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Banking in Lebanon:
An Empirical Investigation of Performance, Capitalisation and Mergers

A Thesis Presented by

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Thesis Release Form

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Dedication

This thesis is dedicated to my brother Mohammed,

who motivated and encouraged me to do the PhD.

Acknowledgments

I would like to thank everyone who has encouraged and supported me during the period of my study.

First and foremost, I thank my parents for their unwavering belief in me and their undying support throughout my PhD.

A deep grateful thanks to my supervisor Professor Alec Chrystal, whose guidance and supervision has been crucial in accomplishing this thesis; and also to Professor Forrest Capie, whose initial supervision has led to the building of the foundations of this study and establishing its due path to completion. I would like to thank Professor Giovanni Urga, who has invested his time and efforts to improve the quality of the PhD programme at Cass Business School. I also thank Mrs. Margaret Busgith, for her continuous help and support.

Finally, I thank my friends who stood by me whenever I needed them and each one of them has left a special memory in my heart: Jolnar and Ibrahim, Samer, Laxmi, Abed, Marwa, Zakia, Hadi and Vivi.

Abstract

This thesis investigates three aspects of Lebanese banking: Bank Performance, Bank Capital and Bank Mergers. The first chapter tackles the issue of bank performance, with focus on the differences between domestic and foreign banks. We study panel data of almost the entire population of Lebanese banks between 1993 and 2003 to analyse the (different) determinants of domestic and foreign banks' profitability. Using the Fixed Effects Regression Model, we find that foreign banks are more profitable than domestic ones and factors that shape a domestic bank's profitability are different from those of a foreign bank, mainly the macroeconomic variables. Moreover, we find that subsidiaries of foreign banks perform better than domestic banks acquired by foreign banks. The second chapter tests the applicability of some bank capital theories. Specifically, the Too-Big-To-Fail, the signalling, and the cyclicality of bank capital theories. Besides, we test the importance of market capital requirements vs. regulatory capital requirements. We use a panel of data from almost all the population of commercial Lebanese banks between 1993 and 2003. We split the panel data "horizontally" (according to bank ownership) and "vertically" (by time), and find that the above mentioned theories are applicable in certain conditions and circumstance. The Too-Big-To-Fail hypothesis emerges with tighter capital requirements, foreign banks do not "signal" using their capital level and foreign bank capital is not cyclical, etc... The third chapter deals with bank mergers in emerging markets. We are interested in: (1) finding the motives behind bank mergers, and (2) detecting the outcome of bank mergers. We study the merger experience in the Lebanese banking sector, which has witnessed a large number of bank mergers. We find that mergers in emerging markets are driven by the will of large healthy banks to acquire small underperforming banks. Additionally, we find that the regulatory authorities play an important role in this process. Bank mergers do have a constructive effect on consolidated entities as there is an improvement in profitability and efficiency, but the credit risk deteriorates.

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1 Chapter One: An Overview of the Lebanese Banking System

1.1 Introduction

The Lebanese economy is a typical model of an open and service-oriented economy [1] with extensive links abroad, an unrestricted exchange and trade system, free access to foreign investment and perfect capital and labour mobility. The banking sector is the centrepiece of the Lebanese economy, and banks represent a very active segment because of the limited role of other financial intermediaries. Prior to the civil war (1975-1990), the Lebanese banking sector was the most advanced banking sector in the Middle East, but it has been seriously affected by the war, as were all other sectors. By the end of 1990, banks were lagging behind in terms of infrastructures and services (as a result of 15 years of war and partial isolation from international financial markets), their capitalisation levels dropped dramatically and their assets and liabilities became highly dollarised after the severe depreciation of the Lebanese currency in the late 1980s and early 1990s. Since early 1990s, the banking sector has been implementing restructuring and modernisation programmes and procedures, along with increasing capital, service diversification, debt issuing, and mergers and acquisitions. As a result, the sector has overcome most of its problems, grown at fast rates and become capable of regaining its leading position in the region. Moreover, the sector has witnessed the return of foreign banks, and the establishment of investment banks to pursue development of the domestic emerging capital market.

At the end of 2004, there were 54 commercial banks and 10 investment banks operating in the Lebanese market. These banks can be classified into three categories: (1) domestic banks with majority domestic control, (2) domestic banks with majority foreign control and (3) subsidiaries of foreign banks. [2] Also, there were representative offices of 16 foreign banks, and there were 33 other financial institutions, 9 brokerage institutions, and 3 leasing institutions operating in the Lebanese market. The banking sector employs about 1.2%

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[1] The Lebanese economy is based mainly on the service sector, which accounts for about 60% of GDP. The main components of the service sector are the commerce, the tourism and the financial services. Source: the Lebanese Ministry of Finance.

[2] The classification of these banks according to their ownership will be illustrated in detail in the following chapter.

of the total domestic workforce and contributes about 5% of GDP. More than 80% of the total assets of the banking sector are invested domestically. [3] [4]

The Lebanese banking system has several features that represent advantages among the other banking systems in the Middle East. These features are:

a- Free exchange system and free movement of capital and earnings.

b- The banking secrecy law, which was implemented in 1956, affected all banks established in Lebanon, as well as foreign banks' branches. According to this law, all bank managers and employees who are exposed to the banks' activities, cannot reveal what they know concerning their clients' names, assets or holdings to any party whatsoever, whether individuals or public authorities.

c- Money laundering law: because the banking secrecy law could be used as a mean for illegal operations (money laundering particularly), the Association of Banks in Lebanon (ABL) has set up a Due Diligence Convention. With respect to the law of banking secrecy, this law aims at preventing money-laundering operations.

d- The free banking zone, which was established in 1975, grants the government the right to exempt non residents' deposits and liabilities in foreign currency from:

- The income tax on interest earned,
- The required reserves imposed by the central bank, and
- The deposit guarantee premium imposed on bank deposits by the National Deposits Guarantee system.

e- The openness to foreign banking: the Lebanese market is very open to foreign banks and has a long history of foreign banking. Foreign banks can receive deposits from the public and perform credit operations, fiduciary operations and portfolio management on the behalf of other parties. Besides foreign banks can carry out brokerage activities, without intermediation, on the floor of the Beirut Stock Exchange. [5]

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[3] Source: the Association of Banks in Lebanon, the Annual Report.

[4] The main sectors of the economy and their participation in the GDP are approximately as follow: Agriculture (6.3%), Manufacturing (13.5%), Construction (9.4%), Market services (22.6%), Trade (21.3%), Non-market services (11.6%). Source: the Lebanese Ministry of Economy and Trade.

[5] On the other hand, foreign banks are prohibited from: (1) carrying out industrial or commercial activities or any activity other than banking, (2) participating, in any form, in industrial, commercial or agricultural institutions or any other institutions except within the limits of the private funds, (3) carrying out, on its behalf, any operation on

The banking sector is controlled and regulated by the central bank (Banque du Liban) which imposes the necessary prudential rules related to capital adequacy, asset quality, liquidity, profitability, management efficiency and effectiveness. The central bank coordinates its activities with the Banking Control Commission (BCC) to implement banking regulations and supervision. The central bank imposes the rules and regulations, and the BCC supervises the business, ensures the banks comply with the appropriate rules and regulations, and reports to the Central Council of the central bank about the status of operating banks especially the one(s) that are not in accordance with applied regulations. The Central Council has the authority to withdraw a license and remove a bank from the central bank's official list and its decisions are unchangeable and definitive.

The above cited features make the Lebanese banking system somewhat different from the other banking systems in the region and the other emerging markets generally. Thus, it is interesting studying such a market in order to extract some conclusions that may help in setting investment and regulatory decisions, related mainly to foreign banking and bank mergers and acquisitions.

1.2 The Evolution of the Lebanese Banking Sector After 1990

It is important firstly to have a clear image of the market under study and understand its features and characteristics. In order to do that, we will look at the evolution of the whole banking sector during the period that will be studied later. As mentioned before, the civil war that occurred in Lebanon between 1975 and 1990 had destructive effects on the domestic economy. The sectors of the Lebanese economy started to recover gradually after the war ended and the fastest one among them was the banking sector. However, from around 1993, banks started to overcome their problems. Some changed their structures and all worked on complying with the international standards of efficiency and capital adequacy. Thus, the period before 1993 could be considered as a transitionary period where most banks were still inefficient and undercapitalised. Therefore, in order to be able to extract useful lessons from

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derivatives, and (4) reducing the capital assigned for its investment, or buying back any part of it. Source: the Central bank of Lebanon.

the available data, the scope of our empirical analysis will cover the period from 1993 onwards. However, we will use some data before 1993 for the third empirical chapters, which will help clarifying the situation of most small banks [6] at that period. In the following section, we will focus on the evolution of three main variables: total assets, capitalisation and fixed assets. In addition, the evolution of the sector's total assets will be compared to the evolution of the entire economy, proxied by GDP.

1.2.1 The Evolution of Assets and Capitalisation

The Lebanese banking sector has been growing at high rates by all terms since the early 1990s. The evolution of the size of the sector represented by the consolidated balance sheet is shown in Table 1.1 and Figure 1.1:

Table 1.1: The Evolution of the Entire Sector Assets and Capital ($ billion)

Year	Assets	Growth rate (%)	Capital	Growth rate (%)	Capital-to-asset ratio (%)
1991	7.73		0.17		2.18
1992	7.96	2.95	0.14	-14.77	1.80
1993	10.99	38.07	0.26	80.99	2.36
1994	14.75	34.13	0.41	58.11	2.78
1995	18.21	23.46	0.72	74.97	3.94
1996	23.96	31.60	1.25	74.41	5.23
1997	29.88	24.73	1.96	56.37	6.55
1998	36.49	22.11	2.40	22.59	6.58
1999	40.45	10.83	2.67	11.07	6.59
2000	45.03	11.35	2.90	8.88	6.45
2001	47.78	6.09	2.96	1.98	6.20
2002	52.56	10.02	3.33	12.55	6.34
2003	60.12	14.37	3.65	9.46	6.07
2004	65.92	9.65	3.85	5.64	5.85
	Total growth (1991-2004)	7.5X	Total growth (1991-2004)	22X	

Source: Banque du Liban.

[6] Banks operating in Lebanon are classified into four groups according to the amount of deposits they hold, and the threshold varies according to the growth of the total sector deposits. These groups are Alpha, Beta, Gamma and Delta. In 1992, the classification was as follows: Alpha group contained banks with deposits over $200 million, Beta group contained banks with deposits between $50 and $200 million, Gamma group contained banks with deposits between $20 and $50 million and Delta group contained banks with deposits under $20 million.

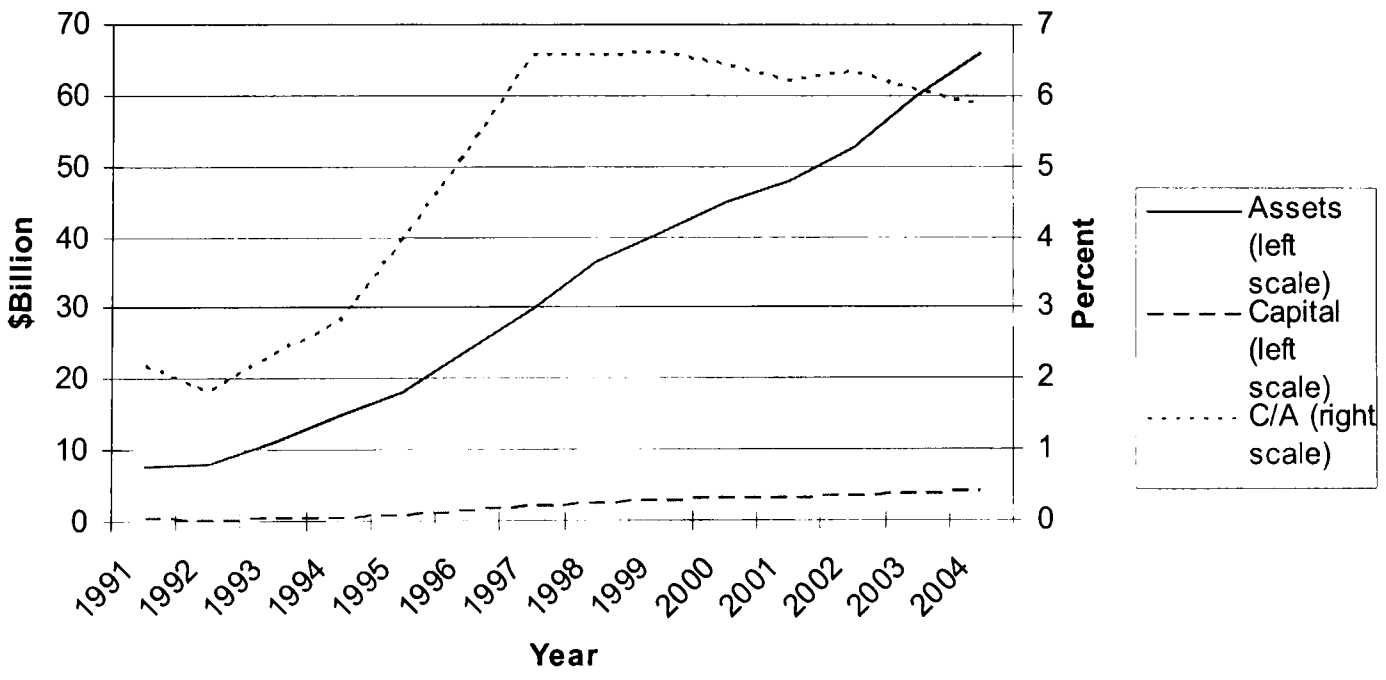
We observe from Table 1.1 and Figure 1.1 the "jumps" in the size of the Lebanese banking sector, where its total assets have increased more than 7 times during the last fourteen years. The considerable growth of assets was provoked mainly by the growth of deposits due to the increasing domestic and external confidence in the Lebanese banking system. The increase of deposits has allowed banks to augment their lending capacity, and expand their loans to the private and the public sector. Additionally, the capitalisation of the sector has increased about 22 times during this period. Note that the capitalisation growth rate was very high between 1993 and 1998, when the central bank required banks to boost their capital in order to enhance their solvency and meet the Basle Accord requirements. Another important remark is that capital accounts represented only 2.18% relative to total assets in 1992, and became more than 6% in 2003. This increase in capitalisation was mainly due to:

i. The re-valuation of fixed assets.

ii. The admission of new shareholders to most of the banks and the changes of their ownership.

iii. The various credit instruments on the international financial markets.

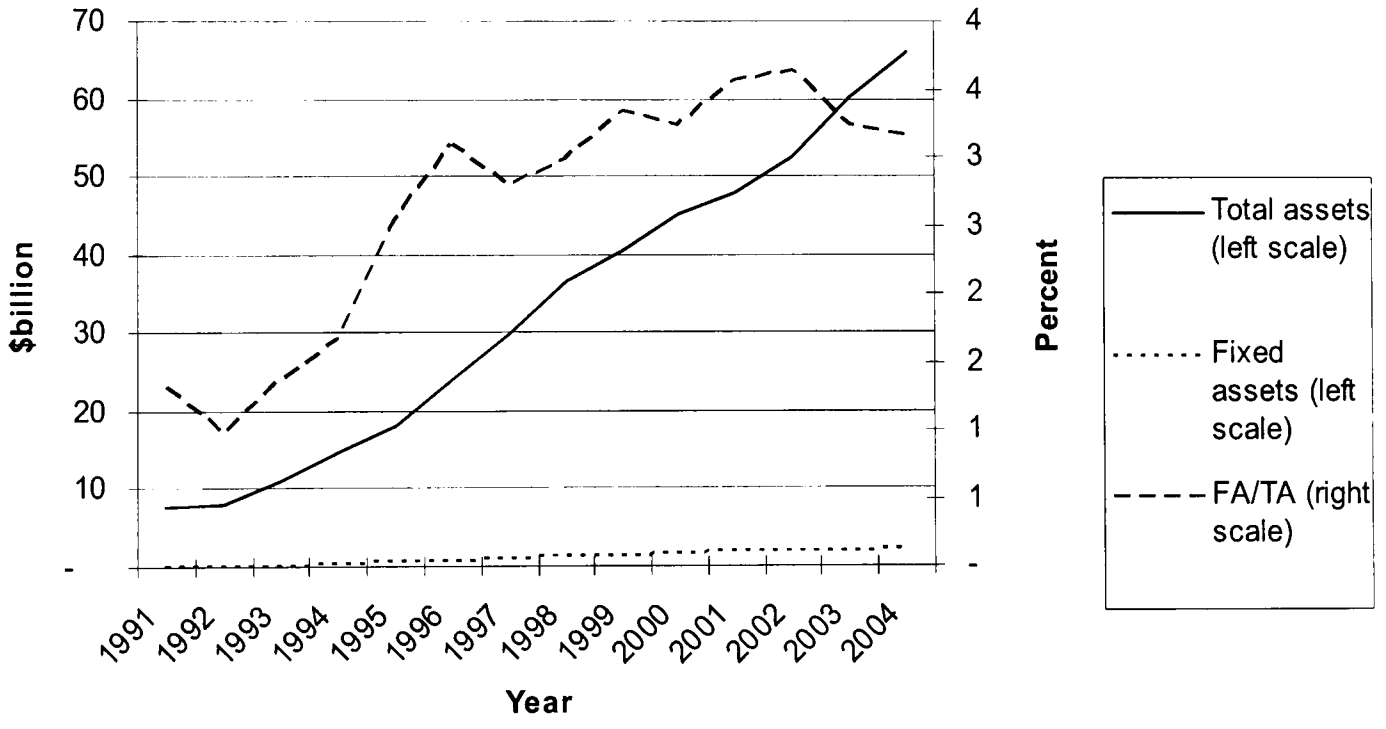
Figure 1.1: The Evolution of the Banking Sector Assets and Capitalisation



1.2.2 The Evolution of Fixed Assets

Over the last 14 years, Lebanese banks have been heavily investing in developing and modernising their infrastructures, to regain their position in the region and face the increasingly competitive environment. They have invested heavily in IT and information systems, technology of exchange and data treatment, telecommunication systems, E-banking, and ATMs. Additionally, they have expanded their presence domestically and abroad by spreading their network of branches in the Lebanese market and the international markets. The following figure exhibits the evolution of fixed assets:

Figure 1.2: The Evolution of the Banking Sector Fixed Assets



1.2.3 The Evolution of the Banking Sector Compared to the Entire Economy

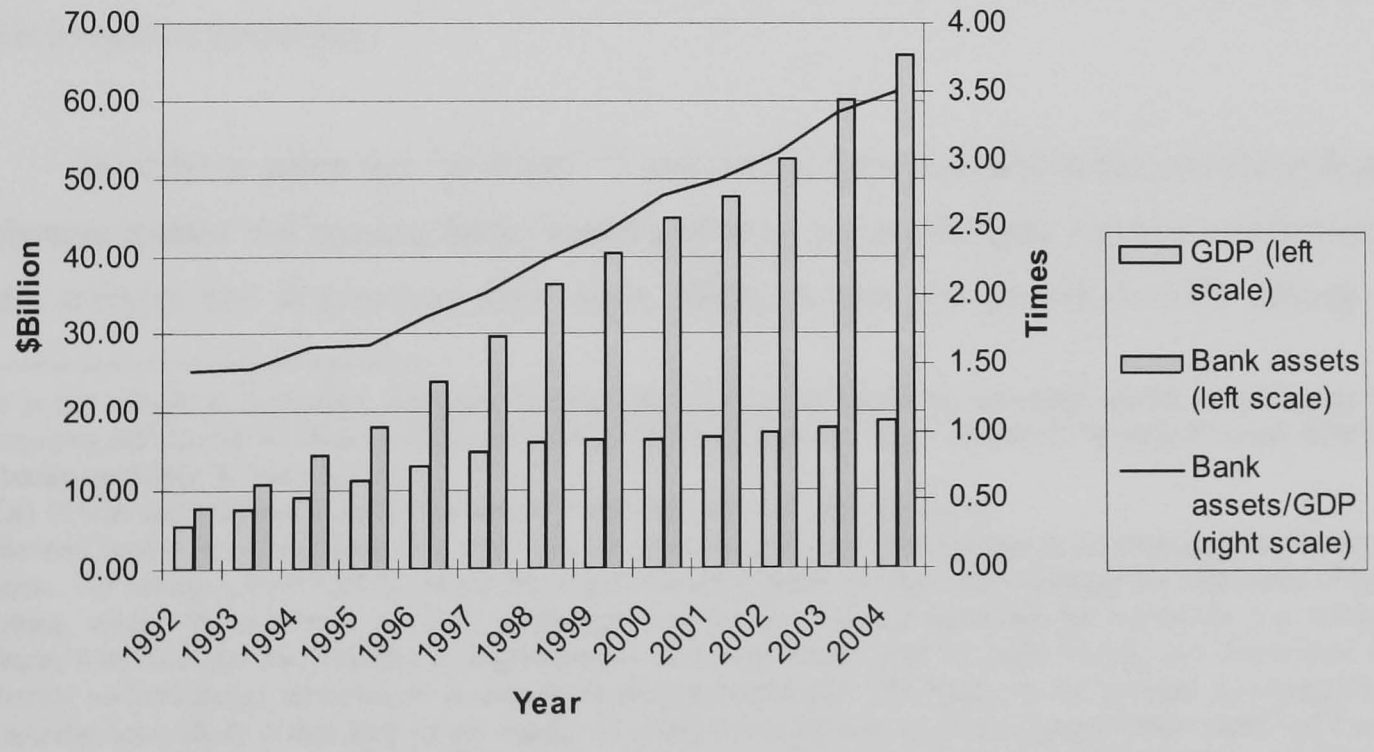
During the last decade, the Lebanese economy has witnessed significant changes, and moved from a "war economy" to one of reconstruction and development. The sectors of the economy that have been affected by the war, started, in early 1990s, to recover and overcome the structural problems caused by the war. The biggest and most active sector has been the

banking sector, which has grown at high rates, more than the economy as a whole and more than any other sector. Figure 1.3 shows the evolution of the sector compared to GDP.

Additionally, relative to the size of the economy, the Lebanese banking sector is one of the largest in the world and is about 3.5 times the GDP. To get a better idea about this fact, note that this ratio was in some emerging markets, at the end of 2003 as follow: 0.44X in Greece, 0.68X in Turkey, 1.69X in Israel, 1.21X in Thailand, 0.66X in Indonesia, and 2.33X in Singapore. [7]

This "large" size of the Lebanese banking sector allows it to play a dominant role among the other sectors of the economy. This "excess capacity" of the banking sector has forced Lebanese banks to expand their activities internationally where 18 banks have considerable presence in 14 foreign countries, with very ambitious plans for large and medium sized banks to expand their activities internationally in the future.

Figure 1.3: The Evolution of the Banking Sector Compared to GDP



[7] Source: International Financial Statistics, IMF, 2004 and the central banks of the cited countries.

1.3 The Characteristics of the Lebanese Banking Sector

In the following sections, we will analyse the characteristics of the Lebanese banking sector, focusing on three issues: the overbanking, the concentration and the dollarisation of the sector.

1.3.1 Overbanking

The Lebanese banking system is potentially overbanked due to the existence of large number of banks (either Lebanese or foreign banks). [8] Many of these banks are small (in terms of total assets). Compared to other emerging markets, Lebanon seems heavily banked. For instance, the number of banks in some emerging markets is as follow: Republic of Korea (53), Thailand (30), Argentina (91), Brazil (165), Poland (81), Cyprus (14), Indonesia (133) and Singapore (110). [9] Besides, we have to take into consideration the wide differences in population and geographical surface between these countries and Lebanon. The existence of large number of banks competing in a narrow market restricts the opportunities of expanding their in-market operations.

In order to solve this "problem" [10] and reduce the number of banks operating in the Lebanese market and creating larger banking entities, the central bank has been encouraging bank mergers and acquisitions since early 1990s. A law was passed in 1992 aiming at

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[8] It is not simple to determine what the "appropriate" number of banks for a certain market is. However, by comparing the number of banks in different markets, we can "assume" that a country is "crowded" or not in terms of banks operating in that country.

[9] End of year 2004 figures. Source: the central banks' websites of cited countries.

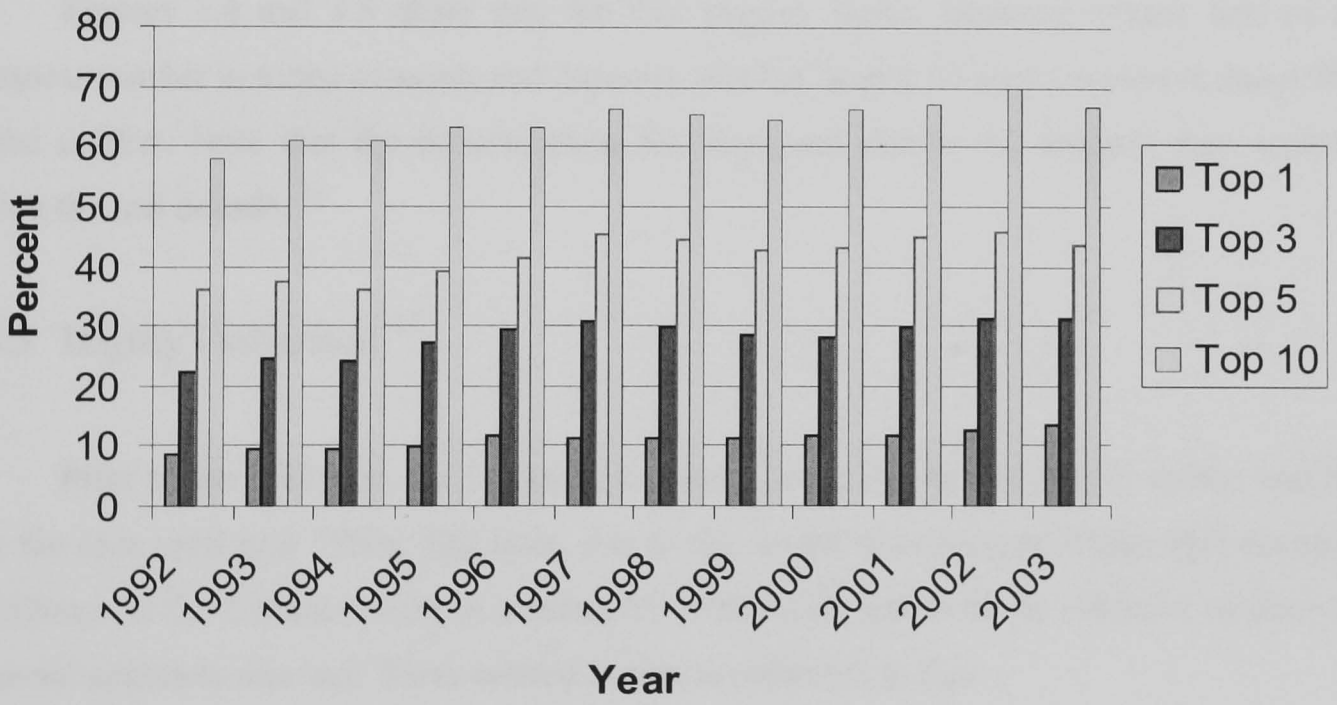
[10] Several papers have addressed this issue and the potential problems that emerge in an overpopulated banking system. For instance, Pyle (2002) claims that the increased number of banks may damage the efficiency of loan markets, where the existence of many alternative sources for external financing for borrowers (i.e. banks), reduces their concern for building a reputation for creditworthiness with a single lender, and diminishes the potential self-enforcing agreements to sustain lending arrangement. The larger is the number of (competing) banks, the more likely is that they do not engage in costly screening and, as a consequence make more bad loans. Kuo and Lee (2003) illustrated the problems that emerged in Taiwan post-deregulation. In 1991, the Taiwan Ministry of Finance deregulated the establishment of new commercial banks in order to increase the competition between banks and to increase financial efficiency. Then, the number of financial institutions in Taiwan increased rapidly to overbanking. After the Asian crisis in 1997, the effects of overbanking emerged and affected the market structure: the quality of banks' assets worsened, interest spread and the profitability of banks decreased.

encouraging and facilitating bank consolidations and offering many incentives to merging banks. This issue will be subject to empirical analysis in the third chapter of this thesis, where we will assess the bank mergers experience in Lebanon as a model for bank mergers in emerging markets.

1.3.2 Concentration

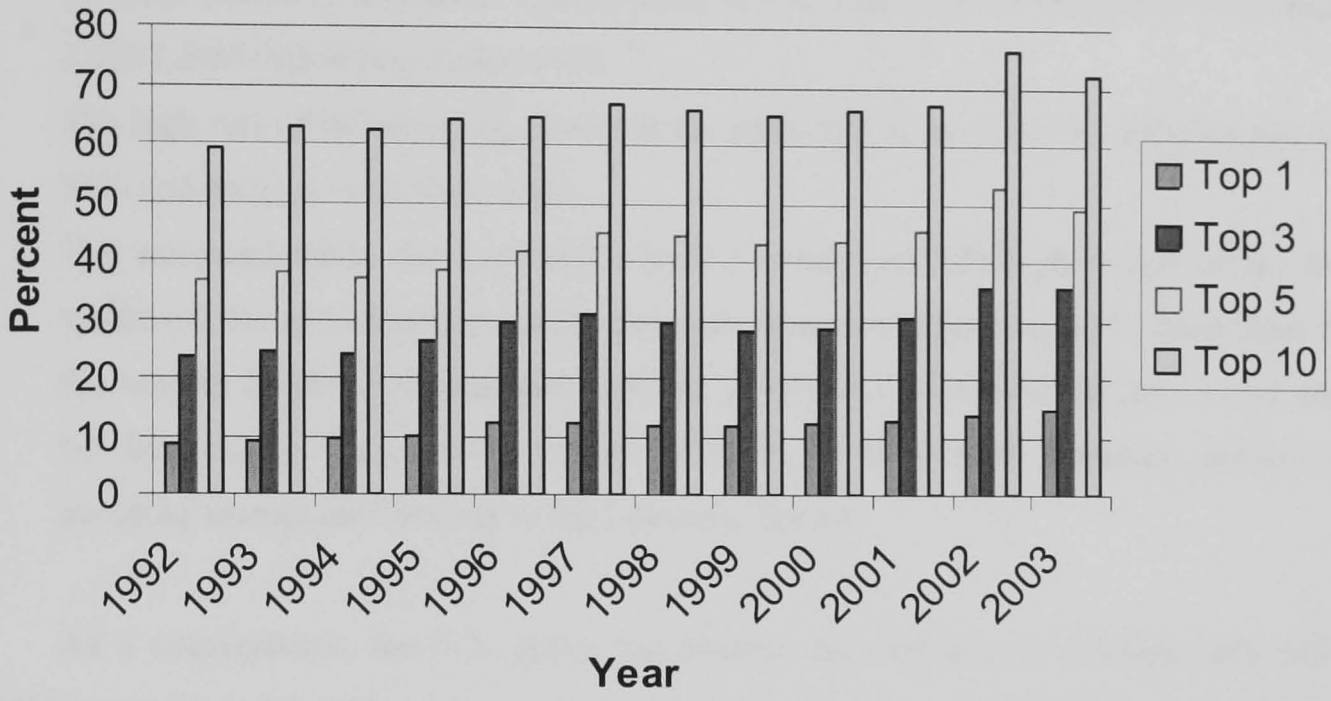
Even though it is not expected that banks would be of similar sizes, there is a wide range among them in Lebanon. In fact, it could be claimed that few banks dominate the Lebanese banking sector, where the others have a very small market share and play a very moderate role in the national economy. Figures 1.4 and 1.5 clarify this situation:

Figure 1.4: Asset Concentration



As a result, the Taiwanese government drafted the "Merger Law for Financial Institutions" in October 1999 in order to avoid financial crisis.

Figure 1.5: Deposit Concentration



Figures 1.4 and 1.5 show that the five biggest banks dominate almost half of the Lebanese market in terms of assets and deposits, and the largest 10 banks represent about 70% of the market. Note that the concentration has increased due to the mergers that occurred during the last decade. [11]

1.3.3 Highly Dollarised [12]

Prior to the civil war, the Lebanese currency (the Lira) had been very stable, and this was the case until mid 1980s. But later, due to the severe economic problems that occurred, confidence in the Lebanese Lira as a mean for settlements and to be an effective medium for financial contracts was lost. Three related factors contributed to this:

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[11] The concentration in the Lebanese banking system appears to be less than many other emerging markets. A study by the IMF showed that in 2000 the concentration in some emerging markets (in terms of largest ten banks deposit share) was as follow: Republic of Korea (77.7%), Malaysia (82.2%), Philippines (73.3%), Thailand (79.4%), Argentina (80.7%), Brazil (85.6%), Chile (82%), Mexico (94.5%), Venezuela (75.7%), Czech Republic (90.3%), Hungary (80.7%), Poland (77.7%) and Turkey (72%). Source: International Capital Markets, IMF, 2001.

[12] Although this issue is not related directly to our study and it will not be a part of our empirical investigations, we have mentioned it here as one of the characteristic of the Lebanese banking sector only.

i. The value depreciation: in December 1984, the exchange rate was 8.9 LBP/USD, when its value started to depreciate continuously to 530 LBP/USD in December 1988 and to 2,420 LBP/USD in September 1992. [13]

ii. The high rate of inflation, especially in the early 1990s. In 1992 the inflation rate was 33% and jumped to 131% in 1993. [14]

iii. The increased public debt (mainly in local currency) and the high budget deficit have weakened the confidence in the government monetary credibility and raised fears that the heavily indebted government may find it effective to reduce the debt's real value by depreciating the currency. These expectations have been a reason, always, for avoiding savings and lending in the Lebanese Pound.

As a consequence, the U.S. dollar has become the currency of savings, and widely utilised in commercial settlements. As a part of the economy, the banking sector became highly dollarised as well. Below, we will look at deposits and loans dollarisation.

1.3.3.1 Dollarisation of Deposits

Although the exchange risk is controlled since 1993 and almost fixed since 1998, the level of dollarisation of deposits is still very high, because individuals and enterprises tend to deposit their savings in USD in order to secure them. Among the emerging markets, Lebanon seems to have one of the highest dollarised banking sectors as shown by the study of Honohan and Shi (2002). They ranked 25 emerging markets according to the level of their deposits dollarisation between 1990 and 2000 Lebanon was ranked the sixth among them. [15] The following figure shows the level of dollarisation of deposits:

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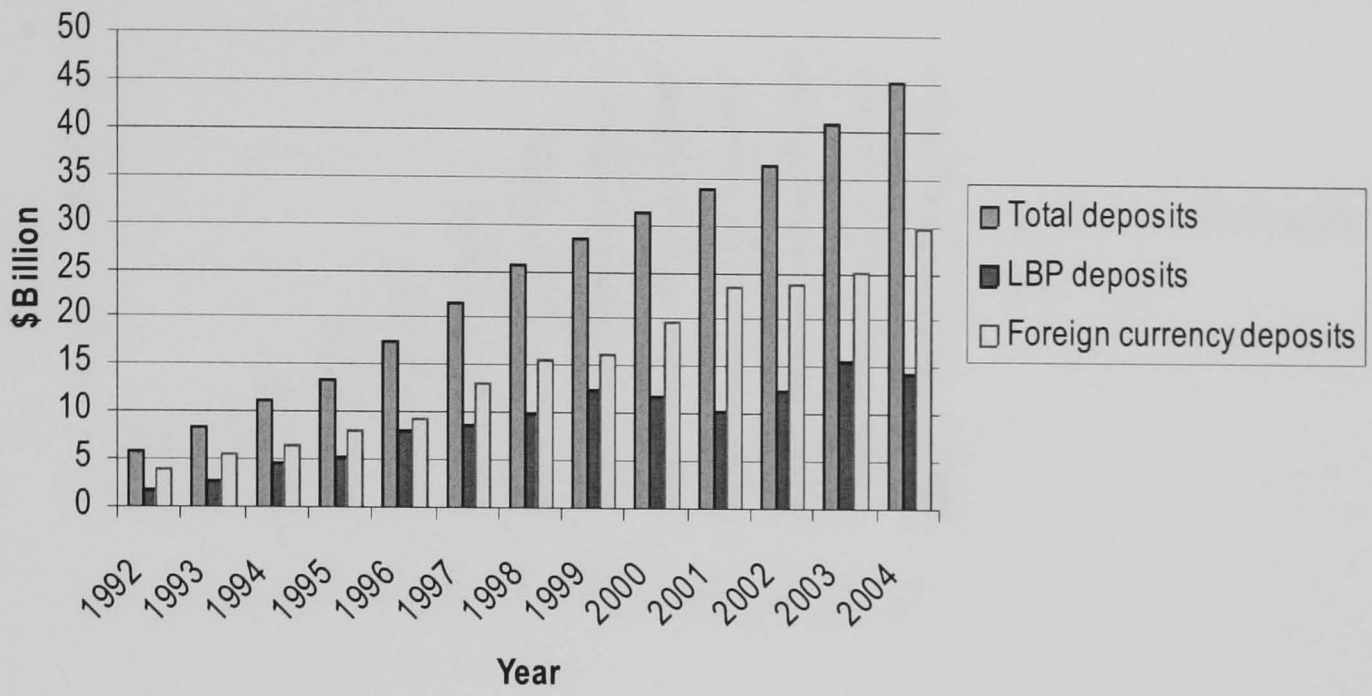
[13] The government and the central bank could overcome this risk since 1993, and were able to prevent exchange rate fluctuations. Moreover, since 1998 the exchange rate was always around 1,500 LBP/USD.

[14] Starting 1994 the inflation rate started to decline. It became (12.1%) in 1994, (9.9%) in 1995, (5.2%) in 1996, (3.5%) in 1997, (1.6%) in 1998, (1.4%) in 1999, (-0.9%) in 2000, (2.9%) in 2001, (4.2%) in 2002, (2.3%) in 2003 and (2.5%) in 2004. Source: the Lebanese Ministry of Finance.

[15] The five countries that preceded Lebanon were Cambodia, Bolivia, Angola, Zaire and Georgia.

Figure 1.6: Dollarisation of Private Sector Deposits

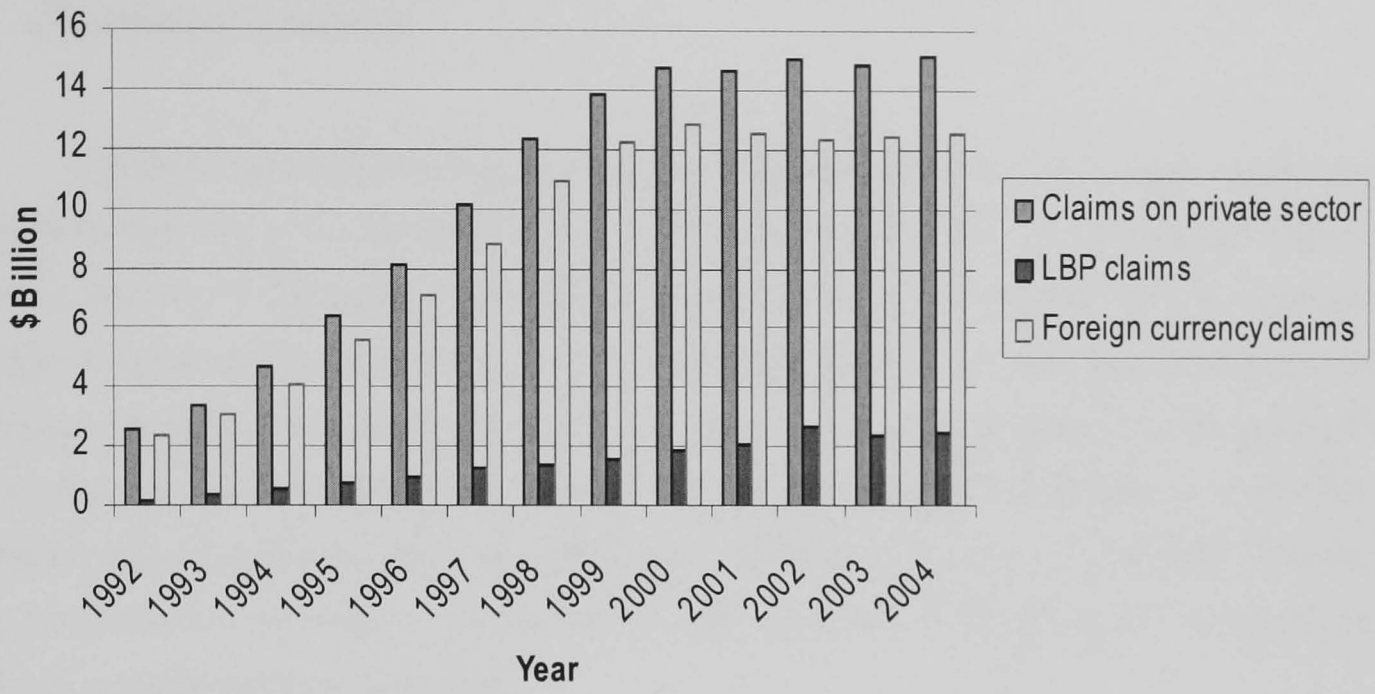


1.3.3.2 Dollarisation of Loans

The high dollarisation of deposits is accompanied by high loan dollarisation. Lebanese banks tend to practice a very conservative policy to avoid foreign exchange risk although this risk is under the control of the central bank. This policy aims at decreasing the FOREX risk by decreasing the share of LBP loans to the private sector as shown in Figure 1.7. The dollarisation of loans is even higher than deposits rate, and it has not fallen below 80% during the period of study. Lebanese banks implement this policy although it reduces the interest income from the private sector lending, since LBP interest rates are higher than USD. Lebanese banks tend to use their deposits in LBP to invest in Lebanese T-bills, and the deposits in foreign currencies to make USD loans.

A final remark is that the dollarisation of domestic and foreign banks funds is similar and the proportion of foreign currency deposits and loans are almost the same for the two categories. For instance, at the end 2003 the percentage of interest-earning assets in foreign currencies was 62.81% for domestic banks and 64.59% for foreign banks. On the other hand, the percentage of interest-bearing liabilities in foreign currencies was 64.97% for domestic banks and 64.99% for foreign bank.

Figure 1.7: Dollarisation of Private Sector Loans



1.4 Motivations, the Importance of the Study and the Potential Extracted Lessons

The above general outlook and analysis of the Lebanese banking system allows us to understand the type of market under study. It is an emerging market with an advanced banking system, which is in fact more advanced than all the other sectors of the economy. This banking system is subject to the international standards of banking practices, from regulation to capital solvency standards, to accounting and disclosures etc. It is open to foreign banking and the investment in domestic banks is allowed. A considerable number of Lebanese banks have presence abroad under the form of subsidiaries, branches or representative offices. Besides, the consolidation of banks is "welcome" by the regulatory authorities and incentives are offered to banks that wish to merger.

What is important about such a case study? And what are the lessons that we can conclude from studying a banking sector like the Lebanese banking sector? Primarily we were interested in analysing three different topics in banking: (1) Bank Performance, (2) Bank Capital, and (3) Bank Mergers. In order to extract useful lessons from our research, we have to implement an appropriate case study with specific characteristics that help doing so. We believe that the characteristics of the Lebanese banking sector allow the extraction of many conclusions regarding the three topics that will be subject to empirical analysis. Firstly, the existence of considerable number and market share of foreign banks in Lebanon permits the comparison between the profitability of foreign banks operating in a market and the domestic banks of that "host" market. Secondly, again this existence of foreign banks in Lebanon allows analysing the capitalisation differences between them and the domestic banks. Moreover, the change in capital requirements that occurred in 1999 adds another motive for implementing this case study because we are interested in knowing the reaction of banks to new capital regulation, taking into consideration the ownership factor (i.e. domestic vs. foreign). Finally, regarding the bank mergers topic, Lebanon has witnessed the largest number of bank consolidations among the emerging markets. Therefore, it could provide a sufficient sample that when analysed, gives a picture of the motives and the consequences of bank

consolidations in emerging markets. Now, considering the research questions/hypotheses, the motives behind them are the following.

