Impact of Foreign Bank Entry on the Credit Stability of Host Countries

A Study on South Asia

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgments), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Abstract

This study investigates lending sensitivity of foreign and domestic banks to crises and business cycles in South Asia. It also studies the credit behaviour of banks in reaction to financial liberalization and deposit structure of banks. The dataset consists of more than 200 banks for the period 2003-2009 from four countries in South Asia, with information on *Ownership Structure* and *Balance Sheet* of banks. During crisis, foreign banks credit remains insensitive, while domestic banks emerge as stabilizers. In response to host country macroeconomic fluctuations foreign banks' credit growth demonstrate positive relationship, but no association has been witnessed in response to home country macroeconomic fluctuations. Finally, financial liberalization and exposure to short term deposits does have a significant impact on lending behaviour of foreign banks.

Key words: Foreign banks; Developing Economies; Credit growth; Financial Stability

Chapter 1 Introduction

During the latter half of 1990s, developing economies in South Asia witnessed a 100% increase in foreign banks penetration, though in varying proportion across different countries (Claessens et al. 2008). This internationalization of the banking sector has been viewed as a vehicle for improving both the quantity and quality of financial services in the host countries. On the contrary, critics have pointed to the potential risks for the stability of the banking system due to the danger of volatile credit supply. The significance of foreign banks' credit volatility becomes critical especially during crises and macroeconomic fluctuations in the host countries. Highly volatile credit supply of banks increases the over-all risk of the banking system in the country. A better comprehension of foreign banks' credit decisions has policy implications for those countries that are still uncertain about the potential consequences of opening up banking sector to foreign competition.

The potential credit consequences of foreign banks have been studied by Haouat, Nicolas and Navarro (2010) for Latin America and by de Haas and van Lelyveld (2006) for Central and Eastern European Economies (CEE). Both studies suggest conflicting credit response of foreign banks to crises, where the study on Latin America documents a positive role of foreign banks in reducing credit volatility, while the other study finds no significant influence on credit behavior for CEE. Macroeconomic variables such as GDP, inflation and lending rates also play a role in determining the credit behavior of banks. Some banks behave pro-cyclically while others behave anti-cyclically in terms of their credit growth.

There is no empirical research on the role of foreign banks with regards to credit stability in South Asia, leaving a gap in the literature. I therefore focus on four South Asian economies

(Bangladesh, India, Pakistan, Sri-Lanka) utilizing a panel dataset consisting of balance sheets and income statements of more than 200 banks. The selection of these countries owes to the number of similarities and differences between them. In terms of similarities, these economies opened their banking sector for foreign banks at about same time in 1990s. Further, the central banks of these countries are signatories of the BASEL accord representing uniform regulatory practices. Finally, in terms of political instability and violence, more or less, these four countries stand in the same category.

One aspect which distinguishes these economies from one another is the degree of openness, measured in terms of percentage of gross loans held by foreign banks in each country. Pakistan stands out to be the most open with 51.6% bank-loans held by foreign banks followed by Bangladesh, India and Sri Lanka respectively (See Appendix 1).

Lately, these economies have undergone different phases of booms and busts which had implications on the credit behavior of foreign banks. The Indian economy has been the fastest growing economy in terms of GDP followed by Sri-Lanka, Pakistan and Bangladesh. Since 2003, these economies had distinct boom years but in terms of bust they commonly share 2008 exhibiting a big dent on the growth rates (see Figure 1). These peculiar characteristics of South Asian economies coupled with their exposure to political crises mandates the need for studying the role of foreign and domestic banks in these countries. Therefore, this dissertation addresses the following research question:

"Do foreign and domestic banks in South Asia react differently to business cycles and host country financial crisis in terms of their credit behavior.[1]

Additionally this study examines the impact of home macroeconomic conditions, such as GDP growth and average lending rates, on foreign banks' lending activities, an issue rarely addressed previously.

The main findings of this study regarding credit stability are as follows: Firstly, I find strong evidence regarding the difference in credit behavior of domestic and foreign banks both during normal and crisis periods. During normal times private banks' credit growth is significantly greater than public and foreign banks. During crisis, foreign banks are insensitive due to their careful relationship based lending policy while domestic banks exhibit stabilizing role. Between public and private banks it is the public banks that extend 5.36% more credit compared to their credit in normal times. This particular behavior of public banks can be attributed to financial support from the government and long term credit commitments to their big clients[2].

Secondly, an economically significant relationship between credit growth and host country macroeconomic variables is observed. This identifies the pro-cyclical credit behavior of foreign and domestic banks in South Asia. In relation to changes in GDP of host country, private banks show the most robust increase in their lending activity. However, this stronger response than public and foreign banks is associated with the pattern of growth in

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[1] Credit behaviour and lending behaviour in this dissertation means loan supply or growth in loans on yearly basis.
[2] Haouat, Nicolas and Navarro (2010) document similar results.

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these economies. The increase in GDP in South Asia is mostly driven by *"increased cosumerism"* which triggers the demand for consumer credit in the country. Private banks in this respect seem well equipped in serving the needs of their clients. However, there is a significant negative relationship between host country inflation and banks' credit growth. Such reaction is expected as rising inflation always works against lenders and it also fares up interest rate in the county which in turn detriments credit.

Thirdly, my results indicate that foreign banks do not react to their home country macroeconomic conditions. This insignificant evidence in favour of *Push Effect* (i.e. tendency of foreign banks to respond to home country macroeconomic conditions) is bound to happen as most of the foreign banks in South Asia are independent subsidiaries, operating free from the influence of parent banks.

Finally, the degree of openness of banking sector, measured in terms of financial liberalization, plays a significant positive role in shaping the lending behavior of both foreign and domestic banks. Although foreign banks' credit reaction is mild, private banks credit decisions are significantly influenced by the increased presence of foreign banks in the host country, because, the domestic banking sector views foreign banks' entry as an improvement in the investment climate of the country (Sathye 2002). Similarly the deposit structure impacts the credit decisions of banks as well. Results indicate that banks with higher exposure to long term deposit increase lending more favorably compared to banks with higher exposure to short term deposits. A bank's own financial health has positive

effects on the credit activities with exception of *size* which has a negative relationship with credit growth.

This dissertation has the following policy implications for central banks of host countries. First, countries in South Asia facing grave crises in the form of political instability and violence may allow foreign banks to enter since they neither tend to stabilize nor destabilize credit situation in the host countries during crises. Nevertheless, their entry will result in banking sector liberalization of the host country, thereby, encouraging domestic private banks to lend more. On the contrary, allowing foreign bank branches may prove to be catastrophic for host countries[3] during crises as they have strong tendency to act on the directions of their parent banks in home countries. Secondly, this study can assist central banks in regulating reserve requirements for short term and long term deposits because the higher the exposure to long term deposits, the more stable the credit supply of banks. Finally, countries having low participation of private banks in their banking sector can also suffer more volatile credit supply during calm periods. This study highlights the need for right mix of private and public banks for domestic banks, too much of both private and public banks can make host countries more vulnerable.

The rest of the dissertation is structured as follows. Chapter 2 provides an overview of the literature and theoretical considerations, underlining the link between foreign banks' entry and credit stability in host countries. Chapter 3 outlines the methodology employed and

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[3] This point can have a strong relevance for India since it is the country in South Asia with restrictions on controlling interest for foreign entrants.

Chapter 4 presents the description of dataset. Empirical results and robustness tests are reported and discussed in Chapter 5 and finally, Chapter 6 concludes the study.

Chapter 2 Literature Review

The literature review is organized into two sections starting with an introduction to the banking sector in South Asia followed by theoretical framework explaining existing stream of research related to credit volatility.

2.1. Banking Sector Outlook in South Asia

In South Asia, the Indian banking sector is characterized by a huge dominance of public banks with share of deposits around 80%. These banks are instrumental in financing fiscal deficits and lack proper lending incentives which results in massive loan losses (NPL's)[4]. Owing to structural reforms and deregulation of the banking sector, the share of foreign bank deposits surged to 10.5% in 2003 (Gormley 2009). The unique feature of foreign banks in India is that they are largely denovo branches or subsidiaries of foreign holding banks. This huge dominance of public banks makes them critical in terms of their credit behavior. Whereas, foreign bank branches may turn out to be less reactive to their home country macro economic conditions.

Pakistan's, Sri Lankan and Bangladesh banking sectors are similar in many respects. First, all these countries initiated financial liberalization in 1990s. Second, an almost similar amount of public bank representation can be witnessed in these countries based on assets

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[4] For further study on Indian licensing regime and financial system prior to 1991, See Ghemawat and Khanna (1998), Hanson (2003), and Tarapore (1999)

held. Lastly, in case of foreign banks these countries have comparable representation of independent fully owned subsidiaries since they privatized most of their public owned banks to foreign banking companies. Hence for these countries, mainly independent foreign banks are likely to play their role in shaping credit behaviour.

2.2. Theoretical Underpinning

As yet there is no detailed theory on multinational banks, inspecting the association between foreign direct investment in the banking sector and credit stability especially in the context of developing countries. However, the mushrooming of foreign banks into developing and emerging economies has attracted empirical discourse among academicians and practitioners alike. The majority of the literature pinpoints the positive efficiency effects of foreign banks in the host country (Lensink and Hermes, 2004). The benefits of foreign bank entry in terms of efficiency may be diluted if a trade-off between banking efficiency and banking stability exists. Before discussing further literature on the topic, a discussion on theoretical underpinnings related to the subject is imperative.

Some general beliefs about the ramifications of foreign bank presence on the host country banking system can be suggested. The majority of these beliefs are based on the fact that most of the subsidiaries of foreign banks are not perfectly independent from their parent banks (Holding Banks) with extremely diversified portfolio of subsidiary banks worldwide. Consequently, the banking practices of foreign bank subsidiaries in the host country will be influenced by the parent holding banks in their home countries. These foreign based parent banks may act favorably for the foreign banks subsidiaries by being the back-up supplier of

credit during times of financial stress. Additionally, foreign parent banks can operate internal capital markets and centralized treasury operations to inject equity and credit over its subsidiaries in the host countries (Stein, 1997). Empirical studies for the US provide evidence of bank holding companies operating internal capital markets in which they allocate capital and liquidity to subsidiary banks. The study by Houston et al. (1997) reports that foreign bank subsidiaries' credit supply is more correlated with the cash flow and capital position of the parent bank in the home country than with the bank's own capital and cash flow. Other studies also testify the winner-picking behavior of holding banks where they supply evidence of negative correlation of credit supply of foreign banks with the credit growth of other subsidiaries in the group. Houston and James (1998) compared stand-alone banks to foreign bank subsidiaries in US, and found that stand-alone banks are more sensitive to their own liquidity, capital and credit position than the foreign bank subsidiaries. And array of all these findings may lead to less volatile credit supply of foreign banks. In particular foreign banks compared with host country banks may be less vulnerable to host country bank capital shocks since they are backed by ample funding sources of their holding banks in the home country.

