

**Dynamics of Competition, Liquidity and Risk –  
An Interactive Network Analysis of Indian Banks**

*Extended Abstract of the  
Thesis submitted to the  
Indian Institute of Technology, Kharagpur  
For award of the degree  
of*

**Doctor of Philosophy (Ph.D.)**

*by*

**Abhishek Poddar**

**(18BM91R01)**

Under the guidance of

**Prof. Arun Kumar Misra & Prof. Ajay Kumar Mishra**



**VINOD GUPTA SCHOOL OF MANAGEMENT  
INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR**

**October, 2023**

## **EXTENDED ABSTRACT**

Financial regulation and risk management practices have evolved due to the global financial crisis. The importance of financial stability in formulating macroeconomic policy is widely acknowledged. However, banks operate in an interconnected network system consisting of many banks and their respective links. Banks are interdependent because of payment systems and liquidity supports; at the same time, they also compete. Interconnected complex network systems have far-reaching implications on the economy. Hence, the link between bank competition and stability is essential to financial sector regulators. However, in recent years, there have been a series of bank failures that were operating in an interconnected network, primarily due to discontinuous changes in asset prices caused by stiff competition and liquidity crises. Though competition has eased the lending rate and improved service quality, indiscriminate lending and cut-throat competition have increased the systemic risk of the banking system.

India has aligned its banking system with BASEL standards as an emergent market economy. To ensure a stable financial system, it initiated banking reforms in capital adequacy, asset quality, liquidity, and management systems and introduced risk-based supervision. Despite these reforms, numerous banks experienced significant loan defaults and increased stressed loans. Such defaults caused panic among depositors and raised concerns about the banking system's stability. Moreover, economic growth is critically dependent on a country's monetary system. Hence, the government infused capital to maintain the banking system's stability.

The study reviewed the literature on the different proxies to assess the intensity of bank competition, level of bank liquidity and riskiness of the banks, the various factors affecting them, and the conflicting relationship among these variables. The study found that the current literature does not have consensus on the nature of the impact that competition may have on a bank's liquidity and stability. Since banks operate in an interconnected network system, a complex system consisting of many banks and their respective links. Empirical studies found several studies that have been conducted to understand the impact of network structure on systemic risk and stability of the financial system and different methods to construct financial networks. Significant empirical studies have been conducted in developed nations to assess bank competition, liquidity, risk, and its determinants. However, studies in the context of the Indian economy are scarce.

The study assessed the intensity of bank competition, level of bank liquidity and riskiness of the Indian banking system during the economic upcycle period between 2010 and 2014 and the economic downcycle period between 2015 and 2020. Besides assessing these variables, the study also explored how these variables varied across the two phases of the economic cycles. The study also identified the bank-specific determinants of bank competition, liquidity and risk, which significantly influence these variables through an advanced econometric approach in an emerging market economy like India. Additionally, the study helped to understand the variability of bank-specific parameters like bank size, profitability, level of capitalisation and ownership based on bank competition, liquidity and risk, respectively.

The study developed a novel method for constructing bank competition, liquidity and risk networks to understand the interactions among these networks through advanced econometric approach and machine learning models. The constructed networks also helped to visualise the intensity of interactions among these variables during the two phases of the economic cycles and develop the corresponding network indices. These indices have helped to identify the highly competitive banks, the banks that are most risky and responsible for risk spillover and finally, the banks that are the primary liquidity providers in the banking network system. Additionally, the study contributes to the existing literature by identifying the bank-specific determinants of these network indices. The study proposed a new parameter for understanding the intensity of the interactions among bank competition, liquidity and risk networks, i.e. the average path length of an interactive network. Finally, with the help of advanced machine learning models, the study helped to predict future network indices with a forecast horizon of one year.

As a policy measure, the RBI should emphasise mergers and acquisitions by supporting them when competition is intense, prohibiting them in highly concentrated banking markets, and limiting the monopoly power of big-sized banks to promote healthy competition. RBI should emphasise credit quality during the business upcycle so that they do not default during the business downcycle, leading to a rise in the volume of nonperforming assets in Indian banks, especially the public sector banks. The RBI should closely and proactively monitor that the banks have a comprehensive credit appraisal framework so that the borrowers do not default and impose higher risk weight to contain excessive loan creation during economic up-cycle depending upon the type and magnitude of risks and sufficient provision to absorb unexpected losses. The RBI should also ensure that through

increasing higher-quality capital and liquidity provision, banks strengthen their resilience against adverse shocks due to fluctuations in the intensity of competition. Finally, the RBI should examine the interaction among bank competition, liquidity and risk while framing policy guidelines. While enhancing competition in the banking system, the RBI should also pay attention towards providing liquidity to the banking system while not disturbing the solvency and stability of the banking system.

**Keywords:** Bank Competition, Bank Risk, Bank Liquidity, Economic Cycles, Interactive Network, Copula, LASSO VAR