few banks to build a strong franchise or charter value.

The primary lesson from the diverse global experience with financial deregulation during the 1980s is that the profitability of financial institutions should be an important public policy concern. Financial institutions are profit-maximizing enterprises that provide de factor public goods. They control the payment system and serve as the primary channel through which monetary policy attempts to guide the economy…There is no simple way for a government to create a financial system which assumes private investor of adequate return, promote maximum efficiency, and recognizes the public-good character of many banking services(Hale,1991 page 267-269.)

Hale (1991), in the original paper has highlighted first the root cause of banking crisis of 1980s that followed the deregulation of financial system such as the one in the U.S. Hale (1991) and many writers have argued that deregulation (which include lifting restrictions on asset type holding, deposit rate ceiling, entry, branching and brokerage etc.) was to be blamed for most part in destroying bank Charter value. These changes, according to critics, had led to stiffer competition among banks as well as between banks and other financial institutions. (Pyle 1984, Edward and Mishkin 1995, Hellmann et.al., 2000).

Deregulation had resulted in squeezing bank profit, while banks responded by taking excessive risks (since there is less at stake for them or they were under pressure from shareholder) to do so to the detriment of the whole system. According to Hale (1991), the policy dilemma that regulators face then, and perhaps now too, is to recognize the "legitimacy" of concerns for bank return/profitability does not necessarily mean surrendering to the wish of unbridled private profit motive, but to understand the link and importance of bank profitability to bank solvency. Hale (1991) recognizes the uniqueness of every country's system yet he recommended, in general, for adjustment in various regulatory mechanisms to make room for banks to maintain Charter value with adequate profit. This will enable them to carry on the provision of the indispensable pubic good that they are uniquely suited to provide.

3.6. Empirical Literature: relationship between bank capital and assets portfolio risk

This part consists of two sections. Section one reviews literature on the impact of bank capital requirement on bank capital level and bank portfolio risk. Section two reviews literatures that specifically focus on the analysis of the relationship between bank capital ratio and bank earning/profitability. The review includes brief discussion and comments on findings, models and methods as well as contrasting among them wherever possible. The chapter ends with short summary about issues discuss in various sections of this chapter.. Finally, we provide a summary of where and how the current study is related to previous studies and how and where it differs from these predecessor studies. Specifically, we state in points what makes the current study different.

3.6.1. The relationship between bank capital and portfolio risk

Most previous empirical studies on the impact of capital adequacy requirement in banking have focused on examining the impact of capital requirement on bank capital and risk-taking or portfolio risk. Therefore, reviews in this section is limited to available (on hand) papers published in revered journals and which involved empirical studies on risk-based capital standard only and mostly of studies from the early 1990s or very late eighties up-to-date.

There are two main reasons for this selection. First, most studies before 1990 were on capital standards other than the risk-based capital standard. Since the focus of the current study is on the risk-based capital standard, this study attempts to review and examine the findings of studies on the impact of the risk-based capital standard on various banking aspect within the scope in order to build on them. Therefore, studies earlier than that are not very much relevant to what we want to focus on in this section.

However many of these studies on bank capital are cited also or reported elsewhere in this text to support and provide evidence in the relevant contexts.

Second, earlier studies before the 1990s in this line are different from majority of empirical studies conducted in the 1990s and onward in terms of empirical methods applied in the analysis. As such, the review in this section will proceed to examine closely specific aspects of these literatures. Specifically, the review will be looking at the aim of these studies, their focus, their methodology, and empirical estimation methods, focusing on one single study at a time.

The review will also be arranged according to their chronological order as well as grouping them according to part of the world region or country (e.g. the United State of America, Europe and Asia) they belong. In addition, the review will also include contrasting various aspects of the studies and highlighting strength and weakness, relative advantages of various methodologies and methods. A close examination of any of these aspects may help in finding a new gap in the literature. Current study or future research may attempt to contribute to filling those gaps.

It is also well known that theoretical works on bank capital requirement are divided on the impact or on the effectiveness of capital requirements for banks (VanHoose 2007). This review should be able to highlight some of these differences by studying the results of empirical studies from different parts of the world.

Avery and Berger (1991) study assess the relative accuracy of the new risk-weighing system in the case U.S. banks. The paper was an attempt to evaluate the United State's version of the then new RBC or, the Risk-Based Capital Standard devised by the Basel committee on banking supervision in 1988. This accord is also known as Basel I Capital Accord. The study was conducted before the accord officially went into full adoption in 1992.

Avery and Berger (1990/1991) study was among several first attempts of their kind to try to empirically examine the new risk-weighting system for the capital standard[24] in an effort to predict the potentials for the new RBC or risk-based capital standard to be effective and how it will improve over the old one. The authors have computed the risk-weights for various asset categories separately using past balance sheet data of commercial banks in the U.S. from 1981 to 1989, to see it would have affected banks during that time because the new system was not yet put into effect.

They found that, capital ratios computed using the new system predicted accurately several measures of bank performance in the past, and that the performance of the new capital system compared to the old capital system was significant. Moreover, they found that the new capital standard was more informative about bank performance profile and more stringent compared to the old system. Yet, they also found that some risk categories have poor ability to predict actual bank risk/asset risk profile categories accurately. They concluded that in any case the system was a great improvement over the old capital standards. Now after more than 20 years, their basic findings have been confirmed in various studies, especially poor risk-weights assignments to some assets categories. This has led to several reforms of the original Basel capital accord and today the new and significantly different capital standard has gone into effect this year and next year.

The current study aims to take a similar approach by attempting to examine ahead some features found in the new capital standard or the Basel III system. Specifically the capital buffer and Leverage requirement and how banks may respond in

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[24] Keeton(1989)'s study was another attempt of this kind , and at that time Keeton noted, and I quote,"---Hoping to gain better control over bank risk-taking, regulators have decided to tie banks capital requirement to their estimated risk while retaining an absolute floor on capital...and Keeton then asked will the new plan control risk in the banking industry?" Page40. Now, after two decades of that historical accord, regulators are struggling to get bank capital levels to the level deem desirable". Thus if I may use keetton's words here I would say as " hoping to secure and conserve on adequate bank capital level, regulators now require buffer capital and have decided to tie bank capital buffer requirement to managers discretional profit distribution to secure that buffer while maintaining the minimum required capital in place. Thus, this study asks will capital buffer requirement be secure. Will sufficient capital levels be maintained in the banking industry now?

adjusting their capital buffer levels with their assets portfolio risk return mixes. There has been a number of studies conducted on bank capital and risk adjustment decisions and another few studies on bank capital and returns/earning adjustment decisions in the past. In this and the next sections, this study follows closely individual studies to review and discuss them from various dimensions that include their aims, methodologies, methods, and findings.

Most research findings and conclusions (as presented in this Chapter), on the effectiveness of the 1988 Basel capital standard (Basel I) in reducing excessive bank risk-taking behavior, in general are mixed. Mixed empirical finding on the impact of capital requirement in banking is common among earlier empirical studies as well as among the latest studies.

3.6.2. Empirical Studies on the relationship between bank capital and portfolio risk

The work of Shrieves and Dahl (1992) is credited continuously, in this strand of literature, to have been the first to develop and test bank capital and risk decision model that recognize the simultaneous and partial adjustment nature of capital and risk-taking decision in banking as implied by various theoretical models. Since then their work has been the benchmark methodology in this strand of empirical studies on bank capital and risk-taking regulation.

Shrieves and Dahl (1992) framed their model within two basic hypotheses: a pure moral hazard assumption, which entails a simultaneous but negative adjustment of capital and risk decision, and, a constrained moral hazard theoretical assumption, which posit (based on various theoretical views), a simultaneous positive adjustment of bank capital and bank portfolio risk decision. Using significantly large sample of banks in the U.S. for a short time period, their study lend a support to the constrained moral hazard

theoretical models with a finding of a significant positive relationship between capital and risk-taking among their sample U.S. banks in the period between 1984 and 1986.

Shrieves and Dahl (1992) concluded with the followings: (1) Capital and risk decision of average bank in their sample tend to be influenced not only by regulatory pressure per-se but also by owners/ managers' own self-regulating behavior. This behavior is induced by various cost and benefits associated with distress and bankruptcy as suggested by numerous bank capital structure theories. (2) The present of a positive regulatory pressure, especially, on banks with low capital level is confirmed. (3).

Furthermore, they concluded that a positive capital risk relationships is an indication that the effectiveness of risk-based capital standard will be dependent on the accuracy of the relative risk-weight assigned to various asset categories as compare to their actual risk exposure.

Jacques and Nigro (1997) followed closely the model development steps in Shrieves and Dahl (1992) with minor modification to both the methodology and method. Whereas in the former they introduced the new measure of capital and risk in the equations (the Basel I based capital standard variables), in the later they used the more asymptotically efficient estimation method of 3SLS instead of the 2SLS. Jacques and Nigro (1997) closely study the impact of the risk-based capital requirement on U.S. banks' capital and risk-taking decision during first year of the implementation of the new accord.

Their study focused especially on how regulatory pressure affected two groups of banks; namely those banks that had met or exceeded the new minimum capital requirement ratio and those that had not met it. The three implicit hypotheses tested are that, (1) group one (banks that met the standard or exceeded it) will decrease their capital level and increase their portfolio risk while group two will do the opposite. Alternatively, they tested also that; group one banks could potentially do the opposite

action (i.e. increase capital reduce portfolio risk) for signaling purpose or to avoid possible future frictions with regulators/supervisors on capital issues etc.

Their study highlighted three main findings; first they found that introduction of the risk-based capital standard was effective in increasing bank capital and reducing portfolio risk for all banks. Second, their more detail analysis found that regulatory pressure (on both capital level and portfolio risk) was more pronounced in the desirable way among banks with capital ratio higher than the minimum, compare to regulatory pressures the model detected among banks with low capital levels than the minimum requirement. Finally, Jacques and Nigro (1997) concluded with a suggestion that put emphasis on the need for more research on how variation in the level of capital deficiency at banks with low capital may limit the effectiveness of regulatory action.

Aggarwal and Jacques (2001) study builds on its predecessors (Shrieves and Dahl, 1992, Jacques and Nigro (1997) in terms of methodology which they modified to incorporate PCA (PCA = Prompt Corrective Action) proxy variable; and the method whereby they preferred using 2SLS as in Shrieves and Dahl (1992) instead of the 3SLS. Their study focused mainly on assessing the effectiveness of the PCA provision in the FDICIA or the Prompt Corrective Action supervisory rules employed in the U.S. banking system to strengthening the FDICIA[25] in the early nineties.

Two dummy variables were used to reclassify all the five categories of the PCA bank categorizations into mainly two classes of adequately capitalized banks and undercapitalized banks. Interaction terms of these two proxy variables with lag capital were added to test the difference in the adjustment speed between the two groups of banks. Two prior hypotheses were made regarding the response of the two groups of

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[25] FDICIA refers to the Federal Deposit Insurance Corporation Improvement Act, and PCA means Prompt corrective action: is a legal provision added to FDICIA and consists of rules and action supervisors need to take to toward problem bank, especially the undercapitalized banks.

banks to PCA provision requirements. Whereas the response of undercapitalized banks was expected to be more pronounced in increasing capital levels and reducing portfolios risk, adequately capitalized banks were equally hypnotized to behave in manner similar to the behavior of undercapitalized banks, based on prediction of signaling or regulatory cost avoidance theories. Their models were estimated using a sample data on 2552 insured banks for 3-year periods.

Their main finding however, showed that: both categories of banks have responded as hypnotized and that banking risk level has diminished significantly in the first two years of PCA. Therefore, the study concluded that PCA system was effective in inducing banks to increase capital and reduce risk. Among the latest empirical studies that are closely related to the above studies are three empirical studies by Berger et.al (2008), Flannery and Rangan (2008), and Jokipii and Milne (2010).

Berger et.al., (2008) study was set up to investigate the determinants of what they called a "significant capital holding above the regulatory minimum requirement" at BHC in the U.S. between 1991 and 2007. Berger et.al., (2008) study started by, first, examining the sources of increase in bank capital during the period under study using simple statistical methods. They found that about 167% of annual increase in bank capital during the period is attributed to addition from the retained earnings as well as from new share issuance.

They estimated that the balancing figure that makes the adjustment percentage 100% was about -67% representing share buyback activities to maintain the target capital structure. From this initial analysis, the authors concluded that banks must have a specific target capital level above the minimum regulatory requirement that they have been actively managing over this period and hence they proposed a target capital structure for BHCs.

The authors then developed a number of hypotheses that they empirically can test to identify factors that had influenced this target capital adjustment level and speed over time. A single equation with partial adjustment methodology was developed and the stepwise regression methods as well as dynamic panel data methods were used to estimate the model coefficients from the selected proxy variables. They provided the following findings on the determinant of bank target capital ratio adjustment speed and capital level as: Target capital ratio is negatively related to bank size; negatively related to market to book ratio and positively related to retail deposit size, franchise. Furthermore, they found that Larger BHC targeted significantly higher capital level above the minimum during the period. Bond market pressure was found not to be significantly affecting BHC target capital ratio during the period. BHC with relatively lower capital ratio but above the minimum requirement was found to adjust to its target capital ratio more rapidly compare to others. BHC that were classified as critically undercapitalized adjust to their target capital ratio very slowly compare to others. BHC specific fixed effect was found to be very important and that almost all econometric results are sensitive to it.

Flannery and Rangan (2008) study was also motivated to investigate almost the same higher regulatory capital ratio phenomena observed among U.S. bank holding companies or BHC as in Berger et.al (2008), but using slightly a different sample period (1985-2002 period.), yet with some overlapping with Berger (2008) study period. Flannery and Rangan (2008) focus on three hypotheses designed to test the relative significant of bank profitability, regulatory pressure, and market forces effect on bank capital build up during the period. Their results emphasis more on the important of market forces in affecting bank capital levels due partly to regulatory changes that had been presumed to had had enhanced market participants incentive to monitor banks during this period.

In contrast, Jokipii and Milne (2010) examine how U.S. bank holding companies adjust their holding of capital buffer and portfolio risk in the period between 1985 and 2008). At this point, it is notable, on one hand, that while all previous studies have focused on analyzing observed changes in bank absolute regulatory capital/leverage ratios on bank capital and portfolio risk. Jokipii and Milne (2010) study represents the first study on bank capital buffer and risk adjustment decision.

Jokipii and Milne (2010) applied a simultaneous equation model with partial adjustment as in Shrieves and Dahl (1992).However, unlike the later study, they estimated their model using full-information estimation method. They used relatively new and sophisticated dynamic panel estimation methods as found in (Arellano and Bond 1991, Arellano and Bover 1995, and Blundell and Bond, 1998). This advanced method specifically accounts for individual fixed effect and can accommodate simultaneous dynamic panel specifications at the same time. Their study was comprehensive and was the most extensive of its kind in this strand of literature on U.S. BHC bank holding companies.

In overall, their study found a positive relationship between capital buffer and bank portfolio risk adjustment. Their robustness test based on periodic dimension found changes in the direction of capital and portfolio risk adjustment relationship over the years. The relationship changes from positive to negative signs. Jokipii and Milne (2010) concluded that such relationship characteristics between the two variables (capital and risk adjustment) differ among banks at different levels of capitalization.

3.6.3. **Studies outside the US Banking Industry**

US banking and financial system are rich in terms of availability of data and size, thus it has been very competitive in attracting researchers (US or non US academics) all over the world. This has translated into relatively large number of

empirical literature on US banks and financial system etc. However, there is a growing volume of empirical literature in many areas now that used data coming outside the United State. Below this study, reviews available published empirical papers on capital and risk adjustment from both developing and other developed countries other than the U.S.

3.6.3.1.   The United Kingdom

Ediz et.al., (1998) examined U.K. banks behavior toward capital requirement. Like many other countries who anchored their capital requirement on Basel capital standard but retain significant local autonomy on (relaxing/strengthening) various aspect of the capital standard, the United Kingdom, is among countries imposed relatively a stringent standard on banks operating in U.K. compare to the Basel standard requirement. Specifically U.K imposes relatively higher regulatory capital minimum of 9% for banks to maintain, and additionally establishes a trigger zones for regulatory intervention into banks should bank capital ratio hit that low or near to the zone. Thus, banks keep their distance from the zone.

Ediz et.al., (1998) has argued that studying such regulatory systems and their impact on bank behavior could provide useful contribution to the literature. Additionally, banks from different regulatory jurisdiction may behave differently, and thus studying a cross-sectional bank data within a single country could provide a unique knowledge and information on bank behavior with great opportunity to enrich literature.

Therefore, the specific objective in Ediz et.al.,(1998) was to test the effectiveness of the above system. They used the balance sheet and income statement data of a sample of U.K. based commercial banks for the period between 1989 and 1995. They formulated and tested a single hypothesis with the assumption that regulatory pressure should affect banks differently based on their relative distance to

trigger zones as indicated by two dummy variables proxies, specified as regulatory capital trigger zones. The model was estimated using a panel random effect method in addition to a switching regime regression model. They further make use of instrumental variable method to account for the present of endogenous lag dependent variable effect.

Ediz et.al.,(1998) found a strong result in favor of their hypothesis on the impact of the designated capital zones rules that activates regulatory action on banks whose capital falls near to the zones. The proxy regulatory capital ratios were found to be positive and significant in all cases either the point estimate or the interval based estimates. For example, their result showed that quarterly adjustment rate for a bank nearing the minimum required capital ratio was about 50% upward surge in capital level. Ediz et.al.,(1998) concluded that capital requirement and the capital zoning system found in the United Kingdom were effective in inducing banks to increase their capital level with no evidence of bank engaging in portfolio asset reshuffling to improve their capital level.

3.6.3.2. Switzerland

Rime (2001) study focused on commercial banks operating in Switzerland. His sample consisted of three types of depository intuitions in Switzerland (Cantonal banks, big banks and Regional banks) for a period of 7years or 1989 to 1995. The main objectives of the study were to examine the nature of capital and portfolio risk adjustment for Swiss banks as well as to test the regulators influence on Swiss banks' capital and risk decisions. His methodology involved estimating a modified version of the simultaneous equation models of Shrieves and Dahl (1992) and the late adaptation to it. He applied the 3SLS instrumental variable method to estimate two differently specifications of the models based on two capital ratios; the risk-based capital ratio and a Leverage ratio each with risk-weighted asset ratio as the main proxy measure of risk.

Rime (2001) also created two different proxy variables for testing regulatory pressure. Results of the first capital measures (the Leverage ratio) indicated a positive and significant relationship between bank Leverage ratios and asset portfolio risk adjustment, while no significant relations was discovered between the risk-based capital ratio and changes in portfolio risk. Moreover, Rime (2001) found that regulator pressure significantly influenced Swiss bank capital adjustment, especially the Leverage ratio, but did not induce any significant changes on Swiss bank portfolio risk adjustment.

Rime (2001) interpreted the first finding (the positive relationship between risk and Leverage ratio) to be due to the binding effect of the risk-based capital regime. He interpreted the second finding (the lack of any regulatory pressure effect on Swiss banks' asset portfolio composition) could be the result of the underdeveloped secondary market for securitised asset in the Swiss financial system. Finally, Rime (2001) concluded that positive capital and risk relationship finding in his context could not be given the common interpretation found in literature. That is the usual "unintended consequence" interpretation of the effect of risk-based capital requirement on bank risk-taking behavior.

A notable specification problem for testing the effect of regulatory pressure, and consequently for evaluating the effectiveness of regulatory pressure, in almost all the papers reviewed above, is the used of dummy variable approach.[26] Dummy variable approach is often used to test regulator effect (pressures) in studies of bank capital and risk adjustment. It involves indentifying banks with different levels of capitalization and then make, based on that, somewhat a' prior hypothesis about the magnitude and direction of the assumed pressure from the regulator on banks holding different capital stock. However, Jackson et al., (1999), have criticized this approach by pointing out to a

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[26]An alternative approach widely found in empirical literature to check for results robustness is the split sample or subsample analysis approach and it is thought to be able to overcome some of the arbitraries associated with dummy variable approach.

well-known econometric problem of omitted variables effect, that if present in those cases, could complicate the interpretation of the estimated coefficients for the dummies. This in turn, opens up the findings in these studies to a challenge as Jackson et al., (1999) directly stated in their conclusion. Thus, they highlighted the need to look for the present of market effect in this context rather than attributing them to regulator effect.

3.6.3.3. Switzerland

Bichsel and Blum (2004) study is one study that attempted to examine the above two issues (i.e. bank capital level and bank probability of failure) separately in the Swiss banking system context. They set up two models. The first model examine the effect of capital, as measured by capital to asset ratio (Leverage ratio), on bank risk as measured by volatility of market value of bank asset. The second model test the impact of bank capital level (in the form of leverage radio also) on a measure of bank probability of failure (as measured by a z-score, a number that measure banks distance to default) for 19 Swiss banks over a period of 12 years using monthly data (1990 to 2002). The two variables were estimated in two separate single equations models using a panel random effect method.

The departure from the use of a simultaneous partial adjustment framework of Shrives and Dahl (1992) in their context was justified based on lack of appropriate data or proxy variables. Bichsel and Blum (2004) found a positive impact for capital on the asset portfolio volatility but no effect on the probability of bank failure proxy (as measured by bank z-scores) in their model. These findings, on the impact of capital requirement in the context of Swiss banking, contrasted with that of Rime (2001) who found a positive impact for capital standard on capital level but no effect for capital on risk-taking or change in portfolio risk levels.

An interesting thing to note among the findings in Bichsel and Blum (2004) is the finding of no significant relationship between capitalization level and bank failure. This particular finding is in line with past studies mentioned in Pringle (1974).

3.6.3.4.　Spain

Barrios and Blanco (2003) specifically pick up the above point to motivate their study and to make a case for an approach that account and test for both market and regulatory influence on bank capital and risk decision. This approach, which Barrios and Blanco (2003) adopted, from Wall and Peterson (1978), argues for a methodology that involves designing and testing two regulatory capital systems/regimes, one controlled by the regulator and the other by market forces. Such a model argues that banks will switch between the two capital regimes depending on which capital regime is binding on them.

Hence, Barrios and Blanco (2003) developed and tested these theoretical market and regulatory capital model to study how regulatory apparatus and market forces affect Spanish bank optimal capital buffer and regulatory capital ratios adjustment respectively. They calibrated the two models by estimating a disequilibrium models using market and balance sheet data of sample of Spanish banks for the years 1985–1991. They found that both regulatory factors and market forces are present and are influential on the optimal capital ratio decision of Spanish banks. In their case, they reported that the speed of adjustment for banks under the market capital model was higher compare to the speed of adjustment of bank under the influence of regulatory system. This particular finding and similar results that appeared in favor of market model has led the authors to conclude that: the market for bank capital regulation in Spain is dominated by market forces rather than regulators base on their model finding. However, they highlighted that this finding contrasted from the findings of Wall and

Peterson (1987, 1995) in the case of U.S. commercial banks as well as from the inconclusive findings of his immediate predecessor at home , that is Carbo,(1993)'s inconclusive finding on his study on Spanish banks.

In general, empirical findings, including those reviewed above, have reported both findings, a positive and negative relationship between capital and portfolio risk adjustment, yet each of these two outcomes has its implication. One implication cited for a positive finding in the capital risk adjustment relationship is the so-called the unintended consequence of higher capital requirement. This is so because banks are profit maximizing entities and hence, would tend to offset leverage restriction in one side of the balance sheet by reshuffling low risk assets in the other side of the balance sheet with more risky investments that promised higher returns (Koehn and Santomero (1980, and Kim and Santomero1988).

Similarly, many authors have associated a negative impact of capital on assets portfolio risk adjustment as an indicator of the effectiveness of capital requirement. The negative sign is interpreted in this case as regulatory pressure in work to dissuade banks from engaging in excessive risk-taking and to induce them to hold higher capital and thus maintaining safety in banking. However, many others authors do not believe that bank portfolio risk proxies used in empirical studies are at best good indicators of the likelihood for bank failure, and thus a negative sign on such proxies may not be an accurate indicator of bank safety.

Therefore, a serious question remains that has not been completely answered still now. The question is what is the relationship between capital level and actual likelihood of bank failure? This question has been asked repeatedly in the past as well as in present time. Among the theoretical studies, before the risk-based standard of 1988, that discussed this issue at great length is the study of Pringle (1974). Yet, Pringle (1974) cited, among other studies, empirical studies by Cotter (1966) and Vojta (1973)

who had found no significant relationship between bank capital levels and bank failure or probability of bank failure.

3.6.3.5. South Korea

Jeitschko and Jeung (2007) tested the theoretical model developed in Jeitschko and Jeung (2005), on a selected sample of banks in the South Korean banking system. The model framework suggests that there are three agents with major influence on bank capital and risk-taking decision. The agents are a regulator, a Shareholder, and a manager. Each agent dominates in a particular organizational/market setting and depending on bank capitalization levels.

The three factors used to identify a dominant agent in each case are :(1) Capitalization: whereby undercapitalized banks' capital decisions (public or private) are dominated by regulator incentive. Otherwise: (2) manager incentive dominates at publicly listed banks, (3) while privately held banks' capital and risk decisions are assumed to be under the influences of owners' incentives. Accordingly, the three hypothesis state that capital and risk adjustment are positively related in a regulator controlled banks case, and they are negatively related in a shareholders control banks while they are expected to be positively related for capitalized public listed banks where managers incentive are thought to dominate.

A heterogeneous sample of banks (Mutual saving banks and commercial banks) representing these three classification of banks were selected from the South Korean banking system and a simple linear regression methods was initially used, then fixed effect panel methods as well as a piecewise linear regression model were used to estimate the relevant coefficients of the proxy variables at levels.

In overall, the results provide a strong support for two of the three hypotheses on managers and shareholders dominated banks, while the third hypothesis received mixed

results from different banking organizations. Specifically, the hypothesis of a positive relationship between capital and risk for regulator incentive dominated banks received support among Mutual and saving banks while it was not supported among listed commercial banks. The theoretical predictions in Jeitschko and Jeung (2005) that were tested in Jeitschko and Jeung (2007) are interesting and appealing. It will be interesting to see if these findings could be robust to change in methods and variables form.

3.6.3.6. Germany

Stolz,(2007) is the first published empirical work to test the predictions of capital buffer theory (separately developed by both Marcus, 1984 and Milne and Whalley, 2001) using German saving banks data for a period spanning between 1993 and 2004, with both year inclusive. Stolz (2007) adopted Shrieves and Dahl (1992) simultaneous equation models for bank capital buffer and assets portfolio risk adjustment. He proposed two types of relationship. Stolz (2007) tested four main hypotheses: the first two alternative hypotheses to the null hypothesis say that banks with higher capital buffer are expected to adjust both capital and portfolio risk simultaneously and positively. While capital and risk adjustment for low capital banks is expected to be negative. Furthermore, Stolz (2007) made two additional hypotheses with regard to the adjustment speed. The speed of adjustment to capital buffer and portfolio risk for banks with low capital buffer is predicted to be faster compare to banks with higher buffer capital.

Three different econometric methods were used to estimate the coefficients. The methods were the 3SLS method, the dynamic panel data method, and a rolling window method. In summary, the findings from the three methods were consistent and they provide some supportive to several of his hypotheses. However, yet Stolz (2007) also recorded some inconsistencies among methods as well as lack of support for some

hypothesis. On overall, the Stolz (2007) made the following conclusion about his most important findings in the study.

1) Capital buffer adjustment has an impact on bank portfolio risk for German saving banks between 1993 and 2004 in many ways: such that German banks.

2) adjust capital faster than their asset portfolio risk adjustment

3) Low capital buffer banks adjust capital and risk faster than higher capital buffer banks

4) Capital and risk adjustment for low capital buffer banks are negatively related

5) Capital and risk adjustment for banks with higher capital buffer are positively related

6) The coordination for capital and risk adjustment did not support a two way adjustment predicted.

7) The findings on overall are consistent with capital buffer theory.

3.6.3.7.   Malaysia

The empirical analysis in Ahmad et.al., (2008) has focused on examining the determinants of bank regulatory capital ratio as measured par Basel I risk-based capital standard framework in the Malaysian context. The study pays a special attention to the impact of capital requirement or regulatory pressures and bank risk-taking on bank capital ratio. To perform such test, the study developed two types of proxy variables for risk-taking (as measured by NPL and ZRISK) and three proxies variables for regulatory pressures (that is a dummy for 1996_dummy, 1999_dummy and two capitalization Dummy variables). The study utilized balance sheet data for a period stretching between 1994 and 2003 for the analysis, adopted, and then formulated a single equation model as

the main methodology. The relevant equation coefficients were estimated using both pool and two other variants panel estimation methods.

The results with regards to the risk-taking proxies used (NPL and ZRISK), was a positive effect of risk-taking on capital ratio. This means that banks with higher portfolio risk (as measured by the proxies) tend to have higher capital ratios. While concerning regulatory pressures proxies, no significant regulatory pressure was found during the years 1996 or before the crisis. On the other hand, a significant regulatory pressure was found to impact on bank capital ratio positively during the period 1999 and on ward.

The study concluded by highlighting some research findings with various implications: first, the association between higher capital levels and higher measures of risk(as measures by the proxies) could mean that well-capitalized banks also take higher risk so it is crucial for risk to be accurately measured. Second small banks (in terms of asset size) seem to be affected by the capital standard tightening during 1999 compare to big banks, thus, research may need to look if the too big to fail incentive could be at work. Third, the sign on profitability proxies indicate that bank profit contribution to capital decreases as capital increases.

On the important of the findings in the above paper with regard to current research is in order here. On overall, the many unexpected findings such as the negative impact of profitability proxies on bank capital may indicate the unusual nature of the period. During the crisis bank, profitability was affected badly and at peak of the crisis capital was in fact brought in from outside sources in most cases. The interpretations of the result from capital risk relationship estimates on a broader term may be limited also by the fact that only a single equation, methodology was used. A two-way simultaneous estimation may shed more light on the relationship as suggested in Shrieves and Dahl (1992).

Furthermore, it is also noted that the most popular measures of portfolio risk, that is the ex-ant risk measures (the risk-weighted asset to total asset ratio) was not used in this study. The use of nonperforming loan, which is an ex-post measure of risk, may have limitations too. Of course, this point will be more relevant if the assumption was that banks make capital and risk decisions simultaneously as suggested by many empirical studies. The study, in general, has obviously motivated and, paved the way for more investigation on the issues and implications highlighted by the findings. Specifically, concerning one issue, that is further investigation on bank capitalization and profitability relationship in developing countries in light of the new Basel III capital buffer requirement that is now attached to banks' ability to distribute profit freely.

3.6.3.8.   China

Zong-yi, et al., (2008) study used a dynamic panel data methods to assess the impact of capital adequacy requirement on risk-taking behavior of banks in China.The paper focused specifically on the impact of a new Regulation rules Governing Capital Adequacy of Commercial Banks in China that was issued in 2004. The guideline establishes key role of the capital adequacy requirement in the Chinese banking regulatory system as part of china's effort to get its banks ready for the implementation of the international capital standard of Basel II by 2007. Zong-yi, et al., (2008) first developed a theoretical model of bank capital and risk-taking dynamics.

The model predicted a negative relationship between capitalization and risk-taking behavior. Zong-yi, et al.,(2008) empirically tested the model prediction on commercial banks in china. Using mainly variables widely used in previous related studies, namely in the framework of Shrieves and Dahl (1992) simultaneous equation methodology and it extended versions, the authors applied a dynamic panel data

estimation methods on data of a sample of only 12 commercial banks in china for the years 2004 to 2007.

Zong-yi, et al., (2008) listed their findings in six points and made a conclusion about the overall results as follows. First, a negative relationship was found between changes in capital and risk among the 12 Chinese commercial banks. Second, regulatory pressure was found to be effective in forcing banks to increase capital but it has no significant effect on bank risk-taking or in inducing banks to reduce asset risk. Third, bank size significantly affected both bank capital and risk-taking positively. Fourth, Earnings levels as measured by the returns on assets do not affect bank capital at any significant level. Fifth, Bank nonperforming asset level was found to affect changes in bank risk positively. Sixth both lagged capital and risk representing adjustment rate and speed of capital and risk respectively were found to be statistically significant (–0.915, –0.761, for capital and risk adjustment rates respectively).

Zong-yi, et al., (2008) concluded that since increasing capital led to reduction in asset risk then Chinese authorities can used regulatory capital requirement to control bank excessive risk-taking. However, the authors highlighted that the lack of any significant effect for regulatory pressure on bank risk-taking indicates that regulator will need to reinforce the effectiveness capital regulation to have a direct effect on portfolio risk level as well as on relatively undercapitalized banks.

3.7. The capital and earning relationship in banking

The impact of regulatory capital requirement on bank profitability especially the return to equity capital ROE though not extensively examine compared to the volume of investigation devoted to the examination of the impact of regulatory capital requirement on bank portfolio risk, is not totally ignored. Now such impact on bank profitability and

ROE[27] is widely expected and speculated among industry players with the introduction of the new Basel III capital buffer requirement. The new Basel III capital standard has practically linked between bank capital buffer and bank discretional profit distribution. However, the impact of firm's capital structure on firm value and return to the shareholders has long been a central element in capital structure theories and empirical analysis in mainstream corporate finance literature. Yet, it has received less attention from empirical analysis point of view when it comes to regulatory capital requirement in the context of banking.

To the knowledge of this study, very few published scholarly papers that addressed this issue directly with focus on ROE, in regulatory capital requirement context. The most notable paper on this issue is the study of Berger (1995), and Hutchison, and Cox (2006). Berger (1995) study was the first empirical analysis to contemplate a two-way relationship examination between bank regulatory capital and bank earning, or the returns on equity capital, specifically. This literature is not to be confused with other studies of determinants of bank capital structure or studies on the determinants of bank profitability for several reasons. First, studies of the determinant of bank capital structure/bank profitability, despite the fact that they are related to this issue, they are, however, a separate and distinct strand of literature that focus on examining the broadest factors that affect both capital and profitability in banking.

Second, most of those studies involved single one-way equation estimation, while the current context employs two-way relationship. Third, the context here aims to examine closely the relationship between bank regulatory capital requirement changes and a change in bank profitability measure of ROE, the returns to equity capital while

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[27] For example, since the birth of the idea experts and analyst commentary as well as regulator have continued to be published in newspapers blog and other official media outlets. For example the following links are samples of some regional newspapers articles that represents opinions and commentaries from expert and analyst on the impact of Basel III capital buffer requirement on bank return to equity capital (ROE). This commentaries have continued to come indicating the important of the issue:

controlling for exogenous and bank specific factors. Typically, studies on the determinant of bank capital structure/bank profitability will use varieties of proxies to measure bank profitability (ROA ,ROE, NIM) or bank capital while this study uses only one measure of bank profitability (ROE) for a very specific reason relevant to this study context. Therefore, the difference between this literature and other related studies is the area or focus and the objectives. Accordingly, this study found very few empirical literatures with such an objective and focus and, these studies are reviewed below. The important for such focused analysis have been highlighted in the first chapter of this thesis as well as in various chapters and sections of this text.

There are two important reasons for focusing the analysis on this single measure of bank profitability ROE rather than other measures such as ROA returns on asset and NIM the net interest margin. The first reason is the empirical precedent in Berger (1995) as will be discussed later. The second reason is the new Basel III capital standard that attached the capital buffer requirement to bank profit distribution. The potential impact of a compulsory link between buffer capital requirement and managers' freedom to disburse profit, on ROE and bank valuation in general, has been speculated[28] to be negative.

Yet, there is no enough empirical evidence in the context of banking with clear-cut on this issue. Is should be noted that bank owners care much about the ROE, even though this does not mean that they do not look at other measures. On the other hand, Berger (1995) finding of a positive capital earning relationship and the hypotheses he offered therein to explain that has made it urgent to conduct further empirical analysis on this issue. The issue is very much relevant and interesting now more than ever,

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[28] See for example Industry analysis report by Citi Investment Research & Analysis of Citigroup Global Markets Inc."*Simulating Bank Earnings in a Basel III World'* January, 2 2010. See also local banking analyst commentaries on Basel III, especially the capital buffer requirement and its link to managers discretional profit distribution, in updated news article report that appeared in the local version of The Edge Financial Daily, May 27, 2010 by Lam Jian Wyn, under the title:"*Local banks should not rush into Basel 3, say industry experts*"

especially in the context of the current regulatory capital debate related to the new Basel III capital buffer requirement.

3.7.1. Empirical Studies on Capital and Earning in banking

Berger (1995) performed his analysis on a data that covers the entire U.S. commercial banking systems from early 1980s to early 1990s. In the preliminary analysis, Berger (1996) applied a simple Granger causality methodology and found that book value of CAR (capital to asset ratio) and ROE (returns on equity capital) to positively affect each other in a "Granger causality sense" over an extended period. To further, examine this unexpected result, Berger (1995) extended the analytical methodology to account for various factors and minimized potential spurious effects using a number of modeling strategies. Yet, the two-way positive effect persisted over time.

With regard to a positive effect of earning on bank capital, Berger (1995) pointed to stickiness in dividend payout ratio to be the main potential explainer. This is because as more earning are accumulated over the years in the form of retained earnings or reserve, more capital based are build up. However, a finding of a positive capital effect on earning was a "surprise". Accordingly, Berger (1995) assembled several alternative hypotheses within the realm of corporate capital structure theory to test the later.

The particular theories entail an assumption of the existent of an optimal capital structure for banks that is above the regulatory minimum. Hence, at any time, a bank might be below or above this minimum, with additional assumption of a partial adjustment toward this target capital ratio, such adjustment process could result in a positive or negative relationship between capital ratio level and earnings ratio levels. This will depend on the relative position of bank capital level relative to the optimal

capital level. Using that framework, for example, Berger (1995) found the strongest support for a positive capital-earning relationship in the (1) expected bankruptcy cost hypothesis. According to this preposition, as Berger (1995) explained that, if potential bank failure becomes imminent, the expected bankruptcy cost increase and expected ROE will fall because other cost including the cost of debt financing increase. Under such circumstance, banks will be below their optimal risk level as well as optimal capital levels. As such, increasing capital reduces banks, overall risk of failure, which improves ROE by lowering premium on the uninsured debt according to Berger (1995). Banks may also indirectly increase regulatory capital level by lowering portfolio risk and hence lowering expected bankruptcy cost. Similarly, Berger (1995) pointed out that (2) Signaling hypotheses would suggest a signaling equilibrium.

This necessitates the assumption of asymmetric information between managers and outsider investors whereby manager can use capital structure change to signal good insider information, and consequently, this may lead to improvement in share prices as well as the ROE. (3) Berger (1995) alternatively suggested that a third hypothesis exists to explain a positive capital-earning relationship. This one is driven from the charter value theory.

The basic assumption of this theory is that banks with higher charter value (higher expected future profits) tend to hold higher capital to protect these franchise value. Finally, (4), the simultaneous positive, adjustment of both capital and portfolio risk is possible under moral hazard assumption (Kim and Santomero 1980). This could result in a positive increase in capital, risk, and returns on equity simultaneously as explained by portfolio models. The acceptance of any of these hypotheses may not necessary rule out a spurious positive correlation between capitals and earning if other important variable are omitted in the model, according to Berger (1995). Therefore,

there is a need to use as many controlled variables in the regressions as possible to achieve a robust result.

After an extended analysis Berger (1995), concluded that, all but one hypothesis, the expected bankruptcy cost hypothesis was the one that is consistent with this data and hence has provided a support for the "surprised" positive capital effect to earning findings on U.S. bank data. Meanwhile Berger (1995) also noted that the positive effect of higher CAR on ROE did not persist when data for early 1990s of the U.S. banking was used. This led him to conclude that bank capital level may have exceeded the ideal threshold during 1990 periods. He also noted that, compare to the 1990s, the 1980s-banking environment in the U.S. was relatively risky and therefore an increase in capital could mean that good banks may be signaling their good prospect to the market. However, the available data did not provide enough or strong support for this hypothesis.

In a recent study, Hutchison and Cox (2006) re-examine Berger (1995) study, using almost the same data set and period with additional control period not included in Berger (1995). Hutchison and Cox (2006) first raised a serious doubt regarding Berger (1995) findings. Especially the positive effect of higher capital on bank earning, as this particular finding run against the traditional notion that financial leverage always improves earning so long a bank remains profitable (with a positive ROA). Thus, their criticisms stem from both theoretical, statistical and data measurement issues. Hutchison and Cox (2006) for example, described Berger (1995) findings of a positive capital-earning relationship in banking as "Anomalous"

They suggested that the positive association between bank capital and earning that Berger (1995) reported might have been the results of a statistical distortion, whereby few extreme (good or poor industry performers) outliers exerting undue influence on the data and consequently, driving the statistics. Accordingly, they re-

examined Berger (1995) study using the same data set in a comparative analysis between two distinct economic periods (1983-1989, and 1996 to 2002). Hutchison and Cox (2006) also utilized a special research design that takes into account the above-mentioned data issues carefully using multiple econometric methods. In overall, the have shown that Berger (1995) results is sensitive to the inclusion or exclusion of outliers such as large negative capital values with corresponding negative values for profit.

There are studies that examine the impact of capital on profitability or the impact of profitability on bank capital but these are out of the narrow scope of this study. Yet many of these studies are also extensively cited in other parts of this research where they are must relevant.

3.8. Chapter summary: how the current study differs from its predecessors

In summary, the definition and function of bank capital have evolved in terms of meanings as well as in terms of its composition of financial instruments that are accepted as capital in banking. Similarly, the definition, quantification, and measurement of risk in banking have also seen a similar evolutionary pattern, especially in the context of the international capital standards. These historical facts are discussed at varying lengths and details in sections 3.1 to 3.4 of this chapter. In recent years, these variables have further undergone several changes in their meaning and definitions under series of international capital standards adjustments known as Basel I, II, and III. Instrument that can qualify as capital in banking have been expanded under Basel I and II to include many hybrid instrument that are more of quasi capital. The aim in many cases has been to enhance market role since general market investors hold most of the new capital instrument.

Meanwhile, in the latest amendments to the international capital standard, equity capital has been vigorous re-enforced to be the main source of bank capital. This highlighted the emphasis that regulators placed on risk-enduring characteristics and quality of equity capital when it comes to issues of how to keep banks safe and prevent excessive risk-taking. The definition and identification of risk in banking was initially confined to the on the balance sheet asset portfolio risk as traditional banking of taking deposit and making collaterized business loans was the dominant activity in commercial banking service in the past. As other banking activities expands and banking market deregulation it comes with that new environment other sources of risk. Therefore, it has become necessary to expand the definition of what constitute risk in banking.

Under successive changes made to various international capital accords, the definition and identification of sources of risk in banking was expanded to include market and operational risk, and systemic risk etc. On the other hand, banking profitability issues was initially not much concern to bank regulators in terms putting any rules for the allocation of earnings between all stakeholders including what should be maintain for the general financial stability until recently. That is in contrast to the fact that for managers and owners the issue of earing (the ROE to their shares) is always the most important issues whenever capital is to be raised. It was only very recently that regulators in their latest capital standard Basel III have included bank profitability issue into the regulatory equation.

Most of the empirical studies on bank capital requirement, as discuss at lengths in sections 3.5, 3.6 and 3.7 were overwhelmingly devoted to examining the relationship between bank capital and bank asset portfolio risk measures under regulation. These studies, in general did not only differ in their methodologies and their methods of estimation, but they also differ sharply in terms of their empirical findings about the effect of capital requirement on bank capital level and bank asset portfolio risk. As a

result, many questions are still left without a satisfactory answer in this literature. As such, the door for more empirical investigation has been left open on many strand of empirical research on bank capital requirement and bank risk-taking. The current research has taken up some of the unanswered questions on bank capital and bank portfolio risk decisions for further investigation as explain in the introduction,

The two empirical papers on bank capital and bank earning decisions discussed in section 3.7 form the core published empirical studies that have closely examined the relationship between regulatory capital requirement and profitability in in banking in a simultaneous modeling framework. The two published papers reviewed in this study that closely examine the issue of capital and earning relationship in banking differed markedly in terms of their arguments and findings on the nature of this relationship. This is among one of the reasons that motivate the current study.

The current study is similar to almost all the above studies in the sense that it examines similar issues on the impact of bank regulatory capital requirement on bank, capital and risk-taking as well as on bank profitability. Concerning the methodology the study is closely related to Shrives and Dahl (1992). In that respect, it is also closely related to other studies that have improved on Shrives and Dahl in terms of estimation methods. This includes the use of the Thee-Stage least Square estimation methods or 3SLS.

Nevertheless, this study stands distinct from all the above studies in the following aspects: (1) this is the first study that examine the simultaneous impact of regulatory capital and bank portfolio risk as well as bank portfolio return measure of ROE on each other in the context of a single study. (2) This study is also the first study to examine bank managers' simultaneous adjustment of regulatory capital and bank portfolio measure of ROE in a partial adjustment framework. It is noted that Berger(1995) and others have examined bank regulatory capital and bank profitability

(ROE) using similar methodology, the Granger causality or Var methodology in a system of equations.

However, that particular methodology differs from the simultaneous equation methodology applied in this study. (3) This is the first study to examine bank managers' simultaneous adjustment to regulatory capital buffer and bank portfolio ROE at least in developing countries. (4)This study applies a simultaneous adjustment concept and partial adjustment framework to study bank Leverage ratio and bank portfolio ROE adjustments relationship. Many past studies have examined the simultaneous adjustment of bank portfolio risk and leverage ratio, nonetheless, this study extended this methodology to examine mangers' adjustment to bank leverage ratio and bank profitability ratio (ROE). (5) This is the first study to examine bank capital buffer and bank portfolio risk as well as bank portfolio return measure of ROE adjustment in sample of developing countries, while the few available studies have been carried out in developed countries.

CHAPTER FOUR

THE THEORETICAL FRAMEWORK

4.1 Introduction

This chapter reviews briefly related theories to provide a framework and support for the development of several testable hypotheses for this study. This review is not comprehensive. It is to provide a framework for the empirical analysis undertaken in this study. A more recent and more extensive review of theoretical models is provided in VanHoose (2007). Furthermore, this study aims specifically to examine how past capital requirements on banks (Basel I rules etc.) affected bank managers' capital and assets portfolio decisions and use that insight to improve understanding on the likely effect of the new capital requirements (Basel II/III capital standards).

Therefore, we start the inquiry with selected literature on theoretical models to find out what has been predicted by these models. We begin with literature that is concerned specifically, with evaluating the impact of capital requirement in banking in general as well as those that concern the International capital standards of Basel accords past and present accords. These models have been generally described as being highly mixed in terms of their findings and conclusions (VanHoose, 2007).

4.2 Traditional capital structure theory and classical economic views of bank capital

At the onset, the fundamental argument against requiring banks to hold more equity capital as a mean to control excessive risk-taking and to protect depositors and taxpayers, as currently being advocated in Basel III and other past capital régimes, rest on some orthodox economic views. One form of that argument is based on the notion that raising and holding more equity capital in a firm, albeit it provides some kind of

safety cushion, is costly inasmuch that it depresses earnings, or limits the return on equity. This particular point has been well illustrated with details in classical financial economic text e.g. in Mishkin (2001, 2002). Nevertheless, to what extent regulator imposed capital requirement on banks can actually affect risk-return frontier or prevent failure in banking has remained until now hotly debated in theoretical models with mixed empirical support.

4.3 The Modigliani Miller (1958) theory, does it apply to banks?

Not very long ago, Miller (1995) contested anew, the higher cost notion attributed to funding with equity capital in banking in general, while he alluded even to the applicability of M & M (1958) propositions to banks in principle, if [they] banks are "left to their own'. The same idea has been strongly defended earlier by Black et.al (1978) as they illustrate, that under the perfect capital markets conditions there could hardly be any obvious cost advantage for banks in the course of changing their funding mix of debt and equity. In their view, such exercise brings about no add value since debt and equity are perfect substitutes under such conditions.

Therefore, contrary to what bankers would argue otherwise, bank capital requirement could be a cheap tool to keep banks safe (Black et.al 1978). However, most theoretical models, as we shall see, that analyze bank regulatory capital decision making often quickly sidestep the idea of perfect capital market conditions under which M&M (1958) theory thrives well, since, in essence, going by that theory would eventually deny any raison d'être for banks to exist in the first place. Therefore, many of the theoretical models on capital requirement in banking present their explanations under the assumptions of imperfect capital market[29]. Thus it is not surprising anyway, that no

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[29]Conditions for perfect market under which M&M theory works are many and they are listed in M&M(1958). As these assumptions are relaxed by successive researchers in corporate finance, an optimal capital structure is said to exit under varieties of assumptions

single theory is found to suffice for explaining all circumstances of bank capital decision since none of the models is a perfect "all-in-one" model.