In contrast foreign banks in the host country can have adverse effects on the credit supply in comparison to domestic banks if they respond pro-cyclically to the business cycles in the host country. The reason for their fickle credit supply in the host country owes to the allocation of credit and liquidity of its parent bank over different countries based on expected risk and returns. This implies that when an economy of any particular host country shrinks the lending activities of bank subsidiaries in this country may be curtailed in favor of other countries in the portfolio. Overall all studies point towards the importance

of internal capital markets in shaping the credit supply behavior of foreign banks in host countries.

The historical literature until today hints in the direction of favourable (stabilizing) impact of foreign bank entry on the credit supply in host countries but with some exceptions. Separate papers by Crystal et al. (2002) for Chile, Colombia and Argentina, and Dages et al. (2000) for Argentina and Mexico demonstrate, that after the massive influx of foreign banks to Latin American countries and their presence during the decade depicted less volatility in their credit growth compared to domestic banks. Moreover the significant credit growth by foreign banks during times of crises and in the years afterwards owes to the diversity of ownership of foreign banks (De novo banks and Take-Overs).

Another stream of research substantiates the point that foreign banks don't shrink their credit supply during unfavorable macroeconomic conditions, in fact, they view such economic downturns as a window of opportunity to expand either by acquiring existing banks in the host country or by expansion of existing foreign subsidiaries (Peek and Rosengren (2000a), Goldberg (2002), and Soledad Martinez Peria et al. (2002)). Also De Haas and Van Lelyveld (2004, 2006) and Kraft (2002a) report similar findings for ten Central and eastern European countries. Whereas Dages et al. (2000) suggest that foreign and domestic banks with low non-performing loans react similarly to the business cycles which emphasizes that bank financial solvency, not mode of entry, has been pivotal.

Contrary to these positive findings, some empirical findings also identify negative and unfavorable effects of foreign banks on the credit volatility under certain situations. Peek

and Rosengren (2000a) notified that cross-border lending of foreign banks did indeed contract during macro-economic meltdowns in Latin America. Another study on pull factors by Morgan and Strahan (2004) highlights the positive relationship between foreign bank presence and macro-economic fluctuations. The reason behind such a positive sensitivity to host country business cycles seems to be the propensity of foreign banks to redistribute funds over its subsidiaries in other countries.

The foreign bank's credit supply is also contingent upon their reaction to home country and host country business cycles. The changes in the credit behavior of foreign bank in response to changes in macro-economic variables of home country is termed as *Push Factor* and the variation in the credit supply of foreign bank in response to changes in the host country business cycles is branded as *Pull Factor*.

The literature on push factors (the degree of correlation of foreign bank activities in host country with changes in home country) also reports contradictory findings by reporting sometimes positive push relationship and other times the opposite. In connection to positive push relationship, Jeanneau and Micu (2002) provide evidence of positive correlation between foreign bank lending in host country and economic volatility of home countries comprising of major industrial countries. In addition, Peek and Rosengren (1997) document the positive push relationship for Japanese banks as the sharp plummet of stock market in Japan caused Japanese banks in USA to squeeze credit.

Plenty of studies done over last two decades with the prominent paper done by De Haas and Van Lelyveld (2006) in the recent past. They report a negative push relationship between

foreign banks lending activity in the host country (only for the green-fields) and worsening economic conditions in the home country. Furthermore, Soledad Martinez Peria et al. (2002) pinpoints the negative push relationship between all foreign banks in Latin America (except Japanese banks) and the worsening economic conditions in their home countries. Similarly, Calvo et al. (1993), Hernandez and Rudolph (1995), and Moshirian (2001) document negative push relationship by mentioning the alternative investment seeking behavior of parent banks in home countries as a result of deteriorating economic conditions in the host country.

Interestingly, the results of Goldberg (2001) with regards to push relationship varied across Asia and Latin America as the correlation for Asia (Negative) was opposite to that of Latin America (Positive). Lastly, take-over banks may differ from de novo banks and thus the notable study by De Haas and Naaborg (2006, 2005a,b) draws comparison between take-overs and de novo banks in Central and Eastern European Countries by conducting structured interviews with board members and managers of both parent and subsidiary banks. Their main findings are that existing domestic banks taken over by foreign banks remained independent of parents in their risk management practices for quite some time and even local management was kept in place for certain years. On the contrary, the majority of green fields since very beginning happened to be closely aligned to the parent bank in terms of risk management practices and banking policies. Therefore such closely integrated green field foreign banks can easily be handled and controlled from the country of origin of parent bank compared to takeovers. Other authors such as Soledad Martinez Peria and Mody (2004) distinguish the green fields for the practice of charging low interest

rate spreads than takovers for Latin-America. In contrast, Fries and Taci (2005) finds green fields in CEE to be less efficient than takeovers.

The investigation of literature does verify the impact of foreign banks on credit volatility in Central and Eastern European countries and Latin America but nothing has been studied in the context of South Asian economies. Earlier studies, while studying the relationship between foreign bank entry and their impact on credit volatility in the host country, seem to ignore the varying degree of financial liberalizations of the countries in the sample. The inclusion of this variable (financial liberalization) might change the relationship between foreign bank presence and credit volatility as documented in previous studies. Therefore in this paper I intend to study how foreign and domestic banks differ in their response to business cycles (fluctuations in GDP) in host country by accounting for varying levels of financial liberalization in each sample country (India, Pakistan, Sri-Lanka and Bangladesh).

Deposit structure also plays significant role in shaping lending behaviour of banks (Micco 2000). Banks' *Sources of Loanable Funds* also determines the lending sensitivity of foreign and domestic banks. Banks with heavy reliance on cyclically sensitive sources of funds, i.e. demand deposits and saving deposits, are reported to have higher volatility in their credit activities. Domestic banks lending behaviour in South Asia can be more vulnerable since they have high exposure to short term deposits than foreign banks.

2.2.1. Hypotheses

To carry out this study I have broken down the research question into following empirically testable hypotheses. Taking into account the theoretical underpinning from section 2.1 I can formulate five hypotheses.

Hypothesis1: *Foreign Banks and Crises*

Foreign banks' lending behavior during crisis is contingent upon their attitude towards their clients, since most of the foreign banks rely on relationship lending policy in developing countries. This means the banks fund their clients though the business cycle irrespective of the performance of the economy (Focarelli and Pozollo 2000). Relationship based lending policy of foreign banks emerges from the fact that these banks establish branches in host countries to follow their multinational clients. Similarly, Public banks also follow relationship-based lending as they have big businesses as their clients. Elyasiani and Goldberg (2004) assert that the relationship lending policy is mainly associated with big banks. That happens to be the case with public banks in South Asia as well, since they are bigger than private banks both in terms of assets and deposits. On the other hand, because of small size private banks among domestic banks pursue transaction based lending where they fund their clients more during economic booms and restrict customer funding during recession. In this manner I expect

H_0 = *Foreign banks credit growth or (deposit growth) in host country is expected to have negative relationship with the crisis of host country.*

H$_1$ = *Foreign banks credit growth or (deposit growth) in host country is expected to have no relationship with the crisis of host country.*

Hypothesis 2: *Foreign Banks and Pull Factors*

The literature suggests foreign banks potential credit behavior in the host country can be influenced by host country business cycles. It can be pro or anti-cyclical depending on the conditions supporting each of them. If foreign banks act like a multinational and redistribute funds on risk and return basis then they can act more pro-cyilcally than domestic banks. In contrast, they can act anti-cyclically if they find recessions in the host country as an opportunity to enhance credit market share. Actually foreign banks in South Asia are expected to operate more pro-cyclically which implies they tend to increase the credit supply during times of rising GDP (boom) and vice-versa. The underlying reason for their pro-cyclical behavior is based on the fact that most of the foreign banks in these countries are branches of parent banks which function independent of their parent banks in home countries. On the other hand, I anticipate credit supply of domestic banks to be negatively associated with the business cycles and crisis period in the host country.

H$_0$ = *Foreign banks credit growth or (deposit growth) in host country is expected to have no relationship with the business cycles of host country.*

H$_1$ = *Foreign banks credit growth or (deposit growth) in host country is expected to have positive relationship with the business cycles of host country.*

Hypothesis 3: *Foreign banks and Push Effects*

In case of *Push Effects*, it can be asserted that when macroeconomic conditions in the home country deteriorate, parents of foreign banks in the home country will enhance their credit activities abroad, since lending opportunities in the home country are limited. On the contrary, when home country macroeconomic conditions improve, the opportunity costs of restricting home country credit mounts and banks may therefore apportion less capital to their foreign subsidiaries (Molyneux and Seth, 1998; Moshirian, 2001). In this context there is a negative relationship between the home country business cycle and the foreign subsidiary's credit supply. Nonetheless foreign banks in South Asia are either independent foreign branches or take-overs which carry out business independently of their parents. Therefore I expect

H_0 = *Foreign banks credit growth or (deposit growth) in host country is expected to have negative relationship with the business cycles of home country.*

H_1 = *Foreign banks credit growth or (deposit growth) in host country is expected to have no relationship with the business cycles of home country.*

Hypothesis 4: *Credit Growth Sensitivity to Financial Liberalization*

The countries in South Asia vary in their degree of financial liberalization with Pakistan at the top followed by Bangladesh, India and Sri Lanka (See Figure 1). Figure 1 depicts that

Pakistan's banking sector turns out be the most open in terms of foreign bank presence hovering around 45 to 60% compared with India and Bangladesh being moderately open with foreign bank presence between 10 to 15% over the last 8 years. In contrast Sri Lanka's banking sector tends to be most conservative in terms of openness with foreign bank presence of only 6%. However, these variations in the openness can have considerable impact on the results of my study. According to Tornell and Westermann (2005), liberalization tends to yield higher credit growth but also higher volatility. To study how foreign and domestic banks credit behaviour change in relation to financial liberalization of the host country following hypothesis needs to be tested.

