

Macro Environment of Commercial Banking in Developing Countries - Are They Really Conducive in Achieving Competitiveness?

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Abstract: *The degree of competition is an important aspect of financial sector development and, in turn, economic growth. However banks in the developing countries are competing in an environment where the financial infrastructure or the prerequisites for such competition is scarce. Hence, the present paper aims at assessing and identifying the macroeconomic forces that drive competition in the banking sector of Sri Lanka. The study covers both micro and macro level data for all 25 banks in Sri Lankan commercial banking sector for the period 1996 to 2015. The econometric model developed in this study comprised six major categories of variables; bank market structure, contestability, inter-industry competition, regulatory policies, bank efficiency and economic development. The study found a strong evidence to support a positive effect market structure suggesting state bank concentration promotes competitive behavior of other banks in the short run. Overall, the study identifies the macro environment with improved foreign bank performance, broadening financial access to the mass (branch expansion) and increased competition pressure coming from non banking sector financial industries is conducive for bank competition. Further, findings of the study revealed that the macro environment characterized with higher level of development in the capital market, increasing Central Bank policy rates, improving state bank efficiency and high inflationary pressure restrain the ability of the banking sector to compete in the market. Hence, study highlights the need for creating a macro environment with continuous financial reforms and proper monitoring mechanisms to facilitate competition in the banking sector in order to reach the favorable outcome of such competition.*

Key words: *bank competition, financial freedom, contestability, market structure, inter-industry competition*

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I. Introduction

Competition is desirable for maximization of social welfare and existence of Pareto efficiency¹. In other words, in a competitive market setting, there is allocative and productive efficiency as well as dynamic efficiency. As in other industries, competition in the banking system is also needed for efficiency and maximization of social welfare. Banks as a service industry contribute to economic development by providing financial means need to other industries to produce goods and services. Thus competition in the banking industry helps economic growth by promoting capital accumulation. Traditional Industrial Organization models² such as Klein (1971), predict that restraining competitive forces should unequivocally produce welfare losses. Therefore increased competition in the financial sector can be vital for access of firms and households to financial services, in turn affecting bank efficiency and overall economic growth.

As in other industries, the degree of competition in the banking sector is needed for the efficiency of the production of financial services, the quality of financial products and the degree of innovation in the sector. Hence, bank competition is a key indication of the financial sector development of a country. Until the 1970's, financial repression was commonly accepted as a condition necessary to promote investment and growth. A financial system is recognized as repressed when the financial system is subject to controls and limits are deliberately imposed on financial prices (mainly interest rates) and volumes of financial magnitudes. The necessity of financial liberalization and hence the competitiveness in the financial market for economic growth in developing countries was clearly recognized in the economic theories presented by McKinnon (1973) and

¹ An allocation is Pareto efficient if there is no other allocation in which some other individual is better off and no individual is worse off. The term is named after Vilfredo Pareto (1848–1923), an Italian economist who used the concept in his studies of economic efficiency and income distribution.

² Industrial organization (or industrial economics) is the subject which is concerned with the workings of markets and industries, in particular the way firms compete with each other.

Shaw (1973). Mackinnon - Shaw analyses concluded that alleviating financial restrictions in developing countries' mainly by allowing market forces to determine real interest rates, can exert a positive effect on economic growth as interest rates rise toward their competitive market equilibrium.

Since the seminal work of Mackinnon - Shaw (1973) a number of under developed countries in South America, Africa and Asia that were regarded as repressed economies in terms of financial policies, undertook financial liberalization measures. Technological innovations and policy measures taken over the past few decades have resulted in achieving current level of growth and prosperity experienced by emerging economies (Guzman, 2001). Further, the last three decades have witnessed the emergence of vast financial markets straddling national boundaries. This enabled massive cross border capital flows from those who have surplus funds and are in search of high returns to those seeking low cost funding. The borrowings or accessing the financial market of a country is not new; what is new is the enormous diversity of markets and instruments through which a firm can raise funds. Thus, new developments in information technology and further progress in liberalization and harmonization of the financial markets have strongly affected the financial environment in which financial intermediaries operate. These contributions in international integration, together with the entry of new types of competitors and entry of foreign banks in to local operations are likely to have contributed to banks' competitiveness in the era of globalization (Guzman, 2001). However, significant differences can be observed among these economies with regard to the degree of competition in their banking sectors.