4.4 Models based on Moral Hazard assumption Framework

Models incorporating Moral Hazard assumption[30] frameworks are considered the most widely used frameworks in the analysis of bank capital requirement and bank capital and risk return decisions. Yet, most of the findings from these models too tend to be sharply divided with regard to the impact of capital requirement on bank capital and bank assets risk. In principle, theories implying the existence of moral hazard tendency in banking may be divided into two groups.

The first group involves models or explanations that are based on Pure Moral hazard assumption in banking. These models consider, standard capital requirement alone to reduce bank failure or risk taking as a futile effort. Black et.al (1978) expositions, the conclusion reached in Kareken and Wallace, (1978) etc are an exemplary theoretical model in this group. Merton (1977) deposit insurance option model in banking is the most widely used framework to illustrate and substantiate this argument. The implication of these models is that moral hazard is the dominant behavior in an unregulated banking environment with a flat rate deposit insurance system. As such Keeley and Furlong and Keeley (1989) and Keeley and Furlong (1990) highlighted the need to diminish this option value for deposit insurance in banking by requiring a form of coinsurance such as higher capital requirement.

The second group involves Models/ theories or explanations that assumed constrained moral hazard or dominant of prudent behavior in banking. A number of

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that are not always mutually exclusive, extending this to banking has added to the list many other imprecations that are unique for banks some time collectively known as safety net (e.g Deposit insurance Discount window, deposit rate restriction, entry restriction etc)…These elements are also components of what is known in banking literature as Charter/Franchise Value. It is the base for another banking theory related to capital and risk-taking by banks.

[30]These models are diverse but they can come under two categories i.e. pure and constrained moral hazard assumption as explain in the body text.

bank capital decision models come under this category. The most common demonian among is their account for moderating factors assumed that prevent banks from excessive risk-taking. Bankruptcy cost, charter value protection or regulatory pressures are among such factors that affect bank attitude to risk taking. Many models in this group have an optimal solution to capital and risk decision. Examples of these theories are the Target capital buffer theory developed in both Marcus (1984), Milne, and Whalley (2001). These are dynamic capital decision models. Some other static bank optimal capital structure models such as that of Harding, Liang and Ross (2008) also subscribe to this school.

A much detailed discussion of these models in Shrieves and Dahl (1992) concluded that capital and risk-taking relationship direction implied by these models indicate two opposing signs between bank capital and risk-taking. The first groups of theories predict a negative relationship between capital and risk-taking in banking. Models belonging to the second group imply a positive relationship between capital and risk-taking. Some examples of such models and their predictions will be reviewed briefly in the following sections.

What seems to be obvious in when reading studies on modeling bank capital decision to predict the effect of capital regulation on capital, risk and return, is that each model seems to focus on one or few aspects while implicitly relaxing or ignoring other factors. Hence, most of their results tend to be at odd in many cases. It is because of this fact that many argue for the need for an empirical analysis to verify which model prediction is supported in a particular case or in particular situation. Since a comprehensive review of theoretical literature is beyond the scope of this research, thus, the study will focus on reviewing selected theoretical models with explicit or implicit assumption of moral hazard in banking to build a framework for the analysis and to derive the hypothesis to be tested.

4.5 An Illustrative explanation of Moral Hazard Hypothesis

First an illustrative explanation of how moral hazard could arise in banking. In general, the argument that is advanced in moral hazard models is that banking operations are plagued with mangers/owners moral hazard tendency (a strong incentive to maximize owners' wealth with little regard for the interest of other stakeholders). This can be explained in a simple illustration that makes use of balance sheet structure with insured deposit and a limited liability status of equity as a point of reference, as done in many economic analysis papers.

It is easy to recognize the existence of an underlying premise for the present of an incentive from manager/owners side of the contract to exploit the structures and the nature of contracts relationships presented on bank balance sheet. Owners of a bank are residual claimers and this residual claim can be as high as possible or zero. This is so because equity position is similar to holding a call option with limited downside and unlimited upside pay-off. On the other hand, since deposits in bank are fully insured either explicitly or implicitly. It is argued (Merton 1977) that this situation also is equal to giving bank owners/managers additionally, a put option on bank asset. A put option is the right but not the obligation to sell the asset to the insurer at maturity (or bankruptcy event). Since, the principal objective of a manager is to maximize owners' wealth, thus their objective function will be optimized when both the value of their equity as well as the value of the insurance put option are maximized. This can be done by reducing capital and taking on high-risk strategies (issuing risky loans) to bid for the highest possible return on asset, which is equal to biding to left as much loss as possible with the deposit insurer provider should the strategy fails. This is the classical moral Hazard story in banking. Hence, a higher regulatory capital requirement in banking is justified to reduce the chance of this incentive being the dominant (Furlong and Keeley, 1989, and Keeley and Furlong, 1990).

The basic objective function for such managers that attempt to maximize in this case is given as written in Stolz (2007) as follows:

$$V_T(E) = max[A - D, 0] - 1$$

Where:

$V_T(E)$ = Terminal value of equity capital, A = Bank asset, D = Deposit. Equation 1 simply states that the maximum value, at maturity/event of liquidation, of owners' equity is given as the maximum of [*A-D, 0]* or the difference between assets and deposit or zero.[See solution for the above equity valuation equation in Stolz ,(2007)].

The implication of this assumption

The direct implication of the moral hazard framework as a tool to analyze bank capital requirement and risk taking is that it suggests in general, that banks would engage in excessive risk-taking and that imposing higher capital requirement alone may not be enough, because it could lead to more risk-taking or asset substitution. Nevertheless, concerning the relationship between capital and risk or risk-taking the debate is inconclusive as will be shown next, since some models predict positive effect while others predict a negative impact on risk-taking.

4.6 Models of Moral Hazard in Banking and their findings

Since the aim of this review is to help provide a framework for the main analysis of this research, which focuses on capital buffer. Thus, we provide only a selected number of theoretical models including the typical models of moral hazard to show their differing findings and assumptions, and then we provide the alternative theoretical

model that will represent the framework for driving hypothesis and the empirical analysis in this study.

There is a sharp contrast in the findings of earlier Moral hazard models in banking. This is exemplified in the results of utility maximizing bank within the one period mean-variance framework of (e.g. Koehn and Santomero 1980 and Kim and Santomero, 1988) model vs. another one period value/profit maximizing dominated bank behavior frameworks of (e.g. Furlong and Keeley, 1989 and Keeley and Furlong 1990).

The results of these two models have contradicted each other on how a combination of flat rate deposit insurance and the standard capital requirement ratios could affect bank capital level and bank's "risk-return frontier". While the former shows that the simple capital ratio, in the present of net insurance subsidy, would be ineffective in preventing bank failure, the later produced evidences to the contrary in the case of a value maximizing public bank. This is because (as argued by the later) as capital increases, the value of the insurance put option declines and so does the incentive to gamble.

Rochet (1992) who re-examined these two models and extended them further, confirms the merit of both results in their separate modeling world and shows that, theoretically, the necessary remedies needed for capital requirement or capital standard to be effective under each respective assumptions. This involve making the insurance premium sensitive to risk for value maximizing banks and applying a correct proportional risk-weighting formula to the utility maximizing bank's assets portfolio components, in addition to a minimum capital requirement.

Meanwhile, Blum (1999) concluded with doubt about the effectiveness of capital requirement in reducing bank risk-taking on a long-term base. His main argument was that previous models that have claimed otherwise were static in nature;

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implying that the conclusions may not be generalized over time. Blum (1999) shows that in a dynamic framework of bank capital decision making that extends beyond a single period, capital requirement rules may in fact lead to increase risk-taking instead. In his two period portfolio model of a value maximizing bank that expect to be under compulsion to raise capital in both period would increase equity capital today but would effectively leverage it up with more disproportional amount of risky asset to undo the effect of deleveraging induced by the current as well as a possible future increase in equity. This is so because in his portfolio model, a higher capital requirement has a dual effect of reducing both risk and expected return and thus it induces banks to engage in asset substitution. One obvious limitation in Blum (1999) model is the assumption that banks operate under a binding capital requirement.

This assumption has been challenged on theoretical as well as empirical grounds. For example, Calem and Rob (1999) work. Within the same multi-period modeling framework as in Blum (1999), Calem and Rob (1999) model bank capital and risk decision, and their model predicted a U-shape type relationship between capital requirement and bank risk-taking behavior. In their model, higher capital requirement elicit two types of response, an immediate initial response to high capital requirement is a reduction in bank risk-taking. With time elapse, banks will take on more risk. More importantly, higher insurance prima, in the later case, does not diminish undercapitalized banks appetite to take on more risk. Neither risk-sensitive capital nor restriction on Leverage ratio can deter well-capitalized banks from taking more risk ex-ant. These findings contrast with the result of portfolio model in Rochet (1992).

4.7 Agency Theoretical Perspective

More recently, a work by Jeitschko and Jeung (2005) contributed further in providing more insight into the issue. Jeitschko and Jeung (2005) use an integrated

dynamic modeling approach for bank portfolio and capital decision within the agency frameworks. In this framework, Jeitschko and Jeung (2005) found some insights as to why various models of bank capital decision may provide contradicting results. Jeitschko and Jeung (2005) first recognized the existence of interest grouping in banking organization with devise incentives. Therefore, Jeitschko and Jeung (2005) incorporated them separately and the model shows that the impact of capital on bank risk-taking actually depends on whose incentive, among three agents, dominates bank managers' capital and portfolio risk determination. The agents are the regulator-insurer, the shareholder, and the manager. Accordingly, the capital-risk relationship in banking can be positive or negative depending on the source of dominance in managerial decision and the driving incentive. Similar contrasting findings[31] can be found in models of bank capital decision that explore other imperfect market conditions arising from various forms of information asymmetry, to adverse selection and other types of agency relationships.

To sum up, theoretical models of bank capital requirement (statics or dynamic) that examine the nature of potential Moral Hazard effects on capital and risk have conflicting predictions on the impact of capital requirement (flat or risk-sensitive) on capital and risk, and the nature of the impact of high capital on bank insolvency risk. Given that each model attempts to explain a real world events, therefore, results would depend on model assumption and only empirical examination could tell which model or assumption dominates in particular case or at particular time period or in particular part of the world. The situation has motivated the current study to utilize various models to examine them in different location at different period or in developing countries.

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[31] A more comprehensive reviews of various theoretical models of bank capital decision is found in VanHouse(2007), Santos(2001), Stolz(2002)

4.8 Capital Buffer (Marcus 1984)

It has been widely acknowledged now in several empirical studies as well as in a growing number of theoretical models that a large majority of banks do not seems to be constrained by the standard capital ratio requirement (Flannery, 2004, Berger et.al, 2008). Furthermore, Marcus (1984) highlights the fact that not many banks engage in moral hazard behavior by exploiting insurance protection, citing evidence to that effect from the works of Santomero and Vinso (1977) and the findings of Marcus and Shaked (1984).

This point is also demonstrated sometimes by referring to the observed capital buffers above the minimum regulatory requirement, which many banks maintain over the years since early 1990s (see for example Milne 2002, Berger et.al., 2008, Stolz, 2007). To that extent, empirical studies by Demsetz et.al (1996), Flannery and Rangan (2008), Berger et.al., (2008) Jokipii and Milne (2010) have provided a number of competing explanations for such bank behavior. Among them are the earning retention hypotheses, capital market pressure from uninsured depositors, asset volatility, and Charter value effect.

The phenomena of banks holding significant capital buffer in recent years is said to have presented a puzzling challenge to some popular bank capital decision theories such as those based on deposit insurance induced moral hazard explanations of capital and risk relationship in banking (Milne and Whalley, 2001, Stolz, 2007). That is because these theories maintain that safety net provisions[32] inadvertently induce Moral Hazard behavior in banking and predict that bank, on average, will hold, at most, the minimum capital required by regulator while taking advantage of the deposit insurance provision by increasing assets portfolio risk (Jokipii and Milne 2010). However, since

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[32]A safety net provisions is a collective term that refers to all types of subsides or indirect government support to the banking industry including deposit insurance subsidy, discount window or the "two-big-fail" policy.

most banks in the real world have been shown to hold a positive buffer capital above the minimum, the findings led Flannery and Rajan (2008), in their conclusion to call for a new direction in theoretical modeling of bank capital decision making to take account of this phenomenon.

An alternative views for the existence of an incentive for banks to hold a positive capital buffer regardless of capital regulation is provided in several related strands of theoretical literature on bank capital requirement: The Charter or Franchise value theory (Marcus and Shaked,1984 Peura and Keppo, 2006), the capital buffer theory (Milne and Whalley,2001)[33]. Unlike Moral Hazard arguments, that both information asymmetry and the provisions of safety net in banking have aggravated moral hazard behavior tendency in banking to increase portfolio risk and decrease equity capital, the Charter value[34] , the capital buffer theories and the extended bank-version of corporate capital structure in corporate finance have maintained the opposite view. These theories argue that there exists offsetting private incentives in banking that impact on bank managers/owners behavior positively so that they behave prudently and hold positive capital buffer above the minimum as pointed out in real world examples.

Among the hypothesized sources of such an incentive are the continuing value/or future tax benefit of deposit financing that comes with many other beneficial things when a bank is chartered. If these factors are accounted for, they have a positive effect on capital and negative effect on excessive risk-taking. A brief discussion to compare the two contrasting incentive views and their respective effect on risk and capital levels in banking is given next. The exposition is based on the standard approach

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[33]And in the strands of banking literature that attempts to extend corporate capital structure theories to banking firm (Beltebsperger,1980, Orgler and Taggart, 1983,Harding et.al,2007)

[34] A chatter value or franchise value generally refers to economic rents extractable due to the special characteristic of banking industry. Banking industry is highly regulated; for instance entry is restricted and therefore incumbents have market that is shield off from competitors. This situation creates and sustains an above average perpetuity profit/cash flow to the firms. When these future cash flows are discounted to a current amount, it is known as chatter/franchise value (Demsetz, 1996). Because this value is guaranteed due entry restriction by law, it is available only to the existing firms. If a bank is to fail then it will loss this much future fortune forever. Thurs for this reason banks will hold enough capital and prudent risk to protect it.

in analyzing bank balance sheet structure and the relationships therein using option contracts analogies:

4.9 Charter Value and Capital Buffer Theory:

Unlike Moral Hazard behavior model, the charter value theory converge with other bank capital decision theories (such as capital buffer theory) to the same conclusion in their attempt to explain banks holding of excess regulatory capital. The conclusion is that in real world cases banks " forward looking banks" will always hold a capital buffer for precaution. The common framework of argument assumes that probability distribution of bank owners' equity (the residual claim) value at maturity/liquidation point/shutdown point by regulator could take positive or negative value. This value is the positive or negative franchise value in the context of Charter value theory, while it represents the economic rent or deadweight cost in the context of capital buffer theory. Briefly, these theories would maintain that banks do have "something to lose" in the event of fail strategies that led to bankruptcy or bank closure. If this [potential] negative side get bigger (equal to bigger positive charter value loss) the loss can get bigger. Therefore, such scenario creates an offsetting incentive that induces bank managers not to take on excessive risk and to hold a buffer capital to hedge against such potential loss.

The sources for this incentive, therefore, is the Charter Value or Continuing value that banks will realize as they stay as a going concern. Stolz (2007) wrote to explain the basic objective function for maximizing bank equity value in such framework as given in equation (1) in the previous section, by adding a new component to the right-hand side to represent the Charter/Franchise Value and denoted it as *CV* in equation (2) below. (See Stolz, 2007).

$$V_T(C) = MAX[A - D + CV, 0] - - - - - - - - - - - - - - - - - - - 2,$$

Again as in (Eq1)

V_T (E) = Terminal value of equity capital, A = Bank assets, D = Deposit, CV= Charter value.

Equation 2 states that the maximum value, at maturity/event of liquidation, of owners' equity in a bank is given as the maximum of [*A-D+CV, 0]* or the difference between asset and deposit plus the discounted value of all potential future profits or zero.

Charter value and capital buffer models argue that, accounting for charter value in bank equity valuation can make a difference in banks attitudes toward risk and capital holding when they invest. The following illustrates this mechanics. First, let us assume that banks have a valuable charter value represented by restricted market entry and limited competition in deposit market plus valuable lending relationship, unique bank specific factors as well as other safety net protections. Hence, a bank in such an environment will maximize owners' equity value by investing in risky asset with the highest return (ROA). Also given the availability of deposit insurance protection and limited liability status, banks in such environment may well-reduced capital to the minimum required in order to get the highest return on equity (ROE). Nevertheless, this strategy, also entails a bigger lose if asset returns were poor or below the minimum expected. If we assume that on average banks in such market hold only the minimum required capital, then there is little capital for average bank to cushion the potential losses. These potential losses will include the loss of charter value if bankruptcy occurs or regulator closed the banks, which may be imminent for some banks in this case. In that case, therefore, it makes sense to assume that, banks with higher charter/franchisee value will have an incentive to avoid this scenario at the first place by holding capital buffer.

This means that charter value will moderate bank risk-taking and could induce banks to carry on a buffer capital above the minimum as a precautionary capital. Since charter value can increase or decrease due to increase/decrease in various factors (Marcus 1984), thus its effect on risk –taking and capital holding will vary among banks with higher or lower charter value (Hellmann, et.al.,2000). Empirical studies have generally found charter value proxies to be positively related to capital/capital buffer and negatively related to assets portfolio risk proxies or excessive risk-taking behavior in banking (Demstz, et al., 1996, Jokipii and Milne 2010).

4.10   Capital Buffer Theory (Milne and Whalley, 2001).

On the other hand, the capital buffer theory (Milne and Whalley 2001) extended the Charter value theory to explain further the dynamic trade-off nature of bank capital and risk-taking decision in the presence of bankruptcy cost associated with charter value loss and a "death-weight cost" associated with infringing regulatory rules.

This framework argue that minimum capital requirement in banking has an incentive effect that works together with the charter value effect to induce banks to hold a buffer capital above the minimum capital required. This is so because violation of minimum capital rules leads to liquidation/closure or forced recapitalization. With bank closure, comes the loss of charter value. Thus, if banks have significance charter value, imposing minimum capital requirement led them to hold capital buffer to protect against possible loss of charter value or a higher cost of recapitalization. In this situation minimum capital requirements becomes irrelevant and banks always manage and maintain an endogenous target buffer capital above the minimum in a dynamic trade-off that balances between two costs: the cost of capital and cost of infringing regulatory rules.

The mechanics of capital and risk adjustment under the buffer theory:

According to the capital buffer theory of Milne and Whalley (2001), target capital buffer is a function of asset risk, cost of capital, charter value, and the cost of recapitalization. Furthermore, in such framework also, the relationship between capital and risk-taking depends on the level of capital buffer above the minimum and this relationship is not continues or linear over all ranges of capital. It is described as follows: **First**, at relatively higher levels of capital buffer, the capital buffer theory predicts that banks are "risk-neutral" and hence capital and portfolio risk adjustments are both simultaneous and proportional at this level (Milne and Whalley, 2001, Stolz, 2007). **Second**, at relatively low capital buffer levels from the target buffer but above the minimum capital requirement, the capital buffer theory predicts that banks will exhibit a "risk-avoidance" behavior in that they will tend to increase capital and reduce risk-taking. **Third**, at relatively very low levels of capital or capital levels below the minimum banks may exhibit moral hazard behavior or become risk-lover. Increase in capital requirement may lead even to higher affinity for risk-taking.

Implication

Milne and Whalley (2001) argue that (pages 8, 28), the prediction of their model shows that regulatory effort could gain greater efficiency in using resources by focusing on unprofitable and severely undercapitalized institutions and closing them, because the model, predict that "forward looking banks" will always hold a sufficient buffer capital above the minimum. Profitability is an important component of buffer theory in that profitable banks actively build their target capital buffer from their periodic profit/cash flows and that dividend is only paid from the residual cash flows. Hence, profitable banks are expected to hold a buffer capital.

Two related amendment in Basel III are at order here; the buffer capital requirement and Leverage restriction. The proposal to require banks to hold capital buffer above the minimum and to link that requirement to profit distribution suggest that there is a need to align bank incentive with regulatory objectives. To that effect, it is important to know how capital buffer adjustments affect bank profitability measures such as the returns to equity holders. This issue is not addressed directly or examine adequately in theoretical models compare to the amount of theoretical works conducted on bank capital and risk-taking decisions. Empirical analysis of the impact of bank regulatory capital requirement on bank profitability measures (especially the return to equity capital or ROE) with special focus as seen in Berger (1995) is also limited.

4.11   Hypothesis Developments

Hypothesis on relationship between bank capital and portfolio risk adjustments

The following Null Hypothesis is tested against two alternative hypotheses as below:

H0: observed changes in bank capital and portfolio risk measures are not significantly related to each other.

The two alternatives Hypothesis are:

H1: observed changes in bank capital and portfolio risk are positively related.

This hypothesis is supported by constrained moral hazard theories as explained in Shrieves and Dahl (1992).

H2 observed changes in bank capital and portfolio risk are negatively related

Pure moral hazard dominates.

Brief explanation on these hypotheses (1&2)

The two alternative hypotheses are tested based on the traditional moral hazard hypothesis as formulated and discussed in Shrives and Dahl, (1992). The hypotheses seek to find out which of the two competing theoretical arguments, on moral hazard assumptions in banking, the data explains. These two hypotheses are as named in Shrives and Dahl, (1992) Pure and Constrained moral hazard. Hence, this test makes no distinction among sample banks based on their specific individual characteristics like amount of capital buffer they hold. One of the basic assumption in the case of pure moral hazard models holds that bank managers will engage in risky lending and borrowing activities all else the same. We may verify this empirically, if we observe a negative relationship between bank capital and portfolio risk adjustment behavior. On the other hand, if we observe empirically a positive capital and portfolio risk adjustment relationship, (i.e. when banks increase capital ratio they also increase portfolio risk-weighted asset ratio concurrently) we conclude that these banks are, under constrains or operate with restrain (hence, the term constrained/restrained moral hazard).

This constrain can be due to various cost consideration of financial distress including managerial private-interest preservation motive or other factors such bankruptcy cost avoidance or due to the "unintended consequence high capital requirement" on bank behavior. The later means that requiring banks to hold capital level that a bank might consider as excessive, could lead the bank to increase portfolio risk also in conjunction to compensate for the opportunity cost of capital. Hence, a positive coordination in adjustment to capital and risk often observed could be a result of any of the above.

Hypothesis based on Buffer capital theory predictions

The additional hypotheses tested in this study are based on the capital buffer theory prediction. The buffer capital theory argued that the extra or excess capital that most banks hold should have impact on the relationship between capital and portfolio risk adjustment. Furthermore, the amount of such buffer capital holding should also affect the speed of adjustment to target capital and portfolio risk. The hypothesis and the supporting explanation are presented next.

Taking the implied null hypothesis to be that: *there is no differences, between banks with relatively high capital buffer (based on some criteria) and banks with relatively low capital buffer, in how fast they adjust to their target capital and portfolio risk as well as how they coordinate adjustments to target capital buffer and portfolio risk.* The following four hypotheses are re-stated from Stolz (2007), and Jokipii and Milne (2010) as below:

H3: Banks with lower capital buffer adjust capital buffer ratio faster than banks with higher capital buffer.

H4: Banks with lower capital buffer adjust their portfolio risk measures faster compare to banks with higher capital buffer.

H5: observed changes in bank capital and portfolio risk measures are positively related for banks with relatively higher capital buffer.

H6: observed changes in bank capital and portfolio risk measures are negatively related for banks with relatively lower capital buffer.

The last two stated hypotheses above concern the nature of coordination (***Ha5*** and ***Ha6***) between adjustment to capital and portfolio risk. The two are based on the prediction of capital buffer theory that simultaneous coordination of changes in bank capital and bank portfolio risk should be different for banks holding different levels of capital buffer according to (Stolz 2007) illustration. It is predicted this coordination is expected to be positively related for banks with high capital buffer and to be negatively related for banks with low capital buffer, all in relative terms.

In the context of capital buffer theory, banks are divided, in relative terms, into banks with high capital buffer and banks with low capital buffer. Buffer theory argues that most banks try to avoid violating regulatory minimum capital requirement and hence try to take their distance from the minimum by maintaining a target capital buffer (Milne and Whalley, 2001). This is because violation of the regulatory minimum is costly as well as raising additional capital promptly. Hence, most banks maintain buffer cushion for safety. By maintaining a buffer banks have to balance between two costs, the regulatory cost of violating the minimum capital ratio, and the opportunity cost of additional capital holding.

The first two stated hypotheses (Ha3 and Ha4) are also derived from the capital buffer theory. These two concern the adjustment speed to optimal target capital and portfolio risk ratios. The explanation is that, because different banks hold varying levels of capital buffer for safety, thus buffer capital level should also influence how (Milne and Whalley, 2001) fast banks adjust to their target capital buffer and target portfolio risk. According to this theory, the speed should the fast for banks with small buffer capital compare to banks with bigger buffer capital. Factors that may explain that will include regulatory pressures etc. These four empirically testable hypotheses as stated above are as based on Milne and Whalley, (2001) as formulated in Stolz (2007), and in Jokipii and Milne (2010). This study adopted the hypotheses to test them empirically.

Hypothesis on the relationship between bank capital and bank earning/return ROE.

The relationship between bank capital and profitability is an important issue at least to bank owners and managers at all time, but this relationship has now gained more significant and importance, not only to owners and managers of banking firm but also for bank regulators and regulatory policies. By that, it has also become important for the safety and soundness of the financial system as a whole.

The international capital standard formulated under the new Basel III capital accord has created a conditional link between bank manager's free hand profit allocation and their capital buffer levels above the minimum requirement. Under the new system, a compulsory allocation of portion of bank profit to the capital conservation account will become a requirement. This new role has led to many (including bankers, analyst, and rating agencies) to suggest on the possible impacts of capital buffer/conservation requirement on banking returns (profitability measures such as the ROE) (more on this is provided in footnotes to chapter1 section 2.3).

As may be expected, this situation has heightened the need to examine closely the impact of changes in bank capitalization variables on bank return to equity and the vis-à-vis. The hypotheses formulated in this section concern the relationship between bank capital and bank profitability/earning measures. These hypotheses are adopted from Berger (1995) study and are further supported by capital buffer theory (Milne and Whalley 2001).

In his empirical examination of the relationship between bank capital and earring, Berger (1995) illustrated the traditional view first and its implication for CapitaLand portfolio risk-returns relationship. His first argument was about the applicability of the Modigliani Millar (1958) theorem to banks. Berger (1995) stressed, as he tries to explain his surprised empirical findings, that looking from the static

theories point of view in the context, as I quote here "… *in banking, a higher capital-asset ratio (CAR) is associated with a lower after-tax return on equity (ROE)*" page 432. In such framework capital and return on capital/ROE are expected to be negatively related which seems to be a surprise according to him.

Yet, it might be unexpected because why investors would like to provide more capital (when regulators ask them) for fewer returns on the equity capital. Yet despite this seeming irony here, the notion is actually consistent with the risk-return framework in portfolio theory in that higher returns are associated with higher risk. If investors aim for more return they should also be willing to expose more of their funds to the risk of loss, since they have the claim on all residuals when investment turns out good. However, the simple aim behind increasing equity capital at a bank is also to reduce the risk of bankruptcy and the risk of loss to investors, particularly those who are not residual claimers. So if the risk of failure is reduced for all in this case, then capital investors should also get "relatively" smaller returns on investment as the risk of them losing all their investment is also reduced and investment safety is now guaranteed at higher level. This safety is exactly what regulators also seek from capital requirement. Thus we can, empirically test the following hypotheses as stated below.

Null hypothesis ***Ho:*** *that, there is no relationship between capitalization and earning on equity capital in banking.*

With the following alternative hypothesis 7 & 8:

H7 *All, other things being the same, changes in bank capital level are positively related to changes in bank equity returns***.**

H8 *All, other things being the same, changes in bank capital ratios are negatively related to changes in bank equity returns.*

The above hypothesis could be supported with traditional DuPont ratio analysis framework (see Hutchison, and Cox 2006) whereby financial leverage and operating performance analysis are used to demonstrate this view. In using such framework, keeping operating performance constant, returns on equity capital can be affected (positively or negatively) by changing (manipulating) the capital structure. (See also Mishkin 2001) for a textbook illustration of this point. However, Berger (1995) argues that the assumptions that led to those conclusions are severely restrictive relative to real world observations. This is because if we are to relax some of those restrictive assumptions such as the followings listed points discussed in Berger (1995) (see Berger, 1995, pages 433-436).

1) One period assumption or (static vs. dynamic theories)

2) Perfect capital market assumptions

According to Berger (1995) setting aside the above assumptions will indicate recognition that the followings issues will matter in the bank capital structure decision and bank valuation:

a. Existence of Significant bankruptcy cost from financial distress

b. Existence of Tax shield for debt financing

c. Asymmetric information that can lead to

   i. market timing assumptions

   ii. Agency problems and their related cost

For example, a higher Leverage level in the capital structure has a higher probability of creating distress if operating performances are affected. New creditors would tend to charge a premium for extending loans or rolling over the old one in such

cases. Increasing equity capital tends to eliminate or severely reduced the prospect of bankruptcy and as a result, it affect the premium downward. In addition to that, it also lowers the risk on equity capital; hence, the cost of equity (or the ROE) should also fall. Consequently, Berger(1995) argue that the reduction in premium on new outside debt may compensate more by offsetting the low equity return due to higher amount of equity capital so that the overall ROE will be positive or up in the next period. Thus, sometimes one may observe a positive relationship between equity capital and return on equity or ROE. Table 5.1 gives a brief summary of the hypothesis formulated in this chapter for testing. The upper part shows the hypothesis relevant to the relationship between bank regulatory capital and bank portfolio risk, and lower part of the table summarizes the hypothesis that are on the relationship between bank capital and portfolio return proxy of ROE.

4.12   Chapter Summary

Apart from the classical view of capital and risk in banking, as well as the Modigliani and Miller (1958) perfect capital market assumption, the few theories discussed in this chapter focused on analyzing the impact of incentives that has the potential to derive bank managers capital and assets portfolio risk-return management decisions. Most of these models base their analysis on the assumption of the present of moral hazard incentives in banking. These traditional moral hazard models highlighted the potential for banks to increase risk and to reduce capital on one hand, but disagreements remain among them whether this particular behavior will be the dominant under all circumstances.

Hence, among them, a group of other theoretical model come to conclusion that indeed the problem of information asymmetry and government provision of safety net including the deposit insurance are an important source of incentive for banks to

increase risk and to reduce their own or shareholders funds at stake or simply say to exploit. However, other models have demonstrated that bank managers' incentive to exploit disappear or totally diminish in situations where bankruptcy will be costly to managers or owners, and if managerial risk aversion dominates in capital and risk return decisions etc. Hence the potential for the existence of both pure and constrained moral hazard in banking is predicted. Under the pure moral hazard version the behaviour of managers who exploit the safety net by increasing risk and reducing capital or when we observed a negative capital portfolio risk relationship, will dominate.

On the other hand when constrained moral hazard behaviour dominates majority of bank managers' decision with regards to capital and portfolio risk are likely to be prudential in that they have vested interest for the going concern status of the bank. Hence we can also observe a positive capital and risk relationship in banking. Therefore, an empirical analysis that is based on two alternative hypotheses (instead of one) is more appropriate in formulating models to examine which of the two versions of moral hazard behaviour exists in a particular banking system. Making such identification is important for regulators.

The capital buffer and charter value theories provide an alternative perspective for bank behavior that highlighted the view that most banks are prudent and forward-looking. These theories argue that banks will voluntary hold capital for self-protection and will often take calculated risk. It is only when bank's franchise value/or the economic rent fall with little capital at stake that looting incentive becomes dominant. As their names indicated the capital buffer and charter value theories explain the behavior of banks with valuable charter and how/why these banks will hold significant capital buffer to protect these values.

In real world, banks will normally have different charter values and hence they are likely to hold different levels of capital buffer. So if we are to test the capital buffer

and charter value theories empirically with precision we need to device ways to separate banks based on their capital levels or charters or their bank specific characteristics. This study aims to examine the capital buffer hypothesis on bank capital and risk decisions by testing the predictions of capital buffer theories. In addition, the study also examines the Leverage ratio decision of banks in the context of traditional moral hazard theories. Tables 4.1 summaries the testable hypothesis developed in this chapter.

Table 4.1 Summary of testable hypothesis

The combine Null hypothesis statement is that No relationship between changes in bank capital and changes in portfolio risk and return.	*Δ*Capital ratios and Portfolio risk *ΔCBF&ΔPRISK*	Remark/ comment
Hypothesis relevant to bank capital and bank portfolio return risk analysis		
	Expected sign	Remark/ comment
The Null hypothesis is that No relationship between changes in bank capital and changes in bank portfolio risk such that H0: β =0		
The Alternatives Hypothesis *Ha1: observed changes in bank capital and portfolio risk are positively related*	+	Leverage related cost factors moderate the decision
H2: observed changes in bank capital and portfolio risk are negatively related	--	Pure moral hazard, from asymmetric information, deposit insurance effect etc. create incentive to exploit others to maximize ROE
	Expected sign	Remark/ comment
H3 *H3: Banks with lower capital buffer adjust capital ratio faster than banks with higher capital buffer.*	+Dreg	In Buffer capital theory, regulatory pressure and other cost factors affect speed difference
Ha4: *Bank with lower capital buffer adjust their assets portfolio risk measures faster compared to banks with higher capital buffer*	+ Dreg	In Buffer capital theory, regulatory pressure and other cost factors affect speed difference
H5: *observed changes in bank capital and portfolio risk measures are positively related for banks with relatively higher capital buffer.*	+coeffi	Charter value, buffer capital theories
H6: *observed changes in bank capital and portfolio risk measures are negatively related for banks with relatively lower capital buffer*	--coeffi	Pure moral hazard, from asymmetric information, deposit insurance effect and low equity effect. create incentive to exploit others to maximize ROE or resurrect the bank
	Expected sign	Remark/ comment
Hypothesis relevant to bank capital and bank portfolio return ROE analysis.		
The Null hypothesis is that No relationship between changes in bank capital and changes in bank portfolio ROE such that H0: β=0	Expected sign in capital ratios & Portfolio LVR/ CBF&PROE	Remark/ comment
The Alternatives Hypothesis H7 *H7 All, other things being the same, changes in bank capital level are positively related to changes in bank equity returns (ROE).*	+	Various effect including charter value, reputation, signaling theory, managerial incentive and bankruptcy cost
The Alternatives Hypothesis *H8* *H8 All, other things being the same, changes in bank capital ratios are negatively related to changes in bank equity returns (ROE).*	--	Base on traditional financial analysis point of view on financial leverage and equity multiplier effect on ROE

CHAPTER FIVE

METHODOLOGY

5.1 Introduction

This chapter discusses the derivation of empirical methodology, explains the estimation method and data screening exercises carried out in this study to analyze bank managers short-term capital and portfolio risk decisions as well as bank managers short term capital and portfolio return/ROE decisions in Indonesia and Malaysia. The chapter is divided into three main parts. The first part develops and discusses the methodology that the study follows to examine the main research issues. The second part discusses the empirical estimation methods used to estimate the simultaneous equation models developed in this study. The third part describes the data and sample selection and screening process.

5.2 Part One: An Empirical model of capital and risk decision (Objective One)

5.2.1   The Simultaneous Equations framework

This study adopted the methodology first developed by Shrieves and Dahl (1992) and further extended by Jacques and Negro (1997), Jokipii, and Milne (2010). In the next sections, we illustrate the model derivation process and explain the estimation method that we use to estimate the relevant coefficients.

In their frameworks observed changes in bank i capital/capital buffer ratios at time t (ΔCBF_{it}) are modeled as a function of endogenous changes (refers to as ΔCBF_{it}^{ED} ,the subscript ED stand for the word endogenous) in bank target capital/ buffer capital ratios, some bank specific and other exogenous factors that include changes in bank optimal portfolio risk. A similar assumption is made about observed changes in bank

portfolio risk as is represented in equations 1&2. In this initial equations, the small ε and μ stand for all other exogenous factors that affect target capital and portfolio risk respectively. Following the work by Shrieves and Dahl (1992),Milne and Whalley (2001), the following two equation systems are formulated simultaneous as follows:

$$\Delta CBF_{it} = \Delta CBF_{it}^{ED} + \varepsilon \qquad Eq1$$

$$\Delta PRISK_{it} = \Delta PRISK_{it}^{ED} + \mu \qquad Eq2$$

The endogenously determined capital level/portfolio risk changes in the above were further built on the assumption that banks have some internally determined target capital buffer/Leverage ratio and portfolio risk respectively (Jokipii and Milne, 2010). Banks adjust their capital/capital buffer and portfolio risk level respectively and periodically toward these target levels as given below (in the case of capital buffer) as outlined in Jokipii and Milne (2010) shown in the following equation 3 &4.

$$CBF_{it}^{T} = \gamma X_{it} + \upsilon_{it} \qquad Eq3$$

$$PRISK_{it}^{T} = \lambda Y_{it} + e_{it} \qquad Eq4$$

Whereby CBF_{it}^{T} and $PRISK_{it}^{T}$ are banks optimal target capital/capital buffer ratio and portfolio risk levels respectively. These adjustments, as in equations 3 & 4 depend on many factors. The X and Y variables stand for all the factors that affect bank optimal target capital and portfolio risk respectively. Furthermore, in the context of

panel data v_{it} and e_{it} are combination of the error terms plus individual bank specific

fixed effect components respectively in each equations[35].

5.2.2 The partial Adjustment framework

Because of various cost associated with raising capital in banking, banks can

only partially adjust their capital buffer toward the optimal target periodically (Jokipii

and Milne 2010). Therefore, the above equations are modified to recognize this fact as

follows:

First, observed endogenous change in bank capital (buffer/Leverage) ratio and

assets portfolio risk are functions of a difference between bank target capital

(buffer/leverage) ratio and portfolio risk level respectively at time T minus (or *t-1*) and

the current period values of the two variables. In other word, banks' previous capital

buffer/leverage ratio and portfolio risk levels respectively at time (t-1) or in the

immediate past period and minus their current period values respectively. In the context

of partial adjustment framework, these equations are written as follows in 5 & 6:

$$\Delta CBF_{it}^{ED} = \gamma \ (CBF_{it}^{T} - CBF_{it-1}) \qquad Eq5$$

$$\Delta PRISK_{it}^{ED} = \lambda (PRISK_{it}^{T} - PRISK_{it-1}) \qquad Eq6$$

Thus, the complete partial adjustment model for the two equations was introduced as

given in equations (7&8) below.

Since optimal target capital/capital buffer and portfolio risk level are not directly

observable, previous literature in this area has indicated that they can be estimated based

on bank revenue and some known cost variables as well as other exogenous variables.

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[35] Note that this study borrows and follows closely jokipii and Milne (2010) model derivation approach. However, it has made some modification by using capital letter and other modifications in portfolio risk equation.

Hence observed changes in target capital/capital buffer and portfolio /risk are modeled based on difference between some current targeted capital buffer/risk level minus previous capital levels, plus all other exogenous variables that affect both target capital buffer and risk as well as other bank specific variables (Stolz,2007, Jokipii and Milne 2010) shown in the equation below.

$$\Delta CBF_{it} = \gamma\ (CBF_{it}^T - CBF_{it-1}) + v_{it} \qquad Eq7$$

$$\Delta PRISK_{it} = \lambda\ (PRISK_{it}^T - PRISK_{it-1}) + e_{it} \qquad Eq8$$

Finally, the complete model is given in equations 9 & 10 below;

$$\Delta CBF_{it} = \alpha - \gamma_0 CBF_{it-1} + \gamma_l X_{it} + \gamma_1 \Delta PRISK_{it} + v_{it} \qquad Eq9$$

$$\Delta PRISK_{it} = c - \lambda_0 PRISK_{it-1} + \lambda_j Y_{it} + \lambda_2 \Delta CBF_{it} + e_{it} \qquad Eq10$$

Whereby:

> v_{it} *and* e_{it} *in the general specification form will, each contain both the fixed individual effect and the error terms or the so-called white noise. In equation 9 & 10 (such that* $v_{it} = \mu_{I,t} + \eta_{i,t}$ *, and* $e_{it} = \kappa_{i,t} + \phi_{i,t}$ *)*

The remaining variables are arranged according to equation arrangement above.

Capitalization equation   Eq9

> ΔCBF_{it} = *observed change in bank capital buffer, the dependent variable*

> $\Delta PRISK_{it}$ = *observed change in bank portfolio risk level independent in capital equation.*

X_{it} = Stands for all other exogenous and bank specific variables that affect bank optimal target capital/capital buffer ratios. In the base model these includes the followings variables:

(1) CBF_{it-1}/LVR_{it-1}(Lag dependent variable capital/capital buffer ratios).

(2) **ROA** (Current return on bank asset)

(3) **LPTA** (Loan loss provision to total assets)

(4) **LTA** (Natural log of total assets) Size proxy

(5) **LIQ** (total loan to total deposit) liquidity proxy

(6) **HHI** (Herfindahl-Hirschman Index)

(7) **Time Dummy** variable: Year Dummies (2000 -2007)

(8) Dreg = the capital buffer dummy

Portfolio risk equation   **Eq10**

The following variables are included in the portfolio risk equation

$\Delta PRISK_{it}$= observed change in bank portfolio risk level, the dependent variable.

ΔCBF_{it} = endogenous change in bank capital buffer,

and Y_{it} stands for the following variables:

(9) **PRISK**$_{it-1}$ (Lag dependent variables to the risk-weighted asset ratio).

(10)   **LLPTA** (Loan loss provision to total assets)

(11)   **LTA** (Natural log of total assets) Size proxy

(12)   **LIQ** (total loan to total deposit) liquidity proxy

(13)   **HHI** (HERFINDAHL-HIRSCHMAN INDEX)

(14)   Time variable: Year Dummies (2000 -2007)

(15)   Dreg = the capital buffer dummy

Dependent variables used in the two equations

Two main ratios represent bank capitalization variables in this study for analysis.

(1) **Capital buffer ratio (*CBF*)** --- Eq9: Capital buffer refers to the margin of regulatory capital that banks keep above the specified regulatory minimum capital. This ratio may be based on the Basel specified ratio of 8% or the locally designated minimum ratio or by regulators. It is calculated as follow: = [Bank total regulatory capital ratio in (absolute ratio) – the minimum required capital ratio or the Basel 8%]. This study refers to this ratio as the capital ratio because the aim of this test the capital buffer theory, it is indicated by this symbol *CBF.*

(2) **Leverage ratio (*LVR*)** --Eq9: this capital ratio refers to the simple Leverage ratio as follow: = (equity capital/bank total asset). This study decided to examine bank decision with regards to the adjustment of this ratio with respect to bank portfolio risk since this ratio will soon become a major regulatory variable that regulators will monitor and banks would have to comply with restriction place on it. This ratio is indicated in this study the following symbol *LVR*

(3) **Risk-weighted Asset Ratio (Equation 10).**

Based on our review of literature, we can classify bank asset portfolio risk proxies into two broad categories: the ex-ant and ex-post proxies.

An example of an ex-ant portfolio risk measure is the risk-weighted asset ratio. This is because this particular measure is calculated ahead and capital is provided for it immediately. An example of ex-post portfolio risk proxy is the non-performing loans to total asset ratio or to total loans ratio. Because these proxies are calculated from loan

default data, hence it is named as ex-ant portfolio risk proxy. This study adopted and used the former in the analysis.

Independent Variables Measurement and definitions:

Bank specific variables.

As we have indicated in the first part of this section, we have indicated in the previous section capital buffer theory indicated that bank optimal capital buffer also depend on bank specific as well as other exogenous variables (Milne and Whalley 2001) and the must be included in the equation. Literature has offered a number of revenue and cost variables that are identified as important determinants of bank optimal capital/capital buffer and portfolio risk levels (see Shrieves and Dahl, 1992, Jacques, K., & Nigro, P. (1997, Stolz, 2007 and, Jokipii and Milne 2010). This has research followed this literature and included the following variables as discussed below:

$CBF_{it-1}/ LVR_{it-1}/ PRISK_{it-1}$

The inclusion of the lag values of capitalization and portfolio risk proxy variables in the capital and portfolio risk equations respectively are based on the original methodology developed in Shrieves and Dahl (1992).

Profitability proxy: (ROA)

As suggested and followed by almost all studies in this literature, bank profitability is an important source of bank capital. In the framework of capital buffer theory, (Milne and Whalley, 1999) banks only pay dividend after satisfying regulatory capital requirement and setting up a buffer capital to protect them "insurance" from violating regulatory minimum. Similarly, the pecking order theory in corporate finance would suggests that firms (including banks) would tend to use up internally generated funds first, to finance their projects until it is exhausted, and only then they will

consider outside financing. This is explained and argued in Myers (1984) as being due to the existence of severe information asymmetry between bank managers and outside investors (bank asset is often described as opaque) that will make outside financing costly compared to internal funds. This study included this variable in the capital equation with expected positive impact on bank capital. This proxy variable is indicated in the model as ROA (or return on asset).

Loan loss provision to total loan variables:

The amount provision for loan loss in banking is closely related to bank capitalization variables as well as bank portfolio risk measures (specifically the measure used in this study, the risk-weighted asset ratio) In fact in the context of Basel capital standard provision are added to bank capital and bank portfolio is reduced by the amount of provisioning. Again, majority of studies in this strand of literature have included this variable in the model. Some papers included the total loan loss provision to total loan while other used the ratio net provisions (e.g. Stolz, 2007). This study tested both variables and found no significant difference between the two. Thus, this study included the total loan loss provision instead of the net provision. We expect this variable (the particular form of the variable that is used in this study) to have a positive impact on bank capital and a negative impact on portfolio risk proxy or the risk-weighted asset ratio. This variables is indicated in the model as *LLPTA*.

Bank Size Indicator variable.

Bank size is recognized as an important indicator of bank fund raising capability. This is so because size is often associated with the effect of scale economy and ample resources. The scale economy effect will normally include human, physical, as well as financial resources. Size is also associated often with extensive network of

relationships that bank can exploit quickly to gather resources more efficiently. Additionally, economies of scale in banking may also be manifested in some crucial banking activities such as monitoring and screening ability that can give big banks an advantage to take on greater risk since they are better position to diversify and manage risk better. This will tend to reduce the overall portfolio risk.

Hence, size is expected to impact on both capitalization and assets portfolio risk of a bank. If big bank need to hold less capital due to their ability to raise capital more easily compare to small-unknown banks, they should also be able to assume greater portfolio risk that they can diversify to reduce the overall risk of their portfolio. Thus, the impact of size can sometimes be positive or negative if potential for both the economies of scale and diseconomies of scale are considered. Hence, the outcome results obtained from the analysis need to be interpreted with these possibilities in mind. Therefore, in line with the extant literature (Shrieves and Dahl, 1992, Jacques and Nigro, 1997 and Jokipii and Milne 2010), this study also included a proxy for bank size in the form of natural log of bank total asset or *LT.A*

Liquidity

Just as maintenance of a minimum capital is a requirement in the context of Basel capital standard, maintaining adequate liquid asset is also a requirement for banks under Basel capital accord. In the context of the new Basel III capital standard, (see Basel Committee on Banking December 2009) a minimum liquidity requirement for banks to maintain has been strengthen. However, how does bank liquidity affects bank capital?

One best way to answer this question is to define what a standard textbook in investment have defines liquidity. In such context, describing a banks position as being liquid means the ability to turn its asset quickly into cash with little loss in the asset

value. Because most bank loans are illiquid, thus they add a form of risk to bank portfolio by their nature. This is the liquidity risk. Since the aim of capital adequacy requirement is to get bank risk under control and protect banks against going bankrupt.

Therefore, capital and liquidity should be related even though they may be seen as separate issues in bank regulation rules. Short (1978) noted this separation argument but rejected it and provided a lengthy discussion to explain and demonstrate that capital and liquidity are related in many ways. He cited Revell (1975)'s four types of liquidity in banking to support his points. Not all past empirical studies included this variable in their models but some had included it. For example, on one hand, Shrieves and Dahl (1992), Jacques and Nigro (1997).Aggarwal and Jacques (1998) as well as Stolz (2007) did include it their model.