In the first chapter (Bank Performance) we look at the performance differences between the domestic banks of an emerging market and the foreign banks operating in it. It is known – according to the literature – that foreign banks are more efficient than domestic banks due to several factors, such as their corporate governance amongst others. Most of the literature stops at this point: the efficiency differences (and their determinants) between domestic and foreign banks. Therefore, there are many other issues that do not have an empirical support. Among these things could be the following: could this efficiency superiority be translated in better profitability? [16] Besides, there are many other issues that could represent an interesting subject to investigate, and do not have any empirical evidence so far. These issues could be, for instance, (1) the effect of foreign ownership on domestic banks profitability, (2) the profitability differences between the subsidiaries of foreign banks and the domestic banks with foreign control, and (3) how the profitability of domestic banks and foreign banks is determined (similarly or differently?). In the first chapter of this thesis we will analyse these points empirically and try to find an answer for each of them. Lebanon is a good case study to investigate these issues since it has a significant presence (as mentioned before) of foreign banks, where almost half of the banking sector is dominated by foreign banks.

In the second chapter (Bank Capital) we firstly follow the literature in analysing the determinants of bank capital. The literature has suggested several theories regarding bank capital and its determinants. We pool a group of domestic banks and foreign banks operating in the Lebanese banking sector for a period of 11 years and we find that these theories do hold. But what if we take into consideration some factors that could have an effect on the decision of banks to set their capital? We assume that these theories are applicable in certain conditions only, where some factors like the ownership of banks may prove the inapplicability of these theories or even lead to different ones. Thus, it is interesting to investigate if a domestic bank

[16] The first impression could be that better efficiency SHOULD be translated into better profitability. However, there are other factors that could offset it, e.g. the better knowledge of the market, the concentration etc. This issue will be explained in detail later.

sets its capital differently from a foreign bank and thus, whether the same theories on banking could be applicable for the two groups of banks indifferently. The main question regarding this issue is: what the determinants of a bank capital are, taking into consideration the differences between a domestic bank and a foreign bank.

Another important issue regarding bank capital that the second chapter of this thesis will tackle: how banks react to newer – tighter – capital requirements. Again we do not have in the literature an empirical study that shows how banks react to new regulation, taking into consideration the ownership factor. We will try to fill this gap and find empirical evidence on how banks change their policy and "reshuffle their balance sheet items" to adopt the new capital requirement. We will try to find answers for these questions by analysing data on banks in Lebanon for the same reasons mentioned above.

In the third chapter (Bank Mergers) we will analyse the bank mergers experience in Lebanon. A considerable body of literature has analysed bank mergers in different developed markets, but this will be the first study on bank mergers in an emerging market. Lebanon has witnessed the most number of bank mergers among all the emerging markets and thus, it could represent a good case study for such a subject. The literature on developed markets has shown the motives behind bank mergers and their outcomes. We will try to find out if the factors that motivate banks to consolidate in a developed market are the same in an emerging market. Moreover, we will try to detect the outcome of bank mergers in emerging markets. Thus, this study will fill a gap on bank consolidations in emerging markets since. One last remark regarding our case study is that the data set that will be analysed contains a group of assisted mergers whereas all the other studies have tackled different sets of unassisted mergers.

This main body of the thesis is structured as follow:

1. An introductory chapter, which includes the overview of the Lebanese banking system.

2. Three empirical chapters, where each chapter tackles a different topic in banking. These three chapters are structured as follow: (1) each chapter will start by an introduction, (2)

followed by a review of the literature related to its topic, (3) from the literature we will extract the hypotheses that will be subject to empirical investigation, (4) an explanation of the methodology used and all the issues related to the specification of the models exploited, (4) an illustration of the data used and some analyses where this may help understanding better the empirical findings, (5) the empirical results and the interpretation of these results, (6) the conclusion of the chapter, (7) a summary of the empirical studies cited in the review of the literature, and (8) the appendices of the chapter.

3. The conclusions of the thesis and the value added of this study.

2 Chapter Two: The Determinants of Domestic and Foreign Bank Profitability

Abstract

We analyse and compare the profitability of almost the entire population of domestic and foreign banks operating in the Lebanese market between 1993 and 2003. Almost half of the banks are "foreign", i.e. they are either subsidiaries of foreign banks, or domestic banks with foreign control. To control for the effect of bank ownership on performance, we split the sample into three categories: (1) domestic banks with domestic control, (2) domestic banks with foreign control, and (3) foreign banks. We find that foreign banks were more profitable than all domestic banks regardless of their ownership control, i.e. whether domestic or foreign. This may suggest that it is better for a multinational bank to establish a subsidiary/branch rather than acquiring an "existing player" in the host country. We also find that although they operate in the same market, domestic banks' and foreign banks' profitability determinants are different, i.e. factors that are important in shaping domestic banks' profitability are not necessary important for foreign banks and vice versa. Finally, we found that foreign banks are less affected by the macroeconomic factors of the host country than domestic banks.

2.1 Introduction: the Expansion of Foreign Banks

Banks expand their operations internationally by establishing subsidiaries and branches or by taking over established foreign banks. This internationalisation of banking systems has been encouraged by the liberalisation of international financial markets. The increased presence of foreign banks in host markets raises two issues: (1) the effect of this presence on domestic banking systems and (2) the competition inequalities and differences in performance between foreign and domestic banks. The entrance of foreign banks may improve the quality and availability of financial services in the host market by increasing competition, enable better application of modern banking skills and technologies, encourage the development of the bank supervision and legal framework, and enhance a country's access to international capital markets. Claessens et al. (2001) argue that while foreign banks have lower overhead expenses, profitability and interest margins than domestic banks in developed countries, the opposite is true in developing ones. Besides, they found that the increased presence of foreign banks is associated with reductions of profitability, non-interest income and overall expenses of domestic banks and the competitive pressure from foreign banks leads to positive efficiency effects at domestic banks. Lensink and Hermes (2004) also claim that the entrance of foreign banks motivates domestic banks to enhance their efficiency and increase the diversity and quality of financial services in order to retain their market share. Additionally, foreign bank entry is associated with falling costs, profits and interest margins of domestic banks especially at higher economic development. Foreign bank entry also raises worries of destabilising effects especially in emerging markets, where a fast external financial liberalisation can be seen as a potential trigger for financial instabilities, and where relatively inefficient domestic banks may not be able to withstand competitive pressure, resulting in bankruptcies (Buch and Golder, 2001). This instability, according to Song (2004), could occur if foreign banks shift funds suddenly from one market to another for risk management purposes.

It is interesting to analyse foreign bank performance, what determines it and how it differs from domestic bank performance. The different structure and characteristics of foreign and domestic banks on one hand, and the different influence of external factors on these banks on the other, could lead to performance differences between the two categories. Empirical

analysis of foreign and domestic bank performance will illustrate if the two groups of banks perform differently and the reasons behind the difference (i.e. the factors causing it). This may help clarify the necessary conditions for successful entry of multinational banks into foreign markets, and on the other hand, could assist in developing a regulatory framework for foreign bank entry and expansion. The Lebanese banking market has a substantial foreign bank presence. Foreign banks are almost half of the number of banks operating in the Lebanese market, and thus provide a good test case for understanding how and why bank performance varies according to ownership.

The Lebanese banking sector has a long history of foreign participation. After the First World War and until the independence in 1946, the banking system in Lebanon was dominated by the presence of foreign banks, and a great proportion of funds was deposited with foreign banks abroad. These foreign banks focused on the financing of the foreign trade, leaving domestic financing to domestic banks. Starting with independence and continuing with the establishment of the central bank (Banque du Liban) in 1964, the banking system in Lebanon has witnessed continuous progress and rising prosperity. This development has promoted the establishment of more domestic banks, which has lead to a reduction of differences between foreign and domestic banks. The former lost their overwhelming monopoly power and the domestic banks became important players in the market. The Lebanese banking system remains very open to the entry of foreign banks and the acquisition of domestic banks by foreign banks/investors is permitted. At the end of 2003, 63 banks were operating in Lebanon. Among them, 21 were foreign banks (33% of banks) and 8 banks (13% of banks) were domestic banks with foreign control (i.e. majority foreign ownership), which leaves only 54% of banks with domestic control (total or majority control). Moreover, foreign banks control a considerable stake in the banking sector. For instance, among the top 10 banks (in terms of assets), the 5^{th} and the 8^{th} were foreign banks, the 6^{th} and the 9^{th} were domestic banks with foreign control. In terms of deposits, the 5^{th} and the 9^{th} were foreign, the 6^{th} and the 8^{th} were domestic with foreign control. All these four banks controled about 30% of the assets and of the deposits among the top 10 banks.

2.2 Foreign Bank Entry and Expansion: Determinants

A wide number of empirical studies have analysed the motives behind foreign bank entry and expansion. The aim was to understand why multinational banks "target" a certain market to establish subsidiaries, branches or representative offices, and the characteristics of bank "exporter" country and those of an "importer". On the other hand, the literature has tried to detect the differences between domestic and foreign banks in terms of structures and organisation and thus, if they should be subject to different regulation.

On the determinants of foreign bank entry in the United States, Goldberg and Saunders (1981) and Hultman and McGee (1989) found that interest differential between the U.S. and foreign deposits and loans is the most important factor determining foreign bank presence and growth in the U.S. Grosse and Goldberg (1991) claim that foreign investment in the United States, foreign trade with the United States, and the size of the banking sector in the foreign country are positively correlated with the country's bank presence in the United States. They also found that, the greater the country risk of the source country, the more foreign banking appears to be allocated to the (relatively low-risk) U.S. market. Fisher and Molyneux (1996) replicated Grosse and Goldberg (1991) on the determinants of foreign bank entry and activity in London. They find firstly that banks' market size is one of the most significant factors of the origin country, suggesting that countries with large banking markets have the largest banking presence in London. They found additionally that a more stable country environment appears to attract foreign banks, implying that banks whose home countries are more risky than the UK will have more tendency to conduct business through London. Finally, they found that there is a strong relationship between the level of trade and foreign bank presence in London. Brealey and Kaplanis (1996) found a positive correlation between the size of a foreign bank and the GDP of its home country. Moreover, the GDP of the parent country is more important than the GDP of the host country in determining the size of the foreign bank. They argue that large economies are large exporters of banks. Williams (1998) studied the factors that distinguish between domestic and multinational banks operating in Australia, and the effect of these factors in determining the profits and size of foreign banks in Australia. He found that the size of the parent bank in the home country has a positive and significant effect

on the size of the foreign bank. Also, Wright (2002) has the same finding: the size of the parent bank has a positive and significant effect on the subsidiary's size and the larger parents have larger subsidiaries in Australia. Clarke et al. (2001) say that banks that expand abroad are characterised by large size with large home-market share and superior efficiency. Minh and Tripe (2002) analysed the factors affecting the size of foreign bank subsidiaries in New Zealand. They found that the parent bank's size and its profitability have a positive impact on the foreign bank size: larger and more profitable multinational banks have the larger foreign subsidiaries in New Zealand. They also tested the effect of long-term presence of a foreign bank in a local market on its size and found that it has indeed a positive and significant effect on the size of its subsidiary, indicating that the specific experience of operating in a local market is an important factor in determining foreign bank's size (and profitability). On the decision of establishing a branch or a subsidiary in the host country, Ball and Tscheoegl (1982) analysed the effect of the parent bank's experience at operating internationally, its knowledge of the host country, the home country specific advantages and the distance between the host country and the parent's bank headquarters. They found that if the parent has already a presence in the host country, the other three factors were not important. Finally, Magri et al. (2004) studied the determinants of foreign bank entry and activity in Italy. Their results show that: (1) trade has a positive effect on foreign bank entry and it influences both the entry decision and the activity level of foreign banks, (2) banks come mainly from larger countries with more developed financial systems, and (3) the difference of interest spreads (defined as loan rate minus interest rate on short term Government bonds) between Italy and the country of origin has a strong positive effect on the entry decision into Italy. They argue that foreign bank entry seems to be strongly influenced by the possibility of arbitrage between interest rates. From the above-cited studies, it seems that foreign banks are affected by their home macroeconomic factors more than those of the market where they operate. Hence, we propose the following hypothesis:

H1: foreign banks are affected by their parent bank's market macroeconomic factors (e.g. GDP and inflation) more than those of the host market.

The level of openness of the host country affects the presence of foreign banks. Parkhe and Miller (1998) examine how banking regulations and the banking system development of a host country influence U.S. banks' preferences for organisational form in that country. They found that a bank's size, globalisation, product diversity and charter value influence organisational form preferences. They found a positive relationship between banking system development and the percentage of subsidiaries for larger banks and more internationalised banks, and that more global banks establish a higher percentage of subsidiaries in host countries with high banking system development than in countries with low banking system development. Additionally, they argue that there is a negative effect of banking system development and regulation for low size banks and low global banks. Dopico and Wilcox (2001) claim that countries that were more economically liberal as measured by (1) their openness to foreign banking in the past, (2) by their currently permitting banks to undertake more activities, and (3) by their involvement in international trade, tend to have more foreign banks. Moreover, they found that countries that had smaller domestic banking sectors (relative to their own GDP) tended to have more foreign banks.

2.3 Foreign Bank Efficiency and Profitability

The structural and organisational differences between foreign and domestic banks may have implications for differences in cost structures and scale and scope economies. These differences result from different management strategies, differences of the markets they serve (i.e. retail, corporate, etc), knowledge of the local market, international synergies, and regulation. A parent company of a foreign bank can provide its subsidiary with access to international markets, international diversification, and access to low-cost funds. These factors represent benefits for the foreign subsidiaries with cost advantages. However, a lack of familiarity of the foreign bank's parent company with the nature and features of the local markets, and difficulties with adaptation of home country strategy into the local markets may obstruct its development. A final remark is that foreign banks operating in a host market are subject to two processes: the first is due to their ownership by a foreign multinational bank and

the second is due to their participation in the host banking system. [17] In this study, we will put these processes into a single model to explain foreign bank profitability in Lebanon. In the following section, we will examine the literature and extract several hypotheses that will be subject to empirical investigation.

There are two types of evidence on foreign bank efficiency in comparison with domestic banks, according to the market studied. Studies that had focused on developed markets found that foreign banks do not have efficiency superiority: they have less or the same efficiency as domestic banks. For instance, DeYoung and Nolle (1996) argue that foreign banks operating in the U.S. were significantly less efficient than domestic banks. Although there was little difference between the two sets of banks in terms of output efficiency, foreign banks had a distinct disadvantage in terms of input efficiency, primarily driven by excess expenditures on purchased funds. Elyasiani and Mehdian (1997) studied the production efficiency of domestic and foreign banks in the U.S. They used linear programming techniques and found that foreign and domestic banks were operating under different technologies, however, foreign banks were as efficient as the domestic banks relative to their respective group-specific frontier. Elyasiani and Rezvanian (2002) investigate the efficiency difference between the cost structures and the cost economy characteristics of foreign banks and domestic banks in the U.S. Their results indicate that although the cost structure of the two categories of banks are different, scale and scope economy measures derived for the two groups, relative to own-group cost structure, are not significant. Regarding the less developed countries, the results were different. Sturm and Williams (2004) compared the efficiency of foreign owned-banks operating in Australia with Australian domestic banks. They found that foreign banks were more input efficient than domestic banks, mainly due to superior scale efficiency, however, this did not result in superior profitability. Bongini et al. (2001, 2002) used foreign ownership data to predict financial distress and closure of financial institutions in the East Asian financial crisis. They found that foreign-owned institutions tend to be more efficient and less risky than domestic institutions due to their corporate governance and operational structures, or sometimes because they were more diversified. Unite and Sullivan

[17] For more details regarding foreign bank supervision, see Song (2004) who presents an important study about the division of responsibilities between the home and the host countries and the co-operation between banking supervisors.

(2003) studied the effect of foreign ownership on Philippines banks and found that the entry of foreign banks leads to a decline in operating expenses and an increase in domestic banks' risk. They claim that due to the foreign bank entry, domestic banks are forced to take on less creditworthy customers due to the increased competition. Finally, Detragiache and Gupta (2004) examined the experience of Malaysia during the crisis of 1997 and provided evidence on the performance of foreign banks during extreme financial fragility. They found that foreign banks (particularly those with operations not concentrated in Asia) had relatively low non-performing loans, and their profitability and capitalisation even improved during the crisis. Additionally, foreign bank lending and deposits contracted less than for domestic banks.

From the above-cited studies it is clear that foreign banks are (on average) more efficient than domestic banks, however, there is no clear evidence about the difference in profitability of the two groups of banks. We will try to find out if (and why) there is a difference in profitability between the two categories. We presume that better efficiency could be translated into higher profitability and hence we propose the following hypothesis, and we will test it empirically later:

H2: in an emerging country, foreign-owned banks have higher profitability (ROE and/or ROA) than domestic banks.

Peek et al. (1999) compared the performance of acquired banks in the U.S. post-acquisition. They divided acquired banks (the targets) into four categories: the first and second categories contain domestic banks acquired by foreign banks and domestic banks, respectively. The third and fourth categories contain foreign banks acquired by foreign banks and domestic banks, respectively. They found that domestic banks acquired by foreign banks have the lowest performance among all groups. They argue that the reason could be that foreign banks acquire domestic banks that already perform poorly (as shown by their low ROA), that have low capital ratios and poor loan quality. The motivation for such a strategy is that poor performers provide a relatively low-cost entry vehicle, and the new management would then attempt to improve the long-run performance of the target. After the acquisition, targets' capital ratios improve, but their non-performing loans and past-due loans rise sharply

and their ROA deteriorates compared to other targets. Nine quarters post-acquisitions, these banks have significantly fewer non-performing loans and much higher capital, although they remain less profitable than domestically owned targets. We base on these findings and hypothesis *H2* to assume that domestic banks acquired by foreign banks/investors have lower profitability than the subsidiaries of foreign banks, and we propose the following hypothesis:

H3: subsidiaries of foreign banks have higher profitability than domestic banks acquired by foreign banks/investors, even in the long run. [18]

Williams (1998) studied the determinants of profitability of foreign banks operating in Australia, and focused on factors related to their home countries. He found a negative effect of the size of the parent bank on foreign banks' profitability, whereas home net interest margin and home GDP show some positive effect on foreign banks' profitability. Williams (1996, 1998) found that foreign bank profitability in Australia is a positive function of the Australian net interest margin and fees. Molyneux and Seth (1998) modelled the determinants of foreign bank profitability in the U.S. They found that capital strength, assets composition, commercial and industrial loan growth, and U.S. GDP growth were important factors in determining foreign banks' ROA. They found that profitability appears to be inversely related to banks' loans-to-assets ratios, which implies that foreign banks that dedicate a larger proportion of their business to securities have relatively higher returns. For ROE, they found that capital strength was the most important factor. Minh and Tripe (2002) investigated the determinants of foreign bank profitability in New Zealand and focused on the effect of their home factors. They found that: firstly, the size and the profitability of the parent bank have a positive effect on the profitability of its subsidiary operating in New Zealand, indicating that larger and more profitable multinational banks earn higher profits in New Zealand. Second, the specific experience of operating in New Zealand is the most important factor determining a foreign bank's size and profitability in New Zealand. Third, the relative capital scarcity in New

[18] The motive behind testing this hypothesis is to find out if it is better for a foreign bank to establish a subsidiary or to acquire a bank in the host country. It could be faster for a multinational bank to enter a foreign market by acquiring an "existing player", but it could be better to establish a subsidiary or a branch.

Zealand compared to the home countries (as reflected in interest rate differentials) affects negatively bank's ROA. [19]

Domestic banks are mainly affected by domestic variables and their profitability is influenced by factors related to their market (among these factors are – of course – the characteristics of these banks). The last cited four studies and the studies cited to develop the first hypothesis (*H1*), suggest that foreign banks and domestic banks are affected by the internal factors at varying degrees. We build on this to argue that foreign banks' and domestic banks' profitability are determined "differently" and hence they should implement different strategies in order to maximise it. We propose the following hypothesis:

H4: the profitability determinants of foreign banks are different from those of domestic banks and hence, the strategy adopted by foreign banks to maximise their ROE and/or ROA should be different from those implemented by domestic banks.

2.4 Measuring Bank Performance: the Return on Equity Model

The most popular model for evaluating firm performance is the "return on equity model". Return on equity (ROE) is a measure of the rate or return flowing to the bank's shareholders. It represents the net benefit the shareholders receive from investing their capital in the bank, i.e. placing their funds at risk in the hope of earning an appropriate profit. So ROE measures the profitability from the shareholders perspective, and it measures bank accounting profits per dollar of book equity capital. ROE is defined here as net income divided by average book value of equity. Return on assets (ROA) is an indicator of managerial efficiency and it shows how the bank's management converted the institution's assets under their control into earnings. ROA is defined here as net income divided by average book value of assets. [20] ROE is linked to ROA by the equity multiplier (EM), which is equal to total assets divided by total

[19] They argue that as the interest rate differential widened, the relative cost of New Zealand liabilities increased, with negative impacts on the growth of foreign banking in New Zealand and therefore on foreign banks' profitability.

[20] In some other cases, ROA is calculated by adding the after-tax interest to the numerator. We did not use this methodology due to the lake of some needed information for some banks. However, the comparison of the results

equity (the inverse of the equity-to-asset ratio), or average assets divided by average equity. A bank's equity multiplier compares assets with equity, where high EM ratio indicates a large amount of debt relative to equity. Thus, EM measures the bank's financial leverage and represents both a profit and a risk measure: profits measure because it has a multiplier impact on ROA to determine a bank's ROE, and a risk measure because it reflects how many assets can go into default before a bank becomes insolvent (Sinkey 2002, p 131). ROE and ROA are linked by the following equation:

$$ROE = ROA \times EM \tag{2.1}$$

2.5 Profitability Determinants: Control Variables

What are the factors that maximise a firm's value? In other words, what are the factors that influence its profitability? Several factors affect the revenues that banks earn from assets and pay on liabilities and therefore, their net income flows. The profitability and changes in profitability of a bank (regardless of its ownership) are determined by two sets of variables: Internal variables and External variables. The internal variables are related to the bank itself and they are planned according to the management decisions. The external variables are an outcome of the environment where the bank is operating. Our purpose is to separate these two effects and determine their degree of importance on foreign and domestic banks. We assume that the relationship between ROE and ROA and the variables that determine them can be described by the following equation:

$$Y = aX + bZ + \varepsilon \tag{2.2}$$

where Y is the bank's ROE/ROA, X is a vector of internal variables and Z is a vector of external variables and ε is an error term.

Among the internal variables, we cite the size of the bank, its investments, its off-balance sheet activities, efficiency, ownership structure, etc. On the other hand, the main external variables that affect the bank's profitability are: macroeconomic conditions, market demand and supply conditions, cost of inputs, concentration and competition, regulation (or

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for some banks using the two methods does not show significant differences. Therefore, we will use the ROA as explained above.

deregulation) concerning capital and liquidity requirements, etc. In the following, we will shed light on the findings of the literature regarding the determinants of bank profitability.

2.5.1 Size Effects

Many studies have argued that a large size allows banks to enjoy scale and scope economies. Scale economies can be achieved by maximising bank's outputs and reducing the "per unit cost" and scope economies can be achieved by joint production and marketing. Large banks are less affected by changes in business environment and can react more effectively to protect themselves from shocks that would affect the profitability. Humphrey and Pulley (1997) found that in response to interest rate deregulation on U.S. banks in the early 1980s, which sharply raised banks costs and lowered their profits, large banks reacted more effectively by changing their output prices and input use. On the other hand, smaller banks responded with few major adjustments and instead relied on the improved business environment to stabilise their profitability. DeYoung and Hasan (1998) investigated the determinants of profit efficiency of banks by testing a set of economic, regulatory, structural and financial variables on new and established U.S. banks. They found that size had a positive impact on banks' profitability. Unite and Sullivan (2003) found that size has a positive impact on profits and non-interest income, and a negative impact on operating expenses. Rime and Stiroh (2003) analysed scale and scope economies for Swiss banks between 1996 and 1999. They found that the size of banks has a positive impact on ROE (but a negative insignificant effect on ROA).

2.5.2 Off-Balance Sheet Activities

Off-balance sheet activities represent another source of income for banks and, therefore, they should be considered as a determinant of bank profitability. Clark and Siems (2002) investigated the statistical and economic importance of including off-balance sheet activities when estimating U.S. bank cost and profit X-efficiency measures. Their tests provided strong support for including off-balance sheet activities in X-efficiency studies, where the results demonstrate that such activities increase the cost-efficiency estimates.

Cebenoyan and Strahan (2004) tested the effects of on- and off-balance sheet items on banks' ROE. They found that interest rate derivatives contracts (as a proxy for bank management of market risk) has a positive effect on ROE (but a negative effect on ROA). Additionally, they found it to have a positive influence on the volatility of ROE and ROA.

2.5.3 Deposit Growth Effects

Deposits from the public represent the main source of funding for banks. A bank with more deposits is able to allocate more funds for loans and investments and, hence, increase its revenues. Empirical studies have found a positive influence of deposits and deposit growth on banks' earnings. For instance, Swindle (1995) tested the correlation between a set of balance sheet items of a sample of U.S. bank holding companies. He found that the largest correlation was between deposit growth and ROE, which means that banks that had higher deposit growth enjoyed higher profitability. Gonzalez-Hermosillo (1999) studied the effect of deposits on bank failures in the U.S. and two emerging markets: Mexico and Colombia. His findings show that larger deposits from the public lower the probability of failure and increase bank's survival time.

2.5.4 Loans Effects

Kwast and Rose (1982) examine the relationship between bank profitability and operating performance. They tested the influence of real estate loans, commercial and industrial loans, consumer loans and "other loans" on bank's total income and net income and found that all the types of loans have a positive and significant effect on profitability.

2.5.5 Capital Requirement Effects

Capital requirements generally oblige banks to hold more equity than they would hold voluntarily. Therefore, these requirements represent an external constraint on banks' operations, which may affect their profitability negatively (at least in the short run) and/or growth. On the other hand, banks with high level of capital adequacy may compensate their

allocation of high (costly) capital by lowering their funding costs. Therefore, capital requirements and higher capital levels may imply two scenarios:

Scenario1: capital requirements => lower ROE

Scenario 2: capital requirements => higher ROE

Regarding the first scenario, Brinkmann and Horvitz (1995) found that Basle capital requirements had forced banks with low capital-to-asset ratios to cut back lending (and lose the opportunity of more revenue). Besides, due to these capital requirements, banks with low ratios increased their total assets faster than loans, whereas banks with higher ratios had loans grow at a faster rate than assets. Peek and Rosengren (1995) show that regulatory restrictions seriously limit the credit available from local lenders, and lead to shrinkage of both bank loan portfolios and bank lending. Chiuri et al. (2002) tested the effects of the introduction of capital adequacy rules on bank lending policies in emerging markets and provided some evidence of a negative impact of minimum capital requirements on banks lending. The enforcement of capital adequacy requirements has had a negative effect on the supply of bank loans, and the effect tends to be stronger for less well-capitalised banks.

For the second scenario, Berger (1995) claims that higher capital adequacy is followed by higher earnings due to the following reasons: (1) Higher capital-to-asset ratio (CAR) may cause higher ROE if it reduces risk-related barriers to entry or expansion into more profitable activities (e.g. OBS activities). (2) Safer banks are able to borrow uninsured funds more easily to take up on-balance-sheet investment opportunities with high revenue. (3) An increase in CAR raises the expected ROE by lowering interest expenses on uninsured debt. (4) Capital may affect earnings through operating costs. For instance, when a bank is not fully cost efficient, a change in CAR increases the pressure on management to reduce operating costs to offset the higher financing costs. Empirically, Berger (1995) found that for U.S. banks there was a positive relationship between capital and earnings and that each variable positively Granger-caused the other: an unexpected increase in capital tended to be followed by an increase in earnings and vice versa. In addition, Bourke (1989) tested the profitability determinants of a sample of banks from North America, Europe and Australia and found that capital ratios affected their profitability positively. They claim that well-capitalised banks

enjoy access to cheaper sources of funds or that the prudence implied by high capital ratios is maintained in the loan portfolio with consequent improvement in profit rates. Molyneux and Thornton (1992) replicated Bourke's methodology using European banks and found that capital ratios were positively correlated to profitability. Rime and Stiroh (2003) found that for Swiss banks, excess capital [21] had a positive and significant correlation with ROA, ROE, and the standard deviation of ROE. Cebenoyan and Strahan (2004) found that the capital-to-risky asset ratio has a positive and significant impact on ROA, but a negative (insignificant) impact on ROE. In addition, they found that this ratio had a negative and significant effect on the volatility of ROA and ROE.

2.5.6 Liquidity and Reserve Requirement Effects

This variable is another proxy for regulation and its effect on banks' profitability and its impact is not clear. Studies that had tested the impact of liquidity requirements found different results. For instance, Kwast and Rose (1982) detected the influence of reserves on banks' profitability and found that liquidity has a positive effect on total income, operating income, and net income. Bourke (1989) also found liquidity ratios to be positively related to profitability. He claims that these results were not expected, as liquidity holdings (particularly if imposed by authorities) represent an expense to banks. Conversely, Molyneux and Thornton (1992) found that liquidity ratios had a negative effect on profitability and liquidity holdings represent a cost to the bank.

2.5.7 Credit Risk Effects

According to Spahr (1989), Gonzalez-Hermosillo (1999), and Kolari et al. (2002), credit risk and assets quality is an important predictor for insolvent institutions that usually have large proportions of non-performing loans (NPLs) prior to failure. Berger and DeYoung (1997) found that NPLs have a negative and significant effect on short-term efficiency. They argue that, when loans become past due or non-accruing, operating costs rise because of the difficulty in dealing with these loans. In addition, high levels of problem loans cause banks to

[21] Defined as available capital less required capital divided by required capital.

increase spending on monitoring, working out and/or selling-off these loans. Also DeYoung and Hasan (1998) found that the relative NPL ratio had a negative impact on banks profitability.

2.5.8 Treasury Bills Investments

Capital requirements and the implementation of the risk-based capital have a direct effect on banks' investment decisions, since they have to allocate private funds for each type of assets. Capital adequacy rules require much higher capital levels for loans to the private sector than for those to the public sector. So the enforcement of these rules may cause a shift in banks' assets from investments that require high capital (e.g. commercial loans) to those that require less capital (e.g. treasury bills). This reallocation of assets allows banks to hold less (costly) capital.

2.5.9 Interest Rate Spread

The interest margin [22] is an important determinant of banks' profitability, and its increase leads to higher profits for banks. More generally, large interest margins may enhance the degree of stability of the banking system as banks can increase their profitability and raise their capital. [23] The status of competition and concentration in a market has a direct effect on banks' interest rate spreads. When banks have a degree of market power, they tend to lower rates paid on deposits and raise rates charged on loans (i.e. higher IRS). Hannan (1991) shows that the loan rate decreases in absolute value of the elasticity of loan demand and increases with concentration. Conversely, the rate offered for each type of deposit decreases with concentration of the relevant deposit market. Saunders and Schumacher (2000) assess the effect of changing market structure (mainly due to bank consolidations) on NIM in the U.S.

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[22] Interest Rate Spread and Net Interest Margin will be used here interchangeably.

[23] Interest rate spread may reflect the riskiness banks. First, banks that have a high spread may be more risky. For instance, Gonzalez-Hermosillo (1999) claims that high yields paid on loans and thus high interest rate spread may mean that the bank is originating high-risk loans. Second, according to Soledad et al. (2001), a low interest spread may be a sign of riskiness. Their findings on Argentina, Chile and Mexico show that the interest rates respond to bank risk taking, and banks with a larger share of NPLs pay higher interest rates on deposits (i.e. low NIM). On

and Europe. Their results showed that due to restrictions on interstate banking and universal banking, the spread for the U.S. banks was by far the largest among all markets, suggesting that the competitive structure in the U.S. allows banks to have higher spreads than in all other European markets.

On the determinants of NIM, Zarruk and Madura (1992) claim that changes in capital regulation or deposit insurance premiums have direct effects on the bank's interest margin. They find that an increase in bank capital requirement or in deposit insurance premiums results in a reduced interest margin under non-increasing risk aversion. So, an increase in the capital-to-deposits ratio and an increase in the cost of deposit insurance reduce the optimal margin. Wong (1997) shows that the optimal bank interest margin is larger when the bank is risk averse than when the bank is risk neutral. Besides, the optimal bank interest margin is positively related to the bank's market power, its operating expenses, an increase in credit risk, and an increase in interest rate risk. Furthermore, an increase in the bank's equity capital has a negative effect on the spread when interest rate risk is small. Finally, Unite and Sullivan (2003) find that the interest rate spread is affected positively by the bank's capital level, and negatively by the size of the bank, GDP, inflation, and the reserve requirement.

2.5.10 Efficiency Effects

As a proxy for bank efficiency we will employ two variables: cost-to-income ratio and cost-to-average asset ratio. A bank that is not able to operate efficiently and control its costs will suffer from high expenses, high risk, low growth etc, and the consequence will be lower profitability.

2.5.11 Listing

Listing of bank shares on a stock exchange represents another motive for banks to improve their performance and increase their profits. Any announcement of profits (losses)

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the other hand, a rise in ROA, liquidity and capital adequacy reduces the interest rates charged by banks (i.e. high NIM). This means that risky banks pay higher interest rate for deposits and their interest spread (NIM) narrows.

will reflect positively (negatively) on bank's share (Docking et al.,1997). Hence, listed banks have a motive to enhance their profitability to avoid any capitalisation of negative announcements in their share price.

2.5.12 Ownership Structure Effects

In emerging markets, a large number of businesses (including banks) are characterised by a narrow family-ownership, and they mainly finance themselves by issuing stock to family members to avoid the dilution of their control. These banks could perform worse than those with institutional ownership because of the limited financial capability of their owners to afford costly technologies and even to boost the bank capital if needed. We claim that the ownership structure of a bank plays a crucial role in determining its performance. Testing the effect of institutional ownership on bank performance will be an original contribution since (according to our best knowledge) no empirical studies have provided evidence on this issue.

2.5.13 Concentration Effects

Concentration affects the degree of competition of a certain market. In more concentrated markets, banks may be able to increase the interest charged on loans and lower the interest paid on deposits. The literature is highly suggestive. For example, Kwast and Rose (1982) found that concentration affects positively and significantly U.S. banks' profits. Bourke (1989) also found a positive and significant effect of concentration on ROE (however, a moderate effect on ROA). Hannan (1991) showed that bank profits are a positive function of the level of concentration of each market in which the bank operates. Besides, an increase in concentration has a larger impact on the profits of a bank with more loans and deposits than a bank with smaller loans and deposits. He adds that changes in deposit market concentration have a bigger effect on ROA than do changes in loan market concentration. Neumark and Sharpe (1992) analyse the impact of market concentration on the adjustment of prices for consumer bank deposits. They find that banks in concentrated markets tend to be slower to increase interest rates on deposits (the six-month certificate of deposits and the money market deposit account) in response to rising open market rates. Conversely, these banks are faster to

lower interest rates on deposits in response to falling market interest rates. They state that when market interest rates fluctuate in either direction, the adjustment behaviour of banks in concentrated markets allows them to extract more surplus from depositors than banks in less concentrated markets.

2.5.14 Economic Growth

The national economic environment has a direct influence on banks' growth and profitability. In recessionary conditions, borrowers face difficulties and might find it hard to repay their debts to banks, which increases banks' credit risk and harms their profitability. Several empirical studies have found a direct effect of GDP growth on banks' profitability and bank failures. For example, Demirguc-Kunt and Detragiache (1999) analysed a sample of 36 markets (emerging and mature) and show that low GDP growth is associated with a high probability of a banking crisis. Berger et al. (2000) found that regional/macroeconomic shocks are strong determinants of banks stability and that banks are vulnerable to these shocks, whereas favourable economic conditions boost their profitability. Bongini et al. (2002) analysed the relation between micro- and macroeconomic variables and bank fragility in the East Asian countries and found a negative relation between GDP per capita and the failure of banks. Unite and Sullivan (2003) found that GDP growth had a positive impact on profits and non-interest income, and a negative impact on operating costs and credit risk (LLP-to-asset ratio). Salas and Saurina (2003) argued that better economic conditions lower loan loss. They found that GDP growth has a negative influence on Spanish banks' loan loss ratios.

The relationship between economic growth and financial sector development is in fact bi-directional. The literature has provided evidence about how economic growth and financial development affect each other. For instance, Calderon and Liu (2003) analysed the effect of economic growth on financial development and the effect of financial development on economic growth on a sample of developing and industrial countries. They found that: (i) financial development leads to economic growth in both groups, (ii) a bi-directional causality exists between economic growth and financial development, (iii) financial deepening contributes more to the causal relationships in developing countries than in industrial

countries, which implies that financial intermediaries have larger relative effects in less-developed economies, (iv) financial development enhances growth through more rapid capital accumulation and technological change. Smith (1998) examined the effect of concentration on the economy and claimed that an imperfectly competitive banking system can result in a bad macroeconomic outcome. Increased banking competition improves the efficiency of the financial system, which, in turn, improves the level of macroeconomic activity and reduces the severity of business cycles. But when banks have market power, even highly creditworthy firms may face a higher cost of financing.

2.6 Methodology

2.6.1 Model Specification

The variables affecting bank profitability and the equation relating ROE and ROA and their determinants as tested in equation (2.2) are as following: [24]

$$\begin{aligned} ROE_{it}(ROA_{it}) = {} & \beta_0 + \beta_1 SIZE_{it} + \beta_2 OBS_{it} + \beta_3 DEP_{it} + \beta_4 LOAN_{it} + \beta_5 CAP_{it} + \beta_6 LIQ_{it} \\ & + \beta_7 RISK_{it} + \beta_8 TBILLS_{it} + \beta_9 IRS_{it} + \beta_{10} CI_{it} + \beta_{11} CA_{it} + \beta_{12} LISTED_{it} + \beta_{13} OWN_{it} \\ & + \beta_{14} FOREIGN_{it} + \beta_{15} CONC_t + \beta_{16} GDP_t + \beta_{17} INFL_t + \varepsilon_t \end{aligned} \tag{2.3}$$

The data set under study is a cross-section and time-series (panel data). The first applicable estimation in such cases is Ordinary Least Squares (OLS). The banks included in our sample are widely dispersed in terms of efficiency and this factor has to be considered in our regression. The OLS method is not suitable in this case since it does not consider the firm-specific effect. The Fixed Effects method (or the Least Squares Dummy Variable, LSDV)

[24] Note that not all these variables will be included in one single model. We will test for the multicollinearity among the regressors and then, we will run regression models that do not include variables that together could cause any misspecification problem.

solves this problem and allows us to take into consideration the firm-specific effects on regression estimates. [25]

2.6.2 The Implication of Control Variables

Regarding the explanatory variables, we have employed the following. [26] Firstly, for foreign ownership, we define a bank as "foreign bank" if it has more than 50% of its equity under foreign control. Consequently, this will include domestic banks under foreign control and the subsidiaries of foreign banks. We proxy for this factor by a dummy variable (FOREIGN) that takes the value of 1 if the bank is "foreign", zero otherwise. The size (SIZE) of a bank will be utilised to control for scale and scope economies. Off-balance sheet activities (OBS), private sector loans as proportion of total assets (LOAN) and treasury bills as proportion of total assets (T-BILLS) are proxy for banks' investment opportunities/decisions. Costumer deposit growth (DEP) represents the growth opportunities/strategies. Capitalisation level (CAP) is employed to detect the effect of capital requirements on banks' profitability. Also the liquidity (LIQ) controls for the effect of reserve requirements on banks' profitability. RISK will control for the effect of credit risk on banks' profitability. The net interest margin (IRS) will control for the market power of banks. Cost-to-income ratio (CI) and cost-to-asset ratio (CA) control for the efficiency of bank management. For listed banks, we employ a dummy variable (LISTED) that takes the value of 1 if the bank is listed, zero otherwise. We test for the effect of institutional ownership on banks by employing a dummy variable (OWN) that takes the value of 1 in the presence of an institutional ownership in the bank, zero otherwise. To proxy for the effect the monopolistic behaviour of banks, we utilise the proportion of the top 5 banks' assets of the entire banking sector's assets (CONC). Finally, to control for the effect of the economic environment on banks' profitability, we exploit two variables: the GDP growth (GDP) and the inflation level (INFL).

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[25] Another applicable method is the Random Effects Model (The Generalised Least Squares) which besides incorporating the firm-specific effects, it takes into consideration the time effects. We will test for the appropriate model by performing the Hausman test later.

[26] For the calculation of the variables, see Appendix 2.B.

The expectations reported in Table 2.1 are based on the findings of previous empirical studies. The two variables reported with "?" have no a priori expectations, due to different results reported by different studies (CAP and LIQ). On the other hand, the expectation of the effect of the institutional ownership (OWN) is based on the rationale mentioned previously, again due to the lack of relevant empirical studies.

Table 2.1: The Expected Sign of Coefficients of Independent Variables

Variable	**Expected sign**
SIZE	+
OBS	+
DEP	+
LOAN	+
CAP	?
LIQ	?
RISK	-
TBILLS	+
IRS	+
CI	-
CA	-
LISTED	+
OWN	+
FOREIGN	+
CONC	+
GDP	+
INFL	-

2.7 Data

To estimate Equation 2.3, we use a panel data set for the Lebanese banks between 1993 and 2003, i.e. 11 years. Annual data (balance sheets and P&L accounts) are used for

almost all of the population of Lebanese banks. Few banks were dropped from the study because of lack of data. Data for some banks for some years were not available therefore we are analysing an *unbalanced* data set. The source of bank data is BilanBanques, and regarding the macroeconomic variables, we will use end of year figures (reported by the central bank of Lebanon) to be consistent with the year end banks' data.