According to Claessens & Laeven (2003), in actual conduct, the factors explaining the deference in the level of competition is rather country specific and depends on a number of factors such as the country's macro-performance and stability, the quality of the country's information and bank specific factors. A number of recent papers have investigated the effects of regulations and specific structural or other factors presumed to relate to the competitive environment on banking performance. The Sri Lankan banking sector too has been characterized by a number of notable changes over the last two decades. Advances in technology, new types of dynamic bank firms, various products and services, financial liberalization, and the ongoing economic and regulatory integration have increased the degree of competition and efficiency in the Sri Lankan banking sector. These have further affected the changes in the market structure of the banking sector. However there is a common obstacle that can be observed in many developing countries. That is, banks in the developing countries are competing in an environment where the financial infrastructure or the prerequisites for such competition is scarce. Hence, the present paper aims at assessing and identifying the macroeconomic forces that drive competition in the banking sector of another unique emerging economy, Sri Lanka.

II. Theoretical and Empirical background

As financial intermediaries, banks maximize allocative efficiency with both the quantity of credit supply as well as their efficient allocation. Traditional Industrial Organization theory depicts that a competitive industry is characterized by a large number of small banks and the potential benefits are similar to those of competition in other industries. Subsequent empirical studies after Klein (1971) confirm the positive effect of bank competition (Guzman 2000, Beck et al, 2003, Demetriades et al, 2008). The traditional approach to competition has been to associate with more firms with more price competition and fewer firms with less price competitive behavior (this approach is also called 'structural approach'). This definition comes from a classic Industrial Organization argument, called the Structure-Conduct-Performance paradigm (SCP)³, which assumes that there is a causal relationship running from the structure of the market to the firm's pricing behaviour, the firm's profits and degree of market power. The non-structural approaches⁴ posit that factors other than market structure (concentration) may affect competitive behaviour. This approach has been developed in the context of the New Empirical Industrial Organisation (NEIO) literature. The ambiguous results of the concentration approach and the results of the emerging contestability literature⁵, both suggest that the competitive behaviour of banks is not necessarily related to the number of banks in a market or to their concentration but to other factors such as entry-exit barriers and the general contestability of the market (Baumol et al. 1982; Rosse and Panzar, 1977; Panzar and Rosse, 1987). The most important advantage of non-structural approaches is that it does not assume that concentrated markets are not competitive, because contestability may depend on the extent of potential competition and not necessarily on market structure (Casu & Girardone, 2006). Thus, according to contestability literature, the structure is only one source of competition.

Contestability is not necessarily related to concentration or the number of banks (Northcott, 2004). The importance of the role played by open entry in competition has long been acknowledged in the contestability

³ The Structure Conduct Performance (SCP) model dates back to the pioneering work of the Harvard economist Edward Mason, in the 1930s, and of his doctoral student Joseph Bain, in the 1950s.

⁴ Non-structural approaches measure competition without using explicit information about the structure of the market. Instead, non-structural measures focus on obtaining estimates of market power from the observed behavior of banks

⁵ The theory of contestable markets was advanced as a generalization of the theory of perfectly competitive markets, (Baumol, 1982)

literature. The growing consensus in this area is that contestability improves with less-severe entry restrictions, the presence of foreign banks, a few restrictions on the activities that banks can perform, and well-developed financial systems, the last two of which may indicate that competition from the non-bank sector is important. The contestability literature also introduces other characteristics of the banking industry that may help explain contestability in a concentrated market. Asymmetric information between banks and borrowers, the branch network and the use of technologies including information technology, telecommunications, and financial product technologies are among these characteristics. When there is asymmetric information between borrowers and the lenders, a new bank finds it difficult to attract borrowers. The reason is that the opaque borrowers are locked in the existing banks through the lending relationships they have already established with them and are reluctant to incur a switching cost in the cause of changing their lender bank. Therefore, more proprietary information provides a larger incentive for incumbents to compete strongly for market share. This puts downward pressure on lending rates even in the absence of a large number of banks (Ariccia, 2001).

