Banking sector competitiveness: Does competition for off-balance sheet banking matter?

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ABSTRACT

Despite core banking, banks also engage in off-balance-sheet (OBS) market activities. In many developed banking industries, OBS activities have grown to be significant during the last two decades. This paper provides rather scarce evidence on the competitiveness among banks for OBS activities and its impact on the degree of banking sector competition in Sri Lanka. Panzar-Rosse H statistic approach employing in this study to estimate bank competition used a comprehensive set of bank-level data of the whole commercial banking sector in Sri Lanka covering the period 1996-2018. The first-round analysis of the study uncovers substantial differences among banks concerning the OBS activities. EGLS panel estimation procedure applied in this study provides evidence for a lower level of competitiveness among Sri Lankan banks for OBS activities. More interestingly, the findings further reveal that the degree of competitiveness for OBS activities has a significant positive impact on the overall competitiveness of the banking sector in Sri Lanka. These results suggest banking institutions revisit their business models with greater emphasis on nonconventional banking activities in enhancing bank-level efficiency and hence positively contributing to the overall competitiveness of the banking sector.

Introduction

Traditionally banks were engaged in providing loans to investors and households and fund them by attracting deposits from savers. However, in recent years, various economic forces have encouraged banks to revisit the traditional role of bank financial intermediation. Diminishing profitability of banks with traditional banking activities and understanding the importance of non-interest income to become more stable in the market have led banks to turn to new non-traditional financial activities (Kohler, 2013). This has also been due to the open market and tough regulation from the central bank (Sun et al, 2017). These efforts include a variety of activities such as issuing various types of guarantees like letters of credit, making future commitments to lend, engaging in derivatives transactions, certain loan commitments, and revolving underwriting facilities which are generally not appearing on the balance sheet. In addition to the purpose of earning additional fee income, banks also engaged in these off-balance sheet activities to increase volatility, hedge risks, avoid regulatory costs and taxes, tailor financial instruments, save capital, avoid reserve requirements as well as to face the reduced competitiveness in traditional activities. Many empirical findings too have explored interactions between noninterest income and business performance (Trivedi, 2015; Senyo et al, 2015).

Despite many studies done on banking sector competition, less attention has been paid to analyzing the nature and intensity of non-price competitiveness of the banking sector. Banks differ from one to another in many ways. It may be product diversification, innovation, service quality, or branch expansion. The effect of branch expansion has been studied by Allen and Gale (2000) and proved how branch network can provide more competitive outcomes. Theses banking literature suggests that banks need to compete for capturing and retaining their non-interest revenue base to be stable all the time. This greater attention on non-interest income in recent literature motivated the researcher to analyze its importance particularly from a competition point of view in a unique developing country, Sri Lanka.
The commercial banking sector of Sri Lanka has been developed with some remarkable changes over the last two decades. After the highlights of the influential work of Mackinnon - Shaw (1973), many of the underdeveloped countries including Sri Lanka introduced a series of reforms in the financial sector. These reforms, along with the economic liberalization policies initiated in 1977 and continued thereafter made a positive change in the competitive climate of the banking sector in Sri Lanka. Many aspects of the banking sector thereafter, such as technological advancements, entry of new banks, innovative financial products and services, relaxation of financial regulations have laid the path to the present level of competitiveness and efficiency of the banking sector experienced by Sri Lanka. OBS activities exposure of the banking sector is also noticeable during this period. However, the financial sectors of many developing countries are still functioning in an environment where the most vital prerequisites for such competition are imperfect. Hence, the expected net results of development that take place in financial markets of underdeveloped countries are not fully reached and inadequately uncovered in the prevailing literature. Specifically, competition for OBS activities of banks has not been adequately addressed in recent literature on bank competition. By applying Panzar-Rosse H statistics (1987) to test bank competitiveness, the present paper aims to analyze the degree of competition in the Sri Lankan banking sector and to explore the importance of off-balance sheet activities on such competitiveness during the period 1996-2018.

