IMPACT OF HIGHER CAPITAL ADEQUACY REQUIREMENTS FOR BANKS: EVIDENCE FROM BRICS

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by

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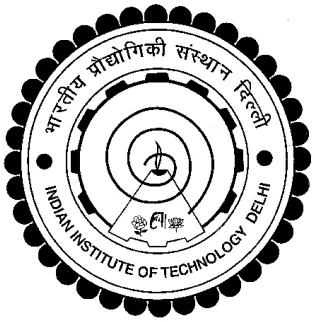

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CERTIFICATE

The thesis titled, **"Impact of Higher Capital Adequacy Requirements for Banks: Evidence from BRICS",** being submitted by **Ms. Noor Ulain Rizvi** to the **Indian Institute of Technology Delhi**, for the award of the degree of **Doctor of Philosophy** is a record of bonafide research work carried out by her. She has worked under our guidance and supervision and has fulfilled all the requirements for the submission of this thesis, which has attained the standard required for a Ph.D. degree of this institute. The results presented in this thesis have not been submitted elsewhere for the award of any degree or diploma.

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The Chinese Bamboo Tree: a story of patience and perseverance

Like any tree to grow, the Chinese Bamboo tree requires nurturing through water, fertile soil, and sunshine. However, there is a peculiarity with Chinese bamboo, which has earned it a mention here. The farmer plants the seed, waters it and adds fertilizer for a whole year, but nothing happens. There are no visible signs of growth despite the care taken by the farmer.

The farmer does the same hard work, nurturing, and care in the second year. However, to her disappointment, there is no growth above the soil. However, she knows there is something in there; she has seen so many flourishing tall bamboo trees around.

Years pass and the farmer continue to take care of the seed even though there are no signs of growth, not even a sapling above the soil is seen. Nothing concrete to show for all the efforts she took in the past four years!

Her patience is tested, and she begins to wonder if her efforts, care, and hard work in nurturing the tree will ever be rewarded. She starts doubting herself and questions the value of her efforts. Inevitably, many of us would start to quit in such situations.

However, then finally in the fifth year – something astonishing happens…

The sapling appears, and within six weeks it grows as tall as 80 feet!

However, think for a moment, does the Chinese Bamboo tree really grow 80 feet in six weeks? Did the seed of Chinese Bamboo tree do nothing for four years only to grow exponentially in the fifth? The answer is NO.

In fact, for the first four years, the little tree was growing underground, developing a root system strong enough to support its potential for outward growth in the fifth year and beyond. Had the tree not developed a strong unseen foundation, it could not have sustained its future tall structure.

The same principle is true for researchers. Researchers, who patiently toil towards worthwhile dreams and goals, overcoming adversities and challenges, grow the strong internal foundation to develop an unparalleled knowledge about the subject matter at hand. In their research journey, they often doubt their work, their efforts, and their hard work and wonder if all this was worth spending years? Did they choose a problem that cannot be solved? Will there be any concrete evidence to support their work? Something visible to others? And then towards the end of this journey, they start seeing their work getting accepted, appreciated, and leaving them with satisfaction that their patience and perseverance paid.

"A book is almost always a collective effort, even if it has only a single author."

Raghuram G. Rajan

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seemed to have little direction.

To my life-coach, my mother: because I owe it all to you. Many Thanks! Whatever I have achieved (or will achieve) in life would not have been possible without your constant support, unconditional trust, timely encouragement, and endless patience.

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Noor Ulain Rizvi

ABSTRACT

The global financial crisis (GFC) of 2008 imposed huge costs on the economies which are unwinding to date. Some studies report that the economic output of G-7 countries reduced by almost five percent, which is almost equivalent to an output loss of US$ two trillion, in addition to millions of jobs (lost) and the unquantifiable financial hardships borne by individuals (Bank of Canada, 2010).