The bank can differentiate itself in a way that it will come up with competitive advantage. The branch network is one of such ways which is particularly important for a bank to differentiate itself from others and be more competitive in the industry. Very simplistically, a bank can compete on prices (e.g., by decreasing its lending rates) or it can compete by locating branches close to clients, taking advantage of the fact that clients place value on being close to services (Northcott, 2004). Contestability literature also highlights the use of technology as one other advantage that a bank can use to be competitive in the market. This is because, technology advances may lead to the development of new products and services that has more scale economies than traditional banking products. Further, Automated Teller Machines (ATM) networks and remote banking systems provide an alternative, lower-cost way to attract more customers by reducing sunk costs and barriers to start new branches. Also advancements in information technology have led the banks to keep records of borrowers and use that information in assessing the creditworthiness of borrowers.

Barth, Caprio and Levine (2001) in their study dealing with 107 countries, document that various regulatory restrictions in place in 1999 on commercial banks, including various entry and exit restrictions and practices affect the competitiveness in the banking industry. The authors further explain this in another paper and reveal that restricting bank activities is associated with negative bank performance and stability, as compared to a situation when banks can diversify into other financial activities (Barth, Caprio and Levine, 2003). Their results are consistent with the view that broad banking powers allow banks to diversify income sources and enhance stability. What they have tried to confirm through their study was that, the ability of the banks to compete in the market when unrestricted practices of banks improved. The impact of bank regulations, concentration, and institutions on bank net interest margins and overhead expenditures was investigated in a more rigorous way by Demircug-Kunt, Laeven, and Levine, (2004). For this, they used bank level data across 72 countries while controlling the effects of a wide array of macroeconomic, financial, and bank specific-traits. One major finding of their study was that tighter regulations on bank entry, restrictions on bank activities, and regulations that inhibit the freedom of bankers to conduct their business, boost bank net interest margins. These may be confirmations of the theoretical predictions of the literature, McKinnon (1993), Shaw (1973). They advocate the desirability of financial liberalization measures to free banks from financial repression which may also encourage greater competition among financial institutions.

In another cross-country study on banking structure, the role of foreign banks was investigated by Claessens, Demircug-Kunt and Huizinga (2001) which showed that entry by foreign banks improves competition and makes domestic banking systems more efficient by reducing margins. Further, the results of Barth, Caprio and Levine's study (2003) also indicate that barriers to foreign-bank participation enhance bank fragility. The paper critically analyses this and stresses that it is not the actual level of bank concentration, rather it is the contestability of the market that is positively linked with bank stability. By relating the competitiveness indicator (estimated using a structural model) to a number of country characteristics, Claessens & Laeven, (2003) too confirm this relationship. Their findings reveal that greater foreign bank presence and fewer activity restrictions in the banking sector can make for more competitive banking systems. In contrast to these findings, Gormley (2007) shows that, foreign banks financed only a small set of very profitable firms upon entry, and that on average, firms were eight percentage points less likely to have a loan after a foreign bank entry, because of a systematic drop in domestic bank loans in India. While the potential benefits of foreign bank entry are many, this kind of evidence suggests that information asymmetries may prevent many firms in developing economies from realizing these benefits.

One separate body of recent research interest focus on mixed oligopoly that exclusively studies competition between public and private firms. The basic idea in this strand of literature is that state ownership of banks provide an indirect means of regulating the conduct of private banks and hence the level of competition. There have been only a few articles which examine the effect of competition between public and private banks on the level of competition in the whole banking market in an economy. Saha and Sensarma (2004) studied the competition between a private bank and a public bank and have demonstrated that the mixed approach can be

useful, but they share a common limitation of focusing only on deposit competition and not default risk. This shortcoming was addressed in the Saha and Sensarma (2009), by focusing both deposit and loan markets. This study highlights that the welfare maximizing objective of the government can mitigate the default risk of the competition. These findings support the view that public-private bank interaction affects the level of competitiveness in the bank market.

III. Methodology

In order to identify the contributors or determinants of bank competitiveness, the study employed the methodology adopted by Claessens & Laeven, (2003). Accordingly the explanatory data fall in four categories: market structure, contestability, inter-industry competition and general level of development. As the role of government regulations is an important determinant promoting competitive climate, that factor is also taken in addition to the above variables.