The Licensed Commercial Banking sector (LCB) dominates the financial system of Sri Lanka. Also, it is the most prominent single category which remarks the largest asset base and provides the highest volume of financial services to the economy. LCB sector represents 55% of the total financial sector assets and nearly 73% of total banking sector assets as of the end of 2018 (Central Bank Annual Report, 2018). The sector comprises 25 banking institutions of which 12 are foreign banks. Among 13 domestic banks, 6 larger banks are comprising four private banks and two state banks that hold the largest asset share of the banking sector hence are considered systemically important banks. The interest margin ranges between 3.5% and 3.6% during 2014-2018, whereas the Return on Investment of the whole banking sector lies between 1.1% and 1.5%. The interest income of the banking sector stood at 10.1% as a percentage of average assets and this percentage recorded as 1.3 percent from non-interest income in 2018 (Central Bank Annual Report, 2018).

Sri Lanka offers a most interesting and possibly unique setting in which to examine the bank competition for OBS activities for few reasons. First, the recent financial and economic crisis has highlighted the crucial position of banks in the economy. While the competitive climate in the banking sector in Sri Lanka has been growing many years, there appears to be no significant study done about the non-conventional activities of the banking sector. However, it is important to identify the kinds of reforms and environments which enable to promote efficiency in the banking systems of low-income countries. From a policy perspective, the information on competition for OBS activities enables policymakers to further understand the nature of present competitive culture and to develop policies to strengthen the financial systems quantitatively and qualitatively. Second, the study contributes to the existing theories by way of testing their applicability in the context of developing countries, because, the Sri Lankan financial sector is another unique setting to research as it is characterized by most of the features of emerging economies. Sri Lanka stepped into an open economy after the liberalization policies introduced in 1977. The broad idea of implementing such reforms was to enhance economic growth while improving market efficiencies to generate more benefits to the general public. The process of transition from a closed to an open market economy entails fundamental changes in behavior of enterprises in many countries. The magnitude of such impact would be higher in the context of developing countries. Most of the finance-growth theories have been tested in the U.S. or other Western country context, or in comparing a group of countries. To what extent, these theories are portable across different countries have become increasingly important with the development of financial markets in recent years.

**Literature Review**

**Theoretical Background**

Recent theoretical and empirical literature paves the path to the current debate on the economic role of competition in the banking industry. Traditional Industrial Organization models\(^2\) such as Klein (1971), envisage that restrictive competitive forces create welfare losses. Therefore, increased competition in the financial sector can be vital for access of firms and households to financial services and external financing, in turn affecting bank efficiency and overall economic growth.

Theoretically, bank competition is believed to be good, as it improves efficiency, lowers loan prices, and encourages financial innovation. Banks being the financial intermediaries, maximize allocative efficiency with both the quantity of credit supply as well as their efficient allocation (Guzman, 2000). More efficient banks earn supernormal profits simply because they are more efficient than others (Fu & Hefferman, 2005). Analysis of competitive behavior assumes homogeneous and contestable markets in banking. In these markets competitive efforts certainly create efficient banks by reducing costs and maximizing rents with the improved competition. The contestability features of the banks ensure efficiency to customers through better screening and monitoring, while offering lower loan rates and attractive deposit rates. This proves an apparent causality from competition to efficiency (Schaek and Cihak, 2014).

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\(^1\) The financial system of Sri Lanka consists of four main components. They are financial institutions, financial markets, financial infrastructure and the financial regulatory framework.

\(^2\) Industrial organization (or industrial economics) is the subject that is concerned with the workings of markets and industries, in particular, the way firms compete with each other.
The literature provides many empirical studies on banking competition. These studies have used different measures to estimate the level of competition in the banking sector. Learner index (Lerner, 1934) is a well-known traditional measure of bank competition. It captures the variance between product prices and the marginal cost of production, which indicates the degree of market power. It is a direct measure of bank competition.

The literature also proposes various indirect measurements representing two major streams: structural and nonstructural approaches. Structural methods are based on the Structure – Conduct – Performance (SCP) paradigm, which predicts that more concentrated markets are more collusive. Under this hypothesis, competition is measured by bank concentration such as the Hirfindahl-Hirschman index (HHI) which assumes that market structure affects banks’ behavior, and the Boone indicator (Boone (2000, 2004), of which the relationship between relative market shares and relative marginal costs is estimated. Non-structural approaches measuring competitiveness are based on ‘New Empirical Industrial Organization’ (NEIO) literature.