Since our study focuses on the differences in profitability between domestic and foreign banks, we split the sample into three sub-samples according to their ownership: the first sub-sample contains domestic banks with domestic control, the second contains domestic banks with foreign control, and the third contains foreign banks. [27] The banks in the second and third sub-samples are clarified as Foreign Banks and this division allows us to compare two strategies for a multinational bank entering a foreign market: establishing a subsidiary from scratch or acquiring a bank in the host market. The following two figures show the evolution of ROE and ROA for the three sub-samples:

Figure 2.1: The Evolution of Banks' ROE (According to Ownership)

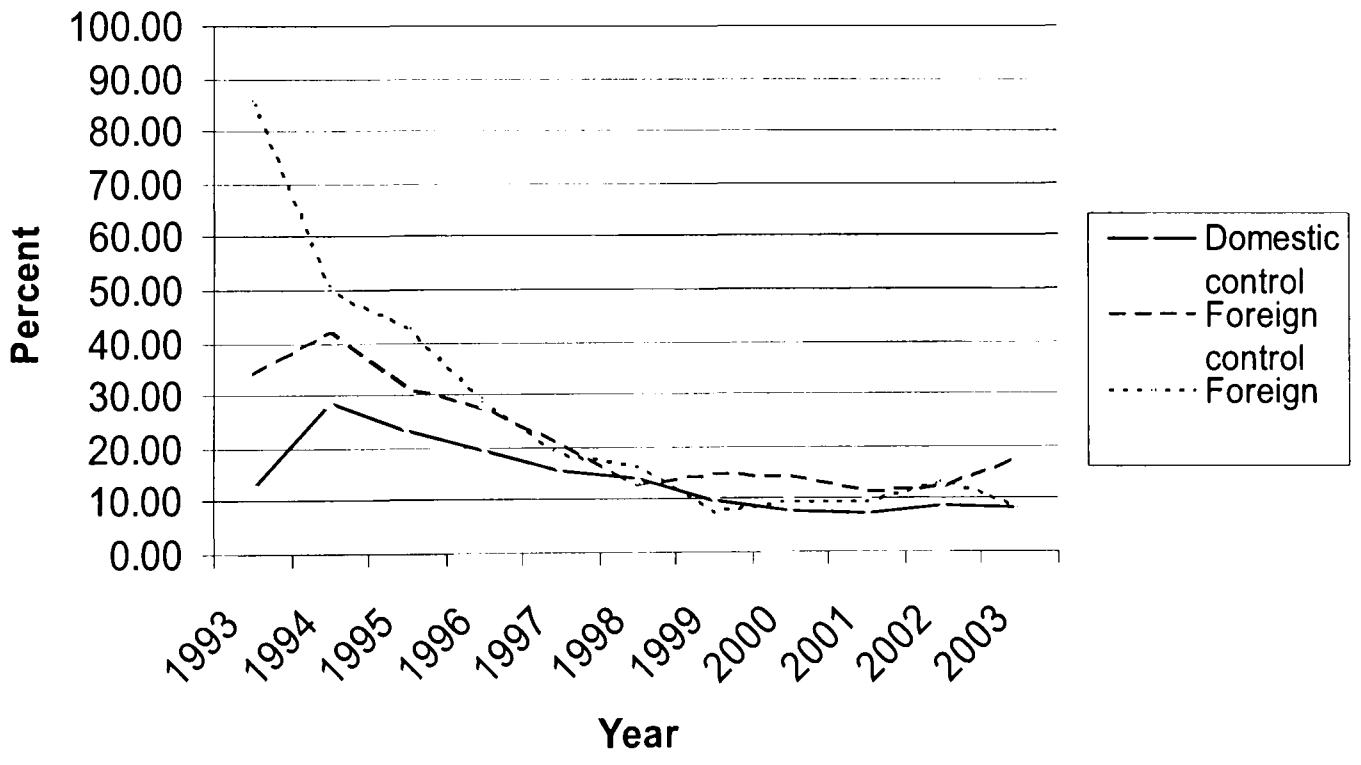
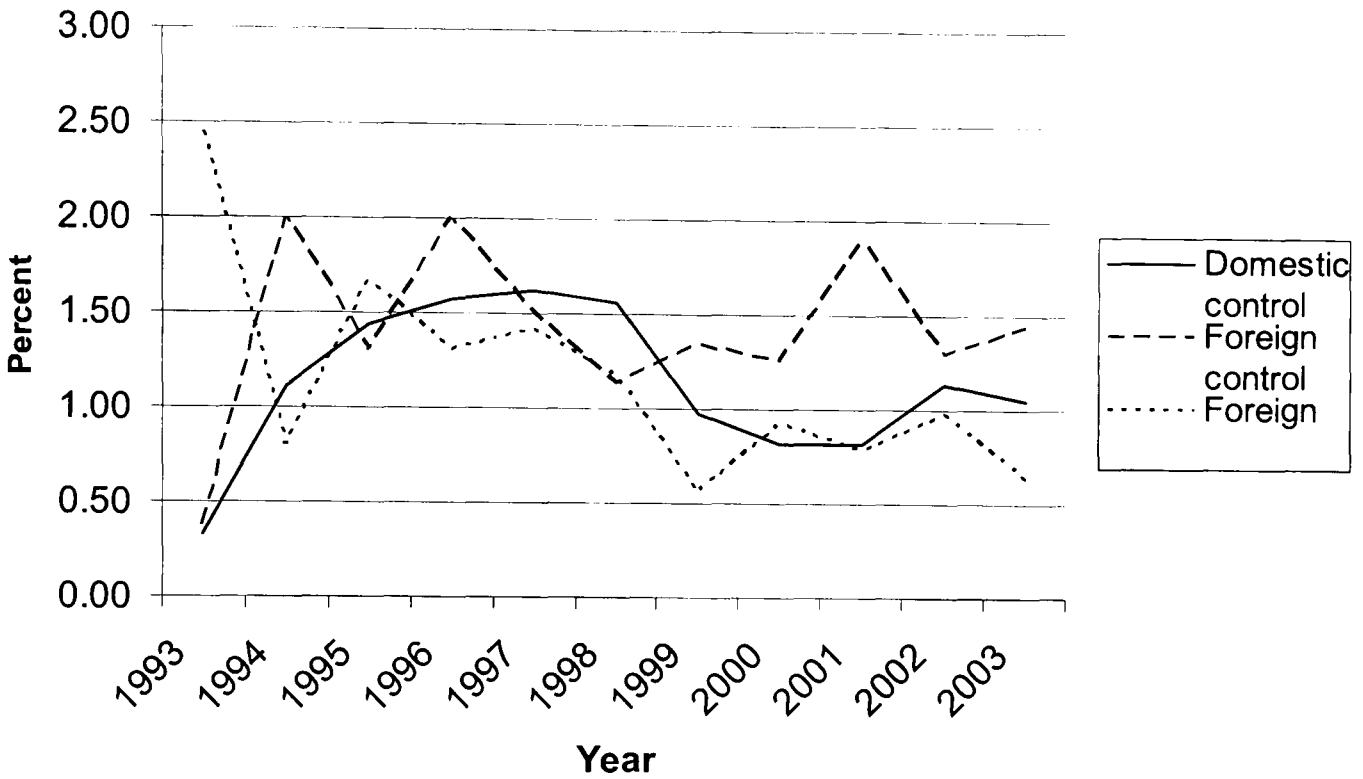


Figure 2.2: The Evolution of Banks' ROA (According to Ownership)



The ownership of a substantial number of Lebanese banks has changed since 1992, which has changed the structure of the banking sector and the market share of domestic and foreign banks (Table 2.2). Before 1992, domestic banks with domestic control and foreign banks dominated the market, whereas domestic banks with foreign control had a moderate share. Regarding the number of banks, the total number of banks has decreased from 72 in 1992 to 63 at the end of 2003. The major decrease was for domestic banks with domestic control due to 17 merger operations. On the other hand, 2 domestic banks with foreign control and 6 foreign banks were taken over. [28] Therefore, the percentage of domestic banks has decreased from 65% to less than 54%. At the same time, the foreign investment in the Lebanese banks has almost tripled during the same period, where several domestic banks where subject to foreign acquisitions.

Regarding the equity, we notice that domestic banks have raised their capitalisation and foreign acquirers have boosted significantly the equity of acquired banks. Conversely,

[27] None on the banks operating in the Lebanese market is publicly owned, i.e. owned directly by the government. Only one bank is owned by the central bank since the year 2000, when it took it over after it was insolvent. Therefore, our case study does not have public banks.
[28] Several other domestic and foreign banks have entered and exited the Lebanese market during that period.

foreign banks tended to lower their equity. Regarding the market share, domestic banks have grown faster than the other two groups and despite the decrease in their number, their assets and deposits have witnessed a growth. Foreign banks have lost an important share of deposits and loans. This decrease in foreign banks' market share during the period under study was mainly due to the acquisition of some foreign banks by other domestic banks, which has shifted the control of their assets to domestic banks. Therefore, this issue has decreased the market share of foreign banks and increased the market share of domestic banks.

Finally, in order to understand the data subject to analysis, we present some descriptive statistics for the period 1993-2003 in the following two tables. Table 2.3 contains the descriptive statistics for domestic banks, and Table 2.4 contains the descriptive statistics for foreign banks.

Table 2.2: Market Share of Banking Groups

	# of banks	Percentage of banks			Equity			Assets			Deposits			Loans		
		Dom.	Dom./ FC	For	Dom.	Dom./ FC	For	Dom.	Dom./ FC	For	Dom.	Dom./ FC	For	Dom.	Dom./ FC	For
1992	72	65.28	5.56	29.17	64.50	1.32	34.18	60.03	2.07	37.91	59.28	2.20	38.52	69.48	1.88	28.64
1993	72	63.89	6.94	29.17	68.98	1.44	29.58	61.87	2.13	36.00	60.77	2.25	36.98	68.11	1.91	29.98
1994	72	61.64	6.85	31.51	74.25	1.97	23.78	65.19	2.29	32.52	63.66	2.39	33.95	69.65	2.60	27.75
1995	71	59.15	8.45	32.39	75.55	2.56	21.89	67.24	3.13	29.63	65.05	3.32	31.63	68.94	2.72	28.34
1996	76	55.84	11.69	32.47	67.13	9.29	23.57	66.13	7.08	26.79	67.27	3.88	28.85	62.45	10.47	27.08
1997	81	56.41	10.26	33.33	72.71	8.07	19.21	69.07	5.49	25.45	70.38	2.28	27.34	65.91	9.56	24.53
1998	79	56.00	9.33	34.67	73.02	8.45	18.52	68.07	6.02	25.28	70.06	2.66	27.27	65.10	10.44	24.46
1999	73	53.42	9.59	36.99	72.19	9.11	18.69	68.10	7.54	24.36	69.91	3.77	26.32	63.13	12.15	24.72
2000	68	49.28	13.04	37.68	66.32	14.77	18.91	61.13	13.24	25.63	63.23	9.77	27.01	57.79	16.96	25.26
2001	69	47.69	13.85	38.46	67.64	14.80	17.56	62.93	15.74	21.33	64.90	12.54	22.56	57.79	20.31	21.90
2002	65	53.45	13.79	32.76	68.92	14.68	16.40	64.74	15.56	19.69	66.70	12.37	20.94	57.94	20.65	21.41
2003	63	53.97	12.70	33.33	71.43	13.38	15.20	68.39	13.68	17.93	70.87	10.21	18.92	57.70	20.98	21.32

Notes:
Dom. = banks with domestic control. Dom./FC = banks with foreign control. For. = foreign banks.
Source: The central bank of Lebanon, Association of Banks in Lebanon and BilanBanques.

Table 2.3: Descriptive Statistics for Domestic Banks

		ROE	ROA	DEP	LOAN	CAP	LIQ	RISK	TBILLS	IRS	CI	CA
1993	Mean	13.63	0.34	27.28	29.82	4.46	65.80	2.79	25.46	4.19	88.08	4.59
	Median	4.71	0.17	27.47	29.25	3.58	66.25	1.72	20.08	3.54	93.27	3.44
	SD	18.21	0.49	27.99	12.86	4.26	13.39	3.17	14.69	2.17	15.50	3.66
	Maximum	78.07	1.70	135.80	73.36	19.33	98.05	14.11	91.43	10.92	104.13	21.85
	Minimum	-6.22	-0.87	-15.43	1.78	0.02	23.03	0.00	2.18	0.04	40.35	0.64
1994	Mean	29.14	1.21	46.70	29.34	7.84	65.02	1.22	30.99	3.77	77.50	3.98
	Median	28.71	0.99	33.43	31.57	4.84	62.84	0.46	27.82	3.75	72.67	3.44
	SD	32.40	1.59	81.00	12.43	13.28	13.13	2.21	16.94	1.88	30.09	2.10
	Maximum	112.65	7.12	547.37	58.52	90.61	98.46	12.50	95.51	10.45	209.01	12.61
	Minimum	-51.11	-2.80	-32.34	0.21	0.06	36.13	-0.64	0.00	-1.15	33.01	0.56
1995	Mean	24.04	1.43	25.14	31.58	11.50	61.07	1.56	32.04	4.48	73.92	4.04
	Median	18.14	1.03	17.50	33.83	6.87	58.22	0.76	29.12	3.80	75.71	3.52
	SD	32.07	2.37	30.65	14.26	16.56	15.11	2.44	18.35	2.74	27.15	2.97
	Maximum	170.48	10.59	160.55	59.60	98.09	99.18	13.18	96.47	14.62	140.25	19.88
	Minimum	-34.87	-5.30	-47.55	0.00	0.75	32.72	-0.47	0.00	1.35	7.13	0.41
1996	Mean	20.16	1.70	31.64	30.46	10.10	63.06	1.56	34.62	4.51	67.58	3.44
	Median	16.09	1.27	31.11	30.71	7.58	63.35	0.99	34.28	4.15	65.89	3.07
	SD	17.53	2.14	21.76	10.88	7.84	12.86	2.17	13.82	2.28	26.07	1.77
	Maximum	85.64	11.66	87.60	54.03	50.04	97.78	10.82	70.11	13.81	148.57	9.50
	Minimum	-7.21	-2.38	-10.99	0.21	3.38	25.17	0.00	0.00	2.12	9.76	0.32
1997	Mean	16.19	1.61	30.46	31.30	14.05	62.01	0.97	28.71	3.65	66.03	2.89
	Median	18.30	1.37	24.84	32.21	9.03	61.57	0.65	27.81	3.25	64.09	2.61
	SD	14.32	1.79	25.80	10.11	14.95	11.84	1.66	12.37	1.74	28.83	1.42
	Maximum	52.74	8.37	98.54	54.49	89.26	97.87	4.49	56.72	11.89	125.38	5.98
	Minimum	-10.26	-0.69	-25.88	0.04	3.61	35.69	-4.46	1.43	1.21	2.72	0.07
1998	Mean	14.01	1.50	33.04	31.97	13.06	61.13	0.92	32.92	3.46	64.07	2.60
	Median	13.58	1.17	20.74	29.47	9.21	63.29	0.43	32.44	2.99	64.64	2.29
	SD	11.43	1.63	64.29	9.75	10.80	11.05	2.81	11.38	1.97	26.70	1.63
	Maximum	41.63	7.07	363.41	55.92	49.87	78.32	9.26	61.61	11.40	103.36	9.57
	Minimum	-1.28	-0.08	-69.00	16.41	3.28	35.73	-9.41	5.57	1.09	0.84	0.02

1999	Mean	10.33	1.02	27.04	33.45	11.34	59.55	0.46	35.06	2.99	71.36	2.51
	Median	10.30	0.83	16.35	30.50	8.77	61.41	0.32	35.40	2.59	70.77	2.19
	SD	9.97	1.34	51.67	10.61	8.27	11.95	1.06	11.31	1.54	31.76	1.58
	Maximum	29.14	5.58	295.54	64.25	41.72	76.09	3.02	65.12	7.66	136.61	8.48
	Minimum	-8.99	-1.23	-66.67	19.92	3.07	22.06	-3.69	8.85	0.95	0.95	0.04
2000	Mean	8.91	0.89	15.91	32.43	11.43	61.42	0.99	32.97	2.79	75.96	2.26
	Median	9.16	0.66	11.34	30.09	8.22	64.87	0.83	32.46	2.55	67.06	1.95
	SD	9.22	1.35	26.08	11.56	7.92	12.00	1.28	12.61	1.32	49.18	1.47
	Maximum	25.83	4.61	111.35	65.72	39.01	77.69	5.99	64.02	6.62	273.38	7.42
	Minimum	-17.41	-2.57	-21.04	15.25	3.99	30.02	-0.51	4.43	0.53	3.24	0.14
2001	Mean	8.04	1.02	19.46	29.09	13.47	64.85	0.86	32.64	2.78	71.20	2.06
	Median	8.39	0.72	9.77	25.64	8.53	68.67	0.66	33.01	2.38	63.69	1.74
	SD	8.27	1.57	55.89	12.31	14.84	12.55	1.07	14.92	1.85	41.33	1.19
	Maximum	22.78	6.47	327.14	65.52	85.92	86.73	3.23	86.59	10.74	249.83	4.91
	Minimum	-18.43	-2.21	-45.38	0.00	3.51	39.73	-1.31	5.02	0.10	2.82	0.13
2002	Mean	9.50	1.17	15.55	27.28	12.24	66.85	1.18	33.32	3.05	63.54	1.94
	Median	10.10	0.82	8.36	25.99	8.47	67.35	0.89	35.54	2.64	67.39	1.66
	SD	6.52	1.37	36.08	11.41	10.21	11.82	1.38	12.32	1.99	26.29	1.06
	Maximum	27.65	6.36	184.94	64.37	39.86	95.67	7.01	58.77	11.92	102.10	5.02
	Minimum	-0.65	-0.07	-49.04	0.51	3.69	41.80	-0.60	2.75	1.36	3.75	0.15
2003	Mean	10.15	1.13	28.37	22.38	11.53	71.39	1.50	24.76	2.70	63.98	1.75
	Median	10.44	0.86	19.82	19.98	7.22	73.47	0.79	25.67	2.45	63.60	1.56
	SD	8.81	1.22	35.51	9.69	12.69	11.16	1.66	8.93	1.46	33.47	0.83
	Maximum	31.88	4.92	173.86	48.54	66.47	92.82	5.45	45.08	7.36	196.67	3.98
	Minimum	-20.22	-1.41	-15.14	0.21	2.29	45.35	-1.44	1.96	0.73	3.35	0.20

Notes:

ROE is the after tax net profit-to-average equity ratio; ROA, which is the after tax net profit-to-average asset ratio; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; is the provisions for doubtful loans-to-gross loan ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio.

Table 2.4: Descriptive Statistics for Foreign Banks

		ROE	ROA	DEP	LOAN	CAP	LIQ	RISK	TBILLS	IRS	CI	CA
1993	Mean	82.65	2.35	17.25	25.37	4.72	70.63	5.49	16.86	5.65	69.96	4.81
	Median	24.35	0.75	16.93	23.95	2.68	72.77	3.01	14.54	4.37	72.97	3.20
	SD	164.21	5.78	19.16	16.14	6.91	15.37	7.48	9.72	3.93	23.10	4.35
	Maximum	764.19	27.05	45.81	55.51	31.77	97.07	32.40	35.21	18.63	100.00	20.54
	Minimum	0.00	0.00	-13.55	0.00	0.47	39.03	0.00	0.72	2.04	28.26	1.29
1994	Mean	50.99	1.63	25.82	25.81	7.83	69.06	3.40	20.04	4.06	74.11	4.08
	Median	54.94	1.55	27.00	23.35	4.81	70.10	1.27	20.53	3.62	66.37	3.46
	SD	57.94	2.25	33.87	14.44	11.50	14.10	7.08	11.24	1.53	36.99	2.34
	Maximum	226.58	7.12	129.08	55.62	56.88	95.24	32.45	41.62	8.53	196.49	9.88
	Minimum	-43.51	-3.72	-43.05	2.51	0.69	40.90	0.00	1.64	2.22	27.43	1.50
1995	Mean	43.36	1.90	15.54	30.39	9.44	62.90	1.66	20.34	4.71	67.27	3.68
	Median	22.88	1.56	9.91	28.19	6.91	63.39	1.13	18.99	4.16	64.65	3.35
	SD	55.86	1.79	26.59	17.41	9.49	16.82	2.07	10.55	1.90	23.24	1.74
	Maximum	255.90	6.86	93.44	71.93	44.54	95.31	8.67	38.03	9.02	120.50	8.82
	Minimum	-12.63	-0.69	-22.59	2.64	0.75	25.64	0.00	1.18	2.24	26.05	1.82
1996	Mean	30.55	1.76	22.82	29.81	10.11	63.73	2.03	24.79	4.64	70.57	3.61
	Median	19.79	1.22	23.98	30.24	7.48	62.76	1.32	24.34	4.00	71.21	3.15
	SD	38.97	2.52	22.02	15.95	8.88	16.02	2.48	13.62	2.53	25.60	1.77
	Maximum	157.59	11.66	87.60	66.97	40.32	95.98	10.68	50.56	13.81	127.59	10.06
	Minimum	-13.28	-1.27	-8.63	2.31	0.96	26.27	0.00	0.19	1.38	17.67	1.86
1997	Mean	18.27	1.41	39.28	28.89	11.62	65.15	1.06	22.53	3.71	69.20	3.11
	Median	16.16	1.50	20.79	28.56	7.64	66.51	0.41	21.68	3.71	66.26	2.93
	SD	18.49	1.17	103.36	15.31	10.38	16.61	1.98	12.31	1.47	24.01	1.32
	Maximum	73.67	4.25	481.43	57.12	44.77	96.38	7.45	49.16	6.68	112.64	7.03
	Minimum	-6.49	-0.31	-33.74	2.02	1.50	30.84	-2.51	0.00	-0.06	28.78	1.58
1998	Mean	16.11	1.17	15.59	31.20	10.33	63.30	2.89	22.38	3.35	74.35	2.75
	Median	12.30	0.96	18.21	32.22	7.27	64.18	0.60	19.92	3.03	66.65	2.50
	SD	17.57	1.11	19.11	15.63	8.22	17.26	10.13	13.41	1.64	35.40	1.05
	Maximum	60.39	3.16	60.07	63.87	37.16	96.56	47.76	51.08	7.65	206.35	5.33
	Minimum	-16.25	-1.16	-40.40	1.92	2.46	27.40	-3.66	0.00	-0.02	33.73	1.51

1999	Mean	7.05	0.56	13.90	29.44	13.87	63.86	0.73	28.04	3.31	85.88	3.13
	Median	9.56	0.78	6.29	34.99	7.75	61.50	0.18	23.68	3.13	69.25	2.33
	SD	17.89	1.73	22.63	17.11	17.43	17.53	1.91	16.66	1.83	52.15	2.58
	Maximum	41.91	3.45	101.48	65.77	84.79	96.63	6.45	59.97	8.84	262.93	13.85
	Minimum	-38.02	-4.79	-2.98	1.17	1.58	26.69	-3.86	0.00	0.09	22.92	0.99
2000	Mean	1.79	0.81	31.60	28.08	12.14	65.42	1.10	23.93	3.10	119.64	2.54
	Median	11.70	0.73	9.98	25.00	8.71	67.12	0.26	24.40	2.71	68.82	2.04
	SD	41.23	1.46	79.83	16.30	12.36	16.47	2.36	15.31	1.29	201.40	1.24
	Maximum	44.71	3.23	380.15	66.62	57.15	97.50	9.76	51.58	6.06	987.48	6.61
	Minimum	-155.43	-3.08	-5.68	1.18	0.72	25.38	-1.18	0.00	0.28	15.22	0.53
2001	Mean	9.15	0.78	18.58	27.58	9.87	66.98	0.76	20.52	2.75	79.11	2.28
	Median	9.24	0.48	1.31	25.78	7.32	63.12	0.42	19.58	2.33	78.58	1.96
	SD	14.08	1.56	54.02	14.83	7.54	16.47	1.68	13.93	1.35	53.41	1.15
	Maximum	35.49	3.82	203.00	66.30	25.79	97.80	5.51	51.72	5.18	267.01	5.79
	Minimum	-32.75	-3.62	-16.55	1.21	2.91	28.26	-3.14	0.00	0.61	15.37	0.47
2002	Mean	13.24	0.98	27.43	24.44	9.05	69.88	1.18	20.90	2.69	70.41	2.27
	Median	12.24	0.78	2.26	24.78	6.59	66.13	0.32	19.60	2.67	66.91	2.11
	SD	15.19	1.11	82.31	13.45	6.53	14.85	3.60	13.91	0.97	34.11	0.91
	Maximum	36.50	3.26	346.36	45.75	27.11	98.03	12.75	53.05	4.72	165.65	3.73
	Minimum	-22.75	-1.34	-20.50	1.22	2.97	46.18	-4.61	0.00	1.17	12.77	0.34
2003	Mean	8.05	0.63	-1.06	24.41	8.64	69.78	2.51	17.41	2.59	82.79	2.28
	Median	7.94	0.55	-3.10	21.11	6.53	73.82	1.01	14.73	2.59	75.42	2.24
	SD	16.91	1.03	13.05	15.18	5.40	16.67	3.68	12.75	0.83	53.78	1.02
	Maximum	39.13	2.46	18.27	47.16	23.83	98.65	11.53	41.11	4.21	269.66	4.19
	Minimum	-34.37	-1.85	-37.28	0.71	3.03	43.37	-1.90	0.00	1.25	17.26	0.39

Notes:

ROE is the after tax net profit-to-average equity ratio; ROA, which is the after tax net profit-to-average asset ratio; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; is the provisions for doubtful loans-to-gross loan ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio.

2.8 Empirical Results

2.8.1 Fixed Effects (LSDV) vs. Random Effects (GLS): the Hausman Test

Regarding the model specification, we will perform the Hausman test (Hausman, 1978). The Fixed Effects estimates $\hat{\beta}_{FE}$, are calculated from the following equation:

$$y_{it} = X_{it}\beta + \varepsilon_{it} \tag{2.4}$$

These estimates include an individual constant for each firm and are consistent under both the null hypothesis of no misspecification and the alternative hypothesis. The Random Effects estimates $\hat{\beta}_{GLS}$, are calculated from the following equation:

$$y_{it} = X_{it}\beta + \mu_i + \varepsilon_{it} \tag{2.5}$$

where μ_i is the individual effect.

The Random Effects model allows for two types of unobserved effects affecting y_{it}: an idiosyncratic (firm-specific) time-constant effect μ_i, which is random, and an idiosyncratic time-varying random error ε_{it}. Under the null hypothesis both estimates are consistent, but $\hat{\beta}_{GLS}$ is more efficient, whereas under the alternative hypothesis only $\hat{\beta}_{FE}$ is consistent. The specification test consists of seeing how large the difference in estimates is, $\hat{q} = \hat{\beta}_{FE} - \hat{\beta}_{GLS}$ in relation to its variance, $M(\hat{q}) = M(\hat{\beta}_{FE}) - M(\hat{\beta}_{GLS})$. Hausman's *m*-statistic is given as:

$$m = \hat{q}'\hat{M}(\hat{q})^{-1}\hat{q} \tag{2.6}$$

Hausman has shown that m is distributed asymptotically as χ^2 with k degrees of freedom, where k is the number of estimated parameters. To test the Random Effects model, we calculated the *m*-statistic for each of the individual coefficients one at a time, by using the following equation:

$$m = \frac{\left(\hat{\beta}_{FE} - \hat{\beta}_{GLS}\right)^2}{SE^2\left(\hat{\beta}_{FE}\right) - SE^2\left(\hat{\beta}_{GLS}\right)} \tag{2.7}$$

where, SE^2 are the estimated variances of the coefficients. The results are reported in Appendix 2.C. The critical χ_1^2 value is 3.84 at the 5% level and as we see from column four, the null hypothesis that the two coefficient estimates are equal is accepted in 11 out of the 15 cases.

Next, we undertake a joint χ^2 test of all the coefficients. This results in an m-statistic of: $m = \hat{q}'\hat{M}(\hat{q})^{-1}\hat{q} = 460.68$. Since m is distributed asymptotically as χ_{15}^2 which has a critical value of 24.99 at the 5% level, this gives evidence of the presence of misspecification in the Random Effects model and therefore, the Fixed Effects is the appropriate model.

2.8.2 Determinants of Banks' ROE

In this section we analyse the determinants of banks' ROE and we focus on the effect of foreign control on banks. We then compare the performance differences between domestic banks with foreign control and foreign banks.

2.8.2.1 The Entire Sample

Before analysing the results for the dependent variables individually, we will look at the overall models. [29] These models seem to be satisfactory for estimating the determinants of banks' profitability. From Table 2.5, we see that these models generate an adjusted R-squared of around 68%. Additionally, the F-test shows the significance of the models. Now, looking at each variable separately, we obtain the following overall conclusions.

[29] We present different regression models in each section, where each one does not include all the control variables. We do this to avoid any multicolinearity among the regressors. The tests show that LIQ and T-bills should not be included together in one single model, as well as OWN and FOREIGN, since they are perfectly correlated.

Firstly, the lag dependent variable shows a positive and significant effect on the current one. This proves that current profitability has a strong effect on the future profitability of banks (i.e. profitability is persistent). The size variable has no effect on banks' ROE, which means that shareholders of all banks earn similar returns on their invested funds. Off-balance sheet activities are associated with lower ROE, which may show that the income resulting from OBS is offset by the extra capital needed when engaging in such activities (according to risk-based capital rules that banks operating in Lebanon are subject to). Deposit growth shows a positive correlation with profitability. Thus the deposits (local and foreign) received by banks could be a source of increasing profits. The capitalisation level has a negative association with profitability. T-bills investments enhance banks' ROE. Credit risk as expected has a negative and significant effect. IRS shows the expected sign, a positive and significant effect on ROE, so if banks have certain monopoly power, they will realise higher profits. CI and CA have a negative and significant impact on ROE and banks that are not able to control their expenses realise lower profits. The variable distinguishing listed and unlisted banks shows a positive effect and thus, listing represents another motive for banks to boost their profitability. The ownership structure shows some positive impact on ROE and this variable does have an ability to distinguish between banks according to their ownership structure (institutional or individual). Foreign ownership does not show a significant effect on banks' ROE. Foreign banks or banks with foreign control do not seem to have better ROE than domestic banks. This result does not support *H2*, since foreign banks do not show superiority over domestic banks in terms of ROE. Surprisingly, concentration has a significant negative effect on ROE. This contradicts the findings of the literature that argues that higher concentration is usually accompanied by higher profitability, where banks are able to extract higher rates from customers. This was not the case of the market under study, where the concentration does not have a positive correlation with banks' profitability. Thus, the Lebanese banking sector has moved towards higher concentration – from 37% to 44% during the period of study [30] – but with more intense competition and hence, it did not have a positive effect on banks' profitability. The two macroeconomic variables show the expected effect (GDP positive effect and inflation negative effect).

[30] Besides, the top 10 banks concentration has increased from 61% to 67% during this period.

Table 2.5: The Determinants of Bank ROE – Regression Estimates for the Entire Sample (1993-2003)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	25.46 (0.74)	157.78*** (3.91)	13.06 (0.36)	172.06*** (4.49)	23.77 (0.70)	155.37*** (4.02)	11.71 (0.33)	169.88*** (4.63)
LAG_ROE	0.20*** (5.98)	0.20*** (5.79)	0.19*** (6.25)	0.20*** (5.83)	0.20*** (6.01)	0.20*** (5.81)	0.19*** (6.27)	0.20*** (5.85)
SIZE	3.87 (1.06)	-2.61 (-1.02)	4.77 (1.33)	-2.57 (-0.87)	4.08 (1.11)	-2.40 (-0.91)	5.00 (1.38)	-2.34 (-0.78)
OBS	-0.89*** (-3.01)	-0.78*** (-2.62)	-0.83*** (-2.99)	-0.77** (-2.51)	-0.88*** (-3.04)	-0.78*** (-2.66)	-0.82*** (-3.04)	-0.76** (-2.56)
DEP	0.04 (1.49)	0.04* (1.66)	0.04* (1.72)	0.04* (1.74)	0.04 (1.48)	0.04* (1.67)	0.04* (1.71)	0.04* (1.75)
LOAN	0.12 (0.59)	-0.05 (-0.19)	0.06 (0.43)	-0.20 (-1.32)	0.12 (0.53)	-0.05 (-0.19)	0.04 (0.32)	-0.21 (-1.35)
CAP	-0.15 (-0.93)	-0.40*** (-3.75)	-0.17 (-0.97)	-0.45*** (-4.17)	-0.14 (-0.83)	-0.39*** (-3.56)	-0.16 (-0.89)	-0.44*** (-4.01)
LIQ	0.21 (1.09)	0.19 (1.04)			0.21 (1.09)	0.20 (1.05)		
TBILLS			0.27*** (3.08)	0.07 (0.57)			0.27*** (3.11)	0.07 (0.57)
RISK	-1.59*** (-2.70)	-1.48*** (-2.82)	-1.55*** (-2.73)	-1.47*** (-2.82)	-1.59*** (-2.65)	-1.48*** (-2.77)	-1.54*** (-2.68)	-1.48*** (-2.76)
IRS	5.59*** (8.92)	5.65*** (7.04)	5.25*** (8.39)	5.62*** (6.49)	5.55*** (8.88)	5.62*** (6.99)	5.21*** (8.34)	5.59*** (6.46)
CI	-0.13*** (-3.36)	-0.14*** (-3.83)	-0.13*** (-3.47)	-0.14*** (-3.85)	-0.13*** (-3.36)	-0.14*** (-3.81)	-0.13*** (-3.46)	-0.14*** (-3.83)
CA	-4.84*** (-4.99)	-5.41*** (-5.33)	-4.79*** (-4.92)	-5.46*** (-5.29)	-4.80*** (-5.16)	-5.37*** (-5.53)	-4.74*** (-5.07)	-5.42*** (-5.45)
LISTED	1.90 (0.85)	3.82* (1.67)	1.75 (0.85)	3.70 (1.59)	1.38 (0.690	3.42* (1.74)	1.15 (0.62)	3.26 (1.59)
OWN	2.91 (1.31)	2.18 (1.04)	3.40* (1.64)	2.37 (1.15)				
FOREIGN					3.01 (1.22)	1.68 (0.77)	3.32 (1.48)	1.94 (0.94)
CONC	-1.70** (-2.13)	-2.45*** (-2.78)	-1.55** (-2.04)	-2.44*** (-2.67)	-1.71** (-2.15)	-2.45*** (-2.81)	-1.56** (-2.07)	-2.44*** (-2.71)
GDP	1.96*** (2.93)		2.47*** (3.77)		1.95*** (2.99)		2.45*** (3.86)	
INFL		-0.07*** (-4.42)		-0.06*** (-3.32)		-0.07*** (-4.48)		-0.06*** (-3.35)
Adjusted R-squared	0.6751	0.6714	0.6812	0.6713	0.6749	0.6712	0.6809	0.6712
TxN	655	655	655	655	655	655	655	655
F-statistic	15.7721	15.5250	16.1918	15.5231	15.7624	15.5148	16.1750	15.5120
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

All regressions are estimated with the Fixed Effects model (LSDV). For a sample of 78 banks (domestic and foreign) and for a period of 11 years, we estimate the determinants of bank ROE.

The dependent variable is ROE, which is the after tax net profit-to-average equity ratio; LAG_ROE is the year *t-1* ROE; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio; LISTED is a dummy variable which equals to 1 if the bank share is listed, 0 otherwise; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth. INFL is the inflation level.

t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

After this preliminary analysis of the entire sample, we will deepen our investigation of the determinants of bank ROE according to ownership and we will try to see whether different categories of banks have different profitability determinants.

2.8.2.2 The Determinants of Domestic Banks' ROE and the Effects of Foreign Ownership

It is obvious from Figure 2.1 that the profitability (ROE) of banks differs according to their ownership. Hence, we split the sample into three groups in order to understand how each group performs. In the first regression we include domestic banks only regardless of their ownership (i.e. majority or minority domestic control). The reason for this is to find out if foreign ownership of domestic banks has any effect on profitability and if this profitability changes as a result of the acquisition of a domestic bank by a foreign bank. The results of the regressions are reported in Table 2.6. The regression results for the first sub-sample show different results from those of the entire sample. The SIZE variable has now captured a negative effect. This shows that larger domestic banks' shareholders earn less than those of smaller banks and thus, it seems that domestic banks do not benefit from economies of scale. This may be due to the limited domestic investment opportunities because of the small size of the Lebanese market, and because it is "crowded" by the existence of large number of banks relative to the size of the market. The large size of Lebanese banks represents an excess capacity, which could be utilised in other markets abroad, and that is why many Lebanese banks are increasing their operations abroad and expanding internationally. OBS activities do not seem to represent a source of income for domestic banks, where it is associated with lower ROE. The effect of deposit growth is significantly positive for this sub-group and domestic banks benefit from issuing more deposits. The effect of capitalisation on banks' ROE remains the same showing that domestic banks' ROE is affected negatively by any increase in equity. LIQ does improve domestic bank's profitability. Additionally, T-bills capture a significant effect, which suggests that investing in government securities is profitable for domestic banks. In this regression, the LISTED variable is unable to distinguish between domestic banks. The institutional ownership is not associated with higher ROE and banks with institutional ownership do not have better returns to shareholders than those with family/individual ownership. Regarding the foreign ownership, we see that this variable does not have a

significant effect and is unable to classify domestic banks, which have similar ROE regardless of their ownership control (domestic vs. foreign control). Thus, foreign investment in domestic banks does not improve their ROE. Finally, we see that domestic banks are strongly affected by the macroeconomic variables. Higher GDP growth improves domestic bank's profitability and higher inflation level deteriorates it.

We notice that the adjusted R-squared has increased from 68% up to more than 73%, indicating less variability when only domestic banks are included.

Table 2.6: The Determinants of Bank ROE – Regression Estimates for Domestic Banks (1993-2003)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	63.63* (1.94)	147.68*** (4.23)	33.81 (1.16)	158.26*** (5.51)	62.78* (1.94)	147.45*** (4.20)	33.31 (1.16)	157.97*** (5.52)
LAG_ROE	0.11** (2.37)	0.12*** (3.27)	0.08* (1.79)	0.11*** (2.73)	0.11** (2.40)	0.12*** (3.30)	0.08* (1.82)	0.11*** (2.76)
SIZE	0.34 (0.13)	-4.26** (-1.97)	1.87 (0.66)	-3.76 (-1.29)	0.37 (0.14)	-4.30** (-2.2)	1.97 (0.70)	-3.76 (-1.28)
OBS	-0.65*** (-3.81)	-0.59*** (-3.30)	-0.51*** (-3.27)	-0.47** (-2.38)	-0.65*** (-3.85)	-0.59*** (-3.32)	-0.51*** (-3.35)	-0.48** (-2.42)
DEP	0.05* (1.67)	0.06* (1.73)	0.05** (2.11)	0.05** (2.03)	0.06* (1.67)	0.06* (1.74)	0.05** (2.090	0.05** (2.04)
LOAN	0.20 (0.85)	0.09 (0.37)	0.13 (1.15)	-0.11 (-0.95)	0.20 (0.85)	0.10 (0.39)	0.12 (1.13)	-0.11 (-0.95)
CAP	-0.20 (-1.15)	-0.39*** (-2.87)	-0.23 (-1.28)	-0.44*** (-3.54)	-0.20 (-1.18)	-0.39*** (-2.96)	-0.23 (-1.31)	-0.45*** (-3.71)
LIQ	0.32 (1.44)	0.34* (1.67)			0.32 (1.41)	0.34 (1.60)		
TBILLS			0.41*** (4.27)	0.24** (2.29)			0.41*** (4.29)	0.24** (2.28)
RISK	-1.73*** (-6.91)	-1.47*** (-5.12)	-1.69*** (-6.41)	-1.43*** (-4.98)	-1.75*** (-6.46)	-1.48*** (-4.81)	-1.71*** (-6.07)	-1.44*** (-4.72)
IRS	4.43*** (4.28)	4.40*** (4.22)	4.15*** (4.14)	4.25*** (4.10)	4.45*** (4.33)	4.43*** (4.27)	4.15*** (4.17)	4.26*** (4.14)
CI	-0.27** (-2.35)	-0.26*** (-2.62)	-0.24** (-2.41)	-0.25*** (-2.72)	-0.27** (-2.35)	-0.26*** (-2.62)	-0.24** (-2.41)	-0.25*** (-2.71)
CA	-3.80*** (-4.24)	-4.17*** (-5.10)	-3.69*** (-3.76)	-4.15*** (-4.69)	-3.79*** (-4.36)	-4.18*** (-5.19)	-3.66*** (-3.82)	-4.15*** (-4.74)
LISTED	0.41 (0.24)	1.74 (1.12)	0.05 (0.03)	1.15 (0.69)	0.41 (0.27)	1.88 (1.37)	-0.15 (-0.09)	1.20 (0.77)
OWN	0.10 (0.07)	-0.52 (-0.38)	1.06 (0.71)	-0.15 (-0.10)				
FOREIGN					-1.06 (-0.52)	-1.41 (-0.70)	-0.59 (-0.34)	-1.05 (-0.58)
CONC	-1.42** *(-2.28)	-1.82*** (-3.42)	-1.10*** (-1.98)	-1.77*** (-2.90)	-1.42*** (-2.31)	-1.82*** (-3.490	-1.10*** (-2.01)	-1.76*** (-2.96)
GDP	1.02*** (2.20)		1.88*** (3.52)		1.01*** (2.28)		1.85*** (3.62)	
INFL		-0.09*** (-14.68)		-0.06*** (-4.71)		-0.09*** (-14.71)		-0.06*** (-4.71)
Adjusted R-squared	0.7073	0.7223	0.7368	0.7306	0.7074	0.7224	0.7367	0.7307
TxN	457	457	457	457	457	457	457	457
F-statistic	16.9770	18.1906	19.5065	18.9278	16.9840	18.2014	19.4943	18.9358
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

All regressions are estimated with the Fixed Effects model (LSDV). For a sample of 55 domestic banks and for a period of 11 years, we estimate the determinants of domestic bank ROE.

The dependent variable is ROE, which is the after tax net profit-to-average equity ratio; LAG_ROE is the year *t-1* ROE; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio; LISTED is a dummy variable which equals to 1 if the bank share is listed, 0 otherwise; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth. INFL is the inflation level.

t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

By running the regressions containing domestic banks (with domestic or foreign control), we do not see a significant difference between the two categories in terms of ROE (Table 2.6), which suggests that the two categories foreign banks and domestic banks with foreign control do not have advantage over domestic banks with domestic control.

Table 2.7: The Determinants of Bank ROE – Regression Estimates for Domestic Banks with Domestic Control and Foreign Banks (1993-2003)

	(1)	(2)	(3)	(4)
C	29.03 (0.70)	144.49*** (45.41)	25.73 (0.77)	163.40*** (4.09)
LAG_ROE	0.20*** (5.71)	0.20*** (5.56)	0.20*** (5.91)	0.20*** (5.58)
SIZE	4.76 (1.31)	-1.02 (-0.40)	5.42 (1.52)	-0.95 (-0.33)
OBS	-0.93*** (-2.90)	-0.83** (-2.55)	-0.88*** (-2.92)	-0.81** (-2.47)
DEP	0.04 (1.450	0.04* (1.68)	0.04* (1.74)	0.05* (1.80)
LOAN	0.10 (0.350	0.02 (0.07)	-0.005 (-0.03)	-0.20 (-1.12)
CAP	-0.04 (-0.27)	-0.18 (-1.64)	-0.05 (-0.30)	-0.22* (-1.90)
LIQ	0.23 (1.06)	0.25 (1.280		
TBILLS			0.25*** (2.79)	0.09 (0.72)
RISK	-1.48** (-2.38)	-1.38** (-2.45)	-1.42** (-2.41)	-1.35** (-2.44)
IRS	5.77*** (7.11)	5.61*** (6.53)	5.43*** (6.64)	5.55*** (6.18)
CI	-0.13*** (-3.50)	-0.13*** (-3.97)	-0.13*** (-3.60)	-0.14*** (-4.00)
CA	-4.89*** (-4.69)	-5.30*** (-4.89)	-4.84*** (-4.80)	-5.35*** (-5.00)
LISTED	1.97 (1.00)	4.02** (2.05)	1.83 (1.02)	3.88* (1.91)
FOREIGN	2.23 (0.18)	-0.96 (-0.08)	2.48 (0.20)	-0.55 (-0.04)
CONC	-2.06** (-2.31)	-2.77*** (-3.03)	-1.95** (-2.22)	-2.76*** (-2.89)
GDP	1.69** (2.45)		2.07*** (3.03)	
INFL		-0.07*** (-3.36)		-0.06*** (-2.72)
Adjusted R-squared	0.6650	0.6620	0.6699	0.6619
TxN	567	567	567	567
F-statistic	14.8748	14.6904	15.1851	14.6803
Prob(F-statistic)	0.0000	0.0000	0.0000	0.0000

***Notes*:**

All regressions are estimated with the Fixed Effects model (LSDV). For a sample of 67 banks (domestic with domestic control and foreign) and for a period of 11 years, we estimate the determinants of domestic and foreign bank ROE.

The dependent variable is ROE, which is the after tax net profit-to-average equity ratio; LAG_ROE is the year *t-1* ROE; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio; LISTED is a dummy variable which equals to 1 if the bank share is listed, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth. INFL is the inflation level.

t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

However, we run regression models containing domestic banks with domestic control and foreign banks to see whether there is a difference between the two categories. The results are reported in Table 2.7. The impact of FOREIGN in the four presented models does not have a significant influence. It is obvious that foreign banks do not have better ROE than domestic ones. Since foreign banks report similar ROE to domestic banks with majority or minority domestic ownership, hypotheses *H2* and *H3* do not reveal support here.

2.8.2.3 The Determinants of Foreign Banks' ROE

The differences between the results reported in Tables 2.5, 2.6 and 2.7 show that foreign banks operating in the Lebanese markets perform differently from domestic banks and the factors that affect their ROE could be different. To find out if there are some specific factors that influence foreign banks more (or less) than domestic ones, we run regressions including only foreign banks. The results are reported in Table 2.8. [31]

A general comparison between the results reported in Table 2.8 and those reported in Table 2.6 shows that – indeed – what is important in determining domestic banks' ROE is not the same for foreign banks. Firstly, we notice that the size variable that had negative effect on domestic banks loses its effect here, which means that large and small foreign banks generate similar ROE. Deposit growth has completely lost its effect. Therefore, this factor has a positive effect only for domestic banks and it does not show that receiving more deposits improves foreign banks' ROE. Capitalisation level has a (weak) positive effect on foreign bank's ROE, whereas it had a negative effect for domestic banks. This could be interpreted in many ways. Firstly, it could be because bank capital is more costly for domestic banks than foreign banks. Secondly, it may suggest that foreign banks have better capability in increasing their earnings when increasing their equity. Thirdly, it could be due to the fact that foreign banks have lower capitalisation than domestic banks. T-bills investments do not improve foreign bank's ROE like domestic banks. Credit risk seems to have lower impact on foreign banks because the negative effect is less significant than in Table 2.6.

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[31] Note that the outcome of the regressions should be interpreted carefully, because the subsidiaries of foreign banks may have a nominal number of issued shares, and the funds necessary for their activities may come mainly from their parent company.