Thus, as the first step, the level of bank competition was measured with H-statistic. Panzar and Rosse (1987) define a measure of competition, the H as the sum of the elasticities of the reduced-form revenue function with respect to factor prices. Accordingly, this revenue function can be written as;

$$\text{Log } TIR_{it} = \alpha_0 + \beta_1 \log IPL_{it} + \beta_2 \log IPF_{it} + \beta_3 \log IPC_{it} + \lambda_1 \log TA_{it} + \lambda_2 \log NPL_{it} + e_{it}$$

----- (Equation 1)

The study estimates the PR model assuming three input and single output (gross interest revenue) production function, with other firm-specific control variables; the bank size and credit risk. Panzar and Rosse (1977), show that the sum of input price elasticities, $H = \sum_{i=1}^n \beta_i$ reflects the competitive structure of the market. In this study, banks are considered as employing three factor inputs namely, labour, funds, and capital. An extensive set of panel data of Sri Lankan commercial banking sector which comprise 25 individual banks, from 1996 to 2015 have been used for this estimation.

in the second step factors that explain the competitiveness of the banking system of the country were identified. To do so, the average H-statistic was regressed on six major categories of variables which are assumed to be affecting the degree of bank competition in Sri Lanka. The regression model is as follows:

$$H_t = \alpha_0 + \alpha_1 MS_t + \alpha_2 Cont_t + \alpha_3 InterInd_t + \alpha_4 GovReg_t + \alpha_5 Bankeff_t + \alpha_6 EcoDev_t$$

----- (Equation 2)

The above time series regression was run for the sample (the whole commercial banking sector which comprises 25 commercial banks) period of the study, that is 1996- 2015. For the structure of the banking system, the 2-state bank concentration ratio, a measure of banking system concentration and foreign bank operations, were used. As proxy for the foreign bank ownership variable, the ratio of foreign bank assets to total banking system assets was used.

For the contestability of the market, previous studies have used some indices such as activity restriction variable and entry fit variable etc. (Barth, Caprio, and Levine, 2001 and Claessens & Laeven, 2003). The present study has to be restricted to the data availability and used informal entry barriers as they are quite common and many formal barriers in financial markets have been removed over time in the country. The existence of large scale economies in many financial industries, due to relatively large fixed costs, causes a hindrance for new entries. Accordingly, three variables are incorporated under *Contestability*. These are the factors that affect banks ability to contest in the market. Under this category, growth rate of bank branches in the bank market was taken to indicate entry barriers, growth rate of ATM machines was taken to indicate technological development in the market, and financial freedom index used as to indicate ability to contest as a free financial institution in the economy Financial freedom index (compiled by Heritage Foundation) measures the degree of independence of financial institutions from government control and interference..

To describe the competition coming from inter- industry, the size of the country's stock market capitalization to GDP, and non banking financial sector performance were used. Under bank efficiency category, annual average efficiency scores of the banking sector and efficiency scores of two state banks were used. The central bank repurchase rate was used to proxy bank regulations. The regression also controls for the country's general economic development and macro-economic stability as these can be expected to affect banking sector performance. For that logarithm of per capita GDP and the annual change in the consumer price index were employed.

IV. Results and Discussion

As the results of the estimated reduced form revenue equation (Equation 1), the estimated *H*- statistic is 0.58 for the sample period. This value does not lend support for a perfectly competitive banking market in Sri Lanka, as the estimated *H* statistic significantly differs from 1. This value is also significantly non-negative (closer to zero), thus offers no evidence for a monopoly in the banking market. The results suggest that for the observed period, the Sri Lankan banking sector is characterized by monopolistic competition for traditional banking activities according to the PR classification. This indicates that an increase in input prices will lead to a less than proportional increase in interest revenues, as the demand for banking faced by individual bank is inelastic. As this value is in the range between 0.5 and 1, the estimated *H* statistic supports evidence for a moderately competitive market for interest revenue in the Sri Lankan banking industry.

In order to identify what factors contribute to the variations in the degree of bank competition in Sri Lanka, the Equation 2 was analyzed as a multiple regression analysis with a constant. The results of the initial analysis are given in table 1.