H_0 = *Foreign banks credit growth (deposit growth) in host country with more financial liberalization will have less impact on the credit volatility in host country.*

H_1=*Foreign banks credit growth (deposit growth) in host country with more financial liberalization will have more impact on the credit volatility in host country.*

As countries in my sample vary in terms of their openness to foreign direct investment in various sectors so countries with higher liberalization are expected to have higher influence on foreign bank credit behavior.

Figure 1 Percentage of Banking Assets held by Foreign Banks in South Asia
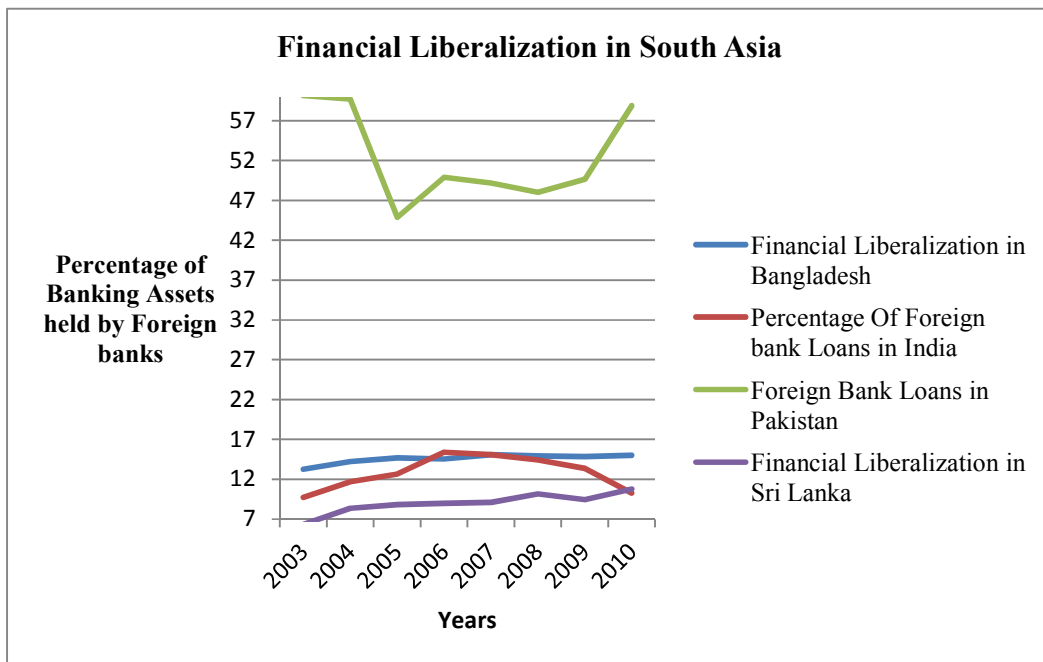
Hypothesis 5: *Lending Behaviour of Banks in response to Deposit Structure.*

Deposit structure of banks in South Asia mostly comprises of short term deposits. From the literature banks with more exposure to current deposit might experience more fluctuations in their lending activities. Between foreign and domestic banks a significant difference in credit reaction should be anticipated as foreign banks have less exposure to current deposits than domestic banks (See Table 3.2). In the same manner, among domestic banks, Public Banks with higher exposure to short term deposits are assumed to be more responsive in terms of credit growth.

H$_0$ = *Banks with more short term deposits experience less volatility in the credit compared to banks with less short-term deposits.*

H$_1$ = *Banks with more short term deposits experience more volatility in the credit compared to banks with less short-term deposits.*

Talking about the sign of relationship my expectation is that Public banks will be insensitive but private banks will have positive relationship and same applies to foreign banks. To answer this hypothesis I include short term deposits as a control variable in my model and see its impact on credit volatility.

Chapter 3 Econometric Methodology

This chapter discusses the methodology, variables of interest, econometric model and estimation procedures employed to explain the credit behaviour of foreign and domestic banks.

Literature suggests two types of models for explaining the credit behaviour of banks. These are the first (mean level estimation) and second moment models (variance models). First moment models, also called linear regressions, have mainly been used to explain credit behaviour, as they estimate an average change in gross loans of banks against an average change in explanatory variables. Second moment models, such as ARCH by Engle (1982), measure the volatility of banks' gross loans. These models require large amounts of data. With yearly data the use of the second moment model is not feasible as its estimates become unreliable due to insufficient observations. Only one study on Latin American countries, by Haouat et al. (2010), employs the ARCH model using quarterly data. I therefore resort to first moment model for two reasons. First previous literature predominantly points the use of first moment models for studying credit behaviour including studies by La Porta et al. (2002), Panizza and Micco (2006) and de Haas van Lelyveld (2006). Secondly, it produces reliable estimates provided the number of observations exceed the number of parameters to be estimated.

My model builds on the first moment models used by La Porta et al. (2002), Panizza and Micco (2006) and de Haas and van Lelyveld (2006) to explain credit behaviour of during crises and across business cycles. An appropriate definition of credit behaviour is

imperative. Previously, *Credit Behaviour*$_{it}$ has been measured either from the liability-side or asset-side of the balance sheet. Liability-side measures of credit behaviour often use the percentage change in total deposits of a bank from one period to the next, whereas asset-side measures use the percentage change in gross loans of a bank from one period to the next (de Haas and Naaborg 2005a). Most empirical studies including La Porta et al. (2002), employ the asset side approach, because banks have control over credit decisions but not over deposit decisions. Moreover, deposits may not exactly reflect the lending activities if they are subject to regulatory reserve requirements. Therefore, following La Porta et al (2002), *Credit Behaviour*$_{it}$ is measured as the percentage change in *Gross Loans*$_{it}$ of bank *i* in year *t* as outlined below:

$$Credit\ Behaviour_{it} = \left(\frac{Gross\ Loans_{it} - Gross\ Loans_{it-1}}{Gross\ Loans_{it-1}} \right) \times 100 \qquad (3.1)$$

Credit Behaviour$_{it}$ in (3.1) does not adjust for the changes in banks' gross loans because of a systemic increase in credit demand for the whole banking system (de Haas and van Lelyveld 2006). Therefore the effect of an industry wide increase in credit demand needs to be taken out. After correcting for macroeconomic factors that influence the credit supply of the entire banking system, only bank-specific changes in the supply of credit can be computed, as in (3.2) below:

$$Credit\ Behaviour_{it} = \left(\frac{\dfrac{Gross\ Loans_{it}}{\sum_{i=1}^{N} Gross\ Loans_{it}} - \dfrac{Gross\ Loans_{it-1}}{\sum_{i=1}^{N} Gross\ Loans_{it-1}}}{\dfrac{Gross\ Loans_{it-1}}{\sum_{i=1}^{N} Gross\ Loans_{it-1}}} \right) \times 100 \qquad (3.2)$$

3.1 Variables

Having defined the dependent variable, we now introduce and explain variables of interest which will be used to test the hypotheses outlined in chapter 2. Variables of interest are variables whose influence on *Credit Behaviour$_{it}$* will be studied while keeping the bank specific variables, size, profitability, liquidity, constant.

3.1.1 Variables of Interest

Micco and Panizza (2006) note that bank ownership plays a role in determining the credit behaviour of banks. They created two dummy variables, Public and Foreign, to measure different credit reaction by public, private and foreign banks in the country. Similarly, to measure the impact of ownership structure on credit behaviour two time-invariant dummy variables *Public$_i$* and *Foreign$_i$* are employed in this project. *Public$_i$* and *Foreign$_i$* represent domestic and foreign banks in the sample respectively. *Public$_i$* switches between one and zero for state-owned and private banks respectively. Similarly, *Foreign$_i$* is one for foreign-owned banks[5] and zero otherwise.

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[5] A bank is considered to be foreign if foreign shareholders own more than 30% of its shares. Shareholding of banks in South Asia is less concentrated and mostly controlling stake can be gained by buying 30% shares in the banks (Akhter 2010). According to the Bank for International Settlements, a bank is considered foreign if more than 50% of shares are held by shareholders.

In addition to differences in credit behaviour of domestic and foreign banks during normal periods, recent literature highlights the need for investigating credit behavior during crises. Crises in previous literature have been vague. According to Morgan and Strahan (2003) and de Haas and van Lelyveld (2006), crisis refers to banking and currency crises. For this they use Caprio and Klingebiel (2002) criteria as a proxy of banking and currency crises.[6] Other authors measure crises from a macro-economic perspective such as a fall in GDP, a huge changes in the inflation rate, etc. Over the last decade no banking crisis has been witnessed in south Asian countries (Valencia and Laeven 2008). Instead these countries commonly face political crises during which bank lending behaviour needs to be investigated.

Dinc (2005) uses *ElectoralCycle*, a dummy variable to represent a political crisis that refers to an election called before the end of a parliamentary term. His definition of a crisis seems somewhat limited in scope as countries might have elections on time and yet still suffer from terrorism, violence and bad governance. A political crisis in this study represents political turbulence, terrorism and violence in the country. The political crisis in the host countries is measured by a country level variable *Crisis$_t$*, which varies with time but not for banks in the country. *Crisis$_t$* uses political instability and state of violence scores by Worldwide Governance Indicators (WGI) as a proxy for political crises. High WGI scores indicate bad political and law and order situations in the country. To differentiate the credit behaviour of domestic and foreign banks, an interaction of *Crisis$_t$* with *Public$_i$* and *Foreign$_i$* is utilised.

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[6] Banking crises are characterized by excessive amounts of non-performing loans, depositor bank runs in excess of 5% a month, and sharp reductions in equity and asset prices.

As countries in this project differ in terms of their financial liberalization which potentially affects the credit behavior of both foreign and domestic banks, a variable $FinLib_{it}$ (Financial Liberalization) is included in (3.1). Suwanaporn et al. (2007) compute financial liberalization as the ratio of foreign banks' Credit to GDP and Mehrez and Kaufmann (2000) measure it as a ratio of foreign banks' assets to total banking assets. Measuring openness of banking sector relative to GDP is implausible since the composition of GDP varies from country to country in my sample. Therefore, I use ratio of foreign banks' assets to total banking assets as a proxy of financial liberalization in (3.1). An interaction with $Public_i$, and $Foreign_i$ is also employed to find out which banks react more strongly in terms of credit activities.