On the other hand, Jokipii and Milne (2010) study that this study follows closely had included liquidity proxy variable in their model. Thus, following the studies that included this variable in their study this variable in both capital and portfolio risk equations with expected negative / positive impact on bank capital and portfolio risk proxies respectively as suggested in previous studies. The liquidity proxy variable in this study is indicated as Liq. It is defined as total bank loans/total deposit or *LIQ*.

Other Exogenous Variables (market concentration proxies)

*The Herfindahl-Hirschman Index or the **HHI***

One of the most important factors in theoretical model of bank capital/capital buffer is the value of bank charter or franchise value. The charter value or franchise value is a measure of the value of having a banking business as a going concern. This charter/franchise value is said (Hellmann et al.2000) to increase or decrease depending on many factors including the level of regulatory control or restriction that limit, protect and regulate entry into the banking industry of a country.

Furthermore, theoretical model of bank capital requirement have indicated that charter /franchise value is related to both bank capital and bank portfolio risk. For instance, banks with significant charter/franchise value are expected to hold buffer capital to protect this and are expected to adopt effective risk management strategies such as monitoring and screening that limit their risk exposure (Milne and Whalley2001). As such, proxies of charter/franchise value are expected to be positively related to capital and negatively related to bank portfolio risk.

Empirical literature offers proxies that are assumed to capture charter/franchise value effect. For example, many, including Jokipii and Milne (2010) used Tobin's Q which is calculated as follows: **(book value of liabilities + market value of equity)/ (book value of assets)** to capture the charter/franchise. However, this particular proxy is difficult to obtain for all banks. This is due to limited number listed banks in many cases. Therefore, we find many studies (e.g. Shrives and Dahl, 1992, Jacques and Nigro, 1997) did not even included this proxy.

This study tries to proxy the charter/franchise value effect by calculating the HHI ratio or Herfindahl-Hirschman Index for market concentration and use it to capture charter/franchise value effect for the following reasons. First, the *HHI* is very popular measure of market concentration. Market concentration is associated with few firms in the industry, which translate to less completion and could lead to some firms making abnormal profit. Second, if this profit opportunity continues in the future due to regulatory restrictions or firm efficiency and technology it will result in some kind of monopoly or market power for some firms. Third, this situation can be described as a valuable charter/franchise for these firms. Finally*, HHI* is also related to merger. Mergers tend to increase market concentration as well as market power for acquiring firms. Thus, *HHI* ratio may well proxy the nature of the industry charter/franchise

opportunity. We used HHI as my proxy for this charter value with expected positive effect on bank capital and negative effect on bank portfolio risk.

Macroeconomic proxy variables (Year dummies)

In line with majority of studies in this literature (Bank capital literature), we included time dummy variable to represent the macroeconomic effect during the sample period. We conduct subsample analysis (based on period) to examine two distinct periods in economic history of ASEAN4 countries. We perfume that by analyzing separately 2000-2003 periods and 2004-2007 periods. Mergers and consolidation characterized the first period, while the later period witness liberalization activities. That was the time when many of these countries open their banking industry to foreign competition. We explain more on how we design this test and conduct it in Chapter 6 where we present the initial interpretation of the test result. In the discussion part, we elaborate on the findings by comparing the two separate results and contrast; them with the full sample period (2000-2007) sample and conclude on them.

Capital buffer dummies variable

Moreover, we follow Stolz (2007)'s methodology in differentiating between banks with higher capital buffer and those with lower capital buffer and use the dummy variable approach to examine how capital buffer levels influence bank capital buffer and portfolio risk adjustment management. In some studies similar dummies are used that are based on degree of bank capitalization and the resulting difference or effect on managers capital and risk adjustment behavior is often interpreted as or attributed to regulatory pressure effect. Therefore, following Stolz (2007), we name this Dummy variable as *Dreg*. *Dreg* is equal 1 when a bank has a standardized capital buffer ratio

above the cutoff point and zero if below this cutoff point. We explain in the next paragraphs the cut-off points we adopted in this study.

Theories as well as previous empirical findings which this study follows closely have indicated that bank specific characteristics including their holding of capital buffer do influence the way individual banks adjust toward their desired or target capital and asset portfolio risk levels. These differences observable in the speed of adjustment to target capital buffer and portfolio risk as well as in the nature of coordination between capital and portfolio risk adjustment. Following the literature, I use a dummy variable approach with interaction terms to conduct such analysis for capital buffer. I followed previous literature by classifying the sample banks into two groups: high capital buffer banks and low capital buffer banks. These are in relative terms as the cut-off point is based on median of the standardized capital buffer borrowed from Stolz (2007)[36]. I name the dummy variable *Dreg*.

Dreg represents the relative impact of bank *capital buffer level* on bank capital buffer and portfolio risk decisions. The variable *Dreg* is defined as follows; individual banks in the sample data are divided by distributing them around the median standardized capital buffer. This is the cutoff point, adopted from Stolz, (2007) with some modification. *Dreg* is equal to a unity or 1 if the bank hold a standardized capital buffer that is above the median standardized capital buffer. Therefore, *Dreg* is a dummy variable with binary numbers structure such as 0/1. A particular bank's capital buffer level will be indicated in the data as one (1) if it is high than the median standardized capital buffer, while other banks whose capital buffer are equal or below the standardized capital buffer will be indicated as zeros or (0.0). We chose to adopt and use only the median standardized capital buffer from Stolz (2007) for several reasons.

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[36] Stolz (2007) provides a strong argument for the use of standardized capital buffer instead of absolute capital buffer. The aim of standardization is to remove the effect of volatility element from bank capital buffer.

First, our sample data sets are relatively very small compare to Stolz (2007) sample, and thus using, for example the 10-percentile cut-off point or even the 25 percentiles that Stolz (2007) used also would make one group very small compare to the other and this could lead to reduction in statistical test power or render some coefficients insignificant. Moreover, such choices would be difficult to defend and since it is likely to bring statistical problems.

Second, since my sample banks generally hold a very large capital buffer above the minimum required capital, it is difficult to find a precise cut-off point that can divide the banks to two group in a meaningfully manner better than the median ; especially in the absent of regulatory based cut-off point. Median is the middle number if we arrange the numbers according to their magnitude from the smallest to the largest number. Using the median in this case is justifiable because it will lead not to a statistical distortion of some group being too small.

Third, I have not come across any locally specified regulatory capital buffer ratio that differentiates between or defines low and high capital buffer for banks in the two countries. Although, the best option will be to base such cut-off point on the definition of regulators/supervisors, however, with such definition not available to this study, the median is considered acceptable. Median is generally not bias to any one side of the distribution, it takes the meddle position.

The dummy variable model is the third model specification we introduced in this study. The variable proxies regulatory influence on bank managers' capital and portfolio risk decisions. With this specification, this study aims to test the influence of regulatory agencies on managers capital and portfolio risk decision in the two countries. In doing so, I closely follow the approaches adopted in majority of published papers in this literature in terms of running the analysis as well as interpreting the results.

5.3 An Empirical model of capital and portfolio return decisions (Objective Two)

5.3.1 The simultaneous equation framework

As with bank capital and portfolio risk model, this study additionally assume that observed changes in bank i capital/capital buffer and portfolio returns (ROE) ratios at time t (ΔCBF_{it}), $\Delta PROE_{it}$ respectively are a function of endogenous changes in the *target capital/ buffer capital and portfolio return (ROE) ratios,* PLUS some other bank specific factors and other exogenous variables. They will include changes in bank projected capital/capital buffer and portfolio return (ROE) respectively. The two systems of equations represented and illustrated as follow.

$$\Delta CBF_{it} = \ \Delta CBF_{it}^{ED} + \varepsilon \qquad\qquad Eq11$$

$$\Delta PROE_{it} = \Delta PROE_{it}^{ED} + \mu \qquad\qquad Eq12$$

The endogenously determined capital level change in the above was further built on the assumption that banks have a target capital buffer/leverage level and portfolio return (ROE) that they periodically adjust toward and that this can be shown as given below (only the case of capital buffer is shown) in equations 13&14 below:

$$CBF_{it}^{T} = \gamma W_{it} + v_{it} \qquad Eq13$$

$$PROE_{it}^{T} = \lambda Z_{it} + e_{it} \qquad Eq14$$

Whereby CBF_{it}^{T} **and** $PROE_{it}^{T}$ are banks target capital/capital buffer and portfolio return (ROE) levels respectively. The W and Z stand for all other factors that affect bank target capital buffer and portfolio return (ROE) respectively. Furthermore,

in the context of panel data v_{it} and e_{it} are combination of the error terms plus individual bank specific fixed effect components in each equations[37].

5.3.2   The partial adjustment framework

Here also it is argued that due to the high cost associated with raising equity capital as well as cost of other activities associated with the process in overall, banks can only partially adjust their capital buffer/and portfolio ROE toward the target capital buffer and portfolio ROE partially every period. In the context of capital buffer theory, banks trade-off between paying a divided and retaining the earning to build up capital buffer (Milne and Whalley, 2001). This exercise depends on many factors including bank's current level of capital buffer above the minimum capital as well as the regulatory pressure and the cost of external funds etc. Therefore, the above equations are modified to recognize this target buffer/portfolio return (ROE) adjustment process. In the context of partial adjustment framework, the equation is written as in 15& 16:

$$\Delta CBF_{it}^{ED} = \gamma \; (CBF_{it}^{T} - CBF_{it-1}) \qquad Eq15$$

$$\Delta PROE_{it}^{ED} = \lambda \; (PROE_{it}^{T} - PROE_{it-1}) \quad Eq16$$

Thus, the complete partial adjustment framework for the two equations above was introduced as given in equations (17&18).

Since this target capital level/return will not be directly observable, thus, in the context of this study they are represented by factors/variables that previous literature have indicated as approximates for various bank revenue and cost factors that determined the dependent variables. Hence observed changes in (dependent variables)

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[37]Note that, again, this study borrows and follows closely jokipii and Milne (2010) model derivation approach. However, it has made some modification by using capital letters in this new case.

target capital/capital buffer and assets portfolio /return (ROE) are modeled here as based on the difference between some current targeted capital buffer/ portfolio return **(PROE)** level minus previous capital levels, plus all other exogenous and bank specific variables. In this study, these variables are mainly borrowed from Berger (1995). Parsimony is adopted in selecting the included variables as discussed in the following.

$$\Delta CBF_{it} = \gamma \, (CBF_{it}^T - CBF_{it-1}) + v_{it} \qquad Eq17$$

$$\Delta PROE_{it} = \lambda \, (PROE_{it}^T - PROE_{it-1}) + e_{it} \quad Eq18$$

The full model, therefore, is given 19 & 20 as stated below:

$$\Delta CBF_{it} = \alpha - \gamma_0 CBF_{it-1} + \gamma_j W_{it} + \gamma_2 \Delta PROE_{it} + v_{it} \qquad Eq19$$

$$\Delta PROE_{it} = c - \lambda_0 PROE_{it-1} + \lambda_k Z_{it} + \lambda_2 \Delta CBF_{it} + e_{it} \qquad Eq20$$

Whereby:

v_{it} *and* e_{it} **,** again, in *the general specification form will, each contain both the fixed individual effect and the error terms or the so-called white noise. In equation 9 & 10 (such that* $v_{it} = \mu_{I,t} + \eta_{i,t}$ **,** *and* $e_{it} = \kappa_{i,t} + \phi_{i,t}$ *)*

The definition and description of the remaining variables are as below:

ΔCBF_{it} = *is the observed change in bank capital buffer, the dependent variable*

$\Delta PROE_{it}$ = *is the observed change in bank portfolio returns of ROE a dependent variable*

W_{it} = *Stands for all other exogenous and bank specific variables that affect bank optimal target capital/capital buffer ratios. In the base model these includes the followings variables in the capital equations.*

Capital variables Equation: Eq19

The following variables are included in the capital equation

ΔCBF_{it} = observed change in bank capital buffer, the dependent variables

CBF_{t-1} = one period lag of dependent variable as predictor

$\Delta PROE$ = observed change in bank portfolio return

ROA = measure of bank operating performance or profitability

LTA = a proxy for bank size, the natural log of total asset

$LLPTA$ = loan loss provision to total asset

$HHI:$ The Herfindahl-Hirschman Index or the $HHI.$

Profitability or Portfolio returns variable Eq20

The following variables are included in the portfolio risk equation

$\Delta PROE_{it}$ = *observed change in bank portfolio risk level, as the dependent variable*

$PROE_{t-1}$ past period lags value of profit

ΔCBF_{it} = *observed change in bank capital buffer as endogenous explanatory*

and Z_{it} *stands for the following controlled variables:*

$BSMD:$ Bank share of market deposit, measures market power (Berger, 1995)

$LLPTA:$ Loan loss provision to total asset

$OEA:$ measures operating efficiency= total operating expense/total asset.

$LTA:$ Proxy of bank size = natural log of total asset.

$HHI:$ The Herfindahl-Hirschman Index.

Individual time variable are included as year Dummies (2000 -2007).

Dependent Variables measurement and definitions

Capital ratios remain in definition as in the preceding section on capital and portfolio risk models.

Independent Variables measurement and definitions:

The selected control variables are in many cases borrowed from Berger (1995) as well as from studies that deal with determinant of bank capital and bank profitability. II select variables with the principle of parsimony in model building in mind as well as to avoid multicolinearity and related problem. Therefore, the following controlled variables that I finally choose and include them in the two models are discussed.

Bank Profitability Proxy (ROA):

Profit is important source of capital and profit from operations are used in many ways. Almost all literature area has recognized the important profitability as source of bank capital. For example, Flannery and Rangan (2006) argue higher profitability can have two opposing effect on bank capital depending on individual firm preference.

First, we may find a positive effect of higher profit on capital may be observed because of firm "passive" accumulation of residual profit persist or what Berger (1995) would term as sticky growth in dividend. However, a positive sign between profit and capital could also arise due to active, rather than passive buildup of capital reserve from successive higher earnings. This is interpreted by many including, Flannery and Ragan(2006) ,as a hedging strategy to protect a valuable charter in case of unexpected loss, as have been argued for example in the context of capital buffer theory (Milne and Whalley 2001).

Second, a higher bank profit may also be associated with lower capital because a firm may have a very stable cash flow that is constantly used to service maturing debts

without the need to maintain the costly capital on the book for long time. In this study, the proxy for the overall bank profitability is the after tax profit to total asset ratio. More specifically, it is the average annual after tax profit divided by total asset or the ROA. It measures the net overall operating performance of a bank without consideration of sources of financing. In this sense, it also performs as one form of efficiency measurement.

Bank Market Power proxy measures:

Bank Share of Market Deposit (BSMD)/ Herfindahl-Hirschman Index:

The impact of market power of a bank on its profitability is captured in this study, by the inclusion of both variables of *BSMD* or (bank share of market deposit) and the concentration measure of Herfindahl-Hirschman Index. In the first market power measure, the deposit share of individual bank as percentage of the total market/industry deposit is used. In this context, we can also measure bank's market power by using it borrowing market or lending market proxies. Accordingly, it will measure the deposit market power or lending market power of a bank. The second market power measure, the concentration ratio, affects both capital and earning variables; because higher concentration may be associated with higher charter value due to limited competition and entry restriction at first place. If this situation create a profitable franchise for more efficient banks then they are likely to protect that by maintaining higher capital as argued in the context of Capital buffer theory (Marcus 1984, Milne and Whalley 2001). Higher concentrations if associated with higher charter value, banks in such environment are also predicted in Hellman et. al., (2000) to behave prudently by not engaging in excessive risk-taking thereby protecting their franchise from ruin. Therefore, this study included these two proxies in the model. Furthermore, BSMD or

bank share of market deposit is expected to affect bank profitability positively whether structure determines performance or performance determines the structure theories is assumed as discussed in (Berger 1995). Both market power and efficiency are expected to have positive effect on bank profit.

Loan Loss Provision (*LLPTA*).

This study included the ratio of provision for loan loss to total asset in both capital and earning equation for the following reasons. Apart from the fact that general provision/ reserve is part of Tier2 capital under the International capital standard, provisions are also a deductions from bank current profit and thus they should affect the reported earnings. In fact, a well-documented literature on capital and earning management argue that banks use provision to manage both earning and their capital to maximize value. See Ahmed et al., (1999) for example, for discussion of such incentives opportunities available under the Basel I capital accord, Healy, and Wahlen (1998) for thorough reviews of such literature. Thus, we expect provision to be negatively related to bank earning and positively related to bank capital.

Operating Efficiency Measures Proxy:

The impact of efficiency on profitability comes from its impact on operating cost. Banks can increase efficiency when they rationalize their operations. This will usually involve cost reduction measures cost. The reduction in cost will translate into higher profit. Therefore, variables that measure bank efficiency should be included in profitability equation. There many ways of to measure efficiency, Berger (1995) included average operating cost to total asset as a measure of bank operating efficiency. In line with literature, this study use total operating cost to total asset ratio in the profit and is indicated in this study as OEA. The proxy is expected to have positive impact on

bank profit and capital. The lower the cost or the more efficient the bank is, the more likely the bank will perform better in term of profitability all else constant. Profitability in turn are likely to contribute to improve in capital ratio. This is simple because profit one important source for capital.

Bank Size

Bank size is controlled by including natural log of total asset in both capital profit equation. Although Berger (1995) used several size dummies to account for various bank size classes based on asset size categories. That approach will be less practical here as the number of banks in this study is relatively small compare to the thousands of banks that Berger (1995) used. Additionally, majority of studies in this area also use the normalized bank total asset as a proxy for bank size. This variable is discussed in the preceding section as well as its expected or possible signs.

Macroeconomic proxy variables (year dummies)

In addition the above exogenous control variables, I have created and full set of year dummy variables in included them the models, results not reported. These dummy variables are expected to capture all the macroeconomic condition that can affect many aspects of banking operation in a way that would influence both capital levels as well as profitability measures according to Berger (1995).

5.4 Empirical Estimation Methods:

The systems of simultaneous equations in a dynamic panel data model form specified in 9 & 10 and 19 &20, are reproduced below,

$$\Delta CBF_{it} = \alpha - \gamma_0 CBF_{it-1} + \gamma_1 X_{it} + \gamma_2 \Delta PRISK_{it} + \nu_{it} \qquad Eq9$$

$$\Delta PRISK_{it} = c - \lambda_0 PRISK_{it-1} + \lambda_1 Y_{it} + \lambda_2 \Delta CBF_{it} + e_{it} \qquad Eq10$$

and

$$\Delta CBF_{it} = \alpha - \gamma_0 CBF_{it-1} + \gamma_1 W_{it} + \gamma_2 \Delta PROE_{it} + \nu_{it} \qquad Eq19$$

$$\Delta PROE_{it} = c - \lambda_0 PROE_{it-1} + \lambda_1 Z_{it} + \lambda_2 \Delta CBF_{it} + e_{it} \qquad Eq20.$$

The above systems of equations in the two models can be generally represented by the following standard system of simultaneous equations in a dynamic panel model form or DPD form (Greene, 2002, Page 381). The purpose of writing such general model here is to explain and illustrate the econometric and other issues that will arise when attempting to estimate these models. We also explain how this study deals with such issues and the justification of the chosen estimating technique/methods that is finally adopted.

The general form of the above systems of equations is represented by the following generic simultaneous system of dynamic panel equations:

$$\Delta X_{it} = \alpha_1 - \gamma X_{it-1} + \Delta Y_{it} + \beta_1 K_{it} + \eta_{it} + \varepsilon_{it} \qquad Eq21$$

$$\Delta Y_{it} = \alpha_2 - \lambda Y_{it-1} + \Delta X_{it} + \beta_2 Q_{it} + \mu_{it} + \nu_{it} \qquad Eq22$$

the i & t are $i \in \{1,...,.N\}$, $t \in \{1,....,T\}$.

Whereby in the dynamic panel specification context, the $\eta_{it} + \varepsilon_{it}$ and $\mu_{it} + \nu_{it}$ are respectively the unobserved individual bank specific effects (η and μ) in the two equations (21 &22) respectively and the observations specific errors or white noises (ε_{it} and ν_{it}) in the equations (21& 22) respectively.

X generally stands for capitalization variables (capital buffer/leverage ratio), while Y will represents both bank portfolio risk and return measures (Risk-weighted

asset ratio and the return to equity capital or the ROE). Note that in the model the two variables are specified as change (i.e. they are in the first difference form written in the models as ΔX_{it} & ΔY_{it}). They are the two dependent variables and are included also as explanatory variables, hence they are endogenous variables; meaning their value is determined within the equation systems.

K_{it} and Q_{it} represent a matrix of the remaining controlling factors. That is to say, variables that literature suggested as explanatory variables in these models as discussed in the preceding sections. The variables that K_{it} and Q_{it} represent are exogenous or strictly exogenous base on the assumption that they are uncorrelated with observations-specific disturbance or error terms. Each dependent variable in these models depends on their own lags, at least one period lag, as explanatory variable. These variables are represented in lag form as - γX_{it-1} and $-\lambda Y_{it-1}$). These lag variables are said to be predetermined variables in models like this with reference to the endogenous variables in the model. As such, these variables are assumed to be correlated only with past observations-specific disturbance but not the future disturbances (Greene 2002, page 380-382). The coefficients on the two lag dependents variables should also satisfy the dynamic stability condition that $|\gamma| < 1$ and $|\lambda| < 1$.

The above model raises a number estimation problem that presents some challenges. They requires a careful examination of the models assumptions before deciding on any estimation method. The problems are listed as follows:

1) **Simultaneity problem due to Endogenous regressors**

By construction the above model is a system of two simultaneous equations with endogenous variables[38] (e.g. the $\varDelta Y_{it}$ in the X equation, and ΔX_{it} in the Y equation). The simultaneous form of the model with endogenous variables in the right hand side has created a cross-correlation feedback problem. This cross-correlation feedback needs to be accounted for to obtain a precise test of theoretical predictions. Note that this study aims at examining the impact of banks simultaneous decisions on both capital and assets portfolio risk levels. The goal is to see how changes in these two variables affect each other when they are taken simultaneously. In other word, how bank managers perform this activity. Therefore, to be sure that we can obtain such estimates in a precise manner, an estimation method that can account for these feedbacks is needed. Since this particular model specification methodology was originally based on theoretical arguments discussed in Shrieves and Dahl (1992) etc., thus, this requirement is marked here as our first priority in this study.

2) **Panel specification and the fixed effect**

The model is a panel data model, which necessitate an estimation method that will take the individual heterogeneity into account or the fixed effect. This time-invariant individual bank characteristic is said to be correlated with individuals in the model or is a fixed effect. This problem, should it be the only one in this model, then the most widely used solution is the within estimator or similar methods such as the LSDV or Least-square dummy variable method that account for the fixed effect directly.

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[38] The discussions on the theoretical background for this model is given in chapter four as well as in the first part of this chapter whereby arguments of both Shrives and Dhal (1992), and Capital buffer theory are presented.

3) **Dynamic panel specification**

Moreover, the equation systems are also a system of dynamic panel equations with the appearance of a lag dependents variable in each equation in the right hand side. These predetermine variables, by construction, are said to be correlated with past observations-specific disturbance (Wooldridge, 2002 Greene, 2002). In this case the use of OLS or the within estimator will produce inconsistent and bias estimates especially in short panels (Batlagi, 2005, Greene, 2002). Taken into account problem 2 and 3 the next potential estimation method suggested in Greene (2002), is the 2sls instrumental variable method (or Two-stage least-square Instrumental variable). However, this particular estimation method may suffer the same fate if valid instrument is not used or weak instrument problem persisted.

4) **Short Panel Problem**

Moreover, the data used in this study covers relatively very short period 2000 to -2007, hence it fits short panel description. This meant that the data sets have very short time dimension (T = 8 years or 2000-2007) with relatively large number of individual cross-sectional units or banks (Indonesia 52 banks, Malaysia 26). With this last problem (4) and problem (2) and problem (3) from earlier sections, several successive methods were devised in econometric to deal with the issues and the development was gradual over time.

For example, Baltagi (2005) discussed these methods starting from Anderson and Hsiao (1981) first differencing methods to remove the fixed effect and then use instrumental variable (IV). The estimator is said to be consistent in the context of the problems (2,3 and 4 above). According to Baltagi (2005), this estimator is consistent but it will not be the most efficient because of suboptimal use of available instruments. Hence, he explains how Arellano and Bond (1991) extended the Anderson and Hsiao

(1981) methods by making use of the additional instruments in what is known as the GMM estimator or the generalized methods of moments is also known as the Difference GMM. Finally, this estimator was later improved and extended in two separate, but closely related, works by Arellano and Bover (1995) and the Blundell and Bond (1998) System estimator or the Systems GMM estimator. This so-called system estimator is said to bring about improvement to the original Arellano and Bond (1991) Difference GMM estimator in terms of precision and bias reduction (Baltagi, 2005).

By taking up all the four (4) econometric problems together as listed in the last section, there is no single estimator that can satisfied all these requirements at once. Greene (2002) provides a survey and discussion on several potential estimation methods available to estimate a simultaneous equation model such as the generic one specified above in equation 21 and 22. Greene starts with the least consistent and efficient to the more consistent and more efficient estimation methods. He explains that there are several estimation methods for such models as derived above. He divides methods broadly into two categories of estimator methods namely: 1) Single Equation: Limited Information Estimation Method 2) Full Information System Estimation Methods.

The first category group comprises the use the ordinary least-square method and a long list of instrumental variable estimation methods that includes among others, the 2SLS or the two-stage least square method, other instrumental variable estimation method, the GMM methods etc. Apart from the ordinary least square, these estimators share two characteristic that is they all are a single equation and utilize an instrumental variable estimation method.

The second group of estimators comprised, the "system estimators", comprise of followings listed in Greene (2002): (1) 3SLS: Three-stage least square (2) FIML: Full Information Maximum Likelihood method, (3) GMM :(H3SLS) or Heteroscedasticity three-stage least square method, and (4) I3SLS: the Iterated three-stage least square

methods. These methods share the characteristic that they all are system estimators. Greene (2002) then provided a brief empirical testing to compare these estimation methods. He concluded that system estimators have greater advantages on consistency and efficiency dimension estimates. He noted that much of the advantage associated with the use of the single equation methods are in simplicity and computational ease. (Greene 2002).

The Chosen estimation method for this study:

After discussing the four econometric issues in the model developed in this study and the suggested econometric estimation methods for such a model, this study additionally consulted published empirical papers that used the same model [i.e. the Shrieves and Dahl (1992) simultaneous equation methodology] for guide on estimation method. The papers reviewed included those from early nineties to the latest paper by Jokipii and Milne (2010). We found that, apart from Shrives and Dahl (1992) who used the 2SLS estimation method, majority of authors have used the 3SLS system estimation method or three-stage least square methods. The exception to this was a recent paper by Jokippi and Milne (2010), in which it was claimed that a simultaneous GMM system estimator was used.

Based on this survey, therefore, the best estimation method for this study would have been to use a simultaneous GMM system estimator that Jokipii and Milne (2010) paper claimed to have used if it was available to this study. The reason for such preference is that this particular estimator, if it existed, would have been the only candidate that fulfills all the requirements to estimate our model. Unfortunately, this is where one of the limitations of this study comes. This study has made an effort to contact the above authors for information on the new program to estimate the model developed in this study. The initial response was positive with one of the co-authors

giving some valuable information, however, efforts to contact the first co-authors in charge of the econometric issues has yet to yield any fruit/results[39] Nevertheless, I am hopeful for positive results.in the near future.

Therefore, this study made the final decision to use 3SLS System estimator or the three-stage least square estimation methods in line with vast majority of studies in this strand of empirical literature in banking. Below is a brief description of this Pooled 3SLS system estimator.

The Three-Stage Least Square Method:

The Three Stage Least Square Method of estimation or 3SLS is a full information estimation method. In this study, this method is implemented using Reg3 programme in STATA10.0. As the name indicates, the programme performs a successive series of regression analysis at three-stages with the initial coefficients from earlier stages being used in the later regression models until the final solution is found. 3SLS is similar to 2SLS in that both are pooled instrumental variable estimation method. However, the 3SLS is said (Stolz 2007) to be more asymptotically efficient compared to 2SLS. 3SLS can accommodate the feedback information from the correlated cotemporaneous error terms due to its systems of equation structure as explained in Zellner and Theil (1962). However, it assumes that the pooled sample is homogenous in that individual fixed effect is considered insignificant. This may be true or may not be the case. Nevertheless, as we have said it earlier, there is no other known estimation method (to our knowledge) better than 3SLS in our context except the Simultaneous system GMM estimator. To date, however, this study could not obtain the

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[39] I have provided, at the appendix, the detail e-mail correspondent sent to both Alistair Milne of Case Business school and Terhi Jokipii of Bank of Finland---.. This study used Stata software (Stata 10 SE flavor) for all major estimation for this study. It also utilize Eviews, SPSS as well as specialized excel programs. Stata 11 is the latest version but does not have program or menu for simultaneous GMM

codes for such dynamic panel data systems GMM estimation programme. Therefore, we proceed with our estimation using 3SLS method in STATA with Reg3, as done by majority of authors in this line of literature.

The specific instrumental variables used in 3SLS to account for the endogeneity problem between the two dependent variables and their respective lag independent variables are solved in STAT Reg3 as follows:

In SATA 10.0's Reg3 programme, after selecting and entering the endogenous dependent variables as well as the independent variables in their respective specified menu options or running the written programme codes in the editor, the instruments are made from all the right hand side variables. They include, in our case, the lags levels of the endogenous dependent variables (the predetermined variables) in the estimation process. Therefore, in this study the instruments are formed from all bank specific variables that we included in the models as well as the *HH1* and the broader macroeconomic variables, the year dummies as well as the lag level of our endogenous dependent variables (i.e. the predetermined variables).

5.5 Data Sample Selection, and Screening

Data Sources:

The financial information used in this study is sourced mainly from two sources: The Fitch-IBCA BankScope database, and the Asian Development Bank or ADB. Bank financial information comprises the balance sheet and Income statement data obtained from BankScope database. While information on banking system total deposit where obtained from Asian Development Bank database.

Sample selection process:

A criterion was established for the selection and inclusion of the banks in the study at three different levels: country level, Industry level and individual bank level.

Selection at Country level

First, we selected the regional name ASEAN banks from BankScope database selection menu. After several processing of the data obtained from this step, we found that only four countries have the sufficient data[40] (in term of number of years and other data quality issue). The four countries are as follows: Indonesia, Malaysia the Philippine, and Thailand. These are the initial selected four countries for inclusion into this study; however, after running regression for all the four countries we found that to keep the thesis within a manageable limit in terms of volume, we decided to report for two countries only. The selection of these two countries was justified based on practical issues. The specific issues are discussed in detailed in the Chapter one at the introduction. We do not repeat it here.

Selection at Industry Level

From the above step we obtained a large number financial institutions all of them were categorized under the name Banks. They include commercial banks, finance companies, investment banks, and other financial institutions. At this stage, we select only commercial banks for inclusion in this study for the following reasons. First, commercial banks represent the most homogenous institution across countries in terms of regulatory characteristics and the application of certain international standards (especially the Basel capital standard) and other regulatory and accounting issues. The

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[40] This may not necessarily mean that other countries have no sufficient data in the BankScope; rather it could be the limit of my access to the data because of the nature or level of subscription I used to access data. For trial version BankScope sometimes limit number of years as well as other aspect of data. So maybe these include limited number of countries that I could access at my subscription level.

most important of these include the availability of deposit insurance protection to commercial banks, explicitly or implicitly.

Achievement of such kind of homogeneity is highly desirable concerning the estimation method this study used. That is the use of the pooled 3SLS estimation method. This method explicitly assumes such homogeneity. Second, commercial banks are also the biggest holders of backing system deposit in many countries including the countries included in this study. This also will make this study comparable to many other studies from other developed countries that use only commercial banks data.

Selection at Bank level

Individual commercial banks were selected in this study based on the following criteria: Because the model in this study included a lag dependent variable therefore, at least a complete three-year period data at minimum is needed to make room for other possible data transformations. Thus, for an individual bank to be included in this study at least the bank must have three years complete information for the main dependent variables used in this study.

1) The data point on the main dependent variables should not be out of expected ranges to the extent that they can significantly influence the statistical results when they are excluded or included. Although we did not specified any such range, rather we conduct a quick analysis with the available data sets, and examine the statistics as shown in Table 5.1 and found that very few (small and large) data points. After running some initial analysis with or without these few (large/small observations) we found no significant different in the results. Therefore, we include all the observations.

According to the above criteria, the followings (as shown below) are the samples and numbers of individual banks selected in each country case. The first column gives

the total number of banks in our sample as at the end of 2007. The second column gives the highest actual usable number of commercial banks to this study. In the case of Malaysia, the sample 26 represents the total number of commercial banks (domestic and foreign). The figure 22 represents the smallest number of commercial banks over the whole period. The numbers fluctuate however, over the years. See for example Table 2.3, Chapter 2 for more detail. Chapter 2 discusses more on the profile of the two country's banking sector over the period 1997-2010 and gives some account on changes in the number of banks.

Country number of Commercial banks 2000/2007 Sample selected		
Total Number of Banks as of		Sample taken
Year	2007	2000/07
Indonesia	130	52
Malaysia	22	26

Screening the Data for outliers and negative values in the main variables:

We perform data screening to consider the inclusion or exclusion of observations or individual banks based on whether the observation has significantly influenced the results or not. This was based on examining the effect of inclusion of observation values that are outside the expected ranges. Accordingly, values of capitalization variables, especially the capital buffer are not expected to be negative[41] and if negative values are found, and that if these values have significantly changed the regression results (qualitatively and quantitatively) then they are excluded. However, if the inclusion/exclusion of these values did not result in significant qualitative change in

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[41] This is so because negative capital would technically mean bankruptcy. However, in banking sometimes banks can operate with negative capital until they recover or be taken over by others. Banking is also so protected that government do not allow some banks to fail so that we may see some banks with negative capital ratio for some years and would be left to recover. So what is important here is to see whether the negative values are few whether they are influential I.e. can change statistical result or not. Base on the later inclusion or exclusion from analysis made here.

the results then they may be included or excluded. In either case, a robust test will be provided to show the alternative results for comparison purpose between the two results. Only one of the results will be adopted for the main in text analysis and interpretation.

We included observations with values of capital buffer ratio[42] that are above 100%. In our sample, we found few banks with actual Basel based capital ratio that is more than 100%. For example a bank with actual Basel standard capital ratio of 130%, we calculate capital buffer for this banks as usual as (130% -8% = 122%). The capital buffer ratio for this bank in the particular year will also be above 100% or 122% as calculated above. Technically and based on the way the regulatory capital, the Basel based capital standard ratio is calculated, a banks may sometimes have regulatory capital ratio, (capital as percentage of risk-weighted asset) that is more than 100%. This is not something abnormal in banking operation. This, in fact could be the result of bank deliberate decision to shift the balance in their assets portfolio mix toward lower risk asset for any reason. Therefore, these banks are not outside or outliers of my sample but their behavior in such cases are of interest to this study to investigate. If that decision is motivated to reduce risk or improve regulatory capital significantly or anything, else it should form part of banks strategies even if they look odd. An alternative measure of capitalization in this study is the Leverage ratio (equity capital/asset). This ratio cannot be expected to be above 100%, as we cannot imagine, at least within the current fractional reserve banking system regimes, an all equity bank except in theory.

Table 5.1 below presents the screening results of the main dependent variables included in this study as follows: capital buffer, ratio, Leverage ratio, the Risk-weighted asset ratio and the ROE or return on equity. As can be seen from table4.0 by country, the capital buffer variable has the following number of negative observation for

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[42] This criterion applies to capital buffer only i.e the buffer capital calculated from the minimum risk-weighted capital ratio or the Basel capital standard ratio. This does not include values of the Leverage ratio because Leverage ratio in banking is not expected to be 100% or say, it we cannot imagine banking in M& M world.

following sample data sets: 6 for Indonesia, 1 for Malaysia, 2 samples respectively. Capital buffer observations with values more than 100% are 8 for Indonesia, 5 for Malaysia. Data set for Indonesia has 5 negative observations for Leverage ratio.

Table 5.1 Screening results for outliers and negative values of main dependent variables

Dependent Variables Screened	Indonesia	Malaysia
	No Observation	No Observation
Capital buffer Ratio -100%	6	1
Capital Buffer Ratio >100%	8	5
Leverage Ratio -100 %	5	0
Leverage ratio>100%	0	0
Risk-Weighted Asset Ratio -100	0	0
Risk-Weighted Asset Ratio >100%	0	0
ROE -100%	21	6
ROE >100%	5	0

It can be seen that none of the sample dataset for the two countries has any observation above 100% or below 0% (zero) for the variable risk-weighted asset ratio. None of the four sample datasets has a value for the Leverage ratio that is above 100%. This last observed result is fairly expected because we cannot imagine a bank operating with a 100% equity capital within the current commercial banking regime[43]. Sample datasets from all countries have at least several negative observations for the variable ROE; the return on equity capital. This is not surprising at all because making loss sometime is part of business. So this value or observations are not excluded from the analysis. Nonetheless, in the case of Indonesia there are altogether five/twenty observations with ROE value that are above 100%/ below -100%. As we have said earlier, in the case of ROE it is not strange for a business to make loss. Therefore, we do not consider removing the observation with ROE below -100% from our sample. If this was a capitalization variable then the story will be different.

Furthermore, it was noted that the pattern of negative capital and ROE are associated with specific periods or years. In fact, they tended to appear among earlier

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[43] Although some theories may argue otherwise, see for example Miller (1995). Nonetheless, that argument will remain valid in theory only and we do not need to test that in this study.

part of the sample years, in majority of the cases, or the years 2000-2003/4 compare to years from 2004-2007). Therefore, a split sample analysis performed to help further investigate if earlier years results could be different from later year's results. The aim of that is to see if these two-sample period could show differences in terms of speed of adjustment to capital and assets portfolio risk as well as the nature of coordination in adjustment to capital and assets portfolio risk or capital and portfolio return (ROE) decisions. It is also obvious that the period from 2000-2007 could be influence by the consolidation activities (mergers, restructuring and regulatory reforms) and capital injections in the aftermath of the 1997/98 Asian crisis. Thus, changes in capital and portfolio risk levels might not be free from the effects macroeconomic and broader financial aspects of the period that may be temporal. As we do not have specific variables to represent each of the many factors, thus, this also many warrant the use of the two-subsample analysis approach.

Testing for Unit root

The test for a unit root process is not very common in published papers in this strand of bank capital literature[44] to the knowledge of this study. Stolz (2007), who perform this test is an exception among recent studies.

Table5.2Levin-Lin-Chu (2002)(LLC) panel unit-root test; the Null Hypothesis: Unit root (There is a common unit root process)

	Indonesia	Malaysia
Method: Levin, Lin & Chu t*	Prob.**	Prob.**
Series: CBF	0.0000	0.0000
Series: ΔCBF	0.0000	0.0000
Series: LVR	0.0000	0.0000
Series: ΔLVR	0.0000	0.0000
Series: RWAR	0.0000	0.0000
Series: ΔRWAR	0.0000	0.0000
Series: ROE	0.0000	0.0000
Series: ΔROE	0.0000	0.0000

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[44]Almost all the published empirical I reviewed have not shown or indicate that they perform or need to perform this test.The exception is Stolz (2007) who perform this text and reported it.

Therefore, for reader who might be interested in these results, we have performed panel unit root test for the main dependent variables using Levin-Lin-Chu unit root testing method as in Stolz (2007). We compute the test for both the level and change or difference form of the variables. The test results are shown in table 5.2 below: we only provided the variables and the significant levels to save space.

Table: 5.2 presents the results for all the panel unit root test for panel series cases. The Null hypothesis for the Levin, Lin & Chu is that: there is common unit root process in the panel data. This hypothesis, as can be seen in Table 5.1, is rejected at the highest significant levels in all cases.

5.6 Chapter Summary

This chapter explains the methodology this study follows to conduct its empirical investigation. The chapter comprises three main parts: Methodology part were discussion takes a systematic steps to illustrate the model development for capital and portfolio risk models and capital and portfolio return (ROE) models successively. The second part discusses the estimation methods. First, we generate a representative econometric model for the system of simultaneous equation developed in the previous sections and then illustrate the econometric estimation problem associated with the dynamic system equation on hand. Next it discuss a broad range of suggested estimation methods in the literature to arrive at the chosen estimation methods and justified the choice based on situational constrains highlighted therein. Finally, the third part explains data collection process that involves the description of the sources, the then the selection process at three different levels. The country level, Industry level and at individual bank level. The next subsection discusses the screening process. These involve the analysis of outliers and extreme observation and their possible effect on the results. It also provides explanation on how to the study deals with individual cases.

Another screening involves the unit root testing to examine if the panel unit series are stationary or contain unit roots. The aim of these screenings, in general, is to ensure that the data is ready for the final analysis.

CHAPTER SIX

ANALYSIS, RESULTS AND DISCUSSIONS

6.1 Introduction:

In this chapter, we present and discuss the analysis result obtained from our simultaneous equation models, using sample commercial bank data from Indonesia and Malaysia. The analysis focuses on examining bank managers' capital (capital buffer and the Leverage ratios) and asset portfolio risk and return decisions in separate models. (i.e. capital and risk model and capital portfolio return models). The study used simultaneous equation models and partial adjustment frameworks as developed in Shrieves and Dahl (1992). The study estimated the models using the full information Three Stage-Least Square estimation method.

We present and discusses the analysis results in two parts (Part one and part two under headings based on our two major research objectives 1 & 2 respectively). In the first part, we present and discuss the analysis result of bank capital and assets portfolio risk decisions models (objective one). In the second part, we present and discuss the analysis results of bank capital and bank portfolio return/(ROE) decision models (objective number two). Finally, at the end of each discussion section in each part, we provide a summary of our research questions and findings that indicate the extent to which our analysis results have provided answers to our research questions.

Our analysis progresses as follows: In the first part of this chapter, (part one: capital and assets portfolio risk decisions analysis), we use three analysis approaches with several models to examine bank mangers' capital and assets portfolio risk decisions. First, the study presents the full sample model results (that is the entire 8 years sample data model results). In the second approach, we present the results of two

subsample models. That is, we divide the dataset into two equal subsamples based on years (data set 1, 2000-2003 and data set 2, 2004-2007).

The rational for splitting the data into two subsamples and analyzing them separately as standalone models is also discussed. It should be noted that all the three sample models (the full sample models and the two-subsample models) contain the same independent variables, (Model specification I or the based model). Therefore, the only difference between the three models in the base specification for each capital ratio model is the specific years included or covered in each model. One of our aims in doing this is to control for any difference between the restructuring, recovery years, and the later years were banking market was relatively more stable and more liberalized. Such analyses are part of this research's broader objective.

Note that, in the based model specification (Model I) for each of the three main sample data sets, we model separately both types of capital ratios, (i.e. the regulatory capital buffer ratio and the Leverage ratio models) with bank assets portfolio risk proxy (or the risk-weighted asset ratio) as separate system equation.

Finally, the study use the dummy variable approach with the full sample data set only (data set3 2000-2007), and for capital buffer ratio model only to examine how banks with relatively high capital buffer as defined in this study manage their capital in comparison to banks with relatively low capital buffer. The study aims to test the capital buffer theory in this extended analysis using the dummy variable approach. Therefore, the study only included the dummy variables and its interaction terms to models with the capital buffer as the dependent variable. This analysis is not used with the Leverage ratio model, at least not in this study.

In the dummy variable approach, we use three different model specifications with the full sample data set. In these three models the study examines the impact of capital *buffer levels* on bank capital buffer and assets portfolio risk adjustments

decisions. The successive model specifications test several hypotheses that are based on the capital buffer theory explained in Chapter 4 and formulated in Chapter 5. The study aims to answer questions (outlined in chapter one) on how capital buffer levels affect the adjustment speed as well as the nature of coordination of change in bank capital buffer and change in bank assets portfolio risk proxy.

Therefore, a capital buffer dummy variable is created to represent two groups of banks with different levels of capital buffer (high vs. low). Two interaction terms are created from this capital buffer dummy variable. The first interaction term tests the impacts of capital buffer level on (1) the speed of adjustment to target capital buffer and target assets portfolio risk proxy. The second interaction term tests (2) the significant of the nature of coordination between change in target capital buffer and change in target assets portfolio risk at commercial banks in Malaysia and Indonesia.

On the other hand, the base model specifications aims to examine the nature of coordination in the instantaneous change to both the capital ratios (Leverage or capital buffer ratios) and the assets portfolio risk proxy (the risk-weighted assets ratio or RWAR) of bank managers. This particular model specification (based model I) will test the traditional moral hazard theory about bank managers' capital and assets portfolio risk decisions. That is the model tests banking firms' capital and portfolio risk decision under capital regulation in general regardless of other bank specific characteristics.

The traditional moral hazard assumption of banking firm behavior under capital regulation and government insurance subsidy is of two versions (Shrieves and Dahl,1992) (1) A pure moral hazard behavior predicts that the safety net provisions induces banks to exploit (specifically), the insurance agency by increasing risk and reducing capital. Hence, the pure moral hazard argument predicts a negative capital risk relationship in banking. (2) A constrained moral hazard hypothesis, on the other hand, counters that prediction by accounting for individual and institutional factors that can

sometimes dominate and moderate bank attitude toward risk-taking. These can include managers' risk-aversion view or the existence of substantial bankruptcy and distress related cost with certain financial structures or decisions that are inescapable for owners/managers. Therefore, sometimes, we can observe a positive relationship between capital ratios and assets portfolio risk proxy. The base model specification in all cases is designed to test these predictions. The predictions are formulated in hypothesis *1 & 2 or Ha1 Ha2* in chapter 4.

We start by presenting the result for the full sample model first, and move on to present the results for the two subsamples models.

With regard to countries, we present them alphabetically, i.e. the results for Indonesian sample banks data are presented first, then the result for sample Malaysian bank are presented next. As usual, we start with the descriptive statistics and correlation analyses of the main dependent variables.

6.2 Descriptive statistics:

6.2.1 Bank Capitalization ratios

Table 6.1 shows the annual average as well as the overall mean and standard deviation for the two capitalization variables used in this study. That is the Leverage ratio and capital buffer ratio. Capital buffer is calculated as the difference between banks actual absolute capital ratio based on Basel standard or locally adjusted regulatory capital ratio and the minimum required capital ratio. For example if bank B has an absolute risk-weighted regulatory capital ratio of 9.5%, and the minimum ratio in the country is based on Basel minimum capital ratio of 8% then bank B's buffer capital ratio is calculated as (9.5%-8%= 1.5%). Thus, bank B has a capital buffer ratio of 1.5%

above the minimum required capital ratio. This is the ratio, which this study used in the models as dependent variable.

Looking at the results by country, over the years 2000-2007, we can see that (based on pooled data) commercial banks in these two countries (Indonesia and Malaysia) in general have been holding significant capital buffer throughout the period. For example Table 6.1 shows (for pooled data) the overall period average capital buffer levels and their standard deviations in bracket by country as 19.90 (3.93) and 18.02 (3.74) respectively for banks in Indonesia and Malaysia. These figures are relatively very high compared to the five-year annual average capital buffer shown in Table 6.2 for banks in 15 European countries. Table 6.2 is adopted from Milne and Jokipii (2008) for comparison purpose. As can be seen from this table the highest five-year average capital buffer recorded among these the 15 countries was 4.79 and was in Finland. In fact, only four countries among the 15 European countries recorded a capital buffer level for commercial banks that is at high of 4.0 and above and they are as follows: Finland 4.79, Belgium, 4.56, Ireland 4.15, and Luxembourg, 4.04-see Table 6.2.

Similar comparison can be made for capital buffers reported about banks in the United States, in Jokipii and Milne (2010), and in Berger, et.al., (2008). The above descriptive statistics findings are widely acknowledged in financial or mainstream press commentaries, that Asian Banks are relatively well capitalized compared to their counter parts in the developed countries such as the U.S and in the EU countries, and that Basel III should not matter much to them. Similar comparison can be said about the Leverage ratio (this is defined in banking as = [average total equity capital/average total asset]).