H statistics model was developed by Panzar and Rosse (1987). It is based on empirical analysis of the causality of factor input prices on firm-level revenues. H statistic is estimated by adding the elasticities of total revenue to its factor input prices. Shaffer (1982) reported the first application of the Rosse-Panzar test to banking data, for a sample of banks in New York. His study showed that the H = 1 for a monopolist bank in a perfectly contestable market and a sales maximizing bank subject to break-even constraints.

Empirical Review
An empirical study of Liyanagamage (2018) reveals that greater competition has a considerable impact on efficiency improvement in the Sri Lankan banking sector and further reveals that this relation is U-shaped in the short run. It is necessary for firms to regularly introduce new technology, new processes, and financial products and reduce costs over time to be dynamically efficient. In this regard, Wonglimpiyarat (2008) studied Thailand banking sector and revealed that the competitive behavior including the strategic direction and the adoption of technology with the development of the banking economy may have positive consequences. This in turn stimulates technological development ultimately affecting dynamic efficiency. Schaeck and Cihak, (2008) used Panzar-Rosse H-statistic to test the competitiveness and found that more competitive banking systems have a lower probability of bank failure and a longer time to the crisis, and therefore are more stable than monopolistic systems. Soedarmono et al. (2013), analyzed a sample of 607 commercial banks in 12 Asian countries between 2001 and 2007 and investigated the link between market power in banking, bank risk taking, insolvency risk, and capital ratios. Their results bring to light that a high level of market power in banking is coupled with higher risk-taking, insolvency risk, and capital ratios.

Many subsequent studies (Nathan and Neave, 1989; Molyneux et al, 1994; Staikouras and Fillipaki, 2006) utilize the Rosse-Panzar statistic to assess competitive conditions in various developed and developing economies. The same approach was applied by Fu (2009) during the period of major structural change in the Chinese commercial banking industry (1997-2006) and found that banks in China operate under a system of monopolistic competition in general. Panzar-Ross approach has also being used in cross country studies. For example, Staikouras and Fillipaki (2006) employed this approach for the European Union and their outcome advocate that European banks were operating under conditions of monopolistic competition.

In an African banking analysis, Fosu (2013) found that the banking markets are characterized by monopolistic competition in Africa. In Angola, Barros and Mendes (2016) study found that the banking market was monopolistic. Theoretically, in a monopolistic competitive market, firms have minimum power over the market price. Hence, the banks operating in these markets compete based on product differentiation. Therefore, managers have to adopt strategies such as mergers, acquisitions, enhancing cost efficiencies, diversifying deposits and loans, and increasing non-interest revenue (Andrie and Cápraru 2014). However, the common observation that can be made in the literature is differences across countries concerning composition of the banking sector and bank income. Therefore, to what extent these findings can be generalized among countries is questionable. More precisely, the question of the magnitude of competitiveness among banks for non-interest income and its impact on banking sector competition is essentially empirical.

Research and Methodology
This study employed New Empirical Industrial Organization (NEIO) approach, which measures competition based on banks’ actual behavior. Hence, Panzar - Rosse (PR) H-statistic with some modifications is used to measure the degree of bank market competition in this study. The sample covers the whole commercial banking sector of Sri Lanka which consists of 24 banking institutions as of the end of 2018 and the sample period covers 22 years starting from 1996.

The analysis is done in three consecutive steps of which the first and second steps are to measure the intensity of banking sector competition for total revenue and competition for non-interest revenue respectively (Equation 1(a) and 1(b)). In the third step, the expected impact of non-interest revenue competition on total revenue competition is tested by using Equation 2. All three econometric models were developed and tested as a panel data approach.

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1 This theory was developed in 1934 by American economist Abba Lerner and is one of the most widely used tools for measuring market power.
The H statistics is estimated as the summation of elasticities of a bank’s revenue to input prices in the reduced form panel equation presented in Equation 1(a).

\[ \log T R_{it} = \alpha + \beta_1 \log I PL_{it} + \beta_2 \log I PF_{it} + \beta_3 \log I PC_{it} + \lambda_1 \log T A_{it} + \lambda_2 \log N PL_{it} + e_{it} \] ...

This study estimates the PR model with the assumption that banks use three factors of input to produce a single output (total revenue).