To test Hypothesis 5, *Banks with more short term deposits have positive relationship with credit growth*,). A bank-level variable $ShTDep_{it}$ is employed Majnoni et al. (2003) assert that a higher exposure to short term deposits has a positive association with credit growth. In their paper short term deposits imply customer demand and saving deposits of less than one year. This measure of short term deposits ignores the short term money market funding by banks, as non-deposit based funding by banks may lead to volatile bank loans (Rashid 2011 which represents the core-deposits and inter-bank deposits held by bank *i* in year *t*. Core deposits of banks reflect demand deposits and saving deposits of less than one year. Similarly, its interaction with $Public_i$ and $Foreign_i$ provides help in comprehending the distinct reaction of foreign and domestic banks.

As mentioned in Hypothesis 3, domestic and foreign banks react differently to business cycles and macroeconomic fluctuations. Micco and Panizza (2006) find that state-owned banks play a useful credit-smoothing role because their lending is less responsive to macroeconomic fluctuations than lending by private banks. But the definition of Micco and Panizza for macroeconomic fluctuations only refers to changes in GDP. Goldberg (2001), de Haas and van Lelyveld (2006) and Kraft (2002) document that banks respond not only to changes in GDP but also to changes in lending and inflation rates. Therefore, $MACRO_{it}$, a matrix of host and home country macroeconomic variables is used to measure banks' credit reaction to host and home country macroeconomic changes. Host country macroeconomic variables are host country changes in GDP *(Host ΔGDP)*, host country inflation rate *(Host Inflation)*, and host country average lending rate *(Host Lending Rate)*, which apply to both foreign and domestic banks. Secondly, home country macroeconomic variables such as home country changes in GDP growth rate *(Home ΔGDP)* and home country changes in lending rates *(Home Lending Rate)*, which apply only to foreign banks, and not domestic banks, are also utilized. Lastly, a difference of home and host country macroeconomic variables, *Host – Home ΔGDP* and *Host – Home ΔLending Rate*, have been employed, since foreign banks as such might not respond to home and host country macroeconomic conditions, but instead to the gap between them (Goldberg and Saunders 1981).

3.1.2 *Control Variables*

Besides variables of interest a set of bank level control variables, $CONTROLS_{it}$, is included, which could potentially affect the credit behavior of banks. These involve total assets of a bank to total banking assets in the particular country as a measure of *Size* (–) (in parentheses the expected sign) of the bank in a particular country, equity over total assets as

a proxy of bank *Solvency* (+), liquid assets over total assets, as a measure of *Liquidity* (+), return on assets as a measure of *Profitability* (+) and lastly *Net Interest Margin*, as a measure of bank efficiency (+). To avoid the problem of endogenity in the model, three variables, *Solvency*, *Size* and *Liquidity*, are lagged because total assets also appear as part of the *Credit Behaviour$_{it}$*.

3.2 Econometric model

Among the panel regression models from the literature explaining lending behaviour of banks, the de Haas and van Lelyveld model (2006) appears to be most relevant for this study. Their study is similar to our study in some respects. Their model aims to explain the difference in credit behavior of foreign and domestic banks during crises using panel data of 250 banks from central and eastern Europe. Similarly this project attempts to estimate credit behaviour of foreign and domestic banks during crises using a panel data of 202 banks from South Asia. However, the de Haas and van Lelyveld study covered a period from 1993 to 2000 and overlooks the effect of financial liberlalization and deposit structure on banks' credit. Therefore by extending the de Haas and van Lelyveld panel regression model, an insight into the credit behaviour of banks can be sought by using Equation (3.3) below.

$$Credit\ Behaviour_{it} = \alpha + \beta_1 Public_i + \beta_2 Foreign_i + \beta_3 Crisis_t + \beta_4 FinLib_{it}$$
$$+ \beta_5 ShTDep + \Gamma_6 MACRO_{it} + \Delta_7 CONTROLS_{it} + \mu_i + \varepsilon_{it}$$

(3.3)

where:

Credit Behaviour$_{it}$ is a dependent variable, *Public$_i$, Foreign$_i$,,Crisis$_t$, FinLib$_{it}$ ShTDep$_i$* and

MACRO$_{it}$ are variables of interest which tend to explain *Credit Behaviour$_{it}$* while keeping the bank-specific variables *CONTROLS$_{it}$* constant. μ_i is an unobserved panel-level heterogeneity which varies with cross-section and ε_{it} is an idiosyncratic error that varies across cross-section and time. Two categories of panel regressions in (3.3) will be estimated for the whole sample, and then for domestic and foreign banks separately in each country. In the first regression I use *Credit Behaviour$_{it}$* in (3.1) as a dependent variable and in the second regression I utilize *Credit Behaviour$_{it}$* (3.2) as a dependent variable for reasons discussed earlier.

3.2 Estimation Procedure

Equation (3.3) is estimated by using several estimation methods: Pooled OLS[7], Fixed Effects and Random Effects. Pooled regression assumes common error structure which might sound unviable because banks in my sample vary both across time and across cross-section. Therefore, I estimate *Credit Behaviour$_{it}$* in (3.1) by both Fixed Effect and Random Effect models and the final choice between the two depends on the statistical significance when applying the Hausman test (Hausman and Taylor (1981)). The Hausman test determines whether $\mu_{i,}$ an unobserved panel-level heterogeneity, is correlated with independent variables or not. If $\mu_{i,}$ are correlated then a bank level fixed effect is assumed to exist in the model. However, in this project I am not interested in estimating bank

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[7] In the ordinary growth regressions for 3.1 (Tables 5.1 and 5.2) country dummy variables are included to incorporate varying banking growth rates across countries in the sample. While I did not include country dummy variables in (3.1) while using (3.3), in this model the dependent variable already factors in growth of the country's banking industry.

specific fixed effects as there are 202 banks which make it difficult to interpret. Nevertheless, to account for country level fixed effects, country dummy variables are included in (3.3) for ordinary growth regressions (3.2).

Chapter 4 Data and Summary Statistics

4.1. Data

4.1.1. *Bank level Data*

For the variables outlined in methodology section, I obtain yearly balance sheet and income statement data for 261 banks, including foreign and domestic, from four countries in South Asia over the period of 2003-2009 from Bureau van Dijk's BankScope database (see Appendix 2). India tops the list with 134 banks followed by Pakistan, Bangladesh and Sri-Lanka with 64, 41 and 22 banks respectively. The final dataset contains 202 banks after removing banks for which data were not available for more than three years (see Table 3.1). This reduction in sample size is also due to winsorizing through which the top and bottom 1% extreme credit growth observations are excluded from the sample that allows my results to be more stable.

Among 261 banks in the original dataset around 23 banks are non-commercial banks such as Investment Banks, Cooperatives and Non-banking finance Institutions whose prime business is different from commercial banks. Hence observations of 23 banks are also removed as they are involved in asset management, buying and selling of securities etc. which renders them inappropriate for comparison with commercial banks.[8]

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[8] This paper focus is on the credit behaviour commercial banks, savings banks, co-operative banks, real estate/mortgage banks, and medium and long term credit banks. Therefore, I have dropped any entities other than commercial banks such as Islamic banks, securities houses, non-banking credit institutions, specialised governmental credit institutions, central banks, and multilateral governmental banks.

My study is based on yearly balance sheet and income statement data for all banks from the BankScope. According to Mathieson and Roldos (2001) the information contained in this database by and large represents around 90% of total banking assets in a specific country. To ensure that my panel is representative for the banking system of Asian countries, I check the coverage of the BankScope data by comparing with information from central banks of the respective countries and the internet. The BankScope database underestimates the representation of foreign banks as it does not report the financial statements of foreign banks' branches, since they do not publish their financial statements independently of their parents. To resolve this issue, I obtain financial statements of foreign banks branches from the official websites of these foreign banks in host countries.

By now India has the largest number of foreign banks followed by Pakistan, Bangladesh and Sri Lanka. Because of unavailability of data on foreign bank branches in India it ranks second in terms of number of foreign banks. Table 4.1 demonstrates that out of 202 banks in my sample, 49 are foreign banks and 153 domestic banks. Analysis of composition of foreign banks reveals that the Indian banking sector dominates other countries in terms of public bank penetration.

4.1.2 Macroeconomic Data

Macroeconomic data on inflation, Gross Domestic Product and Lending rates of host and

Table 4.1   Composition of Domestic and Foreign Banks in South Asia

	Domestic Banks		Foreign Banks	Total
Country	Public Banks	Private Banks		
Bangladesh	8	24	8	40
India	36	39	17	92
Pakistan	6	25	18	49
Sri Lanka	3	12	6	21
Total	53	100	49	202

Note: This table reports the composition of domestic and foreign banks in South Asia. Countrywise list of domestic and foreign banks is appended in Appendix 3.

home countries have been obtained from the World Development Indicators (WDI) database of the World Bank[9]. Macroeconomic data for all countries in my sample are available up to 2009. For 2010, I resort to the official websites of central banks of each country. Data for crisis variable have been sourced from Worldwide Governance Indicators (WGI), which reports individual and aggregate governance indicators for 213 countries over the years 1996 to 2010[10].