Table 1 Regression results-determinants of competition (Equation 9)

Variable	Coefficient
Constant	-7.74*** (-8.08)
Market Structure:	
State bank concentration	0.79*** (12.34)
Foreign bank concentration	0.10 (0.32)
Contestability :	
Branches	0.97** (8.26)
ATMs	-0.06 (-2.75)
Financial Freedom	-0.15 (-1.33)
Inter-industry competition:	
Non banking fin sector	0.58* (3.89)
Stock Market development	-1.09*** (-18.29)
Government Regulations:	
REPO	-3.83*** (-19.28)
Bank efficiency :	
State bank efficiency	-1.00** (-7.36)
Banking sector Efficiency	1.54** (7.60)
Economic development:	
Log(GDP per capita)	0.32** (4.92)
Inflation	-1.46 (-13.78)
<i>Ad R-squared</i>	0.98
<i>F-statistics</i>	62.22**
<i>Durbin-Watson stat</i>	3.22

Note: The dependent variable is the competition measured with *H* statistics. *t* values for coefficients are in parentheses. ***, **, and * indicate a significant difference from zero at 1%, 5%, and 10%, respectively.

As a start, it is useful to note that many of the regression coefficients are statistically significant; out of the 13 coefficients 9 are significant at the 10% level. From among these variables, concentration, branch growth, non banking sector development, bank efficiency and the economic growth are positively correlated with the degree of competition, while stock market development, central bank policy rates and state bank efficiency are negatively correlated. Presence of foreign banks, technological expansions (measured with growth rate of ATMs) and financial freedom index reports no statistical relationship with the degree of competition in the Sri Lankan banking sector.

More interestingly, the study found a strong positive correlation between bank concentration measured with the two state bank concentration ratio and the degree of bank competition in the country. This relationship is statistically significant at 1% level. This suggests that more concentrated bank environments are more competitive. This is quite contradictory to the common wisdom that says concentrated markets are less competitive. This positive nexus between concentration and competition can be justified with two aspects. First, this can happen through the competitive pressure of private banks (both domestic and foreign) against the state banks. Banking market of Sri Lanka is very small. When this small banking market is highly concentrated around the two state banks, other non-state banks in the market need to extensively compete to capture the market. On the other hand, state banks too need to react to this competition in order to protect their market share. (this is further evident with the negative relationship between concentration and branch expansion). Thus, competition among all banks to capture a small market results in a competitive climate in the banking sector.

Second, positive correlation can be explained through the financial freedom channel. The study finds no significant direct effect of financial freedom index on bank competition. However given in the correlation matrix (see table 2) a strong positive relationship between financial freedom and bank concentration is evident. Financial freedom index is a measure of banking efficiency as well as a measure of independence from government control and interference in the financial sector. In the periods where the banking sector is highly concentrated, authorities may try to enhance competition by relaxing regulations and giving more freedom to bank operations. This would help financial institutions to provide various types of financial services to individuals and companies. Hence, the banks get more freedom to extend credit, accept deposits, and conduct operations. The increased competition in concentrated markets may have been channeled through this improved financial freedom.

The effect of contestability is proxied with bank branch expansion, technological expansions and financial freedom index. Only branch expansion is found as statistically correlated with the degree of bank competition. This relationship suggests that branch expansion improves the contestability in the market and this in turn improves the competitive climate in the banking sector. This result supports traditional industrial organization literature; more banks more competition. When new branches are established, the competition between existing banks and new banks in an area increased. The positive effect of branch expansion may particularly be true as the Sri Lankan bank market is small. Contestability through technology expansion is not statistically significant in explaining the level of competition over time. The financial freedom index too does not support a straightforward relationship to the banking sector competition in the country. Rather, financial freedom might have indirectly affected the degree of competition in the bank market. The correlation of the index with some other variables included in the model and its wider scope of definition, may have affected the degree of competition indirectly rather than a directly.