Table 6.1 Means and standard deviations capital buffer/Leverage ratios at annual average figures

Bank Leverage Ratio (%)	Indonesia (%)	Malaysia (%)
2000	9.52	10.56
2001	9.71	11.21
2002	13.21	14.44
2003	13.71	13.25
2004	13.67	12.71
2005	13.92	11.75
2006	14.85	11.42
2007	15.58	7.67
Avg Leverage (2000- 2007)	13.02	11.63
Std Leverage (2000-2007)	2.23	2.03
Bank Capital buffer	Indonesia	Malaysia
2000	15.42	12.07
2001	21.57	14.59
2002	24.16	21.89
2003	25.90	22.56
2004	18.83	20.37
2005	20.84	18.72
2006	17.36	18.83
2007	15.14	15.14
Avg Buffer (2000 -2007)	19.90	18.02
Std Buffer (2000 -2007)	3.93	3.74

Note: this values averages after pooling the sample data in each country case

Table 6.2 Capital buffer levels at some European banks (adopted from Milne and Jokipii (2008) here for comparison)

Country	2000	2001	2002	2003	2004	Avg
AT	1.96	2.89	2.63	3.08	3.10	2.32
BE	5.75	5.31	5.06	4.66	4.45	4.56
FI	1.38	1.68	2.53	10.97	11.20	4.79
FR	1.80	1.78	1.67	1.84	1.49	1.91
DE	3.00	2.79	2.85	4.41	4.37	2.97
GR	4.51	2.83	2.24	3.42	4.57	3.40
IE	3.05	3.05	4.95	6.82	5.54	4.15
IT	1.61	1.34	2.32	2.42	2.87	1.92
LU	4.07	3.94	3.75	4.88	2.47	4.04
NL	2.69	2.80	3.23	3.56	3.50	3.04
PT	0.98	1.23	1.62	2.04	2.21	1.87
ES	2.50	3.20	2.82	2.63	2.51	2.59
DK	1.75	2.24	2.43	2.79	2.23	2.32
SE	2.46	2.70	2.29	2.53	2.68	2.65
UK	2.37	1.50	0.96	0.92	0.85	1.46
EU25*	3.84	3.45	3.66	4.18	4.03	3.77
EU15*	2.66	2.62	2.76	3.80	3.60	2.93
EA*	2.77	2.74	2.97	4.23	4.02	3.13
DK–SE–UK*	2.19	2.15	1.90	2.08	1.92	2.14
RAM10*	5.81	4.85	5.02	4.75	4.67	5.14

Note: AT = Austria, BE = Belgium, DE = Germany, ES = Spain, FI = Finland, FR = France, GR = Greece, IE = Ireland, IT = Italy, LU = Luxembourg, NL = Netherlands, PT = Portugal, DK = Denmark, SE = Sweden, UK = United Kingdom*denotes figures equal to the un-weighted average of composite countries. Capital buffer is defined as the institutions total risk weighted capital (Tier 1 + Tier 2) capital less the required minimum (8% or the higher value in Table 2). Within each country average bank capital buffers weighted by bank market share. **Source: Milne and Jokipii (2008)**

Leverage ratio is a much precise measure of the total capital funds in a bank, if potential regulatory capital arbitrage is not present. On this capitalization dimension (Leverage ratio) banks in these two countries, again, seem to be highly capitalized per Leverage ratio. Overall, on average Indonesian and Malaysian banks are highly

capitalized on this dimension compared to commercial banks in the EU countries seen in Table 6.2.

The overall period average and standard deviation for the Leverage ratio by country from the upper part of Table 6.1 are 13.02(2.23) 11.63(2.03), respectively for Indonesia, Malaysia.

6.2.2 Bank Portfolio Risk

Table 63 presents the overall period average of total risk-weighted asset ratio as well as the annual average by country.

Looking at this Table, we can see a different picture about bank asset portfolio composition in these four countries that is the opposite of what we have seen in Table 6.1 on capitalization ratio. Now this table shows that based on overall period averages 47.9% and 55.5% of commercial bank asset portfolio in Indonesia and Malaysia consist of risk-weighted asset. While banks in Indonesia and Malaysia seem to be well capitalized on the account (capital buffer and Leverage ratio) of both capital ratios, they also have relatively moderate weight of their portfolio in the risk-weighted asset in terms of overall volume of asset portfolio.

6.2.3 Correlation Analysis

Table 6.4 display the correlation analysis results for the main interdependent variables used in this study. As one can see from the correlation table, Table 6.4, overall, for the significant of the cross-correlation between parewise variables, the parewise correlations between capitalization variables are all, relatively high and significant indicating their closeness to each other.

Table 6.3, annual average of risk weighted asset to total asset ratio

RWAR (as percentage of total assets)	Indonesia	Malaysia
2000	0.431	0.654
2001	0.480	0.653
2002	0.507	0.626
2003	0.545	0.587
2004	0.559	0.601
2005	0.592	0.599
2006	0.567	0.583
2007	0.570	0.581
Average RWAR (2000 to 2007)	0.479	0.555
Std RWAR (2000 to 2007)	0.159	0.186

However, cross-correlation between capitalization ratios and both portfolio risk proxy (RWAR) and the return on equity capital (ROE) shows varying degree of significance as well as in the size of correlation coefficients.

For example, for the pooled sample of 52 Indonesian commercial banks there is only one significant parewise correlation between one capitalization variable (Leverage ratio) and ROE at level and RWAR in the first difference form. While for the pooled sample of 26 Malaysian commercial banks over the period, the correlation coefficient is significant between levels of capitalization variables and levels of assets portfolio risk proxy (RWAR) and assets portfolio return proxy ROE.

No significant correlation is observed between capitalization variables at levels and the ROE at both the levels and the first difference form of the variable ROE in the case of pooled sample Indonesian bank data except the for Leverage ratio.

Concerning the direction of the cross correlation between variables (capitalization variables and assets portfolio risk and return proxies) in the two forms of the variables (levels and first differences), the following pattern are observed. For example, the cross-correlation between capitalization variables and assets portfolio risk proxy, at levels and first difference, for the pool data of sample Indonesian banks are as follows: First, between capital buffer and assets portfolio risk the sign of the cross-correlation is negative in both cases proxy (i.e. at levels cases as well as at first

difference cases). The cross correlation coefficient between Leverage ratio and assets portfolio risk proxy, for the pool data of sample Indonesian banks is positive and in both the level and the first difference form of the variables again. This meant that the signs of the correlation coefficient or pattern of direction are maintained moving from levels form of the variable to the first differences form of the variables in the case of sample Indonesian banks.

On the other hand, there is a change in sign or direction of the cross-correlation coefficient between capitalization variables and assets portfolio return proxy or the ROE when moving from level to the first difference of the two variables. For example, there is a change from negative to positive when we more with the correlation coefficient from levels of these variables (capital buffer, Leverage ratio and portfolio ROE) to their first difference form in the case of Indonesian banks.

This particular observation in coefficient sign change is what Shrives and Dahl (1992) discovered about bank capital ratio and assets portfolio risk proxy cross-correlation results. The finding led the authors to argue for the use simultaneous equation modeling approach to study bank capital and portfolio risk decisions. Such kind of cross-correlation sign change between capitalization variables and assets portfolio risk proxy is not found in this study, except for the case between Leverage ratio and portfolio risk proxy in the case of Malaysian sample banks.

However, a similar pattern is found between capitalization variables and bank portfolio return ROE in this study as can be seen from Table 6.4. This particular cross-correlation sign change is found in the case of both Indonesian and Malaysian pooled sample data separately as can be seen from Table 6.4. Hence, this last finding provides a strong support and may be a good justification for adopting and extending the simultaneous equation modeling approach of Shrives and Dahl (1992) in this study to

examine bank managers' capital and portfolio return (ROE) adjustment decision for the sample banks from Indonesia and Malaysia.

As for Malaysian banks as can be seen from Table 6.4, the preceding pattern of cross-correlation direction that is seen in the case of the Indonesian sample commercial banks is almost exactly what is observed in the cross-correlation direction of these variables for the pool sample of Malaysian commercial banks. Again, exception for one case of cross-correlation between the Leverage ratio and bank portfolio risk proxy in the case of Malaysian banks. This cross-correlation changed from negative in the levels to positive in the first difference.

Table 6.4, Pearson Correlation between dependent variables for banks in Indonesia,& Malaysia; respectively from top to bottom

	CPR	ΔCPR	CBF	ΔCBF	LVR	ΔLVR	ROE	ΔROE	RWAR	ΔRWAR
CPR	1	.154*	1.000**	.152*	.797**	.302**	-0.054	0.007	-0.110	0.073
ΔCPR		1	.154*	1.000**	0.03	.682**	0.027	0.003	0.080	-0.017
CBF			1	.152*	.797**	.304**	-0.054	0.008	-0.110	0.082
ΔCBF				1	0.029	.682**	0.031	0.003	0.071	-0.017
LVR					1	.235**	-0.099	.132*	.164**	-0.005
ΔLVR						1	0.08	0.034	0.020	0.075
ROE							1	.385**	0.019	0.021
ΔROE								1	-0.007	-0.043
RWAR									1.000	.136*
ΔRWAR										1
CPR	1	0.025	1.000**	0.025	.872**	-0.06	-.215**	0.012	-.641**	-0.081
ΔCPR		1	0.025	1.000**	-0.029	.646**	0.11	0.099	0.038	-0.023
CBF			1	0.025	.872**	-0.06	-.215**	0.012	-.641**	-0.081
ΔCBF				1	-0.029	.646**	0.11	0.099	0.038	-0.023
LVR					1	0.044	-.271**	-0.01	-.472**	-0.003
ΔLVR						1	0.153	0.091	0.106	0.155
ROE							1	.551**	0.139	0.073
ΔROE								1	-0.027	0.024
RWAR									1	.323**
ΔRWAR										1

**.Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).Correlations are based on the pooled sample (Eight year periods of observations on about 52, 26 Indonesian and Malaysian commercial banks respectively banks = 52*8 observation and 26*8 observation).

A correlation between variables is an indicator of statistical relations between the movements of two variables and they are expressed in terms of direction, size, and significant levels. A regression analysis is necessary to uncover more about the nature of the association and causation between two variables.

Meanwhile, Shrieves and Dahl (1992) has used the change in the direction of correlation between the level and first difference form of capitalization variable and portfolio risk from negative to positive in the first difference to argue partially for a case to analysis the change in bank capital and portfolio risk ratios instead of analyzing these variables at their levels.

This is the simultaneous adjustment methodology in modeling capital and portfolio risk. As can be seen from Tables (6.4,) the correlation analysis in this study shows a mixed pattern of changing direction between capitalization variables and assets portfolio risk and return proxies. The correlation direction between variables, on one hand, in one case of Malaysian sample data set has some similarity (for this see the case of Leverage ratio for Malaysia sample data) to the correlation direction observed in Shrieves and Dahl (1992). On the other hand, other correlation directions show no change of sign (see all the cases for Indonesia sample data). Nevertheless, many other studies found similar direction in correlation movements (e.g. Stolz, 2007). Whether all correlation direction in this study resemble that seen in Shrieves and Dahl (1992) or not the decision to use the simultaneous equation models is supported by theoretical argument provided in all the previous studies that followed Shrives and Dahl (1992) as well as Shrieves and Dahl (1992).

CHAPTER SIX PART ONE

**ANALYSIS RESULTS AND DISCUSSIONS:
RESEARCH OBJECTIVE ONE**

CAPITAL AND RISK DECISION MODELS

6.3 CAPITAL BUFFER AND PORTFOLIO RISK DECISION MODELS

6.3.1 Introduction

In this section, we present the analysis results of applying the simultaneous equation model specified in chapter 5 in equation 9 & 10 on the sample data sets using the three-stage square estimation method. We first present the full sample results by country and then we present the results for the subsample models. We first present the base model specification without capital buffer dummy variable. In the subsequent sections, we add capital buffer dummy variable (***DReg*** indicated as 1/0 in the data to represent banks with relatively high/low capital buffer**)** to the models and its interaction terms in successive models. By that, we test for any differences, in adjustment speed as well as in the nature of coordination of the changes to bank capital buffer and change to assets portfolio risk, between banks with relatively higher capital buffer and those with relatively low capital buffer as defined in this study.

Specifically, the analysis in the later sections will test the capital buffer theory of Milne and Whalley (2001). This theory, as discussed in chapter 4, predicts that banks with relatively low capital buffer or those whose capital levels is approaching the minimum capital are expected to adjust their capital buffer at a higher speed compared to banks with relatively higher capital buffer or those whose capital levels are at significant distance from the regulatory minimum capital. Similarly, this theory predicts that the nature of coordination between change in capital buffer and change in assets

portfolio risk proxy will be positive for banks with higher capital buffer and negative for bank with relatively lower capital buffer.

Therefore, the first indicator/interaction variables term ($DReg*CBF_{t-1}$, and $DReg*PRISK_{t-1}$) are aimed at testing the difference in adjustments speeds to capital buffer ratio and to assets portfolio risk proxy between two groups of banks, one with relatively low capital buffer and the other with relatively high capital buffer.

The second interaction term variables ($DReg*\Delta CBF$ and $DReg*\Delta PRISK$) are aimed at testing the nature of coordination between change in capital buffer ratio and change in assets portfolio risk for two groups of banks that differ in terms of their relative capital buffer level holding. The capital buffer theory predicts that banks holding different size of capital buffer behave differently in the way they coordinate between the decision to make change to capital and portfolio risk.

On one hand, banks with relatively high capital buffer are expected to adjust (increase) both capital and assets portfolio risk positively to maintain the balance. On the other hand, banks with relatively low capital buffer are expected to coordinate changes to capital and assets portfolio risk negatively (increase capital and reduce risk) to achieve balance and move their capital levels away from the regulatory minimum. The hypothesis formulated in chapter 4 (*H3, H4, H5* and *H6*) are based on this theory.

A similar approach that is also used in this literature for the same purpose is to divide banks into undercapitalized and well-capitalized banks based on some regulatory defined cut-off points for well-capitalized and undercapitalized banks. The main aim in this case is to test the regulatory influence on bank capital and portfolio risk adjustment decisions. Studies of Shrieves and Dahl (1992), Jacques and Nigro (1997), Aggarwal and Jacques (2001) etc. used this approach). Because the cut-off points in those studies were based on regulatory definition, their approach may not be equivalent to the one used in this study for several reasons.

The classification of banks into high and low capital buffer in this study may not be exactly comparable with those definitions found in the above mentioned studies on developed country banks for several reasons. First, because in overall all banks in this study, and in developing countries to some extent, often hold very high capital buffer that it may be difficult to divide and describe their relative standings into undercapitalized and well capitalized.

Second, such classification in studies conducted in developed countries will normally have practical effect on bank behavior. This is expected because sometimes the cut-off points for capital level classes are taken directly from actual regulatory classification of banks based on their absolute capital levels as seen for example in Shrieves and Dahl (1992) study and in Aggarwal and Jacques(2001). Such regulatory classifications will normally put certain restriction on bank activities or even asset holdings. In that case, they can really affect bank behavior.

Looking at capital buffer levels in our sample it is difficult to assume the same clear-cut behavioral differences among sample banks in this study. Nevertheless, we can still assume that regulators may in fact note and hence take into account the observed differences among banks under their supervision based on the size of their capital stocks. Thus, they may consider banks with big capital stock for any other preferential treatment compare to banks with relatively small capital stock without making a clear were the cut-off point is. Therefore, such treatment may create an incentive for banks to manage their capital/capital buffer in some ways that is favorable to their overall business strategy and can earn them regulatory favor.

This study uses the median standardized capital buffer as the cut-off point to classified banks into relatively higher and lower capital buffer banks. This cut-off point

approach is adopted from Stolz (2007)[45], with slight change in the designation of banks with high/low capital in the dummy definition. In this study, the dummy variable takes the unity or number 1 if a bank has a capital buffer in excess of the median standardized capital buffer and zero otherwise. The resulting binary variable is name as **DReg.**

This particular dummy approach in the analysis has been criticized in this literature for reasons discussed in chapter three; this limitation could be overcome in this study by applying subsample analysis. That is by directly dividing the dataset into two separate sets for banks with different capital buffer level based on some cut-off point. However, due to small size of the samples it was found to be impractical to use that approach in this study. In fact, this study has made an initial attempt to conduct such analysis but the results were not conclusive, hence further attempts were not made.

In the next section, we present the base model specification result estimated from equations 9 and 10. The presentation is by country and is arranged alphabetically starting with results for Indonesia, and then Malaysia. The section that follows will present results of the extended analysis in three different model specifications with the dummy variables and its interaction terms.

6.3.2   Indonesian Banks

6.3.2.1   Full Sample Model

Tables (6.5a & 6.5b) present the estimated results for equation 9 & 10 using sample Indonesian bank data. The coefficients are placed in the same row along with their respective independent variables names, and the standard deviation is placed in the next row. Beginning with control variables, all the independent variables in the full

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[45] It is noted that Stolz (2007) uses several cut-off points and robust test them, however, due to the difference between the sample used in this study and that of Stolz (2007) in term of sample size I found the standardized Median capital buffer the most suitable cut-off point.

sample model are significant with the expected signs (positives and negative) except for the loan loss provisions to total asset ratio. This ratio has the expected positive sign in the capital equation but is not significant. The insignificant of loan loss provision to total asset ratio has been reported frequently in many related studies. Despite this fact, many studies on bank capital have kept on including this variable. For example, both Rime (2001) and Stolz (2007), found this variable insignificant in their respective studies.

The coefficient on bank profitability proxy ROA 1.996*** is positive and highly significant as expected. This finding confirms the assumption of buffer capital theory that bank profit is an important source of capital fund. Banks use profit to build up capital levels before considering external capital (Milne and Whalley, 2001). This can also be interpreted in the same way in the context of traditional corporate capital structure theories such as the pecking other theory.

Table 6.5a Indonesia Banks: Three-Stage Least Square estimate of a Simultaneous Equation for Capital Buffer and Portfolio Risk: base model specification I *Capital buffer Equations*

Base Model Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	ΔCBF	ΔCBF	ΔCBF
*CBFt-1 (*1year lag bank capital buffer ratio)	**-0.414***	**-0.0843**	**-0.517***
	-0.038	-0.0736	-0.0294
ΔPRISK (Change in risk-weighted asset ratio)	**77.83***	**61.42***	**23.07**
	-26.52	-34.67	-20.83
*ROA (*Return on average total asset *: profitability)*	**1.996***	0.552	**2.598***
	-0.456	-0.477	-0.638
LLPTA (Loan loss provision to total assets ratio)	**19.25**	**-59.78**	**-183.6***
	-59.57	-58.29	-90.53
LTA (Natural log of total asset proxy for size)	**-1.056***	**-0.0754**	**-1.150***
	-0.563	-0.919	-0.43
LIQ (Liquidity proxy: total loan/total deposit)	**6.821***	**7.881***	**1.944***
	-1.304	-1.849	-1.12
ΔHHI (Herfindahl-Hirschman Index *market concept)*	**0.115***	**0.0761**	**-0.995**
	-0.0483	-0.047	-0.692
Year Dummies	yes	yes	yes
Constant.	**-7.808***	**-10.22***	**4.640***
	-3.133	-3.1	-1.877
"R-sq"	0.1915	0.0527	0.7389
F-Stat	12.42	9.28	48.46
Observations	248	99	149

Standard errors below coefficients next row, *** p<0.01, ** p<0.05, * p<0.1 are significant levels at 1%, 5%and 10% respectively.

Such higher and significant impact of profitability on bank capital buffer would be a welcome in the context of Basel III. A 1% increase in bank profit brings about additional percentage increase in bank capital buffer that is about 199% or 200% times to build the capital buffer. The coefficient on bank size proxy or the natural log of total asset has a negative impact on both bank capital buffer and portfolio risk.

However, the coefficients, is significant only in capital equation and not in the portfolio risk equation. This will suggest that (in our case with Indonesian banks) the bigger the bank size in terms of asset the smaller its capital buffer. To the extent that our assumption for asset size to proxy bank size holds in this case, big banks have more flexibility to raise capital quickly and cheaply. This is due to their extensive networks and economies of scale in fund raising plus their ability to diverse asset to reduce risk. Significant reduction of *risky* asset on their balance sheet will results in less need to hold larger buffer capital while their asset size remains big.

Table 6.5b: Indonesia Banks: Three-Stage Least Square estimates of a Simultaneous Equation for Capital Buffer and Portfolio Risk, base model specification I Portfolio Risk Equations

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	*ΔPRISK*	*ΔPRISK*	*ΔPRISK*
*PRISKit-1 (*1year lag of risk-weighted asset ratio)	-0.212***	-0.12	-0.247***
	-0.0341	-0.093	-0.0408
ΔCBF (Change bank capital buffer ratio)	0.00155***	0.0101**	0.000486
	-0.000541	-0.00443	-0.000486
LLPTA (Loan loss provision to total assets ratio)	-0.186	0.829	0.14
	-0.328	-0.851	-0.707
LIQ (Liquidity proxy: total loan/total deposit)	0.0132*	-0.0587*	0.0153
	-0.00701	-0.035	-0.00969
LTA (Natural log of total asset proxy for size)	-0.00165	-0.00481	0.00102
	-0.00333	-0.011	-0.0034
ΔHHI (Herfindahl-Hirschman Index *)*	-0.000256	-0.000766	0.0127**
	-0.000288	-0.000597	-0.00507
Year Dummies	Yes	yes	yes
Cons.	0.137***	0.161***	0.120***
	-0.0213	-0.0526	-0.0226
"R-sq"	0.0876	-1.6163	0.259
F-Stat	5.25	1.31	6.96
Observations	248	99	149

Standard errors below coefficients next row, *** p<0.01, ** p<0.05,* p<0.1   are significant levels at 1%, 5% and 10% respectively.

We have, in deed, hypnotized that the relationship could be positive or negative. The coefficient on bank liquidity proxy (LIQ) is significant in both capital and portfolio risk equations. It has a positive impact on both bank capital buffer and bank portfolio risk. Market concentration as measured by the ***HHI*** or Herfindahl-Hirschman Index has significant positive impact on bank capital and a positive but insignificant impact on bank portfolio risk. Now we look at the variables of main interest in this study. Tables (6.5a & 6.5b) show the results of the estimated adjustment speed to target capital buffer and portfolio risk as well as the coefficients indicating the impact of change in capital buffer ratio and portfolio risk proxy ratios on each other for the sample Indonesian bank data. First, the coefficient on the lag dependent variables in both capital buffer and portfolio risk proxy equations are negative and highly significant as expected. The coefficients also satisfy the dynamic stability condition by being within the expected boundaries of | 0 and 1| in absolute terms. Thus, these figures can be interpreted as adjustment speed as have been done, for example, in Shrieves and Dahl, (1992), Stolz, (2007), Jokipii and Milne, (2010). Their magnitude or size indicate that Indonesian banks on average adjust both their capital buffer and portfolio risk at relatively very high speed compare to what have been found in similar studies in developed countries. This observed high speed of adjustment to both target capital and the target portfolio risk level here is not surprising.

This point should be clear if we take into account the significant size of buffer capital that these banks were holding over the entire sample period of 8years. There is, clearly, a big difference between commercial banks capital buffer levels in these two countries (Indonesia and Malaysia and to some extent banks in developing countries in general), and those of commercial banks in the developed countries such as those examples presented in Table 6.2, (some developed countries in Europe). Therefore, it may make sense that to say, in other to achieve and maintain such amount of high buffer

capital over the 8 years period or so, these banks would need to adjust to their target capital buffers and portfolio risk levels at relatively high-speed compare to their western counterparts.

Moreover, we already know that efforts to build up capital at banks in these countries were at their highest at the beginning of the century in the aftermath of the crisis. This was evidenced in the massive and rapid government intervention to inject capital into the undercapitalized banks within a very short period. And with the subsequent economic recovery we have seen the capital levels of these banks strengthen to the extent that they were able to pay back (especially in the case of Malaysian banks) to the governments the funds it initially injected into them within a short period.

It is also noted here that Indonesian banks, in particular adjust capital buffer toward the target level at a high speed compare to the speed at which they adjust to their target portfolio risk level. This particular finding is common among studies in the developed countries. To say it specifically, on average, Indonesian banks adjust to their target capital buffer at speed that is exactly twice faster (41.4%) than the adjustment speed of their portfolio risk-weighted asset ratio (21.2%). The base case specification model also shows that the simultaneous adjustment to both capital buffer and portfolio risk are positively related among sample Indonesian banks included in this study. On average during the whole sample period, a 1 unit/percent of positive change in bank portfolio risk is coupled with 77.83% increase in bank capital buffer, while a 1 unit/percent increase in bank capital buffer is associated with only 0.155% increase in bank portfolio risk.

With this result of a positive two-way simultaneous adjustment of capital buffer and bank portfolio risk, the Null hypothesis that there is no relationship between these two adjustments/changes can be rejected at a very high significance level. Hence, this result also provides support for a group of theories and hypothesis that collectively

supports the existent of constrain behaviour in bank risk-taking. This will include bank manager private interest guard incentive hypothesis, as well as the bankruptcy and distress related cost hypothesis. These factors can created a strong incentive among banks to self-regulate by acting prudently to balance their appetite for risk-taking with serious effort to maintain adequate capital for safety. This positive relationship is also interpreted sometimes as a result of an unintended consequence for capital regulation in that banks that are forced to increase capital tend to increase portfolio risk with increase in capital simultaneously to compensate for forgone opportunity cost of capital.

6.3.2.2   The Subsample Models

The period of 2000-2007 in the ASEAN region can be distinguished into two financially distinct periods[46]. The first period (2000-2003) is known to be characterised by financial restructuring, mergers and consolidation in the immediate aftermath of the 1997/1998 Asian financial crisis, while the later period is more stable relatively. Capital build up at commercial banks in the early years in the aftermath of the crisis was partly done by external injection of capital into a number of banks in these countries. Governments have helped these programs either directly or indirectly. In the next section we present the analysis results of the two subsamples, focusing on the main variables of interest in this study.

On overall, most of the controlling variables in the capital equation are significant with the expected sign especially for the 2004-2007 subsample equations. An exception in the capital buffer equation was the loan loss provision to total asset ratio. This ratio has turned out significant in this sub-period equation (2004-2007) but has the

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46 This definition is to some extend aimed at simplifying the analysis by balancing the samples rather than a very precise separation of this period into perfectly distinct period based on financial characteristics. It is possible that some will look at it as from 2000-2004 or so. In addition, the 2000-2003/2004-2007 is likely to suit the Malaysian banking system characteristics better compared to the Indonesian banking system characteristics in some cases.

wrong negative sign. Controlling variables in the portfolio risk equation in the two subsample equation are mostly insignificant although with changing sign from period to period. See Table (6.5a & 6.5b).Again the exception is the loan loss provision which carries significant coefficient but wrong sign. Only liquidity proxy is significant in the portfolio risk equation for subsample 2000-2003, while the Herfindahl-Hirschman Index[47] is significant in the subsample 2004-2007 model in this equation.

We now examine the main variables of interest in this study. The lag coefficient of both capital buffer and portfolio risk in the subsample 2000-2003 model are comparably small and insignificant (capital, 0.0843, and risk 0.12) in both equations, while these lag coefficients (lag capital= 0.517, lag risk = 0.247.) are relatively high and significant in the 2004-2007 subsample model. In the exact opposite manner, the coefficients of change in capital buffer in portfolio risk equation and the coefficient of change in portfolio risk in the capital buffer equation are both positive but they are only significant in the subsample model of 2000-2003 only. These can be stated in another way as follow: for Indonesian commercial banks the speed of adjustment to target capital buffer and portfolio risk are high and significant only in the post restructuring and post mergers period of 2004-2007, while banks coordinated simultaneous adjustment of capital buffer and portfolio risk are high and significant during the restructuring and mergers period of 2000-2003 but not in the post restructuring period of 2004-2007.

What might explain the slow and insignificant adjustment speed to capital buffer and portfolio risk for Indonesian banks during the period 2000-2003, while the coefficient turn out high and significant during 2004-2007 periods will be taken up in the discussion section.

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[47] For ease of writing and to save space, the Herfindahl-Hirschman Index will be abbreviated in writing in this text as HHI.

6.3.2.2.1 The buffer level dummy Model

Table 6.6 presents the estimated results of applying equation 9 & 10 of chapter 5 with additional variable, **_Dreg,_** included now, to the sample data for Indonesian banks. To interpret the coefficients on dummy variable in Table 6.6, **_DReg,_** will indicate both the direction and significance of the behaviour of one group of banks relative to the other group when regulatory capital rules change. This will be in terms of their capital and portfolio risk management behaviour under capital regulation. Thus, in this study it will indicate how holding high capital buffer affects bank capital buffer and portfolio risk adjustment as compare to holding relatively low capital buffer. Hence banks with relatively high capital buffer are the reference group that is identified in the data with unity, and is interpreted in relation to the other group, namely banks with relatively low capital buffer.

For example to interpret the **_Dreg_** in Table 6.6 in the case of Indonesian banks, it is direct as follow:, Results for the sample Indonesian banks show that banks with capital buffer above the median standardized capital buffer increase capital by more and portfolio risk by less compare to banks with standardized capital buffer that is equal or less than the median standardized capital buffer (**_Dreg_** in capital equation = 8.215*** and in portfolio risk equation = -0.0352***). These results appear to run contrary to expectations as well as against the theoretical predictions. For example, the expected sign on Dreg, which represents high capital buffer banks in this study, should have been negative in both equations to indicate that banks with high capital buffer adjust (increase[48]) both capital buffer and portfolio risks by less compare to banks with low capital buffer.

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[48] This is the standard interpretation use in the context of capital buffer theory Milne and Whalley (2001). See for example Stolz (2007) on how to interpret this coefficients. The buffer capital theory explains the reaction/respond of individual banks after an increase in regulatory capital requirement. Banks in general tend to react by **_INCREASING_** their capital in two ways. (1) Direct increase of capital or (2) Reduction in risk-weighted asset in their portfolio to improve capital ratio. Therefore, the words **_adjust/change/and increase_** are synonymous in many part of this thesis. The positive and negative signs here will tell by how much

Hence it appears to contradict what the capital buffer theory predicted; that is to say banks with low capital buffer adjust (increase) capital/risk by more compare to banks with high capital buffer. Meanwhile, to make that conclusion concrete, further analysis may be needed to test the impact of buffer level on the adjustment speed. This analysis is taken up in the next model. Before proceeding to the next model for further analysis, we quickly compare the base model results with the second model results and see what else has changed in the base model result after introducing **Dreg** to control for buffer level differences among sample banks.

Table 6.6 Indonesia Banks Three-Stage Least Square estimates of a Simultaneous Equation of Capital Buffer and Portfolio Risk: Model Specification II

Independent	Full Sample[2]	Full Sample
	ΔCBF	*ΔPRISK*
*DReg (*Dummy = high buffer banks =1/ low buffer 0)	8.215***	-0.0352***
	-2.07	-0.0114
CBFt-1(lag dependent variable of capital buffer)	-0.423***	
	-0.0369	
ΔPRISK (Change in portfolio risk-weighted asset ratio)	81.37***	
	-25.83	
ROA (return on asset = measures bank profitability)	1.648***	
	-0.493	
LLPTA (loan loss provisions to total asset ratio)	*-29.56*	**-0.0708**
	-58.48	-0.324
LTA (Natural log of total asset = bank size proxy)	-1.158**	-0.00126
	-0.545	-0.00324
LIQ (liquidity = total loan divided by total deposit)	7.373***	0.0120*
	-1.293	-0.00682
ΔHHI (Herfindahl-Hirschman Index *)*	0.113**	-0.000229
	-0.0466	-0.000281
PRISKit-1(lag dependent variable Risk-weighted asset ratio)		-0.210***
		-0.0331
*ΔCBF(*Change in capital buffer ratio endogenous expiatory variable)		0.00143***
		-0.000524
Year Dummies	Yes	Yes
Constant	-11.63***	0.153***
	-3.281	-0.0217
Observations	248	248
R-squared	0.235	0.135

 Standard errors below coefficients next row, *** p<0.01,** p<0.05,* p<0.1 are significant levels at 1%, 5% and 10% respectively.
 [2]Full sample comprises all higher capital buffer banks. Note we also refer to the full sample as 2000-2007   Sample where we added up the two data sets:(2000-2003) and (2004-2007)subsamples based on period. (High CBF banks = their individual CBF>median CBF).

As we can see from Table 6.6 Several changes in the first results are observed after introducing **Dreg** into the model or after controlling for buffer capital size in the

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the increase will be. So it should not be confused with another potential interpretation of this result like: bank will increase capital and reduce risk because of the negative and positive signs may seem to suggest

second model. In general, it is noted that the main coefficients of interest in this study have all remained significant with their respective expected signs. However, coefficient in the capital buffer equation have increased in terms of size while that of portfolio risk equation have decreased in size (there is an increase in the coefficient size for CBF_{it-1} before = |-0.414***|, after = CBF_{it-1} after = |-0.423***|, while $\Delta PRISK$ increase from 77.83*** before to $\Delta PRISK$= 81.37*** after).

What happens to the main coefficients in the portfolio risk equation before, (see Table 6.5b) and after,(see Table 6.6), controlling for bank capital buffer size was exactly the opposite of what has happened to the main coefficients in the capital buffer equation. The coefficients in portfolio risk equation have generally reduced in their size after controlling for bank capital buffer levels. Hence the next model will control for the impact of buffer level on the speed of adjustment to both capital buffer and portfolio risk by introducing the two interaction term of Dreg $DReg*CBF_{t-1}$, and $DReg*PRISK_{t-1}$

6.3.2.2.2   Model with adjustment speed interaction term

Now, after introducing the interaction terms, $Dreg*CBF_{t-1}$, and $Dreg*PRISK_{t-1}$, previous results shown in Table 6.7, has changed as can be seen in Table 6.7. Now the two coefficients on $DReg$ in the two equations in Table 6.7 are negative as expected although only one of the coefficients is significant compare to results in Table 6.6. Their signs do indicate that banks with bigger capital buffer adjusts (increase) both their buffer capital level and portfolio risk by less compare to low capital buffer banks. However, because the coefficient for $DReg$ in the capital equation is not significantly different from zero, so we can only say that high capital buffer banks significantly adjust their portfolio risk by less compare to low capital buffer banks.

There appear to be no significant different between the two groups of Indonesian banks in term of the nature of their capital buffer adjustment behavior. With regards to

the speed at which banks with high capital buffer actually adjust (increase) their capital buffer and portfolio risk compare to low capital buffer banks in relative terms, we look next at the coefficient on the interaction terms **Dreg*CBF_{t-1},** and **Dreg*PRISK_{t-1}** in Table 6.7. As can be seen from Table 6.7 coefficients of the two interaction terms **Dreg*CBF_{t-1},** and **Dreg*PRISK_{t-1}** are positive and significant. Therefore, the coefficients on these two variables can be interpreted in the context of capital buffer theory in the following way. On average, sample(Indonesian), banks holding high capital buffer adjust (increase) their respective capital buffer and portfolio risks at speeds that are (approximates) about (½) half or 50% and 8.5% respectively less, compare to the adjustment speed at which low capital buffer banks adjust (increase) their respective capital buffer and portfolio risk after regulatory capital increase.

Table 6.7:Indonesia Banks Simultaneous Equation Mode Capital Buffer and Portfolio Risk: Pool 3SLS Estimation Method: Specification III

Independent variables and definitions	Full sample	Full Sample
	ΔCBF	*ΔPRISK*
DReg (Dummy = high buffer banks =1/ low buffer 0)	**-2.8**	**-0.0759*****
	-1.738	-0.0254
CBFt-1(lag dependent variable of capital buffer)	**-0.543*****	
	-0.0288	
ΔPRISK (Change in portfolio Risk-Weighted Asset ratio)	**63.80*****	
	-18.22	
ROA (return on asset = measures bank profitability)	**1.576*****	
	-0.417	
LLPTA (loan loss provisions to total asset ratio)	-23.65	-0.18
	-45.23	-0.313
LTA (natural log of total asset = bank size proxy)	**-0.885****	-0.000141
	-0.402	-0.00315
LIQ (liquidity = total loan divided by total deposit)	**4.800*****	0.0102
	-0.944	-0.00659
ΔHHI (Herfindahl-Hirschman Index **)**	**0.101*****	-0.000223
	-0.0345	-0.000272
DRgCBFt-1(interaction term: buffer adjustment speed)	**0.507*****	
	-0.0445	
DRg*PRISKit-1(portfolio risk adjustment speed)		**0.0851***
		-0.0439
PRISKit-1(lag dependent variable of portfolio risk)		**-0.237*****
		-0.0385
ΔCBF(change in bank capital buffer ratio endogenous variable)		**0.000696***
		-0.000415
Year Dummies	Yes	Yes
Constant	-7.012***	0.170***
	-2.416	-0.0247
Observations	248	248
R-squared	0.534	0.183

Standard errors below coefficients next row,*** p<0.01, **p<0.05,* p<0.1 are significant levels at 1%, 5% and 10% respectively.

(For the actual coefficients and their significant level from Table 6.8 are as capital equation: **0.507*****, and portfolio risk equation: **0.0851*)**.

With these findings on the speed of capital buffer and portfolio risk adjustment in the case of Indonesian sample banks included in this study, we can reject the Null hypothesis that adjustment speed between the two group of banks are not significantly different statistically.

In addition, we can say that our findings on the sample data for Indonesian commercial banks provide partial support for hypothesis 5 or *Ha5* and full support for Hypothesis 6 or *Ha6.* Hypothesis *5 &6 or Ha5 Ha6* predicted that adjustment speed to target capital buffer and portfolio risk are faster for low capital buffer banks compare to banks with higher buffer capital. However, since the coefficient on *DReg* in capital equation in Table 6.7 is negative as expected but not significant from zero, then Ha5 is only supported partially. This can be understood later in the discussion part in the context of regulatory reform measures. Indonesian banks had difficulty with raising capital in the early years as restructuring was on.

Next, to assess the impact of capital buffer level on the coordination of capital buffer and portfolio risk adjustments by our sample Indonesian commercial banks, we introduce the second interaction term (*DReg*ΔCBF* and *DReg*ΔPRISK*) into the third model (model III Table 6.8) to become the fourth model or Model IV shown Table 6.9. we first look at what happen to the coefficient on *Dreg* in Table 6.9 before moving on to interpret the second interaction terms. Thus, looking at Table 6.9 it can be seen that the signs on the dummy term *DReg* in both equations (-/-) have not changed. They are still negative however; their sizes have reduced only in absolute terms, yet only the coefficient for the portfolio risk equation is significantly different from zero. This means that the difference in behaviour between the two banks with regard to capital adjustment is not statistically significant still.

6.3.2.2.3   Model with coordination interaction term

Now we look at the coefficients on the interaction term ***Dreg*ΔPRISK*** and

Dreg*ΔCBF in Table 6.8. We can see that this model, the previous result has changed

the pattern in that, the interaction term coefficient are neither significant nor do the

signs on their coefficients resemble what was expected or predicted by buffer capital

theory about the coordination of capital and portfolio risk adjustment by high buffer

capital banks..

Specifically the coefficient on ***Dreg*ΔPRISK of*** (**-36***),* the interaction term that

indicates the impact of change in bank portfolio risk level multiplied by its buffer level

on changes in bank capital buffer level (in terms direction and magnitude of change).

The coefficient is negative and insignificant. The coefficient on ***Dreg*ΔCBF of***

(***0.00058***), the second interaction term introduce in this model, is positive as expected

but insignificant also. These two unexpected results render the rejection of the Null

hypothesis in favour of both ***H3 and H4*** (the third and fourth hypothesis of buffer

capital formulated in chapter 4) impossible with current data on hand. The two groups

of banks do not seem to adjust their capital buffer and portfolio risk significantly in any

different way or manner.

We can recall that the cross-correlation between buffer capital and bank risk-

weighted asset ratio in both levels and the first difference form is negative indicating

that the correlation between the two variables in either form is negative. However, our

base model as well as in the extended specifications have indicated that there is a

positive relationship between changes in buffer capital and portfolio risk, meaning that

the coordination, in general, is a two-way positive.

Thus, the analysis results of this study could not provide support for the two

stated hypotheses (***Ha3 and Ha4***) on the nature of the two-way coordination of capital

and portfolio risk adjustments by banks with relatively high buffer capital with the current data. Capital buffer theory predicts that the coordination of adjustment to target capital buffer and portfolio risk by banks with relatively high buffer capital is a two-way positive adjustment. A two-way positive coordination is only confirmed in the base model case without differentiating between sample banks.

Table 6.8 Indonesia Banks Three-Stage Least Square estimates of a Simultaneous Equation of Capital Buffer and Portfolio Risk: Model Specification IV

Independent	Full Sample	Full Sample
	ΔCBF	$\Delta PRISK$
*DReg (*Dummy = high buffer banks =1/ low buffer 0)	**-1.944**	**-0.0553***
	-2.078	-0.0295
CBFt-1(lag dependent variable of capital buffer)	**-0.542***	
	-0.0292	
DRgCBFt-1(interaction term: buffer adjustment speed)	**0.513***	
	-0.0466	
ΔPRISK (Change in portfolio Risk-Weighted Asset ratio)	**76.82***	
	-25.37	
DRgΔPRISK (interaction term the impact capital buffer level)	**-36**	
	-26.91	
LLPTA (loan loss provisions to total asset ratio)	-34.58	-0.159
	-46.91	-0.309
LTA (natural log of total asset = bank size proxy)	**-0.827****	-0.000419
	-0.403	-0.00312
LIQ (liquidity = total loan divided by total deposit)	**4.850***	0.0083
	-0.996	-0.00759
ΔHHI (Herfindahl-Hirschman Index)	**0.0973***	-0.000221
	-0.0346	-0.000271
ROA (return on asset = measures bank profitability)	**1.332***	
	-0.475	
PRISKit-1(lag dependent variable of portfolio risk)		**-0.218***
		-0.0417
*DRg*PRISKit-1(portfolio risk adjustment speed)*		**0.0447**
		-0.0522
ΔCBF(change in bank capital buffer ratio endogenous variable)		**0.00063**
		-0.000455
DRgΔCBF(Interaction term for impact of capital buffer level)		**0.000584**
		-0.00102
Year Dummies	Yes	Yes
Constant	-6.778***	0.160***
	-2.423	-0.0262
Observations	248	248
R-squared	0.536	0.177

 Standard errors below coefficients next row,*** p<0.01,** p<0.05,* p<0.1 are significant levels at 1%,5% and 10% respectively.

Nevertheless, looking at the coefficients on the two independent endogenous variables from Table6.8 (*ΔPRISK* and *ΔCBF*), **76.82***, 0.00063** respectively, both indicate a two-way positive coordination of adjustment to target capital buffer and target portfolio risk, but only one-way is significant. That is from portfolio risk proxy to capital. Similar interpretation of this is done before. Meanwhile this fourth model

specification or Model *IV* has also provided partial support for **H3** (hypothesis number 3, is about adjustment speed differences for buffer capital between the two group) but could not provide support for **H4** (hypothesis number 4, is about adjustment speed for portfolio risk). These are indicated by the following coefficients on the two speed interaction terms **Dreg*CBF$_{t-1}$,** and **Dreg*PRISK$_{t-1}$**) from Table 6.8 (***0.513**** and ***0.0447)***, respectively.

6.3.3 Malaysian Banks

6.3.3.1   Full Sample Model

Tables (6.9a and 6.9b) show the analysis results of estimating the simultaneous equation model 9&10 developed in chapter 5 using sample Malaysian bank dataset. To start the interpretation with control variables, we see that the coefficients of the following controlling variables have, as indicated by their signs respectively, significant positive and negative impact: (+) *ROA*, (-) LTA and (-) *LIQ*, on bank capital buffer, while the following two controlling variables (**LTA**=bank size, and LIQ= liquidly proxy) also have, significant positive impact on bank portfolio risk. These results are not outside expectations with regards to the signs on the coefficients. For these coefficients and their magnitudes see Tables (6.9a and 6.9b). Once again, the variable **LLPTA** or the loan loss provision to total asset ratio is found to be insignificant in both equations, so is the change in *ΔHHI* index. Yet both coefficients carry the expected sign in the portfolio risk equation, while *ΔHHI* index has an unexpected sign in capital equation.

The results on the main variables of interest in this study in the case Malaysian bank sample data are read as indicated by the coefficients on lag dependent variables of bank capital buffer and bank portfolio risk proxy (i.e. *CBF$_{t-1}$, PRISK$_{t-1}$*) respectively, as

well as the coefficients on the two endogenous variables in capital buffer and portfolio risk equations respectively, (i.e. *ΔPRISK, ΔCBF*) as shown in Tables (6.9a & 6.9b). Looking at Table 6.9a first, to read the absolute coefficient on the lag dependent variable for capital buffer, is equal (CBF_{t-1} = | 0.250 | and, while the absolute coefficient on the lag dependent variable for portfolio risk proxy or the risk-weighted asset ratio, as shown in Table 6.9b, is equals to $PRISK_{t-1}$ = | 0.444 |. Both lag coefficients are shown in the respective tables are relatively big in size and are highly significant. The coefficients are also within the range of dynamic stability boundaries |0-1|. Hence, these coefficients indicate adjustment speed as interpreted in similar studies.

The coefficients mean that, on average, during the full sample period, average Malaysian commercial bank adjust toward its target capital buffer and portfolio risk at the following speeds respectively (CBF_{t-1} = |0.250 | and $PRISK_{t-1}$ = | 0.444 |.). Meanwhile, this result indicates that average Malaysian commercial bank adjust portfolio risk at a speed faster than the speed at which they adjust to their target capital buffer ratio /levels. (i.e adjustment to target risk-weighted asset ratio is almost 2x speedier than that of capital buffer). This is apparently the opposite of what we have seen in the case of Indonesian banks whom adjust capital buffer twice faster than the adjustment speed for portfolio risk. Meanwhile, the 25% adjustment speed for capital buffer indicates that average Malaysian commercial bank closes almost half (2*25%) of the gap between its target capital buffer and the actual buffer level within two years period, and such bank almost reaches its full target level of buffer capital within four years period (4*25%). This is based on the full sample results, the 8-year period average.

With regard to the coordination of capital buffer and portfolio risk adjustments, there is a significant two-way positive coordination of capital buffer and portfolio risk

adjustments. For example, the coefficient on the change in buffer capital in Table 6.9b indicates that a 1 unit/percent increase in an average commercial banks capital buffer, on average over the full sample period, is associated with 0.281%(percent) increase in bank portfolio risk-weighted asset ratio. On the other hand a 1 unit/percent increase in average Malaysian commercial bank portfolio risk-weighted asset ratio is associated with an increase of 45.16 unit/ or 4516 % (percent) in its capital buffer levels on average over the full sample period.

With this finding of a positive capital buffer and portfolio risk adjustments relationship over the full sample period we can reject the Null hypotheses of no significant relationship between bank capital buffer and portfolio risk adjustments. With that this study also, as with the sample Indonesian bank data, finds a support for a constraint moral hazard hypothesis in the case of Malaysian banks sample data. Hence *Ha1* or the Alternative hypothesis no1 is supported here again. This study did not find any support for Ha2 or the pure moral hazard hypothesis.

6.3.3.2   Subsample Models

The results for the two subsample models for the sample Malaysian bank data case are presented in Tables (6.9a and 6.9b) from these tables the following findings on control variables are listed. Bank profitability measure of ROA and the loan loss provision to total asset ratio have positive impact on bank capital buffer. However, all, but only one case (the ROA case) is significant for the 2000-2003 subsample models.

The coefficient for *ΔHHI index* is not computed for the two subsample model cases. This may be due to two reasons: one reason may be due to the small sample data problem, and the second reason might be because of the relatively short time period there was no much change in the index which makes it behave as a constant term. As such STATA Software's Req3 programme for simultaneous equation models considers

it redundant and hence was automatically dropped from the model. This is because we have included year dummies; these year dummies will be correlated with the index in the short time period, and because we have added the usual regression constant term in the models.

In fact we note that we used the difference form of the variable ΔHH not the level form HHI. Since the index will be the same in each year in the short period if it does not change. Hence a perfect colinearity will result it and the constant term or some year dummies. We have seen that when we used the full sample period then the ΔHHI is not dropped from the model because some variation in the index is detected during the full sample period. A variation in the industry structure should be expected in the longer period data because after the restructuring and mergers activities that extended up to 2003 completed, the Industry would have a new structure. Thus, ΔHHI was included to capture this. Nevertheless, it was found to be insignificant, but with the right signs in some cases.