4.2. Summary Statistics

Literature suggests that variation in credit behavior among public (state-owned), private-domestically and foreign owned banks depends on the degree of difference between their

[9] World Development Indicators (WDI) is the primary World Bank database for development data from officially-recognized international sources.
[10] Detailed documentation of the WGI, interactive tools for exploring the data, and full access to the underlying source data available at www.govindicators.org.

balance sheet health and funding differences (Goldberg 2000). Therefore, an analysis of the

balance sheet and income statement of foreign and domestic banks is essential. To do this

Table 4.2 Summary Statistics for Foreign and Domestic Banks

	Domestic Banks			**Foreign Banks**			
	Mean	**Std Dev**	**CV***	**Mean**	**Std Dev**	**CV**	**D=F (p-Value)**
Gross Loans	4227.1	11940.2	2.8	2355.8	7146.804	3.03	**0.01**
Credit Growth	27.4	50.3	1.8	24.2	40.33067	1.67	0.32
Total Customer Deposits	5492.8	16233.2	3.0	2913.6	7812.003	2.68	**0.01**
Total Liabilities	6601.6	19280.3	2.9	4045.8	12192.45	3.01	**0.03**
Total Assets	7106.6	20536.3	2.9	4503.2	13628.52	3.03	**0.04**
Total Capital Ratio	13.8	7.8	0.6	17.1	12.56566	0.73	**0.00**
Liquid Assets	688.0	1883.1	2.7	490.2	1290.783	2.63	**0.09**
Non Earning Assets	667.7	2038.2	3.1	605.5	1640.549	2.71	0.63
Net Interest Revenue	133098.6	316819.9	2.4	181190.3	519422	2.87	0.13
Pre-Tax Profit	99.3	285.9	2.9	73.9	189.3525	2.56	0.15
Equity	489.3	1271.2	2.6	428.8	1271.876	2.97	0.47
Net Income	70.5	193.0	2.7	49.5	130.5064	2.64	**0.08**
LLP/NIR	27.3	92.9	3.4	23.7	81.84119	3.45	0.57
Net Interest Margin	2.9	5.4	1.8	3.6	2.620711	0.73	**0.04**
ROA	1.1	3.0	2.7	1.2	2.796476	2.37	0.75
Cost To Income Ratio	57.3	61.4	1.1	68.3	62.82291	0.92	**0.01**
Total Securities	1987.4	6234.1	3.1	1318.0	4490.207	3.41	**0.08**
Loan Losses	29.4	91.9	3.1	34.7	104.6442	3.02	0.42
Equity Over Total Assets	10.0	11.3	1.1	13.7	12.81366	0.94	**0.00**
Current Deposit	1251.143	1201.1	2.9	660.1	781.1	1.90	**0.01**
Term Deposit	3555.5	10025.4	2.8	1702.3	5293.073	3.11	**0.00**

p-values equal to or smaller than 10% are in bold.

H_0= Domestic banks are equal to Foreign bank. *D* is domestic banks.

CV= Coefficient of variation measured as standard deviation divided by mean of the variables.

F represents foreign banks in the entire sample.

equality of mean tests are carried out on a series of balance sheet and income statement

items.

In Table 4.2 we see that foreign banks have significantly higher *Net Interest Margins* and

lower profitability than their domestic counterparts as documented by Demirgüç-Kunt and

Huizinga (1999). One of many possible reasons for foreign banks having higher net interest margin owes to the argument that well capitalized banks in terms of higher Total Capital Ratios have lower funding cost because of lower potential of bankruptcy. Interestingly that is also the case with foreign banks in South Asia that demonstrate high *Total Capital* and *Solvency* ratios as can be seen in Table 4.2. Table 4.2 also indicates the difference between foreign and domestic banks in terms of their gross loans where domestic banks have significantly higher *Gross Loans* compared with foreign banks.

Based on balance sheet items such as *Gross Loans, Total liabilities, Total assets, Total Capital Ratios, Term Deposits* and *Equity* foreign banks happen to be more heterogeneous as they report higher coefficient of variation unlike results reported by De Haas and van Lelyveld (2006) (See Table 4.2).

The difference in coefficient of variations between foreign and domestic banks, measuring with-in group variation, indicates heterogeneous cross-sectional structure in the data. However, in terms of solvency foreign banks are significantly better than domestic banks since they have higher *Total Capital Ratios* and *Equity Over Total Asset* ratios. Whereas within-group coefficient of variation (CV) in credit growth of foreign banks is greater than the domestic banks across the whole sample over 8 years. However this variation is unconditional without accounting for the effect of variables that determine credit growth. To account for conditional variations I resort to regression analysis as presented in Chapter 3.

Focusing on credit behavior of domestic banks, understanding of the difference in the balance sheet and income statement structure of public and private banks is imperative.

Table 4.3 Summary Statistics for Private and Public Banks

	Private Banks			Public Banks			Priv=Pub
	Mean	**Std Dev**	**CV**	**Mean**	**Std Dev**	**CV**	**(p-Value)**
Gross Loans	1467.2	3094.6	2.1	8575.9	17936	2.1	**0.000**
Credit Growth	30.8	61.6	2.0	22.3	23.47565	1.1	**0.013**
Total Customer Deposits	1765.7	3843.7	2.2	10896.1	23993.81	2.2	**0.000**
Total Liabilities	2238.4	4674.0	2.1	13500.1	29130.51	2.2	**0.000**
Total Assets	2465.3	5129.2	2.1	14444.9	30993.02	2.1	**0.000**
Total Capital Ratio	14.0	7.7	0.5	13.4	7.897959	0.6	0.294
Liquid Assets	267.4	541.4	2.0	1353.1	2824.873	2.1	**0.000**
Non Earning Assets	236.3	471.1	2.0	1343.9	3095.942	2.3	**0.000**
Net Interest Revenue	69649.9	163785.5	2.4	356640.3	776279.2	2.2	**0.000**
Pre-Tax Profit	46.6	116.6	2.5	182.2	421.9244	2.3	**0.000**
Equity	223.0	491.8	2.2	910.4	1872.098	2.1	**0.000**
Net Income	31.6	85.1	2.7	131.8	280.124	2.1	**0.000**
LLP/NIR	28.2	97.0	3.4	25.9	85.23818	3.3	0.732
Net Interest Margin	2.8	6.8	2.4	3.1	1.33391	0.4	0.397
ROA	1.3	3.6	2.9	0.9	1.636476	1.8	**0.061**
Cost To Income Ratio	59.1	61.5	1.0	54.5	61.03805	1.1	0.265
Total Securities	661.7	1499.9	2.3	4051.4	9434.543	2.3	**0.000**
Loan Losses	13.2	38.7	2.9	58.1	139.873	2.4	**0.000**
Equity Over Total Assets	12.0	12.8	1.1	6.9	7.621009	1.1	**0.000**
Current Deposit	318.7	825.6	2.6	1426.6	3282.466	2.3	**0.000**
Term Deposit	1115.5	2337.3	2.1	7222.6	14877.48	2.1	**0.000**

p-values equal to or smaller than 10% are in bold.

H_0= Private banks are equal to Public Banks. **Priv** stands for Private Banks.

Pub is public banks.   CV= Coefficient of variation

Table 4.3 indicates that public banks are significantly bigger than private banks in terms of their balance sheet items such as *Gross Loans*, *Total Assets*, *Total Customer Deposits*, *Total liabilities* and *Term Deposits*. Although, public banks in terms of numbers (53) are almost half of private banks (100) but their overall balance sheet size makes them bigger in the sample. Empirically negative relationship between size of the bank and credit growth have been recorded. Therefore owing to the bigger size of public banks, a higher negative

coefficient may be anticipated. This implies that public banks retrench more credit against the size in comparison with private and foreign banks. The only point where they are not significantly different from private banks is *Total Capital Ratio* and that conformity stems from standard regulatory capital requirement imposed by central banks on private and public banks.

Looking at the asset quality, public banks have significantly higher *Loan Losses* (58.148) compared to private banks and the main factor driving Public banks' loan losses in South Asia is politically motivated loans. Finally, the higher proportion of long term deposits by public banks can also lead to higher positive coefficients, which entails greater credit response of public banks against long term deposits. This behavior emerges from the fact that banks with large volume of long term deposits enjoy more autonomy and control over credit decisions.

Chapter 5 Findings

5.1. Results for Hypotheses

5.1.1. *Foreign and Domestic Banks Credit Behaviour During Crises.*

To test first hypothesis whether crisis has any effect on the credit growth of banks in host countries, panel regression results are outlined in Table 5.1 and Table 5.2. Table 5.1 presents PCSE estimates for full sample, domestic banks and foreign banks separately in Column II, III and IV respectively. Before commenting on the difference in credit activities of foreign and domestic banks during crises, the situation before crises needs to be discussed. In Table 5.1, Column II, it can be noticed that domestic and foreign banks credit growth is significantly different from one another. Overall domestic banks show higher credit growth during normal times compared to foreign banks after controlling for set of macroeconomic and bank specific variables. Talking about individual coefficients, private banks report highest credit growth of 16.32% followed by public banks with only 2.08% less and foreign banks credit growth happens to be the least with 8.74% less than private banks (Negative sign with coefficients of public and foreign in second column of full sample regression implies the reduction in credit growth relative to reference case i.e. *Private Banks*). A similar pattern of credit growth for domestic and foreign banks has also been observed earlier in Table 4.2 and Table 4.3. For the whole panel, the crisis variable

Table 5.1[11] Panel Regression with Panel Corrected Standard Errors.

Dependent variable-Credit Growth

Variables	Full Sample	Domestic Banks	Foreign Banks I	Foreign Banks II[12]
Private[1]	16.32*	8.45		
	(1.68)	(0.48)		
Public	-2.08**	1.21**		
	(-1.97)	(1.98)		
Foreign	-8.74**		-6.32***	-7.69*
	(-1.92)		(-2.31)	(-1.79)
Crisis	-2.78	5.01*	1.07	0.89
	(-1.12)	(1.90)	(0.56)	(1.01)
FinLib	0.64***	0.69***	0.54*	0.31*
	(3.18)	(4.77)	(1.69)	(1.82)
ShTDep	0.0014***	0.0011*	0.0009	0.0006
	(2.70)	(1.71)	(0.32)	(0.25)
Host- Home ΔGDP	1.26			1.09
	(1.13)			(0.67)
Host- Home Δ Lending Rate	0.86			0.73
	(1.46)			(1.38)
Host ΔGDP	5.38***	6.52***	4.48*	
	(3.27)	(2.96)	(1.73)	
Home ΔGDP	-1.38		-1.46	
	(-0.68)		(-0.73)	
Host Inflation	-1.55***	-1.28***	-1.30*	-1.34***
	(-4.48)	(-2.88)	(-1.69)	(-2.29)
Host Lending Rate	0.54	1.56		
	(0.48)	(0.93)		
Home Lending Rate	0.98		1.1	
	(1.20)		(1.05)	
Liquidity	15.42	46.7	-81.80***	-79.30***
	(1.01)	(0.28)	(-3.25)	(-2.56)
Profitability	1.31***	1.13**	2.29***	3.12*
	(2.90)	(1.97)	(2.29)	(1.69)
LogSize	-2.71	-3.51***	-2.86*	-2.20*
	(-0.68)	(-2.45)	(-1.68)	(-1.79)
Net Interest Margin	0.51	-0.51	2.83	2.70***
	(0.53)	(-1.00)	(1.64)	(2.53)
Solvency	0.02	0.35*	0.028	0.065
	(0.18)	(1.66)	(0.07)	(0.28)
Observations	1168	842	326	326
No Of Banks	202	153	49	49
Hausman test statistic	0.03	0.12	0.17	0.15
Breusch Pagan Test	0.035	0.075	0.012	0.058
R^2	0.30	0.25	0.35	0.23

