THE IMPACT OF CAPITAL REGULATION, INCOME DIVERSIFICATION AND OWNERSHIP STRUCTURE ON RISK OF COMMERCIAL BANKS

BY

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ABSTRACT

The 2007-2008 financial crisis provides evidence of acceleration of bank risk due to the absence of adequate capital level. To address the excessive risk-taking and default of the bank, regulatory authorities emphasise the capital adequacy regulation. This study examines the effect of capital adequacy regulation on the risk of the banking system of different economies. Moreover, the effect of income diversification, ownership structure and concentration risk are examined on the risk of the bank. 565 commercial banks from 52 countries were studied during the period from 2011 to 2015. Considering the panel nature of this study, linear dynamic panel data model estimation using the Maximum Likelihood with Structural Equation Modelling was followed. The result is consistent with the existing empirical evidence that finds the increase of capital ratio decreases bank risk and the regulatory pressure affects the risk of the bank negatively. Also, the study finds income diversification through engagement in non-traditional activities decreases the risk and increases the liquidity and solvency of the bank. Also, the concentration of ownership is negatively associated with the liquidity risk of the bank. Finally, the study finds that although the negative effect of regulatory pressure causes banks to increase their risk undertaking, in the long-term, they increase the capital level followed by a decrease of default risk of the bank. The study helps fill the gap in banking literature on the effect of recent changes in the capital regulation on bank risk in different economies and reaffirms the crucial role of increasing the non-traditional activities to diversify their income sources with an aim to increase the solvency.

مُلخّصُ البَحث

لقد أظهَرت الأزمةُ الماليةُ عامَ 2007–2008م بوضوحٍ أنّ ازدِيادَ الخُطورةِ على عَملياتِ البُنوكِ مُرتبطٌ بشكلٍ كبيرٍ بِغيابِ مُستوىً مُلائِمٍ لرأسِ المال. وبناءً عليه فقَد أقرّت السُّلطاتُ الماليةُ قوانينَ تحدّدُ الحدّ الأَدنى لِكفايةِ رأسِ المال، وذلكَ لتجنّبِ الآثارِ السّلبيةِ النّاتجةِ عن مُخاطرةِ البُنوكِ في التّمويلِ المفرط، الأمر الّذي يجعَلُها غَيرَ قادرةٍ على الإيفاءِ بِالتزاماتِها تجاهَ عُملائِها. بناءً على ما تقدّم، فإنّ هذه الدّراسةُ تهدفُ إلى فحصِ تأثيرِ قوانينِ كفايةِ رأسِ المالِ على المخاطرِ التي قد تواجهُ النّظُمَ البنكيةَ في عددٍ من الدّول. كما اهتَمّت الدراسةُ بأثرِ كلٍّ من تنويعِ الدّخل، هيكليةِ الملكية وخطرِ التركيز على تلكَ المخاطِر. تمت دراسةُ عملياتِ التّمويلِ في 565 بنكًا تجاريًّا في 52 دولةً خلالَ الفترةِ بين 2011–2015م. بالنّظرِ إلى طَبيعةِ هذِه الدّراسة، فقَد تمّ توظيفُ أُنموذجِ لوحةِ البياناتِ الدّيناميكيةِ الخطّيةِ لتقديرِ أقصَى الاحتمالاتِ مع اتّباعِ أُنموذجِ مُعادلةِ الهيكليّة لتحليلِ النتّائج. أظهَرت الدراسةُ الحاليّة توافقًا مع نتائجِ الدراساتِ السابقةِ في أنّ رفعَ معدّلِ رأسِ المالِ يُقلّلُ المخاطرَ التي تُواجِهُها البُنوك، بالإضافةِ إلى أنَ الضّغطَ الناشئَ عن القوانينِ التنظيميّةِ يُؤثرُ بشكلٍ سلبيٍ في أداءِ البُنوكِ عندَ مُواجهةِ تلكَ المخاطر. كما خَلُصت الدّراسةُ إلى أن تنوّعَ الدّخلِ — من خلالِ تنفيذِ نَشاطاتٍ غيرِ تقليديةٍ — يُقلّلُ المخاطرَ التي تُواجِهُها البُنوكُ ويزيدُ من سيولة الماليّة لديها. كما وُجِدَ أنّ مَبدأَ تركيزِ المِلكيّةِ ذو علاقةٌ سلبيةٌ معَ المخاطِرِ المتعلّقةِ بالسّيولة للبُنوك. وأخيرًا أظهَرت الدراسةُ أنه بالرّغمِ من أنّ الضّغطَ الناشئَ عن القوانينِ التنظيميةِ يدفعُ بالبنوكِ إلى زيادةِ المخاطَرة، إلا أنّ ذلك يُؤدّي — على المدى البعيدِ — إلى رفعِ مُستوى رأسِ المالِ متبوعًا بخفضِ الخَطرِ المتَمثّل في عَجزِ البُنوك عن الإيفاءِ بالتزاماتها الماليّة. هذه الدراسةُ سوف تساعد في سدِّ ثغرة في أدبيات الدراسات البنكيّة، وتُعدّ إضافةً للدراساتِ المتعلّقةِ بتأثيرِ التّغيُراتِ في القوانينِ التّنظيميّةِ على المخَاطرِ التي تُواجِهُها البُنوكُ في عددٍ من الأَنظِمةِ الاقتِصاديّة، كما أنها تُؤكدُ أهميّةَ الدّورِ الكبيرِ الذي تقومُ به النّشاطاتُ غير التقليديّةِ لتنويعِ مصَادرِ دخلِ البُنوكِ بِهدفِ تَحسينِ مَلاءَتِها الماليّة.