Table 2.8: The Determinants of Bank ROE – Regression Estimates for Foreign Banks (1993-2003)

	(1)	(2)	(3)	(4)
C	47.60 (0.62)	179.76*** (2.66)	24.81 (0.34)	149.17*** (3.70)
LAG_ROE	0.20*** (3.85)	0.21*** (3.74)	0.20*** (3.86)	0.21*** (3.76)
SIZE	9.24 (1.12)	4.32 (0.65)	9.32 (1.19)	3.99 (0.66)
OBS	-1.43*** (-2.77)	-1.22** (-2.24)	-1.40*** (-2.82)	-1.21** (-2.36)
DEP	0.02 (0.53)	0.02 (0.57)	0.01 (0.34)	0.01 (0.38)
LOAN	-0.43 (-1.07)	-0.63 (-1.59)	-0.19 (-0.74)	-0.33 (-1.39)
CAP	0.17 (0.92)	0.08 (0.52)	0.19 (1.17)	0.10 (0.76)
LIQ	-0.34 (-0.87)	-0.46 (-1.29)		
TBILLS			-0.31 (-1.15)	-0.47 (-1.55)
RISK	-1.30* (-1.73)	-1.31* (-1.74)	-1.32* (-1.75)	-1.32* (-1.76)
IRS	7.75*** (3.06)	7.48*** (3.51)	8.19*** (3.10)	8.02*** (3.26)
CI	-0.11*** (-4.35)	-0.12*** (-4.89)	-0.11*** (-4.46)	-0.12*** (-5.07)
CA	-5.56*** (-3.88)	-5.63*** (-3.60)	-5.43*** (-3.37)	-5.54*** (-3.06)
CONC	-2.68* (-1.85)	-3.77* (-2.07)	-2.72* (-1.92)	-3.66* (-2.22)
GDP	2.62* (1.94)		2.30* (1.82)	
INFL		0.02 (0.60)		-0.005 (-0.13)
Adjusted R-squared	0.6651	0.6509	0.6675	0.6570
TxN	203	203	203	203
F-statistic	12.1477	11.4627	12.2677	11.7519
Prob(F-statistic)	0.0000	0.0000	0.0000	0.0000

***Notes*:**
All regressions are estimated with the Fixed Effects model (LSDV). For a sample of 24 foreign banks and for a period of 11 years, we estimate the determinants of foreign bank ROE.
The dependent variable is ROE, which is the after tax net profit-to-average equity ratio; LAG_ROE is the year *t-1* ROE; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth. INFL is the inflation level.
t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.
*** Significantly different from zero at the 1% level.
** Significantly different from zero at the 5% level.
* Significantly different from zero at the 10% level.

Regarding the effect of macroeconomic factors, the figures show clearly that foreign banks are less affected by these factors than domestic banks. Obviously, CONC and GDP show a less significant effect on foreign banks than on domestic banks (significance at 10% vs. 1% for domestic banks). Besides, the inflation does not show any impact on foreign banks' ROE. This may be evidence that although these banks operate in the Lebanese market, they are less influenced by its macroeconomic conditions and this gives a support for the hypothesis *H1*. The result could be due to the fact that there are constraints on domestic banks'

investments abroad, whereas foreign banks may have the opportunity of investing abroad, which lowers the effect of domestic factors on their profitability.

Finally, we observe that the adjusted R-squared of the models are around 66% compared to 73% for domestic banks and the same models are able to explain the profitability of domestic banks more successfully than that of foreign banks. Hence, we may conclude that foreign banks operating in a host market are not only affected by their own characteristics and by the host market macroeconomic variables, but they are also influenced by some other factors that are not included in our regressions. These factors could be their home microeconomic factors (e.g. the size of their parent company) and/or their home macroeconomic factors (e.g. concentration, GDP, inflation). These findings give support for hypothesis *H4*. When studying the determinants of profitability of foreign banks, we may have to include more variables that are related to their home market (but this is beyond the scope of our study).

2.8.3 Determinants of Banks' ROA

In the following section, we extend our analysis to detect the determinant of banks' ROA. We use the same methodology used in the previous section. Our aim is to identify the different determinants of domestic and foreign banks' ROA and if the control variables affect differently the two categories of banks.

2.8.3.1 The Entire Sample

The estimated models in Table 2.9 show well determinant estimates of influences on ROA for the entire sample. The F-test indicates the fit of the overall models, which also generates a high adjusted R-squared (up to 82%). The same models with the same variables do better at explaining the relationship between these explanatory variables and ROA than ROE. The main conclusions are: as for ROE, the lag of ROA has a strong influence on current ROA, which means that there is persistence in profitability. The size of a bank has a negative impact on its ROA. T-bills and IRS show a positive effect on ROA and they have a strong influence

in enhancing banks' ROA. The institutional ownership boosts bank's ROA and listed banks do have higher ROA than other banks. In contrast to ROE, foreign ownership does have a positive influence on ROA. OBS activities, DEP, LOAN, and CAP do not have a significant impact. Credit risk and the efficiency indicators (CI and CA) show a significant influence on ROA. Finally, ROA is similarly affected by GDP, concentration and the inflation level to ROE.

Table 2.9: The Determinants of Bank ROA – Regression Estimates for the Entire Sample (1993-2003)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	-1.12 (-0.57)	4.29*** (3.42)	-1.71 (-0.68)	5.21*** (5.12)	-1.24 (-0.64)	4.04*** (3.36)	-1.81 (-0.74)	4.96*** (5.16)
LAG_ROA	0.11** (2.56)	0.10** (2.39)	0.11** (2.50)	0.10** (2.40)	0.11*** (2.67)	0.10** (2.48)	0.11*** (2.61)	0.10** (2.49)
SIZE	0.12 (0.76)	-0.21*** (-2.65)	0.15 (0.90)	-0.22*** (-2.62)	0.13 (0.89)	-0.18** (-2.52)	0.17 (1.03)	-0.19** (-2.47)
OBS	0.0004 (0.03)	-0.001 (-0.08)	0.002 (0.19)	-0.001 (-0.17)	0.001 (0.15)	0.0002 (0.02)	0.003 (0.32)	-0.001 (-0.07)
DEP	0.001 (0.97)	0.001 (1.13)	0.001 (1.06)	0.001 (1.14)	0.001 (0.92)	0.001 (1.06)	0.001 (0.99)	0.001 (1.07)
LOAN	0.01 (0.75)	0.001 (0.10)	0.005 (1.05)	-0.01 (-1.55)	0.004 (0.68)	0.0001 (0.02)	0.004 (0.83)	-0.01* (-1.79)
CAP	0.01 (0.72)	-0.01 (-1.25)	0.01 (0.59)	-0.01 (-1.53)	0.01 (0.84)	-0.005 (-0.96)	0.01 (0.70)	-0.01 (-1.27)
LIQ	0.005 (0.56)	0.01 (0.84)			0.005 (0.60)	0.01 (0.91)		
TBILLS			0.01* (1.83)	-0.001 (-0.21)			0.01* (1.83)	-0.001 (-0.20)
RISK	-0.08*** (-4.20)	-0.07*** (-4.05)	-0.08*** (-4.30)	-0.07*** (-4.03)	-0.08*** (-4.09)	-0.07*** (-3.99)	-0.08*** (-4.18)	-0.07*** (-3.96)
IRS	0.65*** (9.19)	0.65*** (9.87)	0.64*** (8.72)	0.65*** (9.64)	0.65*** (9.30)	0.64*** (9.95)	0.64*** (8.83)	0.65*** (9.72)
CI	-0.005** (-2.02)	-0.005** (-2.23)	-0.005** (-2.03)	-0.01** (-2.22)	-0.005** (-2.03)	-0.005** (-2.23)	-0.005** (-2.03)	-0.01** (-2.22)
CA	-0.40*** (-10.09)	-0.43*** (-12.15)	-0.40*** (-9.08)	-0.43*** (-11.74)	-0.40*** (-10.37)	-0.43*** (-12.62)	-0.39*** (-9.23)	-0.43*** (-12.09)
LISTED	0.07 (0.46)	0.23** (1.97)	0.07 (0.44)	0.24* (1.95)	0.03 (0.18)	0.18* (1.87)	0.02 (0.13)	0.18* (1.84)
OWN	0.27*** (2.72)	0.27** (2.34)	0.28*** (2.89)	0.28** (2.45)				
FOREIGN					0.36** (1.99)	0.30 (1.63)	0.37** (1.99)	0.31 (1.62)
CONC	-0.02 (-0.64)	-0.04** (-2.18)	-0.01 (0.49)	-0.04** (-2.15)	-0.02 (-0.67)	-0.04** (-2.21)	-0.02 (-0.52)	-0.04** (-2.18)
GDP	0.04* (1.65)		0.05*** (2.63)		0.03 (1.65)		0.05*** (2.65)	
INFL		-0.01*** (-14.48)		-0.01*** (-13.92)		-0.01*** (-15.89)		-0.01*** (-15.17)
Adjusted R-squared	0.8037	0.8220	0.8060	0.8218	0.8039	0.8216	0.8061	0.8214
TxN	656	656	656	656	656	656	656	656
F-statistic	30.1623	33.8828	30.5916	33.8341	30.1930	33.8095	30.6105	33.7572
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

All regressions are estimated with the Fixed Effects model (LSDV). For a sample of 78 banks (domestic and foreign) and for a period of 11 years, we estimate the determinants of bank ROA.

The dependent variable is ROA, which is the after tax net profit-to-average asset ratio; LAG_ROA is the year *t-1* ROA; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio; LISTED is a dummy variable which equals to 1 if the bank share is listed, 0 otherwise; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth. INFL is the inflation level.

t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

After this overview of the results of the regressions, it seems that some different results will emerge if we split the sample into sub-samples as in the previous section. Consequently, we will analyse the effect of foreign ownership on banks, and try to find out if ROA determinants differ according to banks' ownership.

2.8.3.2 The Determinants of Domestic Banks' ROA and the Effects of Foreign Ownership

The results reported in Table 2.10 are for the domestic banks with domestic and foreign control. This division allows us to detect the effect of foreign investment on domestic banks' ROA. It is obvious from these figures that the two categories have similar ROA and again foreign investment in domestic banks does not enhance their profitability. Looking at the variables individually, we conclude that, first of all, the lag dependent variable loses its significant effect and domestic banks' ROA is not persistent. Therefore, the other group (the foreign banks) may have driven the effect shown in Table 2.9. Bank size shows a negative influence in two out the eight models, which may support again the theory of excess capacity for domestic banks, or it may suggest that asset augmentation was not accompanied by the same growth in earnings. Listed banks have higher ROA, whereas they show to have similar ROE. LOAN shows to have a positive effect in two models, which suggests that private sector lending have some effect in improving ROA. T-bills influence hold and they add to domestic banks profitability. The institutional ownership in domestic banks does boost their profitability in terms of ROA and proves that it has a constructive impact on domestic banks. Finally, the other variables (OBS, DEP, CAP, and LIQ) do not have a significant influence on domestic bank ROA.

Finally, we perceive that the adjusted R-squared of the models increased by 6-7%, indicating that these models have better capability in explaining the variability of ROA when including domestic banks only.

Table 2.10: The Determinants of Bank ROA – Regression Estimates for Domestic Banks (1993-2003)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.06 (0.03)	4.02*** (3.17)	-0.26 (-0.14)	5.07*** (5.50)	-0.10 (-0.05)	3.71*** (3.01)	-0.30 (-0.17)	4.83*** (5.25)
LAG_ROA	-0.02 (-0.54)	-0.01 (-0.37)	-0.02 (-0.54)	-0.01 (-0.36)	-0.02 (-0.48)	-0.01 (-0.31)	-0.02 (-0.47)	-0.01 (-0.31)
SIZE	0.08 (0.61)	-0.15* (-1.66)	0.10 (0.75)	-0.16* (-1.65)	0.10 (0.83)	-0.12 (-1.42)	0.12 (0.94)	-0.14 (-1.43)
OBS	0.004 (0.58)	0.01 (0.98)	0.01 (0.87)	0.004 (0.65)	0.005 (0.62)	0.01 (0.98)	0.01 (0.87)	0.004 (0.67)
DEP	0.001 (0.93)	0.001 (1.09)	0.0005 (1.00)	0.001 (1.12)	0.0005 (0.80)	0.0005 (0.92)	0.0004 (0.83)	0.0005 (0.95)
LOAN	0.02 (1.15)	0.01 (0.89)	0.01** (2.10)	0.002 (0.43)	0.02 (1.14)	0.01 (0.90)	0.01* (1.84)	0.001 (0.21)
CAP	0.01 (0.60)	-0.003 (-0.37)	0.005 (0.48)	-0.01 (-0.70)	0.01 (0.67)	-0.002 (-0.26)	0.01 (0.53)	-0.005 (-0.62)
LIQ	0.01 (0.57)	0.01 (0.80)			0.01 (0.65)	0.01 (0.88)		
TBILLS			0.01** (1.59)	-0.0003 (-0.09)			0.01** (1.53)	-0.0004 (-0.09)
RISK	-0.13*** (-6.86)	-0.12*** (-6.07)	-0.13*** (-6.46)	-0.12*** (-5.81)	-0.13*** (-6.69)	-0.12*** (-6.12)	-0.13*** (-6.31)	-0.12*** (-5.80)
IRS	0.62*** (9.56)	0.62*** (10.45)	0.62*** (9.40)	0.62*** (10.11)	0.62*** (9.58)	0.62*** (10.41)	0.61*** (9.44)	0.62*** (10.07)
CI	-0.02*** (-3.71)	-0.02*** (-4.07)	-0.02*** (-3.72)	-0.02*** (-3.97)	-0.02*** (-3.69)	-0.02*** (-4.01)	-0.02*** (-3.69)	-0.02*** (-3.92)
CA	-0.35*** (-6.96)	-0.38*** (-8.03)	-0.35*** (-6.57)	-0.38*** (-7.85)	-0.35*** (-6.95)	-0.37*** (-7.90)	-0.35*** (-6.56)	-0.37*** (-7.72)
LISTED	0.13 (1.17)	0.21*** (2.63)	0.13 (1.14)	0.21*** (2.63)	0.07 (0.72)	0.16** (2.43)	0.07 (0.64)	0.16** (2.36)
OWN	0.27*** (5.07)	0.24*** (3.66)	0.28*** (5.26)	0.25*** (3.74)				
FOREIGN					0.15 (1.22)	0.14 (1.19)	0.17 (1.24)	0.16 (1.22)
CONC	-0.02 (-0.75)	-0.04* (-1.87)	-0.01 (-0.57)	-0.04* (-1.90)	-0.02 (-0.74)	-0.04* (-1.82)	-0.01 (-0.57)	-0.03* (-1.86)
GDP	0.04 (1.62)		0.05*** (2.59)		0.03 (1.53)		0.05** (2.47)	
INFL		-0.004*** (-7.43)		-0.004*** (-8.32)		-0.004*** (-7.29)		-0.004*** (-8.06)
Adjusted R-squared	0.8748	0.8834	0.8761	0.8831	0.8736	0.8824	0.8748	0.8820
TxN	457	457	457	457	457	457	457	457
F-statistic	47.1915	51.1027	47.7474	50.9275	46.7075	50.6312	47.1894	50.4306
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

All regressions are estimated with the Fixed Effects model (LSDV). For a sample of 55 domestic banks and for a period of 11 years, we estimate the determinants of domestic bank ROE.

The dependent variable is ROA, which is the after tax net profit-to-average asset ratio; LAG_ROA is the year *t-1* ROA; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio; LISTED is a dummy variable which equals to 1 if the bank share is listed, 0 otherwise; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth. INFL is the inflation level.

t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

Since the foreign control of domestic banks has not improved their ROA, we will try to detect the differences (if any) between domestic banks with domestic control and foreign banks' ROA. The results are shown in Table 2.11.

Table 2.11: The Determinants of Bank ROA – Regression Estimates for Domestic Banks with Domestic Control and Foreign Banks (1993-2003)

	(1)	(2)	(3)	(4)
C	-0.85 (-0.36)	3.99** (2.35)	-0.98 (-0.45)	5.26*** (4.69)
LAG_ROA	0.11** (2.41)	0.11** (2.31)	0.11** (2.39)	0.11** (2.34)
SIZE	0.08 (0.67)	-0.21*** (-4.09)	0.11 (0.81)	-0.22*** (-4.03)
OBS	0.01 (0.52)	0.005 (0.62)	0.01 (0.67)	0.004 (0.51)
DEP	0.001 (0.65)	0.001 (0.84)	0.0005 (0.74)	0.001 (0.93)
LOAN	0.005 (0.59)	0.004 (0.53)	0.001 (0.42)	-0.01 (-1.40)
CAP	0.02*** (2.83)	0.01 (1.37)	0.02** (2.21)	0.01 (0.99)
LIQ	0.01 (0.77)	0.01 (1.30)		
TBILLS			0.01** (2.00)	0.0001 (0.05)
RISK	-0.07*** (-3.67)	-0.06*** (-3.34)	-0.07*** (-3.80)	-0.06*** (-3.33)
IRS	0.60*** (11.11)	0.58*** (10.19)	0.59*** (10.38)	0.58*** (10.16)
CI	-0.005** (-2.13)	-0.005** (-2.35)	-0.005** (-2.16)	-0.005** (-2.36)
CA	-0.39*** (-10.00)	-0.41*** (-11.99)	-0.39*** (-9.17)	-0.42*** (-11.88)
LISTED	0.06 (0.49)	0.21*** (2.78)	0.06 (0.47)	0.22*** (2.83)
FOREIGN	0.37** (1.20)	0.12 (0.42)	0.37** (1.21)	0.13 (0.44)
CONC	-0.02 (-0.62)	-0.04** (-2.49)	-0.02 (-0.49)	-0.04** (-2.33)
GDP	0.03 (1.49)		0.05** (2.42)	
INFL		-0.01*** (-11.11)		-0.01*** (-10.18)
Adjusted R-squared	0.7958	0.8127	0.7980	0.8120
TxN	568	568	568	568
F-statistic	28.2926	31.3798	28.6614	31.2399
Prob(F-statistic)	0.0000	0.0000	0.0000	0.0000

***Notes*:**

All regressions are estimated with the Fixed Effects model (LSDV). For a sample of 67 banks (domestic with domestic control and foreign) and for a period of 11 years, we estimate the determinants of domestic and foreign bank ROA.

The dependent variable is ROA, which is the after tax net profit-to-average asset ratio; LAG_ROA is the year *t-1* ROA; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio; LISTED is a dummy variable which equals to 1 if the bank share is listed, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth. INFL is the inflation level.

t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

By looking at the foreign ownership variable, we notice that it has captured a significant effect here and therefore, foreign banks have better ROA than domestic banks regardless of their ownership (domestic vs. foreign). Although this factor was not able to distinguish banks according to their ROE, it is now able to separate them according to their ROA. Therefore, hypotheses *H2* and *H3* do find support when considering ROA.

2.8.3.3 The Determinants of Foreign Banks' ROA

We have seen that foreign and domestic banks operating in the Lebanese markets have different factors that affect their ROE. Now we will see if it is the same for the estimation of ROA, and how the determinants of ROA differ between the two groups. The empirical findings are reported in Table 2.12.

Table 2.12 shows clearly that different factors influence domestic banks and foreign banks' ROA, which gives again support for hypothesis *H4*. Some factors that were important for domestic banks became unimportant and vice versa. For instance, in contrast to domestic banks, foreign banks' ROA is in fact persistent. Differently from domestic banks that have a negative correlation between size and ROA, foreign banks generate similar ROA regardless of their size. Foreign bank CAP shows to have a positive influence on ROA and foreign banks benefit more than domestic banks from boosting capital. On the other hand, investing in liquid assets deteriorates foreign banks' ROA. DEP, T-bills do not improve foreign bank ROA. Finally, foreign banks seem again to be less affected by domestic macroeconomic factors. The concentration does not have any effect on ROA and GDP affect less significantly foreign banks (10% vs. 1% for domestic banks).

The adjusted R-squared generated by foreign banks models dropped below those of domestic banks by 7-8%, indicating again that foreign banks could be affected by some "external factors" that do not have impact of domestic banks (i.e. foreign banks home market GDP, inflation, etc...). This gives support for hypothesis *H1*.

Table 2.12: The Determinants of Bank ROA – Regression Estimates for Foreign Bank (1993-2003)

	(1)	(2)	(3)	(4)
C	3.24 (1.42)	7.43*** (2.80)	-0.97 (-0.59)	4.39*** (2.62)
LAG_ROA	0.22*** (7.09)	0.21*** (7.10)	0.22*** (6.52)	0.21*** (6.33)
SIZE	0.09 (0.60)	-0.16 (0.96)	0.12 (0.89)	-0.16 (-1.12)
OBS	-0.03 (-1.43)	-0.03 (-1.37)	-0.03 (-1.49)	-0.03 (-1.42)
DEP	0.0001 (0.06)	0.0005 (0.36)	-6.51E-05 (-0.04)	0.0003 (0.24)
LOAN	-0.05*** (-3.06)	-0.05** (-2.50)	-0.01 (-1.43)	-0.02** (-2.24)
CAP	0.03*** (4.91)	0.02*** (2.77)	0.03*** (7.78)	0.02*** (3.33)
LIQ	-0.04** (-2.54)	-0.03* (-1.90)		
TBILLS			-0.0003 (-0.07)	-0.007 (-1.43)
RISK	-0.07*** (-4.96)	-0.06*** (-5.46)	-0.07*** (-4.84)	-0.06*** (-5.46)
IRS	0.64*** (7.34)	0.61*** (6.51)	0.63*** (7.66)	0.61*** (6.81)
CI	-0.003** (-2.46)	-0.003** (-2.58)	-0.003** (-2.41)	-0.003** (-2.56)
CA	-0.33*** (-5.25)	-0.35*** (-5.51)	-0.33*** (-4.51)	-0.34*** (-4.74)
CONC	-0.01 (-0.41)	-0.04 (-1.48)	-0.01 (-0.34)	-0.04 (-1.59)
GDP	0.05* (1.96)		0.05* (2.16)	
INFL		-0.002*** (-2.70)		-0.003*** (-4.46)
Adjusted R-squared	0.8139	0.8138	0.8095	0.8117
TxN	204	204	204	204
F-statistic	25.6704	25.6552	24.9730	25.3115
Prob(F-statistic)	0.0000	0.0000	0.0000	0.0000

***Notes*:**
All regressions are estimated with the Fixed Effects model (LSDV). For a sample of 24 foreign banks and for a period of 11 years, we estimate the determinants of foreign bank ROA.
The dependent variable is ROA, which is the after tax net profit-to-average asset ratio; LAG_ROA is the year *t-1* ROA; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth. INFL is the inflation level.
t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.
*** Significantly different from zero at the 1% level.
** Significantly different from zero at the 5% level.
* Significantly different from zero at the 10% level.

2.9 Conclusion

We have analysed the profitability differences between foreign and domestic banks operating in Lebanon between 1993 and 2003. We have chosen several internal variables that represent a bank's characteristics and 3 external variables (concentration, GDP and inflation),

and detected their different effects on foreign and domestic banks. The sample of banks was divided into three sub-samples according to their ownership (domestic or foreign).

Regarding ROE, we found that: (i) all banks have similar ROE regardless of their ownership, (ii) the determinants of foreign banks' ROE are different from those of domestic banks, (iii) institutional ownership does not improve domestic banks' ROE, and (iv) macroeconomic factors of the host market affect foreign banks' ROE less than domestic banks.

On the other hand, we found that for ROA: (i) subsidiaries of foreign banks have higher ROA than all domestic banks, (ii) the determinants of bank ROA differ according to bank ownership, (iii) institutional ownership in domestic banks improve their ROA, and (iv) macroeconomic factors of the host market affect foreign banks' ROA less than domestic banks.

For both ROE and ROA, we found the estimated models show better capability in explaining the variability of domestic banks' profitability more than foreign ones, which may lead to a conclusion that foreign banks operating in a market are not only affected by the conditions in that market, but also by other factors that could be related to their home markets.

Appendix 2.A: Summary of Cited Empirical Studies

Study	Market	Period	Sample	Findings
Berger (1995)	US	1983-1989	14,862 banks	- capital has a positive impact on bank's earnings
Berger and DeYoung (1997)	US	1985-1994	All banks	- NPLs have a negative effect on cost-efficiency and a positive effect on capital of small banks - Cost efficiency has a negative effect on NPLs and a positive effect on capital - Staff expenses have a negative effect on profitability
Berger et al. (2000)	US	1969-1997	All domestically chartered US commercial banks	- Macroeconomic shocks are strong determinants of banks persistence - In boom periods, of-balance sheet activities increase substantially
Bongini et al. (2001)	Indonesian, Malaysia, South Korea and Thailand	1996-1998	283 financial institutions	- Foreign ownership decreases the probability of distress - Foreign-owned banks were more efficient and less risky than domestic banks
Bongini et al. (2002)	Indonesian, Malaysia, Philippines, South Korea and Thailand	End-1996 data	246 financial institutions	- A negative relation between foreign ownership and bank failure - A negative and significant relation between GDP per capita and bank failures
Bourke (1989)	Europe, North America and Australia	1972-1981	12 markets, 90 banks	- Concentration has a positive effect on return profitability - Capital level has a positive effect on ROA - Liquidity has a positive effect on ROA - Staff expenses has a positive effect on ROA
Brealey and Kaplanis (1996)	Developed and developing markets		2000 overseas offices (37 parent and 82 host countries)	- Host countries are large economies with large overseas trade
Brinkmann and Horvitz (1995)	US	1987-1991	10,445 banks	- Loans-to-asset ratio increased for banks with larger capital surplus, and decreased for other banks
Calderon and Liu (2003)	Developing and industrial countries	1960-1994	87 developing and 22 industrial	- Financial development leads to economic growth - Bi-directional causality between economic growth and financial development - Financial intermediaries have larger effect in less developed economies - The longer the period, the larger the effect of financial development on economic growth - Financial development enhances growth through rapid capital accumulation and technology changes.
Cebenoyan and Strahan (2004)	US	1988-1993	Entire bank population	- A positive and significant relation between size and banks' profitability - A negative and significant relation between the size and volatility of

				banks' ROA - Derivatives have a negative correlation with ROA but positive correlation with ROE - A positive and significant relation between CAR and ROA but negative relation with ROE - A negative and significant relation between CAR and volatility of ROA and ROE
Chiuri et al. (2002)	Developing countries	1992-1997	10 crisis countries and 5 non-crisis countries	- Capital requirements have a negative effect on loans supply for less capitalised banks
Claessens et al. (2001)	80 developed and developing countries	1988-1995	7,900 banks	- In developed countries, foreign banks have lower overhead costs and lower profits than domestic banks - In developed countries, foreign banks have higher profits, higher interest margin, and higher tax payments than domestic banks
Clark and Siems (2002)	US	1992-1997	Entire bank population	- Off-balance sheet activities increase cost-efficiency estimates
Demirguc-Kunt and Detragiache (1999)	Developed and developing countries	1980-1995	36 systemic banking crises in 65 countries	- Low GDP growth is associated with high probability of bank failures
Detragiache and Gypta (2004)	Malaysia	1997 (the Asian crisis)	46 banks (foreign and domestic)	- Non-Asia-oriented foreign banks performed better in terms of profitability and loan quality, but worse in terms of cost efficiency - Foreign bank operating mainly in Asia did not differ from domestic banks
DeYoung and Hasan (1998)	US	Years 1988-1990-1992 and 1994	16,282 banks	- Size has a positive effect on profitability - NPLs have a negative effect on profit efficiency - Concentration has a positive effect on profitability
DeYoung and Nolle (1996)	US	1985-1990	240 domestic banks and 62 foreign banks	- Foreign banks are less profit-efficient than US-owned banks - Foreign banks had disadvantages in input efficiency due to excess expenditures on purchased funds - Foreign banks sacrificed profitability in exchange for increased market
Dopico and Wilcox (2001)	Developing and developed countries	1999	133 countries	- Foreign banks have significantly larger presence in countries that were open to foreign ownership of banks, more international trade, and more interaction with the rest of the world - Countries that had smaller or more profitable domestically-owned banking sectors tended to have more foreign banking
Elyasiani and Rezvanian (2002)	US	1992-1994	2054 observations (foreign banks and domestic banks)	- Foreign banks do not possess advantage in product-specific scale economies - Domestic banks and foreign banks are not widely different in terms of scale and scope economies
Fisher and	UK	1980-1989	Foreign banks from	- Bilateral trade, market size, country risk and distance are correlated with

Molyneux (1996)			66 countries	the number of firms and employees. - The size of the banking sector of the foreign country is positively correlated with that country's bank presence in London - The smaller the cultural distance and the less stable the home country, the more likely foreign banks are to enter London.
Gonzalez-Hermosillo (1999)	U.S. Southwest, Northwest and California, Mexico and Colombia	(1986-1992), (1991-1992), (1992-1993), (1994-1995) and (1982-1987) successively	(2,946), (261), (562), (31) and (18) banks successively	- Large deposits from the public are associated with lower probability of failure and higher deposits increase bank's survival time - High interest spreads reflect banks riskiness - Low GDP growth is associated with banking crises
Humphrey and pulley (1997)	US	1977-1988	683 bank	- Large banks react more efficiently to deregulation shocks than smaller banks
Kwast and Rose (1982)	US	1970-1977	41 high-profit and 39 low profit banks	- Liquidity has a positive effect on net income - Loans have a positive effect on net income - Concentration has a positive effect on profitability - Demand deposits have a positive effect on profitability, and time deposits have a negative effect
Lensink and Hermes (2004)	Developed and developing economies	1990-1996	48 markets	- The presence of foreign banks forces domestic banks to reduce costs and increase efficiency. - Foreign banks entry is associated with falling costs, profits and margins of domestic banks at higher level of economic development - Foreign banks entry is associated with increasing costs and margins of domestic banks at lower level of economic development
Magri et al. (2005)	Italy	1983-1998	203 foreign banks	- The size and the development of the financial sector are positively related to foreign bank entry decision - The profit opportunities of the local market has a positive effect on the entry decision - The trade has a positive effect on entry decision
Minh and Tripe (2002)	New Zealand	1991-2000	8 foreign banks	- Foreign bank parent profitability has a positive effect on the subsidiary's size - The profitability of the parent bank has a positive effect on the profitability of the subsidiary - The relative capital scarcity has a negative effect on the subsidiary's ROA - The specific experience of operating in the host market is an important factor determining the profitability of the subsidiary
Molyneux and Seth (1998)	US	1987-1991	Average of 125 foreign subsidiaries	- Foreign bank profitability in the US is related to growth in bank's commercial and industrial loans, capital level and the host country GDP

				- Foreign bank profitability is inversely related to bank's loan-to-asset ratio
Molyneux and Thornton (1992)	18 European markets	1986-1989	Average of 1053 banks per year	- A positive effect of concentration on return on capital and return on assets - A negative effect of liquidity on ROA - A positive effect of staff expenses on ROA
Neumark and Sharpe (1992)	US	Oct. 1983-Nov. 1987	255 banks	- In concentrated markets, banks tend to be slower in respond to increase deposit rate as a respond to increase in market interest rate. But they respond faster to falling market interest rate
Parkhe and Miller (1998)	US	1984-1995		- A bank's tendency to use a more subsidiary-oriented strategy is negatively related to the levels of banking system development and banking regulation in the host country - More global banks establish a higher percentage of subsidiaries in host countries with high banking system development than in countries with low banking system development
Peek and Rosengren (1995)	New England, U.S.	1989Q1-1992Q2	150 banks	- Capital requirements caused a drop in bank's lending
Peek et al. (1999)	US	1984Q1-1997Q2	2565 banks	- Foreign banks that are acquired by domestic banks are more troubled than most banks prior to the acquisiton
Rime and Stiroh (2003)	Switzerland	1996-1999	289	- The asset size has a positive effect on ROE, but negative effect on ROA - Excess capital has a positive effect on ROA, ROE, and SD of ROE
Salas and Saurina (2003)	Spain	1968-1998	21 banks	- Better economic conditions imply lower loan loss ratios - Large banks have higher loan loss ratios than small banks
Saunders and Schumacher (2000)	Germany, Italy, Switzerland, UK, Spain, France, U.S.	1988-1995	736 banks	- NIM is an increase function of: implicit interest rate, required reserve by the central bank, capital requirements, and concentration
Soledad et al. (2001)	Argentina, Chile and Mexico	1981-1997	(155), (37), and (34) banks successively	- More profitable banks attract more deposits - Risky banks pay higher interest rates on deposits - Higher CAR reduce the interest rates on deposits
Spahr (1989)	US	1985	117 failed banks and 117 non-failed banks	- 4 and 5 years prior to failure, the size of the commercial and industrial loan portfolio predict the failure. Operating efficiency is also important factor - 2 and 3 years prior to failure, loan revenue is higher for failed banks - 1 year prior to failure, the profitability is lower for failed banks
Sturm and Williams (2004)	Australia	1988-2001	19 foreign banks and 16 domestic banks	- Large Australian banks used their size as a barrier to entry of foreign banks - Foreign banks display superior technical efficiency due to superior scale efficiency
Swindle (1995)	US	1984Q1-1986Q4	51 BHCs	- A positive and significant correlation between deposit growth and profitability

				- A positive and significant relation between capital and ROE
Unite and Sullivan (2003)	Philippines	1990-1998	39 banks (yearly average)	- Larger banks are more able to control their expenses - A positive relation between foreign ownership and profits - A negative relation between foreign ownership and risk - A positive and significant relation between GDP and banks profitability - A decline in interest rate spreads was followed by increase in profits and non-interest income
Williams (1998)	Australia	1987-1993	Average of 55 foreign banks	- Foreign bank size is a positive function of the parent size - Foreign bank profitability is a positive function of the Australian NIMs
Wright (2002)	Australia	1988-1992	45 foreign banks	- The larger the parent bank has larger subsidiary. - Foreign bank "follow" their customers

Appendix 2.B: Calculation of Control Variables

Variable	Description
Dependent variables	
ROE	After tax net income divided by average equity
ROA	After tax net income divided by average assets
Independent variables	
SIZE	Natural log of assets
OBS	Log off-balance sheet (assets side)
DEP	Customer Deposit growth (percentage)
LOAN	Loan-to-asset ratio
CAP	Equity-to-asset ratio
LIQ	Cash and central bank + T-bills + marketable securities + deposits with head office and branches and with the other banks divided by total assets
RISK	Provisions for doubtful loans-to-gross loan ratio
TBILLS	T-bills-to-asset ratio
IRS	Net interest margin divided by average assets
CI	Cost-to-income ratio
CA	Cost-to-asset ratio
LISTED	Dummy variable (1 for listed, zero otherwise)
OWN	Dummy variable (1 for institutional ownership, zero otherwise)
FOREIGN	Dummy variable (1 for foreign ownership, zero otherwise)
CONC	Assets of top 5 banks divided by sector total assets
GDP	Real GDP growth (percentage)
INFL	Inflation level

Appendix 2.C: the Hausman Test

	Fixed Effects	**Random Effects**	$\hat{q}$	*m*
LAG_ROE	0.196049 (0.032797)	0.228910 (0.032719)	-0.032861 (0.00005)	211.309768
SIZE	3.874979 (3.651073)	1.724862 (0.695198)	2.150117 (12.847034)	0.359850
OBS	-0.885218 (0.294418)	-0.443392 (0.204962)	-0.441826 (0.044673)	4.369804
DEP	0.042391 (0.028466)	0.035986 (0.023715)	0.006405 (0.000248)	0.165478
LOAN	0.124176 (0.209491)	0.017687 (0.072499)	0.106489 (0.038630)	0.293549
CAP	-0.151010 (0.161888)	-0.474367 (0.120078)	0.323357 (0.011789)	8.869265
LIQ	0.206388 (0.189628)	0.115589 (0.085573)	0.090799 (0.028636)	0.287905
RISK	-1.593381 (0.591190)	-1.732554 (0.643457)	0.139173 (-0.064531)	-0.300151
IRS	5.591543 (0.626872)	4.715091 (0.784398)	0.876452 (-0.222312)	-3.455365
CI	-0.133261 (0.039626)	-0.121508 (0.035036)	-0.011753 (0.000343)	0.403074
CA	-4.836574 (0.968834)	-3.978637 (1.066163)	-0.857937 (-0.198064)	-3.716249
LISTED	1.895926 (2.235896)	-1.740373 (1.529272)	3.636299 (2.660558)	4.969886
OWN	2.906673 (2.226173)	-0.695822 (1.054263)	3.602495 (3.844376)	3.375833
CONC	-1.704801 (0.800263)	-1.450455 (0.603839)	-0.254346 (0.275799)	0.234561
GDP	1.962953 (0.670412)	0.795511 (0.212383)	1.167442 (0.404346)	3.370682
Adjusted R-squared	0.6751	0.6025		
df	645	645		
F-statistic	15.772	67.088		
Critical χ_1^2 value				3.84

***Notes*:**

The first regression is estimated with Fixed Effects model (LSDV) and the second regression with the Random Effect model (GLS); the dependent variable is ROE, which is the after tax net profit-to-average equity ratio; LAG_ROE is the year *t-1* ROE; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; LOAN is the loan-to-asset ratio; CAP is the equity-to-asset ratio; LIQ is the liquid assets-to-total asset ratio; RISK is the provisions for doubtful loans-to-gross loan ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio; LISTED is a dummy variable which equals to 1 if the bank share is listed, 0 otherwise; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; CONC is the top 5 banks assets as a percentage of the total banking sector; GDP is the real GDP (percentage) growth.
Standard errors in parentheses.

3 Chapter Three: The Applicability of Bank Capital Theories

Abstract

The literature on bank capital shows the importance of market capital requirements vs. regulatory capital requirements. Theoretical and empirical studies show that larger banks hold less capital, that banks use their solvency to signal confidence, that bank capital (especially according to the risk-based capital rules) follows the economic cycle. Finally, many studies show how banks react to new (tighter) capital requirements. However the literature does not distinguish between domestic and foreign banks in all these issues. In this chapter we test the applicability of these findings taking into consideration the ownership of banks. We study the Lebanese banking sector and analyse the factors that influence the capital of almost the entire population of commercial domestic and foreign banks operating in the Lebanese market between 1993 and 2003. Firstly, we analyse the determinants of bank capital for the entire sample (all domestic and foreign commercial banks), the findings consist with those of the literature. Next, we divide the panel data according to the bank ownership and by time. Different results emerge and most of these theories do not hold in all the cases. We find that (1) the reaction of domestic banks to new capital requirements differs from that of foreign banks, (2) foreign banks do not use their capital level as a signal for confidence, and domestic banks adopt this policy only when few other banks are able to do so, (3) foreign bank capital does not vary according to the economic cycle, and even domestic bank capital loses this feature when capital requirements become tighter, and (4) the Too-Big-To-Fail doctrine does not hold in all cases even for the same category of banks.

3.1 Introduction

Banking is one of the most regulated industries in the world, and the bank capital standards are one of the most prominent aspects of such regulation. [32] This prominence results from the central role that banks play in financial intermediation, the importance of bank capital for bank soundness and the efforts to adopt international common capital standards. Banks are the most important financial intermediaries, which is a result of their role as providers of payments, loans and deposits, and monitoring services and as producers of information. The importance of regulation of bank capital is derived, among other things, from the role it plays in banks' soundness and risk-taking incentives and from its role in the corporate governance of banks, in addition to the influence of capital level on the competitiveness of banks. This important influence was one of the motives behind the international efforts to harmonise capital standards in the 1980s, when the international meeting of bank capital regulation started with the 1988 Basle Accord on capital standards. Since its introduction, the capital accord has been acknowledged for its contribution to the widespread use of risk-based capital ratios both as measurement of the soundness of banks and as trigger devices for regulators' intervention. The accord has generated a debate on how best to design the regulation of bank capital due to the differences in opinion and the objectives of that regulation and the different results that studies have found regarding the optimal design of capital standards.

In order to suggest an optimal regulatory framework, a large body of literature has analysed the factors affecting and determining a bank capital and the reaction of bank capital to the change of these factors. Some of these studies have developed a number of principles/theories about the factors influencing bank financial structure and some others analysed the response of banks to capital requirements. However, there are still gaps in the literature regarding the differences between a domestic bank's and a foreign bank's capital, for example: what are the differences between domestic banks and foreign banks in terms of

[32] The role of banks as deposit collectors is the main reason behind this issue. When a firm goes bankrupt, the effects of bankruptcy are limited to the shareholders, and to some extent to the creditors and the debtholders. On the other hand, a bank failure has additional effect of the depositors and maybe on the national economy if it triggers the failure of other banks.

capital structure? How is a foreign bank capital determined? When capital requirements become tighter, what is the reaction of banks when we take into consideration the ownership of banks? And finally, do all the findings of the literature apply on banks regardless of their ownership (i.e. domestic vs. foreign)?

In the host market, domestic banks and foreign banks operate (and compete) together. However, they may not be subject to the same influence of different micro- and macroeconomic factors. Among those different factors is the regulatory effect. Evidence shows that although banks are subject to the same capital requirements, neither their capitalisation level nor their reaction to any new regulation are the same. The different capitalisation level is due to the fact that foreign banks tend to hold the minimum (costly) capital required by regulators and invest as much as possible funds, mainly abroad. On the other hand, domestic banks tend usually to keep more than the required capital and keep high "buffer" to be able to absorb any shocks and to keep reserves to exploit any investment opportunities in their market. Foreign banks do not implement the same policy, since their position as a subsidiary of a larger multinational bank, allows them to "import" funds when needed. Multinational banks keep the minimum capital in their subsidiaries abroad and create an internal capital market and channel capital among subsidiaries or from the main branch in the home market to the subsidiary that needs these funds. Thus, it is useful when studying bank capital, to distinguish between domestic and foreign banks. In another word, we could assume that by considering the ownership of banks (domestic or foreign) the findings and the theories built on these findings do not hold in all cases because empirical studies about bank capital consider all banks operating in one market (or more) without considering the effect of ownership.

3.2 Foreign Banking and Regulatory Concerns

During the 1980s, banks in some countries claimed they were at competitive disadvantages relative to banks in other countries and "levelling the playing field" internationally was one objective behind the Basle Accord (BIS 1999). These competitiveness differences are due to accounting treatment across countries and to differences in the cost of

capital. Differences in the protection provided by the safety net in each country could affect a bank's cost of equity. The introduction of minimum capital requirements aimed at narrowing the international differences and competitiveness among banks. Imposing comparable capital standards on banks across countries diminishes the value of having a strong safety net. Thus, internationally agreed minimum capital standards narrow international cost-of-equity differentials for banks.

Studies showing the advantages of foreign bank participation tend to ignore the question of the regulation and how foreign banks react to capital requirements, and if foreign banks react in the way regulator wants or they behave in a way to escape regulation. Makler and Ness (2002) raise this issue by arguing that although foreign banks aid in the development of financial systems, they increasingly place financial institutions beyond the reach of effective national regulation. They add that emerging market regulators become dependent on monitoring by regulators from a bank's parent country, which diminishes their effective sovereignty in this area. Chiuri et al. (2002) argue that foreign banks are less sensitive to "shocks" caused by higher capital requirements, and that the impact of more stringent minimum capital regulations on banks' deposit taking in some emerging markets, has been smaller for foreign owned banks. Song (2004) illustrates a problem facing regulators, which is particularly acute in very small countries. In some circumstances, such countries may have a few large companies, and the local banks cannot compete because the large exposure rules keep them from offering large lines, whereas a small branch of a major international bank can offer these lines using the parent bank's world-wide capital. He adds that many countries have tried to level the playing field by requiring such banks to have some form of quasi-capital and sometimes limit lending to a multiple of that local quasi-capital in order to tie foreign bank down and restricts its ability to compete. However, that is often ineffective because quasi-capital requirements can meet simply by a "piece of bookkeeping" where foreign bank branches can avoid the requirements by booking some of the transactions at the offshore branches. Another issue confronting supervisors is that foreign banks entering local markets tend to offer a variety of new financial products, including derivatives, in order to expand their market share in the local market. These new derivative products can allow market participants

far better hedging opportunities and, thereby, can be a source of considerable benefit, but they may also be used as a way of avoiding prudential regulations.

3.3 The Optimal Capital Structure and the Value of the Banking Firm

In the absence of bankruptcy costs and corporate income taxation, and with perfect capital markets, the value of a firm is independent of its capital structure and the way it is financed (Modigliani and Miller, 1958). But in reality, the violation of one or more of the simplifying assumptions (i.e. the existence of bankruptcy costs, taxation and market imperfections) leads to an optimal financial structure of a firm and its value. Consider first the situation where interest on debt is tax deductible but no bankruptcy costs exit. In this case, there is an incentive to substitute debt for equity. In the absence of bankruptcy costs and the positive incentive for debt (as tax savings), this may lead to a situation with all debt and no equity. Conversely, in the case of no taxes but positive bankruptcy costs, the value of the firm is maximised when it is unlevered (i.e. when it is a pure equity firm without any debt). Therefore, the tax system creates an incentive for firms to increase their leverage and encourages them to use subordinate debt over equity (since debt payments are tax-deductible expense). A firm with risk-free debt could borrow at an interest rate below the required return on equity, reducing its weighted-average cost of financing and increasing its value by substituting debt for equity. However, when leverage is higher, the cost of bankruptcy and financial distress becomes high and so are the risks to shareholders, increasing the costs of equity. Combining costly bankruptcy with the tax deductibility of interest produces a situation in which bankruptcy costs provide a disincentive that offsets the tax-shield incentive to expand debt. Under these dual conditions, an optimal capital structure exists in which the value of the firm is maximised.