1- *Constant in the regression indicates private banks.*
2- *t-statistic in parenthesis.*
3- ** significant at 10%, ** significant at 5% and *** significant at 1%.*
4- *In this table blank spaces indicate that particular variable is not relevant for the particular regression.*

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[11] Country dummy variables have been included in this panel regression but they are not reported.
[12] Foreign Banks II shows the results of regression with difference of macroeconomic variables.

appears to be playing no significant role in its effect on credit growth (Column II Table 5.1). Interestingly, this result is against the empirical evidence so far documented in the literature which indicates negative relationship between crisis and credit growth (Ivashina and scharfstein 2008, De Haas and Van Lelyveld 2006). However, this difference in the result owes to the definition of crisis adopted in these studies. Earlier studies define crisis being the financial crisis strictly including only banking and currency crisis in the subject countries. In contrast, crisis in this dissertation represents political instability and violence in the country, which is usually already factored in by banks before setting up operations.

Before generalizing the insensitivity of credit growth to crisis for all banks in the sample, a separate investigation for foreign and domestic banks is imperative. In case of foreign banks, Table 5.1 reports insignificant impact of crisis on the lending behaviour after controlling for country level variations among Pakistan, India, Sri-Lanka and Bangladesh. These results confirm hypothesis 1. This insensitivity largely stems from the fact that foreign banks in these countries rely on parental support and at the same time foreign banks pursue relationship based lending policy, which hardly tarnishes their lending activity during crises. These findings are consistent with the study by Haouat, Nicolas and Navarro (2010), that foreign banks are well diversified having higher quality loans (LLP/NIR lower than domestic banks, see Table 4.2).

 In a separate regression for domestic banks across the whole panel, a significant positive credit reaction is noted in response to crisis after controlling for country fixed effects. Table 5.1 Column III indicates that crisis coefficient is positive and significant at 10% significance level. This stabilizing credit behaviour of domestic banks during crises can be

attributed to informational advantage local banks enjoy, as they know local clients and market better than foreign banks. Moreover, although, local banks do not have an opportunity to reallocate funds outside the country, but they do re-diversify funds within the country from one city to the other after being hit by the crises (Violence) (Rajan and Islam 2009). While among domestic banks this favourable lending behaviour can be traced to public banks, which when interacted with crisis lend 5.36% (See Column II and III of Table 5.2), whereas their private counterparts lend only 1.2% during crises. Various reasons cause public banks to behave positively during crises. First, this potentially stabilizing role of public banks during crises is linked to the idea, that public banks tend to be recapitalized by their financially powerful owners, the governments, which have more financial resources than private banks. Secondly, essentially the prime objective of public banks is not only to maximize profit but also to trigger the recovery of entire economy (Brei and Schclarek 2010). Thirdly, during crises depositors shy away from private banks and rush to public banks for deposit keeping which fortifies the health of Public Banks and enhances their capability to lend more.

5.1.2. *Credit Reaction to Host Country Macro-Economic Variables*

Focusing on foreign banks, another factor having influence on the lending behaviour is its response to host and home country macro-economic variables. This phenomenon is referred to as *Pull* and *Push Factors* in hypothesis 2 and 3 respectively. Table 5.1, columns IV and V exhibit the results of two sets of regression run separately for foreign banks. Column IV shows the credit growth reaction to host and home country macroeconomic variables separately while column V highlighting the credit behaviour of foreign banks in relation to the difference between the host and home country macroeconomic variables. The

coefficient estimates for Host ΔGDP in Table 5.1 happen to be significant at 1% for full sample and domestic banks and at 10% for Foreign Banks I, thereby confirming the presence of *Pull Effect*. As can be seen for the full sample there is 5.38% increase in credit in relation to the change in the GDP of the host country. However, domestic banks appear to be more pro-cyclical than foreign banks with coefficients of 6.52% and 4.48% respectively. Although, foreign banks are behaving pro-cyclically consistent with the results of study by Houstan and James (1998), but the response is somewhat less potent than domestic banks.

This lower than domestic bank credit reaction of foreign banks is associated with mix of ownership structures prevalent in the South Asia. Because the ratio of foreign owned independent subsidiaries in these countries is high especially in Pakistan Bangladesh and Sri-Lanka respectively. Independent subsidiaries of foreign banks (Takeovers) do not turn to their parents for liquidity support which makes them less responsive to the GDP or business cycles in the host country. Whereas the extremely pro-cyclical credit behaviour of domestic banks calls for further inquiry to understand whether it is caused by public banks or private banks or both.

In this connection separate regressions are estimated whether public and private banks are interacted with *Host ΔGDP*, *Host Lending Rate* and *Host Inflation Rate* as shown in Table 5.2. In Table 5.2, we can observe that Private banks respond more robustly to changes in GDP of the host country by increasing their credit activity by 7.23% as against public banks which increase their credit by only 5.32 to rising GDP. Micco and Panizza (2006) document the same relationship between business cycles and credit behaviour of domestic

Table 5.2 Panel Regression-Credit Growth with Interaction Terms

Dependent Variable- Credit Growth

Interaction Variables	Whole Sample	Interaction with private Banks	Interaction with Public Banks
Crisis	-2.78	1.2**	5.36***
	(-1.12)	(1.98)	(1.71)
Host Δ GDP	5.38***	7.23**	5.32*
	(3.27)	(2.01)	(1.76)
Host lending Rate	0.54	0.65	0.36
	(0.48)	(0.83)	(0.47)
FinLib	0.64***	1.93**	0.83
	(3.18)	(1.99)	(0.63)
ShTDep	0.0014***	0.0011*	0.0096**
	(2.70)	(1.78)	(1.97)
Term Deposits	1.2**	0.89*	1.80**
	(1.98)	(1.69)	(1.99)
Liquidity	15.42	-5.8	-2.01
	(1.01)	(-0.78)	(-0.32)
Profitability	1.31	2.32*	1.1
	(2.90)	(1.86)	(1.45)
LogSize	-2.71	-3.71	-4.56**
	(-0.68)	(-1.36)	(-1.99)
Net Interest Margin	0.51	-1.23	0.70
	(0.53)	(-0.63)	(0.32)
Solvency	0.02	0.42*	0.13
	(0.18)	(1.75)	(0.97)
Hausman Test	0.03	0.12	0.25
R^2	0.3	0.22	0.27

1- t-statistic in parenthesis.
2- * significant at 10%, ** significant at 5% and *** significant at 1%.

banks where he labelled Public banks to be performing *Credit-Smoothing* role. Another reason for aggressive response of private banks to changes in GDP of the host country is because, increase in GDP of these countries is mostly consumers driven. This essentially means increase in consumer spending on durables and luxuries. Such buoyancy in the economy attracts private banks, being pursuant of transaction-by-transaction lending policy, are well equipped to capitalize on this opportunity.

In contrast one macroeconomic variable, host country inflation, exhibits almost homogenous response by all banks foreign and domestic, reporting a statistically significant reduction in credit. Plausibly rising inflation always diminishes the purchasing power of loans which deters the lenders from extending credit. At the same time it also fares up the interest rate in the country which consequently makes loans unaffordable for borrowers across the country (see Table 5.1).

5.1.3. *Foreign banks credit response to home country Macro-economic Variables*

Foreign bank lending also depends on home country economic conditions including GDP and lending rate. Column I and III of Table 5.1 suggest that foreign banks are insensitive to the home country macroeconomic variables. This is result is in contradiction to De Haas and Van Lelyveld (2006) which points negative association between home country macroeconomic variables and foreign banks credit growth in host country. The difference in the result emanates from the difference in the ownership structure of foreign banks in the two studies. Foreign banks, among three countries in South Asia except India, are largely dominated by takeovers and they operate independent of their parents in their home country and that makes them less reactive to the home country changes in GDP and lending rates.

5.1.4. *Credit Reaction of Banks to Financial Liberalization.*

From the Table 5.1, it is noted that financial liberalization does have significant positive impact on the lending volume of banks. In separate regressions for domestic and foreign banks, domestic banks have been influenced more by the deregulation and openness of the

banking sector than foreign banks (See Column III and IV). Domestic banks tend to increase credit after the liberalization regime in the country (i.e. with one percent increase in market share of foreign banks domestic banks increase credit by 0.69%). This higher than foreign bank response emerges from the contagion effect of foreign banks, because when foreign banks enter these countries over all favourable macro-economic environment is perceived by indigenous banks. The entry of foreign banks in turn encourages domestic banks to increase their volume of loans. Whereas among domestic banks, it is the private banks which take the lead from public banks in terms of capitalizing the favourable banking climate of the country. An interaction of private and foreign banks with financial liberalization in Table 5.2 confirms this phenomenon.

5.1.5. *Impact of Short term Deposits on Credit behaviour of Banks.*

Foreign and domestic banks credit expansion also depends upon their deposits structure. In terms of deposit structure, foreign and domestic banks have different exposures to short term deposits (*Current Deposits*). Across the whole panel we can see a strong positive relationship between exposure to short term deposits of banks and credit expansion. Though the coefficient is (0.001) small but significant at 1% level (See Column I Table 5.2).

To find the individual response of foreign and domestic banks, it can be noted that exposure to short term deposits in Table 5.1 have insignificant effect on the credit behaviour of foreign banks. On the other hand, in case of domestic banks it does have a statistically significant impact on loans but very small (see Table 5.2). For foreign banks results owe to the requirement of high initial deposits balances which shy away customers from foreign

banks for deposit keeping. That is why foreign banks end up with low current deposits and has therefore no impact on the lending behaviour of foreign banks. Whereas for domestic banks we can see when short term and long term deposits are interacted with private and public banks the picture becomes clear. The banks with higher exposure to term deposits show more resilience and flexibility for expansion of credit as demonstrated in Column I. II and III of Table 5.2. On the downside decrease in short term deposits of bank (core Deposits) leads to reduction in credit growth of banks as well. In case of interaction with term deposits the coefficients become bigger exhibiting more robust response of credit growth of banks to Term Deposits (Long Term Deposits).