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DECLARATION

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I dedicate this dissertation to my beloved parents, my spouse and sons.

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LIST OF ABBREVIATIONS

BASMEM	Basel Committee Member Countries
BCBS	Basel Committee for Banking Supervision
BIS	Bank for International Settlement
BVD	Bureau van Dijk
CAP	Capital ratio
CAR	Capital Adequacy Regulation
CD	Coefficient of Determination
CEE	Central and Eastern Europe
CFI	Comparative Fit Index
CONOWN	Concentration of Ownership
CPS	Domestic Credit to Private sector
CSI	Capital Stringency Index
EU	European Union
FE	Fixed Effect
FI	Financial Institution
FINOWN	Ownership by Financial Institution
FSI	Financial Stability Institute
G-10	Great -10 Countries
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GGDP	Growth of Gross Domestic Product
GMM	Generalized Method of Moments
HHI	Herfindahl Hirschman Index
ICAAP	Internal Capital Adequacy Assessment process
IFSB	Islamic Financial Services Board
IMF	International Monetary Fund
IND	Income Diversification
JMB	Johnson Matthey Bankers
LCR	Liquidity Coverage Ratio
LIBOR	London Inter Bank Offer Rate
LM	Lagrange Multiplier
LR	Liquidity Ratio

LTA	Loans to Total Asset Ratio
MCR	Minimum Capital Requirement
MD	Market Discipline
MENA	Middle East and North Africa
ML	Maximum Likelihood
MLE	Maximum Likelihood Estimation
NPL	Non-Performing Loan
NSFR	Net Stable Funding Ratio
OLS	Ordinary Least Square
RCAP	Regulatory consistency assessment program
RMSEA	Root Mean Square Error of Approximation
ROA	Return on Asset
ROAA	Return on Average Asset
ROAE	Return on average equity
ROE	Return on Equity
RWA	Risk-Weighted Asset
RWAR	Risk-Weighted Asset Ratio
SBE	Single Borower Expsurre
SD	Standard Deviation
SEM	Structural Equation Model
SIZE	Bank Size
SRMR	Standardized Root Mean Squared Residual
SRP	Supervisory Review Process
TA	Total Assets
TLI	Tucker–Lewis Index
U.A.E	United Arab Emirates
U.K	Unitd Kingdom
U.S	United States
VIF	Variance Inflator Factor

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

During the 2007-2008 global financial crisis, excessive risk-taking by financial organisations and lapses in the regulatory framework to control it were identified as major causes of the crisis (IMF, 2014). Adding to this, Acharya and Matthew (2009) found that the lack of adequate capital against the loan portfolio or assets of the bank, too much dependency on the credit rating of the assets in calculating the required level of capital and reducing the capital level accelerated investments in risky assets significantly causing banks to become insolvent during the 2007-2008 financial crisis.