In Equation 1(a), \( TR_0 \) is the ratio of total revenue to total assets, while \( IPL_{it}, IPF_{it}, \text{ and } IPC_{it} \) are the ratio of staff expenses to total assets (input price of labor), the ratio of interest expenses to total deposits (input price of deposits), and the ratio of other capital expenses to total assets (input price capital) respectively. Equation 1(a) also includes two bank variables that may shift the revenue schedule particularly due to the nature of the Sri Lankan banking system. They are bank size and nonperforming loans. \( TA_0 \) (bank size) which incorporated to control for potential effects of bank size on bank’s revenue. \( NPL_0 \) was incorporated to control the differences in bank abilities to earn interest if resources are locked up in the non-performing assets. The measurement of \( NPL_0 \) of this study is the ratio of non-performing loans to gross loans of the bank.

\[ H = \sum_{i=1}^{n} \beta_i \] reflects the competitive level of the market. To test the bank competitiveness for OBS activities, H statistics were re-estimated by taking non-interest revenue as the dependent variable.

\[ \log N I R_{it} = \alpha + \beta_1 \log I PL_{it} + \beta_2 \log I PF_{it} + \beta_3 \log I PC_{it} + \lambda_1 \log T A_{it} + \lambda_2 \log N PL_{it} + e_{it} \] ...

When estimating panel Equation 1(a) and (b), application of Ordinary Least Squares (OLS) is not effective due to the natural correlation that exists in a time series with its past and future values in bank revenues. Therefore, this study employed Estimated Generalized Least-Squares (EGLS) procedure for the estimation.

Finally, to test the impact of the competitiveness of OBS on overall bank competition, a simple Ordinary Least Squares regression depicted in Equation 2 is estimated.

\[ Com_{it} = \alpha + \beta_1 Com_{non-int} + e_{it} \] ...

In Equation 2, \( Com_{it} \) is the degree of competition for total revenue whereas \( Com_{non-int} \) is the degree of competitiveness among banks for non-interest revenue.

**Findings and discussion**

Despite core banking, Sri Lankan banks also engage in off-balance sheet (OBS) market activities and reflect them in the non-interest income category. Before going to calculating competition scores for banks, it is worth having a closer look at summary statistics of interest and non-interest income of the Sri Lankan banking sector.

**Table 1: Summary statistics of banks’ interest and non-interest income**

|           | Interest Income | Non-interest Income |
|-----------|-----------------|---------------------|
| Mean      | St Dev          | Mean                | St Dev              |
| 1996      | 1381            | 2541                | 382                 | 678                 |
| 1997      | 1518            | 2757                | 425                 | 706                 |
| 1998      | 1511            | 2589                | 450                 | 647                 |
| 1999      | 1870            | 3129                | 474                 | 653                 |
| 2000      | 2162            | 3574                | 602                 | 898                 |
| 2001      | 3077            | 5127                | 691                 | 1041                |
| 2002      | 2620            | 4144                | 712                 | 965                 |
| 2003      | 2277            | 3186                | 805                 | 1043                |
| 2004      | 2219            | 3040                | 939                 | 1095                |
| 2005      | 2982            | 4101                | 1101                | 1276                |
| 2006      | 4273            | 5545                | 1241                | 1430                |
| 2007      | 6864            | 9343                | 1486                | 1718                |
| 2008      | 8903            | 11824               | 1818                | 2060                |
| 2009      | 9038            | 12591               | 1946                | 2226                |
| 2010      | 6834            | 10100               | 2268                | 2606                |
| 2011      | 8139            | 10352               | 2278                | 2209                |
| 2012      | 11286           | 10980               | 2040                | 1889                |
Log \( TIR_{it} = -0.462 + 0.21 \text{IPL}_{it} + 0.36 \text{IPF}_{it} + 0.008 \text{IPC}_{it} + 0.02 \text{TA}_{it} + 0.004 \text{NPL}_{it} \)

\(-5.56)*** (10.76)*** (20.09)*** (1.78)** (2.19)*** (1.15)*

\( R^2 = 0.75 \)

F-statistics = 213.47***

Durbin-Watson stat for serial correlation = 1.99

\[ H = \sum_{i=1}^{n} \beta_i \]

\[ H = \beta_1 + \beta_2 + \beta_3 \]

\[ H = 0.21 + 0.36 + 0.008 \]

\[ H = 0.58 \]

Notes: \( TIR \) is the dependent variable measured with the gross interest revenue to total assets.