5.1.6. *Analysis of Bank-Specific Control Variables.*

Most of the results of bank-specific control variables in Table 5.1 and 5.2 respectively, are in line with the expectations with exception to liquidity. The negative association between liquidity and credit growth of foreign and domestic banks is natural, that banks with higher liquidity do not have enough lending opportunities in the market which forces them to pile up their money in short term liquid assets such as government treasury securities. Profitability and Efficiency (NIM) have significantly positive association with the credit growth of banks. Similar results are reported in Table 5.2 with interaction terms. Finally, after running regression in Eq 3.2 I get similar results though with smaller coefficients (See Appendix 4). Though some of the results for control variables have been different, do not fundamentally contradict the results reported for Eq 3.1 in Table 5.1 and 5.2.

5.2. Diagnostic tests and their results.

In order to get unbiased results from regressions in Eq 3.1 and Eq 3.2 a series of robustness tests are carried out as presented below.

5.2.1. *Multicolinearirty Tests*

After running the above regressions in equation 3.1 and 3.2, a high correlation of 0.92 between *LaggedSize* and *ShTDep* is noted indicating the presence of multicolinearity in the model (See Appendix 4). Leaving multicolinearity unresolved can lead to biased coefficients. Therefore, by taking the log of *LaggedSize* variable the correlation drops down to 0.54 and thus removes multicolinearity from the model. (See Appendix 5).

5.2.2. *Endogeneity Tests*

To test for endogenity in the model and the selection of appropriate estimation method between Random and Fixed effect model, Hausman test is performed. If the results of Hausman test are significant (pvalue less than 5%) then fixed effect model is estimated otherwise I resort to Random effect model. For each regression Hausman test results are appended at the bottom of tables (Table 5.1 and Table 5.2). The results show that the individual effects (μ_i) were in most cases not significantly correlated with the explanatory variables, so that random effects was the best way to model bank level specificities.

5.2.3. *Heteroskedasticity Test*

The Breusch Pagan Lagrangian multiplier test is used to identify any heteroskedasticity in panel specific error structure. The results show that panel specific heteroskedatsicity is

present and to correct for heteroskedasticity, *Panel Corrected Standard Errors* are estimated *(PCSE)* in Table 5.1 and Table 5.2.

Chapter 6 Conclusion

The shift from command to market economy in South Asia has been viewed as a window of opportunity by foreign banks to expand, either through establishing branches in the host country or by taking over domestic banks in the host countries. From the standpoint of host country, foreign banks have assisted the national banking system in terms of enhanced efficiency and technological infrastructure. At the same time there are growing concerns about the penetration of foreign banks in host countries. These are mainly about the capricious or unstable credit behaviour of foreign banks, not only during normal times, but also during crises and macroeconomic fluctuations.

Employing a unique panel dataset on domestic and foreign banks, it is concluded that domestic banks, in terms of credit growth, generally perform a stabilizing role both during normal times and crises. However, among domestic banks, it is public banks which emerge as a stabilizer of credit especially during crises. But, this positive credit disposition of public banks may become questionable if it is directed towards bridging the fiscal deficit during crises. The role of foreign banks have been neither stabilizing nor destabilizing during crises. The empirical analysis in this paper also confirms the evidence of Pull Effect for foreign banks which makes them reacting somewhat pro-cyclical to changing economic conditions of the host country. On the other hand no evidence in favour of Push Factor is witnessed.

The future policy implications for central banks are as under. First, central banks may allow foreign banks in their countries, but not through branches but through full fledge players in the market because foreign banks branches do not operate independently of their parent

banks. Secondly, because of high sensitivity of credit growth to short term deposits, central banks may encourage banks to pursue long term deposits by keeping lower Cash reserve requirements for long term deposits than demand deposits or core deposits. Thirdly, government in host country might increase the ratio of private banks in the pie of domestic banks as they are more resilient and aggressive in capitalizing the benefits from financial liberalization.

I suggest three areas for future research. First, though public banks increase lending activity during crises, future research could investigate the implications on the quality of bank assets in the post-crises period. Secondly, my dissertation indicate that private banks are more receptive in exploiting the benefits from the influx of foreign banks, but in future a study may be launched to find what should be the right mix of private, public and foreign banks that could optimize the advantages of financial liberalization. Lastly, in future one could investigate, whether pro-cyclical credit behavior of private banks dominates their positive credit behavior during crises or not?

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Appendices

Appendix 1: Country-wise Financial liberalization

Country	*Percentage of Gross Loans held by Foreign Banks*
Bangladesh	17.5%
India	13.2%
Pakistan	51.6%
Sri Lanka	8.75%

Note: *This represents 7-years average from 2003 to 2009.*

Source: Author's calculations

Appendix 2: Number of Foreign and Domestic Banks in dataset from bank scope before screening.

Country	*Domestic Banks*	*Foreign banks*	*Total*
Bangladesh	33	8	41
India	111	23	134
Pakistan	45	19	64
Sri Lanka	18	4	22
Total	207	54	261

Appendix 3: Country Wise list of Foreign and Domestic Banks

List of Foreign Banks in Bangladesh

Name of Banks	Legal Charter	Home Country	Size
Habib Bank Lt	Private Ltd	Switzerland	2.0
National Bank Limited	Private Ltd	Pakistan	3.0
Commercial Bank of Ceylon	Private Ltd	Sri Lanka	1.5
State Bank Of India	Private Ltd	India	1.3
Woori Bank	Private Ltd	South Korea	2.7
HSBC	Private Ltd	UK	0.7
Citi Bank	Private Ltd	USA	2.0
Standard Chartered Bank	Private Ltd	UK	1.0
Percentgae Of Deposits Held			**14.3**

List of Domestic banks in Bangladesh

Name of Banks	Legal Charter	Size
Sonali Bank Limited	Public	18.4
Islami Bank Bangladesh Limited	Private	6.9
Janata Bank Limited	Public	12.8
Agrani Bank Limited	Public	10.4
Bangladesh Krishi Bank	Public	7.5
Prime Bank Limited	Private	0.2
BRAC Bank Limited	Private	0.1
Southeast Bank Limited	Private	1.9
AB Bank Ltd	Private	0.2
Pubali Bank Limited	Private	3.1
Bank Asia Limited	Private	1.0
United Commercial Bank Ltd	Public	1.5
Rupali Bank Limited	Public	4.2
Dutch-Bangla Bank Limited	Private	1.4
Uttara Bank Limited	Private	2.1
City Bank Ltd	Private	1.5
Jamuna Bank Ltd	Private	0.3
National Credit and Commerce Bank Ltd.	Public	1.4
Shahjalal Islami Bank Ltd	Public	0.1
Mutual Trust Bank	Private	0.1
Trust Bank Ltd (The)	Private	0.3

Standard Bank Limited	Private	0.5
First Security Bank Ltd	Private	0.2
Al-Arafah Bank Ltd.	Private	0.8
Premier Bank Ltd (The)	Private	1.0
BASIC Bank Ltd-Bangladesh Small Industries & Commerce Bank Ltd	Private	1.1
Social Bank Ltd	Private	1.2
First Security Bank Limited	Private	0.8
ICB Islamic Bank Limited	Private	1.5
Bangladesh Shilpa Bank	Private	2.4
Bangladesh Commerce Bank Ltd	Private	0.3
Bangladesh Shilpa Rin Shangstha	Private	0.6
Percentage of deposits held by domestic banks		**85.8**

List of Foreign Banks in Pakistan

Name of Banks	Legal Charter	Home Country	Size
Habib Bank Limited	Private	Switzerland	14.22
United Bank Ltd.	Private	UAE	11.43
Bank Alfalah Limited	Private	Saudi Arabia	6.16
Standard Chartered Bank (Pakistan)	Private	UK	4.75
Faysal Bank Ltd	Private	Bahrain	3.19
NIB Bank Ltd	Private	Singapore	3.25
Meezan Bank Limited	Private	Kuwait	1.24
Dubai Islamic Bank Pakistan Limited	Private	Dubai	0.40
Samba Bank Limited	Private	Saudi Arabia	0.25
ORIX Leasing Pakistan Limited	Private	Japan	0.83
Trust Bank Limited	Private	Belgium	1.00
JS Global Bank Limited	Private	Kuwait	0.02
Royal Bank of Scotland Ltd (The)	Private	UK	2.39
Atlas Bank Limited	Private	Japan	0.34
Citi Bank	Private	USA	0.45
Pak Oman Bank Ltd	Private	Oman	0.25
First Dawood Bank Limited	Private	Saudi Arabia	0.05
American Express Bank Ltd- Pakistan Branches	Private	USA	1.00
Percentage of Deposits Held			**51.2**

List of Domestic Banks in Pakistan

Name of Banks	Legal Charter	Size
National Bank of Pakistan	Public	13.16
MCB Bank Limited	Private	8.00
Allied Bank Limited	Private	6.06
Askari Bank Limited	Private	3.30
Bank Al Habib	Private	2.29
Habib Metropolitan Bank Limited	Private	3.19
Bank of Punjab	Public	4.79
Union Bank Limited	Private	0.02
Zarai Taraqiati Bank Limited	Public	2.00
PICIC Commercial Bank Limited	Private	0.50
Soneri Bank Limited	Private	1.20
Silkbank Limited	Private	1.00
KASB Bank Limited	Private	0.50
Pakistan Industrial Credit & Investment Corporation Ltd. - PICIC	Private	0.04
Bank of Khyber	Public	0.43
Jahangir Siddiqui & Co Ltd	Private	0.22
BankIslami Pakistan Limited	Private	0.14
Summit Bank Limited	Private	0.29
Mybank Ltd	Private	0.56
JS Bank Limited	Private	0.23
Pak-Libya Bank	Public	0.37
Dawood Bank	Private	0.13
First Women Bank Limited	Public	0.15
IGI Bank Limited	Private	0.12
Atlas commercial Bank Ltd	Private	0.04
Jahangir Siddiqui Bank	Private	0.03
Orix Bank Ltd	Private	0.02
Chartered Bank	Private	0.00
Escorts Bank Ltd	Private	0.01
First National Bank	Private	0.01
Security Bank Limited	Private	0.02
Percentage Of Deposits Held by domestic Banks		**48.8**