In the event of a crisis, a financial institution with higher capital faces a lower rate of probability of failure in paying off its liabilities. The capital of financial institutions plays a critical role in long-term financing, solvency and public credibility. This justifies to avoid bankruptcy and financial stability of the economy the implementation of capital adequacy regulation (Maji and Kumar, 2015; Koehn and Santomero, 1980). Therefore, capital adequacy requirement is a vital regulatory issue for financial institutions to be able to absorb losses without forcing banks into liquidation while taking advantage of profitable growth opportunities.

The most fundamental basis for establishing banking regulations is to safeguard depositors from excessive risks to their deposits. Since business firms and individuals hold a significant amount of funds in banks, there are valid concerns from the depositors to protect their funds. Banks as financial intermediaries channel funds from the lenders or depositors to the borrowers. By doing so, banks facilitate the economy through

transactions, portfolio creations and spreading risks. Since their primary role is to make a profit from matching the gap, it bears risks of mismatch, default and market variability. Excessive risk-taking through lending in risky assets can increase the rate of default in repayment and return of the banks, which ultimately affect the depositors. The aggregate defaults by the banks consequently affect the economy as a whole.

As a result, the regulatory authorities enforce regulations to protect bank depositors. Since banks are engaged in the extensive transformation of credit, liquidity, maturity and other risk-taking behaviours, capital adequacy regulation is intended to address these risk-taking behaviour (Cecchetti, 2015). Moreover, the regulations attempt to create an environment where the banks are expected to operate efficiently and competitively with a reasonable level of banking services throughout the economy (Alam, 2012).

The Basel Committee on Banking Supervision (BCBS) of the Bank for International Settlement (BIS) provides a comprehensive guideline in managing bank capital under Basel I, Basel II and Basel III guidelines. It is an international standard to safeguard the banks from operational and financial risk. The objective of the guidelines is to set risk-sensitive minimum capital requirements, which states that a bank with a high-risk exposure regarding credit, operations and markets will have to maintain a high level of capital to safeguard its solvency and stability as well as the economy (BCBS, 2004).

The Financial Stability Institute (FSI) jointly formed by the BIS and BCBS aimed to promote, assist and support the central banks or financial sector supervisors towards strengthening the financial system. The FSI carries out a periodic survey of the non-member countries of the Basel Committee regarding the implementation status of Basel II and Basel III. Their survey found that most of the countries have adopted the

risk-based capital requirement (Basel II or Basel III) for operating banks formulated by the Basel Committee, in which case the banks are trying to maintain capital based on the risk-weighted assets (FSI Survey, 2015).

The effect of regulatory enforcement of capital adequacy regulation has gained a lot of attention in the recent empirical studies on bank risk but have not achieved any consensus on the result. Moreover, to understand the effect of the capital regulation, it is necessary to consider the bank's ownership structure as the ownership type and degree both shape the risk-taking decision of the bank. Thus, the present study expects a varying impact of ownership type and the degree of ownership on bank risk.

As indicated in the existing literature, other factors identified for an increase of bank risk are portfolio selection, bank size, income diversification, deposit insurance system and a lower rate of return. However, all these factors show a mixed and inconsistent effect on the bank risk of different economies.

Therefore, the present study examines the effect of capital adequacy regulation as well as the role of income diversification, ownership type and concentration, and regulatory constraint on single borrower exposure ratio as a measure of risk concentration on the risk of the bank in a diversified economy.