Do M&M propositions apply to banks? Miller (1995) argues that M&M propositions do and do not apply to banks. Firstly, he argues that it is hard to see anything about demand securities (bank deposits) being so special to rule out the applications of M&M propositions to banks. But on the other hand, what make banks special is the government guarantees that protect these securities (i.e. the deposit insurance). Besides, differently from other firms, bank

capital comes from a number of sources, either on or off balance sheet. The government guarantee, for instance, is an off-balance sheet source of capital, which affects the bank cost of capital from these sources. Moreover, the bank capital is not left to its own devices and the amount of debt a bank may use as a capital is limited by regulators. This makes banks different from other firms and makes M&M propositions do not apply for banks.

3.4 Bank Capital and its Role

Matten (2000, pp 15-17) claims that in classical corporate financial theory, capital has two particular roles: (1) funding the business, and (2) transfer of ownership through selling its shares to third parties. For banks, there is another reason why they hold large amount of capital:

The role of capital in a bank is a buffer against future, unidentified, even relatively improbable losses, whilst still leaving the bank room to recover or organise on orderly winding down.

Matten adds later that a bank's capital is:

The amount held or required to be held by a financial institution to underpin the risk of loss in value of exposures, business, etc., such as to protect the depositors and general creditors against loss.

In other words, when the value of bank's assets drops, the capital provides a cushion that protects the bank from insolvency. A bank can meet its obligations to depositors as long as losses on its asset portfolio do not exceed its capital, and banks with higher capitals are less vulnerable to financial shocks and have more ability to absorb losses.

3.5 The Capital Requirements

Berger et al. (1995) claim that regulatory capital requirements are motivated by two main concerns. First, "the safety net", [33] particularly the deposit insurance component, makes the government (the deposit insurance agency) the largest uninsured creditor of banks, and capital requirements are a means to limit the risk exposure of the government and the taxpayers that stand behind it. Regulators as representatives of the Deposit Insurance, central bank, and the taxpayers, are vulnerable to the same costs of financial and expropriations of value as other creditors. Therefore, regulators require capital for almost all the same reasons that other uninsured creditors of banks: to protect themselves against the costs of financial distress, agency problems, and the reduction in market discipline caused by the safety net. Second, regulatory capital requirements protect the economy from negative externalities caused by bank failures, especially systemic risk. So, the regulatory capital requirements help protect the financial system and the economy from the destructive effects of contagious bank runs. The failure of a large number of banks or the failure of a small number of large banks could set off a chain reaction that may undermine the stability of the financial system.

3.5.1 The Flat-Rate Standard (the Equity-to-Asset Ratio)

Until early 1980s there were no minimum capital requirements in most countries. But after several banking and financial crises, the regulatory concerns about the safety of banking sectors, as well as the emphasis on capital adequacy, have pushed a wide range of countries to introduce formalised capital requirements. This development was spearheaded by the adoption of minimum capital requirements in particular countries (for example, the UK and the USA in early 1980s). Capital requirements were introduced in order to reduce the risk of banks by implementing a uniform standard (the flat-rate standard) that aims at increasing the capital-to-asset ratio. However, that was not an optimal solution. Koehn and Santomero (1980) examine

[33] The safety net is all government actions designed to enhance the safety and soundness of the banking system apart from regulation and enforcement of capital requirements. The safety net includes deposit insurance, unconditional payment guarantees, and access to the discount window, as well as all regulation and supervision procedures that are not directly related to capital.

the portfolio reaction to capital requirements by investigating the effect of capital regulation (minimum capital-to-asset ratio) on the portfolio behaviour of banks. They find that as a reaction for increasing capital requirement, banks have reshuffled their portfolios. For a bank with a low degree of risk aversion, its reaction to an increase in capital-to-asset ratio is a larger shift towards riskier assets, which more than offsets the effect of increasing capital. Therefore, the chance of failure increases. Conversely, if the bank is sufficiently risk-averse, the movement towards riskier securities will be small, relative to the increase in capital. In this case, the chance of failure decreases. So, risky institutions react to spoil the regulatory objectives, and uniformly increase of capital requirements of the banking sector makes the relatively safe banks safer, while risky institutions become more risky. In addition, Kim and Santomero (1988) argue that an inflexible capital regulation via a simple capital-to-asset ratio gives banks an incentive to increase their business risk by portfolio realignment, especially under a regulation that does not consider asset quality in determining capital requirements. They show that the traditional uniform capital ratio regulation is an ineffective way to control the probability of bank insolvency and, thus, to maintain a "safe and sound" banking system. The reason is that it ignores the individual banks different preference structures and permits risky banks to avoid the restrictions via financial leverage and/or business risk. Bichsel and Blum (2004) examined the relationship between the leverage ratio and the risk of Swiss banks between 1990 and 2002. They found a positive correlation between change in capital and risk. [34] They argue that these results indicate that simple leverage restrictions may not be sufficient regulatory instrument to ensure the stability and soundness of banks. [35] So, capital regulation intention was to strengthen the soundness and stability of banking systems by forcing banks to boost their capital position, where higher capital levels allow the bank to absorb greater losses in the event of failure and enforce additional prudence of the management. However, capital regulation via a flat capital-to-asset ratio permits banks to increase their business risk by

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[34] However, they did not find a significant relationship between changes in the capital ratio and the default probability of banks (the likelihood of bank failure).

[35] Additionally, Barber et al. (1996) examined the effect of capital regulation on the riskiness of a bank's capital and the probability of bank failure. Firstly, they showed that an increase in the capital requirement will cause an increase in the riskiness of the asset portfolio, but not sufficiently to offset the effect of a mandatory reduction in leverage. Thus, bank's equity risk declines in response to an increase in the capital requirements. Secondly, they showed that the probability of bank failure increases with the capital requirements. But they argued that this is not caused only by the riskiness of asset portfolio. The reason for this is that the probability of bank failure depends upon both risk and return. An increase in the capital requirements results in an optimal portfolio with a risk-return combination with a higher probability of failure.

portfolio reshuffling. Bank avoidance of the capital requirement has increased bank regulators concerns and has led to the Risk-based capital proposal.

3.5.2 The Risk-Based Capital (RBC)

Failure of the uniform capital ratio regulation in limiting bank bankruptcy risk has led to the devising of new standards for capital adequacy. Banking regulators have proposed a framework that makes capital requirements vary according to the structure of assets and their riskiness. Different capital adequacy rules were introduced in 1988: the risk-based capital (the RBC). In 1988, the Basle Committee of the Bank for International Settlements introduced a capital measurement system commonly referred to as the Basle Capital Accord. This system provided for the implementation of a credit risk measurement framework with a minimum capital standard of 8% by end-1992. Since 1988, this framework has been progressively implemented in all other countries with active international banks. The framework established a structure that aimed at: (1) making regulatory capital more sensitive to differences in risk profiles among banking organisations, (2) taking off-balance sheet exposures into consideration when assessing capital adequacy, and (3) lowering the disincentives to liquid assets with low risk. In June 1999, the Committee issued a proposal for a New Capital Adequacy Framework to replace the 1988 Accord. The proposed capital framework consists of three pillars: (1) minimum capital requirements, (2) supervisory review of an institution's internal assessment process and capital adequacy, and (3) effective use of disclosure to strengthen market discipline. Extensive interaction with banks and industry groups, have led to a final consultative document, which was issued in April 2003, with a view to introducing the new framework at end-2006 (BIS 1999).

So the main difference between the flat-rate and the RBC is that, according to the latter, an individual bank's unique risk profile is evaluated in determining its capital adequacy, by imposing risk weights that specify the minimum capitalisation rates on assets. Hence, banks engaged in less secure banking practices, including off-balance sheet activities, would be required to hold more capital. The new plan places bank assets into several categories and assigns risk weight to each category to determine the minimum capital that should be

maintained against it, therefore, the minimum required level of equity depends on the riskiness of asset portfolios. Besides, off-balance sheet items that have not been previously considered in evaluating the minimum required level of equity capital, are now included and considered.

3.6 The Determinants of Bank Capital

Berger et al. (1995) define two types of capital requirements that determine the level of bank's capital: (a) capital market requirements, and (b) capital regulatory requirements. A bank's market capital requirement is the capital ratio that maximises the value of the bank in the absence of regulatory capital requirements, but in the presence of the rest of the regulatory structure that protects the safety and soundness of banks. This capital market requirement, which is different for each bank, is the ratio toward which each bank would tend to move in the long run in the absence of regulatory capital requirements. Unlike regulatory requirements, sanctions for departures from market capital requirements are two-sided, where the value of the bank will decline if it has either too little or too much capital. Billet et al. (1998) add that the combination of regulatory discipline and the market discipline determine a bank's cost of risk taking. Markets penalise banks for increasing risk, by increasing the costs of debt financing and by limiting the types of claims a bank may issue. On the other hand, regulators impose discipline through risk-based capital requirements and insurance premiums, examination frequency and intensity etc. According to them, banks balance between the market discipline and the regulatory discipline and substitute towards the cheaper one. The substitution may be accomplished by varying the bank's reliance on insured deposits relative to uninsured liabilities. [36] Finally, Alexander (2004) went further to say that there is evidence that suggests that bank capital is increasingly determined by market forces rather than by

[36] Billet et al (1998) argue that regulatory discipline is less costly to bank shareholders than market discipline and thus, banks can shield themselves from the impact of market discipline through the judicious use of insured deposits. They examined the relationship between changes in bank credit rating and the use of insured deposits. Firstly, they found that downgraded banks with larger insured deposit bases experience smaller declines in equity value. Second, they found that downgraded banks increase their use of deposits following the downgrade, indicating that bank managers perceive the costs of insured deposits to have increased less than the costs of insured liabilities. Therefore, the market's ability to discipline is diminished by the relative low cost of insured deposits and the ability of banks to substitutes these claims for market-priced liabilities (i.e. debt).

regulatory requirements. [37] He adds that an explanation for this issue is that although regulators have set the right level of capital requirements, the market has coordinated on standards for prudent banks that exceed the true economic level of capital and the socially optimal level of capital. Moreover, even though these standards are excessive in terms of economic capital, banks have to follow them otherwise they would be punished by the market, where depositors could withdraw their funds or banks become unable to access certain markets anymore if their capital levels fall below their peers' levels.

We are going to assess the effect of each type of capital requirements on banks, but with taking into consideration the effect of ownership. In other words, we will try to detect the importance of regulation and market forces on domestic and foreign banks separately. We will try, in addition to detect some important issues, for instance: (1) how domestic and foreign banks are affected (and react) to capital requirements, (2) how the effect of regulation vs. the effect of market forces changes between domestic and foreign banks, and (3) whether domestic and foreign banks are affected by the market forces in the same way and the same magnitude. We will start by shedding a light on the findings of the literature on bank capital and we will see the empirical findings on the effect of regulation and market forces on bank capital. Moreover, we will extract some hypotheses that will be tested empirically in the following sections.

3.6.1 Capital Regulation

Deposit insurance may give banks an incentive to increase risk by increasing the risk of their assets or increasing their leverage. This risk-shifting incentive and the potential externalities resulting from bank failures, has been among the reasons for regulating bank capital. Depositors are fully insured and therefore, they have no incentive to adjust the demand returns for the risk undertaken by the bank. Moreover, because sometimes the deposit insurance charges banks flat insurance premium, this gives them an incentive to increase risk.

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[37] He says that in the 1990s and early 2000s, banks in the G10 countries have consistently held capital that far exceeds the regulatory minimum requirement. For instance, US bank holding companies have on average held between 12 and 13 percent capital throughout the 1990s. Similarly, UK banks and building societies have held between 12 and 14 percent throughout the 1990s and 2000s.

Santos (2000) argues that the need to regulate banks is caused by corporate governance problems arising from the separation of ownership from management. When frictions prevent the writing of complete contracts between shareholders and managers, the financial structure of a firm is important because it determines the allocation of control rights among the firm's claimholders. In the case of banks, an efficient allocation of control rights need to take account of the fact that bank debtholders (depositors) are not in a position to monitor managers because they are small and uninformed and thus, they need a representative. Banks' shareholders favour no interference, while depositors are more conservative. Moreover, the lower the bank's solvency, the stronger the shareholders' bias towards more risk and the weaker the depositors' bias against risk. According to Santos, an efficient regulation requires an increase in interference when bank performance deteriorates and includes a credible mechanism to transfer control to the regulator when the bank's solvency is low. The minimum solvency requirement could be part of such regulation if it defines the threshold for the transfer of control to the regulator.

Bank regulators face agency conflict regarding the firms they supervise because of different goals and objectives, asymmetric information, or dishonesty. Banking authorities use the regulatory interference in an attempt to correct an unsafe or unsound banking practice. The major instrument of regulatory interference is capital regulation. [38] As other forms of regulation are removed, capital adequacy regulation gets relatively more important. In addition, the experience from banking crises in several countries during the last decades have made both regulators and the banks themselves more aware of the importance of a sufficient capital-to-asset ratio. Both the 1988 Basle Capital Accord (Basle I) and the proposals from the Basle Committee on Banking Supervision to update and revise legislation (the forthcoming Basle II) include minimum capital requirements.

Many empirical studies have tried to assess the impact of capital requirements on banks' capital level, and how important regulations are in determining banks' capitalisation. Those studies have found that regulators represent an important factor in determining banks'

[38] Other instruments include cease-and-desist orders, removal of officers and directors, the threat of termination of deposit insurance, and denial of requests for expansion into new products or markets.

capital level, not dominant though. In our analysis, we will detect the effect of regulation on banks, with considering the separation between domestic and foreign banks. For both groups, we do not expect that the capital regulation will be able to explain the entire behaviour and variability of bank capital. [39] In order to test the regulatory effects, we will try to find out the relationship between three variables (the risky assets, the off-balance sheet activities and the treasury bills) and the bank capital of domestic and foreign banks, and how the two groups of banks adjust their capital according to these factors.

3.6.1.1 Risky Assets

According to RBC rules (to which banks operating in the Lebanese market are subject), the level of bank capital should vary according to the riskiness of the bank's portfolio. Therefore, the more the percentage of risky assets in the bank's portfolio, the more the required capital. Several empirical studies employed the loan-to-asset ratio as a proxy for bank risky assets and tried to find out its influence on the level of capitalisation. For instance, Dahl and Shrieves (1990) included this ratio to proxy portfolio risk since it is positively correlated with the probability that a bank will increase equity in anticipation of higher loan losses. They find a positive and significant impact for this variable on bank's capital and that banks need more capital to fund potential losses on their loan portfolio. Dahl and Spivey (1996) also find a positive and significant relation between banks' loan-to-asset ratio and equity acquisition. They claim that the greater portfolio risk increases subsequent need for capital.

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[39] Barrios and Blanco (2003) developed two models to explain the way Spanish banks set their capital level. The first is a "market model", which contains banks that are not affected by regulation since their capital level is higher then regulated one, and depends on a set of variables (e.g. bank size, liquidity premium, operating costs, variance of ROA, credit risk and liquidity risk). The second, the "regulatory model", explains the behaviour of banks whose capital ratio is below regulator one. They found that the market model explains better the behaviour of Spanish commercial banks, and the average probability of belonging to either regime (the market or the regulatory regime) was close to 0.7 and 0.3 respectively, which provides evidence of the dominance of the market model. They declare that capital adequacy regulation is a factor related to capital decisions, however, it is not the most important, and the pressure of market forces is the main determinant of banks capital requirements.

3.6.1.2 Treasury Bills Investments

Again according to the RBC rules, different assets with different riskiness, require the hold of different capital. Capital requirement represents a motive for banks to shift their balance sheet assets from investments that require high capital (e.g. commercial loans) towards investments that require less capital (e.g. treasury bills). So higher capital requirements push banks to invest more in T-bills since they require less capital to be held. Dietrich and James (1983) employ the ratio of U.S. treasury securities to total deposits as a proxy for default risk, and claim that the higher this ratio, the less risk from default associated with the portfolio and hence, the less capital desired. Their empirical findings support this hypothesis, and show a negative and significant effect of treasury investments on capital changes.

3.6.1.3 Off-Balance Sheet Activities

Off-balance sheet activities are subject to capital requirements, just as are on-balance sheet items and any expansion in OBS requires additional capital. Empirical studies claim that OBS activities are positively correlated with higher capital level. Rime (2001) says that capital regulation in Switzerland was revised in 1989 to take account of the development of off-balance sheet and securitisation activities. This reform, which constituted a partial harmonisation with the Basle accord, introduced heavier charges for off-balance sheet activities (i.e. more capital).

We believe that banks react to regulation and specifically to capital regulation differently according to ownership (domestic vs. foreign). We will test this empirically and therefore, we propose the following hypothesis:

H1: domestic banks and foreign banks are affected differently by regulation and the reaction of domestic banks and foreign banks to a change in regulation is different.

3.6.2 Effect of Deposit Insurance

Although capital requirements represent the main way of intervention of the authorities in the banking system, it is not the only instrument that guarantees the stability and soundness of banks. These ways of intervention are, for instance, the deposit insurance, the unconditional payment guarantees, and the lender of last resort. The lender of last resort (the central bank) provides banks with the liquidity (when needed) by discounting their assets, thus, banks avoid liquidating them and realising losses from the distress sale of assets. Therefore, the central bank plays a very important role in providing solvent but illiquid banks with needed liquidity. Therefore, it is important to test the influence of the safety net on banks, and how significant this influence is. In our case study, the safety net is formed by deposit guarantee (provided by the National Deposit Insurance Company) and the lender of last resort (the central bank). Berger et al. (1995) compared the effect of the creation of the Federal Reserve in 1914 and the Federal Deposit Insurance Corporation (FDIC) in 1933 on banks capital levels. They say that the creation of both institutions has reduced the risk of bank failures: the Federal Reserve by permitting banks to obtain liquidity through discounting assets and the FDIC by providing unconditional government guarantee for most bank creditors. Although the establishment of the two institutions has led to a decrease in banks capitalisation, they find that the creation of the Federal Reserve led to a small reduction in capital ratios, whereas the FDIC establishment had a larger and more-lasting effect. Hence, we will focus on the effect of deposit insurance on bank capital. We will proxy for this effect by the deposit-to-total liability ratio, assuming that the more the bank is financed by deposits the lower would be the market capital requirements (since all depositors are guaranteed even if the bank failed).

Government deposit insurance may protect banks from runs, but at a cost because it leads to moral hazard. By offering a guarantee that depositors are not subject to loss, the provider of deposit insurance bears a risk. This diminishes depositors' incentive to monitor banks and to demand an interest payment appropriate with the risk of the bank. Furthermore, when the insurance scheme charges the bank a flat rate premium, the bank does not internalise the full cost of risk and therefore it has an incentive to take on more risk and its appetite for risk taking increases with an increase in competition in the banking sector. For instance,

Dietrich and James (1983) claim that a conflict arises between the level of equity desired by bank shareholders and the level desired by the deposit insurance. With partial insurance, shareholders benefit from additional equity financing through a reduction in the required contracted rate on partial insured deposits. Therefore, the expected sign on the insurance variable is negative. The larger the proportion of completely insured deposit the less benefit accrues to shareholders from augmenting capital. Allen and Rai (1996) say that an increase in government subsidies may encourage banks to view the governmental safety net as a substitute for capital and, hence, reduce their capital levels. So, creditors and other bank shareholders may require lower capital in the presence of extensive and generous government guarantees. Cull et al. (2002) argue that deposit insurance schemes are primarily intended to reduce the risk of systemic failure of banks and to stabilise the payments and financial system, however it could lead to greater systemic instability. In typical deposit insurance scheme, if a depository institution becomes insolvent, the insuring government agency absorbs all (or nearly all) of the depositors' losses. This engenders a moral hazard problem because it creates an incentive for depository institutions to engage in excessively high-risk activities. They add that capital regulation is one way to mitigate the distortionary effects of deposit insurance, but it effectiveness is limited. Bhattacharya et al. (1998) argue that deposit insurance invites banks to seek excessive portfolio risk and keep lower liquidity reserves relative to the social optimum. Thus, regulatory restriction aimed at limiting risk taking may be necessary, in the form of cash-asset reserve requirements and the risk-sensitive capital requirements and deposit premia. Finally, because the deposit insurance makes banks carry more risk, it could even have a negative on the entire banking system. For instance, Demirguc-Kunt et al. (2000) studied the effect of deposit insurance in 61 countries and found that variations in coverage, funding or management of deposit insurance schemes are significant determinants of the likelihood of banking crisis, especially across countries where interest rates have been deregulated and the overall institutional framework is weak. [40] Cooper and Ross (2002) claim that although deposit insurance avoids bank runs, it implies less monitoring by depositors.

[40] The trade-off introduced by deposit insurance – ruling out bank runs at the expense of moral hazard – has motivated proposals to change the design of the deposit insurance scheme or introduce complementary regulations aimed at reducing the moral hazard while maintaining the protection to depositors. The most frequent proposals to deal with the moral hazard caused by deposit insurance are to charge banks risk-related insurance premiums and to regulate their capital structure.

which allows banks to hold riskier portfolio. If deposit insurance is complete enough, depositors and bank's interest are aligned: both are keen to hold risky portfolio, "effectively gambling with taxpayers' money". They demonstrated that a potential consequence of the combination of an inadequate capital requirement with a generous deposit insurance fund is the type of banking instability observed in the US during the 1980s.

3.6.3 Asymmetric Information and Signalling

The private information produced by banks regarding their loan customers creates an asymmetric information problem for banks vis-à-vis financial markets. Bank managers have more information about their banks' financial condition than the capital markets. Because of this opacity, the market draws inferences from the actions of the bank and managers may signal information to the market through capital decisions. If it is less costly for a "good" bank to signal high quality through increased leverage than for a "bad" bank, a signalling equilibrium may exist in which banks that expect to have better future performance have lower capital. Alternatively, a signalling equilibrium may exist in which higher capital signals favourable private information. Asymmetric information combined with transaction costs of new issues may also influence the relative costs of internal versus external finance and the relative costs of debt versus equity. When raising funds from external sources, especially the costs of issuing equity, transaction costs may be substantial.

Hughes and Mester (1998) say that managers use the level of financial capital to signal the level of risk, where an increase in financial capital reduces the probability of insolvency. Since financial capital constitutes the bank's own bet on its management of risk, it conveys a credible signal to depositors of the resources allocated to preserving capital and insuring the safety of their depositors. (Sinkey 2002, pp 269-270) claims that the confidence in a bank is a function of the real or economic net worth, the stability of economic or real earnings, and the information quality. Each of these factors has a positive and direct effect on confidence for individual banks and the banking system. The more economic net worth a bank has and the more stable a bank's (real) earnings are, the safer it is perceived to be. Besides, the better the quality of information available about a bank's financial conditions, the more confidence

interested parties have in the bank. Because banks hold capital to resolve agency conflicts between shareholders and depositors, creditors, and guarantors, equity capital provides assurances to these parties that banks will not take on excessive risk. Moreover, because it is common to view bank capital or net worth as a cushion to absorb unexpected losses arising from credit, interest rate, and operating risks, bank capital can be viewed as the critical element in generating confidence about a bank's ability to handle uncertainty.

Do all banks "signal"? In other words, do all banks use their capitalisation level to signal for confidence? We believe that this (costly) strategy is not implemented by all banks all times to attract depositors. [41] To detect this issue, we propose the following hypothesis:

H2: signalling is a (costly) strategy that is not adopted by all banks, and implemented in certain circumstances.

3.6.4 The cyclicality of bank capital

Berger et al. (1995) argue that banks may hold excess capital to be able to exploit unexpected investment opportunities. This argument, in fact, depends on how difficult it is for a bank in the short run to increase its capital, and may expect banks' buffer capital to decline in periods of high economic growth, since more profitable projects are likely to exist. It is important to analyse the variation of banks' capital level over the business cycle from the perspective of the pro-cyclicality of both the present and the forthcoming capital requirement. As a result of their evaluation of future risk and investment opportunities today versus tomorrow, banks may use their buffer capital to either dampen or increase the pro-cyclical effects embedded in the legislation. (Cull et al., 2002) claim that the pro-cyclicality comes from the closer link between risk and capital requirement. In an economic downturn, risk is more likely to increase, and the capital requirement may therefore increase. Banks are expected to respond by reducing their supply of new loans, and this will slow down economic growth, while the opposite is expected to happen in an economic development. Therefore,

[41] Another way for "signalling" may be the issuance of bonds. We focus on the usage of capital to signal because only recently banks in Lebanon started expanding their issuance of different financial instruments.

banks may use their buffer capital to either dampen or increase the pro-cyclical effects as a result of their evaluation of future risk and investment opportunities today contra tomorrow.

Does this theory applied for all banks at all times? In other words, is bank capital cyclicality applied for all banks in all times? This could not be the case. To test for this issue, we propose the following hypothesis:

H3: the cyclicality of bank capital does not apply for all banks, and is limited by certain circumstances.

3.6.5 Size Effects and the "Too-Big-to-Fail" Theory

O'Hara and Shaw (1990) tested the effect of the Too-Big-to-fail policy implemented to some banks by the regulator in the US in September 1984, and found a wealth creation to the banks subject to this policy. [42] The claim that the market reaction to this policy was because it could have an effect on bank's cost of funds. Because its cost of funds no longer tied to its riskiness, the bank has an incentive to increase the risk of its operations, which should also lead to a higher expected return.

Studies that try to find the market capital requirement and the determinants of banks capital level show a negative impact of the size on the level of capital. Among those studies, Kwan and Eisenbeis (1997) and Rime and Stiroh (2003) who find a negative and significant relation between size and capital, indicating that bank size has a negative effect on capital level. Bongini et al. (2001) found evidence of too-big-to-fail policies pursued by national authorities in the East Asian countries included in the crisis countries sample. Chiuri et al. (2002) tested the effect of capital adequacy requirements (according to Basle Accord) on bank lending policies in 15 emerging markets. They found that changes in deposits and in loans are

[42] Kaufman (2002) illustrates the emergence of the Too-big-to-fail theory in 1984, where this term is frequently used in banking to describe how bank regulators deal with troubled banks. He says that the term came into usage when the regulators in the US were faced with the insolvent Continental Illinois National in Chicago, which was the largest seventh bank in the country and the largest correspondent bank having interbank deposit and Fed funds relationship with more than 2200 other banks. Rather than allowing the bank to fail, the federal regulators protected all uninsured deposits and creditors against loss by recapitalising the bank and kept it solvent.

positively affected by changes in capital. Moreover, they found that both deposits and loans grow at a higher rate for larger banks. They argue that this is consistent with the Too-Big-To-Fail hypothesis, according to which consciousness that the risk of closure during the crisis is lower for larger institutions drives depositors to move their deposits to larger banks. Cebenoyan and Strahan (2004) also found a negative relation between capital-to-asset ratio and bank size and that increasing in bank size is associated with lower capital ratios, suggesting that larger internal capital markets allow banks to operate with a smaller cushion against insolvency. Konishi and Yasuda (2004) studied the riskiness of Japanese banks, and found that bank total assets were negatively and significantly related to bank riskiness, suggesting that large banks are more capable of managing risks than small banks. By managing their risk, large banks may be able to hold relatively less capital than smaller banks. Finally, Lindquist (2004) found a negative effect of size on Norwegian banks' buffer. He claimed that this could be due to the higher level of monitoring and screening in large banks due to scale economies may reduce the need for buffer capital as insurance. The negative size effect may also come from a diversification effect not captured by the measure of credit risk. A third explanation is related to the too-big-to-fail hypothesis.

Besides, Shrieves and Dahl (1992) studied the determinants of U.S. bank's capital changes (ΔCAP) between two periods of time. Their results show a negative impact of size on ΔCAP. However, the size variable was more significant for low capitalised banks than for high-capitalised banks. They argued that this could be interpreted as indicating that large banks were either subject to less regulatory pressure to increase capital, or that pressure exerted was less effective. Rime (2001) repeated the same test for Swiss banks. He also finds that the size of banks has a negative and significant impact on capital changes, indicating that large banks increased their ratio of capital to risk-weighted-assets less than other banks. Moreover, he finds that large banks have excess capital less than smaller ones do. He argues that their lower excess capital may be related to their easy access to capital markets, which allows them to raise capital quickly. Also Godlewski (2005) has recently applied a similar equations framework to those of Shrieves and Dahl (1992) but for emerging markets and found similar results: the size of banks has a negative and significant impact. [43] Dahl and

[43] His sample consists of 30 emerging markets from Central and Eastern Europe, Asia and South America.

Shrieves (1990) and Dahl and Spivey (1996) analyse the factors influencing equity issuance of U.S. banks. They include the lagged size of banks in their model to account for the influence of banks' size on target capital levels. They find that the size has a negative and significant effect on the required amount of equity issuance. This means that the bigger the bank, the lesser the required amount of equity to be acquired is. Houston and James (1998) argue that by establishing an internal capital market within a bank holding company, larger and diversified banks can more efficiently allocate funds within the organisation and avoid or lessen external financing costs. Such transfers of capital across regions may be difficult and costly if the bank is not affiliated with a bank holding company. They find that although both affiliated and unaffiliated banks appear to be cash flow constrained and both types of banks find it relatively costly to raise external capital, but the wedge between the cost of internal and external capital is larger for unaffiliated banks. The reason may be that bank holding companies are typically much larger than the average unaffiliated bank and their size is likely to make it easier for them to raise external capital, thereby reducing the wedge between the cost of internal and external capital.

3.6.6 Performance Effects

Profitability may have a positive impact on bank's capital when a bank can increase its capital through retained earnings rather than through equity issues, since the latter may signal negative information to the market about the bank's value. The literature has shown a positive impact of profitability (ROA) on bank's capital. For instance, Marcus (1983) finds a positive influence of ROA on capital-to-non cash assets for U.S. banks. Allen and Rai (1996) detected the determinants of bank capital level and used the NIM as a proxy for the profitability. Their results show a positive and significant effect of this factor on banks capital level. Berger and DeYoung (1997) tested the relation between banks' inefficiency and their capital level. They discover that cost-inefficient banks are likely to have low or even negative earnings, which reduce their capital. Kwan and Eisenbeis (1997) find a positive and significant relation between ROA and capital. They also find that the capitalisation is driven positively by ROA confirming that profitability leads to higher capital. Dietrich and James (1983), Jacques and Nigro (1997) and Rime (2001) find that current earnings (ROA) have a positive and

significant impact on capital changes, indicating that profitable banks can more easily improve their capitalisation through retained earnings. Regarding the factors influencing equity issuance of U.S. banks, Dahl and Shrieves (1990) and Dahl and Spivey (1996) tested the impact of profitability on the required equity acquisition (equity issuance). They found that the higher the expected ROA, the lower the desired amount of required equity acquisition in order to realise the targeted capital level. This negative and significant relation between ROA and the equity acquisition implies that profitability is an indication of the expected capability of a bank to generate equity internally through retained earnings.

3.6.7 Credit Risk Effects

Credit risk and the quality of assets have a direct effect on banks' survival. Therefore, regulators require from banks to have a higher capital according to its risk level since heavy losses resulted from investments and lending reduce the capital. Dahl and Shierves (1990) argue that the higher the credit risk facing a bank's loan portfolio, the higher the needed capital to absorb the potential losses. Shrieves and Dahl (1992) show that changes in capital levels are positively related to changes in asset risk and changes in non-performing loans (NPLs). Kwan and Eisenbeis (1997) find a negative and significant relation between capital and bad loans indicating that credit risk and financial leverage reinforce each other. They claim that greater financial leverage tends to have a positive effect on credit risk, and capitalisation responds negatively to higher credit risk. Berger and DeYoung (1997) studied the effect of previous losses on bank's capital, and used lagged NPLs (for years *t-1* to *t-4*). Their results show has a positive and significant coefficient suggesting that high levels of NPLs require high capital ratios. This positive relation was significant only for low-capital banks, which shows that these banks take action to increase capital after NPLs increase, perhaps under pressure form regulators or capital markets. According to Blose (2001) loan loss provisioning (LLP) affects a banking firm in several ways: first, the reported net income will be less for the period in which the LLP is taken. On the other hand, if the bank eventually writes down the asset, the write down will reduce taxes and thus increase the firm's cash flow. Second, since measures of capital adequacy are generally calculated using the book value of assets and book value of equity, the provisioning of loans and their associated write-downs

will cause a decline in these capital adequacy measures. Blose finds that LLP announcements have more effects on less capitalised banks, which indicates that the associated write-downs worsen capital adequacy problems for banks. Chen (2001) studied the interactions between the banking sector, asset prices and aggregate economic activity. In a basic model without asset fluctuation, when banks suffer capital erosion due to loan losses, banks with weak capital positions find it difficult to seek alternative sources of finance and are forced to cut back lending. With less investment from the previous period, entrepreneurs and banks earn less revenue and end up with a lower level of net worth, which further weakens the lending capability of banks and borrowing capacity of entrepreneurs. When fluctuations of asset prices are taken into account, the asset price becomes a dominant factor in determining the bank's capital-to-asset ratio and entrepreneurial leverage.

3.6.8 Deposit Growth Effects

High deposits and high deposit growth represent a very important (relatively cheap) source of funds to finance the bank's investments. Empirical work finds a positive correlation between deposit growth and bank's capital. Dietrich and James (1983) tested the effect of deposit growth on capital changes and found that the former has a positive effect on the later. They claim that to maintain a particular capital structure, the bank will increase its use of capital as deposits grow. Swindle (1995) also found a positive and significant impact of deposit growth on capital changes. Dahl and Shrieves (1990) find a positive and significant impact of deposit growth on equity issuance. They explain that issuing banks are characterised by rapid growth, and those banks need more capital to fund expected future asset growth. Finally, Allen and Rai (1996) found that deposit growth affects positively bank capital level. On the other hand, Soledad et al. (2001) and Chiuri et al. (2002) find that deposits respond to bank risk taking, particularly to capital adequacy risk. A rise in the capital-to-asset ratio leads to an increase in the growth rate of deposits, which conclude that depositors tend to prefer well-capitalised banks and higher capitalisation attracts more deposits.

3.7 Methodology

3.7.1 Model Specification

We assume that a bank capital is determined by two types of variables: market capital requirements and regulatory capital requirements. So the capital level (C) depends upon a set of exogenous internal variables *X*, exogenous external variables, *Y*, the regulatory *R*, and a stochastic disturbance term ε:

$$C = aX + bY + cR + \varepsilon \tag{3.1}$$

Among the internal factors, we can cite the bank's size, profitability, ownership structure, etc…, and for the external factors there is GDP. On the other hand, the regulatory is the capital requirements and reserve requirements set by the regulators. The exogenous variables in equation 3.1 are related to the capital level as follow: [44]

$$\begin{aligned} CAP_{it} &= \beta_0 + \beta_1 ROA_{it} + \beta_2 SIZE_{it} + \beta_3 OBS_{it} + \beta_4 DEP_{it} + \beta_5 RISKY_{it} + \beta_6 DEPINS_{it} \\ &+ \beta_7 CRDRISK_{it} + \beta_8 TBILLS_{it} + \beta_9 LIQ_{it} + \beta_{10} OWN_{it} + \beta_{11} FOREIGN_{it} + \beta_{12} SIGNAL_{it} \\ &+ \beta_{13} CONC_t + \beta_{14} GDP_t + \varepsilon_t \end{aligned} \tag{3.2}$$

3.7.2 The Implication of the Explanatory Variables

Regarding the explanatory variables, we will employ the following. [45] Firstly, for foreign ownership, we define a bank as "foreign", if it has more than 50% of its equity under foreign control. Consequently, this will include domestic banks under foreign control and the subsidiaries of foreign banks. We proxy for this factor by a dummy variable (FOREIGN) that takes the value of 1 if the bank is "foreign", zero otherwise. We detect the effect of bank profitability (ROA) on their capital. CRDRISK will control for the effect of credit risk. SIZE

[44] Same as in the previous chapter, we will not include all the control variables in one single model, because including perfectly correlated variables will lead to a misspecification problem. The test for multicolinearity will show what variables should not be included together.

[45] For the calculation of the variables, see Appendix 3.B

of a bank will be utilised to control for the effect of bank size. The risky assets (RISKY), off-balance sheet activities (OBS) and t-bills investments (T-bills) to control for the effect of regulation. DEPINS [46] and DEP controls for the effect of deposit insurance and costumer deposit growth on bank capital. LIQ is utilised to detect the effect of liquidity requirements/reserves on bank capital. We test for the effect of institutional ownership on banks by employing a dummy variable (OWN) that takes the value of 1 in the presence of an institutional ownership in the bank, zero otherwise. For the effect of asymmetric information and how banks use their capital as signal for solvency, we employ SIGNAL. [47] To proxy for the effect of competition on banks profits and consequently on their capital, we utilise the proportion of the top 5 banks' assets of the entire banking sector's assets (CONC). Finally, to control for the effect of the economic environment on banks' capital and to detect the cyclicality of bank capital, we exploit the GDP growth (GDP). The expectations reported in Table 3.1 are based on the findings of previous empirical studies. The variable reported with "?" have no a priori expectations, due to the lack of relevant empirical studies.

[46] A note on the deposit insurance in Lebanon is that the National Deposit Guarantee Institution (NDGI) provides the insurance to deposits in Lebanon, which was established after the failure of Bank Intra in 1966. The NDGI is a cooperative joint stock company, where banks participate in half of its capital and the government in the other half, and this capital is increased or decreased whenever a new bank is listed or deleted from the banks' list, by the amount of the bank's contribution plus the equivalent government contribution. The NDGI guarantees resident and non-resident deposits in all currencies, except foreign currency deposits held in branches abroad. The board of directors of the NDGI is formed of seven members: three are appointed by the Council of Ministers and they represent the government, and four are elected by the member banks in a general assembly. The NDGI source of funds is the annual premium paid by banks, and an amount paid annually by the government, which is equal to the total annual premium paid by all banks. Source: the central bank of Lebanon.

[47] Lindquist (2004) tested the effect of competition on Norwegian bank's capital buffer. To proxy for this variable, he used a bank's competitors' average capital. We use the same variable but implementing the average

Table 3.1: Independent Variables, Expected Sign of Coefficients

Variable	**Expected sign**
ROA	+
SIZE	-
OBS	+
DEP	+
RISKY	+
DEPINS	-
CRDRISK	+
TBILLS	-
LIQ	-
OWN	?
FOREIGN	-
SIGNAL	+
CONC	+
GDP	+

3.8 Data

To estimate Equation 3.2, we use a panel data set for the Lebanese commercial banks between 1993 and 2003, i.e. 11 years. Annual data (balance sheets and P&L accounts) are used for almost all of the population of Lebanese commercial banks. Few banks were dropped from the study because of lack of data. Data for some banks for some years were not available therefore we are analysing an *unbalanced* sample.

The source of data is BilanBanques. Regarding the macroeconomic variables, we use end of year figures (reported by the central bank of Lebanon) to be consistent with the year end banks' data. Banks' balance sheets show that most banks hold a capital ratio well above

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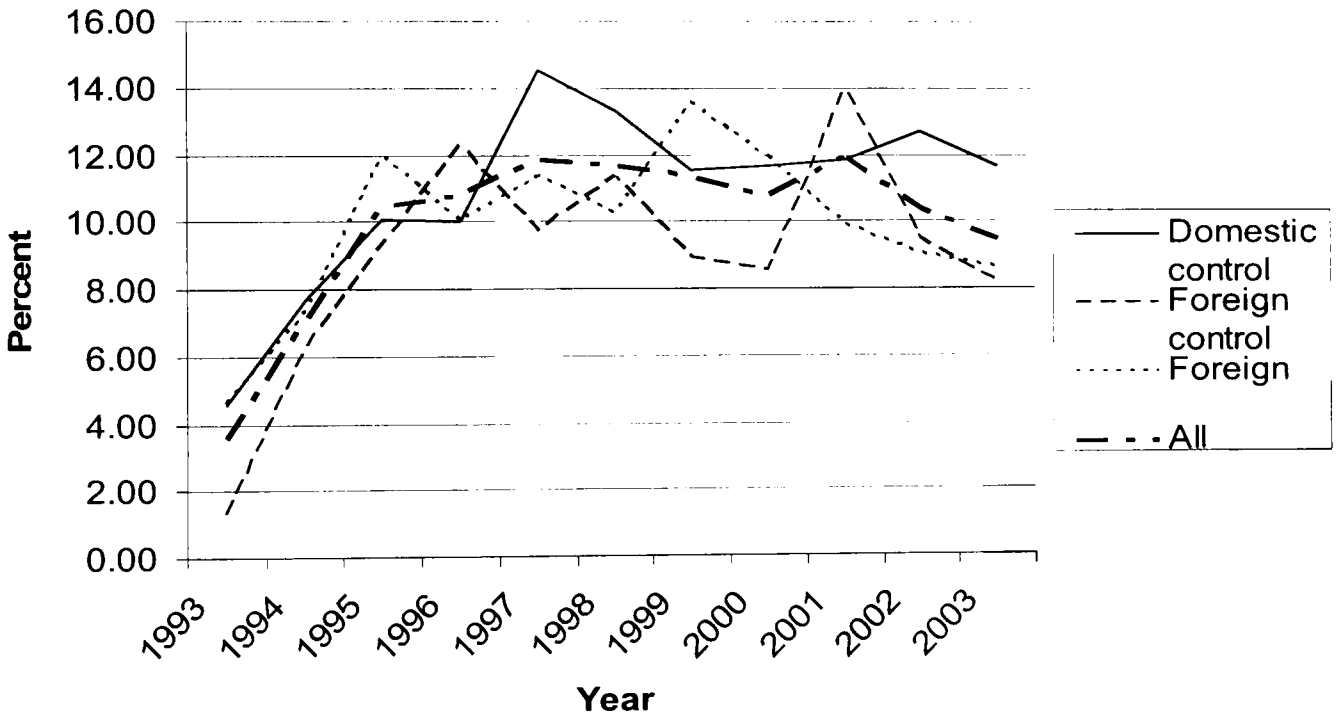
of the entire banking sector, since although these banks differ in size and ownership, they are all commercial banks and they serve the same markets and have similar activities.

the required minimum, however, and a better understanding of how these capital are determined and how they vary across banks and over time may help us to understand the effect of capital adequacy regulation for domestic banks and foreign banks.

The study focuses on the differences in capitalisation between domestic and foreign banks, thus, we split the sample into three sub-samples according to their ownership: the first sub-sample contains domestic banks with domestic control, the second contains domestic banks with foreign control, and the third contains foreign banks. The following figure shows the evolution of the equity-to-asset ratio for the entire sample and for the three sub-samples:

Figure 3.1: The Evolution of Bank Equity-to-asset ratio (According to Ownership)



To understand the data subject to analysis, we present some descriptive statistics for the period 1993-2003 in the following two tables. Table 3.2 contains the descriptive statistics for domestic banks, and Table 3.3 contains the descriptive statistics for foreign banks.