Both the coefficients on bank liquidity proxy as well as bank size proxy (the natural log of total asset), have negative impact on bank capital buffer (see Table 6.9a), but they are significant only in the 2000-2003. The coefficients of these variables in the portfolio risk equation are shown in Table 6.9b and equals (LIQ =0.396, and LTA = 0.014, respectively. They show a positive and significant impact on bank portfolio risk in the subsample period model of 2000-2003. Yet, in the 2004-2007 models only the coefficient on liquidity proxy was found to be significant with positive impact. The remaining controlling variables in the two subsample models were found to be insignificant. Now looking at the main variables of interest for this study, we can see that the coefficients on the lag dependent variables that represent, respectively, bank capital buffer and bank portfolio risk adjustment speeds during the two subsample periods as

Table 6.9a: Malaysian Banks: Three-Stage Least Square estimates of a Simultaneous Equation for Capital Buffer and Portfolio Risk, base Model specification I Capital Buffer Equation

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	ΔCBF	ΔCBF	ΔCBF
*CBFt-1 (*1year lag bank capital buffer ratio)	-0.250***	-0.299***	-0.227***
	-0.0387	-0.0564	-0.0548
ΔPRISK (Change in risk-weighted asset ratio)	45.16**	45.00*	58.16*
	-18.84	-25.72	-30.12
*ROA (*Return on average total asset *: profitability)*	1.542*	2.167*	1.757
	-0.803	-1.294	-1.308
LLPTA (Loan loss provision to total assets ratio)	158.8	363.3	235.1
	-176.1	-264	-246.9
LTA (Natural log of total asset proxy for size)	-2.488***	-3.622***	-1.65
	-0.784	-1.17	-1.025
LIQ (Liquidity proxy: total loan/total deposit)	-8.034**	-24.25***	-2.147
	-3.949	-8.115	-4.332
ΔHHI (Herfindahl-Hirschman Index)	-0.368		
	-1.169		
Year Dummies	Yes	Yes	Yes
Constant.	30.13***	50.16***	13.6
	-7.136	-11.09	-8.856
"R-sq"	0.1395	0.1906	0.1935
F-Stat	4.46	4.09	4.25
Observations	152	69	83

Standard errors below coefficients next row,*** $p<0.01$,** $p<0.05$, * $p<0.1$ are significant levels at 1%, 5% and 10% respectively.

indicated in Tables (6.9a & 6.9b), are, (*CBF$_{it-1,}$* = -0.299*** for 2000-2003 model, and

CBF$_{it-1,}$ = -0.227*** for 2004-2007 the speeds for capital buffer adjustment in the two

subsample model, while the followings are the respective coefficients for adjustment

speed for portfolio risk in the two subsample model equations: *PRISK$_{it-1}$* = -0.510*** in

the 2000-2003 model and *PRISK$_{it-1}$* = -0.346*** in the 2004-2007model equation).These

coefficients are all highly significant and relatively big in size in all equations of the two

subsample models. Again, in the subsample models Malaysian commercial banks

appear to adjust portfolio risk at a speed faster than the speed at which they adjust to

their capital buffer toward their respective targets (see coefficient in Tables 6.9a &

6.9b).

Comparing the adjustment speeds between the three different models in these

tables for capital buffer and portfolio risk we can see that, in most cases, the shorter

adjustment periods have relatively faster adjustment speed (for both capital buffer and

portfolio risk equations). For example, we see that on average for the full sample period

of 8 years banks adjust their capital buffer at a speed of 25% per annum, see Table 6.9a.

When we shorten this period by half, we see that average bank increases its adjustment speed to 29.9% (see Table 6.9a) or in other word they close about 30% of the gap in their target capital buffer within a year period compare to only 1 quarter of this gap when we use the 8 years span model result. Similar comparable illustration can be made for the risk-weighted asset ratio adjustment speed over different periods.

Regarding how banks coordinate the adjustment to target capital buffer and portfolio risk during the subsample periods, this study found a significant two-way positive adjustment relationship between the two variables only in the 2004-2007 subsample model case. The coordination of adjustment to capital buffer and portfolio risk for 2000-2003 subsample model is significant in one-way only, from portfolio risk to capital buffer. This one-way adjustment is also marginally significant at 10% level.

This perhaps can be explained to some extent by the fact Malaysian banking institution have undergone a rapid capital build-up exercise between 1998 to December 1999, whereby Danamodal injected a total of RM7.5billion into 10 banking institutions (BNM,1999).

Therefore, by 2000 banking institutions were well-capitalized and were in fact gradually paying back to Danamodal. Hence, Ito and Hashimoto, (2007) noted that the agency (Danamodal) did not make any additional capital injection into banks since 2000, and by January 31, 2001 the total outstanding of capital injection into banks amounted to only RM3.7 billion down from a total of RM7.5 billion in 1999.

Therefore, we can see the positive coordination from portfolio risk to capital is significant but the opposite is not significant though still positive because there is little or no active capital buffer build-up during the period compare to lending activity. But since any new lending will have to be backed by additional capital, if a bank wants to maintain certain buffer capital level above the minimum, then and increase in risk-

weighted asset ratio would be significantly matched by an increase in capital; as such a two-way positive impact was expected.

Table 6.9b: Malaysian Banks: Three-Stage Least Square estimates of a Simultaneous Equation for Capital Buffer and Portfolio Risk, base model specification I Portfolio Risk Equations

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	*ΔPRISK*	*ΔPRISK*	*ΔPRISK*
*PRISKit-1 (*1year lag of risk-weighted asset ratio)	**-0.444*** **	**-0.510*** **	**-0.346*** **
	-0.0616	-0.0798	-0.0831
ΔCBF (Change in bank capital buffer ratio)	**0.00281*** **	**0.000979**	**0.00382*** **
	-0.00105	-0.00122	-0.00142
LLPTA (Loan loss provision to total assets ratio)	**-0.321**	**-0.586**	**-1.6**
	-1.024	-1.158	-1.644
LIQ (Liquidity proxy: total loan/total deposit)	**0.278*** **	**0.396*** **	**0.191*** **
	-0.0367	-0.053	-0.0459
LTA (Natural log of total asset proxy for size)	**0.0144*** **	**0.0144** **	**0.00905**
	-0.00502	-0.00696	-0.00662
ΔHHI (Herfindahl-Hirschman Index: concentration *)*	-0.00746		
	-0.0082		
Year Dummies	Yes	Yes	Yes
Constant	-0.0676*	-0.0996**	0.0249
	-0.0347	-0.0469	-0.0465
"R-sq"	0.245	0.4845	0.2057
F-Stat	8.22	10.18	5.68
Observations	152	69	83

Standard errors below coefficients next row,*** p<0.01,** p<0.05, * p<0.1 are significant levels at 1%,5% and 10% respectively.

To conclude on this part, we sum up the findings as follows, subsample result show that the speed of adjustment to target capital buffer and portfolio risk are relatively high and highly significant. The coordination of capital buffer and portfolio risk adjustment has remained positive, significant and two-way. Meanwhile, the two-way positive adjustment impact, from capital buffer to portfolio risk, is significant only in the 2004 to 2007 model, while the two-way positive coordination during the subsample period 2000-2003 was significant only from portfolio risk to bank capital buffer and not the other way around.

6.3.3.3   Models with Capital buffer dummy variable

6.3.3.3.1   The buffer level dummy Model

Table 6.10 presents the estimated results of applying equation 9 & 10 of chapter

5 with additional explanatory variable, **DReg,** added to the base model using sample

data of Malaysian Banks. The coefficient on the dummy variable **DReg** is interpreted

direct, as before. On average and over the full sample period an average Malaysian

commercial bank with a standardized capital buffer ratio that is above the median

standardized capital buffer, adjust (increase) its capital buffer by more (positive sign

interpreted) and portfolio risk by less (negative sign interpreted). This is in comparison

to an average commercial bank with standardized capital buffer ratio that is equal to or

below the median standardized capital buffer.

Again the result of the buffer dummy variable here is similar to what we have

seen in the case of Indonesian sample banks. In both cases, in contrast to expectation,

banks with high buffer capital tend to increase capital by more. These high buffer

capital banks however, appear to adjust (increase) their portfolio risk by less compare to

banks with low capital buffer, this later is what was expected. The only difference here

is that the negative coefficient on **DReg** in portfolio risk equation, although negative as

expected is not statistically significantly different from zero. In other word the

expectation, based on capital buffer theory, is for both coefficients to be negative for

banks with high capital buffer. But since the coefficient on **DReg** is not significant,

then, it will mean that there is no actual difference between high buffer capital banks (as

defined in this study) and low buffer capital banks on the way the two groups adjust

their portfolio risk in response to regulatory change in capital requirement. The positive

sign on **DReg** coefficient in capital equation(s) is interpreted as meaning *more* than and

the negative sign on **DReg** coefficient in portfolio risk equation is interpreted as meaning **less** than.

All interpretations are in relative terms in comparison to banks with low buffer capital. Again as we have said before, the expectation that is based on buffer capital theory was that both coefficients, for high capital buffer banks, should have been negative so that we interpret them as: high capital buffer banks adjust (increase) their capital buffer and portfolio risk by **less** relative to low capital buffer banks after a regulatory capital increase. But to actually know the speed difference in adjustment between the two groups we need to look at the significant of the interaction term **Dreg*CBF$_{t-1}$** and **Dreg*PRISK$_{t-1}$** in Table 6.11 in the next section.

6.3.3.3.2   Models with adjustment speeds term

Tables (6.11 and 6.12) show, respectively, the first interaction terms (**Dreg*CBF$_{t-1}$** and **Dreg*PRISK$_{t-1,}$**), the adjustment speed indicators in the capital buffer and portfolio risk equations respectively, and the second interaction terms (**Dreg*ΔCBF** and **Dreg*ΔPRISK**,), respectively as indicators for the nature of the simultaneous coordination in adjustments to target capital buffer and portfolio risk respectively.

Before proceeding with the interpretation of these interaction terms; we look at what has changed from our base model results after introducing **Dreg** into a new model in the case of Malaysian banks. Similar to what we observed in the case of Indonesian banks, the main coefficient of interest, (after controlling for buffer capital levels (in the case of Malaysian bank) have largely retained their significant levels as well as their signs. At the same time these coefficients have changed in terms of their scale or size. There is an increase in the size of the main coefficient of interest in the capital buffer

equation as follows :(from **CBFt-1**=-0.250***,to -0.270***; and **ΔPRISK** = *45.16**.* to

ΔPRISK =54.71).

Table 6.10: Malaysian Banks Three-Stage Least Square estimates of a Simultaneous Equation of Capital Buffer and Portfolio Risk: Model Specification II

Independent	Full Sample[2]	Full Sample
	ΔCBF	*ΔPRISK*
DReg (Dummy = high buffer banks =1/ low buffer 0)	**5.728***	**-0.00739**
	-1.682	-0.0123
CBFt-1(Lag dependent variable of capital buffer)	**-0.270***	
	-0.0389	
ΔPRISK (Change in portfolio risk-weighted asset ratio)	**54.71***	
	-18.61	
ROA (Return on asset = measures bank profitability)	**1.496****	
	-0.739	
LLPTA (Loan loss provisions to total asset ratio)	246.8	-0.439
	-173.3	-1.02
LTA (Natural log of total asset = bank size proxy *)*	**-3.295***	**0.0151***
	-0.813	-0.00507
LIQ (Liquidity = total loan divided by total deposit)	**-10.35***	**0.278***
	-3.945	-0.0364
ΔHHI *(* Herfindahl-Hirschman Index *)*	-0.145	-0.00772
	-1.161	-0.00812
PRISKit-1(Lag dependent variable Risk-weighted asset ratio)		**-0.441***
		-0.0611
ΔCBF(Change in capital buffer ratio endogenous explanatory variable)		**0.00270***
		-0.00096
Year Dummies	Yes	Yes
Constant	35.36***	-0.0704**
	-7.196	-0.0344
Observations	152	152
R-squared	0.152	0.258

Standard errors below coefficients next row, *** p<0.01, ** p<0.05, * p<0.1 are significant levels at 1%, 5% and 10% respectively.
[2]Full sample comprises all higher capital buffer banks. Note we also refer to the full sample as 2000-2007 sample where we added up the two data sets: (2000-2003) and (2004-2007) subsamples based on period. (High CBF banks = their individual CBF>median CBF).

The speed of adjustment to target portfolio risk **PRISKt-1** slightly reduces from

0.444 to **0.441** after controlling for bank capital buffer size, while **ΔCBF** changed from

0.00281*** to 0.00270***, with slight reduction in the coefficient size.

Now we examine the two interaction terms in Table 6.11. The two terms

represent the speed at which banks with high buffer capital adjust their capital buffer

and portfolio risk respectively, relative to banks with low capital buffer as defined in

this study.

We can see that the coefficients on the two interaction terms, **DReg*CBF$_{t-1}$** and

DReg*PRISK$_{t-1}$, are 0.286***and **0.0504.**   Both coefficients are positive, their

numerical values indicate the speeds at which banks with high buffer capital adjust toward their target capital buffer, and portfolio risk levels respectively.

Table 6.11: Malaysian Banks Three-Stage Least Square estimates of a Simultaneous Equation for Capital Buffer and Portfolio Risk: Model Specification III

Independent variables and definitions	Full Sample	Full Sample
	ΔCBF	ΔPRISK
DReg (Dummy = high buffer banks =1/ low buffer 0)	**0.616**	**-0.0402**
	-1.709	-0.0376
CBFt-1(lag dependent variable of capital buffer)	**-0.345*****	
	-0.0385	
ΔPRISK (change in portfolio risk-weighted asset ratio)	**49.27*****	
	-16.84	
ROA (return on asset = measures bank profitability)	**1.910*****	
	-0.608	
LLPTA (loan loss provisions to total asset ratio)	**327.6****	-0.361
	-153.9	-1.034
LTA (natural log of total asset = bank size proxy)	**-2.937*****	**0.0154*****
	-0.722	-0.00512
LIQ (liquidity = total loan divided by total deposit)	**-8.279****	**0.284*****
	-3.581	-0.0371
ΔHHI (Herfindahl-Hirschman Index)	0.0106	-0.0077
	-1.057	-0.00821
DRegCBFt-1(interaction term: buffer adjustment speed)	**0.286*****	
	-0.045	
DReg*PRISKit-1(portfolio risk adjustment speed)		**0.0504**
		-0.0533
PRISKit-1(lag dependent variable of portfolio risk)		**-0.471*****
		-0.0699
ΔCBF(change in bank capital buffer ratio endogenous variable)		**0.00284*****
		-0.000854
Year Dummies	Yes	Yes
Constant	31.56***	-0.0578
	-6.37	-0.0375
Observations	152	152
R-squared	0.299	0.249

 Note: Standard errors are placed under the coefficients in the next row *** $p<0.01$, ** $p<0.05$ $p<0.1$ are Significant levels at 1%, 5% and 10% respectively.

However, after introducing the two-interaction term in the previous model, we can see that coefficients on **DReg**, have largely maintain the same sign (positive and negative) but now both coefficients are insignificant.

Meanwhile, the coefficients on the interaction terms are the speeds and are interpreted as before. We can say, for instance, on average a Malaysian commercial bank that is classified as high capital buffer bank in this study, adjust its capital buffer and portfolio risk at speeds that are respectively, 28.6% times faster and 5.04% times less. This is in comparisons to the respective adjustments speeds of capital buffer and

portfolio risk for an average Malaysian bank, classified as low capital buffer bank in this study.

However, the adjustment speed for high capital buffer banks is significant only in the case of capital buffer adjustment. Nevertheless, this particular significant finding for capital buffer adjustment speed is actually in contrary to what buffer theory predicted. This is because the coefficient on **DReg** is positive (unexpected sign) but insignificant anyway. Hence, the result is inconclusive.

On the other hand, the results for portfolio risk suggest that there is no significant difference between the two groups of banks in terms of speed of adjustment toward their target portfolio risk. This is indicated by the insignificant coefficient (see Table 6.12, **0.0504**) as well as the insignificant coefficient on **DReg** in the portfolio risk equation.

Neither of the two coefficients on the dummy variable **DReg,** in both capital and portfolio risk equations is significant; indicating a no difference test results between the two groups. Therefore, we can reject the Null hypothesis or the **Ho** only in the case of adjustment speed difference toward target capital buffer between the two groups of banks. However, the difference that we found here (a positive adjustment speed or faster adjustment speed {-sign on **DReg**} for high capital buffer banks) is in contrary to what buffer capital theory predicts (i.e. a negative adjustment speed or slow adjustment for high buffer capital banks).

Looking at Table 6.11 as well as Table 6.12, we can see that **DReg** is still positive/negative respectively in capital and portfolio risk equations; however, the previously significant coefficient on **DReg** in the capital buffer equation has lost its significance now and the coefficient for **DReg** in portfolio risk equation remains insignificant. This is a broad indicator that there is no much/or significant differences among sample Malaysian banks included in this study (whether they hold high/low

capital buffer) in terms of how big or fast they adjust toward their target capital buffer and portfolio risk.

Therefore, with this particular finding, we can say that our sample data for Malaysian commercial banks does not provide conclusive support for **Ha5, or** the alternative hypothesis. Furthermore, the current data does not provide any support for **Ha6** too. This conclusion is made because of the behaviors of the coefficients on **DReg,** despite the above finding that provides some support for **Ha5** though not what the buffer theory predicts. Further research may be needed to reach a strong conclusion.

6.3.3.3.3   Model with adjustment coordination interaction term

With regards to the coordination of capital buffer and portfolio risk adjustments decision for Malaysian commercial banks classified in this study as high capital buffer banks, this study found insignificant two-way negative coordination between capital and portfolio risk. These are indicated by the respective coefficients on the two interaction terms in Tables 6.12. It means that no significant differences between the two groups of banks with regard to coordination of adjustment in capital and portfolio risk. This finding here, as the case was before with the Indonesian sample, is in contrary to the predictions of buffer capital theory for banks holding high capital buffer. In particular, not only the coefficients are not statistically significantly different from zero, but the coefficients also carry the wrong or unexpected sign in this case. Capital buffer theory suggests a two-way positive coordination of buffer capital and portfolio risk adjustment by high capital buffer banks.

We conclude here that, the current data could not provide support for hypothesis 3 & 4 or **Ha3 and Ha4.** Meanwhile, the findings with regards to adjustment speed to target capital buffer and portfolio risk by banks with relatively high capital buffer as found in the previous model is maintained in this last model.

Table 6.12 Malaysian Banks Three-Stage Least Square estimates of a Simultaneous Equation for Capital Buffer and Portfolio Risk: Model Specification IV

Independent	Full Sample	Full Sample
	ΔCBF	$\Delta PRISK$
DReg (Dummy = high buffer banks =1/ low buffer 0)	**0.383**	**-.0241**
	-1.674	-0.0411
CBFt-1(lag dependent variable of capital buffer)	**-0.359***	
	-0.0365	
DReg*CBFt-1(Interaction term buffer dummy*lag buffer cap)	**0.297***	
	-0.0486	
ΔPRISK (change in portfolio risk-weighted asset ratio)	**41.55**	
	-18.52	
DReg*ΔPRISK(Buffer dummy*Risk-weighted asset ratio)	**-11.82**	
	-21.5	
LLPTA (loan loss provisions to total asset ratio)	**361.3**	-0.234
	-161.5	-1.006
LTA (natural log of total asset = bank size proxy)	**-3.069***	**0.0155***
	-0.69	-0.00492
LIQ (liquidity = total loan divided by total deposit)	**-8.071**	**0.298***
	-3.577	-0.0353
ΔHHI (Herfindahl-Hirschman Index)	-0.104	-0.00894
	-1.001	-0.00787
ROA (return on asset = measures bank profitability)	**2.210***	
	-0.774	
PRISKit-1(lag dependent variable of portfolio risk)		**-0.498***
		-0.0679
DReg* PRISKt-1(Buffer dummy*Lag Risk-weighted asset ratio)		**0.0313**
		-0.0598
ΔCBF(Change in bank capital buffer ratio endogenous variable)		**0.00260***
		-0.000899
DRegΔCBF(Buffer Dummy*Change in Capital Buffer)		**-0.00101**
		-0.00137
Year Dummies	Yes	Yes
Constant	31.68***	-0.0515
	-6.089	-0.0391
Observations	152	152
R-squared	0.362	0.3

Note: Standard errors are placed under the coefficients in the next row *** $p<0.01$, ** $p<0.05$ $p<0.1$ are significant levels at 1%, 5% and 10% respectively.

6.4. LEVERAGE RATIO AND PORTFOLIO RISK ADJUSTMENTS MODELS

6.4.1. Introduction

The importance of including bank leverage ratio in this study comes from two motivating sources. First, the leverage ratio has been the most widely use measure to proxy bank capital in many previous empirical studies. Second, in the past, many countries do not require any leverage ratio limit for their banks, yet the leverage ratio may be the one banks normally targeted in their actual capital budgeting decision and risk managements activities. Markets and investors may also be looking at the leverage ratio more than the minimum regulatory capital. In fact many have argued recently (see Milne and Whalley 2001) that regulatory minimum capital requirements are not that relevant to bank decisions especially those with higher buffer capital. In that sense, according to them, buffer levels should be studied in terms of how they are adjusted rather than the absolute capital ratio. Moreover, the introduction of the leverage ratio limit in the new Basel III system is another important motivating factor to study past bank behaviour with their leverage ratio for clues about how they might react to the proposed new limits on leverage. To that end this section 6.4 presents the findings of this study about research questions on how commercial banks in the past, in the two countries: Indonesia and Malaysia manage their leverage ratio with their portfolio risk levels. As before the presentation is by country.

6.4.2. Indonesia Banks

6.4.2.1. The Full Sample Model

Tables (6.13a and 6.13b) present the results of estimating equations 9 & 10 for the second capital ratio model used in this study, the Leverage ratio and portfolio risk in

the case of Indonesian commercial banks. As before, we begin with the control variables in the full sample model for both equations Leverage and portfolio risk equation). With the exception of ΔHHI, all the control variables in the capital equation are significant with the expected sign at most. For example, profitability measure of *ROA* and *LLPTA* or the loan loss provision to total asset as well as the liquidity proxy are all positive in Leverage equation as expected. Control variables in the portfolio risk equation are generally insignificant but they carry the expected signs for the full sample model. Finally, coefficient on bank size proxy (the natural log of total asset) is negative and significant in the capital equation as expected confirming one possible scenario for this coefficient see Table (6.13a and 613b).

It is interesting to note from the above findings that the *LLPTA* or the loan loss provision ratio to total assets which was insignificant in almost all the capital buffer equations in the previous section has now become significant in the leverage ratio equation for sample Indonesian bank data. This could mean that Loan loss provision is not an important source for regulatory capital in Malaysia and Indonesia. However, for the Leverage ratio which was not part of official regulatory or monitoring tool in pre-crisis and during 2000-2007 period (the pre-Basel II/III periods) we have a different story here. We will take up this issue to the discussion part.

All the coefficients on the variables of direct interest to this study, for the full sample, as shown in Table 6.13 are ($LVRt_{-1}$ = -0.257, $\Delta PRISK$ =14.81 and in Table 6.13b: $PRISK_{it-1}$ = -0.170, ΔLVR = 0.00705) are all significant with the expected signs. The coefficients on the lag dependent variables of $(LVRt_{-1}, PRISK_{it-1})$ are also within the designated boundaries for dynamic stability |0-1| and thus, can be interpreted as adjustment speed for the leverage ratio and portfolio risk respectively. Comparing the coefficients on the two lag dependent variables from Tables (6.13a & 6.13b), we can see

that coefficient on the lag leverage ratio is relatively high compare to that of portfolio risk ratio in the model (almost 2 times).

This particular finding has strengthen the findings from previous sections where we find that sample Indonesian banks adjust capital buffer at speed that is faster than the speed at which they adjust toward their target assets portfolio risk. Hence we may conclude from these findings that, in general, Indonesian commercial banks adjust toward their desired capital ratios (buffer capital or leverage ratios) at speed that is faster than the speed at which they adjust toward their desired portfolio risk level. In short, capital is raised/build-up at speed quicker than assets portfolio risk adjustment.

To compare the Leverage ratio model with the capital buffer model, we can see that adjustment speeds are relatively smaller in the Leverage ratio and portfolio risk models compare to that of capital buffer and portfolio risk models. The relevant speed parameters shown in Tables (6.13a & 6.13b) for the full sample period model would indicate that, on average Indonesian commercial banks close the following gaps (25.7% and 17.0%) between their actual Leverage ratio, actual assets portfolio risk levels and their respective desired Leverage ratio, desired assets portfolio risk levels within one year period respectively.

With regards to the coordination of assets portfolio risk and leverage ratio adjustments, a significant two-way positive adjustment between the two found. For example, for the full sample model, on average, a 1 unit/percent increase in an average bank's Leverage ratio is associated with 0.705% increase in this bank's assets portfolio risk proxy (the risk-weighted asset ratio) (see Table 6.13b).

On the other hand, as shown in Table 6.13a, a 1unit/percent increase in this bank's assets portfolio risk is associated with additional increase in the bank's Leverage ratio (equity capital/asset ratio) that is about 14.81times unit/ or 1481% percent of the

increase in this banks risk-weighted asset ratio based on the estimate from the full model.

Tables 6.13a Indonesian Banks: Three-Stage Least Square estimates of a Simultaneous Equation for Capital Buffer and Portfolio Risk, base Model specification I Capital Buffer Equation

Base Model Specification	(2000-2007)	(2000-2003)	(2004-2007)
Independent Variables	ΔLVR	ΔLVR	ΔLVR
*LVRt-1 (*1year lag bank leverage ratio)	**-0.257*****	**-0.272*****	**-0.246*****
	-0.0305	-0.0542	-0.0358
ΔPRISK (Change in risk-weighted asset ratio)	**14.81****	**19.74**	**6.869**
	-6.997	-13.48	-7.07
*ROA (*Return on average total asset *: profitability)*	**1.043*****	**0.999*****	**1.200*****
	-0.139	-0.312	-0.194
LLPTA (Loan loss provision to total assets ratio)	**40.36*****	**60.21*****	**-74.11****
	-14.57	-18.96	-30.32
LTA (Natural log of total asset proxy for size)	**-0.349*****	**-0.288**	**-0.250***
	-0.133	-0.229	-0.149
LIQ (Liquidity proxy: total loan/total deposit)	**1.587*****	**2.537*****	**0.467**
	-0.308	-0.444	-0.423
ΔHHI (Herfindahl-Hirschman Index *)*	**0.0141**	**0.0139**	**-0.368**
	-0.0107	-0.0123	-0.228
Year Dummies	Yes	yes	yes
Constant.	-0.892	**-1.642****	**2.237*****
	-0.716	-0.818	-0.639
"R-sq"	0.1994	0.1278	0.3703
F-Stat	10.45	10.97	10.96
Observations	281	123	158

Standard errors below coefficients next row,*** p<0.01, ** p<0.05,* p<0.1 are significant levels at 1%, 5% and 10% respectively.

6.4.2.2. Subsample models

In Tables (6.13a & 6.13b) the two columns to the right are the relevant results for the two subsample period models. The results show that the following controlling variables **ROA, LLPTA** and **LIQ** (i.e. profitability ratio, loan loss provision to total asset ratios and liquidity ratio respectively) have positive impact on leverage ratio and are significant in both subsample models except for the **LLPTA** which has both positive/negative impact on leverage ratio in 2000-2003 models and the 2004-2007 models respectively.

While bank size has the expected negative sign on leverage ratio it is significant only in the last period or the 2004-2007 models. The liquidity proxy is positive and significant only in the 2000-2003 models. Again **ΔHHI** is insignificant in all the models

equations. With regards to the controlling variables included in the portfolio risk equation, none but one control variable, the **ΔHHI**, shows a significant impact but unexpected sign in the portfolio risk equation for the subsample model of 2004-2007.

The adjustment speed for both leverage and portfolio risk proxy in the two subsample period model are (compare to the full sample model, in relative terms) big in magnitude.

Tables 6.13b: Indonesian Banks: Three-Stage Least Square estimates of a Simultaneous Equation for   Capital Buffer and Portfolio Risk, base model specification I Leverage ratio Equation

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	ΔPRISK	ΔPRISK	ΔPRISK
PRISK$_{it-1}$ (1year lag of Risk-Weighted Asset ratio)	**-0.170*** **	**-0.128** **	**-0.228*** **
	-0.0318	-0.0527	-0.0382
ΔLVR(Change in Bank leverage ratio)	**0.00705*** **	**0.00881** **	**0.00185**
	-0.00244	-0.00411	-0.00305
LLPTA (Loan loss provision to total assets ratio)	**-0.153**	**-0.321**	**0.365**
	-0.323	-0.405	-0.735
LIQ (Liquidity proxy: total loan/total deposit)	**0.00852**	**-0.00431**	**0.0121**
	-0.00708	-0.0138	-0.0092
LTA (*Natural log of total asset proxy for size*)	**0.00047**	**-0.00304**	**0.00254**
	-0.0032	-0.00613	-0.00337
ΔHHI (Herfindahl-Hirschman Index *)*	**6.43E-05**	**-0.000213**	**0.0111** **
	-0.000273	-0.000302	-0.005
Year Dummies	Yes	yes	yes
Cons.	**0.0932*** **	**0.101*** **	**0.109*** **
	-0.02	-0.0249	-0.0231
"R-sq"	0.0587	-0.059	0.245
F-Stat	4.9	2.05	6.56
Observations	281	123	158

Standard errors below coefficients next row, *** p<0.01,** p<0.05, * p<0.1 are significant levels at 1%, 5% and 10% respectively.

On the other hand, the simultaneous adjustment of leverage ratio and portfolio risk has remained positive and two-way as found in the full sample model case; however, they are all insignificant except one case in the 2000-2003 models for portfolio risk equation. This is quite the opposite of what we have observed in the buffer capital model, whereby the two-way positive adjustment coordination between capital buffer and portfolio risk was found to be significant (in the 2000-2003 model), though the speed was not significant, while here (with leverage ratio) the speed (for the 2000-

2003 model) is significant but coordination of leverage ratio and portfolio risk is not significant. More light will be shed on this in the discussion part.

6.4.3   Malaysian Banks

6.4.3.1 The Full Sample Model

Tables (6.14a & 6.14b) present the estimated results of Equation 9 &10 of chapter 5 using sample Malaysian commercial bank data. Starting with control variables, in the leverage equation, four of the five control variables in this equation have the expected positive sign yet none of them is significant. Bank size proxy, (natural log of total asset) shows a significant negative impact on bank leverage ratio as expected. As for the portfolio risk equation, bank size proxy and bank liquidity proxy LIQ have significant positive effect on bank risk-taking. This means that with increasing size banks take on more risk. This might be true as big banks have more capacity to diversify and get exposed to various types of risk; meanwhile, the sign on liquidity proxy variable in the portfolio risk equation is not generally consistent because higher liquidity should reduce bank risk of default from unexpected withdrawal.

Looking at Tables (6.14a & 6.14b) in the first column for the main variables of interest in this study, we can see that the coefficients on the lag dependent variables of leverage ratio ad portfolio risk proxy represented in tables as (LVR_{t-1} and $PRISK_{t-1}$ are respectively = -0.338***, and-0.419***). These coefficients are highly significant and relatively big in magnitude. The coefficient are also within the expected boundaries |0 - 1| for dynamic stability as the case was with all the other previous lag coefficients seen in previous section in buffer capital model. Thus, they can be interpreted as adjustment speeds for capital and portfolio risk respectively.

Table 6.14a: Malaysian Banks Three-Stage Least Square estimates of a Simultaneous Equation of Capital Buffer and Portfolio Risk: base model specification I leverage ratio Equation

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Independent Variables	ΔLVR	ΔLVR	ΔLVR
*LVRt-1 (*1year lag bank leverage ratio)	-0.338***	-0.434***	-0.220***
	-0.0438	-0.0714	-0.051
ΔPRISK (Change in risk-weighted asset ratio)	19.32***	20.03**	20.74***
	-5.935	-9.56	-6.706
*ROA (*Return on average total asset *: profitability)*	0.426	0.635	0.164
	-0.263	-0.486	-0.37
LLPTA (Loan loss provision to total assets ratio)	4.98	70.73	-9.448
	-56.11	-97.14	-57.28
LTA (Natural log of total asset proxy for size)	-1.535***	-2.151***	-0.685**
	-0.29	-0.466	-0.328
LIQ (Liquidity proxy: total loan/total deposit)	0.77	-2.795	1.556
	-1.209	-2.811	-1.038
ΔHHI (Herfindahl-Hirschman Index *)*	-0.11		
	-0.369		
Year Dummies	Yes	Yes	Yes
Constant.	15.53***	23.87***	6.314**
	-2.683	-4.543	-2.818
"R-sq"	0.3097	0.3246	0.433
F-Stat	8.18	6.27	8.600
Observations	152	69	83

 Standard errors below coefficients next row,*** $p<0.01$,** $p<0.05$,* $p<0.1$are significant levels at 1% 5% and 10% respectively.

Accordingly, we can interpret the coefficients on the lag dependent variables (-0.334, for leverage ratio and -0.419*** for the portfolio risk proxy) in the following ways: on average, and based on the full sample model results, (Tables 6.14a 6.14b), Malaysian banks close almost about 1/3 (one third) of the gap between their target leverage ratio and the actual leverage level within a year. On the other hand, they close more than 42% of the gap between their actual portfolio risk level and the desired level within a year.

With regards to the results/findings on the nature of coordination between leverage ratio and portfolio risk adjustment decisions, this study found, as shown in Tables (6.14a & 6.14b), that for the sample banks from Malaysia, the coordination between the leverage ratio and portfolio risk adjustment during the full sample period is a positive two-way relationship, and they are highly significant. The relevant coefficients from Table (6.14a & 6.14b) are *ΔPRISK* = 19.32*** and *ΔLVR* = 0.00731***

for portfolio risk-weighted asset ratio and leverage ratios respectively. These coefficients indicate the magnitude and significance of the impact of change in leverage ratio (equity capital/average assets) on bank portfolio risk and the vase-versa.

To interpret, we can say on average, a 1 unit/percent change in bank portfolio risk, is associated with an increase in the equity capital to asset ratio (which is called "leverage ratio" in banking context) by about 19.32 units or percentage times of 1932% percent .The coefficient on the leverage ratio is interpreted in a similar manner. One more time our results here is basically a confirmation of previous results of a positive capital and risk adjustment relationship in banking in these two countries, thus, the positive adjustment relationship between capital and portfolio risk is thus, partly due to bank own internal capital management strategies at least in the case of banks included in this study from the two countries.

6.4.3.2 The subsample Models

Results for the control variables in the two subsample models show very similar patterns, in terms of coefficient significant and sign on the controlling variables. They mirror exactly the picture observed with control variables in the full sample model. For example only bank size proxy (the natural log of total asset) is significant and consistently negative in all the three sample models. On the other hand, bank profitability measure of (ROA) is positive in capital equations in all models though not significant in any of them.

This is quite the opposite of what is observed in buffer capital model; whereby bank profitability as measured by ROA has a significant positive effect on bank capital buffer in most of the models. Yet, Malaysian banks leverage ratio does not seem to be driven by operating profit as measured by ROA. Anyway, for the time being, this result is marked here as inconclusive until we model bank leverage and bank profitability

directly in the next section. Meanwhile, liquidity proxy as well as the loan loss provision to total asset ratio have changed signs from sample period model to another by taking a positive and/or negative signs at a time. Finally, *ΔHHI* shows negative sign in all models for capital equation but none of them is significant.

Table 6.14b: Malaysian Banks Three-Stage Least Square estimates of a Simultaneous Equation for Capital Buffer and Portfolio Risk: base model specification I Portfolio Risk Equations

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	ΔPRISK	ΔPRISK	ΔPRISK
*PRISK$_{it-1}$ (*1year lag of Risk-Weighted Asset ratio)	**-0.419***	**-0.501***	**-0.300***
	-0.057	-0.0772	-0.071
ΔLVR (Change in Bank leverage ratio)	**0.00731***	**0.00146**	**0.0153***
	-0.00241	-0.00268	-0.00398
LLPTA (Loan loss provision to total assets ratio)	0.0715	-0.585	-0.379
	-0.975	-1.146	-1.41
LIQ (Liquidity proxy: total loan/total deposit)	**0.256***	**0.384***	**0.157***
	-0.0347	-0.0515	-0.0402
LTA (Natural log of total asset proxy for size)	**0.0142***	**0.0143****	**0.00446**
	-0.00465	-0.00685	-0.00587
ΔHHI (Herfindahl-Hirschman Index *)*	-0.00755		
	-0.00759		
Year Dummies	Yes	Yes	Yes
Cons.	-0.0604*	-0.0954**	0.0524
	-0.0325	-0.0452	-0.041
"R-sq"	0.3523	0.5104	0.444
F-Stat	9.66	10.66	8.670
Observations	152	69	83

Standard errors below coefficients next row,*** p<0.01,** p<0.05* p<0.1are significant levels at 1%,5% and 10% respectively.

Control variables in portfolio risk equation for the two subsample models, as shown in Table 6.14b, are generally insignificant except for banks size proxy (Natural log of total assets = *LTA*) and liquidity proxy variable (total loan/total deposit ratio). The liquidity proxy has a consistent positive impact on bank portfolio risk in all the sample models, a sign which is expected in this equation. While bank size proxy has a positive impact on portfolio risk, it is significant only in two of the three model equations for portfolio risk. With regards to the coefficients on the main variables of interest to this study, the coefficients as shown in Tables (6.14a & 6.14b) are all, (except for the first difference of leverage ratio or *ΔLVR,* in portfolio risk equation), significant

with the right signs as shown respectively in the following (LVR_{t-1} = -0.434***, & -0.220***, $\Delta PRISK$ 0.03**& 20.74*** and $PRISK_{it-1}$ -0.501*** & -0.300*** ΔLVR = 0.00146 & 0.0153***).

With regards to the speed of adjustment results based on subsample periods of four years, it is shown that Malaysian banks close almost half of the gap between their desired portfolio risk level and the actual one, within a year when adjustment speed is estimated based on shorter time period as indicated by the 2000-2003 models. Estimates based on the 2004-2007 sample data indicates that an average commercial bank in Malaysia closes 1/3 of the gap between the actual portfolio risk ratio and the desired level within a year.

It is interesting to note that throughout our analysis of the Malaysian sample bank data, we found that the highest speed of adjustment to target capital ratios as well as portfolio risk occurred during the period of restructuring or in the periodic model of 2000-2003. Equity capital is expensive and thus, recapitalization is costly, therefore, adjustment toward specific target capital levels is found in many bank studies to be slow. However, if we are to consider the special events during the 2000-2003 models then the high speed of adjustment found during this period in this study for the relevant variables, may not come as a surprised. This is because capital was quickly and rapidly brought into banks. While at the same time the bad assets were removed. It is clearly that these two actions can have a considerable impact on the speed of adjustment difference we see among the three periodic models used in this study.

In fact the official bank recapitalization program was completed by December 1999 (BNM, 1999), and afterward, any change in bank capital level throughout the restructuring period that extended to 2002 or 2003 should be mostly from banks own internal capital adjustments activities. But with initial capital levels (around year 2000) were already at their highest level, thus, at any time banks will be near to their target

buffer levels above the minimum capital requirement and hence one can imagine how fast the speed need to be to close small gaps in short periods.

With regard to the nature of coordination between leverage ratio and portfolio risk adjustments by sample Malaysian banks during the two subsample periods, results from Tables 6.14a 6.14b, show that, there is a two-way positive coordination of adjustment to target leverage ratio and target portfolio risk however, this adjustment is significant only for the 2000-2003 subsample model, and not for the 2004-2007 model. For example a 1 unit/percent change in bank leverage ratio is associated with 0.0153 or 1.53% percent in risk weighted asset in bank portfolio. This is another interesting point to take up in the discussion part in policy context. The insignificant of the two-way positive coordination between leverage ratio and portfolio risk (especially from leverage ratio to portfolio risk is a confirmation of similar finding with the buffer capital model in the previous section. This could mean that Malaysian banks were not matching change in their leverage ratio with change in their portfolio risk at significant levels. What might be the reason for such finding? We shall find out in the discussion part.

6.5.0   CAPITAL AND RISK DECISION MODELS

6.5.1   Introduction

This section provides several contexts in which some or all of the findings of this study may be discussed further to shed more light on them. The followings are some possible contexts that are considered. First, we will discuss our findings in the context of theoretical and past empirical studies' contexts. Second, this study also provides a discussion in the context of regulatory reforms measures undertaken since the end of the 1997/98 Asian banking and financial crisis. These may include referring to events such as restructuring and recapitalization processes of banks and trying to relate the findings to them as well as to other regulatory reforms measures such as the liberalization and related policies in Indonesia and Malaysia during the study period.

The discussion parts are arranged as follows: the first section introduces the discussion parts, the second section restates of the research objectives for this part, the third section give summary of main research findings and the fourth, fifth and sixth sections etc. presents the successive discussions contexts. Finally, we provide a list of research questions in a tabular format (Table 6.17A) and a short summary answers to highlight the extent to which our analysis results provide answers to these questions.

6.5.2   Research Objectives

One of the main aims of this study was to examine commercial banks short-term capital and assets portfolio risk adjustment decisions in Indonesia and Malaysia for the period between ends of 1999 and starting of year 2008 or from the immediate aftermath

of the 1997/1998 banking and financial crisis until the end of 2007, (i.e. Before the latest financial crisis in the developed countries).

The management of bank capital and portfolio risk and return involves several important decisions. They include setting a desired target portfolio risk and accordingly setting the appropriate target capital and return on shareholders' funds, and making the necessary plans on how to adjust toward achieving those targets in the short run. That plan involves deciding on how much capital to raise (internally or externally) and deciding on how much to expand asset portfolio of loans to get specific returns (ROE) on the capital outlay. Most importantly, the decisions also include estimating how quick to make such adjustments to target capital, portfolio risk and target ROE while taking account of other factors that could affect these decisions. Thus, the specific objectives set out for this study is to estimate and test the significance of several key parameters of these decisions as specified here.

1) *To estimate and test the significance of short-term adjustment speed to bank target capital ratios (buffer capital ratio/ leverage ratio)*

2) *To estimate and test the significance of short-term adjustment speed to bank target assets Portfolio risk or target risk-weighted asset ratio.*

3) *To examine the nature of the relationship between short-term changes in bank target capital ratios (buffer capital /Leverage ratio) on bank target portfolio risk and the visa-versa.*

4) *To test the capital buffer theory and regulatory pressure in the case of Malaysian and Indonesian commercial banks.*

5) *To control for selected exogenous and bank specific variables for their effect on capital ratios and bank assets portfolio risk/returns decisions as suggested by literature.*

6.5.3 SUMMARY RESEARCH FINDINGS

The findings on variables of main interest in this study are summarized and presented in Tables (6.15 & 6.16), respectively for sample Indonesian and Malaysian banks respectively.

Table 6.15 Capital (capital buffer and leverage ratio) and portfolio Risk adjustment summaries Indonesia

Indonesia	Capital buffer Base models	Full sample Model 2000-2007		Subsample 1 Model 2000-2003		Subsample 2 Model 2004-2007	
		Capital	Risk	Capital	Risk	Capital	Risk
Lines	Adjustment Speed	Speed	Speed	Speed	Speed	Speed	Speed
1	$CBF_{t-1}/PRISK_{t-1}$	0.414***	0.21.1***	0.0843	0.12	0.517***	0.247***
2							
3	Direction of coordination sign	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +
4	$\Delta CBF/\Delta PRISK$	77.83***	0.00155***	61.42*	0.0101**	23.07	0.000486
Indonesia	Leverage ratio Base model	Full sample Model 2000-2007		Subsample 1 Model 2000-2003		Subsample 2 Model 2004-2007	
		Capital	Risk	Capital	Risk	Capital	Risk
	Adjustment Speed						
5	$LVR_{t-1}/PRISK_{t-1}$	-0.257***	-0.170***	-0.272***	-0.128**	-0.246***	-0.228***
6	Direction of coordination sign	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +
7	$\Delta LVR/\Delta PRISK$	14.81**	0.00705***	19.74	0.00881**	6.869	0.00185
Indonesia	Dummy Variable approach buffer capital	Model I		Model III		Model IV	
	Variables	Capital eq	Risk eq	Capital eq	Risk eq	Capital eq	Risk eq
		High buffer banks adjust		High buffer banks adjust		Low buffer banks adjust	
		Speed	Speed	Speed	Speed	Speed	Speed
8	$DReg$	8.215***	-0.0352***	-2.8	-0.0759***	-1.944	-0.0553*
9	$DReg*PRISKt-1$				0.0851*		0.513***
10	$DReg*CBFt-1$			0.507***		0.0447	
12	$DReg*\Delta CBF$						0.00058
13	$DReg*\Delta PRISK$					-36	

6.5.3.1 Indonesia Banks

Adjustment speed

Finding concerning adjustment speeds for the sample Indonesian commercial banks in the base model specification are shown in row/line 1 and 5 in Tables 6.15.. All speed coefficients in all the three periodic models in the two capital ratios (capital buffer and Leverage ratio) models are stable and significant, except for some coefficients in

the following cases: coefficients on lag capital buffer and lag portfolio risk, (Table 6.15 line 1) for the 2000-2003 models are not significantly different from zero. Furthermore, Indonesian banks adjust to their target capital buffer and target Leverage ratio at speeds that are faster than the speed at which they adjust toward their target portfolio risk on average.

Relationship between change in capital ratios and change in portfolio risk

Table 6.15, row lines (3, 4 & 6, 7) show that the relationship between capital and portfolio risk adjustments is a two-way are positive relationship in all the models for the base model specification.

Coefficients indicating the two-way coordination in adjustment are also sizable and significant in all models, except for the 2004-2007 subsample model for both buffer capital and leverage ratio models. In addition to that, the coefficient for coordination of adjustment from portfolio risk to leverage ratio in the 2000-2003 model is not significant also. In other word, the two-way positive coordination (in the 2000-2003 model) between Leverage ratio and portfolio risk is significant only in one-way; from Leverage ratio to portfolio risk not the opposite direction.

Findings on the Dummy variables approach and capital buffer theory

Findings from the dummy variable analysis approach test the hypothesis relevant to capital buffer theory. The four hypotheses developed in Chapter 4 test differences between banks with relatively high capital buffer and those with relatively low capital buffer in terms of adjustment speed and the nature of the simultaneous coordination between capital and portfolio risk adjustment. *DReg* is the dummy variable and is coded in the data set as equal =1 if the bank has a standardized capital buffer that is above the

median standardized capital buffer for the sample and = 0 otherwise. The specific hypotheses are given below for ease of reference.

Ha3: Bank with low capital buffer adjust capital buffer ratio at speed faster than banks with high capital buffer.

Ha4: Bank with low capital buffer adjust their portfolio risk measures at speed faster compare to banks with high capital buffer.

Ha5: observed changes in bank capital and portfolio risk measures are positively related for banks with relatively high capital buffer.

Ha6: observed changes in bank capital and portfolio risk measures are negatively related for banks with relatively low capital buffer.

Table 6.15, (row 9, & 10, model III) shows the results for Indonesian banks. The findings from this model provide support for both hypotheses 3 and hypothesis 4 (*or* ***Ha3 and Ha4***), but support for Ha3 is inconclusive because coefficients on ***DReg*** in the Model III (row 9) are not significant. Hence, findings could only provide partial support for hypothesis or ***Ha3.***

Concerning hypothesis 5 and hypothesis 6, the findings are shown in Table 6.15, (see rows 12 and 13 model IV), do not provide support for either of the two hypotheses (***Ha5*** and ***Ha6***) on the two-way positive coordination between capital buffer and assets portfolio risk adjustments for high capital buffer banks. Hence, the Null hypothesis of no difference between the two groups of banks, in the way they coordinate the

adjustment toward target buffer capital and portfolio risk cannot be rejected in the case of Indonesian sample bank data.

6.5.3.2 Malaysian Banks

The findings on variables of main interest in the case of sample Malaysian banks are summarized and presented in Tables 6.16.

Adjustment speed

Findings from the base model specification on adjustment speed to target capital ratios and target portfolio risk in the case of sample Malaysian banks are given in Table 6.16. The relevant coefficients for adjustment speed, together with their significance levels are shown on row 1 and row 5. Without exception, the coefficients for adjustment speed in the case of all lag dependent variables in all the three periodic models (capital buffer and Leverage ratio models) are significant. We can see from the results that Malaysian banks adjust target portfolio risk at speeds faster than the speed at which they adjust their target capital ratios. The sizes of the speed coefficients for both types of capital ratios are very close to each other.

Relationship between change in capital ratios and change in portfolio risk

Findings from Table 6.15 row lines (3, 4 & 6, 7) show that the relationship between change in capital ratio, (capital buffer and Leverage ratio models), and change in assets portfolio risk are two-way positively related for all the base model specification. These relationships are also two-way significant in all models, except for two cases in the 2000-2003 subsample period models (for both capital buffer and Leverage ratio models).