Table 2 Correlation matrix of dependent and independent variables

	HSTAT	CONCEN	FOREIGN	BRANCH	ATMS	FINFREE	NON_BANK	STMKT	REPO	EFFSTATE	EFF	GDP
CONCEN		0.281 0.310										
FOREIGN		0.087	0.479 0.759									
BRANCH		-0.163	-0.832	-0.391 0.562								
ATMS		-0.104	-0.817	-0.437	0.991 0.711							
FINFRE		0.217	0.888	0.642	-0.763	-0.743 0.438						
NON_BANK		0.644	0.337	-0.177	-0.183	-0.105	0.236 0.010					
STMKT		-0.235	-0.597	-0.334	0.738	0.717	-0.576	-0.038 0.400				
REPO		-0.197	0.540	0.113	-0.485	-0.522	0.296	-0.176	-0.552 0.482			
EFFSTATE		-0.221	-0.539	-0.195	0.146	0.106	-0.530	-0.267	0.403	-0.425 0.428		
EFF		0.417	-0.147	-0.334	0.022	-0.019	-0.314	-0.252	0.249	0.334	0.318 0.122	
GDP		0.540	0.461	0.219	-0.385	-0.337	0.421	0.340	-0.159	-0.077	-0.093	0.217 0.038
INF		0.061	0.364	0.602	-0.286	-0.297	0.525	0.165	-0.234	-0.209	-0.203	-0.590 0.830

Cell Contents: Pearson correlation
P-Value

The effect of inter-industry competition on the level of bank competition had been measured with the performance growth of non-commercial banking financial sector and stock market. Both variables were statistically significant with a positive sign of non-banking sector and a negative sign of stock market

development. The positive sign of non-banking sector performance suggests a need of tough competition by the commercial banking sector in order to face the competition coming from such industries. Specially, the competition from leasing and specialized finance companies intensified during the last decade. This would force the commercial banking sector to be more competitive in providing financial services and moving towards more diversified financial products. Thus, the study provides significant evidence on positive contribution of non-banking sector performance on bank competition. The coefficient found in relation to stock market development on bank competition is negative, suggesting higher the stock market development lesser the degree of competition. Stock market is the primary source for any company to raise funds for business expansions. Therefore, the stock market is a long term financial market in an economy. However in countries like Sri Lanka the stock markets are not much developed so as to raise funds for companies. Therefore traditionally, the banking sector has been the major suppliers of debt capital for Sri Lankan firms. However, when and where the stock markets are developed the firms go for the stock market to raise funds for their investments. This would challenge the ability of commercial banks to compete for corporate loans in the market. Thus the market for long term debt for the banking sector becomes meager resulting in less competitiveness on the supply side of the debt capital. Therefore the found negative effect of stock market development may be particularly true in the context of Sri Lanka.

Central bank policy rate has been included in the model to test any effect of such policies on the competitive conduct of the banking sector. Repurchase (Repo) Rate and Reverse Repurchase (Reverse Repo) rates, are the policy rates of an economy. These policy rates play an important task in the call money market to facilitate liquidity management in the economy. Thus, if there is excess liquidity in the market, the Central Bank decides a Repo rate to mop-up the surplus money as a safeguard against inflationary pressure on the economy. This process in the short run affects the behavior of the bank. The coefficient found in relation to Repo rate in the analysis is negative suggesting a lower bank competition with higher Repo and *vice versa*. When the Repo rate is higher banks feel more comfortable to invest their excess cash as they get a higher return in secure funds. However, this would affect the banks' liquidity level to be kept at the minimum. This in turn discourages banks to compete in the market. This particular cause of bank competition was evident in the empirical analysis.

The efficiency of the bank market was also tested to assess its validity as a determinant of bank competition. Both the variables, state bank efficiency (*Effstate*) and bank efficiency (*Eff*) were statistically significant. The negative sign of *Effstate* says that the degree of competition is higher when the state bank efficiency is lower. This may be true as the analysis focus on the short run effect of bank competition. The private banks always take the lower level of efficiency of the state banks as a competitive advantage. Therefore, in the short run the lower efficiency of state banks encourages other banks to compete in the market. However in the long run this effect can be scaled down when the state banks too improve their efficiency. The higher efficiency level of the whole commercial banking sector was found as one of the most important determinants of bank competition in Sri Lanka. The found coefficient is highly positive and statistically significant at 5% level.

Finally, the study also included macro-economic stability to assess if there is any effect on the level of bank competition in the country. The macro economic development measured with per capita GDP is statistically significant, revealing a positive effect of favorable economic conditions on the level of bank competition in the country. This suggests that general patterns of the degree of competition over the period change with the different levels of economic development.