At the outset of the global financial crisis, it was a general belief that the financial system of Brazil, Russia, India, China, and South Africa (BRICS) would withstand the crisis and remain insulated. However, as the crisis disrupted the credit and stock markets worldwide, none of the countries including BRICS countries remained unscathed (Khemka *et al*. 2008; Freytag *et al*. 2009; Bajpai 2011; Jae-Kyoung, 2010).

After the collapse of Lehman Brothers, the regulators were confronted with difficult questions, which led to the G-20 leaders to agree on a comprehensive set of prudential norms to increase the resilience of the banking systems. The central component of these reforms is raising capital and liquidity requirements. Theoretically, the benefits of higher capital adequacy requirements are manifolds; it helps in building a strengthened and more resilient financial system which can reduce the frequency of financial crisis and the related cost of such crisis. Given the historical frequency of crises in BRICS, one may think that the benefits would be limited. However, the growing importance of BRICS on the global platform, along with the growing interconnectedness among economies, the exposure to potential shocks will only increase. Thus, it is in the interest of all the five economies to implement the new regulatory norms to build a more resilient financial system.

The literature mostly considers the costs and benefits of the higher capital adequacy norms for the

developed economies like the United States, the United Kingdom, and other OECD countries. However, it is equally crucial for BRICS economies to weigh the benefits of these norms on the economy against the potential costs. It is expected that higher capital norms will manifest in changing the lending spreads, which is an essential element of monetary policy and has the potential to alter the output (or GDP) of the economy.

This study fills the gap in the literature by estimating the impact of higher capital adequacy requirements for each of the BRICS economies, standalone. The conceptual framework of estimating the costs and benefits for each of the BRICS economies is closely aligned with the Long Term Economic Impact (LEI) study by the Basel Committee on Banking Supervision (BCBS). The benefits of higher capital adequacy requirements are estimated in terms of GDP by employing a stepwise approach aided by probability, Hodrick-Prescott filter, and logistic regression. To begin with, the historical probability of a systemic banking crisis is estimated, followed by the approximation of the potential costs of systemic banking crises. Four scenarios of the potential costs of the crises are considered. The impact of an increase in capital requirement on the reduction in the probability of a crisis is measured. This process helps to conclude the amount (in percent) of GDP saved by increasing the capital requirements; reflected in the saving of the potential cost (in terms of GDP) had a crisis occurred.

Further, the costs of implementing higher capital requirements (in terms of GDP) are calculated using time-series analysis. This increase in capital is expected to change the lending spreads, leading to a change in the lending pattern of the banks (credit rationing), altering the investment and consumption in the economy. This channel of higher capital adequacy requirement results in a reduction in GDP (in percent) of the economy. The benefits and costs of implementing higher capital requirements are compared and net impact is calculated for each of the BRICS economies.

The findings are then validated by a structured questionnaire, administered on the banking experts who have been closely involved in the process of Basel implementation at their banks.

This research, delves deeper into the impact of higher capital adequacy requirement on the credit risk (risk in the loan portfolio of banks), which has been termed as the prime contributor to the systemic banking crisis in the past episodes of crises. For analysing this impact, panel regression models are employed. A further disaggregation on the basis of ownership and accounting for the GFC is also done.

The main findings of this study indicate that the net benefits of higher capital adequacy requirements outweigh the costs for all the BRICS economies; however, the benefits for Brazil and Russia are substantially higher. Also, a strong monetary policy of an economy can play a role in controlling the costs of higher capital for the economy. The survey results also establish that higher capital norms will increase the stability and resilience of the banking sector. The survey also gauges the opinion of experts on the indirect impact of these norms, along with the critical success factors in the process of implementation. Finally, the results of the empirical analysis establish a positive relationship between capital norms and credit risk.