List of Foreign Banks in India

Name of Banks	Legal Charter	Home Country	Size
Citibank NA	Private Ltd	USA	**1.4**
HSBC India	Private Ltd	UK	1.0
Standard Chartered Bank - Indian Branches incorporated in the UK	Private Ltd	UK	1.2
Barclays Bank Plc	Private Ltd	UK	0.0
Bank of Tokyo-Mitsubishi UFJ Ltd (The)	Private Ltd	Japan	0.1
Deutsche Bank Ltd	Private Ltd	Germany	0.1
Société Générale French	Private Ltd	French	8.8
Bank Of America	Private Ltd	USA	1.9
American Express bank	Private Ltd	USA	0.5
Oman International Bank	Private Ltd	Oman	0.1
Shinhan Bank	Private Ltd	South Korea	0.5
ChinaTrust Commercial Bank	Private Ltd	China	0.0
Bank of Ceylon	Private Ltd	Sri Lanka	0.0
Mizuho Corporate Bank	Private Ltd	Japan	0.5
Bank of Nova Scotia	Private Ltd	Canada	0.0
BNp Paribas	Private Ltd	French	0.0
Mashriq Bank	Private Ltd	UAE	0.0
Percentage of Deposits Held			**16.2**

List of Domestic Banks in India

Name of Banks	Legal Charter	Size
State Bank of India	Public	20.0
Punjab National Bank	Public	4.0
Bank of Baroda	Public	3.5
Bank of India	Public	3.6
Canara Bank	Public	4.1
IDBI Bank Ltd	Public	2.6
HDFC Bank Ltd	Private	1.9
Union Bank of India	Public	2.6
Central Bank of India	Public	2.1
AXIS Bank Limited	Private	1.5
Housing Development Finance Corporation Limited-HDFC Ltd	Private	2.4
Syndicate Bank	Public	0.1
Oriental Bank of Commerce Ltd.	Private	1.9
UCO Bank	Public	2.0
National Bank for Agricultural and Rural Development - NABARD	Public	2.9

Indian Overseas Bank	Public	2.0
Allahabad Bank	Public	1.7
Corporation Bank Ltd.	Private	1.2
Indian Bank	Public	1.2
Andhra Bank	Public	1.1
State Bank of Hyderabad	Public	1.2
Power Finance Corporation Limited	Public	0.6
United Bank of India	Public	0.9
State Bank of Patiala	Public	1.2
Bank of Maharashtra	Public	0.9
Vijaya Bank	Public	0.8
State Bank of Travancore	Public	1.0
Dena Bank	Public	0.8
Punjab & Sind Bank	Public	0.5
Kotak Mahindra Bank Limited	Private	0.6
State Bank of Bikaner and Jaipur	Public	0.8
Export-Import Bank of India	Public	0.9
State Bank of Mysore	Public	0.7
Federal Bank Ltd. (The)	Private	0.6
Jammu and Kashmir Bank Ltd	Public	0.2
Indian Railway Finance Corporation Limited	Public	1.0
LIC Housing Finance Ltd	Public	0.7
YES BANK Limited	Private	0.3
Indusind Bank Limited	Private	0.3
State Bank of Indore	Public	0.4
Infrastructure Development Finance Co Ltd - IDFC	Private	0.5
ING Vysya Bank Ltd	Private	0.4
Small Industries Development Bank of India	Public	0.5
Karnataka Bank Limited (The)	Private	0.4
Maharashtra State Co-operative Bank Limited	Private	0.4
South Indian Bank Limited	Private	0.3
National Housing Bank	Public	0.9
Karur Vysya Bank Limited (The)	Public	0.3
Housing and Urban Development Corporation Ltd	Public	0.9
Reliance Capital Limited	Private	0.2
IFCI Limited	Private	0.4
Centurion Bank of Punjab Limited	Private	0.5
Saraswat Co-Operative Bank	Private	0.3
Indiabulls Financial Services Limited	Private	0.1
Bank of Rajasthan Ltd	Private	0.2
Tamilnad Mercantile Bank Ltd	Private	0.2
IDBI Bank Ltd. (Old)	Public	0.1
Sundaram Finance Ltd	Private	0.3

City Union Bank Ltd.	Private	0.1
Lakshmi Vilas Bank Ltd	Private	0.2
Infrastructure Leasing & Financial Services Ltd	Private	0.2
SREI Infrastructure Finance Limited	Private	0.0
Dhanlaxmi Bank Ltd	Private	0.1
Catholic Syrian Bank Ltd (The)	Private	0.1
United Western Bank Ltd. (The)	Private	0.2
Global Trust Bank Limited	Private	0.1
Cholamandalam Investment and Finance Company Limited	Private	0.1
Shriram City Union Finance Ltd	Private	0.0
Shamrao Vithal Co-Op Bank Ltd	Private	0.1
Development Credit Bank Limited	Private	0.1
Bank of Punjab Ltd.	Private	0.1
Thane Janata Sahakari Bank Ltd	Private	0.0
Ratnakar Bank Ltd	Private	0.0
SBI Commercial and International Bank Ltd.	Private	0.0
Corpbank Securities Ltd	Private	0.5
Percentage Of Deposits held by domestic banks		**85.8**

List of Foreign Banks in Srilanka

Name of Banks	Legal Charter	Home Country	Size
National Bank Plc-NDB Bank	Private Ltd	Pakistan	3.6
Deustsche Bank	Private Ltd	Germany	2.2
HSBC	Private Ltd	UK	1.3
Citi Bank	Private Ltd	USA	0.8
Standard Chartered Bank	Private Ltd	UK	0.9
Indian Bank	Private Ltd	India	0.4
Percentage of Deposits Held			**9.1**

List of Domestic Banks in Srilanka

Name of Banks	Legal Charter	Size
Bank of Ceylon	Public	21.7
People's Bank	Public	18.4
National Savings Bank	Public	5.4
Hatton National Bank Plc	Private	11.6
Commercial Bank of Ceylon Plc	Private	12.9
Sampath Bank Plc	Private	6.7
Seylan Bank Plc	Private	7.6
DFCC Bank	Private	3.8
Central Finance Company Plc	Private	1.5
DFCC Vardhana Bank Ltd	Private	0.8
NDB Bank Limited (Old)	Private	0.0
Merchant Bank of Sri Lanka Limited	Private	0.4
SMB Bank PLC	Private	0.0
Mercantile Leasing Ltd	Private	0.0
People's Merchant Bank Plc	Private	0.1
Percentage of Deposits held by domestic Banks		90.9

Appendix 4: Correlation Matrix Before Transformations

Correlation	Lagged Size	Crisis	Foreign	NIM	Public	ROA	Solvency	Liqui	HomeLen	HostInf	Home GDP	Host GDP	HostLenRate	ShTDep	FinLib
Lagged Size	1														
Crisis	0.27	1													
Foreign	-0.05	-0.11	1												
NIM	-0.03	-0.05	0.12	1											
Public	0.27	0.27	-0.38	-0.1	1										
ROA	0.02	0.07	0.01	0.2	-0.02	1									
Solve	-0.08	-0.03	0.16	0.2	-0.22	0.22	1								
Liqui	-0.17	-0.31	0.21	0.2	-0.25	-0.03	0.19	1							
HomeLen	-0.06	-0.15	0.62	0.1	-0.31	-0.04	0.12	0.24	1						
Host Inflati	-0.01	-0.26	0.06	0.2	-0.12	-0.13	0.08	0.15	0.04	1					
Home GDP	-0.10	-0.13	0.66	0.1	-0.25	0.00	0.09	0.20	0.63	-0.05	1				
Host GDP	0.14	0.54	-0.11	-0.1	0.22	0.08	-0.10	-0.26	-0.09	-0.47	-0.06	1			
HostLenRate	-0.08	-0.41	-0.04	0.0	-0.10	-0.04	-0.07	0.06	0.00	0.48	-0.05	-0.40	1		
ShTDep	**0.93**	0.22	-0.02	0.0	0.22	0.03	-0.07	-0.14	-0.04	0.01	-0.07	0.10	-0.07	1	
FinLib	-0.11	-0.48	0.20	0.1	-0.18	-0.11	0.20	0.14	0.15	0.21	0.16	-0.45	-0.24	-0.05	1

Appendix 5: Correlation Matrix After Transformations

Correlation	Lagged Size	Crisis	Foreign	NIM	Public	ROA	Solve	Liqui	HomeLen	HostInf	Home GDP	Host GDP	HostLenRate	ShTDep	FinLib
Lagged Size	1														
Crisis	0.51	1													
Foreign	-0.17	-0.11	1												
NIM	0.02	-0.05	0.12	1											
Public	0.52	0.27	-0.38	-0.09	1										
ROA	0.09	0.07	0.01	0.18	-0.02	1									
Solve	-0.27	-0.03	0.16	0.17	-0.22	0.22	1								
Liqui	-0.44	-0.31	0.21	0.15	-0.25	-0.03	0.19	1							
HomeLen	-0.19	-0.15	0.62	0.06	-0.31	-0.04	0.12	0.24	1						
Host Inflation	-0.06	-0.26	0.06	0.15	-0.12	-0.13	0.08	0.15	0.04	1					
Home GDP	-0.23	-0.13	0.66	0.05	-0.25	0.00	0.09	0.20	0.63	-0.05	1				
Host GDP	0.31	0.54	-0.11	-0.13	0.22	0.08	-0.10	-0.26	-0.09	-0.47	-0.06	1			
HostLenRate	-0.19	-0.41	-0.04	0.04	-0.10	-0.04	-0.07	0.06	0.00	0.48	-0.05	-0.40	1		
ShTDep	**0.55**	0.22	-0.02	0.02	0.22	0.03	-0.07	-0.14	-0.04	0.01	-0.07	0.10	-0.07	1	
FinLib	-0.15	-0.48	0.20	0.08	-0.18	-0.11	0.20	0.14	0.15	0.21	0.16	-0.45	-0.24	-0.05	1