Tables 6.16 Capital (capital buffer and Leverage ratio) and portfolio Risk adjustment summaries Malaysia

Malaysia	Capital buffer Base models	Full sample Model 2000-2007		Subsample 1 Model 2000-2003		Subsample 2 Model 2004-2007	
		Capital	Risk	Capital	Risk	Capital	Risk
	Adjustment Speed	Speed	Speed	Speed	Speed	Speed	Speed
1	$CBF_{t-1}/PRISK_{t-1}$	0.250***	0.444***	-0.299***	-0.510***	-0.227***	-0.346***
2	Direction of coordination sign	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +
3	$\Delta PRISK/\Delta CBF$	45.16**	0.00281***	45.00*	0.000979	58.16*	0.00382***
4							
Malaysia	Leverage ratio Base model	Full sample Model 2000-2007.		Subsample 1 Model 2000-2003		Subsample 2 Model 2004-2007	
		Capital	Risk	Capital	Risk	Capital	Risk
	Adjustment Speed	Speed	Speed	Speed	Speed	Speed	speed
5	$LVR_{t-1}/PRISK_{t-1}$	-0.338***	-0.419***	-0.434***	-0.501***	-0.220***	-0.300***
6	Direction of coordination sign	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +
7	$\Delta LVR/\Delta PRISK$	19.32***	0.00731***	20.03**	0.00146	20.74***	0.0153***
Malaysia	Dummy Variable approach buffer	Model II		Model III		Model IV	
	Variables	Capital	Risk	Capital	Risk	Capital	Risk
		High buffer banks adjust		High buffer banks adjust		Low buffer banks adjust	
		Speed	Speed	Speed	Speed	Speed	Speed
8	$DReg$	5.728***	-0.00739	0.616	-0.0402	0.383	-.0.0241
9	$DReg*PRISKt-1$				0.0504		0.0313
10	$DReg*CBFt-1$			0.286***		0.297***	
11	$DReg*\Delta CBF$						-0.00101
12	$DReg*\Delta PRISK$					-11.82	

This indicates that changes in bank capital buffer did not significantly affect changes in bank assets portfolio risk for an average Malaysian banks in 2000-2003 subsample period models, while the opposite is true (i.e. changes in bank asset portfolio positively and significantly affecting changes in bank capital buffer) during this period. Similarly, the positive changes in bank Leverage ratio did not significantly affect changes in bank portfolio risk during 2000-2003 subsample period; and the opposite is true again.

Findings on the Dummy variables approach and capital buffer theory

As can be seen from Table 6.16, (row line 8, 9 & 10, model III) the findings in the case of sample Malaysian banks for model III & IV, (reading from row line 10 Table 6.16) do not provide support for hypotheses 3 & 4(or **Ha3 Ha4**), regarding

differences in adjustment speed between the two groups of banks. This is despite the fact that, the interaction term for buffer capital is significant in both models (III, IV), which indicates a significant difference in adjustment speed between the two groups. However, as we have seen before, this is not what buffer capital theory predicts. Hence, this is an inconclusive support for buffer capital theory.

The findings in Table 6.16, with reference to rows on 12 and 13, do not provide support for any of the two hypotheses (*Ha5* and *Ha6*) about the two-way positive/negative coordination between capital buffer and portfolio risk that is expected. Hence, the Null hypothesis of no difference between the two groups in the way they coordinate the adjustment to buffer capital and assets portfolio risk cannot be rejected in the case of sample Malaysian bank data.

6.5.4 Discussion of findings in the context of theory

Among the salient features of the findings of this study in this part is the scale of the coefficients for adjustment speed at which banks in Indonesia and Malaysia adjust toward their target capital and target assets portfolio risk (risk-weighted asset ratio) level in various sample models. The coefficients on speed proxy are consistently high over various models (periodic models as well as different capital ratio models with various specifications), with very few exceptions that will be discussed later.

Theoretically, equity capital is costly to raise and finance theory generally will suggest that firms are likely to stretch the building of their target capital structure over a longer period of time due to relative cost of equity capital and hence implying slow adjustment speed or small coefficients. Against this background the seemingly consistent and high speed of adjustment (sizable coefficients) to target capital and portfolio risk found in this study may look at first glance to run against this theoretical supposition.

However, putting the results in the right context could explain the normalcy of the numbers. First these findings are still somewhat comparable to several related previous studies that also reported both slow and relatively high adjustment speed for banks with different capital level (e.g Shrieves and Dahl, 1992, Aggarwal and Jacques, 1998 and Stolz, 2007, Jokipii and Milne, 2010). These and other studies have shown that banks holding relatively high capital buffer tend to adjust slowly toward their target capital and portfolio risk, while undercapitalized banks tend to adjust both capital and risk at relatively faster speed (e.g. Shrives and Dahl,1992, Jokipii and Milne). Banks in this study are generally holding high capital buffer, and yet they tend to, (before separating them into high and low capital buffer bank) adjust at very high speed (see the upper parts of Tables 6.15 and 6.16).

Meanwhile, this study also found some evidence, though not very strong, regarding speed differences between a group of banks with high capital buffer and banks with low capital buffer in the case of sample Indonesian banks (see Table 6.15 for coefficients on row 8, 9 and 10 Model III & IV). This indicates that further, research with more data may be needed to reach a strong conclusion. It also shows that adjustments speed found in this study may not be at odd with theory.

Some recent studies have equally reported high adjustment speed, for example (Berger et.al., 2008) found that U.S. BHC or United States bank holding companies adjust rapidly to their target capital level with average speed of 0.333, indicating almost 1/3 gap closing speed within a year. Looking at Tables (6.15 & 6.16) we can see that this average coefficient that Berger et.al., (2008) reported is higher than some of the speed coefficients and lower than others. For the fact that it is an average speed also mean that Berger et.al., (2008) may contain other coefficients that are high than 0.333. Furthermore, Ediz et.al., (1998) reported that U.K banks nearing the minimum required capital ratio tend to adjust capital at speed of almost 50% upward.

This can be evidenced that the current study is comparable to several past studies in terms of high adjustments speed to target capital and target assets portfolio risk. Second, the other context we may need to consider here, in order to account for any plausible reasons for the high adjustment speed, is the historical events in these two countries. The periods of this study are partly crisis and partly recovery. We have seen that banking systems in the two countries have undergone a significant change on many aspects and at a large scale. Moreover, the restructuring and recapitalization, at least, in the case of Malaysia, was rapid. This rapid recapitalization has taken banks to very high levels of capitalization after which adjustments to specific short term target levels can be swift and relatively easy especially if they are internally funded.

Meanwhile, as indicated in the introduction, the findings of this study can be discussed at least in the context of two strands of bank capital theories. These theoretical models are already explained in chapter 4 in more detail. Here we refer to their implications for the findings in this study. The first strands of these theories concerns bank capital and portfolio risk decision models that are built on the assumption that moral hazard behavioral tendency exist in banking. Such models are, generally of two versions :(1) model with the assumption of a pure moral hazard in banking and (2) Models that hypothesize or assume a constrained moral hazard (Shrives and Dahl, 1992).

The first groups of model, the pure moral hazard models, explains the problem as being associated with managers high propensity to take on excessive risk due to asymmetric information or the availability of safety net to rescue them in times of trouble. The most important element of such safety net is the explicit or implicit deposit insurance. These models generally imply negative capital and portfolio risk relationship in banking.

Empirical studies, such as that of Jacques and Nigro (1997),Aggarwal, and Jacques (2001) have found a positive and negative relationship between capital and portfolio risk adjustment. Such behavior in banking is also attributed to the dominance of low risk-aversion attitude among banks receiving the subsidy, and this is consistent with the assumption of heterogeneity in risk preference in banking as explained in the context of mean-variance analysis framework (Kim and Santomero,1988). The conceptualization and mathematical derivation of pure moral hazard behavioral tendency in banking is demonstrated in Merton (1977). Because, pure moral hazard models generally imply a negative relationship between bank capital and bank portfolio risk adjustments, the findings in this study, in general, do not support this hypothesis. Hence, alternative hypothesis 2 or Ha2 in chapter 4 is not supported here.

The second category/version of model built on the moral hazard assumption consist of varieties of bank capital and risk decision models that consider a wide range of factors that can impact on bank capital and risk-taking decision other than the safety net provision. The common thing among these models is that they all imply a positive relationship between capital and bank portfolio risks. The collective name, in Shrives and Dahl (1992), for a group of bank capital and risk decision model that predict positive relationship between bank capital and portfolio risk is "Constrained moral hazard". These models are many and all or some can explain bank capital and risk decision at same point in term. This is because the theories are not mutually exclusive. Among them, I list just few here.

First, Regulatory pressure, various regulatory and supervisory measures can represent explicit or implicit cost. For example an undercapitalized bank may be prohibited from offering some profitable but risky off-balance sheet activities or restriction may be placed on loan portfolio this can represent explicit cost. Second, many theoretical models that used mean-variance analysis framework for bank capital

and asset portfolio decision in the existence of fixed deposit insurance (e.g Kim and Santomero,1988 etc.), come to conclusion that minimum capital requirement under such situations will lead to "Unintended consequence" because banks can lever-up asset portfolio with risk securities, if higher minimum capital is imposed. This will effectively translate into a positive adjustment to capital and risk.

Among other theoretical models, that also predicts a positive relationship between capital and portfolio risk is the so-called Bankruptcy cost avoidance theory. Further theoretical model that reach the same positive capital and asset risk relationship in general in the area of the mainstream corporate finance has been extended by Olgar and Targgart (1981) to banking context and by Harding et.al., (2007). Olgar and Targgart (1981) was the first attempt to extend the implication of mainstream corporate finance capital structure theory to the unique case of banking firm. His conclusion was that a positive relationship between capital and risk adjustment decisions could results by analysing the tradeoffs that exist between the tax advantage of deposit financing and Leverage related costs in banking. This proposition will result if we assume that banks will internalize the failure cost.

Finally, the Managerial risk-aversion has its root in the Agency theoretical model. These models argue that managers consider their private interest when making capital and risk decision in that bankruptcy or distress can potentially cost their industry specific human capital. Hence, managers are also exposed to great personal loss in the event of bankruptcy. Consideration of this risk induces managers to limit asset risk as well as induce them to hold commensurate amount of capital to match up their portfolio risk levels, consequently bankruptcy does not occur in these firms.

So which theory among those discussed above could best explain the findings of this study? Can they all explain it? or only some but not others? Specifically can we state that during the period under study, regulatory pressure was effective and that there

were potential negative consequences to any violation of regulatory rules by banks in the two countries to the degree that banks had factored this cost into their capital and risk adjustment decision to yield a positive relationship? The answer to all the questions is probably, yes; because the period as discussed in chapter two has witnessed many regulatory overhauls in the two countries.

For example, capital requirement, in absolute term, was increased in both countries, at least initially. Similarly, the demand for compliant with risk management standards and systems became compulsory. Supervisory monitoring systems were upgraded. Bank Indonesia (the central bank), for example, had the practice of forbearance with the minimum capital ratio of 4% in the early years, in the aftermath of the crisis. The bank (BI) later, in 2002 adopted zero tolerance (Asia Economic Monitor, 2002) with banks that are slow in adjusting their capital levels to the 8% level; the Basel base standard as agreed when capital rules were initially relaxed. It subsequently issued warning for banks that fail to meet the minimum ratio that they will be transfer to IBRA (Indonesian Bank restructuring Agency) to take them over for further action.

Therefore, the findings of this study have shown that banks may have indeed submit to BI warning as they speed-up adjustment to target capital ratios in the subsample period 2004-2007. Summary results in Table 6.15 shows that adjustment speed during the subsample period 2000-2003 was very slow and insignificant, while in the later period 2004-2007 it became (the speed) fast and significant. If we can measure such regulatory pressure in any proxy variable, test the effectiveness of the regulator and supervisor influences on bank capital, and risk decision, then we will be able to confirm one of the theoretical predictions above. An attempt is made in this study to test such pressure with capital buffer dummy as a test of the capital buffer theory. However, the models yield mixed findings in the case of Indonesia and a weak one in the case of

Malaysia. We will have more discussion on this finding at the end of this section to elaborate on possible reasons for this test results.

Meanwhile on the managerial incentive hypotheses, we can ask if bank managers in Indonesia and Malaysia are, now, on average risk-averse. This allows us to interpret the positive capital and risk relationship to be possibly due to their active efforts to maintain balance between profitability and safety. Consequently avoid the loss of their specialized intellectual capital in the event of bankruptcy, distress that could lead to liquidation. Hence, they became prudent in their capital and risk-taking activities.

This also is a plausible suggestion if we look at the reform measures introduced and the whole process of restructurings and recapitalizing of the banking systems. These efforts move toward privatization, increasing number of banks were listing themselves in capital market. This process reduces the number of traditional family- or institutionally dominated banks. The liberalization efforts try to increase foreign ownership that coincides with government disinvestment in banks and its diminishing intervention in banks. These processes eventually will lead to a fine clear separation of ownership and management. Hence, we could talk about corporate governance. Thus, managers will surely have their own interest at stake, as they will become holders of some fixed stream of cash claim that is the salary and the like, hence, for them to guard against the loss of that claim. At that time, we will see agency problem coming into the play whereby managers and shareholders could see difference level of capital and portfolio risk as optimal.

There is a credible move, as we write this research, toward such corporate environment as the following quote from the Asia Economic Monitor Magazine (2003) commented in its regional update.

"The current wave of bank consolidation has been seen as a Positive development in the restructuring, reforming, and modernizing of banking sectors in the region. Some also see these as a broad movement away from the family-owned banks toward more "corporatized" banks. Concerns have, however, been raised that the consolidation process has largely been led by the governments rather than driven by market forces. Further, the enlargement of bank sizes should not substitute efforts to improve banks' internal risk Management.AsiaEconomic monitor Page, 26-27"

This move from family control banks to a more corporate structure of a banking firm, as the magazine predicts, will bring about separation of management and ownership. Moreover, publicly traded corporate type structure for banks comes with market forces constituting of wider shareholders base as well as creditors that can exerts real influence on various managerial decisions. Creditors for example, can use liquidation threat and bankruptcy to discipline corporate decision. Hence, under such environment one can design a research work with capability to test simultaneously managerial risk-aversion hypothesis as well as bankruptcy cost related trade off theories in bank capital and portfolio risk decisions as discussed above. Therefore, the positive capital risk relationship found in this study can provide support, in general, to all the prediction of these models. However, since this study is not specifically designed to test any of these theoretical models, therefore, it is left to future research to carry out such test. This will enable us to ascertain which of the theoretical models is able to explain the findings of this study further.

Finally, among possible reasons for the inconclusive or the contradictory capital buffer test, results in our study are followings: (1) our samples sizes are relatively small. Sample size is known to have significance impact on the power of a statistical test. We do not underestimate that fact here, as our samples are relatively small. This is obvious if we compare the test results for our 52 sample Indonesian banks with our 26 Malaysian banks. Test results for the Indonesian bank sample provide better support for

the capital buffer theory even though inconclusive. We suspect that the inconclusiveness in this case may also be due (2) relatively a short test period. Furthermore (3) one of our subsample period (2000-2003) were a rough period in terms of data availability, while the other period (2004-2007) witness end of consolidation and with reduction in the number of banks, even though we pooled the data and used the 3SLS, the pooled data can still be affected by the panel structure.

Another point is that in the case of the contradictory findings from our sample Malaysian bank data set; this could be that Malaysian banks may be relatively less homogenous in terms of their activities with implication on capital buffer and assets portfolio risk composition. Indonesian banking system is more fragmented and more specialized, thus, commercial banks there are expected to be more homogenous. However, commercial banks in Malaysia can carry out many different activities other than traditional banking. This could lead to the important of bank specific effect if Malaysian banks engage in these activities at varying degrees and at different levels. This in turn may make them less homogenous as compare to Indonesian banks. Hence, methodological issues related to estimation may come to surface again here. Thus, a more elaborated test could be conducted by future research with the above issues taken into account.

6.5.5   Discussion of findings in the context past empirical findings

With regard to the findings of this study as compare to similar previous empirical studies, we can say, In general, the finding of a two-way positive and significant relationship between changes in capital ratios and changes in portfolio risk obtained in this study is consistent with a number of previous studies. These includes Shrieves and Dahl (1992) study on U.S bank holding companies, whereby the authors concluded about the significant two-way positive adjustment between capital and risk

can be equally explain by regulators effectives as well as managers/owners private incentive motives.

Rime (2001) finding, which used two different capital ratios (leverage ratio and Basel base minimum capital ratio) as done in this study, is also consistent with this study finding on leverage ratio and portfolio risk adjustment. However, Rime (2001) study, unlike this study, found insignificant relationship between regulatory capital adjustment and bank portfolio risk. Rime (2001) concludes about this particular finding as indicating that regulatory minimum ratio was binding in the case of Swiss Banks. Just as the findings of this study went along with a number of previous studies, the most recent empirical findings (especially on capital buffer) were also consistent with what this study found in the two developing countries. For example, Stolz (2007) found a two-way positive and significant relationship between capital and portfolio risk adjustment in the case of banks in Germany. Similarly, Jokippi and Milne (2010) also found a two-way positive relationship between capital buffer and bank portfolio risk adjustment using much larger sample of banks from the United State for a longer period than any similar study.

On the other hand, the finding of a two-way positive relationship between capital and portfolio risk adjustment in this study equally contrasted with the findings in a number of previous empirical studies, whose study, in general, found a negative relationship between capital and portfolio risk adjustment in banking. These includes among Jacques and Nigro (1997) who examine the effectiveness risk-based capital regulation in its first year. Similarly, Aggarwal and Jacques (2001), whose focus was to examine the PCA system or prompt corrective action, in such that they can observe the response of undercapitalized banks in comparison to well-capitalized banks to capital rules. At this point one may ask why these different findings about capital risk relationship among studies, especially in the case of same country banks, for example

the finding in Shrives and Dahl(1992), Jacques and Nigro (1997), and Jokippi Milne(2010) while all of them use banking data from the U.S. the answer is cleart, that is both positive and negative findings are probable, and they can occur for many reasons, including but not only, time period of the study, length of the sample or sample size and composition etc. The findings are all predicted by theoretical models that a positive or negative relationship could be observed at any time for different reasons. So the task is to be able to explain the findings in a reasonable way whenever they are observed. Next, we look at the findings of this study in the context of reform and restructuring exercises.

6.5.6   Discussion of findings in the context of reform policies

With some extra effort on reading into the findings of this study, it is possible to discuss most of the findings of this study if not all of them in the context of banking and financial system reform measures initiated in Indonesia and Malaysia in recent years in the aftermath of the 1997/1998 Asian financial crisis. This is true, because the data that is used in the analysis is the final product of those reform measures. Nevertheless, because such discussion can take a lot more space and time than may be available in this study, and hence one has to be selective. Therefore, only selected findings are examined to highlight some interesting issues or the most eye-catching results.

The decision to split the 8 years period into a two distinct subsample was justified earlier for the fact that we are investigating two distinct and different economic and financial histories of the two countries as one when we use the full sample. Then there was a modeling challenge to account for all the factors or at least to account for the most influential. At the same time, this study aims for parsimony in modeling, thus, the Idea of using the few-selected variable and use them in three different models that include the full sample and split sample, based on period is seen appropriate. Thus, we

have three different models. The expectation was that these three models would yield different results. Here are exactly some of those expected findings. This section aims to discuss them in their various contexts and find out a meaningful conclusion from them.

Looking at Table 6.15, in the case of Indonesian banks, we can see a very striking contrast in Table 6.15 between the results of the two subsample models and similar but less pronounced in Table 6.16 in the case of Malaysian bank. Specifically, for Indonesia, we can see that adjustment speed to target capital and target portfolio risk are both slow and insignificant during the subsample period 2000-2003, while the positive coordination between changes in capital ratio and change in portfolio risk ratio are significant during this period.

On the other hand, for the subsample period 2004-2007 results, we can see that we have a very high and significant adjustment speed to target capital and portfolio risk, yet we also see in this model a very small an insignificant positive relationship between change in capital ratio and change in assets portfolio risk (risk-weighted assets ratio). At the same time, we also see that for the full sample model (i.e. 2000-2007 model), both adjustment speed and the coefficients that indicate the relationship between change in capital and change in portfolio risk are positive and significant in all cases of the full sample models. Such differences in findings in those cases were expected at the onset. That is this research believes that the 8 years period are composed of, at least, two financially distinct periods, which has led the research to model them separately in hope of seeing the difference.

Hence, this is the difference but how to explain these differences based on available contextual facts and evidence. For that case, several plausible answers are found with reference to the historical events during these two different periods as follows: specifically, we look, first, at what was happening in the financial reform process involving restructuring and recapitalization of banks in Indonesia.

Unlike Malaysian banks that were not severely undercapitalized and their recapitalization, by Danamodal, was also rapid and ended before end of December 1999, the Indonesian banking system on the other hand was severely undercapitalized. As a result, Indonesian banks were initially classified into the three groups after being independently audited by international and local auditors (Enoch, et.al.2001, BIS, 1999). With the capital ratios of the two selected groups of banks that will be allowed to continue operating and get recapitalization support ranging between something less than 8% down to -25% (altogether 83 banks). The third group members had capital ratio below -25 %(almost 45 banks) and are closed. In this case, the central banks had to set the minimum capital requirement ratio at 4% almost half below the 8% International standard. Then BI required banks to present credible business plans for bringing capital ratios up to 8% within three years to the review committee.

Yet after three years, in 2002, there were less progress and many banks were still below the 8% minimum ratio. Many factors play into this delay, including slow progress in the joint-recapitalization program. Therefore, in 2002, according to Asia Economic Monitor (2002) the central bank announced a policy change to re-set the minimum capital ratio requirement at 8%. It subsequently announced that any bank that could not achieve this minimum ratio would be transferred to IBRA for resolution.

What all these events will mean for the findings of this study is that the slow adjustment speed to target capital and portfolio risk between 2000 and 2003 could be due to two things. First, it is possible that banks were unable to speed up capital raising process, and hence the speed, because they had few choices; they cannot go to capital market due to various information asymmetry problems. At the same time, the negotiation for joint-recapitalization program with IBRA was making progress very slowly. It is also possible that some banks are taking advantage of the relax rules on capital requirement and hence they fail to adjust quickly. However, why the positive

coordination in adjustment between capital buffer and portfolio risk was significant during this period? This also can be explained by examining regulatory and supervisory policies during this specific time.

According to BIS staff report,(1999) unlike Malaysia whose central bank(e.g. in 1998 and 1999) often set a specific target for loan growth for banks to achieve, Indonesia and Thailand had adopted a more restrictive approach to bank expansion in lending during and in the immediate aftermath of the crisis. According to the report, the policy was meant to avoid banks getting into trouble. Because capital rules were relaxed and if no restriction were placed on loan expansion banks may quickly get into trouble.

So adjustment in risk-weighted assets ratio is expected to be tightly matched up with additional and adequate capital. We have seen that capital build up process was very slow in Indonesia's case. Thus, one would expect a close and tight relationship between the amounts of credit an individual bank would extend in Indonesia during 2000-2003 to be matched closely with regulatory capital requirement to cover the expected exposure; and hence we have the significant positive relationship between change in capital ratios and change in portfolio risk-weighted asset ratio during 2000-2003 period.

Meanwhile the findings for Malaysian banks during the two-subsample period are different from that of Indonesian banks in that the speed of adjustment to target capital buffer and portfolio risk were significant for all the periods and in all models. Moreover, the two-way positive relationship between change (adjustment) to capital and change (adjustment) to assets portfolio risk are also significant in all models, with the exception of the 2000-2003 models. The coefficients are not significant for both capital ratio models (buffer and Leverage ratio) in the case of Malaysian banks.

To explain possible reasons for this finding, is easy, we have already known that Malaysian banks were well capitalized ahead toward the end of 1999. Looking at the

adjustment speed to target capital and portfolio risk, we can see that Malaysian banks adjust assets portfolio risk at speed faster than that of capital. This explains that during the first period, 2000-2003 capital levels are at their highest level and that the target risk-weighted asset portfolio was not at the expected level. This might be one reason why the central bank had been pushing banks to expand their lending since 1998 and in 1999 by setting a target for loan growth but with little progress. BNM might be comfortable with the levels of regulatory capital at banks, while commercial banks might be reluctant to expand their loan portfolio.

Thus, we have seen Malaysian banks over all the periods adding to their risk-weighted asset portfolio at an adjustment speed that is greater than the speed at which they add to their capital ratios. Perhaps under pressure from the central banks to speed up lending to meet recovery targets. Since there was, in fact, less need to raise new capital or make a comparable change to the capital level when new loans are made. Then we see the periodic change in the two variables become less coordinated and hence insignificant at least during 2000-2003. After 2000-2003 periods, the adjustments in the loan portfolio and capital levels have significantly affected each other either because banks might want to increase their target buffer to the next target buffer level. Alternatively, it could be that expansion in risk-weighted asset ratio has reached a level at which any addition to it will need to be matched-up closely with similar change in capital if the existing target capital buffer is to be maintained.

Table 6.17A is a brief summary of our research questions and answers to indicate the extent to which our analysis results provide answer to our research questions.

Table 6.17A: Tabular Summary of research questions and answers in brief

Research Questions	Does the a finding answers this research question
At what speeds levels do commercial banks adjust to their target capital ratios in the short run in Malaysia and Indonesia?	*YES:*--Based on our analysis results our sample banks adjust their target capital ratios at stable and relatively high speed as indicated in Tables 6.15 and 6.16 . with variation in terms of scale and significance level in both country bank cases
At what speeds levels do banks adjust toward their target portfolio risk-weighted asset ratio in the short run in the two countries?	*YES*--Based on our analysis results our sample banks in general on average adjust their target asset portfolio at stable and relatively high speed as indicated in tables 6.15 and 6.16. with some explainable variations
Do banks in the two countries adjust their target capital ratios faster than their target asset portfolio risk level or adjust them at the same speed?	*YES:*--The results are mixed with regard to this question, while sample Indonesian banks adjust capital ratios at faster speed than their adjustment to target portfolio risk or the risk-weighted asset ratio, Malaysian banks do the opposite refer to Tables 6.15 &6.16.
How did commercial banks responded, in terms of adjustments to their capital ratios (buffer capital/leverage ratio), after the initial regulatory increase in the minimum absolute capital requirement in Indonesia and Malays*ia*?	In general the finding of a two-way positive adjustment relationship between capital ratios and assets portfolio risk proxies' in this study an indication that banks in general have responded by increasing both capital ratios and risk-taking positively but at varying degrees/speeds
Did they increase capital/ or reduce their portfolio risk (risk-weighted asset level) in order to comply with the new high capital requirement/or the initial increase in capital requirement?	*YES*--Because we only find a two very positive relationship between capital and portfolio risk, and the fact that many banks maintain high buffer capital, we conclude that there is evidence that compliance was by increasing both capital and risk in relative terms. That is what our research design will allow us to say.
Did they increase both capital and portfolio risk proportionally (positive)	*YES,*--Available evidence from our analysis results, in general, indicates that both capital and risk-weighted asset ratio are increased in some proportions as indicated by the positive regression coefficients.
Do banks with relatively low capital buffer adjust their capital and assets portfolio risk faster (in term of speed) compare to bank with higher capital buffer or vice-versa as suggested by capital buffer theory?	**Mixed Answers** This question can be partially answered with yes in the case of sample Indonesian bank data set as indicated by the coefficient. For sample Malaysian bank data sets the answer to this question is partially answered but contradictory. In general, the results are inconclusive and more research is needed.
Do low capital buffer banks coordinate adjustment (changes) to capital buffer and portfolio risk the same way compared to banks with relatively high capital buffer or vice-versa as suggested by capital buffer theory?	*YES*.-Based on our analysis results summarized in Tables (6.15 & 6.16) we found no significant difference between banks with low capital buffer and those with relatively high capital buffer in the manner they coordinate adjustment to capital buffer and portfolio risk

CHAPTER SIX: PART TWO RESEARCH OBJECTIVE TWO

6.6.0   BANK CAPITAL AND PORTFOLIO RETURNS DECISION MODELS

6.6.1   Introduction

Basel III placed a greater emphasis and importance on bank capital not only in terms of size, but also in terms of quality. The Basel committee has also devised various rules and strategies to ensure that the new capital requirement will be forthcoming from banks in terms of the specified size and quality and timing. To achieve those aims the committee is demanding now a steady stream of bank profit during boom times to build up gradually what the committee termed as "capital conservation buffer"

This so-called "capital conservation buffer" and its direct attachment to banks' free hand to distribute profit together with the limit placed on leverage to name just a few, have ignited a debate not only among bankers, market analyst, and rating agencies but also among academician. Most of the commentaries made by bankers speak out in terms of the industry's concern about the impact of the rules on their competitiveness, efficiency, and profitability among other things. An example for such expression of concern about Basel III capital rules can be found in the comments of Deutsche Bank AG London on Basel III sent to BIS 16-April-2010. The specific rules that were challenged directly in that commentary are summarized below:

1) Banks are unfairly single out for rules that will put them at competitive disadvantage with other industries

2) Leverage limit requirement contradicts simplicity principle of Basel capital system.

3) Unbalanced treatment of bank balance sheet (liabilities side overemphasize)

   4) Leverage limit requirement has no place in the Risk-based capital regulation context.

Many other comments like this talk of the impact of the new rules on bank valuation because of the potential impact of conservation capital buffer on returns on bank equity capital or the ROE. ROE is a popular ingredient in bank valuation models. Therefore, the speculation is about how the new rules will affect the returns on equity as well as bank valuation.

The analysis conducted in part one and this part (part two) are aimed in some ways at helping to provide direct or indirect answers to such questions. Some questions are about the speed at which bank managers change their regulatory capital ratios and assets portfolio return ROE and others are about how managers manage change to their regulatory capital, ratios with changes in their assets portfolio return ROE jointly. Do bank managers increase their target ROE upward when they decide to raise capital ratios level? On the other hand, do they cut back on target ROE projections, in order to build up more capital buffer or limit Leverage? What is the speed of adjustments to both capital and portfolio returns and ROE? Do bank managers adjust capital ratio at a speed faster than adjustment speed to their ROE or vice-versa? Do they adjust them at the same rate or speed?

Toward the goal of answering such questions, this study extends, the research methodology devised in Shrieves and Dahl (1992), and applies it to study bank mangers' capital and asset portfolio returns (ROE) decisions in Indonesia and Malaysia. Specifically the study seeks answers on how bank managers in Indonesia and Malaysia manage changes in their capital ratios and change in their portfolio return ROE during the sample period (2000-2007). The analysis in this part (Part Two) examines the relationship between change in bank capital ratios and change in bank portfolio return measure of ROE. The methodology examines the relationship between the two variables at their first difference level (change). A number of reasons for the appropriateness of this approach in investigation are given in Shrieves and Dahl (1992) and Stolz (2007).

In the next two sections, we present the analysis results. We start with capital buffer and portfolio return of ROE adjustments first, and then we present the results of the Leverage ratio and portfolio return of (ROE) adjustments decision. As done in the preceding sections, we present results by country alphabetically. Two specific alternatives hypothesis will be tested against the null hypothesis of no relationship between changes in bank capitalization variables and bank earning or portfolio return measures of ROE. The theoretical models or discussions on the relationship between capital and earning in banking as presented in chapter 4 have predicted both negative and positive relationship between capital and earning in banking when perfect market assumptions are relax or when those conditions do not exist. The specific hypotheses are formulated in chapter 4 in *Hypothesis 7* and *hypothesis 8* for bank capital and earning.

6.6.2   Capital Buffer and Portfolio Returns/ROE Decision Models

6.6.2.1 Introduction

This section presents the results of the simultaneous equation models of capital buffer and portfolio return as specified in chapter 5 in equation 19 & 20 to the sample bank data from Indonesia and Malaysia. The section presents both the full sample model results and the subsample model results by country alphabetically. We start with capital buffer and assets portfolio return/ROE model. In the section that follows next, we present the results for the Leverage ratio and portfolio returns.

6.6.2.2 Indonesian Banks

6.6.2.3 Full Sample and Subsample analysis

Table 6.18a presents the results of applying equation 19 & 20 to Indonesian commercial bank dataset. We start with control variables in the two equations. For the full sample model, all the controlling variables in capital equation are significant with the expected sign. An interesting result among the controlling variables is the case of the loan loss provision to total asset ratio for Indonesian bank data. This ratio has turned out significant with the expected sign in the capital buffer and portfolio ROE equations. This pattern is also maintained in the Leverage ratio and portfolio ROE model for Indonesian banks in the next section.

This is quite the opposite of what we have seen in the previous section for capital buffer/leverage and portfolio risk models. The loan loss provision to total asset ratio, (which has been found mostly insignificant in the capital and portfolio risk models first part), has, now, shown a significant positive impact on bank capital buffer ratio now as expected. It also, as expected, has a significant negative effect on bank profitability measure of ROE in capital and profitability models. This is not surprising because provisions are made for potential losses before any earning is retained so the amount of after tax net income that affects ROE calculation should be lower whenever banks made generous provisions for loan loss and vice versa. As this provisions are counted as one form of bank capital, thus their positive impact (as indicated by their big coefficient in Tables 6.18a: 113.9**) on bank capital should be expected.

The impact on bank profitability measure of ROE is in fact much bigger. For example, when a bank set aside just 1 unit/percent of its earning for potential loan losses, a huge drop in ROE figure that is almost equal to **425.6***** times the former will result.

Table 6.17a Indonesian Banks: Three-Stage Least Square estimates of a Simultaneous Equation for Capital Buffer and Portfolio ROE, base model specification I Capital Buffer Equations

Base Model Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	*ΔCBF*	*ΔCBF*	*ΔCBF*
CBFt-1(1-year lag of capital buffer)	-0.285***	0.173***	-0.503***
	-0.027	-0.0368	-0.0232
ΔROE(change in bank ROE ,the first difference)	0.0122	0.00727	0.0550***
	-0.019	-0.0198	-0.0183
ROA(bank return on assets)	2.994***	0.998*	3.537***
	-0.515	-0.574	-0.5600
LTA (Natural log of total asset proxy for size)	-0.943**	-0.249	-1.375***
	-0.471	-0.579	-0.4080
LLPTA (Loan loss provision to total assets ratio)	113.9**	62.29	-210.5***
	-53.22	-48.21	-81.1200
ΔHHI (Herfindahl-Hirschman Index *)*	0.0973**	0.048	-0.7110
	-0.0406	-0.0293	-0.5900
Year Dummies	Yes	Yes	Yes
Constant	-3.383	**-7.046***	4.525***
	-2.551	-2.104	-1.6500
"R-sq"	0.3406	0.2767	0.85
F-Stat	12.51	5.39	97.86
Observations	247	97	150

Standard errors below coefficients next row, *** $p<0.01$,** $p<0.05$,* $p<0.1$ are significant levels at 1%, 5% and 10% respectively.

The remaining controlling variables in the capital buffer equation (***ROA, LTA,*** and ***ΔHHI***) are all significant with the expected signs and can be interpreted in a similar manner as above. Concerning the portfolio return (ROE) equation, with the exception of ***HHI*** and ***OEA*** (OEA = measures bank operating efficiency and = operating expense/total asset) in Table, all the other control variables are significant with the expected sign. For example, ***BSMD*** which stands for: bank share of market deposit has a significant positive impact on ROE.The coefficient on this variable *(BSMD)* is interpreted as follows: a 1 percent increase in bank share of market deposit impacts positively on bank portfolio return measure of (ROE) buy about 168.4% (percent) times the increases in ***BSMD*** ratio.

Next we look at the main variables of interest to this study, the coordination of change in bank capital buffer and bank portfolio return measure of (ROE). We examine how a change in one variable (capital buffer ratio) affects change in the other variable (ROE) over the sample periods. We also look at the speed at which commercial bank adjust toward their capital buffer levels as well as the speed at which they adjust toward their target assets portfolio return (ROE). As can be seen from Table 6.18a & 6.18b, for

the full sample model, the speed of adjustment to target capital buffer and portfolio risk are respectively -0.285*** and -0.791***. These coefficients are sizeable, especially for ROE, and highly significant. Both coefficients also satisfied the dynamic stability condition in the context of partial adjustment for being in the ranges |0-1|.The coefficients number indicates that Indonesian commercial banks make adjustments toward their target assets portfolio ROE at a speed that is about three times faster than the speed at which they adjust toward their desired capital buffer level. For the full sample model, the relationship between change in bank capital buffer ratio and change in bank assets portfolio ROE is positive and two-way, as indicated in Table 6.18a & 6.18b, *ΔCBF*=0.651*** and *ΔROE* 0.0122, but only the impact of change in capital on change in ROE or profit is significant. Specifically, the coefficient 0.651 can be interpreted as follows; a 1 percent positive addition to bank capital buffer is associated with about *0.651* increases in bank portfolio return or (ROE).

Table 6.17b Indonesian Banks: Three-Stage Least Square estimates of a Simultaneous Equation for Capital Buffer and Portfolio Risk, base model specification I Portfolio ROE Equations.

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	*ΔROE*	*ΔROE*	*ΔROE*
ROEt-1 (1-1year lag of return to equity capital ratio)	**-0.791*****	**-0.981*****	**-0.713*****
	-0.0223	-0.0237	-0.0266
ΔCBF (Change in Bank capital buffer ratio)	**0.651*****	0.0601	**0.292*****
	-0.13	-0.238	-0.0883
BSMD (Bank share of market deposit)	**168.4*****	32.1	**172.1*****
	-41.48	-51.18	-49.3300
LLPTA (Loan loss provision to total assets ratio)	**-425.6*****	**-396.7*****	23.6900
	-101.5	-101.9	-199.3000
OEA (Measures bank operating efficiency)	0.872	-0.0628	0.3190
	-0.715	-0.974	-0.8990
LTA (Natural log of total asset proxy for size)	**-3.538*****	**2.188***	**-4.631*****
	-0.935	-1.134	-1.0950
ΔHHI (Herfindahl-Hirschman Index *)*	**-0.0669**	**-0.0445**	**2.642****
	-0.0597	-0.04	-1.1420
Year Dummies	Yes	Yes	Yes
Constant	**9.716****	**20.08*****	**3.962**
	-4.079	-3.473	-3.972
"R-sq"	0.8335	0.9504	0.7626
F-Stat	113.78	232.19	61.9
Observations	247	97	150

Standard errors below coefficients next row, *** p<0.01, ** p<0.05,* p<0.1 are significant levels at 1%, 5% and 10% respectively.

The impact of change in ROE on bank capital buffer during the full sample period is found to be insignificant for sample Indonesian banks included in this study. It appears that the positive and significant impact of both *ROA* and *LLPTA* on bank capital buffer may have dominated that of the ROE during this period.

The two subsamples models as shown in tables (6.18a & 6.18b) present contrasting findings with regards to the significant levels of controlling variables. While only one controlling variable turns out significant in the capital buffer equation of the 2000-2003 subsample model case, control variables in the capital buffer equation for 2004-2007 subsample model are all significant with the expected signs, except the *HHI* index. In the case of portfolio return (ROE) equation in the two subsample models, 2 of the control variables (*LLPTA* and *LTA*), are significant with the expected sign for the 2000-2003 model, while 3 control variables are significant in the 2004-2007 model in this equation.

With regard to the adjustment speeds and their significance levels in the capital buffer and portfolio ROE equations, for the two subsample models, we can see, in general, that adjustment speed to target capital buffer is lower than adjustment speed to target ROE, yet both coefficients are highly significant anyway. (e.g. coefficient on lags *CBF vs. ROE* for 2000-2003 model are:**-0.173***** vs.= **-0.981***** respectively). This means that Indonesian banks adjust to ROE on average at a speed that is several times faster than the speed at which they adjust to their capital buffer levels. Similar speed differences can be notice in the 2004/2007 subsample model., Although it can be noticed that the adjustment speed for capital buffer in the 2004/2007 subsample model increase dramatically to about 50% close to the 73% speed of adjustment to bank ROE.

The relationship between change in capital buffer and change in portfolio ROE is a two-way positive relationship during the two subsample models; however, the two-way positive adjustment relationship is significant only in the later period or for the

2004/2007 model. During this lasts period, a 1% percent increase in average Indonesian commercial banks ROE is associated with another addition to this bank's capital buffer that is about 5.5% percent of the increase in the bank's ROE. The lack of significant of the two way positive adjustments of capital buffer and portfolio ROE as seen in the 2000-2003 subsample model and also for the full sample period could be related to the special nature of the first period as restructuring and outside capital infusion to banks couple with the fact that some banks may have been constrained in their capital decisions in this period compare to the last period 2004/2007. On the other hand the insignificant of the two-way positive coordination of adjustment to buffer capital and ROE for Indonesian bank in the full sample model, could be the results of slipover effect of the factors that affect bank capital and profit adjustment during 2000-2003 over the entire period.

With this finding, at least with reference to the results of the subsample model of 2004-2007, we can reject the null hypothesis of no relationship between adjustment to bank capital buffer ratio and bank portfolio ROE in the case of Indonesian banks. Thus, this study provides some support for the alternative hypothesis 7 on two-way positive capital earning relationship in banking. This finding is consistent with findings in many related studies and it can be explained by a number of theoretical models.

6.6.2.4 Malaysian Banks

6.6.2.5 Full sample and subsample models

Tables (6.19a & 6.19b) present the estimated results of equation 19 & 20 applied to the Malaysian bank dataset. Starting with the full sample model and with control variables, it can be seen from the capital buffer equation that only two variables (ROA and *LTA*) are significant with the expected sign (+/- for *ROA/LTA* respectively).

The coefficient on the loan loss provision to total asset ratio has a sizable positive impact on capital buffer as indicated by the size of the coefficient (**196.3**) yet it is not significant. *ΔHHI* index shows a negative impact on capital buffer but not significant in any of the periodic models.

Looking at the full sample model and specifically at the portfolio return (ROE) equation of this model, in Table 6.19b, we can see that only two controlling variables (the **LLPTA** and the **LTA**) have significant negative/positive impact on bank ROE. The two have opposing impact on ROE return to equity. While **LLPTA** or the loan loss provision to total asset ratio has the expected negative (**-1,260*****) impact on bank return to equity or **ROE**, the **LTA** or natural log of total asset has a positive (**4.537*****) impact on bank return to equity capital or the ROE.

Table 6.18a Malaysian Banks Three-Stage Least Square estimates of a Simultaneous Equation of Capital Buffer and Portfolio ROE, base model specification I Capital buffer Equation

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	**ΔCBF**	**ΔCBF**	**ΔCBF**
CBFt-1(1-year lag of capital buffer)	**-0.293*****	-0.440***	**-0.0484**
	-0.0354	-0.0409	-0.0512
ΔROE(change in bank ROE ,the first difference)	**0.109***	**0.129****	**8.000**
	-0.0596	-0.0628	-0.109
ROA(bank return on assets)	2.304**	-0.153	3.780***
	-0.936	-1.06	-1.334
LTA (Natural log of total asset proxy for size)	**-2.932*****	**-4.592*****	**-0.116**
	-0.59	-0.773	-0.823
LLPTA (Loan loss provision to total assets ratio)	196.3	-21.68	309.8*
	-138.7	-171.4	-170.6
ΔHHI (Herfindahl-Hirschman Index *)*	-0.141	0.0000	-2.248
	-0.839	0.0000	-3.421
Year Dummies	Yes	Yes	Yes
Constant	**24.67*****	**43.77*****	**0.000**
	-5.277	-6.664	0.000
"R-sq"	0.3365	0.6519	0.0197
F-Stat	8.97	18.49	6.38
Observations	146	66	80

Standard errors below coefficients next row, *** p<0.01, ** p<0.05,* p<0.1 are significant levels at 1%, 5% and 10%respectively.

Bank share of market deposit is negatively related to bank profitability as indicated by the results in Table 6.19 b. this results is not expected, since deposit is a cheap source of funding compare to equity capital, we would expect that banks that gain

significant deposit market share to realize a positive effect of that on their return to equity as seen in the results in the case of Indonesian commercial banks data set.

This is because bank deposit is a cheap source of fund compare to their capital. It is thus, very difficult to find explanation for this finding here. Although, these are not the main issues of concern for this study however, it will be interesting for any further research to examine the deposit rates in these two countries during the study period covered as well as the margin or the differences between deposit rates and the lending rates in the two countries.

Now, we look at the main variables of interest in this study as shown in Tables (6.19a &6.19b). The coefficients indicating adjustment speeds to bank capital buffer and portfolio return (ROE) for the full sample model are relatively high and highly significant in all periods except for the subsample model of 2004/2007.

Table 6.18b: Malaysian Banks Three-Stage Least Square estimates of a Simultaneous Equation for Capital Buffer and Portfolio ROE, base model specification I portfolio ROE Equation

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	*ΔROE*	*ΔROE*	*ΔROE*
ROEt-1 (1-1year lag of return to equity capital ratio)	**-0.827*****	**-0.876*****	**-0.653*****
	-0.057	-0.0767	-0.188
ΔCBF (Change in Bank capital buffer ratio)	0.216*	0.0542	1.470*
	-0.114	-0.116	-0.826
BSMD (Bank share of market deposit)	-17.62	-23.25	-22.18
	-13.68	-23.88	-17.13
LLPTA (Loan loss provision to total assets ratio)	-1,260***	-1,136***	-1,113***
	-188.5	-289.5	-369.9
OEA (Measures bank operating efficiency)	-0.748	-3.462	1.579
	-1.421	-2.232	-2.111
LTA (Natural log of total asset proxy for size)	**4.537*****	**5.104*****	2.53
	-0.778	-1.28	-2.021
ΔHHI (Herfindahl-Hirschman Index *)*	0.177	0.000	-3.435
	-0.899	0.000	-6.818
Year Dummies	Yes	Yes	Yes
Constant	**-19.05*****	**-14.85**	**0.000**
	-5.29	-9.132	0.000
"R-sq"	0.6662	0.7438	-0.3873
F-Stat	25.83	24.26	3.63
Observations	146	66	80

Standard errors below coefficients next row, *** p<0.01,** p<0.05,* p<0.1 are significant levels at 1%, 5% and 10% respectively

Again, as the case was with Indonesian banks, Malaysian banks, on average, adjust their target ROE at a relatively very high speed that is several times high than the speed at which they adjust their target buffer capital ratio (e.g from Table 6.19a & 6.19b

are the followings: *Lag CBF* = -0.293*** VS. *Lag ROE* = -0.827***). It is noticeable from the relevant tables that the speed of adjustment to target capital and ROE becomes relatively fast when an adjustment period is shorten as can be when they are half in the case of the two subsample model 2000-2003. For example: the followings are the respective speed for subsample 2000-2003 model from Tables (***lag CBF*** = -0.440*** vs. ***Lag ROE* = -0.876*****).

Regarding the relationship between change in capital buffer and change in portfolio return (ROE), the results from Tables (6.3a & 6.3b) indicate a two-way positive relationship in adjustment to capital and portfolio ROE. However, the coefficients are marginally significant at 10% level in three out of the six coefficient cases (.e.g. full sample model both equations, and the 2004-2007 subsamples model the coefficient on *ΔROE*). On the other hand, coefficients in the other two cases (e.g *ΔCBF* in the 2000-2003 model and *ΔROE* in 2004-2007*)* are not significantly different from zero. While coefficient on *ΔROE* in the capital equation in 2000-2003 model (***ΔROE* = -0.129****) is significant at 5% level.

With this finding, and with reference to the full sample model, we can reject the null hypothesis of no relationship between adjustment to bank capital buffer ratio and bank portfolio return measure of ROE. Thus, this study provides a support for the alternative hypothesis 7 stated in chapter for capital and earning relationship. This finding is consistent with findings in many related studies and it can be explained by a number of theoretical models.

6.6.3 LEVERAGE RATIO AND PORTFOLIO ROE ADJUSTMENT MODELS

6.6.3.1 Introduction

This section presents the estimated results from the application of the simultaneous equation models specified in chapter 4 in (equation 19 & 20) on data on bank leverage ratio and assets portfolio return/(ROE). We start with the full sample model results by country first and then present the subsample model results.

6.6.3.2 Indonesian Banks

6.6.3.3 Full sample Model vs. Subsample Models

Tables (6.20a & 6.20b) presents the results of estimating equations 19 & 20, of chapter four, simultaneously using a pool 3SLS full information estimation method in Stata.