The study has important implications for academia and policymakers. While it enriches the existing body of knowledge with new findings and evidence for the academia, for the policymakers, it suggests that a more conservative approach results in a lower probability of a crisis. It is also suggested that there is enough room to increase the capital requirements above the regulatory ratios as the net impact will still be positive. To the best of the author's knowledge, the study has made a novel attempt to assess the impact of each of the BRICS economies separately along with collecting the invaluable insights from the banking experts about the implementation process.

सार

वैश्विक वित्तिय संकट (जी.एफ.सी.) ने उन अर्थव्यवस्थाओं पर भारी लागत लगायी है जो वैश्विक निवेश के लिए उदारवादी हैं। कुछ अध्ययन विवरण करते हैं कि जी-7 देशों के आर्थिक उत्पादन में लगभग पांच प्रतिशत की कमी आई है, जो कि यू. एस. $ दो ट्रिलियन के उत्पादन (आउटपुट) नुकसान के बराबर है। इसके अलावा लाखों नौकरियों खोईं और व्यक्तियों द्वारा वित्तीय कठिनाइयाँ सही गईं (बैंक ऑफ कनाडा, 2010)।

वैश्विक वित्तीय संकट की शुरुआत में, यह एक आम धारणा थी कि ब्राजील, रूस, भारत, चीन और दक्षिण अफ्रीका (ब्रिक्स) की वित्तीय प्रणाली संकट का सामना करेगी और अछूती रहेगी। हालांकि, जैसा कि संकट ने दुनिया भर में क्रेडिट और शेयर बाजारों को बाधित किया, ब्रिक्स देशों सहित कोई भी देश अपनी प्रतिरक्षा बनाये नहीं रख सका (खेमका एट अल, 2008; फ्रेटैग एट अल, 2009; बाजपेयी 2011; जाए- क्योंग, 2010)।

लेहमैन ब्रदर्स के पतन के बाद, नियामकों को कठिन सवालों का सामना करना पड़ा, जिसके कारण जी -20 के नेताओं ने बैंकिंग प्रणालियों की लचीलापन (resilience) बढ़ाने के लिए विवेकपूर्ण मानदंडों के एक व्यापक संग्रह पर सहमति व्यक्त की। इन सुधारों का केंद्रीय अवयव, पूंजी (capital) और तरलता (liquidity) आवश्यकताओं को बढ़ाना है। सैद्धांतिक रूप से, उच्च पूंजी पर्याप्तता आवश्यकताओं का लाभ कई गुना है; यह एक मजबूत और अधिक लचीला वित्तीय प्रणाली बनाने में मदद करता है जो वित्तीय संकट की आवृत्ति और ऐसे संकट की संबंधित लागत को कम कर सकता है। ब्रिक्स में संकट की ऐतिहासिक आवृत्ति को देखते हुए, कोई सोच सकता है कि लाभ सीमित होंगे। हालांकि, वैश्विक मंच पर ब्रिक्स के बढ़ते महत्व के साथ-साथ अर्थव्यवस्थाओं के बीच बढ़ते अंतर्संबंध से वित्तिय आघात में वृद्धि ही होगी। यथाप्रकार, एक लचीली वित्तिय प्रणाली के निर्माण के लिए नए नियामक मानदंडों को लागू करना सभी पांच अर्थव्यवस्थाओं के हित में है।

साहित्य ज़्यादातर विकसित अर्थव्यवस्थाओं जैसे, अमेरिका, यूनाइटेड किंगडम और अन्य OECD देशों के लिए उच्च पूंजी पर्याप्तता मानदंडों की लागत और लाभ पर विचार करता है। हालांकि ब्रिक्स अर्थव्यवस्थाओं के लिए इन मानदंडों के लाभों को इनकी संभावित लागतों से तौलना भी उतना ही महत्वपूर्ण है। ये उम्मीद की जाती है की उच्च पूँजी मानदंडों से ऋण की बदलती ब्याज दरों में फर्क दिखेगा, जो मौद्रिक नीति का एक अनिवार्य तत्व है और अर्थव्यवस्था के उत्पादन (या जीडीपी) को बदलने में सशक्त है।