The Basel Committee member countries have already adopted Basel III (implementation started in 2013) while non-member countries are in different stages of implementing the Basel Accord (BCBS, 2015). This study expects varying impacts of the determinants of bank risk affected by attributes like membership of Basel Committee. Therefore, this study includes the member countries as well as the non-member countries that have implemented the Basel II regulation (implementation started in 2007). The sampled non-member countries have already drafted the Basel III regulation or are in the process of preparing for the implementation of this guideline.

This study covers the period from 2011-2015 to capture the effect of Basel II and Basel III on bank risk.

1.2 RESEARCH PROBLEM

Bank crises have a long-term effect on the entire economic system. It affects a wide-range of stakeholders like depositors, investors, shareholders, regulators both directly and indirectly (Reinhart and Rogoff, 2009; Dell'Ariccia, 2008). Above all, bank crises erode trust and confidence in the financial system and deteriorate people's motivation to invest (Montagnoli and Moro, 2014).

The first issue identified and regulated by the regulatory authorities to prevent a bank crisis is to control the excessive risk-taking by raising the capital level of the banks. In response, most countries have adopted the capital adequacy regulation advised by the Basel Committee. Even though the regulation is implemented to make the banking system, stronger, existing empirical evidence advocates the negative effect of regulatory pressure hypothesis to encourage excessive risk-taking in the banking industry. (Bouheni, 2014; Camara et al., 2013; Murphy, 2013; Matejasak et al., 2009; Hussain and Hassan, 2005; Das and Ghosh, 2004; Diamond and Rajan, 2000; Blum, 1999; Shrieves and Dhal, 1992; Koehn and Santomero, 1980). Increase of fixed cost due to increase of the capital base as advised by the capital regulation to run the bank is found to influence in taking more risk.

Moreover, the International Monetary Fund in its report on financial stability (IMF, 2014) identifies that the financial stability risks have risen globally and are revolving from advanced economies to emerging markets and other economies. Regulatory changes by the central banks are identified to encourage the increase of the financial risk-taking (IMF, 2015) in the emerging markets. Rapid credit creations,

increase of nonperforming loans and slower economic growth are identified behind this risk taking in the emerging markets. This situation also supports the negative effect of regulatory pressure hypothesis in the banking industry. Hence, the relationship between capital regulation and risk of the banking system is a vital issue.

Adding to this, poor banking practices in terms of inadequate capital, inefficient credit risk management, insufficient portfolio diversification and excessive mismatching of maturity are the causes behind bank crisis. Other causes include principal-agent problem, overstuffing (for state-owned banks) and delaying adoption of information technology (Casu et al., 2015).

Major changes like market integration and financial deregulation have led banking systems to change their scope and operational activities. Banks have transferred their traditional role of intermediation to a vast array of businesses (Barry et al., 2011). Diversification has created new sources for income generation for the banks. However, empirical evidence finds the inconclusive effect of this income diversification on bank risk (Ghosh, 2014; Hseih, 2013; Lin et al., 2012; Vallascas, 2012; Stiroh, 2006; Boyd et al., 1998) for different economies. Empirical evidence also justifies that decisions to diversify income are related to bank size, capital and ownership structure.

In analysing the bank risk, ownership structure is an important issue in explaining the risk exposure. Many studies mentioned agency problem arising from the different ownership structure and degree of concentration affects the capital level and risk undertaking by the bank (Laeven & Levine, 2009; Pathan, 2009; Shezad et al., 2009). At the same time, capital regulation affects the excessive risk-taking decision by the shareholders. As a result, the effect of ownership structure for financial institutions and degree of concentration on bank risk needs to be studied, especially given the limited data that exists currently.