Table 6.19a: Indonesian Banks: Three-Stage Least Square estimates of a Simultaneous Equation for Leverage ratio and Portfolio Risk, base model specification I Leverage ratio Equation

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	ΔLVR	ΔLVR	ΔLVR
LVRt-1 (1year lag of leverage ratio	-0.188***	-0.125***	-0.220***
	-0.0247	-0.0457	-0.0268
ΔROE(change in bank return to equity)	0.00629**	0.00258	0.0203***
	-0.00313	-0.00348	-0.00673
ROA(bank return on assets)	1.220***	0.972***	1.443***
	-0.143	-0.229	-0.155
LTA (Natural log of total asset proxy for size)	-0.346***	-0.231	-0.315**
	-0.128	-0.205	-0.153
LLPTA (Loan loss provision to total assets ratio)	48.39***	68.36***	-94.13***
	-14.32	-17.56	-28.52
ΔHHI (Herfindahl-Hirschman Index *)*	0.0064	0.00568	-0.332
	-0.0103	-0.0102	-0.215
Year Dummies	Yes	Yes	Yes
Constant	0.0737	-0.254	1.902***
	-0.598	-0.659	-0.539
"R-sq"	0.2404	0.167	0.3851
F-Stat	8.84	3.550	17.14
Observations	280	121	159

Standard errors below coefficients next row, *** $p<0.01$,** $p<0.05$,* $p<0.1$ are significant levels at 1%, 5% and 10% respectively.

The coefficients on the first two variables from top are the focus of this study. We start by looking at the control variables in the models. All controlling variables (in

the Leverage ratio equation) for full sample model are significant except coefficients on *ΔHHI*. In contrast to that, only two of the five control variables are significant for the portfolio ROE equation in the full sample model. Similar to the full sample model, all the coefficients on control variables in both equations of the 2004-2007subsample model are statistically significantly different from zero except *ΔHHI* in the Leverage ratio equation in this model.

However, **LLPTA** has an unexpected negative sign in the Leverage ratio equation in the 2004-2007 subsample models. Examining the case of the 2000-2003 subsample models, we can see that only two controlling variables (ROA and **LLPTA**) are significant in this model with the expected sign for the Leverage ratio equation, while none of the control variables in the ROE equation in this model is significant.

Concerning the main variables of interest in this study, all the lag dependent variables in the two equations in all sample models are highly significant and the magnitude of the coefficients satisfied the dynamic stability condition. Thus, these coefficients can be taken to represent adjustment speeds. Again, it is noted that adjustment speed to target portfolio ROE is several times faster than adjustment speed to target leverage ratio in all the equations or sample models.

To interpret for example, the speed coefficients from Table 6.20a, for the full sample model case, we can say that an average Indonesian commercial bank closes about 0.188 or 18.8% (percent) of the gap between its actual Leverage ratio and the desired Leverage ratio within a year. On the other hand, this same bank on average, will close 0.853 or 85.3% (percent) of the gap between its actual ROE level and its target ROE within a year. This speed is almost 4.5times (4 ½x) of the speed at which the bank closes the gap between its actual and target Leverage ratio within a year. That is comparing 18.8% vs 85.3%).

Regarding the simultaneous coordination of adjustment to target Leverage ratio and target portfolio ROE, the results from Tables (6.20a & 6.20b) indicate a two-way positive adjustment relationship between the two variables. These positive relationships are significant in five of the six equations of the three models. See Tables (6.20a & 6.20b). For example, with reference to the 2004-2007 subsample model, a unit/1% change (increase) in average Indonesian bank portfolio ROE on average, comes with a 0.0203 unit or a 2.03% percentage increase in the bank's Leverage ratio (equity/total asset). The coefficient for a change in Leverage ratio is interpreted in a similar way in the portfolio ROE equation. With the two-way positive adjustment relationship findings, in general, between a change in bank Leverage ratio and change in portfolio ROE in the case of sample Indonesian banks, this study is able to reject the null hypothesis that there is no relationship between the adjustment of the two variables. Hence, this study provides support for the alternative hypothesis 7 stated in Chapter 4.

Table 6.19b Indonesian Banks: Three-Stage Least Square estimates of a Simultaneous Equation for Leverage ratio and Portfolio Risk, base model specification I Portfolio ROE Equations

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	ΔROE	ΔROE	ΔROE
ROEt-1 (1-1year lag of return to equity capital ratio)	-0.853***	-0.917***	-0.662***
	-0.0365	-0.0567	-0.0425
ΔLVR (Change in bank leverage ratio =equity/asset)	6.914***	8.887**	5.454***
	-1.477	-4.423	-0.92
BSMD (Bank share of market deposit)	194.1**	210.4	113.8**
	-79.14	-158.7	-45.98
LLPTA (Loan loss provision to total assets ratio)	-47.3	-237.4	871.6***
	-232.9	-444	-299.5
OEA (Measures bank operating efficiency)	-1.705	-2.581	-1.577**
	-1.57	-3.784	-0.784
LTA (Natural log of total asset proxy for size)	-5.354**	-6.389	-3.160**
	-2.168	-4.941	-1.521
ΔHHI (Herfindahl-Hirschman Index)	0.219	0.228	3.980**
	-0.144	-0.184	-1.9
Year Dummies	Yes	Yes	Yes
Constant	-7.478	-6.661	2.602
	-9.994	-16.51	-5.181
"R-sq"	0.6425	0.68	0.5868
F-Stat	50.26	35.09	35.71
Observations	280	121	159

Standard errors below coefficients next row, *** $p<0.01$,** $p<0.05$,* $p<0.1$ are significant levels at 1%, 5% and 10% respectively.

6.6.3.4 Malaysian Banks

6.6.3.5 Full sample Model vs. Subsample Models

Tables (6.21 & 6.21b) present the estimated result of applying equation 19 & 20 specified in chapter five on the sample Malaysian commercial bank data, using Pooled 3SLS system estimator in Stata. To begin, the five and four control variables shown in the models in Table (6.21a and Table 6.21b) respectively have shown varying degrees in significant levels. These range from 10% levels to 1% levels of significance. Furthermore, looking at control variables in the Leverage ratio equation, we can see that three of the four control variables included in this model are consistently significant in all three-model cases. The significance levels also range from the lowest significant level of 10% (**LLPTA** in 2000-2003 models) to the highest significant level of 1% in five of the nine cases shown in Table 6.5a. **HHI index** is the only variable that is not significant in all the models for the Leverage ratio equation.

Table 6.20a: Malaysian Banks Three-Stage Least Square estimates of a Simultaneous Equation of Leverage ratio and Portfolio Risk: base model specification I Leverage ratio Equation

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	ΔLVR	ΔLVR	ΔLVR
LVRt-1 (1year lag of leverage ratio	-0.309***	-0.369***	-0.224***
	-0.040	-0.0645	-0.0482
ΔROE(change in bank return to equity)	0.0187	0.0284	0.0324
	-0.0232	-0.0327	-0.0347
ROA(bank return on assets)	1.693***	1.360**	1.512***
	-0.357	-0.534	-0.511
LTA (Natural log of total asset proxy for size)	-1.360***	-1.958***	-0.697**
	-0.253	-0.422	-0.303
LLPTA (Loan loss provision to total assets ratio)	152.1***	150.8*	130.1**
	-54.14	-88.27	-61.06
ΔHHI (Herfindahl-Hirschman Index *)*	-0.3250	0.0000	-0.266
	-0.3280	0.0000	-0.353
Year Dummies	Yes	Yes	Yes
Constant	11.50***	17.69***	4.994*
	-2.415	-3.934	-2.752
"R-sq"	0.3232	0.3921	0.234
F-Stat	10.2	8.26	6.66
Observations	146	66	80

Standard errors below coefficients next row, *** p<0.01,** p<0.05,* p<0.1 are significant levels at 1%, 5% and 10% respectively

With regards to the portfolio return (ROE) equation in Table 6.5b, we can see that only two of the five control variables are consistently significant for all the three sample based models for this equation. The two are, *LLPTA* with a significant negative impact on bank ROE; and the *LTA* or the log of total asset, a proxy for size, and has a significant positive effect on changes in bank portfolio return or the *ΔROE*. BSMD or banks share of market deposit has the unexpected negative effect on bank ROE but is not significant in any of the three sample models, neither the *ΔHHI* index no the *OEA* *(OEA*= the operating expense to total asset) are significant in any of the three indicated significant level.

Now, we examine the main variables of interest in the three models. From Tables (6.21a & 6.21b) we can see that the coefficient on the lag dependent variables (both *lag_LVR* and *lag_ROE*) in all the six equations cases of the three samples based models are all highly significant at 1% levels. The coefficients are also dynamically stable as all coefficients lay between the two boundaries of dynamic stability |0 and 1| in absolute term. Thus, these coefficients are interpreted as adjustment speed for the respective dependent variables, Leverage ratio and portfolio ROE.

Taking the lag dependent variable of the Leverage ratio variable for the full sample model as an example, we can say that, on average, Malaysian commercial banks close about 30% of the gap between their actual Leverage ratio and their target leverage ratio within a year. Hence, these banks, on average, will need about 3, 2.5 or three years and 2 months and a half month to close 100% of this gap. The coefficients on the lag dependent variable of *ROE* can be interpreted in a similar manner. It is noted here again, that Malaysian commercial banks, on average, adjust their target portfolio ROE at speed that is several times faster than the speed at which they adjust their Leverage ratio (equity capital to asset ratio).

With respect to the relationship between change in the target Leverage ratio and change in the target portfolio ROE, the analysis results of this analysis found a two-way positive relationship between capital (Leverage ratio) and bank portfolio return ROE adjustment. However, the relationship is one-way significant from Leverage ratio to ROE in all the three models. In other word, a positive change in average Malaysian commercial banks Leverage ratio tend to be associated with a positive and significant increase in the bank's ROE but not the other way around.

For example, looking at the full sample (2000-2007) model in Table 6.21b for portfolio ROE equation, a 1 unit/1% (percent) increase in an average Malaysian commercial bank's leverage ratio (equity/asset) is associated with about 1.003*** or 100.3% times that increase in banks ROE level. That is a 100% full adjustment. However, the opposite or the reciprocal relationship is not significant from changes in ROE to Leverage ratio is positive but not significant.

Table 6.20b: Malaysian Banks Three-Stage Least Square estimates of a Simultaneous Equation for Leverage ratio and Portfolio Risk: base model specification I Portfolio ROE Equations

Base Specification	(2000-2007)	(2000-2003)	(2004-2007)
Variables	*ΔROE*	*ΔROE*	*ΔROE*
ROEt-1(1-year lag of return to equity or ROE)	**-0.843***	**-0.874***	**-0.744***
	-0.0579	-0.0775	-0.0955
ΔLVR(change in leverage ratio equity/asset)ratio	**1.003***	**0.669***	**1.408****
	-0.297	-0.371	-0.672
BSMD (Bank share of market deposit)	**-10.99**	**-18.4**	**-3.941**
	-13.51	-23.52	-15.91
LLPTA (loan loss provision to total asset)	**-1,197***	**-1,082***	**-1,230***
	-189.9	-286	-262.4
OEA(operating expense to average total assets)	**-0.739**	**-3.287**	**1.609**
	-1.386	-2.202	-1.766
LTA (Natural log of total asset)	**4.200***	**5.095***	**2.695****
	-0.769	-1.287	-1.098
ΔHHI (Herfindahl-Hirschman Index *)*	**0.492**	**0.00**	**-0.353**
	-0.926	**0.00**	-1.197
Year Dummies	Yes	Yes	Yes
Constant	**-15.94***	**-16.14***	**-6.747**
	-5.331	-9.494	-8.006
"R-sq"	0.6342	0.7264	0.4666
F-Stat	25.39	24.06	10.93
Observations	146	66	80

Standard errors below coefficients next row,*** p<0.01,** p<0.05,* p<0.1are significant levels at 1%, 5% and 10%   respectively.

One possible reason to cite for why the positive impact of change in ROE on Leverage ratio, that we observe, may not be significant could be that the relatively higher and significant positive effects of *ROA* dominates or overshadows that of ROE in the case of Malaysian banks in these models. As we have seen that, the relationship was a two-way, positive, and significant in the case of Indonesian sample banks. Other potential explanations for this finding exist and they will be discussed in part 2 of this Chapter at the discussion section.

With the above findings, we can partially reject the null hypothesis stated in chapter 4, that is: no relationship between bank capital (Leverage ratio) and portfolio return of ROE adjustments. We can conclude that at least changes in bank Leverage ratio have significant positive impact on bank ROE in the case of Malaysian commercial banks. As we shall see in the next in the discussion part, this finding is consistent with the findings of many other studies on bank capital and bank earning.

6.7.0   DISCUSSION ON PART TWO CAPITAL AND RETURNS MODELS

6.7.1   Introduction

This part presents discussion of results and findings on our second research objective: bank managers' short-term capital (buffer and Leverage) and assets portfolio return models. The discussion will shed more light on these results and findings within several contexts. First, it will provide an opportunity to compare these results and findings with similar results and findings from previous related studies. Similarly, further evidence within the context of reform measures and within the economic and financial development during the sample periods of the study will be used to provide additional explanation for observed variation found in the results in terms of coefficients significance levels and their scales within models, periods or between country findings.

As before, the discussion will start by restating the research objectives relevant to this part of analysis. It will then provide a brief summary of the main results and findings for this part.

One of the two main aims of this study was to examine commercial banks short-term capital and portfolio return ROE decisions in Indonesia and Malaysia for the period between end of 1999 and starting of year 2008 or the immediate aftermath of the 1997/1998 banking and financial crisis until end of 2007.

The management of bank capital and portfolio return/ROE involves several important decisions similar to their decision on capital and assets portfolio risk. In fact the two decisions are related though we have analyzed them here separately for some obvious reasons. They include setting a desired target portfolio return on shareholders fund and accordingly setting aside appropriate capital level to assume some estimated asset portfolio risk for such returns on shareholders' funds. The plans involve most importantly how quick to make such adjustments to target capital, target portfolio returns/ROE while taking into account other factors that could affect these decisions.

Therefore, the specific objectives set out for this analysis is to estimate and test the significance of several key parameters of these decisions as specified here.

6.7.2 Research Objectives

1) *To estimate and test the significance of short-term adjustment speed to bank target capital ratios (buffer capital ratio/ Leverage ratio)*

2) *To estimate and test the significance of short-term adjustment speed to bank target assets portfolio return/ROE.*

3) *To examine the nature of the two-way relationship between short-term changes in bank target capital ratios (buffer capital /Leverage ratio) on bank target assets portfolio returns/ROE measures and the visa-versa.*

4) *To control for selected exogenous and bank specific variables for their effect on capital ratios and bank assets portfolio risk/returns decisions as suggested by literature.*

Table (6.24) at the end of the discussion section is a summary of our research questions related to the first three objectives. A brief answers to the questions are given to indicate the extent to which our analysis results provide answers to these questions.

6.7.3 Research hypothesis

The main findings presented in Tables (6.22 & 6.23) are based on the testing following null hypothesis of no relationship against two alternative hypotheses as listed below:

Null hypothesis:

Ho: that, there is no relationship between capitalization and earning/returns/ROE on equity capital in banking with the following alternative hypothesis 7 & 8

H7 All, other things being the same, changes in bank capital level are positively related to changes in bank equity returns (ROE).

H8 All, other things being the same, changes in bank capital ratios are negatively related to changes in bank equity returns (ROE).

6.7.4 SUMMARY FINDINGS

6.7.4.1 Indonesian Banks Cases

Speed of adjustment

In general, adjustment speed to target capital ratios (whether capital buffer or leverage ratio) is found to be stable, relatively high, and highly significant in all models cases for all periods for the sample Indonesian banks as shown in Table 6.22 bellow. Similarly, adjustment speeds to bank target portfolio ROE for all models, are stable, sizable and consistently higher than adjustment speed for target capital ratios. The coefficients are also highly significant in all models and during all sample periods for the sample Indonesian banks.

Relationship between change in capital and change in portfolio Return

With respect to the relationship between changes (adjustments) to target capital ratios and changes (adjustments) to target portfolio ROE for the sample Indonesian banks, this study found, in general, a two-way positive relationship between the two changes (adjustments). However, these two-way positive relationships are significant in both directions only in the following cases: first, all cases of the subsample model 2004-2007(whether it is buffer capital and ROE or Leverage ratio and ROE models).The relationship is also two-way significant for full sample model for the Leverage ratio model and one-way significant for buffer capital full sample model. The two coefficients are insignificant for the 2000-2003 subsample models, See Table 6.22. What might account for such a variation in terms of significance will be discussed in the relevant contexts in the discussion sections.

Table 6.21 Capital (capital buffer and Leverage ratio) and portfolio ROE adjustment Summary findings Indonesia

Indonesia	Capital buffer Base models	Full sample Model 2000-2007		Subsample 1 Model 2000-2003		Subsample 2 Model 2004-2007	
		Capital	Return	Capital	Return	Capital	Return
Lines/row	Adjustment Speed	High Speed	Lower speed	Low speed	Low speed	High speed	High speed
1	$CBF_{t-1} / PROE_{t-1}$	-0.285***	**-0.791***	-0.173***	**-0.791***	-0.503***	**-0.713***
2							
3	Direction of coordination sign	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +
4	$\Delta CBF/ \Delta PROE$	0.0122	**0.651***	0.00727	0.0601	**0.0550***	**0.292***
Indonesia	Leverage ratio Base models	Full sample Model 2000-2007		Subsample 1 Model 2000-2003		Subsample 2 Model 2004-2007	
		Capital	Return	Capital	Return	Capital	Return
	Adjustment Speed						
5	$LVR_{t-1} / PROE_{t-1}$	**-0.188***	**-0.853***	**-0.125***	**-0.917***	**-0.220***	**-0.662***
6	Direction of coordination sign	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +
7	$\Delta LVR/\Delta PROE$	**0.00629**	**6.914***	0.00258	**8.887**	**0.0203***	**5.454***

6.7.4.2 Malaysian Bank Cases

Speed of adjustment

In general, adjustment speeds to target capital ratios (buffer capital or Leverage ratio) are found to be stable, relatively high, and highly significant in all models and for all periods in the case of sample Malaysian banks. Similarly adjustment speeds to bank target portfolio ROE are found to be stable, sizable and highly significant in all models and during all sample periods. The adjustment speed to target portfolio ROE is much higher than that of the adjustment speeds to target capital ratios in all cases of this sample.

Relationship between change in capital and change in portfolio return

The findings with respect to the nature of the relationship between changes in target capital ratios and change to portfolio ROE for the sample Malaysian banks is, in general, as in the case of sample Indonesian banks, a two-way positive relationship.

This two-way positive relationship between changes to target capital ratios and change to target portfolio ROE, however, is significant in both direction in only one case; that is the case of the full sample for the capital buffer model.

Tables 6.22 Capital (capital buffer and leverage ratio) and portfolio ROE adjustment summary findings Malaysia

Malaysia	Capital buffer Base models	Full sample Model 2000-2007		Subsample 1 Model 2000-2003		Subsample 2 Model 2004-2007	
		Capital	Return	Capital	Return	Capital	Return
	Adjustment Speed	Lower speed	Higher speed	Comp-low	Comp-low	R-	R.-high
1	$CBF_{t-1}/PROE_{t-1}$	-0.293***	-0.827***	-0.440***	-0.876***	-0.0484	-0.653***
2	Direction of coordination sign	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +
3	$\Delta CBF/\Delta PROE$	0.109*	0.216*	0.129**	0.0542	8.000	1.470*
4	Hypothesis (Ha1/Ha)	Ho: Rejected in all cases except one, Ha1 is supported in all but one case –Ha2 is not supported					
Malaysia	Leverage ratio Base model	Full sample Model 2000-2007.		Subsample 1 Model 2000-2003		Subsample 2 Model 2004-2007	
		Capital	Return	Capital	Return	Capital	Return
	Adjustment Speed	Speed	Speed	Speed	Speed	Speed	speed
5	$LVR_{t-1}/PROE_{t-1}$	-0.309***	-0.843***	-0.369***	-0.874***	-0.224***	-0.744***
6	Direction of coordination sign	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +	Two-way +
7	$\Delta LVR/\Delta PROE$	0.0187	1.003***	0.0284	0.669*	0.0324	1.408**

The relationship is one-way significant in all the remaining models cases. In the case of Leverage ratio model, the two-way positive relationships is one-way significance, from Leverage ratio to portfolio ROE, in all models of the Leverage ratio. The one side significance alternates in the case of buffer capital models; from ROE to capital in the 2000-2003 models and from buffer capital to ROE in the 2004-2007 models, See Table 6.23 for the summary.

The question here is that: why a positive change to bank ROE does not 'seem to' affect significantly changes to target leverage ratio (equity/asset) in the case of Malaysian banks but it does significantly affect changes to target capital buffer, at least in two of the three models cases see Table 6.23. Similar but opposite pattern is observed in the case of sample Indonesian bank. What is special about these two capitalization variables for commercial banks in these two countries? We try to find possible

explanations or answers for these two questions in the discussion section and within the context of reform measures and recovery periods.

Finally, the finding of a two-way positive relationship between changes in capital ratios and change in bank portfolio ROE in all models cases and in both country cases means that we can reject the Null hypothesis of no relationship between short term changes in the two variable capital and returns(ROE)). Therefore, with that conclusion, this study has provided support for alternative hypothesis 7 or *Ha7* as stated in section 6.11.4. The next sections discuss more on these findings within the relevant contexts.

6.7.5 DISCUSSIONS

6.7.5.1 Positive impact of earnings/(ROE) on capital ratios in the context of theory

As presented in the summary Tables (6.21 & 6.22), this study generally found that changes in bank earning or portfolio return/ROE positively affected changes in bank capital ratios (leverage ratio and buffer capital) in all models and in both country cases. Although, there were a number of variations in terms of significance or size of the coefficient for individual (model, period, or country) cases, nevertheless, the positive finding is consistent in all cases and for all models as well as periods and country cases. This study found no negative impact for changes in one variable on changes in the other variable. Hence, the data consistently provides support to only one of the two none-mutually exclusive alternatives hypotheses. Thus, the results finding provides support for *hypothesis7* and not *hypotheisis8,*

This is not the first time to observe a relationship between capital and profitability measure in this literature. Berger (1995) found similar results and considers it not be a surprise. Such results, indeed, could be expected for many reasons. In fact, the positive impact of profitability on bank capital ratio is actually a situation, which we

can only possibly expect, and take a negative finding as an unusual phenomenon for the following reason. For one thing, we can say that bank earning, as a source of capital is the cheapest. In fact, this is exactly what would have been suggested in the context of pecking order theory (Myers 1984) and capital buffer theory (Milne and Whalley 2001). In the context of such theories, profitable firms (banks) with investment opportunity use their own internally generated funds to finance new investment project until internally generated funds are exhausted, and only then outside funds are sought. In this case, it could be the active policy of the management of profitable banks to use part of their internally generated funds to finance projects and hence, over time, we can observe positive impact of profitability measures on bank capitalization variables. Alternatively, as observed in Berger (1995), a positive impact of profitability on bank capital could be a passive rather than active management of profit and capital. Since, he (Berger, 1995) observed, in his sample banks, that dividend payout rate were not growing with increase in bank profitability. Thus, he concludes that the positive impact of profit (ROE) on capital was a passive accumulation and not a deliberate action. Although, the modeling used in this study assumed the former action (active action of management) rather than the later (passive management action), it could not be rule out in our cases here that a passive accumulation has not in fact occurred in some cases of our sample banks. This is because this study has no record of dividend payouts for the sample banks. It will be interesting if future research collect such data and do the testing.

6.7.5.2 Positive Impact of Capital on returns/ROE in the context of theory

Although, the Modigliani Miller (1958) theorem under a very well defined market situation have proven beyond doubt that capital structure is irrelevant, yet the obvious implicit is that when any of those conditions breakdown or become irrelevant then the capital structure issue becomes very important. What we have in banking is that

deviations from such market conditions as defined in Modigliani Miller (1958) are the norms and that the world that Modigliani Miller (1958), describes is the exception. Therefore, changes in bank capital structure as shown in Orgler and Taggart (1983) can affect earnings or ROE in many ways due to corporate taxation, bankruptcy costs, and various agency problems (Jensen and Meckling 1976).

Furthermore, as shown lately in Harding et.al., (2007) regulated banks can choose their capital structure by trading off the cost of breaching regulatory rules on capital with the tax and the deposit insurance subsidy benefits to a level that is optimal. Berger (1995) tested some of these hypotheses and discussed others at length. There are several instances where a potential change in capital structure can influence earning level. We list and briefly discuss some of those cases and show how they can be supported or provide support to the results and findings of this study, albeit none of those theories is directly tested here.

Bankruptcy cost refers to the financial and none financial cost that management as well as owners will pay directly or indirectly should the bank happen to fail, due to inability to meet its timely fixed financial obligation to outsiders, none shareholders. This cost can be higher sometimes depending on who bear it. For example, managers of a failing bank could realize loss of earning or potential future earnings from their specialized managerial skill/ intellectual capital or they could gain bad reputation for incompetency or corruption. For shareholder the cost could involve the most, the loss of charter value. This is the future potential economic rent that comes with chartering on a going concern base. Theory predicts that managers or owners will factor these cost into their capital and risk decision collectively as a bankruptcy cost and will trade it off with other benefits that comes with taking high risk. Actions that reduce this cost (e.g. those actions that persuade debt holders to charge low risk-premium on debt) will have positive effect on capital and hence tend to reduce equilibrium Leverage. If the marginal

gain from financing cost reductions is substantial, then it can improve the next profit and thus, the positive relationship may be observed between positive change in capital to asset ratio with positive change in earning or ROE as found in this study.

Similarly, theories that suggest the existence of signaling equilibrium (e.g Myers, and Majluf, 1984) explain that sometimes managers whose firm have good prospect tend to prefer to show confidence by increasing capital holding with expectation of lower funding cost due to high degree of safety. Accordingly, we can observe a positive relationship between positive changes in capital and earnings from these channels too. One version of moral hazard model (see, Kim and Santomero,1988, Koehn and Santomero,1980), suggest that banks can go it all positive at once, by increasing risk for high expected return (ROE) when capital is increased voluntarily or involuntarily. Such impact if it comes from an involuntary increase in capital then the capital requirement will have what is often referred to as "unintended consequence" for capital requirement in banking. In this case Leverage and asset portfolio risk are also seen as substitutes for each other (Avery and Berger, 1990).

6.7.5.3 Discussion of our finding in the context of similar past empirical findings

The findings of this study can be discussed also in relation to two closely related papers Berger (1995), Hutchison, and Cox (2006). In general the finding of a two-way positive relationship between capital and portfolio ROE is consistent with Berger (1995), one of the two closely related past studies to this study. Although, this study uses slightly different methodology, the two findings could still be explained within the same theoretical frameworks. In Berger (1995), the positive impact of earning on capital was not emphasis too much as it was consciously expected yet Berger (1995) attributed it to passive management action rather than active building of capital with incremental earning. In the context of this study, an active management coordinated strategy was

assumed to lead to a positive relationship between changes in capital and earning ROE. On the other hand.

Berger (1995) empirically tested the positive impact of capital on earning as part of deliberate management action on capital to affect earning positively, and found a support for that in the signaling as well as the bankruptcy cost hypotheses. These hypotheses could be tested in the context of this study too using appropriate data. Meanwhile, Hutchison and Cox (2006) who re-examined Berger (1995), utilizing an alternative methodology as well as Berger (1995) methodology came out with rather a mixed finding. The authors disputed Berger (1995) on statistical as well as theoretical grounds. This study is slightly different, methodologically, from the above two studies yet, it also yield finding that indicates a positive two-way relationship between change in capital and change in earning. It is noted that there were few negative capital and negative ROE values in the samples of this study; they have not significantly change the results when a robust test was conducted for this study not reported here

Hence, this study concluded that the finding of a two-way positive relationship between capital ratios (regulatory capital buffer and Leverage ratios) and bank earning in this study might not be anomalous. Beside that this study also differ from the above two studies in terms of using two different capital ratios (the regulatory capital buffer ratio and Leverage ratio), while the two studies (Berger, 1995 and Hutchison and Cox, 2006) used Leverage ratio. The use of change (first difference form of the variables) as well as lag levels of the dependent variables rather than lag levels only as done in the above two studies is another source of difference between this study and its closest empirical relatives. This differences in models could account or explain any difference between this study and the above two studies.

6.7.5.4 Discussion of the findings within the reforms and recovery contexts

In addition to the discussion of the findings in the above contexts, some aspect of the results and findings in this study can be discussed also within the context of reform and recovery measures (recapitalization and restructuring programs) undertaken for several years in the aftermath of the crisis years of 1997/1998. This is a valid way to explain some of the irregularities or interesting observations and patterns in the results in general. The major factors that shaped the restructuring and reform programs can affect variables of main concern to this study (capital risk and profitability) in many ways. In the next paragraphs, we discuss some of the findings of this study again.

Looking at the analysis results, in general; from Tables (6.21 & 6.22) one can observe some noticeable pattern in both cases of Malaysian and Indonesian sample banks. Let us look, first, at the nature and significance cases among the coefficients estimates of the relationship between change in commercial bank assets portfolio return/ROE and change in their capital ratios. First, we look at the positive relationship between change in capital and change in portfolio ROE. We can see that for the period under study for our samples banks, adjustments to Leverage ratio and portfolio ROE seems to be more important for Indonesian bank managers' short-term capital and portfolio ROE decisions. On the other hand, adjustment to capital buffer and portfolio ROE seems to be more relevant in Malaysian commercial bank managers' capital and portfolio ROE decisions. These conclusions come from the followings observations made on the results.

First, looking at the full sample models results in both country case (the capital buffer and the Leverage ratio models) Tables (6.21 & 6.22), we can see that in both models cases(buffer capital or leverage ratio model) for each country case, the relationship between change in capital ratios and change in portfolio ROE is consistently two-way positive in all models.

Second, for the same full sample models results, the two-way positive relationship between capital and portfolio ROE is significant from both ways for the capital buffer model in the case of Malaysian banks, while for the same capital buffer full sample model, the relationship is one-way significant in the case of Indonesian commercial, banks. On the other hand, the two-way positive relationship between change in leverage ratio and change in portfolio ROE is significant in both ways in the case of Indonesian banks, while it is a one-way significant in the case of Malaysian banks.

What could be the possible reasons for these contrasting findings? Can the pattern in the subsample models result help with further insight as to how to explain these differences between the two countries? Can we look further and reflect in the context of reform measures during the years for possible or probable answers? Yes,

First, let us look at capital buffer models (for the subsamples), we can see that the two-way positive relationship between change in capital buffer and portfolio ROE is entirely insignificant (both ways) in the case of sample Indonesian bank results in the subsample period model (2000-2003). This same relationship is one-way significant, (from portfolio ΔROE to change in capital buffer for 2000-2003 model) in the case of sample Malaysian bank results. Next, we look, again at capital buffer and portfolio ROE model for the subsample 2004-2007 results. (see Table 6.21 & 6.22),.We can see that the two-way positive relationship between capital buffer and portfolio ROE is highly significant in both direction in the case of sample Indonesian banks, while the relationship remains one-way significant (but now from change in capital buffer to change in portfolio ROE) in the case of sample Malaysian bank results.

One more again, let us look at the Leverage ratio and portfolio returns/ROE models (see Tables 6.21 & 6.22), for all the three periodic sample models. We can see that, in the case of sample Malaysian banks results , the two-way positive relationship

between Leverage ratio and bank earning or Δ***ROE*** is one-way significant in all three periodic models, with direction of significance from change in capital (Leverage ratio) to change in bank earning or ROE. Meanwhile, for the sample Indonesian banks results, the two-way positive relationship between change in Leverage ratio and change in portfolio ROE is significance in both ways for the full sample model as well as for the 2004-2007 subsample results. However, for the same sample Indonesian bank result, the relationship, is one-way significant in the 2000-2003 subsample model case, (from Leverage ratio to ROE) and not the other way around.

So the question we ask, why (during the sample period under study) Leverage ratio appears to be the more important and relevant to the simultaneous capital and portfolio returns/ROE adjustment decisions for Indonesian banks than capital buffer; and why the opposite observations and remarks are true about the findings in the case of sample Malaysian bank? This conclusion is made based on judging from the significance of the two-way relationship in the full sample model in each country case with the help of subsample model findings in explaining them.

One can attempt to answer this question based on what is already known about the characteristics of the two samples data or about the periods under study, and about the regulatory rules governing commercial banks in the two countries during the periods. This study believes that the above are valid context to the understanding of these relationships among the variables of interest. In the next paragraphs, we try to do that.

For example, Leverage ratio may have been more relevant to Indonesian sample banks capital decision than capital buffer during the period under study because of regulatory rules, as the followings explain. First, due to severe undercapitalization status of many Indonesian banks and banking system in general from 1998 to 2002, Basel I minimum capital ratio requirement of 8% was relaxed and reduced to a minimum of

4%. Indonesian banks are required to work out how to achieve the 8%minimum target within the years depending on their business plan (Enoch et.al, 2001). Therefore, by virtue of this rules (at least during the subsample period 2000-2003) adjustment to target capital buffer in relation to bank profit/return adjustment, as it is defined in this study, was not expected to be relevant to these banks except for those banks with capital buffer above the Basel based 8% in the short term. This is because the 8% itself, by regulatory rule, was the target. Thus, there was no obvious need for maintaining buffer above the 8% as the 8% is the target itself.

Therefore, the finding shows that there was no significant relationship between changes in the two variables even though the relationship was positive. Meanwhile, in January 2002, the Indonesian regulatory authorities have changed the rules (see Asia Economic Monitor, 2004) and set the Basel 8% minimum capital as the new minimum requirement that all banks must meet. With this rule, and in the context of this study, banks would be expected to change their own target (behavior) and try to achieve the 8% as well as start building a buffer zone above this new minimum of 8%, so that they will not come nearer to violating it. Hence, we see the positive relationship between changes in the two variables become highly significant in the 2004-2007 subsample models.

Besides that, we also need to bear in mind that bank profitability was also recovering slowly during the period 2000-2003, and afterward had improved significantly a lot which also strengthen the relationship, as banks retained more earning to build up regulatory capital buffer (Asia Economic Monitor, Regional updates, 2002,2003,2004 issues). Therefore, the impact of the subsample 2000-2003 result effect on the two-way relationship between capital buffer and portfolio ROE adjustment has overshadowed that of the effect of the subsample 2004-2007 model results. Hence, the

two-way positive relationship between capital buffer and portfolio ROE adjustment for the entire period 2000-2007 turn-out insignificant.

Meanwhile, the Leverage ratio, on the other hand, in the context of this study, will be the de facto capital ratio that is relevant to the sample Indonesian banks capital and portfolio ROE decisions. This study would anticipate that, in addition to Leverage ratio, the buffer capital would become very significant in Indonesian commercial banks capital decisions in the next 5 to 10 years to come as Basel III rules enter into effect, while the Leverage ratio should also become important in the Malaysian banks' capital and portfolio risk/ROE decisions.

We can explain in a similar manner, as discussed above, why the significant relationship between change in capital buffer ratio and change in ROE makes the target capital buffer ratio adjustment with target ROE more important for Malaysian banks capital and ROE adjustment decisions than the Leverage ratio. First, Malaysian commercial banks, in relative terms, during the period under study were not in dire regulatory capital shortage position (base on the Basel capital standard) compare to their Indonesian counterparts. Malaysian banks were already well capitalized by end of 1999. This means that these banks were already holding a significant capital buffer that some of them would like to maintain by directly using internally generated profit in some active capital management, through adjustment, rather than passively accumulating capital. We may remember that Leverage ratio was not the one that regulators in Malaysia, were primarily targeting or monitoring, at least in the past.

Yet, still we have this question, why we see the impact of change in portfolio returns/ROE on change in Leverage ratio insignificant in all the period based sample models for Malaysian banks? Several possible answers are available to this. First, previous study (see e.g Ahmad et al (2008) found profitability, in case of Malaysian banks to have weak or insignificant impact on bank capital decision. although neither

capital buffer ratio nor the Leverage ratio were use in that particular study as proxy for bank capital ratio as done in this study. Rather, they use CAR or the absolute value of Risk-weighted capital adequacy ratio. Hence, we can conclude here that, that particular study has revealed one aspect of Malaysian banks capital decision and this study has revealed other aspects. In fact, the authors have shown surprise at that particular findings' inconsistency with similar studies elsewhere.

However, with the findings of this study on capital buffer ratio at least some consistency has been found. Thus, we can say that profitability is still an important factor in some aspects of bank capitalization in Malaysia as found elsewhere, at least the regulatory capital buffer ratios. On this note we recall that capital buffer theory (Milne and Whalley 2001) have argue that regulatory capital buffer are more relevant to bank capital and risk decision than absolute regulatory capital ratio. With the finding of an insignificant impact for change in portfolio returns/ROE on change in Leverage ratio (another proxy capital ratio used in this study), this study also confirms the findings in Ahmad et.al (2008).

However, this study anticipates the relationship between Leverage ratio and portfolio ROE adjustment to become important in the near future when Basel III rules will take effect. We have suggested another possible explanation for why change in ROE may have insignificant effect on change in Leverage ratio in the analysis section. There, we have indicated that the insignificant impact of a change in ROE on change in Malaysian banks capital ratio could be due to the dominant effect of ROA on Leverage ratio over the effect of ΔROE on Leverage ratio. This is so because ROA is the main direct source for ROE. In addition, technically ROA will have a positive impact on bank Leverage (equity capital/total assets). This direct impact on Leverage ratio comes through the retained earnings channel. Since both variables (ROA and $\Delta \textbf{\textit{ROE}}$) are included in our models, then we can expect some sort of multicolinearity problem

between ROA and ΔROE to dampen the significant effect of ΔROE on change in Leverage ratio model. Hence, all our models have shown a positive and significant effect for ROA on bank Leverage ratio, which seems to overshadow the effect of ΔROE on change in Malaysian bank Leverage ratio.

In addition to the above, a notable change in the adjustment speed seen during the subsample period is worth mentioning here. For an example, in 2004 and onward there were significant changes in regulatory capital rules in Malaysia related to adjustments made to the calculations of Basel I standard capital ratios (by incorporating market risk factors to estimate the standard Basel 1 capital ratios). According to (AEM, 2004), this change has affected CAR or the total regulatory capital ratio level downward as market participants discount bank capital levels. It is possible that because of these changes, the positive impact of *ΔROE* on change in capital ratios (buffer), as well as the adjustment speed to target capital buffer were all insignificant in 2004-2007 model, while these relationships were significant during the subsample period of 2000-2003 or in the capital buffer and ROE models during 2000-2003. Table (6.23) is list of our research questions and a brief answers to them to indicate the extent to which our questions have been answered by our analysis results and findings.

Table 6.23: Tabular Summary of research questions and answers in brief

Research Questions	Does the a finding answers the research question
How do commercial banks coordinate the adjustments of their capital ratios and portfolio return/ROE in Indonesia and Malaysia?	*YES*---Based on findings from our analysis results, managers of our sample banks from the two countries coordinate adjustments of their capital ratios and portfolio return/ROE positively partially and simultaneously.
Did bank managers (in Indonesia and Malaysia) adjust their portfolio returns at speed faster than the speed at which they adjust their target capital ratios in the aftermath of the regulatory increase of minimum capital requirement?	*YES*— Our findings as summarized in Tables (6.21& 6.22) The speed coefficients on lag capital buffer and leverage ratio variables are relatively lower than lag coefficients on ROE. This indicate that our sample banks adjust ROE at speed higher than the speed at which they adjust to capital buffer or leverage ratio
Did commercial banks cut back on their portfolio returns when they decide to increase their capital buffer level or when they want to reduce their leverage ratio?	*NO*--- Based on our findings in Tables (6.21 & 6.22) there is no evidence that our sample banks from the two countries have cut on ROE to reduce leverage
What is the magnitude and significance of adjustment speed to target capital ratios and target portfolio return/ROE for banks in Indonesia and Malaysia?	*YES*---Our analysis results as summarized in Tables (6.21.& 6.22), the coefficients on lag ROE are large and significant in all cases in the two countries. On the other hand coefficients lag capital buffer/leverage ratios are relatively small with mixed significant results.

7.0. CHAPTER SEVEN CONCLUSION AND IMPLICATIONS

7.1. Introduction

Most part of the blame for the late 1997/1998 banking and financial crisis in East Asia were directed at agents in the banking and corporate sectors, at the micro levels, rather than the public sector decision makers. Bank and their corporate customers are blamed for engaging in excessive risk-taking by taking advantage of lax regulation or generous government industrial policies. Therefore, in the aftermath, these countries have introduced many changes to address the weakness that contributed to the making of the 1997/98 crisis. These include not only the re-arrangement and redesigned of the banking and financial systems in these countries, but also it brought about major reforms in the regulatory and supervisory systems. One of these measures was to strengthen the capital standard by raising the minimum absolute capital requirement for banks. In our context here, this is exemplified by the move in Indonesia and in Malaysia to adopt the international capital standards (Basel capital accords) and best corporate practices.

This thesis is concerned with examining and evaluating the impact of these reform measures, in particular the reform measures concerning bank capital regulation and related measures, which have been implemented over a period of 8 years before the newly adopted capital standards of Basel II and Basel III. The period stretch from the end of the 1997/98 East Asian financial crisis up until the beginning of the latest banking crisis in the developed economies in the late 2007 and early 2008. The thesis aims, in these analyses, to look back and see how much progress have been made and how the changes implemented over the years have, affected the intended or the targeted agents' behaviors.

Against this background, this thesis set up its two main research objectives around the following research issues.

1) **Bank managers short term capital and portfolio risk decisions**

2) **Bank managers short term capital and portfolio ROE decisions**

The study then outlines five specific minor research objectives from the above, and subsequently formulates twelve (12) research questions. Eight (8) of these twelve (12) research questions are on the bank capital ratios and bank assets portfolio risk adjustment decisions. The remaining four (4) research questions are devised on bank capital ratios and bank assets portfolio return/ROE decisions. We provide summary answers on these questions at the end of discussion parts (1&2) in Tables 6.17A and Table 6.23. In this Chapter, we conclude on our research findings and highlight some of their implication for policy, practice and future research effort.

7.2.   Conclusion on bank short term capital and portfolio risk decisions results

On the speed of adjustment to capital ratios and asset portfolio risk, this study concludes that our sample banks in both country cases change their target capital ratios (capital buffer and Leverage ratios) on average at a stable and relatively high speed with varying significance levels as indicated in Tables 6.15 and 6.16. However, some variation in the scale of the speed coefficients and their significance levels exist within one country during different modeling periods. These variations are to some degree explainable within bank capital theory. The results are also comparable to some past empirical finding in the case of banks from developed economies. The regulatory reform measures undertaken in the aftermath of the 1997/1998 Asian financial crisis also provided adequate context to explain most of the observed variation in adjustment speed to capital ratios as presented in the discussion part.

Concerning adjustment speed to assets portfolio risk, this study concludes also that our sample banks from the two countries; in general, on average alter their target asset portfolio risk ratio at stable and relatively high speed at varying significance levels and scales as indicated in tables 6.15 and 6.16. Variations in the scale of the speed coefficients and their significance level exist within one country during different modeling periods, and they are found to be explainable within our various discussion contexts as presented in the discussion part. Meanwhile, we attribute the observed disparity in the adjustment speed to both capital ratios and asset portfolio risk measure between Malaysian and Indonesian bank cases on several possibilities.

On one hand, Indonesian banks' high adjustment speed to capital ratios as compared to their relatively slow adjustment to their assets portfolio risk ratio may be due to regulatory restriction placed on lending during the period due to capital deficiency and other difficulties. On the other hand, Malaysian banks' relatively high adjustment speed to assets portfolio risk compared to their relatively low adjustment speed to capital ratios could be due to efforts by authorities to expand in lending to meet demands at a time when capital levels at banks were perceived to be adequate and sustainable for such expansion. In short, the differences are explainable by referring to differences between the two countries in regulatory rules, bank-lending policies, as well as problems associated with bank restructuring effort during the sample period.

The simultaneous positive coordination of adjustments in capital ratios and adjustment in bank assets portfolio risk ratio at varying significance level indicates that our sample banks from both countries have responded to the higher capital requirement imposed on them in the aftermath of the 1997/1998 Asian financial crisis positively. However, this particular finding provides only a broad answer to a number of our specific research questions on bank managers' capital and assets portfolio risk decisions in the post crisis. Several instances of our findings in the subsample analysis results led

us to conclude that the two-way positive adjustment relationship between capital ratios and asset portfolio risk measure seen in the full sample results did not always hold at the same significance levels over all sample periods or models. Again, we found that these cases were also well explainable within our various discussion contexts.

Questions such as: were banks complying with capital rules by only changing their capital and assets portfolio risk mixes could not be conclusively answer with our results on hand. The insignificance of some instances of positive relationship between capital and assets portfolio risk during some sample periods may be because banks may have been using other methods to comply with the capital rules. Since the focus of our research is not on those other factors specifically, future research may try to answer such questions in much detail using appropriate research design. The fact that most of our sample banks maintain high capital buffer throughout the period makes it urgent to ask such questions and find answers to them.

Several reasons explain our mixed findings on the present or non-present of regulatory pressure on banks holding different capital buffer level, especially on how they coordinate adjustment to capital buffer and assets portfolio risk in the post crisis. One such reason has to do with small sample problem that could have affected the statistical power of our test.

7.3. Conclusions on bank short-term capital and portfolio ROE decision results

In general, and on average, managers of our sample banks from both countries adjust their target capital ratios (capital buffer and Leverage ratios) at speeds lower than the speed at which they adjust to their target assets portfolio ROE. The speed coefficients are stable and mostly significant on average in various models over all sample periods with some exceptions.

Our sample banks coordinate changes to their target capital ratios and change to their target assets portfolio ROE positively in all models results, and over all sample periods. This two-way positive performance was also significant economically in terms of coefficient scale with interesting variation in the pattern of coefficient significance level within one-country models as well as between sample banks results from the two countries. This later observation led us to conclude that management of regulatory capital buffer and portfolio return/ROE dominates Malaysian banks capital structure policy, while management of Leverage ratio and portfolio return/ROE seems to be more relevant for Indonesian sample banks capital management strategies during the sample period. This conclusion is also explainable within the context of regulatory policies and capital requirement rules during the sample period as presented in the discussion part.

7.4.   IMPLICATIONS

7.4.1.   Positive capital and assets portfolio risk relationship in banking

A consistent positive relationship between adjustment to capital ratios and adjustments to assets portfolio risk (the risk-weighted asset ratio) found in this study, especially with regard to capital buffer, in all models has important implications for policy, practice and for future research.

First, from the policy point of view, the most cited bank excessive risk-taking and inadequate capital in the pre-crisis East Asia has become a matter history. This could mean that efforts that regulators made in the countries under study in the past to address issues related to banks' contribution to the crisis have been successful. Such successful crisis resolution experience provides valuable point of reference for efforts directed at preventing the occurrence of similar crisis in the future. It could provide lesson for countries in this context.

Second, the concept of capital buffer is new in terms of available documented evidence from banks in the developing countries. It is only recently that the regulatory authorities at international and local levels decided to require banks to maintain a buffer capital. However, our sample banks were found to be holding excess regulatory capital at significantly high levels as per the old and the new international standard.

The implication is that our sample banks from both countries have emerged to be proactive in their capital and risk management in post crisis. Since the analysis in this study is based on capital buffer and Leverage ratios data and not on the absolute regulatory minimum capital ratio, then there is some evidence that our sample banks have their own target capital ratios (capital buffers and Leverage ratio). We believe that these target capital ratios are actively managed by these banks during the sample period. They are not merely complying with the minimum regulatory capital requirement as would be predicted by pure moral Hazard models.

Now in light of that several questions may arise here with policy and practical implication for both regulators and bank managers at the same time. One such question is, Are the new Basel capital standards relevant for banks in developing countries or at least for banks in Indonesia and Malaysia? For example, Table (2.6) from Chapter 2 is reproduced here to highlight this point in the case of commercial banks in Malaysia.

As can be seen from this table Malaysian banks' capital position as of 2011 can be described as relatively strong compared to the new Basel III capital standard. These banks hold almost double of what is required in almost all the cases. For example in the case of the newly introduced Leverage ratio limits of 3%, Malaysian banks on average hold an excess buffer of leverage ratio limit at another 3% margin above the 3% Basel III limit.