In addition to panel regression above, time series estimates of the \( H \) statistic from 1996 to 2018 were generated by EGLS regressions of equation 1(a) to assess the change of \( H \) statistic over the sample period.
The degree of competition in the Sri Lankan banking sector during the last two decades depicts an unpredictable pattern. It has been lying around the mean throughout the sample period even though there are some ups and down along the way. One noticeable drop in the degree of bank competitiveness can be observed during the period 2007-2009. The financial crisis and the economic downturn that arose with the peak time of the civil war could be the reasons for such remarkable drops. A further analysis was carried out to investigate the non-price competition in the Sri Lankan banking sector. In the Sri Lankan banking market, the non-interest income shows high deviations across the sample period. Hence, H statistics were re-estimated by taking noninterest income as the dependent variable to understand any differences exist between price competition and non-price competition in the Sri Lankan banking sector.

The estimations of the total revenue and noninterest revenue models yield some different but interesting results. The mean H statistics for noninterest revenue for the sample period was estimated as 0.41 denoting a lower level of competition among Sri Lankan commercial banks. This result is consistent with the findings of Ezine and Ahmed (2012) who estimated the same for Nigerian banks. The degree of competition in the Sri Lankan banking sector during the last two decades depicts an unpredictable pattern. It has been lying around the mean throughout the sample period even though there are some ups and down along the way. One noticeable drop in the degree of bank competitiveness can be observed during the period 2007-2009. The financial crisis and the economic downturn that arose with the peak time of the civil war could be the reasons for such remarkable drops. A further analysis was carried out to investigate the non-price competition in the Sri Lankan banking sector. In the Sri Lankan banking market, the non-interest income shows high deviations across the sample period. Hence, H statistics were re-estimated by taking noninterest income as the dependent variable to understand any differences exist between price competition and non-price competition in the Sri Lankan banking sector.

These results reveal that the competitive condition for off-balance sheet activities has been intensifying during the first few years of the sample period. This says that competition for some non-interest-bearing products has increased while competition for interest-bearing products has decreased during this period. The reason for rising competition for some products and worsening for other products can be justified by the mechanism of ‘bundling’ (Matthews et al., 2007). In this marketing mechanism, bank customers are encouraged to buy a bundle of products making it conditional to purchase some secondary products when they purchase their primary financial products. For example, a bank offering the customer a credit insurance policy with a leased facility can be mentioned. This may stop the bank customers from searching for the best for some individual product. This may be particularly true in the Sri Lankan context. Because in late 1990s domestic banks adjusted their business strategies by putting more emphasis on developing and promoting their off-balance-sheet activities in to compete with the gradually developing foreign banks. That is, banks expanded into new, non-traditional areas such as agent services, which primarily include collecting and paying household bills on customer’s behalf and acting as an agent for securities and insurance firms, etc. However, gradually banks tend to sell these non-core bank products as one product of a bundle. This has been done by giving concessions and priority to banks’ own account holders. This discouraged banks to compete for such products and from customers’ point of view, this prevents them from searching for the best individual products. Macrolevel inquiry into the patterns of banking sector competition for total revenue and noninterest revenue is also worthwhile to highlight here. While noninterest income plays an important role in banking revenues in the developed world, its contribution to the total income of most of the developing markets is very low. And hence, the competition for non-core business activities is less. In Sri Lanka, the bank competition for non-interest revenue has been significantly declining after 1999. The increasing trend in net interest margins and credit growth of commercial banks during this period might have discouraged banks to compete in the market for non-core activities. However, competition for non-core business activities of commercial banks has started

Figure 2: Degree of Bank Competition of Sri Lankan banks 1996-2018; Source: Calculations by the author

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to increase after 2007. A decline in net interest margins and credit growth also observable during this period. One interesting finding is evolved with this analysis. That is, the 2007–2010 financial crises queried the essential role of financial intermediaries’ stability in reinforcing a smooth transmission of credit to borrowers. While results before the crisis repeatedly doubtful on the power of the bank lending channel, more recent studies show that banks’ non-core income probably have a big impact on the competitiveness in the banking sector.