यह अध्ययन प्रत्येक ब्रिक्स अर्थव्यवस्थाओं में उच्च पूंजी पर्याप्तता की आवश्यकताओं के प्रभाव का आकलन करके साहित्य में योगदान करता है। ब्रिक्स अर्थव्यवस्थाओं में (प्रत्येक के लिए) लागत और लाभों का आकलन करने का वैचारिक ढांचा, बेसल कमेटी औन बैंकिंग सुपरविजन (बीसीबीएस) की लौगं टर्म इकोनौमिक इमपैक्ट (एलईआई) अध्ययन के साथ निकटता से जुड़ा हुआ है। उच्च पूँजी पर्याप्तता आवश्यकताओं के लाभों का अनुमान चरणबद्ध प्रक्रिया से गया किया है, इसके संदर्भ में संभावना (प्रौबैबिलिटी), होड्रिक-प्रेसकॉट फ़िल्टर और लॉजिस्टिक रिग्रेशन का उपयोग किया गया है। सबसे पेहले, एक प्रणालीगत बैंकिंग संकट की ऐतिहासिक संभावना का अनुमान लगाया गाया है, इसके बाद इस की संभावित लागतों का भी अनुमान लगाया गाया है। संकटों की संभावित लागत के चार परिदृश्यों पर विचार किया गाया है। उसके बाद पूंजी की आवश्यकता में वृद्धि का प्रभाव संकट की संभावना में आने वाली कमी पर मापा गाया है। इस प्रक्रिया की मदद से यह निष्कर्ष निकालना जा सकता है कि पूंजी की आवश्यकताओं को बढ़ाकर, कितने जीडीपी (प्रतिशत में) की बचत होती है।

उसके बाद, समय-श्रृंखला विश्लेषण का उपयोग करके उच्च पूंजी आवश्यकताओं को लागू करने की लागतों (जीडीपी के संदर्भ में) की गणना की गई है। पूंजी में इस वृद्धि से ऋण के ब्याज दरों में परिवर्तन आता है, जिससे बैंकों के ऋण पैटर्न में बदलाव होता है (क्रेडिट राशनिंग), यह अर्थव्यवस्था में निवेश और खपत में

परिवर्तन लाता है। उच्च पूंजी पर्याप्तता आवश्यकता के इस चैनल के परिणामस्वरूप अर्थव्यवस्था की जीडीपी (प्रतिशत में) में कमी है। यह अध्ययन, उच्च पूंजी आवश्यकताओं को लागू करने के लाभों और लागतों की तुलना करके प्रत्येक ब्रिक्स अर्थव्यवस्था के लिए शुद्ध प्रभाव की गणना करता है। निष्कर्षों को एक संरचित प्रश्नावली द्वारा मान्य किया गया है, जो बैंकिंग विशेषज्ञों द्वारा प्रशासित हैं। यह विशेषज्ञ अपने बैंकों में बेसल कार्यान्वयन की प्रक्रिया में निकटता से शामिल हैं।

यह अध्ययन, क्रेडिट जोखिम (बैंकों के ऋण पोर्टफोलियो में जोखिम) पर उच्च पूंजी पर्याप्तता की आवश्यकता के प्रभाव में गहराता है, जिसे संकट के पिछले प्रणालीगत बैंकिंग संकट एपिसोड में प्रमुख योगदानकर्ता कहा गया है। इस प्रभाव के विश्लेषण के लिए, पैनल प्रतिगमन (रिग्रेशन) मॉडल कार्यरत हैं। आगे, डेटा को स्वामित्व और जी. एफ. सी. के आधार पर विभाजन भी किया गया है।