Table 3.2: Descriptive Statistics for Domestic Commercial Banks

		CAP	ROA	DEP	RISKY	DEPINS	CRDRISK	T-BILLS	LIQ
1993	Mean	4.42	0.36	27.88	66.54	81.40	67.95	23.30	64.61
	Median	3.58	0.17	27.47	67.58	85.68	14.16	19.83	66.02
	SD	4.25	0.46	28.01	12.79	14.17	309.63	10.00	12.39
	Maximum	19.33	1.70	135.80	94.63	94.14	2019.76	47.17	89.79
	Minimum	0.02	0.00	-15.43	29.59	14.36	0.00	2.18	23.03
1994	Mean	6.19	1.22	33.20	56.58	79.93	20.12	28.77	62.83
	Median	4.95	0.97	32.50	56.57	83.72	10.60	27.68	61.39
	SD	4.63	1.55	23.81	11.18	12.99	35.43	9.42	10.46
	Maximum	19.29	7.12	89.62	81.79	93.92	194.22	51.07	94.53
	Minimum	0.06	-2.80	-32.34	29.84	17.78	0.00	7.47	36.13
1995	Mean	10.35	1.05	25.57	58.72	74.93	19.78	27.78	58.25
	Median	6.72	0.96	17.90	59.06	81.54	11.24	27.42	57.43
	SD	14.35	1.77	31.27	13.27	20.28	39.14	10.47	12.02
	Maximum	98.09	6.86	160.55	100.00	90.69	246.76	47.93	97.10
	Minimum	2.55	-5.30	-47.55	16.40	1.46	0.00	0.00	32.72
1996	Mean	9.02	1.34	33.37	55.38	76.63	19.46	31.73	61.23
	Median	7.14	1.20	31.28	54.15	80.59	8.18	31.82	61.51
	SD	5.34	1.87	20.66	12.37	17.27	41.78	11.33	12.10
	Maximum	25.05	11.66	87.60	100.00	90.51	270.66	55.39	97.78
	Minimum	3.38	-2.38	-8.32	22.41	3.31	0.00	0.00	25.17
1997	Mean	13.85	1.20	27.47	56.68	76.62	15.78	26.55	61.58
	Median	9.03	1.28	23.20	56.27	80.82	12.21	26.81	60.72
	SD	15.37	1.20	21.96	13.61	15.76	15.82	11.41	11.92
	Maximum	89.26	5.62	88.72	81.53	87.56	74.74	49.48	97.87
	Minimum	3.61	-0.69	-25.88	14.59	3.91	0.00	1.43	35.69
1998	Mean	12.49	1.17	36.80	56.88	75.85	14.20	31.32	60.83
	Median	8.78	1.10	21.50	57.56	80.73	10.32	31.24	62.06
	SD	10.81	1.24	65.57	12.51	12.34	13.04	10.86	10.35
	Maximum	49.87	6.89	363.41	81.67	92.82	67.85	57.85	78.32
	Minimum	3.28	-0.08	-54.73	30.84	40.74	0.00	5.57	36.06

1999	Mean	10.37	0.63	26.93	54.83	79.53	14.24	33.85	59.25
	Median	8.08	0.75	15.65	53.88	81.59	11.38	34.19	59.40
	SD	7.77	0.77	54.02	11.43	7.49	11.14	10.62	11.16
	Maximum	41.72	1.91	295.54	81.54	89.09	57.85	57.57	76.09
	Minimum	3.07	-1.23	-66.67	26.05	54.90	0.34	8.85	22.06
2000	Mean	9.97	0.50	18.93	56.18	80.58	15.37	31.46	61.46
	Median	7.84	0.56	14.69	56.57	82.10	13.01	30.91	64.87
	SD	6.70	0.84	26.37	13.07	8.15	12.26	12.30	11.23
	Maximum	39.01	1.78	111.35	85.29	89.88	62.75	64.02	76.86
	Minimum	3.99	-2.57	-21.04	24.29	54.69	0.13	4.43	34.99
2001	Mean	9.49	0.47	23.73	53.06	82.37	18.86	30.03	64.82
	Median	7.71	0.58	9.77	49.17	83.74	15.44	32.01	68.03
	SD	6.81	0.71	59.11	12.65	6.73	15.52	11.67	11.52
	Maximum	39.88	1.61	327.14	85.11	89.88	75.74	56.13	80.36
	Minimum	3.51	-2.21	-6.73	27.32	55.94	0.06	5.02	39.73
2002	Mean	9.25	0.68	22.04	51.01	81.80	20.91	33.51	67.08
	Median	8.12	0.72	10.62	47.34	84.48	17.94	35.62	67.36
	SD	6.71	0.49	34.63	14.72	7.26	13.60	12.69	10.06
	Maximum	38.45	1.84	184.94	96.67	89.05	62.11	58.77	83.00
	Minimum	3.69	-0.07	-1.72	24.47	54.54	3.79	2.75	41.80
2003	Mean	7.70	0.70	20.45	45.66	81.75	24.60	24.27	70.92
	Median	6.73	0.82	16.95	43.06	84.46	22.34	25.96	74.26
	SD	3.89	0.62	14.29	13.55	6.34	17.72	9.00	10.71
	Maximum	18.06	1.67	54.41	78.52	91.13	82.28	38.73	87.40
	Minimum	2.29	-1.41	-0.37	16.39	62.56	4.82	1.96	45.35

Notes:

CAP is the equity-to-asset ratio; ROA is the after tax net profit-to-average asset ratio; DEP is the deposit (percentage) growth; RISKY is the risky asset-to-total asset ratio; DEPINS is the deposit-to-total liability ratio; CRDRISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; LIQ is the liquid assets-to-total asset ratio.

Table 3.3: Descriptive Statistics for Foreign Commercial Banks

		CAP	ROA	DEP	RISKY	DEPINS	CRDRISK	T-BILLS	LIQ
1993	Mean	4.83	2.26	17.92	53.37	78.50	136.68	18.26	69.59
	Median	2.71	0.74	16.93	57.74	88.76	19.22	19.11	71.77
	SD	7.07	5.93	20.11	20.41	21.35	436.17	9.39	14.81
	Maximum	31.77	27.05	49.86	92.51	95.01	1971.20	35.21	97.07
	Minimum	0.47	0.00	-13.55	21.02	21.46	0.00	5.56	39.03
1994	Mean	7.79	1.51	24.07	47.81	75.30	100.82	20.81	68.05
	Median	4.55	1.55	27.00	46.11	84.07	16.52	20.53	70.10
	SD	12.04	1.88	31.72	14.02	21.20	348.35	10.99	13.66
	Maximum	56.88	4.94	129.08	76.78	93.96	1577.42	41.62	95.24
	Minimum	0.69	-3.72	-43.05	27.97	22.13	0.00	2.39	40.90
1995	Mean	9.51	1.69	12.64	48.04	74.49	51.62	21.06	61.92
	Median	6.91	1.56	9.91	50.29	79.77	11.72	18.99	63.39
	SD	9.92	1.49	21.23	16.59	19.47	164.20	10.17	15.83
	Maximum	44.54	5.46	87.25	81.80	92.51	764.19	38.03	92.12
	Minimum	0.75	-0.69	-22.59	23.25	19.60	0.00	1.18	25.64
1996	Mean	10.08	1.39	21.03	48.32	75.51	40.22	25.83	61.94
	Median	7.48	1.22	23.98	45.03	84.24	7.52	24.34	60.84
	SD	9.20	1.31	16.83	17.89	19.45	122.69	13.12	15.02
	Maximum	40.32	4.82	57.53	89.62	93.98	572.02	50.56	90.86
	Minimum	0.96	-1.27	-8.63	21.15	21.29	0.00	1.82	26.27
1997	Mean	11.85	1.50	42.35	46.97	71.48	38.22	23.66	63.59
	Median	7.92	1.53	20.79	43.20	79.13	13.20	22.99	66.14
	SD	10.59	1.13	105.06	16.51	19.08	103.54	11.46	15.38
	Maximum	44.77	4.25	481.43	82.27	90.75	475.20	49.16	93.19
	Minimum	1.50	-0.14	-33.74	26.62	34.34	0.00	4.42	30.84
1998	Mean	8.40	1.00	19.17	16.36	23.66	121.52	12.76	15.97
	Median	7.30	0.97	18.59	47.86	81.13	13.08	20.20	63.04
	SD	8.40	1.00	19.17	16.36	23.66	121.52	12.76	15.97
	Maximum	37.16	3.16	60.07	78.69	91.74	568.17	51.08	93.37
	Minimum	2.46	0.00	-40.40	16.97	27.24	0.00	6.73	27.40

1999	Mean	14.18	0.58	13.16	45.80	67.77	32.63	29.31	62.38
	Median	8.53	0.83	6.14	44.10	79.81	11.37	24.17	61.24
	SD	17.78	1.77	22.95	18.24	24.26	88.77	15.86	16.39
	Maximum	84.79	3.45	101.48	79.28	93.54	427.00	59.97	91.15
	Minimum	1.58	-4.79	-2.98	17.55	11.73	0.00	8.27	26.69
2000	Mean	12.48	0.86	32.62	44.67	69.10	34.51	25.07	63.89
	Median	9.94	0.78	9.86	42.84	76.50	19.94	24.40	65.97
	SD	12.56	1.48	81.65	15.66	20.22	82.08	14.70	15.19
	Maximum	57.15	3.23	380.15	79.56	91.54	387.39	51.58	91.42
	Minimum	0.72	-3.08	-5.68	17.79	32.51	0.00	1.45	25.38
2001	Mean	10.19	0.82	19.00	44.61	74.29	26.73	21.73	65.17
	Median	7.74	0.58	1.28	46.74	84.21	23.51	20.57	61.95
	SD	7.65	1.60	55.65	16.06	18.65	35.50	13.35	15.01
	Maximum	25.79	3.82	203.00	72.89	91.42	152.25	51.72	83.14
	Minimum	2.91	-3.62	-16.55	18.97	27.28	0.00	1.64	28.26
2002	Mean	9.31	0.96	26.35	42.52	77.17	22.58	22.13	68.23
	Median	6.93	0.74	1.19	42.87	82.37	21.29	19.62	63.37
	SD	6.63	1.14	84.71	14.74	11.97	19.35	13.29	13.49
	Maximum	27.11	3.26	346.36	66.65	90.23	68.82	53.05	89.72
	Minimum	2.97	-1.34	-20.50	14.58	52.76	0.00	5.24	46.18
2003	Mean	12.76	0.62	-0.19	40.43	77.70	39.11	18.43	68.08
	Median	6.74	0.54	-2.83	40.94	80.91	32.72	14.95	72.47
	SD	17.45	1.05	12.91	13.52	11.56	44.23	12.36	15.49
	Maximum	77.09	2.46	18.27	61.09	90.11	180.17	41.11	92.59
	Minimum	3.03	-1.85	-37.28	14.95	51.33	0.00	4.66	43.37

Notes:

CAP is the equity-to-asset ratio; ROA is the after tax net profit-to-average asset ratio; DEP is the deposit (percentage) growth; RISKY is the risky asset-to-total asset ratio; DEPINS is the deposit-to-total liability ratio; CRDRISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; LIQ is the liquid assets-to-total asset ratio.

3.9 Empirical Results

3.9.1 Fixed Effects vs. Random Effects: the Hausman Test

Firstly, we will perform the Hausman test in order to test the existence of Random effects, and thus choosing between the Fixed Effects or the Random Effects model. We run a regression model using both the Random Effects and the Fixed Effects, and the results of the test of individual coefficient are reported in Appendix 3.C. The critical χ_1^2 value is 3.84 at the 5% level and as we see from column four, the null hypothesis that the two coefficient estimates are equal is accepted in 11 cases out of the 13 cases.

Next, we undertake a joint χ^2 test of all the coefficients. This results in an m-statistic of: $m = \hat{q}'\hat{M}(\hat{q})^{-1}\hat{q} = 153.77$. Since m is distributed asymptotically as χ_{13}^2 which has a critical value of 22.36 at the 5% level, this gives evidence of the presence of misspecification in the Random Effects model and therefore, we will run all the regressions using the Fixed Effects models (LSDV).

3.9.2 The Entire Sample

In this section, we include all the banks in our sample regardless of their ownership. By doing this, we will be able to compare our results with those reported by the literature. The outcomes of the first regression are reported in Table 3.4. [48] Before analysing the individual coefficient, we look at the explanatory power of the entire models. These models seem to be satisfactory for estimating the determinants of banks' capital since they generate an adjusted R-squared of more than 75%. Besides, the F-test shows the significance of the models.

[48] We present different regression models in each section, where each one does not include all the control variables. We do this to avoid any multicolinearity among the regressors. The tests show that LIQ and T-bills should not be included together in one single model, as well as OWN and FOREIGN, since they are perfectly correlated.

Table 3.4: The Determinants of Commercial Bank Capital – Regression Estimates for the Entire Sample (1993-2003)

	(1)	(2)	(3)	(4)
C	46.06** (2.32)	39.17*** (3.02)	47.57** (2.27)	40.26*** (2.88)
LAG_CAP	0.35* (1.91)	0.34* (1.91)	0.34* (1.91)	0.34* (1.91)
ROA	0.37** (2.12)	0.32** (2.38)	0.45** (2.48)	0.40*** (2.94)
SD_ROA	0.35** (2.16)	0.33** (2.18)	0.34** (2.18)	0.33** (2.20)
SIZE	-0.23*** (-2.61)	-1.85*** (-2.68)	-2.24** (-2.44)	-1.86** (-2.52)
OBS	-0.11 (-1.03)	-0.12 (-1.04)	-0.12 (-1.13)	-0.14 (-1.13)
DEP	-0.003 (-0.30)	-0.003 (-0.24)	-0.003 (-0.30)	-0.003 (-0.25)
RISKY	-0.10 (-1.44)	-0.09* (-1.82)	-0.10 (-1.44)	-0.08* (-1.78)
DEPINS	-0.30*** (-2.98)	-0.30*** (-2.87)	-0.29*** (-2.98)	-0.29*** (-2.87)
CRDRISK	-0.005* (-1.88)	-0.005* (-1.73)	-0.01* (-1.86)	-0.005* (-1.75)
TBILLS	-0.07 (-0.92)		-0.07 (-0.95)	
LIQ		-0.04 (-1.14)		-0.03 (-1.09)
OWN	0.46 (1.01)	0.67 (1.44)		
FOREIGN			-3.59*** (-3.38)	-3.55*** (-3.58)
SIGNAL	0.28*** (5.56)	0.21** (2.38)	0.29*** (6.10)	0.23*** (2.69)
CONC	0.39*** (3.39)	0.44*** (2.75)	0.39*** (3.56)	0.45*** (2.84)
GDP	0.01 (0.03)	0.12** (2.19)	0.04 (0.15)	0.09** (2.10)
Adjusted R-squared	0.7506	0.7491	0.7535	0.7518
TxN	605	605	605	605
F-statistic	22.909	22.737	23.246	23.049
Prob(F-statistic)	0.0000	0.0000	0.0000	0.0000

***Notes*:**
All regressions are estimated with Fixed Effects model (LSDV). For a sample of 70 commercial banks (domestic and foreign) and for a period of 11 years, we estimate the determinants of commercial bank capital.
The dependent variable is CAP, which is the equity-to-asset ratio; LAG_CAP is the year *t-1* CAP; ROA is the after tax net profit-to-average asset ratio; SD_ROA is the standard deviation of ROA for the years *t-2, t-1* and *t*; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; RISKY is the risky asset-to-total asset ratio; DEPINS is the deposit-to-total liability ratio; CRDRISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; LIQ is the liquid assets-to-total asset ratio; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; SIGNAL is banking sector average CAP; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth.
t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.
*** Significantly different from zero at the 1% level.
** Significantly different from zero at the 5% level.
* Significantly different from zero at the 10% level.

From Table 3.4, we conclude the following: the profitability has a positive and strong effect on bank's capitalisation and it suggests that banks rely mainly on their (retained) profits to increase their capital. Thus, banks (domestic or foreign?) that have higher profitability have better ability to boost their capital. The volatility of earnings has a positive effect, which may suggest that when these earnings become volatile, banks boost their capital using (external) funds. Larger banks keep lower capital than their smaller counterparts, which is shown by the

negative and significant effect of SIZE. Thus, we can see clearly that the diversification effects and the too-big-to-fail doctrine hold in this context. This is consistent with the findings of the literature, which suggest that larger banks have better ability to access capital markets (local and/or international) and increase their capital when needed. Larger banks tend to keep lower capital, and when they observe new investment opportunities or when capital requirements increase, they can "easily" adjust their capital. Regarding OBS activities, RISKY and T-bills, we do not see the expected sign and there is no evidence that banks change their capital according to the increase or decrease of such items, which is required according to Basle I. This means that the regulatory effect is not binding. [49] By looking at DEPINS, we see that it has a negative and significant effect on bank capital. Banks rely on deposits to increase their investment capabilities (loans and advances) and when the proportion of deposits among the liabilities increases, the importance of the capital decreases. The problem of moral hazard is clear here, where banks use the deposit insurance privilege to increase their leverage. FOREIGN shows a negative and strong influence effect on capital. However, we have to deepen our analysis to see "which" foreign banks are behind this result. The results show support for the signalling theory in our case study: banks do use their solvency as a signal to depositors and other interested parties. The concentration shows a positive effect on bank's capital. Finally, we find that GDP has a positive and significant influence on bank's capital. This gives support to the theory of bank capital cyclicality and banks do adjust their capital according to the economic cycle.

We can claim that our findings are generally in consistence with the literature when we analyse the entire sample of banks and ignore the ownership effects on one hand, and any "structural breaks" on the other. Thus, the principles (theories) cited previously, hold in this case. However, we will see if by splitting (1) the sample and (2) the time period under study, new results will emerge, and if all these principles will still hold.

[49] These findings are consistent with those of Billet et al. (1998), who show that banks consider the market discipline (reaction) more importantly than the regulatory discipline.

3.9.3 The Determinants of Bank Capital and the Effect of Foreign Ownership

In this section we split the sample into three sub-samples: (1) domestic banks with majority domestic control (ownership), (2) domestic banks with majority foreign control, and (3) foreign banks. This division allows detection of the effect of foreign ownership on bank's capital shown in Table 3.4 on one hand, and what factors are important in affecting the capitalisation level of domestic and foreign banks, on the other. In Table 3.5 we include domestic banks only regardless of their ownership to detect the determinants of domestic bank capital and to test the effect of foreign investment in domestic banks on capitalisation level. The results are as follows.

The results reported for domestic banks only show some differences from the entire sample. The remarks from Table 3.5 are: the profitability of domestic banks has a significant positive effect on their capital. Domestic banks depend on retained profits to increase their equity. More profitable banks have better ability to meet higher capital requirements. The volatility of earnings has lost its effect. This may show that because domestic banks rely mainly on retained profits to boost their capital, the volatility of earnings weaken the capability of these banks to increase their capital. SIZE shows a negative impact and larger domestic banks hold less equity than smaller ones and have higher leverage. Larger domestic banks consider themselves "too-big-to-fail" and therefore, they keep less capital. By focusing on the effect of regulation, it seems that domestic banks do not adjust their capital according to OBS activities, where we do not see an effect of such activities on bank's capital. Regarding RISKY, this factors also does not show the expected sign. According to Basle I, the increase in risky assets should be accompanied by an increase in capital. However, we do not see that domestic banks modify their equity according to the growth of risky assets in their portfolio. T-bills show some negative impact on banks' capital and domestic banks tend to invest in government bonds because it requires holding less capital according to Basle I. The main conclusion from testing the effect of these last three variables is that regulation is not significantly binding and it does not have a strong effect on domestic banks behaviour. Deposit growth does not show to have a significant influence on domestic banks' capital. But DEPINS shows a negative impact on capital, which suggests the existence of the moral hazard

problem because they rely on the deposit insurance to lower their capital. The credit risk has a positive strong effect on the capital, which means that domestic banks adjust their capital with the quality of their asset portfolios and adopt the RBC here. The data show that LIQ is negatively correlated with capital, which means that additional liquidity and reserve requirements affects negatively the ability of banks to boost capital.

Table 3.5: The Determinants of Commercial Bank Capital – Regression Estimates for Domestic Banks (1993-2003)

	(1)	(2)	(3)	(4)
C	65.29** (2.25)	52.44*** (2.77)	65.23** (2.20)	52.25*** (2.66)
LAG_CAP	0.36* (1.76)	0.34 (1.61)	0.36* (1.79)	0.35 (1.63)
ROA	0.69** (2.16)	0.55** (2.38)	0.75** (2.35)	0.62** (2.59)
SD_ROA	0.18 (0.57)	0.13 (0.45)	0.16 (0.51)	0.10 (0.40)
SIZE	-2.86*** (-2.76)	-2.31*** (-2.77)	-2.90** (-2.59)	-2.34*** (-2.68)
OBS	-0.09 (-0.92)	-0.12 (-0.96)	-0.1 (-1.04)	-0.14 (-1.06)
DEP	0.002 (0.19)	0.004 (0.27)	0.002 (0.19)	0.004 (0.26)
RISKY	-0.14 (-1.21)	-0.11 (-1.39)	-0.13 (-1.21)	-0.10 (-1.36)
DEPINS	-0.40*** (-3.15)	-0.40*** (-3.01)	-0.39*** (-3.12)	-0.39*** (-2.98)
CRDRISK	0.04** (2.20)	0.04** (2.42)	0.03* (1.86)	0.03** (2.07)
TBILLS	-0.13† (-1.27)		-0.12† (-1.26)	
LIQ		-0.06† (-1.23)		-0.05† (-1.22)
OWN	-0.23 (-0.32)	0.14 (0.22)		
FOREIGN			-2.73*** (-3.41)	-2.77*** (-3.39)
SIGNAL	0.23* (1.82)	0.15 (0.85)	0.22* (1.78)	0.15 (0.85)
CONC	0.42*** (3.55)	0.53** (2.56)	0.43*** (3.64)	0.54*** (2.62)
GDP	0.21 (0.52)	0.20** (2.08)	0.21 (0.54)	0.19*** (2.67)
Adjusted R-squared	0.6789	0.6740	0.6812	0.6765
TxN	402	402	402	402
F-statistic	14.900	14.596	15.049	14.747
Prob(F-statistic)	0.0000	0.0000	0.0000	0.000

***Notes*:**

All regressions are estimated with Fixed Effects model (LSDV). For a sample of 48 domestic commercial banks and for a period of 11 years, we estimate the determinants of domestic commercial bank capital.

The dependent variable is CAP, which is the equity-to-asset ratio; LAG_CAP is the year *t-1* CAP; ROA is the after tax net profit-to-average asset ratio; SD_ROA is the standard deviation of ROA for the years *t-2*, *t-1* and *t*; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; RISKY is the risky asset-to-total asset ratio; DEPINS is the deposit-to-total liability ratio; CRDRISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; LIQ is the liquid assets-to-total asset ratio; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; SIGNAL is banking sector average CAP; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth.

t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

† Significantly different from zero at the 12% level.

Institutional ownership does not show any effect on bank's capital. On the other hand, foreign ownership in domestic banks does have a significant effect on bank capital and thus, domestic banks capital differs according to ownership. Interestingly, we find a support for the signalling theory among domestic banks and we see that they use their capital level as a sign of confidence to depositors and maybe to other parties about their solvency. The cyclicality of domestic bank capital is obvious in the reported results. GDP has a positive effect on domestic bank's capital and thus, domestic banks do adjust their equity according to the economic cycle. In the case of economic growth, domestic banks boost their capital and decrease it in the cases of economic recession.

Next, we consider the subsidiaries of foreign banks as "foreign" and we include them with domestic banks with domestic control to detect the difference between the two categories and how foreign banks differ from domestic banks in terms of capitalisation. The results reported in Table 3.6 show clearly that foreign banks hold less capital than domestic banks. Foreign banks hold capital less than domestic banks for – at least – two reasons:

a. Firstly, since capital is costly, they try to keep the minimum (costly) capital in their subsidiaries and when needed, they can channel funds to these subsidiaries.
b. Second, their existence in the host market is to collect deposits and channel them to their home market or to some other markets where investment opportunities are better. Therefore, they try to keep the minimum (unemployed) funds in the host market.

Table 3.6: The Determinants of Commercial Bank Capital – Regression Estimates for Domestic Banks with Domestic Control and Foreign Banks (1993-2003)

	(1)	(2)
C	43.07*** (2.68)	41.07*** (3.60)
LAG_CAP	0.40*** (2.65)	0.40*** (2.75)
ROA	0.20 (0.78)	0.19 (0.74)
SD_ROA	0.23** (2.02)	0.23** (2.07)
SIZE	-2.29*** (-3.09)	-2.19*** (-3.27)
OBS	-0.08 (-0.91)	-0.08 (-0.91)
DEP	-0.01 (-1.00)	-0.001 (-1.01)
RISKY	-0.04 (-1.58)	-0.04 (-1.39)
DEPINS	-0.26*** (-2.80)	-0.26*** (-2.75)
CRDRISK	-0.01* (-2.19)	-0.01* (-1.95)
TBILLS	-0.02 (-0.45)	
LIQ		-0.005 (-0.13)
FOREIGN	-3.37*** (-2.84)	-3.31*** (-3.79)
SIGNAL	0.35*** (6.65)	0.34*** (3.64)
CONC	0.31*** (3.73)	0.32*** (4.04)
GDP	0.03 (0.17)	0.06 (0.44)
Adjusted R-squared	0.8459	0.8458
TxN	517	517
F-statistic	40.367	40.330
Prob(F-statistic)	0.0000	0.0000

Notes:
All regressions are estimated with Fixed Effects model (LSDV). For a sample of 59 commercial banks (domestic with domestic control and foreign) and for a period of 11 years, we estimate the determinants of domestic and foreign bank capital.
The dependent variable is CAP, which is the equity-to-asset ratio; LAG_CAP is the year *t-1* CAP; ROA is the after tax net profit-to-average asset ratio; SD_ROA is the standard deviation of ROA for the years *t-2, t-1* and *t*; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; RISKY is the risky asset-to-total asset ratio; DEPINS is the deposit-to-total liability ratio; CRDRISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; LIQ is the liquid assets-to-total asset ratio; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; SIGNAL is banking sector average CAP; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth.
t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.
*** Significantly different from zero at the 1% level.
** Significantly different from zero at the 5% level.
* Significantly different from zero at the 10% level.

3.9.4 The Determinants of Foreign Bank Capital

In this section, we include only foreign banks to detect the important factors that affect their capitalisation level. The results are presented in Table 3.7. Firstly, the profitability of foreign banks does not show to have any effect on their capitalisation. Thus, foreign banks do not rely on retained profits and do not modify their capital according to the annually realised

profits. Foreign banks channel their profits abroad to their home market and they do not keep these profits in their subsidiaries as reserves because they can inject funds when needed. SIZE loses its significant effect here and this shows that foreign banks hold similar capital regardless of their size. In contrast to domestic banks, foreign banks rely on deposits to boost their investment capability. Foreign banks share the domestic banks the moral hazard problem where the deposit insurance has a negative effect on their capitalisation. OBS activities and risky assets have no effect on foreign bank capital. Additionally, foreign banks do not adjust their capital according to the credit risk. This last point gives support to *H1* and shows that domestic banks and foreign banks differ in the way they follow regulation. On the contrary to domestic banks, T-bills and liquidity do not have a significant effect on foreign bank capital. These banks do not hold government bonds to avoid holding more capital and liquidity requirement do not impact their capital. The findings show that foreign banks do not use their capital level as a signal for confidence, which is used by domestic banks as shown above and this gives support to *H2*. The literature argues that banks use their capital level to signal, but it is interesting to find that this theory does not apply for foreign banks. It could be that foreign banks rely on their "name" and reputation as a confidence sign rather than their capital. The concentration does not influence foreign bank capital. Finally, we see that GDP does not have any effect on foreign bank capital. This also gives support to *H3* and suggests that the cyclicality of bank capital does not apply to foreign banks. Foreign banks do not modify their capital according to the host market economic conditions. It could be that those banks operate in the host market to collect deposits and channel them abroad.[50]

[50] Lindquist (2004) studied the determinants of Norwegian banks' buffer during the period 1995q4-2001q4. He found a negative (insignificant) relationship between economic growth and buffer capital. He claimed that this may support the hypothesis that banks hold excess capital to be able to exploit unexpected investment opportunities. However, we believe that the "no effect" of GDP on foreign bank capital is due to the fact that foreign bank may channel their funds abroad to invest them in better investment opportunities. This actually consists with our findings in the previous chapter, where we found that foreign bank profitability is not affected by the economic conditions of the host market.

Table 3.7: The Determinants of Commercial Bank Capital – Regression Estimates for Foreign Banks (1993-2003)

	(1)	(2)
C	11.38 (0.48)	12.87 (0.66)
LAG_CAP	0.31* (1.93)	0.30** (2.02)
ROA	0.39 (1.55)	0.40 (1.61)
SD_ROA	0.41** (2.15)	0.41** (2.12)
SIZE	-0.14 (-0.08)	-0.09 (-0.05)
OBS	-0.10 (-0.68)	-0.10 (-0.67)
DEP	-0.05* (-1.68)	-0.05* (-1.72)
RISKY	-0.01 (-0.27)	-0.02 (-0.58)
DEPINS	-0.18** (-2.45)	-0.18** (-2.49)
CRDRISK	-0.01*** (-3.24)	-0.01*** (-2.78)
TBILLS	0.01 (0.20)	
LIQ		-0.01 (-0.27)
SIGNAL	0.37 (1.62)	0.36 (1.34)
CONC	0.19 (1.21)	0.19 (0.98)
GDP	0.29 (0.89)	0.28 (1.05)
Adjusted R-squared	0.7345	0.7345
TxN	207	207
F-statistic	17.288	17.288
Prob(F-statistic)	0.0000	0.0000

***Notes*:**
All regressions are estimated with Fixed Effects model (LSDV). For a sample of 23 foreign commercial banks and for a period of 11 years, we estimate the determinants of foreign commercial bank capital.
The dependent variable is CAP, which is the equity-to-asset ratio; LAG_CAP is the year *t-1* CAP; ROA is the after tax net profit-to-average asset ratio; SD_ROA is the standard deviation of ROA for the years *t-2, t-1* and *t*; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; RISKY is the risky asset-to-total asset ratio; DEPINS is the deposit-to-total liability ratio; CRDRISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; LIQ is the liquid assets-to-total asset ratio; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; SIGNAL is banking sector average CAP; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth.
t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.
*** Significantly different from zero at the 1% level.
** Significantly different from zero at the 5% level.
* Significantly different from zero at the 10% level.

3.10 The Reaction of Banks to Changes in Regulation (Tighter Capital Requirements)

In the previous sections, we have analysed and tested the differences between the capitalisation of domestic and foreign banks operating in the Lebanese market during the period 1993-2003. Since 1993, all banks operating in Lebanon are subject to the capital

adequacy standards as implemented by the Basle Accord in 1988. Thus, all banks were required to hold a minimum of 8% risk-adjusted capital. In September 1999, these capital requirements were increased by the central banks and banks were required to increase this ratio to 10% by the end of 2000 and 12% by the end of 2001. [51] It is important to test the reaction of banks to these new capital requirements and if (and how) the factors tested in the previous section change of importance when regulation becomes tighter. We assume that the behaviour of banks changes when they are required by regulators to boost their capital. This important change in legislation may cause a change in the behaviour of banks and consequently, it will change the effect of the employed factors before and after it. [52] This may result in instability in (some of) the parameters and thus a "structural break". A structural break may cause a different effect between the two sub-periods and of some the previously reported result may not hold. [53] To test for this matter, we will perform the Chow test. We divide the period under study into two sub-periods: the first from 1993 to 1998 and the second from 1999 to 2003. [54] Then, we run the same regression with the same variables for each of the two sub-periods. The F statistic of the Chow test is based on the comparison of the restricted and unrestricted Sum of Squared Residuals, and it is computed as:

$$F = \frac{(RSS_R - RSS_{UR})/k}{RSS_{UR}/(N-2k)} \sim F_{k,N-2k} \qquad (3.3)$$

where, the RSS_R is for the restricted model (no structural break), and RSS_{UR} is the sum of the RSS of the two sub-periods.

For the first regression model reported in Table 3.5, the Chow test is:

$RSS_R = 9556.73$ and the $RSS_{UR} = 7320.94 + 592.00 = 7912.94$

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[51] In fact this policy has had – additionally – another important objective, which is contracting the increased competition among banks operating in the Lebanese market that may lead to excessive risk-taking by banks (we will see how this policy was implemented also to push banks towards merging in the following chapter). A support to this policy is suggested by the findings of Acharya (2001). Acharya argues that the industrial organisation of the banking sector, in particular the degree of competition among banks affects their risk-taking incentives. More precisely, a more competitive banking sector has banks that may realise lower profits and take greater risk. Hence, the optimal design of capital adequacy regulation should be sensitive to the industrial organisation of the banking sector.

[52] i.e. the variables-regressors employed in the regressions in the previous sections.

[53] The first division of our panel data was "horizontal", i.e. the sample of banks was broken-down. We found that it has resulted in finding several different results from those found by the literature. This second division, which is "vertical" this time, i.e. the time period will be split, may allow for some more different results to emerge and thus, more findings of the literature may not hold.

[54] We include the year 1999 with the second sub-period because it is known that banks start preparing themselves for the new capital requirements and start increasing their capital immediately after the new law is passed.

$$F = \frac{(9556.73 - 7912.94)/14}{7912.94/577} = 8.77$$

The critical $F_{14,577} = 1.67$. Since the computed F is greater that the critical F, we reject the null hypothesis of no structural break. We found similar results for the first model reported in Table 3.4 and Table 3.6. This shows that the effect of variables changes between the first and the second sub-period, and therefore, we have to run different regressions for each of them.

The literature has looked at the effect of new (binding) regulations and the effect of tighter capital requirements on banks and the reaction of banks have been analysed by many empirical studies. However, those studies have looked at the effect on the banking as a whole without considering how banks react to tightening capital requirements taking into consideration the ownership effects. For instance, Jagtiani and Khanthavit (1996) who studied the effect on introducing the Risk-Based Capital on banks, showed that the tighter capital requirements has reduced the optimal bank size that achieves maximum scale and scope economies: large banks that previously were efficient became too large and inefficient. They argue that these results suggest that regulations that encourage large banks to expand their production and product mixes may result in a less efficient banking industry. Schargrodsky and Sturzenegger (2000) studied the effect of tighter capital requirements on Argentinean banks. They found that tighter capital requirements induce banks to chose a lower degree of product differentiation. They also found that although the higher degree of concentration provides firms with enlarged market power, the lower degree of differentiation forces banks to compete more intensively in prices.

3.10.1 The Response of Domestic Banks

We present two different models in the Table 3.8. The second and the third column are for the same model but ran in the two sub-periods. Also the fourth and the fifth column are for the same model, but ran also in the tow sub-periods. It is clear that some of the previously reported results do not hold in the two sub-periods giving additional evidence to the existence of structural break.

Table 3.8: The Determinants of Commercial Bank Capital – Regression Estimates for Domestic Banks (1993-1998 and 1999-2003)

	(1)		(2)	
	1993-1998	**1999-2003**	**1993-1998**	**1999-2003**
C	36.27 (0.80)	-14.66 (-0.81)	41.26 (0.81)	6.38 (0.30)
LAG_CAP	0.35 (1.42)	0.68*** (6.36)	0.27 (0.92)	0.67*** (4.68)
ROA	0.95*** (3.45)	-0.03 (-0.05)	0.98*** (3.46)	0.04 (0.17)
SD_ROA	0.21 (0.43)	-0.25 (-1.18)	0.13 (0.33)	0.29 (1.18)
SIZE	-1.35 (-0.46)	-0.50** (-1.65)	-3.10 (-0.94)	-0.59** (-1.76)
OBS	-0.09 (-1.07)	0.18* (1.75)	-0.27* (-1.67)	0.10 (0.98)
DEP	0.04 (1.35)	-0.03*** (-4.81)	0.04 (1.42)	-0.03*** (-3.67)
RISKY	-0.32* (-1.66)	-0.03 (-0.74)	-0.21* (-1.77)	-0.001 (-0.06)
DEPINS	-0.50*** (-3.17)	-0.21* (-1.97)	-0.52*** (-2.84)	-0.25*** (-6.30)
CRDRISK	0.06*** (2.99)	-0.04* (-1.87)	0.04*** (2.72)	-0.06** (-2.38)
TBILLS	-0.29 (-1.39)	-0.06† (-1.23)		
LIQ			-0.11* (-1.93)	0.15** (2.31)
OWN	1.57 (1.65)	0.84* (1.82)		
FOREIGN			-3.53** (-2.31)	-1.38 (-1.07)
SIGNAL	-0.16 (-0.43)	0.56** (1.86)	-0.18 (-0.43)	0.38** (1.82)
CONC	1.12*** (6.00)	0.64*** (2.68)	1.44*** (4.37)	0.58*** (7.55)
GDP	0.93* (1.62)	-0.85** (-2.38)	1.07** (1.60)	-0.56*** (-3.86)
Adjusted R-squared	0.6189	0.9328	0.6070	0.9283
TxN	245	157	245	157
F-statistic	7.497	45.238	7.180	49.995
Prob(F-statistic)	0.0000	0.0000	0.0000	0.0000

***Notes*:**
All regressions are estimated with Fixed Effects model (LSDV). For a sample of 48 domestic commercial banks and for two periods of 6 and 5 years consecutively, we estimate the determinants of domestic commercial bank capital.
The dependent variable is CAP, which is the equity-to-asset ratio; LAG_CAP is the year *t-1* CAP; ROA is the after tax net profit-to-average asset ratio; SD_ROA is the standard deviation of ROA for the years *t-2, t-1* and *t*; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; RISKY is the risky asset-to-total asset ratio; DEPINS is the deposit-to-total liability ratio; CRDRISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; LIQ is the liquid assets-to-total asset ratio; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; SIGNAL is banking sector average CAP; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth.
t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.
*** Significantly different from zero at the 1% level.
** Significantly different from zero at the 5% level.
* Significantly different from zero at the 10% level.
† Significantly different from zero at the 12% level.

The first remark is that Lag capital captures a significant influence in the second sub-period only. This may show that the persistency of capital emerges when capital requirements become tighter. The profitability variable is positively correlated with capitalisation only in the first sub-period. When capital requirements become more binding, domestic banks start

relying more on external funds to boost their capital. It seems that retained profits became insufficient in increasing domestic bank capitalisation. The volatility of earnings does not have an influence in both sub-periods. SIZE that was not able to distinguish between domestic banks during the first period became able to classify these banks afterwards. This means that smaller banks responded more to the new capital requirements, and the difference emerges when regulation became tighter. The interesting remark is that the principle of too-big-to-fail emerges actually after capital requirements become tighter. Thus, we could argue that this doctrine does not hold always. Regarding OBS and RISKY, we see that domestic banks started to justify their capital according to the change of such variables. In the first model OBS captures a positive effect between 1999 and 2003 and in the second model the negative effect has diminished. Similarly, RISKY has lost its negative effect in both models. For these two variables, it seems that the new regulation has forced banks to adopt more strictly Basle I requirements. DEP that did not have any effect between 1993 and 1998 captured a negative and significant effect. So, after tightening capital requirements, domestic banks started relying more on deposits to increase their loans and advances. The deposit insurance has a negative effect during the entire period under study, and thus, regardless of capital requirements the problem of moral hazard exists. Regarding CRDRISK, we saw in Table 3.5 that domestic banks adjust their capital according to the credit risk. However, the results in Table 3.8 show that domestic banks became unable to do this after 1998. The positive effect captured by CRDRISK in the first sub-period turned to be negative in the second sub-period. Also regarding the negative effect for TBILLS shown in Table 3.5, it seems that banks start investing more in government bills to minimise the capital requirements according to the new regulation. Surprisingly, the negative effect captured by the LIQ before 1999 turned to be positive afterwards. Previously, liquidity requirements affected negatively domestic bank capital; however, afterwards liquid banks were more able to boost their capital. By linking these findings to the effect of Size, we find that smaller banks in the second sub-period started holding higher equity and more liquid assets (relative to total assets) than larger banks. [55] The advantages of institutional ownership appeared actually when requirements become tougher. OWN captures a positive impact and banks with institutional ownership become more solvent

[55] Regarding the issue of capital requirements and reserve requirements, we mention here that the central bank of Lebanon has required Lebanese banks to start implementing the new Basle Accord (Basle II) at the end of year 2006 and 2007.

and have better ability to meet the new regulation than those individual- or family-owned banks. Contrary, the advantage of foreign ownership in domestic banks diminished in the second sub-period. The negative effect captured by FOREIGN between 1993 and 1998 has disappeared afterwards. Interestingly, SIGNAL captures a significant influence after 1999 with the existence of tough regulation! It seems that domestic banks with better solvency start using their capital level to signal and to send a sign of soundness when requirements became hard in order to differentiate themselves from the other banks. Therefore, this theory does not apply always and this – costly – tool (signalling) is not used always, but only when not everyone is able to use it and this gives an additional support to *H2*. Finally and interestingly also, because capital regulation became tighter, domestic bank capital has lost its cyclicality and domestic banks became unable to adjust their capital according to the economic condition. The positive effect has changed to negative effect and capital changed from being cyclical to be "counter-cycle"! This may suggest that same as the signalling theory, the cyclicality theory does not apply always and rigid capital requirements eliminates the ability of banks to signal (using the capital level) and to modify their capital according to economic conditions. Again, this gives support to *H3*.

3.10.2 The Response of Foreign Banks

For foreign banks, the results show that the response to tighter capital requirements was different from that of domestic banks. Firstly, the lag dependent variable has no effect in both periods and thus, foreign bank capital is not persistent. For foreign banks, profitability is not associated with higher capitalisation. Foreign banks do not rely on retained profits to increase capital regardless of regulation. Between 1993 and 1998 the volatility of earnings was positively correlated with capital, where foreign banks increased their capital with external funds. But afterwards this variable has lost its effect. SIZE does not have any impact during the entire period and foreign banks hold similar capital regardless of their size. It seems that the diversification effect or the too-big-too-fail theory do not apply for foreign banks. Regarding OBS and RISKY, it seems that foreign banks started adjusting their capital more according to these investments. DEP captured a significant effect only in the second sub-period, which may show that foreign banks started relying more on deposit to increase their

investment capabilities. Interestingly, in contrast to domestic banks, we found that the effect of DEPINS loses its significant in the second period and the moral hazard problem diminished! CRDRISK shows a consistent effect as profitability: since the profitability does not have an impact on capital, credit risk that affects negatively this profitability does not have an impact as well. All these findings show that the reaction of foreign banks to the new regulation was different from domestic banks and this gives in fact support to *H1*.

Table 3.9: The Determinants of Commercial Bank Capital – Regression Estimates for Foreign Banks (1993-1998 and 1999-2003)

	(1)		(2)	
	1993-1998	**1999-2003**	**1993-1998**	**1999-2003**
C	0.60 (0.02)	152.70* (1.89)	-4.03 (-0.14)	186.92* (1.84)
LAG_CAP	0.11 (0.73)	0.21 (1.03)	0.12 (0.76)	0.06 (0.25)
ROA	-0.44 (-1.13)	-0.53 (-0.79)	-0.48 (-1.55)	-0.15 (-0.32)
SD_ROA	0.27* (1.40)	-0.90 (-0.40)	0.28** (1.67)	0.67 (0.20)
SIZE	1.87 (0.97)	-6.89 (-1.16)	3.10 (1.27)	-9.70 (-1.31)
OBS	-0.35* (-1.71)	-0.17 (-0.25)	-0.39* (-1.86)	-0.04 (-0.06)
DEP	0.02 (0.39)	-0.05 (-1.53)	0.02 (0.61)	-0.05 (-1.56)
RISKY	-0.08* (-1.76)	0.02 (0.11)	-0.14*** (-3.25)	0.01 (0.06)
DEPINS	-0.44*** (-3.87)	-0.02 (-0.25)	-0.42*** (-3.84)	-0.12 (-0.66)
CRDRISK	-0.01 (-1.31)	-0.03 (-1.58)	-0.005 (-0.93)	-0.04 (-1.57)
TBILLS	0.04 (0.46)	0.22 (0.86)		
LIQ			-0.14 (-1.37)	0.09 (1.57)
SIGNAL	0.09 (0.45)	-1.31 (-1.50)	-0.08 (-0.26)	-0.89* (-1.87)
CONC5	0.49** (2.29)	-0.94** (-2.26)	0.54** (2.29)	-0.84*** (-2.81)
GDP	1.62 (0.75)	1.68 (0.52)	1.76 (0.53)	1.21 (0.60)
Adjusted R-squared	0.8698	0.5538	0.8732	0.5440
TxN	115	92	115	92
F-statistic	24.088	14.322	24.806	14.194
Prob(F-statistic)	0.0000	0.0000	0.0000	0.0000

***Notes*:**

All regressions are estimated with Fixed Effects model (LSDV). For a sample of 23 foreign commercial banks and for two periods of 6 and 5 years consecutively, we estimate the determinants of foreign commercial bank capital.