Finally, the results of the OLS estimator of Equation 2 reveal a significant positive influence of competition for off-balance sheet activities on the degree of bank competition. The results are presented in Table 3.

Table 3: Results of the regression analysis Equation 3.

| Variable          | Coefficient | Std. Error | t-Statistic | Prob.  |
|-------------------|-------------|------------|-------------|--------|
| C                 | 0.372607    | 0.062404   | 5.970874    | 0.0000 |
| Com_{non-int}     | 0.314683    | 0.142301   | 2.211394    | 0.0382 |
| R-squared         | 0.277096    |            |             | 0.502174|
| Adjusted R-squared| 0.242672    |            |             | 0.072673|
| S.E. of regression| 0.063244    |            |             |        |
| Sum squared resid | 0.083995    |            |             |        |
| F-statistic       | 8.049513    |            |             | 1.255172|
| Prob(F-statistic) | 0.009870    |            |             |        |

Note: The dependent variable is $Com_{it}$, H statistic for Total Revenue, where $Com_{bank-int}$ is the H statistic for non-interest income.

The estimated regression coefficient for H statistics of non-interest revenue is 0.31 and it is significant at a 5% level of significance. This further stress the importance of OBS activities on the competitiveness of the banking sector. The competition for OBS activities explains about 24% of the total variation of competitiveness of the Sri Lankan banking industry as revealed in the adjusted R squared value. The F statistic and its significance also indicate that the above model better fits the observed data.

Conclusion

The empirical analysis carries out in this paper reveals that the competitiveness of Sri Lankan banks for non-interest income is at a lower level. Further, this paper provides relatively scarce and strong evidence on the effect of OBS activities on the competitiveness of the Sri Lankan banking sector during the period 1996–2018. The moderate level of H statistic found in this analysis points out room for further enhancing the competitiveness among commercial banks in Sri Lanka. The findings of this paper suggest banks’ active rivalry on OBS activities to pushing the degree of bank competitiveness of Sri Lanka a step forward.

The customer base of the Sri Lankan banking industry is comparatively small. Thus, all banks are competing to capture the same customers resulting in having to slash down the rate of interest to retain them. On the other hand, the high cost incurred in managing the portfolios, human capital, and overheads have become challenges to the banking sector of Sri Lanka in the recent past. Thus, the outcomes of this paper point out the need for all banks including state banks to change their operating environment significantly for making the banking industry more competitive.

Bank competition is sometimes assumed to focus only on price (interest income). However, banks as suppliers of financial services can also compete in various other ways, to increase their total income. As in most instances the interest rate depends on government policies, competition in the Sri Lankan banking sector is mostly ‘non-price’. That means, to be sustainable in the future, banks need to continually act in response to market needs and should continually align their strategy to change their business model to compete for non-price. These would be the foremost challenge to reach a higher level competitive climate in the banking industry in the future.

References

Allen, F., & Gale, D. (2000). Financial contagion. Journal of political economy, 108(1), 1-33. http://dx.doi.org/10.1086/262109

Andrès, A. M., & Căpraru, B. (2014). The nexus between competition and efficiency: The European banking industries experience. International Business Review, 23(3), 566-579. https://doi.org/10.1016/j.ibusrev.2013.09.004

Barros, Pestana, C., and Mendes, Z., (2016). Assessing the competition in Angola’s banking industry. Applied Economics, 48, 2785–91. https://doi.org/10.1080/00036846.2015.1128083

Bikker, J. A., Spierdijk, L., & Finnie, P. (2006). Misspecification of the Panzar-Rosse Model: Assessing competition in the banking industry. http://notices-pdf. com/panzar-pdf.html.
Boone, J. (2008). A new way to measure competition. *The Economic Journal, 118*(531), 1245-1261. https://doi.org/10.1111/j.1468-0297.2008.02168.x

Central Bank of Sri Lanka, Annual Reports (1996-2012). Colombo, Sri Lanka.

Fosu, S. (2013). Banking competition in Africa: subregional comparative studies. *Emerging Markets Review, 15*, 233-254. 10.1016/j.ememar.2013.02.001

Fu, M. (2009, June). Competition in Chinese commercial banking. In *22nd Australasian Finance and Banking Conference*.