इस अध्ययन के मुख्य निष्कर्षों से पता चलता है कि उच्च पूंजी पर्याप्तता आवश्यकताओं का लाभ सभी ब्रिक्स अर्थव्यवस्थाओं के लिए लागत से अधिक है, हालांकि, ब्राजील और रूस के लिए लाभ काफी अधिक है। साथ ही मज़बूत मौद्रिक नीति, अर्थव्यवस्था के लिए उच्च पूंजी की लागत को नियंत्रित करने में भूमिका निभा सकती है। सर्वेक्षण के परिणाम भी यह स्थापित करते हैं कि उच्च पूंजी मानदंड बैंकिंग क्षेत्र की स्थिरता और लचीलापन बढ़ाते हैं । कार्यान्वयन की प्रक्रिया में महत्वपूर्ण सफलता कारकों के साथ, सर्वेक्षण इन मानदंडों के अप्रत्यक्ष प्रभाव पर विशेषज्ञों की राय भी लेता है । अंत में, अनुभवजन्य विश्लेषण के परिणाम पूंजी मानदंडों और क्रेडिट रिस्क (जोखिम) के बीच एक सकारात्मक संबंध स्थापित करता है।

अध्ययन में शिक्षाविदों और नीति निर्माताओं के लिए महत्वपूर्ण निहितार्थ हैं। यद्यपि यह शिक्षा के नए निष्कर्षों और सबूतों के साथ मौजूदा साहित्य को समृद्ध करता है, नीति निर्माताओं के लिए यह बताता है कि अधिक रूढ़िवादी दृष्टिकोण से संकट की संभावना (प्रौबैबिलिटी) कम होती है। यह भी सुझाव दिया जा सकता है कि

नियामक अनुपात के ऊपर पूंजी आवश्यकताओं को बढ़ाने के लिए पर्याप्त जगह है क्योंकि शुद्ध प्रभाव तब भी सकारात्मक होगा। लेखिका ने अध्ययन के माध्यम से बेसल की मानक कार्यान्वयन प्रक्रिया के बारे में बैंकिंग विशेषज्ञों से अमूल्य अंतर्दृष्टि एकत्र करने के साथ-साथ ब्रिक्स अर्थव्यवस्थाओं के प्रभाव का आकलन करने के लिए एक नवीन प्रयास किया है।

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LIST OF ABBREVIATIONS

BCBS	Basel Committee on Banking Supervision
BRICS	Brazil, Russia, India, China, and South Africa
CAMELS	Capital adequacy, Asset quality, Management Efficiency, Earning capacity, Liquidity, and Sensitive sector lending
CCPs	Central Counterparties
CCyB	Countercyclical Capital Buffer
CDR	Credit to Deposit Ratio
CET 1	Common Equity Tier 1
CRR	Capital Reserve Ratio
CRAR	Capital to Risk-weighted Asset Ratio
EME	Emerging Market Economy
FII	Foreign Institutional Investor
FRB	Federal Reserve Board
GDP	Gross Domestic Product
GFC	Global Financial Crisis
HP FILTER	Hodrick-Prescott Filter
IDR	Investment to Deposit Ratio
IFS	International Financial Statistics
IIF	Institute of International Finance
IMF	International Monetary Fund
IRB	Internal Rating Based

LCR	Liquidity Coverage Ratio
LEI	Long-term Economic Impact
LIC	Life Insurance Corporation
MAG	Macroeconomic Assessment Group
MCR	Minimum Capital Requirement
NIM	Net Interest Margin
NPA	Non-performing Asset
NSFR	Net Stable Funding ratio
OECD	Organisation for Economic Co-operation and Development
PSB	Public Sector Banks
RBI	Reserve Bank of India
ROA	Return on Assets
SA-CCR	Standardized Approach- Counterparty Credit Risk Exposure
SCBs	Scheduled Commercial Banks
SLR	Statutory Liquidity Ratio
SMEs	Small and Medium Enterprises
TLAC	Total Loss Absorbing Capital
U. S.	United States of America
VAR	Vector Autoregression
WTO	World Trade Organisation