The dependent variable is CAP, which is the equity-to-asset ratio; LAG_CAP is the year *t-1* CAP; ROA is the after tax net profit-to-average asset ratio; SD_ROA is the standard deviation of ROA for the years *t-2*, *t-1* and *t*; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP is the deposit (percentage) growth; RISKY is the risky asset-to-total asset ratio; DEPINS is the deposit-to-total liability ratio; CRDRISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; LIQ is the liquid assets-to-total asset ratio; OWN is a dummy variable which equals 1 if the bank has institutional ownership, 0 otherwise; FOREIGN is a dummy variable which equals 1 if the bank is foreign, 0 otherwise; SIGNAL is banking sector average CAP; CONC is the top 5 banks assets as a percentage of the total banking sector assets; GDP is the real GDP (percentage) growth.

t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

Finally, two important remarks are reported in Table 3.9: foreign banks do not signal at all and there is no cyclicality of foreign bank capital. Foreign banks do not use their capitalisation level to signal regardless of the capital requirements and they do not modify their capital according to the economic cycle. Thus, the signal theory and the bank capital cyclicality theory do not apply for foreign banks at all. The last two remarks give additional support to *H2* and *H3*.

3.11 Conclusion

The literature on bank capital proposes several propositions: the reaction of banks to capital requirements, the signalling theory, the too-big-to-fail theory, the pro-cyclicality of bank capital theory, etc... Empirical studies on bank capital have analysed the determinants of bank capital regardless of the ownership of banks (i.e. whether they are domestic or foreign). Moreover, when those studies look at the reaction of banks to tighter capital requirements, they do not take into consideration the effect of ownership. In this chapter, we firstly analysed the determinants of bank capital for a sample of domestic and foreign banks together. Our findings consist with the literature and all the theories hold in our case studies.

Then, we have divided our panel data "horizontally" (according to the ownership of banks) and "vertically" (by time). Different result emerged from this and most of these principles did not hold in all the cases. For instance, we found that the reaction of domestic banks to capital requirements differs from that of foreign banks and the effect of deposit insurance is different for the two categories of banks. We found also that foreign banks do not use their capital level as a signal for soundness. Moreover, we found that domestic banks adopt this – costly – policy only when few other banks are able to adopt it. On the cyclicality of bank capital, we found that foreign bank capital does not vary according to the economic cycle, and even domestic bank capital loses this feature when capital requirements become tighter. On the too-big-to-fail, this doctrine does not hold in all cases even for the same category of banks.

Appendix 3.A: Summary of Cited Empirical Studies

Study	Market	Period	Sample	Findings
Alexander (2004)	Switzerland	1990-2002	19 banks	- A positive correlation between change in capital and risk - No significant relation between changes in capital ratio and the default probability.
Allen and Rai (1996)	Europe, Japan and the U.S.	1991-1993	(174), (175) and (163) banks successively.	- Deposit insurance, the size, and loans have a negative effect on capital level - profitability and deposit growth have a positive effect on capital level
Altunbas et al. (2002)	11 EMU	1991-1999		- Undercapitalised banks respond more to regulatory changes regardless their size
Barrios and Blanco (2003)	Spain	1985-1991	76 banks	- Higher LLP reduces the needs for capital augmentation - higher deposit share needs more capital - market model is better to explain banks' behaviour for capital requirements
Berger and DeYong (1997)	U.S.	1985-1994	Entire bank population	- Cost-inefficiency reduces bank capital - A positive relation between NPLs and capital
Billet et al. (1998)	US	1990-1995	58 banks	- Downgraded banks with larger insured deposit bases experience smaller declines in equity value. - Downgraded banks increases their reliance on insured deposits - Banks reduce their use of insured liabilities following upgrades
Blose (2001)	U.S.	1980-1993	213 LLP announcements	- LLP causes a decline in capital adequacy - LLP announcements affect more the less capitalised banks
Cebenoyan and Strahan (2004)	U.S.	1988-1993	Entire bank population	- A negative relation between size and capital - OBS activities increase risk-weighted assets. A negative relation between capital-to-risky assets and OBS activities
Chiuri et al. (2002)	Developing countries	1992-1997	10 crisis countries and 5 non-crisis countries	- Higher capitalisation attracts more deposits - More strict capital requirements have lower effect for foreign banks
Dahl and Shrieves (1990)	U.S.	End-1985 to end-1986	11,800 banks per year	- The size has a negative effect on required equity acquisition - The higher the ROA, the lower the required equity acquisition - The higher the credit risk, the higher the needed capital - Deposit growth has a positive and significant impact on equity issuance

				- Market power has a positive effect on under-capitalised banks and negative effect on well-capitalised banks
Dahl and Spivey (1996)	U.S.	1982-1991	1,289 undercapitalised banks	- The size has a negative effect on required equity acquisition - The higher the ROA, the lower the required equity acquisition - Loan-to-asset ratio has a positive effect on equity acquisition
Dietrich and James (1983)	U.S.	1971-1975	10,000 banks	- ROA, deposit growth have a positive impact on capital change - T-bills has a negative impact on capital changes - Market power has a positive effect on under-capitalised banks and negative effect on well-capitalised banks
Docking et al. (1997)	U.S.	1985-1990	578 LLR announcements (492 banks)	- LLR announcement has a negative impact on share price
Godlewski (2005)	30 Emerging markets	1996-2001	2,779 banks	- Size has a negative effect on capital issuance - Capital accumulated in the past allows banks to avoid new capital issuance - Banks with positive evolution of capital engage in risky activities and/or positive evolution in risk contributes to recapitalisation
Houston and James (1998)	U.S.	1985-1989	1976 subsidiaries of 178 BHCs, and 4778 unaffiliated banks	- Affiliated banks are able to increase capital by creating an internal capital market
Hughes and Mester (1998)	US	1989-1990	Banks with assets more than $1 billion	- financial capital serves as a signal of risk
Jacques and Nigro (1997)	U.S.	1990	2,570 banks	- A negative relation between size and capital-to-risk weighted assets - ROA has a positive effect on capital changes
Jagtiani and Khanthavit (1996)	U.S.	1984-1991	91 banks	- RBC reduced the optimal size of bank that achieves scale and scope economies - RBC discourage OBS activities
Konishi and Yasuda (2004)	Japan	1990-1999	48 banks	- The introduction of RBC reduced the total risk, the firm-specific risk, and interest-rate risk of Japanese banks,
Kwan and Eisenbeis (1997)	U.S.	1986Q2-1995Q4	352 banks	- Firm with more capital operate more efficiently - A positive relation between ROA and capital - A negative relation between size and capital - A negative relation between credit risk and capital
Lindquist (2004)	Norway	1995Q4-	147 banks	- larger banks hold less capital

		2001Q4		- GDP growth has a negative effect on bank capital - credit risk has a negative effect on bank capital
Marcus (1983)	U.S.	1965-1977	44 banks	- ROA and government bonds have a positive effect on capital-to-non cash asset ratio
O'Hara and Shaw 1990)	US	1984	63 banks	- wealth creation for banks subject to the TBTF policy
Rime (2001)	Switzerland	1989-1995	154 banks	- Size has a negative effect on capital changes - Large banks have easy access to capital markets - ROA has a positive effect on capital changes
Rime and Stiroh (2003)	Switzerland	1996-1999	289 banks	- The size has a negative and significant effect on banks excess capital
Shierves and Dahl (1992)	U.S.	1983-1987	1,800 insured commercial banks	- The size has a negative effect on capital change - A positive correlation between capital change and NPLs
Soledad et al. (2001)	Argentina, Chile and Mexico	1981-1997	(155), (37), and (34) banks successively	- Higher capitalisation attract more deposits
Swindle (1995)	U.S.	1984Q1-1986Q4	51 BHCs	- A positive relation between deposit growth and capital change

Appendix 3.B: Calculation of Control Variables

Variable	Description
Dependent variable	
CAP	Equity-to-asset ratio
Independent variables	
ROA	After tax net income divided by average assets
SD (ROA)	The standard deviation of ROA for the last 3 years
SIZE	Natural log of assets
OBS	Log off-balance sheet (assets side)
DEP	Costumer deposit growth (percentage)
RISKY	Total assets – cash and central bank – T-bills – deposits with head office and branches divided by total assets
DEPINS	Costumer deposits-to-total liability ratio
CRDRISK	Provisions for doubtful loans divided by gross loans
TBILLS	T-bills-to-asset ratio
LIQ	Cash and central bank + T-bills + marketable securities + deposits with head office and branches and with the other banks divided by total assets
OWN	Dummy variable (1 for institutional ownership, zero otherwise)
FOREIGN	Dummy variable (1 for foreign ownership, zero otherwise)
SIGNAL	Total sector average capital
CONC	Assets of top 5 banks divided by sector total assets
GDP	Real GDP growth (percentage)

Appendix 3.C: the Hausman Test

	Fixed Effects	Random Effects	$\hat{q}$	m
LAG_CAP	0.344406 (0.178015)	0.658885 (0.031231)	-0.314479 (0.030714)	3.219937
ROA	0.376498 (0.181874)	0.458233 (0.165219)	-0.081735 (0.005781)	1.155648
SIZE	-2.168905 (0.855699)	-0.619281 (0.193798)	-1.549624 (0.694663)	3.456833
OBS	-0.132990 (0.110038)	-0.014649 (0.060591)	-0.118341 (0.008437)	1.659884
DEP	-0.002957 (0.013060)	-0.024667 (0.005115)	0.021710 (0.000144)	3.264009
RISKY	-0.101553 (0.068180)	-0.032840 (0.016016)	-0.068713 (0.004392)	1.075017
DEPINS	-0.293961 (0.098812)	-0.146443 (0.017012)	-0.147518 (0.009474)	2.296879
CRDRISK	-0.005900 (0.003169)	-0.005913 (0.001477)	0.000013 (0.000008)	0.000021
TBILLS	-0.064264 (0.072816)	0.002867 (0.019738)	-0.067131 (0.004913)	0.917353
OWN	0.608637 (0.433739)	-0.759115 (0.468043)	1.367752 (-0.030935)	-60.473958
SIGNAL	0.302251 (0.050535)	0.213833 (0.118284)	0.088418 (-0.011437)	-0.683529
CONC5	0.351894 (0.112440)	0.166748 (0.039472)	0.185146 (0.011085)	3.092460
GDP	0.018613 (0.232923)	0.444445 (0.147069)	-0.425832 (0.032624)	5.558295
Adjusted R-squared	0.7507	0.7251		
df	595	595		
F-statistic	22.910	112.205		
Critical χ_1^2 value				3.84

***Notes*:**

The first regression is estimated with Fixed Effects model (LSDV) and the second regression with the Random Effect model (GLS); the dependent variable is CAP, which is the equity-to-asset ratio; LAG_CAP is the year *t-1* CAP; ROA is the after tax net profit-to-average asset ratio; SIZE is the natural log of assets; OBS is the natural log of off-balance sheet activities on the assets side; DEP in the deposit (percentage) growth; RISKY is the risky asset-to-total asset ratio; DEPINS is the deposit-to-total liability ratio; CRDRISK is the provisions for doubtful loans-to-gross loan ratio; TBILLS is the treasury bills-to-total asset ratio; OWN is a dummy variable which equals 1 if the bank has institutional ownership, and 0 otherwise; SIGNAL is banking sector average CAP; CONC is the top 5 banks assets as a percentage of the total banking sector; GDP is the real GDP (percentage) growth. *df* is the degrees of freedom.

Standard errors in parentheses.

4 Chapter Four: Motives and Outcomes of Bank Mergers

Abstract

Bank mergers in developed markets have been analysed by a large body of literature, where the motives and the outcomes of bank mergers have been detected. We add to the literature by analysing the experience of bank mergers in an emerging market. We study the bank merger experience in Lebanon, where between 1994 and 2002, 25 bank mergers occurred. Firstly, we detect the characteristics of merging banks in order to understand the motives behind bank mergers. We find that larger and healthy banks target small, underperforming and undercapitalised banks. Moreover, the targets are characterised by a larger share of non-interest income than acquiring banks. The regulatory authorities play an important role in bank mergers by providing acquiring banks with several incentives. Regarding the outcome of bank consolidation, we find that – on average – the merger operations under study show a significant enhancement in profitability, efficiency and in liquidity risk. However, credit risk deteriorates and growth decelerates post-merger. In addition to the two previous issues, we notice that the effect of the wave of bank consolidations (that have eliminated about 35% of banks), on concentration was offset by the openness of the Lebanese banking system to the entry of foreign banks.

4.1 Introduction

The increasing integration of international markets over the last three decades and the rise of restructuring activity across economic sectors have made business increasingly global. As manufacturing and trade become global, service firms have to follow this development and become bigger and more efficient. Besides, the implementation of financial liberalisation and deregulation all over the world have led to an increase in the number of institutions merging within the domestic markets or across the borders that was in the interest of financial institutions and banks particularly. Hence, the banking industry has seen high numbers of mergers and acquisitions among large and small institutions. Consolidation is an important factor that may help realising large business's growth strategy and expanding its activities to new markets.

Mergers and acquisitions [56] have substantial effects on the performance of the firms merged. It is hypothesised that:

i. The economies of scale and increase in the average size of banks resulting from consolidations may permit banks to operate more efficiently.
ii. Consolidation is a useful way of transferring Excess Capacity and mobilising resources from an entity to another.
iii. Bank consolidations may increase monopoly power, which affects the profitability of banks (although this may not be socially acceptable).

Mergers and acquisitions are important corporate external- and indirect-investment decisions with long-term effects on the companies involved. These effects are related to the capital, organisational and ownership structures, product mix, and nature of the business's activities. It aims at removing identical and duplicate costs from each organisation - such as personnel, offices and machinery - whilst increasing the overall market share. As a result, mergers and acquisitions aim at achieving growth of company's size and value, market share

[56] A Merger is the consolidation of two firms, where the assets of both firms are combined together. Whereas an Acquisition occurs when a firm acquires the majority of another firm's shares, but the two firms remain as separate entities.

and profits. Expenditure reduction, increased market power, reduced earnings volatility, and scale and scope economies could achieve these targets.

Finally, acquisition particularly is based on a theory of efficiency differences. This theory proposes that the more efficient management team of the bidder firm can run the corporate and financial resources of target companies more efficiently, and the assets of the target will be put to a higher value use by the acquirer.

4.2 Motives for Mergers and Acquisitions

The motives for bank merger and acquisition decisions are complex and overlapped. Often there is not just one reason for these decisions, but a variety of reasons that represent the strategy of the firm. In other words, they are the objectives and targets, which combine together to form the firm's strategy. Merger and acquisition choices are undertaken by the management of the company to realise its strategy. These decisions are based on the theory that managers serve the interest of the firm's shareholders and their main objective is to maximise shareholders' wealth. This objective could be achieved by aggregating the values of the merged firms, which implies cost reduction, efficiency enhancement, and optimal running of the target's assets. But, sometimes, the decision-makers (the management) in a firm might put into action a merger and/or acquisition to achieve goals for their own benefit and sometimes at the expense of shareholders. Thus, they might pursue their own interests rather than those of shareholders. In the following, we will look at the motives for bank M&As and shed light on some points that are not investigated by the literature.

4.2.1 Synergy

Synergy is the concept that when two or more firms combine, they increase their value. The new fused entity should be more efficient, profitable and stable than the separate individual firms before the combination, through fusion of their individual skills and capabilities. The synergy from a merger is therefore defined as the difference in the market

value of the post-merger firm relative to the pre-merger value of the two firms as separate entities. According to Kaen (1995, p 869) synergy is calculated using the following equation:

$$\text{Synergy} = PV_{AT} - (PV_A + PV_T) \tag{4.1}$$

where, PV_{AT} = market value of the post-merger firm.

PV_A = pre-merger market value of the acquirer.

PV_T = pre-merger market value of the target.

A portion of the synergy achieved is retained by the target-firm shareholders, and the expenses of the acquisition operation. But the predictable existence of synergetic benefits allows firms to incur the expenses of the acquisition process and still be able to pay target shareholders a premium for their shares. Thus, the Net Present Value of the acquisition is:

$$NPV = [PV_{AT} - (PV_A + PV_T)] - P - E \tag{4.2}$$

where, P = premium paid for the target.

E = expenses of the acquisition operation.

Also, $NPV = [PV_{AT} - (PV_A + PV_T)] - (P + E)$.

The term $[PV_{AT} - (PV_A - PV_T)]$ is the synergistic effect. This effect must be greater than the sum *(P + E)* to give reason for the acquisition otherwise the bidder would have overpaid the target. The shareholders of the acquiring firm benefit only if these benefits are not offset by an excessive price paid to the shareholders of the target institution (Ely and Song, 2000). The synergy has two subdivisions: financial and operating synergies.

4.2.1.1 Financial Synergy

Financial synergy is the impact of a corporate merger or acquisition on the cost of capital of the acquiring firm or the merging entities. In financial markets, larger companies have advantages that may lower their cost of capital and the cost of raising capital because they are considered to be less risky than smaller firms are. So the costs of borrowing by issuing debts are lower for a larger firm, which would be able to offer a lower interest rate than a smaller one. Moreover, the fixed costs of the issuance (registration costs, legal fees,

etc.) would be spread out over a greater money volume of securities because the larger company borrows more capital with each issue. (Gaughan 2002, pp121-123)

4.2.1.2 Operating Synergy

Operating synergy is the real value gains from combining two (or more) individual companies. The main source of operating synergy is the relative cost reductions with the increased production, which are a result of economies of scale and scope (since the "per unit" cost declines, as the output levels rise). The other source of operating synergy is the transferability of managerial and labour skills, where the excess capacity of managerial capital or particular employee skills of one of the merging companies can be utilised to cover the required skills in the other company to improve its performance. The operating synergy theory is rather based on the "differential management efficiency" hypothesis, which indicates that the management of target firm is relatively inefficient. (Gaughan 1991, pp 103-104)

4.2.1.3 Scale and Scope Economies as Sources of Synergy

4.2.1.3.1 Scale Economies

In banking, production requires utilisation of costly resources such as fixed branch costs, data processing systems, teller expenses, etc. In a high level of production, these costs could be spread over an expanded product mix, and so the profit margin will be higher. Economies of scale occur when there is ability to reduce costs per unit of output, holding all other factors constant, and the average cost of a product in the long run decreases as more units are produced.

Mergers and acquisitions result in an increase of the bank's size, hence, to understand the relation between mergers and acquisitions and scale economies, it is important to find out the effect of size on scale economies. Miller and Noulas (1996) investigated technical efficiency of large-sized banks. They found that bank size is significantly positively related to their measure of pure technical efficiency. Berger et al. (1999) found that large institutions

increase scale economies and have the ability to produce more services due to the use of technological innovations, such as phone centres, ATMs, and e-banking, and at lower costs than traditional branching networks. Kolari and Zardkoohi (1987, p 202) show that small banks (with less than $25 million in deposits) were not able to implement automated services as cost-effectively as larger banks can do. Another gain from bank M&As is the savings from holding less cash reserves. Banks hold cash reserves to protect themselves against liquidity shocks, i.e. early deposit withdrawals, occurring before the maturity of loans. Large banks may need to hold lesser amount of liquid reserves. Since holding cash balances is costly, [57] larger banks may incur lower costs of holding cash balances than small banks do. By decreasing cash holding, a bank could move funds from non- or low-interest earning to higher-return assets (loans and securities). Cebenoyan and Strahan (2004) find that large U.S. banks hold fewer liquid assets than smaller banks. They detected a negative correlation between bank's size and liquid assets held, and the more the bank's size, the less the proportion of liquid assets to total assets.

Conversely, Gilligan and Smirlock (1984) found that banks with less than $25 million in deposits are characterised by increasing returns to scale while the larger banks are characterised by diseconomies of scale, with the largest banks experiencing the most severe diseconomies of scale. Shaffer (1993) simulated megamergers between pairs of banks with assets more than $1 billion, by comparing the sum of predicted costs for a given pair of banks with the predicted cost of the merged entity. 49% of possible pairs showed a reduction in cost, with 16-17% exhibit an improvement of more than 10%. Among banks with assets exceeding $10 billion, the merger increased costs by 6-7% and fewer than 15% of possible mergers reduced costs.

4.2.1.3.2 Scope Economies

Economies of scope represent the ability of reducing the average per unit cost by producing more than one product. Economies of scope can be realised through joint

[57] Liquid assets involve additional transportation cost, storage and protection costs, and labour costs. Kwan (2003) found a positive and significant relation between cash-to-total asset ratio and total operating cost-to-earning asset ratio, which means that liquid assets raise operating costs.

production and marketing. On the production side, scope economies may be achieved where facilities applied to one objective or to serving a single market are not fully utilised and are capable of being deployed simultaneously to serve other targets and other markets. Gilligan and Smirlock (1984) explain that economies of scope over the production of goods A and B exist if:

$$C(Q_A,Q_B) \prec C(Q_A,0)+C(0,Q_B) \tag{4.3}$$

where $C(Q_A,Q_B)$ are the firm's (minimised) costs of producing Q_A units of good A jointly with Q_B units of good B at a given vector of input prices. They add that this interdependence is especially common in banking, when outputs (e.g. demand and time deposits) need similar technology and use the same personnel, such as tellers and supervisors. The literature has somehow provided evidence about the relation between size of banks and scope economies. For instance, Zardkoohi and Kolari (1994) claim that there are economies of scale and scope for branch offices representing 43 Finnish saving banks. Their results show that large branch offices operate more efficiently than smaller branches.

4.2.2 Diversification

Gaughan (2002, pp 123-126) identifies the diversification as "growing outside a company's current industry category". Diversification plays a major role in conglomerate mergers where management may go for diversified expansion to enter more profitable industries when the company faces competitive pressures in its current industry. Salter and Weinhold (1979, pp 6-8) define the diversification as "the heterogeneity of output from the point of view of the number of markets served by that output". They consider that products belong to separate markets if their cross-elasticity of demand is low and if (in the short run) the necessary resources employed in the production and distribution of one cannot be changed by another. The degree of diversification of a firm increases as it produces a broader range of independent products, and the heterogeneity of the markets served by this firm.

Why do firms diversify? Jones (1982, p 46) says that mergers can introduce greater stability of profits into cyclical or seasonal business by acquiring firms with counter-cyclical characteristics. Canals (1994, pp 222-224) declares that banks that face several types of risk

can deal with them by entering into other activities through an appropriate diversification of investment portfolios that, additionally, provides greater profitability. He cites the following advantages of diversification: (1) it expands the range of activities, (2) achieves scope economies by distributing a large number of services, (3) permits a complementary links between different kinds of services, (4) allows a more efficient uses of office networks, and (5) reduce the variability of revenues in relation to a given amount of capital. Finally, Allen and Hodgkinson (1989, p 16) claim that there are many types of threat that push firms to diversify: one is the fear of being acquired. We distinguish between geographical diversification and product diversification.

4.2.2.1 Geographical Diversification

This is the result of expanding the activities beyond the current market being served by a bank. Eun et al. (1996) argue that since corporate earnings are less correlated across countries than within a country, a firm's earnings can be stabilised more effectively by acquiring a foreign firm. Besides, when a domestic firm faces weak growth prospects at home, overseas investment may be a preferred option. Berger (2000) claims that diversification of risks associated with the merger from an improved mix of geographic areas, industries, loan types or maturity structure might allow consolidated banks to shift their output mixes from securities toward both consumer loans and business loans, raising expected revenues.

4.2.2.2 Product Diversification

This is referring to adding new non-traditional products that provide non-interest income (e.g. insurance, brokerage, real estate, etc.). Empirical findings of diversification found different effects on banks. For instance, Swary (1981) found that mortgage banking investment results in significant losses to the parent bank holding companies (BHCs). Boyd et al. (1993) argue that BHC mergers with life and property insurance firms are less risky than BHC mergers with securities firms, insurance agent/brokers, and real estate firms. Altunbas (1995, p 270) says that when BHCs combine with securities firms or real estate developers, the volatility of returns and the risk of failure increase. But combinations of BHCs and life

insurance companies seem to reduce the volatility of returns and the risk of failure. Brewer et al. (1996) declare that diversification by real estate specialised savings and loans firms appears to lead to lower total risk and higher average return.

4.2.3 Managerial Motives

Sometimes, the management may pursue their own aims rather than those of shareholders and acquire other firms to increase the size of the firm under their control in order to enjoy higher compensation and benefits. Hubris, or the pride of the managers of the acquiring firm, might represent another main reason for takeovers where managers see great reputational benefits in doing so even though they may not be completely rational in assessing the expected value of these benefits. Amihud et al. (1986) declare that managers of "manager controlled" (MC) firm whose compensation depends on the firm's outcomes exploit benefits from a merger beyond those which accrue to the shareholders and view it as more valuable than the manager of a "shareholder controlled" (SC) firm whose compensation depends on their efforts. MC managers are more willing to pay a higher price for a given acquisition and their shareholders are expected to earn lower returns from conglomerate mergers than in SC firms. Rose and Fraser (1988) say that, after a merger, the bank size rises and the prestige of management enhances and sometimes management salaries as well as benefits improve, but stockholders benefits may be insignificant. Allen and Cebenoyan (1991) compared banks with different managerial stake ownership. They found the greater the managerial stake, the more active the merger policy. The most active acquirers were the firms with the most powerful managers, and MC firms are more likely to engage in risk reducing mergers and pursue acquisitions to increase size than are SC firms. Berger et al. (1999) propose that a managerial objective may be empire building, where management rewards tend to increase with the firm size. Hence, managers may hope to achieve personal financial gains, or to protect their firm specific human by diversifying through mergers and acquisitions. In contrast, Saunders et al. (1990) argue that when managers' wealth is largely in non-diversifiable human capital form, they may act in a risk-averse way, in which case their degree of risk taking would be less than that desired by stockholders. On the other hand and from the target perspective, Hadlock et al. (1999) studied successfully acquired banks and compared them to a matched sample of banks

that were not acquired. Their results show that banks with higher management ownership are less likely to be acquired, because they use their shareholdings to block acquisitions that may lead to their departure.

Besides, there is the Free Cash Flows issue, where the management does not distribute free cash flows to shareholders as dividends and use it to acquire other firms. Harford (1999) finds that the behaviour of cash-rich firms is consistent with the free cash flow hypothesis: cash-richness predicts that a firm will become a bidder, and the cash-rich firms engage in value-decreasing behaviour. Moreover, he shows that the targets of cash-rich firms are also significantly less likely to attract other bidders and the cash-rich bidder's stock price reaction to acquisition announcements is negative.

4.2.4 Elimination of Inefficient Management

Inefficient management can exist for a limited period of time but, over the long period, the market mechanism should ensure that they are replaced. In other words, more efficient firms tend to take over less efficient ones. Thus, banks with significant lower performance might have a higher probability of being targeted and acquired than well-managed banks. Mueller (1977) says that mergers are seen as an economical way to eliminating bad management. It occurs by replacing inefficient management and the transfer of assets from failing to rising firm. Berger et al. (1999) claim that mergers and acquisitions solve the problem of excess capacity, inefficient scale, inefficient product mix, and financial distress problems. They found that troubled or under-performing banks are often taken over as a better alternative to bankruptcy. We base on this to argue that acquired firms have lower performance and higher riskiness (poor risk management) than acquiring banks and we propose the following hypothesis:

H1: acquired banks are less efficient and more risky than acquiring banks.

4.2.5 To Achieve (or Increase) Growth

Mergers and acquisitions are external alternatives, and sometimes cheaper, then internal organic growth. Firms seeking to expand their business have a choice between internal growth and growth through mergers and acquisitions. Internal growth may be a slow process, while growth through mergers may be a more rapid process. Mergers and acquisitions may be the best way to facilitate the growth in another geographical region especially in the international markets where it may be less risky to expand geographically through acquisitions than through internal development. Two studies have considered the effect of mergers on bank assets growth, and reported opposing results. But no studies have looked at the growth changes in deposits, loans, and shareholders' equity particularly. [58] We will test the asset growth for our case study, and compare it to the two mentioned studies. We propose the following hypothesis that will be tested empirically:

H2: banks increase their growth through mergers.

4.2.6 Increasing Market Share/ Market Power

Mergers could increase the market share of the consolidated banks, which may increase their market power. Market power is referred to as monopoly power, and it is the ability to set and maintain price above competitive levels. Mergers tend to reduce competition, which may open the way for improve profit from higher prices. Gaughan (2002, pp 136-138) cites three sources of market power: product differentiation, barriers to entry, and market share. A company is able to increase its market share through horizontal integration. However, an increase in market share in the lack of significant product differentiation or barriers to entry does not always allow a firm to raise its prices significantly because, in such an industry, raising price above marginal cost may only attract new competitors who will drive prices down. Davis (2000) says that from point of view of executives, the gain of market share could

[58] These studies are Cornett and Tehranian (1992) who found that banks experience significant asset growth after the merger, and Focarelli et al. (2002) who found that the growth rate of total assets decreases in the year of the merger and keep decreasing in the long run.

be achieved only through acquisitions and being a market leader brings advantages of pricing power and cost economies. He adds that building market share is a natural strategic objective, particularly in a desirable business with attractive profit and growth potential.

4.2.7 Taxation Considerations and Advantages

A firm with tax losses can offset the profits of the other firm with which it merges. There is an incentive to acquire firms that have accumulated losses to take advantage of these unused allowances that can be used to reduce the acquirer's taxable profit in the future. Ross et al. (1996, pp 779-781) claim that tax gains may be a powerful incentive for some acquisitions. The possible tax gains that come from an acquisition could come from tax deduction from net operating losses, or the use of unused debt capacity, when the acquiring firm may be able to increase its debt-to-equity ratio after a merger creating additional tax benefits. Besides, authorities may use it as an incentive to encourage well-performing banks to acquire targets that suffer from continuous losses. Baer and Nazmi (2000) give an example, and say that in order to deal with public and private problem banks, the Central Bank of Brazil employed several tools, one of them was bank M&As. This tool was advanced through the Programme of Incentives for the Restructuring and Strengthening of the National Financial System (PROER). PROER offers a system of tax incentives and credit facilities to encourage rapid consolidation of the banking sector and acquiring banks were permitted to absorb the losses of the acquired banks on their balance sheet through tax write-offs.

4.2.8 Entry to New Markets

To grow into the market organically by attracting new business through internal efforts and realising the critical size to become an effective competitor, may need many years. The quickest way to enter a new market could be through the acquisition of an existing "player" in that market. Acquisitions can provide access to new markets and technologies, which would take a long time for a company to develop. Hadlock et al. (1999) and Davis (2000) state that entering new markets is an understandable motive for mergers and acquisitions, particularly for banks that have reached the practical limits of expansion in their home markets. Ely and

Song (2000) add that this option was most attractive to institutions located in markets with little potential for growth, especially if they needed to grow larger to remain competitive. Focarelli and Pozzolo (2001) add that banks extend their activities in order to provide services to their home-country clients in international transactions. Eun et al. (1996) claim that sometimes foreign acquisitions are better than domestic acquisitions, since earnings are less correlated across countries, and overseas investment may be the preferred option to achieve growth and diversification.

4.2.9 Bank M&As as a Tool of Solving (or Avoiding) Banking Crises

Acquisitions seem to be the more efficient technique that provides a way for banks to exist from business. Bankruptcy and liquidation involve several problems for individual banks and the entire banking system. In the U.S., the wave of bank failures that started in the early 1980s triggered a wave of bank M&As to avoid the liquidation of large number of failed banks. Hempel et al. (1994, pp 659-663), Mishkin (2000) and Boyd and Graham (2000) have found that there was a significant decline in the number of U.S. banks during 1980s and early 1990s, which was the direct result of bank failures. Due to the competition from financial and non-financial firms, such as brokerage firms, finance companies, insurance companies, investment banks, credit institutions, and mutual funds, banks realised a continuous decline in the ROA and ROE. In order to survive and maintain adequate profit levels, banks needed to develop more cost-effective structure, and bank consolidations were the logical way of achieving gains in efficiency. The trend of bank M&As in the U.S. was driven by market forces that have found that consolidations represent a way to stop the collapse of more banks. Besides, it was driven at the same by regulators that aimed at avoiding bank failures.

On the other hand, in emerging markets, the authorities interfere directly in M&As. They tend to encourage and support efficient and healthy banks to acquire underperforming and unstable banks to avoid banking crises caused by bank failures. Sometimes, they even go further and enforce M&As amongst banks. For instance, Gelos and Roldos (2004) claim that the consolidation trend that began gradually in Central Europe since 2000 is being driven by strong banks being forced to absorb weaker ones to ensure continued stability of national

banking systems. In Argentina and Brazil, the authorities also carried through a process of guided consolidation that has dramatically reduced the number of banks. Shih (2003) argues that some governments of the Asian crisis countries, like Philippines and Thailand, have encouraged or even forced failing banks to merge in order to avoid the forthcoming collapse of banking sector. Policy makers in those countries believed that merging weak banks creates healthier ones, and merging weak banks with healthier ones reduces the risk of bank failures. Moreover, in crisis environment, authorities may force many failing banks, not just two to merger to create a super bank in an attempt to save all the failing banks at the same time. When the banking sector is relatively healthy, there is no urgency for policy makers to take actions to strengthen the banking sector, but they are likely to take interventionist measures, such as encouraging or even forcing banks to merge, when the banking sector is ailing and banks come under severe stress. [59]

The case study under analysis differs from the case of Asian countries. Although the central bank of Lebanon has encouraged and assisted bank mergers, but it did not guide it or force banks to consolidate. Besides, the merger operations have occurred gradually between 1994 and 2002. Therefore, we expect that the empirical findings of our case study should be different from the theoretical findings of Shih (2003) and the experience as a whole should have a positive outcome in general.

4.3 Consequences of Bank Mergers and Acquisitions

There has been an extensive argument about the consequences of bank mergers and acquisitions and whether the consolidation of banks results in favourable or unfavourable outcomes. This argument is due to the different results found by studies that analysed bank M&As, all of which tried to assess the effects of this controversial issue. Clearly, bank

[59] Shih says that when policy makers merge a failing bank into a less distressed bank in attempt to save it, there is no guarantee that the bank created by the merger will be safer than the failing bank. Moreover, in crisis environment, policy makers may force many failing banks to create a super bank in an attempt to save all the failing banks at the same time. He shows that it is probable that the more failing banks are merged to form a super bank, the greater is the bankruptcy risk that the super bank would be. But the result is different when merging a group of healthy banks in a non-crisis environment. So in case of sever banking crises, bank mergers are likely to create even weaker banks and worsen the banking sector problems.

consolidations affect firstly and directly the institutions involved in this operation. Since there are motives to be achieved through the merger, post-merger status will be different from pre-merger status when these targets are realised. The changes could be better performance, higher profitability, reduced risk, growth, etc. Otherwise, the decision would not be rational. Even though what is realised could sometimes be below expectations, or even below what had existed. Besides, M&As affect the entire banking system and the national economy as a whole. From monopoly and concentration matters, to redundancies and unemployment, to changes in bank's policies towards small business lending, all are results of bank mergers and acquisitions.

4.3.1 Consequences for Merged Banks

In analysing the effects of bank mergers and acquisitions, studies typically try to observe the outcomes (positive or negative) through examining three phenomena:

i. The reaction of stock price to the announcement of mergers and acquisitions (the Event Study) and any abnormal returns realised.
ii. The changes in corporate performance.
iii. The correlation between changes in corporate performance and the stock returns.

4.3.1.1 Event Studies

The intention of event studies of bank consolidations is to discover if there are any abnormalities (and their magnitude) in stock returns to the acquiring banks, and/or to the acquired banks in reaction to the merger announcement. The rationale behind this, is that the market "predicts" the success (failure) of the merger and reacts positively (negatively), this prediction reflects in the stock price. According to Weston et al. (1998, pp 93-95) the first step in measuring the effect of the event (here is the acquisition) on the stock is to define the event period. Usually this is centred on the announcement date, which is designated day 0 in event window. The purpose of the event window is to capture the event's effect on stock price and the longer the periods assure that all the effects are captured. The next step is to compute the predicted return for each day in the event period, which is the return that would be expected if

no event (merger), took place. Then, calculate the daily "residual" that is the actual return for that day for the bank minus the predicted return. The residual represents the abnormal return or the part of the return that is not predicted and is therefore an estimate of the change in firm value on that day caused by the event.

Studies that implemented this methodology have found a variety of results, according to the period studied, the length of the event window, the type of deal (merger or acquisition), the sample size etc. Baradwaj et al. (1990) found that targets of hostile bank takeovers experience significant abnormal returns, while those for nonhostile takeovers were insignificant. On the other hand, bidders in both hostile and nonhostile acquisitions experience negative abnormal returns however, the abnormal returns to bidders in hostile acquisitions were not more negative than those of bidders in nonhostile acquisitions. They concluded that hostile bank acquisitions produce more net wealth than nonhostile acquisitions do. Madura and Wiant (1994) show strong evidence that banks experienced negative abnormal returns on average over the 36-month period following the acquisition. They argue that the immediate market reaction to an announced acquisition depends on the financial characteristics of the acquirer and/or the target. Houston and Ryngaert (1994) found that the targets positive returns were offset by negative returns to bidders. For cross-border bank mergers, Cakici et al. (1996) found that foreign acquirers experience positive and significant abnormal returns. In addition, Eun et al. (1996) claimed that target shareholders realised significant wealth gains regardless of the nationality of acquirers. In contrast, the wealth gains to foreign acquirer shareholders varied greatly across countries of acquirers. Zhang (1997) studied the difference in Cumulative Abnormal Returns (CARs) for first-time and repeated acquirers, and the difference between FDIC assisted and non-assisted acquisitions. They observed that first-time acquirers CARs were statistically insignificant, and the average CARs for the repeated and FDIC assisted acquirers are positive and statistically significant. Moreover, the differences were statistically significant, implying that markets appreciate the experienced and assisted bidders. Grullon et al. (1997) examined the market reaction to bank merger announcements, and focus on (1) the method of payment, (2) the banks' capital adequacy, (3) characteristics, and (4) their ownership structure. For a sample of 146 US bank mergers, they found that the target's stock price reacts more favourably when its capital ratio is low, when its size is

smaller, when the bidder's profitability is higher, and when the bidder and the target are in the same state. On the other hand, the bidder's stock price reacts more favourably when the method of payment is cash rather than stock, when the premium paid to the target's shareholders is low, and when the target is in the same state. Cybo-Ottone and Murgia (2000) observed a positive and significant increase in stock market value for the average European bank mergers at the deal announcement. Acquirer banks witnessed a positive and significant market revaluation in the shorter event window. For target banks, they detected a positive and significant effect in all event windows analysed. Finally, Hart and Apilado (2002) show that acquirers tend to receive negative and insignificant abnormal returns, whereas targets tend to show significant positive abnormal returns. They argued that for the entire sampled period, net wealth was created by these mergers.

The above cited studies show different results, however, the majority claimed that acquiring bank tend to realise negative CARs around the merger announcement date, and target banks receive positive CARs. This indicates that there is a transfer of wealth from acquiring to acquired banks' shareholders.

4.3.1.2 Operational Performance Studies

This approach analyses the accounting data of merged banks before and after the merger to determine if there have been any significant changes in the merged banks' performance. Studies that look at the changes in performance examine a variety of measures, however, they focus mainly on changes in profitability, efficiency and riskiness.

Operational performance studies found variety of results according to the markets, samples or period studied as in event studies. For example, Cornett and Tehranian (1992) found that merged banks in the U.S. experience greater improvements in their corporate performance than the banking sector as a whole. That was due to, at least partly, to a greater ability to attract loans and deposits and to improve employees' productivity and asset growth. Rhoades (1993) finds no indication of efficiency gains from horizontal bank mergers, which indicates that horizontal mergers with a relatively large degree of overlap do not result in

efficiency gains. McAllister and McManus (1993) found that consolidation among small banks would be likely to lead to improved cost efficiency. In contrast, they did not find gains resulted from mergers between large banks. Vennet (1996) finds that domestic acquisitions did not realise any efficiency gains. He argues that managerialist motives provide an explanation for these mergers. For a sample of US bank mergers, Peristiani (1997) found that in-market mergers do not yield any significant performance improvements post-merger. Chamberlain (1998) found significant gains realised by reduction of premises and salary expenses, but in small acquisitions these gains were offset by increases in other non-interest expenses. Hart and Apilado (2002) claim to find a statistically significant improvement in profitability for merging banks post-merger. Focarelli et al. (2002) find no evidence of an improvement in profits. The post-merger increase in revenues from a larger market for services and from the growth of loans relative to total assets is offset by an increase in labour costs. They find that mergers are followed by an increase in ROE caused by a reduction in capital. Regarding acquisitions, they detected a post-acquisition long-run increase in profitability for acquired banks, due to a permanent decrease in bad loans accompanied by a long-term reduction in lending. Finally, Diaz Diaz et al. (2004) studied the effect of acquisitions on European Union credit entities performance. They found that these acquisitions had a positive influence on bidders' performance two to three years after the acquisitions. They also found that mergers that form financial conglomerates do not generate higher gains than those obtained in banking concentration.

All the above-cited studies have used similar methodologies but they have studied different markets, periods, and data sets. The common factor among them is that they looked at ***unassisted*** bank M&A operations. Our case study therefore differs, since it analyses a sample of ***assisted*** bank mergers where all acquirers have been offered several incentives. We see that different studies have reported different results on bank M&As, but we expect that the merger cases under study have – on average – succeeded. We propose the following hypothesis:

H3: <u>assisted</u> mergers should result – on average – in an improvement in performance.

4.3.1.3 Market Accuracy Studies

Financial market accuracy studies show how a market stock price reacts to a merger announcement corresponding to the banks' actual performance change. The studies combine the two previous approaches (event study and operational performance study) to determine the accurate forecast of the financial markets to the potential changes of performance of the merging banks. So far, three studies applied this methodology: Cornett and Tehranian (1992) detected a correlation between the abnormal announcement-period stock returns and the various performance measures, indicating that the market anticipates improved performance when the acquisition is announced. In contrast, Pilloff (1996) find that correlations of abnormal return with performance measures are consistently insignificant, providing an evidence that market expectations are unrelated to subsequent merger-related gains. Hart and Apilado (2002) combined the examination of stock market reactions to the merger announcements and the operating performance changes after the bank merger. They investigated the precision of stock market reactions with respect to the subsequent operating performance changes. They noticed that financial markets have not been particularly statistically accurate in predicting subsequent changes in profitability for the combined banks.

4.3.2 The Macroeconomic Consequences of Bank Mergers and Acquisitions

4.3.2.1 Monopoly and Concentration

In studying the consequences of bank consolidations on national economy, several critical questions arise: Does the society benefit from bank mergers? What are the costs to society resulting from increased concentration in banking sector? What is the state of competition after a wave of bank mergers and acquisitions? Merger activities could be motivated by the potential benefits from achieving greater market power resulted from increasing the market shares of the merging banks. The traditional structure-conduct-performance hypothesis asserts that this reflects the setting of prices that are less favourable to consumers (lower deposit rates and/or higher loan rates) in highly concentrated markets as a result of competitive imperfections.

The society could benefit from a bank merger if it implies the production of goods and services at a lower cost as a result of economies of scale. However, studies indicate that the cost is seen greater than the benefit when combinations concentrate businesses in fewer hands without benefiting the economy to any significant degree. In a high concentrated market with high market shares of few firms, the setting of prices will be less favourable to consumers, and result in collusion or other forms of non-competitive behaviour to increase their profits. Berger and Hannan (1989) argue that prices will be less favourable to consumers in concentrated markets because of the non-competitive behaviour exhibit in such markets. Their results show that banks in the most concentrated local market pay a money market deposit account rate (MMDA) that range from 25 to 100 basis points less than those in the least concentrated markets. Similar results were found for short-term certificate of deposits. Corvoisier and Gropp (2002) claim that the ongoing process of consolidation in the banking systems in the Euro zone countries may substantially reduce competition. In more concentrated markets banks may behave less competitively and may use their market power to extract rents from their customers. For loans, Corvoisier and Gropp results indicate an increase of banks' margin by 100-200 basis points. For savings and time deposits, they find that higher concentration resulted in spreads which are 100-200 basis points higher in more concentrated markets. Finally, Sapienza (2002) argues that in-market mergers involve the acquisition of a large local market share and mergers between banks that have a significant market overlap increase both local market concentration and interest rates. He adds that efficiency gains are offset by monopoly power, when borrowers suffer from increased lending interest rates. On the other hand, in studying the monopoly risk of bank mergers and acquisitions in Poland, Bonin and Leven (1996) argue that foreign competition can provide the necessary market discipline in commercial credit markets. They add that if consolidation is practised for economic reasons it should be accompanied with significant openness of the domestic banking sector to foreign competition.