Table 2.6 Impact Assessment of Global Reforms on Capital on Banking Institutions as of 2011

	Common Equity Ratio	Tier-1Capital Ratio	Total Capital Ratio	Leverage Ratio
Minimum requirement	4.50%	6.00%	8.00%	3.00%
Conservation buffer	2.50%	2.50%	2.50%	2.50%
Minimum requirement plus conservation buffer	7.00%	8.50%	10.50%	−
Current Basel II position	12.30%	13.00%	14.80%	−
Estimated Basel III position	9.50%	11.10%	14.80%	5.90%
Source: Bank Negara Malaysia and internal computation				

That is to say, the banks limit themselves at 6% (~ 5.9% see Table 2.6) levels making them far less Leverage compared to the new demarcated capital standard. We ask again, Are these banks going to continue to hold so much capital under the new rules or are they going to refine their management strategies with their seemingly expensive capital holding position as per international standard? Are the regulators going to let them go it alone in the later case or will they required them to maintain their historical capital levels? How are the regulators going to link bank capital to bank target returns? Should regulators put constrain on bank target returns (ROE) or develop target for bank returns/profits as suggested in Hale (1991).

We ask the above questions because we assumed that the new capital ratios on the Table 2.6 are calculated based on guidelines from the new Basel II & III standard. These standards are considered more complex, more precise, and naturally should be more expensive in terms of capital allowance. If so, why the banks still seem to be holding high excess capital ratios as per international standard?

Another implication here is that the data we used in this study was the product of Basel I rules, nonetheless, Basel I rules were subjected to much criticism for not being sensitive enough to changes in banks risk and that its risk-weights categories are arbitrary defined. Now, under Basel II system, banks are allowed to used, among other methods, their own internal rating models to make risk assessment for capital requirement estimation. Therefore, it will be crucial for supervisors to ensure that the

risk measures are representative of true bank risk and that the models be accurate as much as possible to avoid underestimating the true risk of the bank.

Another point is about the insignificant test result we found for regulatory pressure to differentiate between two groups of banks with high/low capital buffer (as defined in this study) in terms of effect of regulatory pressure on their capital and risk adjustment decision. The finding imply in one way that our sample banks are not necessarily under different regulatory pressure to adjust capital and risk differently in any significant manner. Rather, the capital management strategies of these banks could be influenced more by other forces, which this study did not test.

Therefore, future research may try to test other possible factors that could have influenced these banks' capital and portfolio risk decisions in the post crisis period. Several theoretical hypotheses such as managerial risk-aversion or managers and owners' private interest or bankruptcy cost avoidance may explain these capital decisions. This study, thus, would suggest a test of such hypotheses by future researchers. One may try to estimate how much (in monetary term) cots for a bank to go out of business (or bankruptcy reorganization cost inn these countries)

This research had initially attempted to study the banking systems of all the crisis-affected countries in ASEAN as that will provide better opportunity for a more comprehensive understanding of the outcomes of different reform measures undertaken in these countries. Therefore, future research may build on the current research findings and extend its methodologies to study other affected countries such as Thailand, the Philippine or Korea etc.

7.4.2   positive capital and earning (ROE) relationship in banking

The finding of a significant positive relationship between change in bank capital ratios and change in bank earning/assets portfolio return of ROE, in general, means that

changes in the two variables positively and significantly affected each other during the sample period. The positive impact of earning on capital may imply high earnings retention or dormant dividend growth policy of banks or perhaps due to some regulatory directive. It also could imply that these banks may have been actively retaining earnings to build up their capital base (Indonesian banks case) or maintain a buffer zone above the regulatory minimum (Malaysian banks case). The latter is supported, for example, by a recent report by BNM that observed that over the last decade Malaysian banks have sourced almost 57.5% of their regulatory capital funds from internal sources (retained earnings and reserves). One can expect similar behavior in the former case (Indonesian banks).

On the other hand, the positive effect of changes in capital ratios on change in bank earning or ROE may have at least three possible implications. The first is that these banks, after increasing their capital, could have simultaneously increase their assets portfolio risk with high risk high return assets (an unintended consequence of capital requirement in this case) and that resulted in increase in ROE. This hypothesis is not directly tested in this study but rather it is indirectly inferred from the earlier findings of positive relationship between capital ratios and assets portfolio risk measure (i.e. risk-weighted asset ratio) changes in the first model. Future research may try to find out on this issue.

The second possible implication of a positive effect of change in capital ratios on change in bank earning/ROE could have come through overall gain from greater efficiency and will be consistent with signaling hypothesis. Because equity capital is expensive, banks that increase capital could have embarked on aggressive cost cutting or pursued diverse sources of revenue to improve earnings as Berger (1995) pointed out. Hence, the positive capital earnings could have come through these channels. Since increases in capital levels will necessarily precede or at least be parallel with cost

cutting and business diversification activities, the increase will serve as a signal for managers' bullish outlook about the potential future earnings gain from capital management strategy and cost cutting activities.

For example in the 2006 financial stability report BNM, the central bank in Malaysia commented that Malaysian banks' diversification activities in recent years are driven by their capital management strategy that also involved cost cutting exercises to increase the cost efficiency of their high capital. The strategy also aimed at sustaining high returns on shareholder fund in the end, according to the report. Hence, future research may test the impact of increase in capital on earning through improve in revenue or earnings channels. It may also look at it from the contributions gains from elements of business diversification and activities such as fee income contributions etc which will be an empirical test of capital structure signaling hypothesis.

Alternatively, the positive effect of change in capital ratios on change in earnings could imply a reduction in the interest rates charged on non-guarantee funds among bank liabilities or overall cost of borrowed funds according to argument put forward in Berger (1995). This would be suggested under the bankruptcy and distress related cost hypotheses. When capital is increased bankruptcy and distress become remote and hence their relative cost become less resulting in reduction in premium charges on funds from non-deposit external funding sources. The result will be improvement in the net interest margin. High net interest margin will lead to improvement in ROE or bank profit. Future research may test the impact of external funding cost on margins and profit in general as a test of bankruptcy cost hypothesis. Since a premium on individual bank funds mainly represents differential default risk, the bankruptcy cost hypothesis can be tested with this data.

7.4.3   Implication of findings for bank capital theories

The conclusion from the test result of capital buffer theory in the case of Indonesian and Malaysian banks have important implications for theory, policy and for future research. Capital buffer theory concerns the adjustment speed and the nature of coordination in capital and assets portfolio risk decisions between identifiable groups of banks with relatively different capital buffer holding. Earlier in this chapter, we have concluded that the findings on capital buffer theory in the case of Indonesian banks are mixed and generally inconclusive. While the test results in the case of Malaysian, banks are weak and contradictory to the predictions of capital buffer theory due to the insignificant test coefficients or opposite signs. We discuss some implications for this findings and conclusions here.

These two contrasting results and conclusion in the case of Indonesian and Malaysian banks may reflect the nature of capitalization levels of sample banks from both countries as well as some important aspects of regulatory and supervisory guidelines in the two countries during the sample period. For example, we may suggest why capital buffer theory may not hold in the case of Malaysian banks as indicated by the insignificant or contradictory test results. This could be because there were hardly many undercapitalized banks in the Malaysian banking system during the period. As such small sample problem may make it difficult for capital buffer theory test to differentiate between Malaysian banks adjustment decisions. This is because most of them are highly capitalized by the standard. Over the years majority of banks were operating with capital buffer above the minimum required. At points above the regulatory minimum required capital we do not know any specific point that may have specific regulatory potent to affect our sample banks behavior differently. See the descriptive statistics in Table 7.1.

Table 7.1 variation in capital buffer level in the sample from the two country

	Capital buffer < 0 or minus	Capital Buffer < 2	Capital buffer between 2.0-2.5
Malaysia	1 banks	4 banks	3 banks
Indonesia	5 banks	10 banks	8 banks

The other point is that many Indonesian banks were operating undercapitalized for several years as compared to the number of Malaysian banks with low capital buffer. (See Table 7.1 below) This makes the Indonesian sample bank data more suitable to meet the assumptions of capital buffer theory compared to Malaysian sample bank data. This effect will appear in the statistical test power difference between the two country samples. This explains why capital buffer theory seems to be able to explain, partially, regulatory influence on Indonesian commercial banks capital and assets portfolio risk decisions. First, the test result, apart from the first dummy model (model II), indicates that in terms of signs that average Indonesian commercial bank with high capital buffer adjust capital and portfolio risk by less (indicated by the negative sign on capital buffer dummy coefficients in model III and IV Table 6.15) compared to their counterparts with low capital buffer. This result is mainly consistent with hypothesis 3 and hypothesis 4 on the existence of difference in adjustment speed between banks with high/low capital buffer.

The significance of coefficients of both interaction terms (adjustment speed differences) in model III Table 6.15 supported this conclusion. However, because the coefficient on the dummy variable is significant only in the case of portfolio risk equation in all models, therefore, the results are mixed or inconclusive on difference between the two groups of banks concerning adjustment speed to target capital buffer. We have noted in our second model (capital and portfolio return/ROE models) that capital buffer was not very much the focused of Indonesian sample banks capital structure policy at least for the time being.

The insignificant of the coefficient on the dummy variable in the capital equation in model III and IV could also reflect the effect of capital forbearance policy of BI in the earlier years in that there was not much regulatory pressure on undercapitalized banks during the first half of the overall sample period to speed up until after 2002. However, after BI steps up pressure on banks during the later period (2004-2007) the response from banks may not be immediate and significant to a level that will differentiate undercapitalized banks response (in terms of speed and nature of coordination) from that of their counterpart well-capitalized banks. In this case, one could suppose that the results may change to a significant result if the time to response is extended beyond the current sample period. The mixed test results of capital buffer theory in this study may imply that capital buffer theory could hold in developing countries also if regulatory forbearance practices are not dominant always.

Therefore, future research can test the theory on an extended sample period and use more sample units to yield a significant results possible. Longer time will allow the effect of regulatory forbearance of the earlier years (in the case of Indonesian sample) to diminish gradually. Adding more banks may also allow for greater variation in capital buffer levels as sample size increase. We also noted that over the sample period the number of commercial banks in Indonesia average little above 100 banks but this study was able to used only half of that number or about 52 banks due to inaccessibility of data and other problems. With improvement in disclosure, future research may yield conclusive result.

REFERENCES

Aggarwal, R. and K. T. Jacques (2001). "The impact of FDICIA and prompt corrective action on bank capital and risk: Estimates using a simultaneous equations model." *Journal of Banking & Finance* 25(6): 1139-1160.

Ahmad, R., Ariff, M., & Skully, M. J. (2008). The determinants of bank capital ratios in a developing economy. *Asia-Pacific financial markets*, 15(3-4), 255-272.

Ahmed, A. S., Takeda, C., & Thomas, S. (1999). Bank loan loss provisions: a reexamination of capital management, earnings management and signaling effects. *Journal of Accounting and Economics*, 28(1), 1-25.

Allen, F., & Santomero, A. M. (1998). The theory of financial intermediation. *Journal of Banking & Finance*, 21(11), 1461-1485.

Allen, L. and A. Rai (1996). "Bank charter values and capital levels: An international comparison.*" Journal of Economics and Business* 48(3): 269-284.

Anderson, T. W., & Hsiao, C. (1981). Estimation of dynamic models with error components. *Journal of the American statistical Association*, 76(375), 598-606.

Arellano, M. and S. Bond (1991). "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *The Review of Economic Studies* 58(2): 277-297

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, 68(1), 29-51.

Asian Development Bank Asian Economic Monitor *(*2000-2010 *issues) "Regional updates"* http://aric.adb.org

Asian Development Bank http://aric.adb.org/malaysia/data

Avery, R. B., & Berger, A. N. (1991). Risk-based capital and deposit insurance reform. *Journal of Banking & Finance*, 15(4), 847-874.

Avery, R. B. and A. N. Berger (2001). "Risk-based capital and deposit insurance reform." *International Library of Critical Writings in Economics* 133: 37-64.

Ayuso, J., D. Pérez, et al. (2004). "Are capital buffers pro-cyclical? Evidence from Spanish panel data." *Journal of Financial Intermediation* 13(2): 249-264.

Baltagi, B. (2005). *Econometric analysis of panel data*. Wiley. com.

Baltagi, B. H. and D. Levin (1986). "Estimating Dynamic Demand for Cigarettes Using Panel Data: The Effects of Bootlegging, Taxation and Advertising Reconsidered." *The Review of Economics and Statistics* 68(1): 148-15

Baltenperger, Ernst, (1980), "Alternative Approaches to the Theory of the Banking Firm", *Journal of Monetary Economics*, Vol. 6, pp. 1-37.

Bank Negara Malaysia. (1997-2011). Annual Report BNM. Kuala Lumpur. Available online at http//www.bnm.gov.my

Bank Negara Malaysia. (2006-2012), Financial Stability and Payment Systems Report BNM. Kuala Lumpur. Online at http//www.bnm.gov.my

Batunanggar, S. (2006). *Comparison of Problem Bank Identification, Intervention, and Resolution in the SEACEN Countries*. South East Asian Central Banks (SEACEN), Research and Training Centre.

Bank of International Settlements (BIS), 1998.The Basel Capital Accord, International Measurement of Capital Convergence and Capital Standards (July 1988, updated to April 1988)[on line]Available at:<http://www.bis.org/publ/bcbsc111.pdf >].

BIS (1996) "Amendment to the capital accord to incorporate market risk," Basel Committee on Banking Supervision

BIS (1999) "Supervisory lessons to be drawn from the Asian Crisis" Basel Committee Working Ppaer2, Basel Committee on Banking Supervision

BIS (2005) "An explanatory notes on Basel II risk weight functions" Basel Committee on Banking Supervision

BIS, 2009, Comprehensive response to the global financial crisis (September 7, 2009) [online] Available at :< http://www.bis.org/press/p090907.htm> [Accessed 1 June 2011].

BIS, 2010 Basel III: A global regulatory framework for more resilient banks and banking systems (December 2010)[on line]Available at:< http://www.bis.org/publ/bcbs189.pdf>[Accessed 1June 2011].

BIS, 2010 Comments received on the consultative documents "Strengthening the resilience of the banking sector" and "International framework for liquidity risk measurement, standard and monitoring" (December 2010) [on line] Available at: http://www.bis.org/publ/bcbs165/cacomments.htm>[Accessed 1 June 2011].

Barrios, V. E. and J. M. Blanco (2003)."The effectiveness of bank capital adequacy regulation: A theoretical and empirical approach." *Journal of Banking & Finance* 27(10): 1935-1958.

Barth, J. R., G. Caprio, et al. (2004). "Bank regulation and supervision: what works best?" *Journal of Financial Intermediation* 13(2): 205-248.

Ben Naceur, S., & Kandil, M. (2009). The impact of capital requirements on banks' cost of intermediation and performance: The case of Egypt. *Journal of Economics and Business*, 61(1), 70-89.

Berger, A. N., DeYoung, R., Flannery, M. J., Lee, D., & Öztekin, Ö. (2008). How do large banking organizations manage their capital ratios?. *Journal of Financial Services Research*, 34(2-3), 123-149.

Berger, A. N. (1995). "The relationship between capital and earnings in banking." *Journal of Money, Credit and Banking*: 432-456.

Berger, A. N., R. S. Demsetz, et al. (1999). "The consolidation of the financial services industry: Causes, consequences, and implications for the future." *Journal of Banking & Finance* 23(2-4): 135-194.

Berger, A. N., Herring, R. J., & Szegö, G. P. (1995). The role of capital in financial institutions. *Journal of Banking & Finance,* 19(3), 393-430.

Berger, A. N., K. K. King, et al. (1991). "The limitations of market value accounting and a more realistic alternative." *Journal of Banking & Finance* 15(4-5): 753-783.

Berger, A. N. and L. J. Mester (1997). "Inside the black box: What explains differences in the efficiencies of financial institutions?" *Journal of Banking & Finance* 21(7): 895-947.

Bernanke, B. S. (1983). "Nonmonetary effects of the financial crisis in the propagation of the Great Depression." *The American Economic Review* 73(3): 257-276.

Bernanke, B. S., Lown, C. S., & Friedman, B. M. (1991). The credit crunch. *Brookings papers on economic activity*, 1991(2), 205-247.

Bikker, J. A. and P. A. J. Metzemakers (2005). "Bank provisioning behaviour and procyclicality." *Journal of International Financial Markets, Institutions and Money* 15(2): 141-157.

Bikker, J. A., & Hu, H. (2012). Cyclical patterns in profits, provisioning and lending of banks and procyclicality of the new Basel capital requirements. *PSL Quarterly Review,* 55(221).

Bichsel, R., & Blum, J. (2004). The relationship between risk and capital in Swiss commercial banks: a panel study. *Applied Financial Economics*, 14(8), 591-597.

Black, F., Miller, M. H., & Posner, R. A. (1978). An approach to the regulation of bank holding companies. *Journal of Business*, 379-412.

Blair, R. D. and A. A. Heggestad (1978). "Bank Portfolio Regulation and the Probability of Bank Failure: Note." *Journal of Money, Credit and Banking* 10(1): 88-93.

Blum, J. (1999). "Do capital adequacy requirements reduce risks in banking?" *Journal of Banking and Finance* 23(5): 755-771.

Blum, J. and M. Hellwig (1995). "The macroeconomic implications of capital adequacy requirements for banks." *European Economic Review* 39(3-4): 739-749.

Blum, J. r. M. (2008). "Why 'Basel II' may need a leverage ratio restriction." *Journal of Banking & Finance* 32 (2008) 1699–1707: 1699-1707.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, 87(1), 115-143.

Bond, S. R. (2002). "Dynamic panel data models: a guide to micro data methods and practice." *Portuguese Economic Journal* 1(2): 141-162.

Bornhorst, F., & Baum, C. F. (2006). LEVINLIN: Stata module to perform Levin-Lin-Chu panel unit root test. *Statistical Software Components*.

Bris, A. and S. Cantale (2004). "Bank capital requirements and managerial self-interest." *The Quarterly Review of Economics and Finance* 44(1): 77-101.

Borio, C., Furfine, C., & Lowe, P. (2001). Procyclicality of the financial system and financial stability: issues and policy options. *BIS papers*, 1, 1-57.

Carbo, S. (1993). *The impact of regulation on bank capital augmentations in Spain* (Doctoral dissertation, University College of North Wales).

Calem, P., & Rob, R. (1999). The impact of capital-based regulation on bank risk-taking. *Journal of Financial Intermediation*, 8(4), 317-352.

Calomiris, C. W. (1999). "Building an incentive-compatible safety net." *Journal of Banking & Finance* 23(10): 1499-1519.

Calomiris, C. W. (2007). *Bank failures in theory and history: the Great Depression and other" contagious" events* (No. w13597). National Bureau of Economic Research.

Cantor, R. (2001). Moody's investors service response to the consultative paper issued by the Basel Committee on Bank Supervision "A new capital adequacy framework". *Journal of Banking & Finance*, 25(1), 171-185.

Corsetti Giancarlo, Pesenti Paolo and Roubini Nouriel (1998),'What Caused the Asian Currency and Financial Crisis? Part I: A Macroeconomic Overview', NBER, Working Paper, Number 6833.

Corsetti Giancarlo, Pesenti Paolo and Roubini Nouriel (1998), 'What Caused the Asian Currency and Financial Crisis? Part II: The Policy Debate', NBER, Working Paper, Number 6834.

Chami, R., & Cosimano, T. (2003). The nature of capital adequacy constraints under the Basel accord. *Available at SSRN* 456981.

Concetta Chiuri, M., Ferri, G., & Majnoni, G. (2002). The macroeconomic impact of bank capital requirements in emerging economies: Past evidence to assess the future. *Journal of banking & finance*, 26(5), 881-904.

Copeland,T.E.,J.F.Weston,K.Shastri (2005),Financial Theory and Corporate Policy, 4/e, Pearson Education.

Craig, R. J. and J. G. Diga (1996). "Financial reporting regulation in ASEAN: Features and prospects." *The International Journal of Accounting* 31(2): 239-259.

Hutchison, D., & Cox, R. (2006)."The Causal Relationship between Bank Capital and Profitability."*Annals of Financial Economics.*

Dahl,D. and R. E. Shrieves (1990)."The impact of regulation on bank equity infusions." *Journal of Banking & Finance* 14(6): 1209-1228.

Danaharta (Pengurusan Danaharta Nasional Berhad) (2005), Final Report as of September 30th 2005, Kuala Lumpur: Danaharta.

Demsetz, R., Saidenberg, M., & Strahan, P. (1996). Banks with something to lose: The disciplinary role of franchise value. *Economic Policy Review*, 2(2).

Demirguc-Kunt, A. and H. Huizinga (1999). "Determinants of commercial bank interest margins and profitability: some international evidence." *The World Bank Economic Review* 13(2): 379-408.

Dewatripont, M., Tirole, J., (1993.). The Prudential Regulation of Banks. Cambridge, MA, MIT Press.

Dewatripont, M., Tirole, J., & Grimes, A. (1994). The prudential regulation of banks (pp. 73-75). Cambridge, MA: MIT press.

Diamond, D. W. (2001). "Should banks be recapitalized?" *Federal Reserve Bank of Richmond Economic Quarterly* 87(4): 71.

Diamond, D. W. and P. H. Dybvig (1983). "Bank Runs, Deposit Insurance, and Liquidity." The *Journal of Political Economy* 91(3): 401-419.

Diamond, D. W. and P. H. Dybvig (1986). "Banking Theory, Deposit Insurance, and Bank Regulation." *The Journal of Business* 59(1): 55-68.

Diamond, D. W. and R. G. Rajan (2001). "Liquidity Risk, Liquidity Creation, and Financial Fragility: A Theory of Banking." *The Journal of Political Economy* 109(2): 287-327.

Dickinson and Mullineux (2000), Lessons from the East Asian financial crisis: A financial sector perspective *Geoforum* 32 (2001) 133±142

Dowd, K. (1993). "Re-Examining the Case for Government Deposit Insurance." *Southern Economic Journal* 59(3): 363-370.

Dowd, K. (1999). "Does Asymmetric Information Justify Bank Capital Adequacy Regulation?" *Cato Journal* 19(1).

Dye, R. A. (1988). "Earnings management in an overlapping generation's model." *Journal of Accounting Research*: 195-235.

Ediz, T., Michael, I., & Perraudin, W. (1998). The impact of capital requirements on UK bank behavior. *Economic Policy Review*, 4(3).

Edwards, F. R., & Mishkin, F. S. (1995). The Decline of Traditional Banking: Implications for Financial Stability and Regulatory Policy (No. w4993). National Bureau of Economic Research.

Enoch, Charles, Barbara Baldwin, Olivier Frecaut and Arto Kovanen (2001), 'Indonesia: Anatomy of a Banking Crisis – Two Years of Living Dangerously, 1997-1999', *IMF Working Papers* WP/0/52

Estrella, A. (2004). "The cyclical behavior of optimal bank capital." *Journal of Banking & Finance* 28(6): 1469-1498.

Fama, E. F. (1980). "Banking in the theory of finance.*" Journal of Monetary Economics* 6(1): 39-57.

Fama, E. F. and M. C. Jensen (1983). "Agency Problems and Residual Claims." *Journal of Law and Economics* 26(2): 327-349.

Flannery, M. J. (1994). "Debt Maturity and the Deadweight Cost of Leverage: Optimally Financing Banking Firms." *The American Economic Review* 84(1): 320-331.

Flannery, M. J. and K. P. Rangan (2002). "Market Forces at Work in the Banking Industry: Evidence from the Capital Buildup of the 1990s." SSRN eLibrary.

Flannery, M. J. and K. P. Rangan (2008). "What Caused the Bank Capital Build-Up of the 1990s?" *Review of Finance* 12(2): 391-429.

Financial Stability Forum (2009),"Report of the Financial Stability Forum on Enhancing Market and Institutional Resilience: http://www.financialstabilityboard.org/publications/r_0904d.pdf
.
Fund, I. I. M. (2009). Global Financial Stability Report: Responding to the Financial Crisis and Measuring Systemic Risks. Washington DC, International Monetary Fund.

Furfine, C. (2001). "Bank Portfolio Allocation: The Impact of Capital Requirements, Regulatory Monitoring, and Economic Conditions." *Journal of Financial Services Research* 20(1).

Furlong, F. T. and M. C. Keeley (1989). "Capital regulation and bank risk-taking: A note." *Journal of Banking & Finance* 13(6): 883-891.

Gendreau, B. C. and D. B. Humphrey (1980). "Feedback Effects in the Market Regulation of Bank Leverage: A Time-Series and Cross-Section Analysis." *The Review of Economics and Statistics* 62(2): 276-280.

Gerlach, S. and M. S. Yiu (2004). "Estimating output gaps in Asia: A cross-country study." *Journal of the Japanese and International Economies* 18(1): 115-136.

Gjerde, Ø., & Semmen, K. (1995). Risk-based capital requirements and bank portfolio risk. *Journal of Banking & Finance*, 19(7), 1159-1173.

Gilbert, R. A. (2006). "Keep the leverage ratio for large banks to limit the competitive effects of implementing Basel II capital requirements." *Networks Financial Institute Policy Brief.*

Goddard, J., P. Molyneux, et al. (2004). "Dynamics of Growth and Profitability in Banking." *Journal of Money, Credit and Banking* 36(6): 1069-1090.

Gordy, M. B. and B. Howells (2006). "Procyclicality in Basel II: Can we treat the disease without killing the patient?" *Journal of Financial Intermediation* 15(3): 395-417.

Greene, W. H. (2002). Econometric Analysis (5th ed.). New Jersey, Prentice Hall Inc.

Gropp, R. and F. Heider (2007). "What can corporate finance say about banks' capital structures." *European Central Bank working paper*.

Gropp, R. and J. Vesala (2004). "Deposit Insurance, Moral Hazard and Market Monitoring." *Review of Finance* 8(4): 571-602.

Hale, D. (1991). "Should The G-7 Governments Develop Target for Bank Profits" in Global Risk Based Capital Regulations-Capital Adequacy, Edited by Charles A. Stone and Anne Zissu, Irwin, Illinois (page 267-269)

Hancock, D. and W. Passmore (2008). Financial stability and the capital adequacy of large us banking organizations: a VAR in VaR approach, *Working Paper, Board of Governors of the Federal Reserve System*.

Hancock, D. and J. A. Wilcox (1998). "The "credit crunch" and the availability of credit to small business." *Journal of Banking & Finance* 22(6-8): 983-1014.

Hannan, T. H. and G. A. Hanweck (1988). "Bank Insolvency Risk and the Market for Large Certificates of Deposit." *Journal of Money, Credit and Banking* 20(2): 203-211.

Harding, J. (2006). *The optimal capital structure of banks under deposit insurance and capital requirements* (Doctoral dissertation, Department of Economics, University of Connecticut).

Hart, O. D. (1979). "On Shareholder Unanimity in Large Stock Market Economies." *Econometrica* 47(5): 1057-1083.

Hasan, I. and L. D. Wall (2004). "Determinants of the Loan Loss Allowance: Some Cross-Country Comparisons." *The Financial Review* 39(1): 129-152.

Hawkins, J. (1997). Bank restructuring in Southeast Asia. *Exchange*, 100.

Hawkins j.,(1999).Bank restructuring in South-East Asia *BIS Staff papers*.

Healy, P. M., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting horizons*, 13(4), 365-383.

Heid, F. (2007). "The cyclical effects of the Basel II capital requirements." *Journal of Banking and Finance* 31(12): 3885-3900.

Hellmann, T. F., Murdock, K. C., & Stiglitz, J. E.. (2000). "Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Requirements Enough?" *The American Economic Review* 90(1): 147-165.

Hildebrand, P. M. (2008). "Is Basel II Enough? The Benefits of a Leverage Ratio." Speech at the Financial Markets Group Lecture, London School of Economics, December 15.

Holtz-Eakin, D., W. Newey, et al. (1988). "Estimating Vector Autoregressions with Panel Data*." Econometrica* 56(6): 1371-1395.

Hovakimian, A. and E. J. Kane (2000). "Effectiveness of Capital Regulation at U.S. Commercial Banks, 1985 to 1994*." The Journal of Finance* 55(1): 451-468.

Hovakimian, A., Kane, E. J., & Laeven, L. (2003). How country and safety net characteristics affect bank risk shifting. *Journal of Financial Services Research*, 23(3), 177-204.

Hutchison, D., & Cox, R. (2006). The causal relationship between bank capital and profitability. *Available at SSRN 956396.*

International Monetary Fund Global Financial Stability Report 2009

International Monetary Fund Global Financial Stability Report 2010

Jackson, P., C. Furfine, et al. (1999). "Capital requirements and bank behavior: the impact of the Basle Accord." Basle Committee on Banking Supervision Working Papers 1: 1-58.

Jackson, P. and W. Perraudin (2000). "Regulatory implications of credit risk modelling." *Journal of Banking & Finance* 24(1-2): 1-14.

Jacques, K. and P. Nigro (1997). "Risk-based capital, portfolio risk, and bank capital: A simultaneous equations approach." *Journal of Economics and Business* 49(6): 533-547.

Jeitschko, T. D. and S. D. Jeung (2005). "Incentives for risk-taking in banking-a unified approach." *Journal of Banking & Finance* 29(3): 759-777.

Jeitschko, T. D. and S. D. Jeung (2007). "Do well-capitalised banks take more risk? Evidence from the Korean banking system." *Journal of Banking Regulation* 8(4): 291-315.

Jensen, M. C. and W. H. Meckling (1976). "Theory of the firm: Managerial behavior, agency costs and ownership structure.*"Journal of Financial Economics* 3(4): 305-360.

John, K., T. A. John, et al. (1991). "Risk-shifting incentives of depository institutions: A new perspective on federal deposit insurance reform." *Journal of Banking & Finance* 15(4-5): 895-915.

Jokipii, T. and A. Milne (2008). "The cyclical behaviour of European bank capital buffers." *Journal of Banking & Finance* 32(8): 1440-1451.

Jokipii, T & A. Milne (2010). "Bank capital buffer and risk adjustment decisions." *Journal of Financial Stability* III(1): XX.

Jokipii, T., & Milne, A. (2011). Bank capital buffer and risk adjustment decisions. *Journal of Financial Stability*, *7*(3), 165-178.

Jones, D. (2000). "Emerging problems with the Basel Capital Accord: Regulatory capital arbitrage and related issues." *Journal of Banking & Finance* 24(1-2): 35-58.

Jones, D. S. and K. K. King (1995). "The implementation of prompt corrective action: An assessment." *Journal of Banking & Finance* 19(3-4): 491-510.

Kanagaretnam, K., Lobo, G. J., & Yang, D. H. (2005). Determinants of signaling by banks through loan loss provisions. *Journal of Business Research*, 58(3), 312-320.

Kane, E.J.(2000).Capital movements, banking insolvency, and silent runs in the Asian financial crisis *Pacific-Basin Finance Journal* 8 2000. 153–175

Kareken, J. H. (1983). "Deposit insurance reform or deregulation is the cart, not the horse." *Federal Reserve Bank of Minneapolis Quarterly Review* 7(2): 1—9.

Kareken, J. H. and N. Wallace (1978). "Deposit Insurance and Bank Regulation: A Partial-Equilibrium Exposition." *The Journal of Business* 51(3): 413-438.

Kawai, M. (2000). "The resolution of the East Asian crisis: financial and corporate sector restructuring." *Journal of Asian Economics* 11(2): 133-168.

Keeley Frederick, T. and C. Michael (1990). "A reexamination of mean-variance analysis of bank capital regulation* 1." *Journal of Banking & Finance* 14(1): 69-84.

Keeley, M. C. (1988). "Bank capital regulation in the 1980s: Effective or ineffective." *Federal Reserve Bank of San Francisco Economic Review*: 1–20.

Keeley, M. C. (1990). "Deposit insurance, risk, and market power in banking." *The American Economic Review*: 1183-1200.

Keeton, W. R. (1989). "The new risk-based capital plan for commercial banks." E*conomic Review* 74: 40–60.

Keeton, W. R. (1994). "Risk Based Capital Requirements for Comercial Banks." in Global Risk Based Capital Regulations-Capital Adequacy, Edited by Charles A. Stone and Anne Zissu, Irwin, Illinois.

Kim, D. and A. M. Santomero (1988). "Risk in banking and capital regulation." *Journal of Finance:* 1219-1233.

Kirstein, R. (2002). "The new Basle Accord, internal ratings, and the incentives of banks." *International Review of Law and Economics* 21(4): 393-412.

Koehn, M. and A. M. Santomero (1980). "Regulation of Bank Capital and Portfolio Risk." *The Journal of Finance* 35(5): 1235-1244.

Krugman, Paul (1998), 'Saving Asia: It's Time to Get Radical'*, Fortune, September* 7th 1998, No. 138 (5), pp. 74-80.

Krugman, Paul (1998a), 'Curfews on Capital Fligth: What Are the Options?', October 12th1998, http://web.mit.edu/krugman/www/#other

Krugman,Paul (1998b),'What happened to Asia?', January 1998,http://web.mit.edu/ krugma an/www./#other

Krugman, Paul (1999a), 'Balance Sheets, the Transfer Problem, and Financial Crises', inIsard, Peter, Assaf Razin and Andrew K. Rose eds., International Finance and Financial Crises: Essays in Honor of Robert Flood, Norwell Massachusetts: Kluwer Academic Publishers.

Krugman, Paul (1999b), 'Analytical Afterthoughts on the Asian Crisis', Mimeo, MIT.

Laeven, L., & Valencia, F. (2008). Systemic banking crises: a new database. *IMF Working Papers*, 1-78.

Laeven, L. (2002). "International evidence on the value of deposit insurance." The *Quarterly Review of Economics and Finance* 42(4): 721-732.

Lehnert, A. and S. W. Passmore (1999). "The Banking Industry and the Safety Net Subsidy." SSRN eLibrary.

Leland, H. E. (1998). "Agency Costs, Risk Management, and Capital Structure." The *Journal of Finance* 53(4): 1213-1243.

Levin, A., C.-F. Lin, et al. (2002). "Unit root tests in panel data: asymptotic and finite-sample properties." *Journal of Econometrics* 108(1): 1-24.

Liang, X., Ross, S., & Harding, J. (2007). The Optimal Capital Structure of Banks under Deposit Insurance and Capital Requirements. *Available at SSRN 890694*.

Maddala, G. S. (1987). "Limited Dependent Variable Models Using Panel Data." The *Journal of Human Resources* 22(3): 307-338.

Marcus, A. J. (1982). "Risk Sharing and the Theory of the Firm." *The Bell Journal of Economics* 13(2): 369-378.

Marcus, A. J. (1983). "The Bank Capital Decision: A Time Series--Cross Section Analysis." *Journal of Finance:* 1217-1232.

Marcus, A. J. (1984). "Deregulation and bank financial policy*." Journal of Banking & Finance* 8(4): 557-565.

Marcus, A. J., & Shaked, I. (1984). The valuation of FDIC deposit insurance using option-pricing estimates. *Journal of Money, Credit and Banking*, 16(4), 446-60.

Markowitz,H.M,(1959),Portfolio Selection: Efficient Diversification of Investment, Cowles Foundation Monograph 16,Wiley,New York.

Markowitz, H. M. (1999). The early history of portfolio theory: 1600-1960. *Financial Analysts Journal*, 5-16.

Markowitz, H. M. (1991). Foundations of portfolio theory. *The Journal of Finance,* 46(2), 469-477.

Marshall, D. A. and E. S. Prescott (2001). "Bank capital regulation with and without state-contingent penalties." Carnegie-Rochester Conference Series on Public Policy 54(1): 139-184.

Pangestu, M., & Habir, M. (2002). The Boom Bust and Restructuring of Indonesian Banks. International Monetary Fund.

Merton, R. C. (1978). "On the Cost of Deposit Insurance When There Are Surveillance Costs." *The Journal of Business* 51(3): 439-452.

Merton, R. C. (1977). An analytic derivation of the cost of deposit insurance and loan guarantes an application of modern option pricing theory. *Journal of Banking & Finance*, 1(1), 3-11.

Merton, R. C., & Bodie, Z. (1993, June). Deposit insurance reform: a functional approach. In *Carnegie-Rochester Conference Series on Public Policy* (Vol. 38, pp. 1-34). North-Holland.

Miles, D. (1995). "Optimal regulation of deposit taking financial intermediaries." *European Economic Review* 39(7): 1365-1384.

Miller, M. H. (1977). "Debt and taxes." *Journal of Finance*: 261-275.

Miller, M. H. (1995). "Do the M&M propositions apply to banks?" *Journal of Banking and Finance* 19(3): 483-489.

Milne, A. (2001). Minimum capital requirements and the design of the new Basel Accord: a constructive critique. *Journal of Financial Regulation and Compliance*, 9(4), 312-326.

Milne, A. (2002). "Bank capital regulation as an incentive mechanism: implications for portfolio choice " *Journal of Banking & Finance (Netherlands)* 1-23.

Milne, A. (2004). "The Inventory Perspective on Bank Capital." SSRN eLibrary.

Milne, A. (2006). "Optimal regulation of deposit taking financial intermediaries: A correction." *European Economic Review* 50(2): 509-516.

Milne, A. and A. E. Whalley (2001). "Bank Capital Regulation and Incentives for Risk-Taking." SSRN eLibrary.

Mingo, J. J. (2000). "Policy implications of the Federal Reserve study of credit risk models at major US banking institutions." *Journal of Banking and Finance* 24(1/2): 15-33.

Mishkin, F. S. (1999). Lessons from the Asian crisis. *Journal of International Money and Finance*, 18(4), 709-723.

Mishkin, F. S. (1999). Global financial instability: framework, events, issues. *The Journal of Economic Perspectives*, 13(4), 3-20.

Mishkin, F. S. (2001). The Economics of Money, Banking, and Financial Institutions Boston, Addision Wesley Longman.

Mishkin Frederic, S. (2001). The Economics of Money, Banking and Financial Markets. *Reading: Addison-Wesley,*

Mitchell, K. (1984). Capital adequacy at commercial banks. *Economic review*, 69.

Mitchell, D. W. (1986). "Some Regulatory Determinants of Bank Risk Behavior: Note." *Journal of Money, Credit and Banking* 18(3): 374-382.

Modigliani, F. and H. M. Merton (1958). "The Cost of Capital, Corporation Finance and the Theory of Investment." *The American Economic Review* 48(3): 261-297.

Modigliani, F. and H. M. Merton (1963). "Corporate Income Taxes and the Cost of Capital: A Correction." *The American Economic Review* 53(3): 433-443.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, 13(2), 187-221.

Ngo, P. T. H. (2006a). "A Theory of Precautionary Regulatory Capital in Banking." Working Papers of Australian National University.

Ngo, P. T. (2006). A Theory of Precautionary Regulatory Capital in Banking*. *International Review of Finance*, 6(3-4), 99-128.

Park, S. (1997). "Risk-taking behavior of banks under regulation." *Journal of Banking & Finance* 21(4): 491-507.

Paroush, J., & Schreiber, B. (2008). The Relationships Between Profitability, Capital, and Risk: Commercial vs. Saving/Mortgage Banks. *Capital, and Risk: Commercial vs. Saving/Mortgage Banks* (December 6, 2008*)*.

Paul Calem, R. R. (1999). "The Impact of Capital-Based Regulation on Bank Risk-Taking." *Journal of Financial Intermediation*: 317–352.

Peek, J. and E. Rosengren (1995). "The Capital Crunch: Neither a Borrower nor a Lender Be." *Journal of Money, Credit & Banking* 27(3).

Pennacchi, G. (2006). "Deposit insurance, bank regulation, and financial system risks." Journal of Monetary Economics 53(1): 1-30.

Pennacchi, G. G. (1987). "A Reexamination of the Over- (or Under-) Pricing of Deposit Insurance." *Journal of Money, Credit and Banking* 19(3): 340-360.

Pennacchi, G. G. (2005). "Risk-based capital standards, deposit insurance, and procyclicality." *Journal of Financial Intermediation* 14(4): 432-465.

Peterson, L. D. W. a. P. P. (1996). "Banks' Response to Binding Regulatory Capital Requirements*." Economic Review:* 1-17.

Peura, S. and J. Keppo (2006). "Optimal Bank Capital with Costly Recapitalization*." The Journal of Business* 79(4): 2163-2201.

Polonchek, J., M. B. Slovin, et al. (1989). "Valuation effects of commercial bank securities offerings : A test of the information hypothesis*." Journal of Banking & Finance* 13(3): 443-461.

Powell, A. P. (2002). "A Capital Accord for Emerging Economies?" SSRN eLibrary.

Pringle, J. J. (1974). "The Capital Decision in Commercial Banks." *The Journal of Finance* 29(3): 779-795.

Pringle, J. J. (1975). Bank Capital and the Performance of Banks as Financial Intermediaries: Comment. *Journal of Money, Credit and Banking,* 7(4), 545-50.

Pyle, D. H. (1984). "Deregulation and deposit insurance reform*." Economic Review, Federal Reserve Bank of San Francisco* 515.

Rajan, R. G. (1994). "Why Bank Credit Policies Fluctuate: A Theory and Some Evidence." *The Quarterly Journal of Economics* 109(2): 399-441.

Rajan, R. G. and L. Zingales (1995). "What Do We Know about Capital Structure? Some Evidence from International Data*." The Journal of Finance* 50(5): 1421-1460.

Razzak, W. (1997). "The Hodrick-Prescott technique: A smoother versus a filter: An application to New Zealand GDP." *Economics Letters* 57(2): 163-168.

Rejda, G. E. Principles of Risk Management and Insurance, 2005. International edition, Pearson Education.

Repullo, R. and J. Suarez (2004). "Loan pricing under Basel capital requirements." *Journal of Financial Intermediation* 13(4): 496-521.

Repullo, R. and J. Suarez (2008). "The Procyclical Effects of Basel II." CEPR Discussion Papers.

Reynolds, S. E., S. Ratanakomut, et al. (2000). "Bank financial structure in pre-crisis East and Southeast Asia." *Journal of Asian Economics* 11(3): 319-331.

Rime, B. (2001). "Capital requirements and bank behaviour: Empirical evidence for Switzerland." *Journal of Banking and Finance* 25(4): 789-805.

Rochet, J. C. (1992). Capital requirements and the behavior of commercial banks. *European Economic Review*, 36(5), 1137-1170.

Rochet, J.-C. (2004). "Macroeconomic shocks and banking supervision." *Journal of Financial Stability* 1(1): 93-110.

Rochet, J. C. (1992). "Capital requirements and the behaviour of commercial banks." *European Economic Review* 36(5): 1137-1170.

Rochet, J. C. (1999). "Solvency regulations and the management of banking risks." *European Economic Review* 43(4-6): 981-990.

Roodman, D. (2013). xtabond2: Stata module to extend xtabond dynamic panel data estimator. *Statistical Software Components*.

Ross, S. A. (1973). "The Economic Theory of Agency: The Principal's Problem." *The American Economic Review* 63(2): 134-139.

Santomero, A. M. (1997). "Commercial bank risk management: an analysis of the process." *Journal of Financial Services Research* 12(2): 83-115.

Santomero, D. K. A. M. (1988). "Risk in Banking and Capital Regulation." *The Journal of Finance* 43(5): 1219-1233.

Santos, J. A. C. (1999). "Bank capital and equity investment regulations." *Journal of Banking & Finance* 23(7): 1095-1120.

Santos, J. A. C. (2001). "Bank Capital Regulation in Contemporary Banking Theory: A Review of the Literature." *Financial Markets, Institutions and Instruments* 10(2): 41-84.

Saurina, J., (2009), "Dynamic Provisioning: The Experience of Spain" The World Bank Group Crisis Response Policy Note, No. 7, July 2009

Sealey, C. W., Jr. (1983). "Valuation, Capital Structure, and Shareholder Unanimity for Depository Financial Intermediaries." *The Journal of Finance* 38(3): 857-871.

Sharpe, W. F. (1978). "Bank capital adequacy, deposit insurance and security values." *Journal of Financial and Quantitative Analysis*: 701-718.

Sheldon, G. (1996). "Capital adequacy rules and the risk-seeking behavior of banks: A firm-level analysis." *Swiss Journal of Economics and Statistics (SJES)* 132(IV): 709-734.

Short, B. K. (1978). "Capital Requirements for Commercial Banks: A Survey of the Issues Staff Papers-International Monetary Fund: 528-563.

Shrieves, R. E. and D. Dahl (1992). "The relationship between risk and capital in commercial banks*." Journal of Banking & Finance* 16(2): 439-457.

Smirlock, M. (1985). "Evidence on the (Non) Relationship between Concentration and Profitability in Banking." *Journal of Money, Credit and Banking* 17(1): 69-83.

Stern, G. H. (1998). "Government safety nets, banking system stability, and economic development*." Journal of Asian Economics* 9(1): 21-29.

Stiglitz, J. E. (1999). "Lessons From East Asia." *Journal of Policy Modeling* 21(3): 311-330.

Stiglitz, J. E. (2000). "Capital Market Liberalization, Economic Growth, and Instability." *World Development* 28(6): 1075-1086.

Stiglitz, J. E. (2001). "Principles of financial regulation: a dynamic portfolio approach." *The World Bank Research Observer* 16(1): 1-18.

Stolz, S(2002), "The relationship between bank capital, risk-taking and capital regulation: A review of Literature," Kiel Working Paper 1105,Kiel Institute for World Economics

Stolz, S., Heid, F., & Porath, D. (2004). Does capital regulation matter for bank behavior? Evidence for German savings banks. *Evidence for German Savings Banks (*December 2003*). EFMA*.

Stolz, S. and M. Wedow (2005). Banks regulatory Capital Buffer and the Business Cycle: Evidence for German Savings and Cooperative Banks, Dt. Bundesbank.

Stolz, S, (2007). Bank Capital and Risk-Taking: The Impact of Capital Regulation, Charter Value and the Business Cycle, *Springer-Verlag Press*, 2007.

Takatoshi Ito and Yuko Hashimoto (2007) Bank Restructuring in Asia: Crisis management in the aftermath of the Asian financial crisis and prospects for crisis prevention -Malaysia-RIETI Discussion Paper Series 07-E-039

Taggart, R. A., & Greenbaum, S. I. (1978). Bank capital and public regulation. *Journal of money, Credit and Banking, 10*(2), 158-169

Tirole, J. (1994). "On banking and intermediation." *European Economic Review* 38(3-4): 469-487.

Van Roy, P. (2005). "The Impact of the 1988 Basel Accord on Banks' Capital Ratios and Credit Risk-taking: An International Study." SSRN eLibrary.

VanHoose, D. (2007). "Theories of bank behavior under capital regulation." *Journal of Banking & Finance* 31(12): 3680-3697.

Wahlen, J.M., (1994). "The Nature of Information in Commercial Bank in Loan Loss Reserves", *The Accounting Review,* vol. 69, no.3, July, pp. 299-305.

Walker, D. (2006)"New Deposit Insurance System in East Asia" Occasional Paper No.44 The South East Asian Central Banks Research and Training Centre (The SEACEN Centre) Lorong Universiti A 59100 Kuala Lumpur Malaysia

Wall, L. D. and T. W. Koch (2000). "Bank loan-loss accounting: A review of theoretical and empirical evidence." *Economic Review-Federal Reserve Bank of Atlanta* 85(2): 1-20.

Wall, L. D. and D. R. Peterson (1987). "The effect of capital adequacy guidelines on large bank holding companies*." Journal of Banking & Finance* 11(4): 581-600.

Wall, L. D., & Peterson, D. R. (1995). Bank holding company capital targets in the early 1990s: The regulators versus the markets. *Journal of Banking & Finance,* 19(3), 563-574.

Wall, L. D., & Peterson, P. (1996). Banks' responses to binding regulatory capital requirements. *Economic Review, Federal Reserve Bank of Atlanta*, 81.

Wall, L. D. and P. P. Peterson (1998). "The choice of capital instruments." *Economic Review-Federal Reserve bank of Atlanta* 83: 4-17.

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. The MIT press.

Yair E.Orgler and Robert A.Taggart,Jr." Implications of Corporate Capital Structure Theory for Banking Institutions: Note "*Journal of Money, Credit and Banking* Vol. 15, No.2 (May, 1983), pp.212-221

Yilmaz, E. (2009). "Capital accumulation and regulation." *The Quarterly Review of Economics and Finance* 49(3): 760-771.

Young, J. J. (1994). "Outlining regulatory space: Agenda issues and the FASB." *Accounting, Organizations and Society* 19(1): 83-109.

Zellner, A., & Theil, H. (1962). Three-stage least squares: simultaneous estimation of simultaneous equations. *Econometric: Journal of the Econometric Society*, 54-78.

Zhang, Z.-y., J. Wu, et al. (2008). "Impacts of Capital Adequacy Regulation on Risk-

taking Behavior of Banking." *Systems Engineering - Theory & Practice* 28(8): 183-189.