SSRN: https://ssrn.com/abstract=1456083 or http://dx.doi.org/10.2139/ssrn.1456083

Fu, X. M., & Heffernan, S. (2009). The effects of reform on China’s bank structure and performance. *Journal of Banking & Finance, 33*(1), 39-52. https://doi.org/10.1016/j.jbankfin.2006.11.023

Guzman, M. G. (2000). Bank structure, capital accumulation and growth: a simple macroeconomic model. *Economic Theory, 16*(2), 421-455. https://doi.org/10.1007/PL00004091

Klein, M. A. (1971). A theory of the banking firm. *Journal of Money, Credit, and Banking, Vol. 3*, pp. 205–218. https://doi.org/10.2307/1991279

Köhler, M. (2014). Does non-interest income make banks riskier? Retail-versus investment-oriented banks. *Review of Financial Economics, 23*(4), 182-193. 10.2139/ssrn.2261120

Liyanagamage, H. D. D. (2018). Efficiency, Stability and Optimum Level of Bank Competition for Sustainable Development—A study of Sri Lankan Banking Sector. *OIDA International Journal of Sustainable Development, 11*(09), 69-80. 10.20525/ijjbs.v10i1.196

Matthews, K., Murinde, V., & Zhao, T. (2007). Competitive conditions among the major British banks. *Journal of Banking & Finance, 31*(7), 2025-2042. https://doi.org/10.1016/j.jbankfin.2006.11.009

McKinnon, R. (1973). *Money and capital in economic development*, the Brookings institute. Washington, DC. https://doi.org/10.2307/1992568

Molyneux, P., Lloyd-Williams, D. M., & Thornton, J. (1994). Competitive conditions in European banking. *Journal of banking & finance, 18*(3), 445-459. https://doi.org/10.1016/0378-4266(94)90003-5

Nathan, A. and Neave, E.H. (1989). Competition and contestability in Canada's financial system: Empirical results. *Canadian Journal of economics*, pp.576-594. 576-94. https://doi.org/10.2307/135541

Panzar, J. C., & Rosse, J. N. (1982). *Structure, conduct, and comparative statistics*. Bell Telephone Laboratories.

Panzar, J., and Rosse, J. (1982) Testing for 'monopoly' equilibrium. *Journal of Industrial Economics, 35*(4), pp. 443-456. www.jstor.org/stable/2098582

Schaecck, K., & Čihák, M. (2008). How does competition affect efficiency and soundness in banking? New empirical evidence. 10.2139/ssrn.1088605

Schaecck, K., & Čihák, M. (2014). Competition, efficiency, and stability in banking. *Financial management, 43*(1), 215-241. https://doi.org/10.1111/fima.12010

Senyo, D. B., Olivia, A. T., Musah, A., & Nuhu, E. (2015). Income diversification and financial stability of banks in Ghana. *International Journal of Business and Social Science, 6*(6), 177-184. 10.1108/MF-12-2014-0304

Shaffer, S. (1982). A non structural test for competition in financial markets. In *Bank Structure and Competition, Conference Proceedings, Federal Reserve Bank of Chicago, 1982* (pp. 225-243). https://doi.org/10.1016/0165-1765(83)90061-7

Soedarmono, W., Machrouh, F. and Tarazi, A. (2013). Bank competition, crisis and risk taking: Evidence from emerging markets in Asia. *Journal of International Financial Markets, Institutions and Money, 23*, pp.196-221. https://doi.org/10.1016/j.intfin.2012.09.009

Staikouras, C. K., & Koutsoyanoli-Fillipaki, A. (2006). Competition and concentration in the new European banking landscape. *European Financial Management, 12*(3), 443-482. https://doi.org/10.1111/j.1354-7798.2006.0327.x

Sun, L., Wu, S., Zhu, Z., & Stephenson, A. (2017). Noninterest income and performance of commercial banking in China. *Scientific Programming*. 10.1155/2017/4803840

Trivedi, S. R. (2015). Banking innovations and new income streams: impact on banks' performance. *Vikalpa, 40*(1), 28-41. 10.1177/0252690915573616

Wonglimpiyarat, J. (2008). The structural model of competition in the Thai banking industry. *International Journal of Financial Services Management, 3*(3-4), pp.255-268. https://doi.org/10.1504/IJFSM.2008.022551

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