However, some correlations between independent variables were identified in the model. For example, financial freedom index has statistical significant relationship with concentration, foreign banks and stock market operations. However, financial freedom variable was not statistically correlated with the level of competition. This indicates that financial freedom does not directly affect bank competition, but indirectly affects through bank concentration, foreign bank operations and stock market operations. Therefore the equation 2 was re-estimated by adjusting these correlations. Accordingly, the combined effects of financial freedom with concentration, financial freedom with foreign banks and financial freedom with stock market, were included in the model instead of including them individually. *ATM* was also excluded from the model as its high correlation with *Branches*. Applying general-to-specific approach resulted in the final model that best fits for the Sri Lankan banking sector. The reduced form of equation 2 is given as equation (2a).

Equation 2(a) - Test of determinants of competition in Sri Lankan banking sector

$$H_t = \alpha_0 + \alpha_1(\text{Foreign} * \text{Fin freedom})_t + \alpha_2 \text{Branches}_t + \alpha_3 \text{Nonbank}_t + \alpha_4(\text{Stmkt} * \text{Fin freedom})_t + \alpha_5 \text{Repo}_t + \alpha_6 \text{Effstate}_t + \alpha_7 \text{Inf}_t$$

$$H_t = 0.086 + 2.94(\text{Foreign} * \text{Fin freedom})_t + 1.35(\text{Branches})_t + 3.28(\text{Nonbank})_t - 1.43(\text{Stmkt} * \text{Fin freedom})_t - 2.46(\text{Repo})_t - 0.19(\text{Effstate})_t - 1.22(\text{Inf})_t$$

(0.31) (3.8)*** (4.58)*** (3.86)*** (-4.01)*** (-2.7)** (-1.95)* (-3.04)**

Adjusted R² = 0.73
 F Statistics = 6.28***
 Durbin-Watson stat = 2.37 (0.34 < critical value > 2.73)

H_t is the dependent variable of the study estimated by using PR H statistics. The regression results are based on average annual figures of bank level and macro level. The estimates are based on OLS method and using heteroskedasticity (Period weights (PCSE)) standard errors & covariance. *t* values for coefficient are in parentheses. ***, **, and * indicate a significant difference from zero at 1%, 5%, and 10%, respectively.

According to the equation (2a), financial freedom has indirectly affected bank competition through the positive effect it has on foreign bank operations, and the negative effect it has on stock market operations. In addition to that, branch expansion and non-banking sector performance positively affect the level of bank competition. The effects of Repo rate, state bank efficiency and Inflation on bank competition were found as negative.

The effect of concentration on bank competition became statistically insignificant after adjusting for the effect of financial freedom on concentration. Thus, the study finds little evidence that variables describing the banking system concentration can help explain its measured competitiveness, or at least in the way typically posed. The study finds that bank concentration is not negatively correlated with the *H*-statistic, as may be expected specially in the context of developing countries. This suggests that the *H*-statistic (bank competition) and the bank concentration are two variables that cover different concepts. Thus, findings of the study confirm the predictions in the New Empirical Industrial Organization (NEIO) literature that the degree of competition is not necessarily related to market structure.

A strong positive correlation was found between foreign bank operations and financial freedom index. Therefore the combined effect of financial freedom and foreign bank performance on bank competition was found as positive and statistically significant at 1% level. The recent performance developments of larger foreign banks that operate in Sri Lanka and their strategic focus on local customers, may have caused bank competition to be intensified. When the competition pressure coming from these banks is high, the local banks too have to conduct their operations in more competitive manner. Accordingly, under market structure category, only the effect of foreign bank market share was identified as significant in explaining bank competition in Sri Lanka. In addition to the causes discussed above, GDP per capita became insignificant in the final model building, and instead, inflation became statistically significant.

High inflation which often equals more volatile inflation in the country during the sample period discourages banks' ability and willingness to compete in the market. High inflation makes it more costly to borrow and invest. The negative relationship between bank competition and inflation may explain the decrease of appetite for debt financing during the recession period. On the other hand, from the supply side banks have to take extra risk for lending in inflationary situations. Both of these forces discourage banks to compete in the market during high inflation due to their fear of extra risk taking. Therefore the analysis of the present study supports the evidence for positive implications of macro- economic stability on bank competition in Sri Lanka.