Concentration risk is another important issue for small and emerging economies and is included in the present study. Concentration risk arises from the imperfect diversification of "name" and "sector" concentration (BCBS, 2006). Name concentration risk emerges due to large exposures to individual borrowers and sector concentration risk arises when the loan portfolio is not diversified across different sectors. However, an improper reflection of the concentration risk can lead to an inadequate level of capital even though the apparent capital ratio seems high (Grippa and Gornicka, 2016). The Basel framework has not incorporated or considered it directly in the calculation of credit risk and allocation of necessary capital against this risk. However, the regulatory body of each country restricts risk by limiting the percentage of loan to a single borrower tied with the capital of the bank. Banks are expected to estimate the concentration risk and maintain capital buffers autonomously. However, this might not reflect the actual level of risk. As the commercial banks will try to abide by the restrictions of the regulatory authority, the association of this restriction with the risk of the bank means that regulations should affect a bank's level of risk and risk-taking.

In the aftermath of the 2007-2008 crisis, the Basel Accord III addressed issues like liquidity risk and net stable funding position along with other risks associated with credit, markets and operations. Moreover, the survey by FSI confirms the adoption of the minimum capital adequacy regulation by most countries. This leads to the question of how these regulations influence the risk-taking of the bank in a diverse banking system, particularly between the Basel Committee member and non-member countries.

The interconnections of capital position, income diversification and ownership structure motivate the study to examine their effect on bank risk in light of capital adequacy regulation.

The influence of capital regulation on bank risk-taking has been studied extensively, and the results vary considerably. The proxy variables of non-performing loan (Maji and Kumar, 2015; Agoraki, 2011; Ahmad, 2008; Godlewski, 2004; Shrieves, 1992), loan loss reserves (Lee and Hsieh, 2013, Alam, 2012; Altunbus, 2007;), loans to total assets (Mongid, 2012), standard deviation of return on assets, return on equities (Bouheni, 2014; Lee and Hsieh, 2013) and risk index (Shrieves, 1992) do not include the risk associated with the operational and market risk of the banks.

All of these studies follow the proxy variable to measure the risk that represents only the credit risk or earning performance of the bank. The risk measures based on the credit risk of the bank's asset portfolio do not include the risk associated with the operational and market risk of the banks. Other measures like the variance of asset or equity return express the variance in banks earning performance. Some evidence that uses the risk weighted asset to total asset ratio (Jacques and Nigro, 1997; Rime, 2001; Heid et al., 2003; Das and Ghosh, 2004; Hussain and Hassan, 2005) to measure the risk of the bank all addressed the period pertaining to the Basel Accord I. However, after several changes, the global banking industry is now following Basel Accord II or III which is better in calculating and addressing the wide area of risk of the financial institution compared with Basel I. The Basel Committee includes credit risk, market risk as well as the operational risk of the bank denoted by risk-weighted assets (RWA) in measuring a bank's total risk exposure under Basel II and Basel III.

Therefore, there is a gap of evidence on the effect of recent changes in the capital regulation on banks risk which motivates the need to study the effect of regulations on bank risk.

1.3 RESEARCH OBJECTIVES

This study empirically examines the impact of capital regulation on the risk of the commercial banks of Basel Committee member and non-member countries. To achieve this goal, the study investigates the factors affecting the risk of the commercial banks of the Basel Committee member and non-member countries. Consequently, the objectives of this research are:

i. To investigate the effect of implementing the capital adequacy regulation on the risk of the commercial banks.

ii. To investigate the effect of income diversification on the risk of the commercial banks.

iii. To examine the effect of the ownership identity and concentration on the risk of the commercial banks.

iv. To investigate the effect of regulatory pressure to mitigate concentration risk on the risk of the commercial banks.

v. To investigate the role of other bank-specific variables, i.e. bank size, non-performing loans ratio and loans to total asset and macroeconomic variables, i.e. growth of GDP and share of domestic credit to the private sector on the risk of the commercial banks.

vi. To determine the relationship between Basel Committee membership and the risk of banks.

1.4 RESEARCH QUESTIONS

To achieve the objectives, the following research questions are developed:

i. (a) How does the change of capital ratio affect the change of risk of the commercial banks?