Finally it is worth to compare the findings of the present study with determinants of bank competition analysed by Claessens and Laeven (2003). Their sample consisted with banking systems of 50 countries. Their measurement of competition is similar to present study; that is Panzar-Ross approach. Findings of this analysis are quite consistent with the findings of the present study. Their findings too revealed that banking systems with greater foreign bank entry and fewer entry and activity restrictions to be more competitive. Further, in support of the findings of the present study reveal, Claessens and Laeven (2003) too find no evidence that the competitiveness measure negatively relates to banking systems concentration. In conclusion, their findings further confirm the findings of the present study and revealed that contestability determines effective competition.

The study also reports here the results of some robustness test to assess the statistical robustness of the estimated model. The estimation procedure generated heteroscedasticity consistent estimates by employing White's correction in order to keep the estimators efficient. The last rows in *Equation 2a* give more information as to how the explanatory power of study's causes of bank competition model has been built up. The adjusted R^2 s showed in the first row says that the specified model of the study generally explains 73% of the time series variations in the degree of commercial bank competition in Sri Lanka. The found F statistics are significant at 1% level, indicating high collective power of the variables included in the model in explaining changes in bank competition over time. Durbin-Watson stat for the sample period should have been within the range of 0.34 in lower level and 2.73 in upper level at 1% significance level in order to be free from autocorrelation. The calculated Durbin-Watson stat is within this range confirming its robustness from serial auto correlation.

V. Conclusion

This paper tried to answer the question; what are the factors promoting or restraining the level of competition in the bank market of Sri Lanka? The econometric model developed to identify the causes of bank competition comprised six major categories of variables; bank market structure, contestability, inter-industry competition, regulatory policies, bank efficiency and economic development. One of the important observations noted in this analysis was the strong evidence to support the difference between competition and concentration. No evidence was found to prove that state bank concentration has undermined bank competition in Sri Lanka. Instead a positive effect was found suggesting state bank concentration promotes competitive behavior of other banks in the short run. This is contrary to the common criticism of negative impact of bank market concentration on competition. This finding can be taken as an important policy implication. A more competitive climate can be created in the operations of these banks by attracting and retaining their market shares, so that the other banks in the market are encouraged to be more competitive.

The second most important observation found in this study was the indirect implications of financial freedom (index) of the country with the level of bank competition. Though Financial Freedom Index showed deterioration during the recent years, statistical evidence does not directly support any significant effect on bank competition in the country. Rather, supports indirect impact through the impact it has on foreign bank operations. Further, financial freedom has affected bank competition through lowering stock market efficiency. Therefore, general contestability in the market was proved to be one of the important factors that affect bank competition through its effects on bank market structure and inter-financial-industry competition. Overall, the analysis in this study on determinants of bank competition identified foreign bank performance, broadening financial access to the mass (branch expansion) and competition pressure coming from non banking sector financial industries as promoting factors of bank competition, whereas the development in the capital market, Central Bank policy rates, state bank efficiency and inflationary pressure, discourage banking sector ability to compete in the market. The Central Bank intervention in liquidity management is also a need to be handled cautiously, as the higher Central Bank policy rate was identified as a negative cause of bank competition.

Financial freedom includes freedom of financial institution to expand, extend credit, accept deposits, and conduct operations in foreign currencies. Foreign financial institutions operate freely and are treated in the same manner domestic institutions when financial freedom is higher. Recent performances of two dynamic foreign banks (HSBC and Standard Chartered Bank) provide examples for the effect of financial freedom on bank competition. Such freedom increased those banks' ability to compete in the local bank market. Freedom of the non-banking financial sector to engage in traditional banking activities is another key determinant of bank competition as revealed in the study. This would in turn enhance the whole financial system's capacity for competition thereby fostering efficiency in financial resource allocation. Hence formulating policies enabling freedom in the financial market would certainly cause positive implications on the banking sector competitiveness. Overall, the findings of the study point out that the existing macro environment is not so conducive bank competition in Sri Lanka. Hence, study highlights the need for creating a macro environment with continuous financial reforms and proper monitoring mechanisms to facilitate competition in the banking sector in order to reach the favorable outcome of such competition.

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