4.3.2.2 Enhancing the Performance of the Banking System

Globalisation, deregulation, and lifting the restrictions on mergers and acquisitions (especially cross-border consolidations) force local banks to improve their performance.

otherwise larger and more efficient banks (local or foreign) would consider them as potential target for friendly or hostile takeover. Banks with low performance represent a prospective target, and may have a higher probability of being acquired than well-managed banks. Avkiran (1999) says that relative efficiency can be an indicator of likelihood of bank failure or becoming a takeover target. She found that the effect of deregulation appears when a bank is underperforming and it will be a takeover target. As a result, the overall efficiency of the Australian banking sector has improved during the post-deregulation period, where results show a steady rise in employee productivity and ROA. Ely and Song (2000) claim that bank consolidations would improve the sector performance when managers of acquiring banks seek to exploit economies of scale and scope or replace underperforming management of target banks. They add that bidders will be attracted to underperforming firms and corporate control can resolve agency problems since current managers know that more efficient managers can replace them.

4.3.2.3 Employment

After an acquisition, the acquirer starts to discover the potential areas of cost reduction by eliminating or reducing any overlaps or duplicate activities. The main cost reduction potential is the branch network and staff. Therefore, consolidations – especially horizontal – will definitely lead to job losses according to the degree of overlap. Mergers affect negatively the employment level. Rhoades (1998) explained this matter in comparing eight empirical studies done on bank M&As in the U.S. He found a reduction in staff costs accounted for over 50% of total cost reduction, which indicates the significance of staff redundancies. Davis (2000) adds that closing duplicate branch networks (which means job losses) represents a major potential saving, since two-thirds of a typical retail bank's cost base in the branch network.

4.3.2.4 Lending to Small Business

The structural changes that occur in the banking sector may affect directly the credit flows to small businesses. Small banks tend to specialise in small business lending because of

their limited lending capacity, and because their role in local communities gives them an advantage in acquiring information about borrowers. So bank mergers may imply a loss of information or an interruption of previously established relationships caused by post-merger restructuring. Moreover, large borrowers can access national or international credit markets directly by issuing bond and debts, while small borrowers rely on banks to provide their credit needs. Thus, small borrowers that are bank dependent are particularly sensitive to structural changes of the banking system.

Peek and Rosengren (1998) observed that after a merger, large business loans grow more rapidly than small business loans. At small banks, small business lending grew more rapidly than at large banks. Besides, they found that large acquirers are less active small business lenders than small acquirers are and bank's portfolio share of small business loans is inversely related to the size of the bank. Berger et al. (1999) argue that banks created by consolidation may reduce their services for small depositors because of new opportunities to provide wholesale services for large capital market participants. They observed that banks with less than $100 million assets invested about 9% of their assets in domestic small business loans, where only about 2% of assets for banks with over $10 billion. DeYoung et al. (1999) found a negative relation between a bank's size and its small business lending. They say that larger banks with extensive local branching networks may not be able to replicate the advantages of the small local banks because branch managers may be frequently related and decision making may be centralised. Furthermore, larger banks have more extensive lending opportunities and may decide to ignore small business borrowers. Sapienza (2002) declares that changes in the market structure of banking could seriously affect a wide range of nonbanking industries. Small borrowers of target banks are less likely to borrow money in the future from the consolidated bank than small borrowers of banks that do not merge, because large acquirers tend to cut off more small borrowers than other banks do. Focarelli et al. (2002) detected a long-term reduction in lending, especially for small firms, confirming that there is a significant change in lending strategies. Acquiring banks end up in the long run with more lending but with a lower share of small business loans.

In contrast to prior studies, Strahan and Weston (1998) find no significant change following mergers or acquisitions between medium-sized and large banking institutions, on small businesses lending. Bonaccorsi di Patti and Gobbi (2001) add that consolidations affect the volume of credit to both large firms and small and medium-sized ones. Specifically, mergers are followed by a temporary reduction in credit, and a cut in credits to "negative present value borrowers". They did not find that mergers and acquisitions reduce credits to small firms due to changes in bank size.

4.4 Bank Mergers in Lebanon: Causes, Objectives and Related Regulation

In developed economies, market forces dominate and control merger and acquisition processes, while in emerging markets the authorities play a major role in bank consolidations. Bank consolidations in emerging markets are one way of dealing with problems resulting from systemic banking crises or individual financial problems. Therefore, during or after banking crises the authorities encourage and sometimes enforce banks to consolidate to reduce the risk of bank failures and minimise the social cost of banking crises. We have cited previously three studies that looked at bank M&As in emerging markets. [60] All the three studies claim that bank M&As that occur in emerging markets are somehow guided and directed by the authorities, where market forces were absent in these processes.

4.4.1 Regulatory Related to Bank Mergers in Lebanon

The decline of the regulatory control and supervision on the Lebanese banking system during the 1980s has provoked a growth in the number of unstable, undercapitalised and inefficient banks. For instance, during the years 1990, 1991 and 1992 the banking sector average equity-to-asset ratios were 1.38%, 1.66% and 1.94% successively; the provisions for doubtful loans-to-gross loan ratios were 33.41%, 27.46% and 24% successively; the average cost-to-income ratios were 82.53%, 80.74% and 71.61% successively; and the average ROA

[60] Baer and Nazmi (2000), Gelos and Roldos (2002) and Shih (2003).

were 0.34%, 0.43% and 0.61% successively. Besides, the sharp depreciation of the local currency in late 1980s and early 1990s caused high withdrawal of deposits from the Lebanese banking sector and raised the rates of default of stressed borrowers. Consequently, Lebanese banks have suffered from a severe decline in activity and profitability that has reduced severely their capital. Before a banking crisis emerged, the central bank decided to restructure the banking system and push banks to recapitalise in order to avoid the catastrophic effects of a malfunctioning banking system on the economy. Efforts have been undertaken to reform the national banking system gradually. Firstly, a law introduced in November 1991 aimed at reform of the banking sector and focused on the following issues:

a- Giving the banks that have suffered losses of more than one quarter of their capital, one year to recapitalise otherwise they will be delisted from the list of approved banks.
b- Giving the Higher Banking Committee the authority to liquidate insecure banks.
c- Allowing the National Institute for Deposit Guarantee to guarantee the deposits of the relevant banks.

The next step has been the decision of moving towards consolidating the banking sector by the law 192, dated January 1992. This law aimed at facilitating bank mergers and acquisitions and offered incentives for merged banks. [61] The central bank used this law repeatedly to encourage the consolidation of banks operating in Lebanon in order to stabilise and support the banking sector. The "Bank Mergers Law" has offered the following incentives: [62] [63]

a- The banks' chairmen willing to merge have the right to exchange information about customers' accounts.

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[61] This law was initially valid for five years, until law 679, dated March 1998, extended its validity for an additional period that ended in January 2003.

[62] This law has been implemented on mergers among Lebanese banks but it is not applicable when a Lebanese bank acquires a foreign bank. Besides, this law does not implement automatically, but it requires a demand from both acquiring and acquired banks to benefit from its incentives.

[63] Offering incentives to acquirers was implemented in other countries. For instance, the Central Bank of Brazil advanced a programme of incentives for the restructuring and strengthening of the national financial system. This programme offers a system of tax incentives and credit facilities to encourage rapid consolidation of the banking sector. Acquiring banks were given line of credit at below the market interest rate to acquire other banks, and were permitted to absorb the financial losses of the acquired bank on its balance sheet through tax write-offs (Baer and Nazmi, 2000).

b- The central bank is allowed to give acquiring banks long-term loans to help them to absorb targets' losses and pay for redundancies.

c- The central bank can absolve the merging bank income tax within certain limits, and all procedures required to complete the merger are absolved stamp, moving and registration fees.

d- Merged banks are permitted to terminate employee contracts after providing them with benefits and legal indemnities.

Vis-à-vis the law of facilitating bank mergers, the central bank has been issuing directives to push banks towards more mergers such as capital adequacy requirements and branch opening restrictions. The purpose is to force banks to enhance their capital bases to meet Basle Accord requirements and to encourage small- and medium-sized banks to merge with other banks or accept an acquisition offer from the larger ones. In addition, the central bank has restricted new branch opening to two per year, which had a direct influence on bank willing to expand their operation geographically (in-market), by pushing them to look for a target to acquire and exploit its branch network.

4.4.2 The response of Banks

In the early 1990s, Lebanese banks found themselves lagging behind in terms of capital, efficiency, technology, and services. Technological transfer to Lebanon and Lebanese banks was limited to the employment of some innovations and devices, in the form of computer hardware and software and communication technology, and the use of basic methods and information in the form of tools of analysis and quantitative techniques. Thus, domestic banks directed their efforts to develop the sector through – amongst several procedures – rehabilitation and consolidation of their financial structures. Lebanese banks had to grow rapidly and develop their infrastructures to be able to offer competitive services, and play a leading role in financing the economy. The limited organic expansion opportunity and the limitation of new branch opening forced banks to look for external growth choice. Therefore, many large banks targeted medium and small banks to expand their branch networks. On the other hand, smaller banks that had been facing tough requirements from the

central bank, and the increasingly competitive environment accepted acquisition offers from larger banks. Twenty five mergers resulted from the law facilitating bank mergers. [64] These operations have led to the delisting of the 25 target banks.

4.5 Evaluating Bank Mergers in Lebanon: Methodology

4.5.1 Analysing the Characteristics of Acquiring and Acquired Banks

A deep understanding of the merged banks' characteristics allows recognition the variables that determine why a bank becomes a potential acquirer or a target. In addition, this could assist detecting the relationship between the success of a merger and the recent performance of merged banks, which may help in predicting the outcome of a merger. In this section we will implement two different methodologies: (1) comparing the average performance measures of acquiring and acquired banks pre-merger and (2) implementing a Logit Model.

4.5.1.1 Comparison of Acquiring and Acquired Bank Means

The test is based on the following equation:

$$\Delta X^{pre}(i,j) = X^{pre}(i) - X^{pre}(j) \tag{4.4}$$

where,

$\Delta X^{pre}(i,j)$ is the difference of pre-merger performance measures of acquiring bank i and acquired bank j.

$X^{pre}(i)$ is the performance measure of acquiring bank i pre-merger.

$X^{pre}(j)$ is the performance measure of acquired bank j pre-merger.

[64] Besides, several bank acquisitions occurred during the same period. These acquisitions will not be subject to empirical analysis because their number is limited and therefore, it is difficult to test the significance of the differences between the pre- and the post-acquisitions measures. However, we have compensated this issue by analysing the profitability of these banks in the second chapter and their capitalisation in the third one.

We will compare the "raw figures" and the sector-adjusted figures using the sector average as a benchmark. [65]

4.5.1.2 The Logit Model

Regarding the second methodology, we will implement a Logit Model, which helps understanding the relation between the characteristics of a bank and the probability of that bank being an acquirer or a target. We will include in this model all the acquiring and acquired banks. This methodology explains the different characteristics of the two groups and the significance of these differences. The Logit Model is based on the cumulative logistic probability function. Specifically,

$$Z_i = \log\left[\frac{P_i}{1-P_i}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n \tag{4.5}$$

and

$$P_i = E(Y=1|X_i) = \frac{1}{1+e^{-Z_i}} \tag{4.6}$$

where log is the natural logarithm, P_i is the probability that a bank will be acquired. X_i is the jth independent variable, and β_i is the coefficient of the jth independent variable. The coefficients measure the effect on the odds (probability) of being acquired of a unit change in the corresponding independent variable. The dependent variables Y_i in this model take the value of zero or 1 as follow:

$$Y_i = \begin{cases} 1 & for \quad acquiring \quad banks \\ 0 & for \quad acquired \quad banks \end{cases} \tag{4.7}$$

The reason behind using two different techniques is the sample size constraint. We use the first technique because it allows us pooling the data of three years pre- and three year post-merger, which forms a larger data set, whereas using regression analysis will limit the analysis to analysing the means only. On the other, because we want to analyse additionally the characteristics of acquiring and acquired banks one year pre-merger, which limits the analysis

[65] For the calculation of these values, see section 4.5.2.3.

to around 50 observations, it may be more reliable using regression analysis. Moreover, the usage of two different methodologies shows the robustness of the empirical findings.

4.5.2 Detecting the Changes in Corporate Performance Post-Merger

There are three methods used to assess bank mergers and acquisitions. These methods are: (1) Event studies, (2) Operational performance, and (3) Markets accuracy studies. Each of these methods has its advantages and disadvantages. They are implemented and performed according to the characteristics and circumstances of the market and the sample under study. The operational performance test will be implemented in our analysis for the following reasons:

i. In Lebanon, the number of listed and publicly traded banks is limited and market data are available for few banks, so an event study could only be performed for a very small sample. Accounting data are available almost for all banks, thus, OP studies can include a much broader sample of banks.

ii. Event studies reflect expectations and changes in expectations, where informational asymmetries may generate misleading results. Sometimes the market reaction may be negative to a certain merger, whereas it leads to enhancement of performance. But OP studies test the actual performance changes that follow a merger.

iii. OP studies analyse the merger effects in a longer time horizon before and after the merger.

iv. In event studies, it is difficult to isolate the effect of different events (such as merger, dividends, restructuring, or other announcements) on stock price. Moreover, if a bank was involved in several mergers during one period, it should be excluded from an event study. An OP study considers these mergers and treats them as one operation (however, it is not possible to know which deal has added more value).

This methodology (OP) will be employed and developed in a way to analyse more profoundly the bank mergers in Lebanon. The indicators utilised are diverse in order to capture more information about merged banks, and to observe all post-merger changes. The changes in corporate performance will be calculated as follow:

$$\Delta X_{cons}(i,j) = X_{cons}^{post}(i+j) - X_{cons}^{pre}(i+j) \tag{4.8}$$

where,

$\Delta X_{cons}(i,j)$ is the difference of the post-merger performance measure of the consolidated entity and the weighted-average performance measures of acquiring bank *i* and acquired bank *j*, pre-merger.

$X_{cons}^{post}(i+j)$ is the performance measure of the consolidated entity post-merger.

$X_{cons}^{pre}(i+j)$ is the weighted-average performance measures of the acquiring and acquired banks pre-merger. [66]

4.5.2.1 Period Length

It is very important to determine the period of time (time window) that has to be employed, in order to capture the effects of the merger. For the post-merger period, Rhoades (1998) summarised nine case studies about horizontal (in-market) mergers [67] and described their methodologies and findings. He found that roughly one-half of savings from mergers occurs during the first year, and all savings were fully achieved and all gains were realised within three years after the merger (with the majority of savings being achieved after two years). Thus, studies have analysed the ratios for three years preceding the year of the merger and three years after the merger. [68] Additionally, Davis (2000) finds that the sources of savings resulting from bank mergers and the time necessary to captures these savings are as presented in Table 4.1.

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[66] For the calculation of these values, see section 4.5.2.2.

[67] These case studies were done on U.S. banks by the Federal Reserve Board staff. Those studies are not published as he mentions.

[68] Moreover, he argues that the three-year time period was used because of the almost unanimous agreement among the experts interviewed that about half of any efficiency gains should be apparent after one year, and all gains should be realised within three years.

Table 4.1: Source of Merger Cost Savings and Time Necessary to Capture

Range of cost savings	Percentage	Years of capture
Executive and general administration	80 – 100	1
Treasury	90 – 100	1
Marketing	60 – 90	1
Legal	50 – 70	1
HR	40 – 60	1
Audit and accounting	30 – 50	2
Facilities	20 – 30	2 - 3
IT	20 – 30	2
Credit/ mortgage operations	30 – 40	2
Payments operations	25 – 30	2
Deposit operations	10 – 20	2
Other operations	10 – 20	2
Branch network	20 – 30	3

Source: Davis (2000)

It is obvious that the majority of savings are achieved within two years, and all savings are achieved within three years after the merger. Moreover, many other empirical studies have employed a time window of three years before and after the merger. For instance, Cornett and Tahranian (1992), Healy et al. (1992) and Vennet (1996) studied a period of three years before and three years after the merger. [69] Therefore, our pre-merger analysis will cover a period of three years prior to the merger (*t-3* to *t-1*) and a consistent post-merger period, i.e. three years. The year when the merger occurs (*t*) is left out of the analysis because it is considered a transition period. The differences/changes in the pre- and post-merger performance measures will be examined on bank-mean basis and on sector-adjusted bank-mean basis (i.e. employing a benchmark). Finally, the differences between pre-merger measures of acquiring and acquired

[69] However, there are some studies that have employed smaller time windows. For instance, Pilloff (1996) have employed a time period window of two years before and after the merger. Craig and Cabral dos Santos (1997) have employed two time frames according to the availability of data. The first time frame included eight quarters before and eight quarters after the acquisition. The second time frame included four quarters prior to the acquisitions and sixteen quarters after.

performance measures and the changes in pre- and post merger measures of merged banks will be tested using *t*-statistic.

4.5.2.2 Pre-Merger Measures

To obtain the pre-merger period performance (*t-3* to *t-1*), the measures are calculated by aggregating the indicators for merged banks in each of the three years prior to the merger. The indicators of combined firms are weighted average, using the relative sizes (total assets) as weight. In fact, a hypothetical combined firm is created by this procedure and will be used as a proxy for the performance of firms before the merger. This value is calculated as follows:

$$X_{cons}^{pre}(i+j) = \frac{A^{pre}(j)}{A^{pre}(j)+A^{pre}(i)} \times X^{pre}(j) + \frac{A^{pre}(i)}{A^{pre}(j)+A^{pre}(i)} \times X^{pre}(i) \qquad (4.9)$$

where,

$A^{pre}(i)$ is the acquiring bank assets pre-merger.

$X^{pre}(i)$ is the performance measure of acquiring bank *i* pre-merger.

$A^{pre}(j)$ is the target bank assets pre-merger.

$X^{pre}(j)$ is the performance measure of acquired bank *j* pre-merger.

4.5.2.3 The Benchmark

The performance measures could be affected by both firm-specific influences and industry-wide trends. Therefore, it is crucial to create a benchmark in order to evaluate the post-merger performance. Cornett and Tahranian (1992), Pilloff (1996), Vennet (1996) and Craig and Cabral dos Santos (1997) employ as a relevant benchmark the sector-adjusted performance of the merged banks under study. The sector-adjusted measures are calculated by subtracting the sector mean from the sample data. On the other hand, Healy et al. (1992) calculated their industry-adjusted performance measures by subtracting the sector median from the sample measures. Subtracting the sector mean (or median) from the obtained figures permits to assess if the observed differences/changes in the combined firm reflect changes in the combined banks or the whole sector. Moreover, this procedure eliminates the time effect,

since we will be comparing the abnormal sector-adjusted performance of merged banks before and after the merger.

4.5.3 The Indicators (Performance Measures) [70]

4.5.3.1 Profitability Indicators

The first set of performance measures is the profitability indicators. These indicators show how profitable were the banks under study, the diversification potential and income sources, and the efficiency in utilising the assets. Comparing the profitability of banks before and after the merger shows how profitable was the deal.

4.5.3.2 Efficiency Indicators

The second set of indicators is the efficiency indicators, to find out the efficiency of improvements (if any) resulting from the merger. It is important here to discriminate between cost reduction and efficiency improvements. Operating expenses may be reduced by cutting employees, closing branches, consolidating headquarters offices, closing computer and back-office operations, etc. Such reductions in expenses do not automatically translate into improvements in efficiency, but may be accompanied by reductions in assets and revenues, which represent shrinkage of the firm rather than efficiency improvements. Therefore, absolute expense reduction would not be able to control this issue and instead the cost-to-income ratio and the cost-to-asset ratio will be utilised.

4.5.3.3 Risk Indicators

Because changes in observed profitability following a merger may not only be the result of a cost reduction and/or higher revenue, but it may be the result of adopting risky strategies. A change in lending policies aimed at increasing revenues may worsen the quality of the loan portfolio, and a search for more profitable investments may endanger the bank's

[70] For the calculation of the ratios, see appendix 4.B.

liquidity position. Thus it is crucial to analyse and compare the changes in the risk profile of the merging banks before and after a merger. The third set of indicators will be to analyse capital adequacy, credit risk, and liquidity risk measures.

4.5.3.4 Growth and Market Share Indicators

We use those measures to determine the effect of this indicator on post-merger outcomes, and to detect growth and/or market share gains post-merger. Additionally, these measures allow us to detect the concentration changes in the market under study as a whole.

4.6 Data

Firstly, the period under study covers 14 years and includes 25 merger operations. The first acquisition occurred in 1994, and thus by going back three years before that operation, the first year included is 1991 and the last year is 2003. Theoretically, the total number of observations is 75 for both acquiring and acquired banks pre-merger and 75 observations for the merged entities post-merge. But in fact, some observations are missed. For the first section (comparing acquiring and acquired banks), data for two target banks were missing. The total number of observations for acquiring banks remains 75, but with 69 observations for acquired banks. For the second section (testing the effect of mergers on banks' performance), we lost some observations as well. Theoretically, the pre-merger observations were supposed to be 69, but we lost 7 observations due to overlapping merger (repeated acquirers). Additionally, two acquisitions occurred in 2001 and six in 2002 and therefore, we have lost 14 post-mergers observations since 2004 and 2005 accounts are not available. Thus, we have 62 pre-mergers observations and 61 post-mergers observations.

The main source of data used in this chapter is BilanBanques. However, many target bank data were not reported in it. We have got some of the missing data from the central bank and some from the acquiring banks.

We analyse the acquiring and acquired data in Tables 4.2 and 4.3 and we have found the following. For acquiring banks, the means and the medians are in general close, which shows that the distribution of the data is not skewed. On the other hand, for acquired banks the data are obviously skewed, as we notice large differences between the means and the medians. Besides, acquired banks indicators are more dispersed than those for acquiring banks. Regarding the differences, we notice that acquiring banks are more profitable and more efficient than acquired banks. Acquiring banks are less risky, which is clear from the higher capital adequacy, lower credit risk and better liquidity. Regarding the growth, acquiring and acquired banks have similar growth, except the equity growth where acquirers have higher growth rate. The difference in size and in market share is obvious between the two groups. The larger acquirer had a size of $4.65 billion with a 9% market share, whereas the larger target had $835 million assets with 2% market share. [71] From this general comparison, we notice that there are differences between the two groups of banks, however, a statistical analysis is needed to see if these differences are significant or not.

[71] All figures were converted into U.S. Dollar before being analysed. This is to minimise the effect of inflation.

Table 4.2: Acquiring Banks Descriptive Statistics

Performance measures	Mean	Median	SD	Maximum	Minimum	Skeweness	Kurtosis
Profitability							
ROE	17.22	16.48	13.82	63.81	-8.99	0.60	0.50
ROA	1.02	1.09	0.73	2.55	-0.93	-0.18	-0.33
Net profit margin	24.46	27.40	18.22	59.27	-37.01	-0.75	0.67
Asset utilisation	4.16	3.89	1.26	8.66	1.97	1.33	2.69
IRS	3.17	3.12	1.01	6.13	1.22	0.51	0.40
Non-interest income-to-total revenue	23.29	22.58	11.73	77.51	3.85	2.73	11.43
Efficiency							
Cost-to-income ratio	70.00	65.90	21.05	136.57	37.96	0.77	0.13
Cost-to-average assets ratio	2.67	2.41	1.19	7.99	1.04	2.04	6.27
Staff expenses-to-average assets ratio	1.47	1.31	0.71	4.21	0.51	1.90	4.36
Overhead efficiency	41.47	38.75	20.76	131.32	3.87	2.24	8.64
Interest paid to interest received	66.74	71.43	15.69	85.15	15.13	-2.36	5.10
Capital adequacy							
Equity-to-asset ratio	9.22	6.60	14.10	89.26	1.23	5.30	28.76
Equity-to-risky asset ratio	31.61	13.09	99.20	611.41	1.99	5.78	32.64
Loan-to-equity ratio	4.98	4.19	3.57	21.46	0.00	1.74	5.47
Deposit-to-equity ratio	14.61	12.29	11.26	71.05	0.04	2.41	8.76
Credit risk							
Bad debts & provisions-to-gross loans ratio	1.05	0.70	1.38	6.34	-1.55	1.88	4.22
Provisions for doubtful loans-to gross loans	13.40	9.38	14.47	73.82	0.00	2.05	4.77
Liquidity risk							
Liquid assets-to-total assets ratio	67.99	68.04	9.39	97.87	51.69	1.53	3.81
Loan-to-deposit ratio	32.58	33.69	11.41	58.09	1.06	-0.87	1.77
Growth							
Assets	31.22	22.62	31.30	165.37	-2.98	2.52	8.18
Equity	124.81	27.60	443.22	2,690.93	-52.18	5.62	31.32
Deposits	24.75	21.10	24.06	99.81	-45.92	0.40	2.74
Loans	19.88	24.17	35.29	107.15	-73.49	- 0.71	1.41

Market Share							
Assets	3.61	3.63	2.74	8.98	0.02	0.15	-1.14
Deposits	3.62	3.59	2.75	8.59	0.001	0.11	-1.27
Loans	3.29	3.49	2.47	7.92	0.00	0.04	-1.34
Assets ($ million)	1,211.842	1,010.868	1,159.096	4,650.681	4.548	1.037	0.547

Notes:

ROE is the after tax net income-to-average equity ratio; ROA is the after tax net income-to-average asset ratio; NPM is the after tax net income-to-total revenue ratio; Asset Utilisation is the total revenue-to-average asset ratio; IRS is the net interest margin-to-average asset ratio; Overhead Ratio is the non-interest income-to-general operating expenses ratio; Asset/Equity/Deposit/Loan growth is the year-to-year (percentage) growth; Asset/Deposit/Loan market share is the average of all acquiring/acquired banks assets/deposits/loans divided by total sector banking assets/deposits/loans; the other ratios are exactly as written.

Table 4.3: Acquired Banks Descriptive Statistics

Performance measures	Mean	Median	SD	Maximum	Minimum	Skeweness	Kurtosis
Profitability							
ROE	3.63	0.40	37.65	171.05	-116.66	1.12	9.21
ROA	-0.08	0.02	5.71	26.64	-25.09	0.34	14.09
Net profit margin	-31.43	0.92	134.99	97.75	-612.51	-3.35	11.34
Asset utilisation	5.43	4.33	5.07	27.25	-1.26	2.57	7.83
IRS	2.82	2.79	2.68	9.40	-6.96	-0.69	3.56
Non-interest income-to-total revenue	29.68	26.66	96.32	378.98	-453.75	-2.21	16.03
Efficiency							
Cost-to-income ratio	137.53	98.17	200.10	1204.48	2.25	4.48	20.82
Cost-to-average assets ratio	4.91	3.43	4.35	23.48	0.57	2.55	7.56
Staff expenses-to-average assets ratio	2.87	1.83	3.00	16.45	0.00	2.90	9.80
Overhead efficiency	56.58	35.59	116.88	891.12	0.04	6.77	48.56
Interest paid to interest received	74.05	73.40	24.46	160.65	4.80	0.44	3.62
Capital adequacy							
Equity-to-asset ratio	5.01	7.00	33.26	89.26	-165.08	-2.94	16.46
Equity-to-risky asset ratio	18.54	10.01	99.46	611.41	-276.76	3.19	23.77
Loan-to-equity ratio	41.20	5.87	152.85	797.40	-29.78	4.46	19.27
Deposit-to-equity ratio	33.99	11.20	100.09	538.80	-70.14	4.32	18.57
Credit risk							
Bad debts & provisions-to-gross loans ratio	1.13	0.53	1.67	8.89	-0.72	2.36	7.66
Provisions for doubtful loans-to gross loans	126.39	15.05	382.63	2019.64	0.00	4.08	16.49
Liquidity risk							
Liquid assets-to-total assets ratio	53.32	54.21	15.77	97.87	20.14	-0.03	0.55
Loan-to-deposit ratio	52.37	46.07	36.28	178.91	1.06	2.18	4.81
Growth							
Assets	25.13	14.56	47.76	219.27	-32.03	2.39	6.44
Equity	23.50	2.95	81.42	286.55	-188.17	1.07	3.06
Deposits	23.21	12.20	56.65	380.20	-47.90	4.82	29.72
Loans	19.34	14.24	41.40	199.43	-50.00	2.60	9.34

Market Share							
Assets	0.54	0.28	0.57	1.96	0.02	1.18	0.13
Deposits	0.54	0.30	0.58	1.98	0.001	1.22	0.22
Loans	0.64	0.38	0.67	2.36	0.00	1.24	0.42
Assets ($ million)	191.587	104.990	226.010	835.224	2.168	1.570	1.477

Notes:

ROE is the after tax net income-to-average equity ratio; ROA is the after tax net income-to-average asset ratio; NPM is the after tax net income-to-total revenue ratio; Asset Utilisation is the total revenue-to-average asset ratio; IRS is the net interest margin-to-average asset ratio; Overhead Ratio is the non-interest income-to-general operating expenses ratio; Asset/Equity/Deposit/Loan growth is the year-to-year (percentage) growth; Asset/Deposit/Loan market share is the average of all acquiring/acquired banks assets/deposits/loans divided by total sector banking assets/deposits/loans; the other ratios are exactly as written.

In Table 4.4 we show the annual average of acquiring and acquired banks' measures. For acquiring banks, the measures do not change significantly during the three years before the acquisition. The focus is on acquired banks. We notice that acquired banks' profitability deteriorates gradually before the acquisitions. Moreover, whereas it is somehow steady for acquirers, it is highly volatile for acquired banks where it is clear that they change significantly from one year to another. Also the capital adequacy of acquired banks is highly volatile, which may suggest that they were not able to maintain a steady capitalisation. We notice from the credit risk indicators that the credit risk increases for acquired banks gradually before the acquisition. Their quality of loan portfolios deteriorates before the merger, which affects negatively their profitability. Finally, acquiring banks grow rapidly pre-merger, but acquiring banks grow slowly.

Table 4.4: The Development of Acquiring and Acquired Banks' Measures Pre-merger (Bank Means)

Performance measures	Acquirers			Acquired		
	T-3	T-2	T-1	T-3	T-2	T-1
Profitability						
ROE	19.40 (16.20)	16.95 (11.64)	15.31 (13.53)	8.10 (26.58)	9.64 (9.64)	-8.94 (38.75)
ROA	0.99 (0.79)	1.01 (0.70)	1.04 (0.74)	0.33 (8.57)	-0.04 (2.95)	0.21 (3.95)
Net profit margin	22.49 (19.88)	23.80 (17.23)	27.09 (17.91)	-0.38 (50.63)	-54.31 (191.38)	-15.91 (69.39)
Asset utilisation	4.32 (1.30)	4.25 (1.37)	3.91 (1.12)	6.47 (6.46)	4.74 (3.06)	4.96 (5.10)
IRS	3.35 (0.98)	3.32 (1.01)	2.84 (1.01)	3.21 (3.37)	2.76 (2.65)	2.43 (1.62)
Non-interest income-to-total revenue	22.52 (7.66)	21.47 (8.95)	25.89 (16.57)	14.63 (109.72)	36.46 (118.41)	40.30 (29.69)
Efficiency						
Cost-to-income ratio	72.25 (23.11)	70.16 (20.23)	67.60 (20.35)	106.26 (73.22)	87.73 (29.84)	107.89 (71.52)
Cost-to-average assets ratio	2.88 (1.36)	2.72 (0.73)	2.42 (0.97)	5.95 (6.11)	4.53 (2.97)	4.07 (2.85)
Staff expenses-to-average assets ratio	1.59 (0.79)	1.48 (0.73)	1.34 (0.61)	3.57 (4.20)	2.64 (2.16)	2.26 (1.83)
Overhead efficiency	38.24 (12.96)	39.04 (17.72)	47.11 (28.26)	43.10 (30.10)	79.20 (191.72)	45.81 (45.79)
Interest paid to interest received	66.58 (14.65)	66.63 (16.02)	67.02 (16.98)	68.79 (28.31)	75.35 (27.71)	79.03 (12.40)
Capital adequacy						
Equity-to-asset ratio	6.33 (3.77)	7.17 (3.46)	14.17 (23.42)	7.64 (39.67)	0.99 (39.87)	6.71 (4.84)
Equity-to-risky asset ratio	13.90 (9.48)	16.33 (11.41)	64.60 (168.68)	37.54 (150.75)	4.93 (72.72)	11.89 (8.93)
Loan-to-equity ratio	6.16 (4.67)	4.66 (3.13)	4.12 (2.30)	31.22 (101.00)	44.89 (172.53)	48.96 (185.78)
Deposit-to-equity ratio	18.42 (15.54)	13.37 (9.12)	12.04 (6.58)	25.70 (66.32)	39.86 (115.28)	36.97 (118.59)
Credit risk						
Bad debts & provisions-to-gross loans ratio	0.97 (1.15)	1.18 (1.30)	1.00 (1.69)	0.50 (0.83)	1.12 (1.14)	1.92 (2.55)
Provisions for doubtful loans-to gross loans	12.60 (12.84)	14.65 (17.20)	12.94 (13.52)	99.93 (284.45)	132.20 (392.24)	151.92 (485.41)
Liquidity risk						
Liquid assets-to-total assets ratio	66.69 (6.47)	68.45 (10.70)	68.81 (10.63)	56.13 (17.78)	51.18 (14.78)	52.50 (14.69)
Loan-to-deposit ratio	33.23 (10.91)	32.70 (12.12)	31.77 (11.62)	54.51 (41.70)	52.82 (36.59)	49.14 (30.17)
Growth						
Assets	28.99 (19.44)	25.57 (23.20)	39.10 (44.78)	29.34 (46.10)	24.81 (43.38)	20.51 (56.86)
Equity	51.89 (99.27)	63.33 (74.23)	259.22 (750.13)	50.25 (100.97)	19.30 (58.88)	0.06 (78.01)
Deposits	23.63 (26.81)	24.46 (22.52)	26.16 (23.62)	15.96 (32.72)	36.16 (85.93)	15.63 (23.71)

Loans	22.02 (36.37)	18.73 (35.76)	18.89 (35.17)	24.96 (47.39)	14.64 (24.87)	18.54 (51.21)
Market Share						
Assets	3.50 (2.75)	3.60 (2.76)	3.72 (2.83)	0.48 (0.57)	0.53 (0.57)	0.62 (0.59)
Deposits	3.54 (2.80)	3.63 (2.79)	3.68 (2.79)	0.48 (0.59)	0.51 (0.58)	0.63 (0.59)
Loans	3.25 (2.51)	3.25 (2.45)	3.37 (2.55)	0.60 (0.68)	0.63 (0.66)	0.72 (0.69)
Assets ($ million)	998.778 (1,039.606)	1,199.037 (1,148.236)	1,437.712 (1,283.484)	151.660 (209.708)	174.816 (226.220)	251.342 (243.000)

Notes:
ROE is the after tax net income-to-average equity ratio; ROA is the after tax net income-to-average asset ratio; NPM is the after tax net income-to-total revenue ratio; Asset Utilisation is the total revenue-to-average asset ratio; IRS is the net interest margin-to-average asset ratio; Overhead Ratio is the non-interest income-to-general operating expenses ratio; Asset/Equity/Deposit/Loan growth is the year-to-year (percentage) growth; Asset/Deposit/Loan market share is the average of all acquiring/acquired banks assets/deposits/loans divided by total sector banking assets/deposits/loans; the other ratios are exactly as written.
Standard deviation in parentheses.

4.7 Empirical Results

4.7.1 The Differences of Acquiring and Acquired Banks Characteristics

4.7.1.1 Comparing the (Average) Performance Measures of Merged Banks

The empirical results for this section are reported in Table 4.5. The first two columns show the average of all banks during the three years before the mergers. From comparing the figures in these two columns, we find that acquiring banks are more profitable and more efficient than acquired banks. They have better control of risks. Besides they are larger and have higher growth. These differences could be affected by firm-specific influences and/or industry-wide trends. Therefore, we compare the sector-adjusted measures of acquirers and targets by subtracting the sector average from all measures. The results are reported in the last five columns of Table 4.5. The fourth and the sixth columns show the proportion of banks that have higher measures than the sector average. The differences (and their significance) are reported in the last column.

Acquiring banks sector-adjusted ROE is significantly higher than those of acquired banks. The difference is 12.69% and is significant at the 5% level. Besides, we notice that compared to the entire sector, acquired banks report lower ROE (by 15.70) and ROA (by 0.95) than the sector average. [72] Acquired banks shareholders find it no more profitable for them to hold the shares of their banks and thus, they accept the offer from other banks. Acquires have better ROA, net profit margin and IRS, although not significant. Acquiring banks may have relatively lower non-interest income than acquired banks. The negative difference in asset utilisation could be due to the fact that acquiring banks are much larger that targets. An important remark here is that acquiring banks have lower profitability than other banks that do not engage in acquisitions. This is shown by the lower profitability than the sector mean (-3.01 for ROE and -0.11 for ROA). The interpretation for this could be the following explanation.

[72] This is consistent with the findings of Rose (1987) on US banks. He found that acquired banks reported significantly lower ROE and ROA than comparable non-acquired banks. Moreover, acquired banks reported lower equity ratios.

Banks that have low profitability, hope that an acquisition of another bank may create new investment opportunities for them and therefore, this may enhance their profitability. This theory could be supported by looking at another ratio: the non-interest income-to-total revenue ratio. We notice that acquiring banks have lower non-interest income-to-total revenue ratio than the sector mean (by 0.33), whereas acquired bank have higher ratio than the sector mean (by 5.90). So acquiring banks may see this fact as an opportunity to benefit from the targets' ability to generate income from the non-traditional banking activities, in order to diversify their income.

For efficiency indicators, target banks are significantly less efficient. Firstly, their cost-to-income ratio, their cost-to-average asset ratio and staff expense-to-average asset ratio are higher by 30.80%, 2.24% and 1.40% respectively than acquiring banks, and all are significant at the 1% level. Regarding the last ratio (staff expense-to-average asset ratio), acquiring banks may see this fact and consider redundancies as an opportunity for cost saving. In addition, acquirers have 7.18% lower interest paid-to-interest received ratios, which is significant at the 10% level. Both categories have similar overhead efficiency. [73]

The capital adequacy ratios are better for acquiring banks than acquired ones. [74] Although the differences for the first two indicators are not significant, the loan-to-equity ratio

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[73] The performance differences between merging banks could represent a motive for the acquirer as explained before. Moreover, this difference affects the outcome of the merger and the post-merger performance of the merged entity. For instance, Peristiani (1997) argues that the relative performance of targets and acquirers plays a significant role in the post-merger performance and that the difference between acquirers and targets is particularly important in post-merger profitability and operating expenses. His empirical results show that acquiring banks realise higher gains in profitability, scale efficiency, and operating costs when they absorb under-performing targets, which suggests that mergers are more beneficial to acquiring banks when the performance gap between targets and acquirers is wide.

[74] The issue of capital adequacy – for both bidder and target – in bank mergers is a crucial issue and it affects every aspect in it, including the method of payment and the premium paid. Therefore, the difference in capitalisation between the bidder and the target does not only motivate (and trigger) the acquisition but it plays an important role in the method of payment and the premium paid to the target's shareholders. For instance, Grullon et al. (1997) show that the most important factors that influence the payment medium are the relative size of the merging banks and capital adequacy of the acquirer. Their empirical results show that the smaller the acquirer relative to the target bank and the higher the acquirer's capital adequacy ratio, the more likely it is that the acquisition will be financed by a stock swap. Shawky et al. (1996) examined the merger premium paid for a sample of US bank acquisitions and focus – among other variables – on bidders' and targets' characteristics. They found that bank merger premiums were higher for (1) smaller target size, (2) targets with higher ROE, (3) targets in different state than the bidder, (4) transactions carried out through exchange of stock as opposed to a cash purchase, and (5) targets with higher leverage.

is less by 36.37% and the deposit-to-equity ratio is less by 19.93%, and both are significant at the 10% level. This shows that acquiring banks are better capitalised than their targets. Moreover, acquiring banks – in general – are better capitalised than all other banks. This is shown by the positive difference between the equity-to-asset ratio (3.45) and the equity-to-risky asset ratio (22.55). 67% of those banks have higher equity-to-asset ratio than the sector mean and 63% of them have higher equity-to-risky asset ratio than the sector mean.

Table 4.5: Comparison of the Mean and the Sector-adjusted Performance Measures for Acquiring and Acquired Banks

Performance measures	Bank Means		Sector-adjusted means				Difference
	Acquirers	Acquired	Acquirers	% positive	Acquired	% positive	
Profitability							
ROE	17.22 (13.82)	3.63 (37.65)	-3.01 (13.60)	46	-15.70 (35.86)	15	12.69**
ROA	1.02 (0.73)	0.17 (5.75)	-0.11 (0.64)	38	-0.95 (5.74)	14	0.85
NPM	24.46 (18.22)	-23.53 (122.46)	-4.71 (16.53)	33	-53.04 (123.98)	24	48.33
Asset utilisation	4.16 (1.26)	5.43 (5.07)	0.33 (1.13)	63	1.60 (4.87)	67	-1.26*
IRS	3.17 (1.01)	2.82 (2.68)	0.25 (0.92)	58	-0.09 (2.69)	45	0.34
Non-interest income-to-total revenue	23.29 (11.73)	29.68 (96.32)	-0.33 (11.60)	42	5.90 (96.16)	57	-6.23
Efficiency							
Cost-to-income ratio	70.00 (21.05)	100.68 (61.35)	7.27 (19.64)	67	38.07 (62.11)	76	-30.80***
Cost-to-average assets ratio	2.67 (1.19)	4.91 (4.35)	0.51 (1.11)	54	2.74 (4.27)	95	-2.24***
Staff expenses-to-average assets ratio	1.47 (0.71)	2.87 (3.00)	0.28 (0.69)	67	1.68 (2.95)	86	-1.40***
Overhead efficiency	41.47 (20.76)	56.58 (116.88)	-3.60 (20.40)	29	11.29 (116.47)	33	-14.88
Interest paid to interest received	66.74 (15.69)	74.05 (24.46)	-5.17 (15.51)	42	2.00 (24.61)	52	-7.18*
Capital adequacy							
Equity-to-asset ratio	9.22 (14.10)	5.01 (33.26)	3.45 (14.19)	67	-1.26 (33.24)	55	4.72
Equity-to-risky asset ratio	31.61 (99.20)	18.54 (99.46)	22.55 (101.53)	63	6.51 (99.32)	41	16.04
Loan-to-equity ratio	4.98 (3.57)	41.20 (152.85)	-0.34 (3.18)	33	36.03 (151.32)	59	-36.37*
Deposit-to-equity ratio	14.61 (11.26)	33.99 (100.09)	0.04 (8.56)	42	19.97 (94.70)	45	-19.93*
Credit risk							
Bad debts & provisions-to-gross loans ratio	1.05 (1.38)	1.13 (1.67)	-0.05 (1.17)	42	0.07 (1.82)	41	-0.12
Provisions for doubtful loans-to gross loans	13.39 (14.47)	126.39 (382.63)	0.43 (13.50)	33	113.78 (380.14)	55	-113.36**
Liquidity risk							
Liquid assets-to-total assets ratio	67.99 (9.39)	53.32 (15.77)	3.72 (9.63)	71	-10.87 (15.78)	18	14.59***
Loan-to-deposit ratio	32.57 (11.41)	52.37 (36.28)	-4.91 (11.30)	21	14.63 (37.40)	73	-19.54***
Growth							
Assets	31.22 (31.30)	25.13 (47.76)	9.12 (29.26)	71	2.69 (48.87)	36	6.44
Equity	124.81 (443.22)	23.50 (81.42)	98.54 (450.92)	71	-13.64 (76.71)	40	112.18**
Deposits	24.75 (24.06)	23.21 (56.65)	3.21 (21.53)	58	1.52 (58.59)	36	1.69

Loans	19.88 (35.29)	19.34 (41.40)	-4.23 (34.29)	58	-4.60 (41.60)	32	0.37
Market Share							
Assets	3.61 (2.74)	0.54 (0.57)					3.07***
Deposits	3.62 (2.75)	0.54 (0.58)					3.08***
Loans	3.29 (2.47)	0.64 (0.67)					2.64***
Assets ($ million)	1,211.877 (1,159.096)	188.394 (225.448)					1,020.290***

Notes:

For a sample of 25 bank mergers occurred between 1994 and 2002 we estimate the differences of pre-merger average performance measures of acquiring and acquired banks. To test the significance of the differences we compare the test-statistic $z = (\bar{x}_1 - \bar{x}_2) \Big/ \sqrt{s_1^2/n_1 + s_2^2/n_2}$, to the critical z* of the three standard levels of significance (1%, 5% and 10%). $\bar{x}$ is the average performance measure of all acquiring/acquired banks, s^2 is the variance of performance measure of all acquiring/acquired banks and n is the number of observations.

ROE is the after tax net income-to-average equity ratio; ROA is the after tax net income-to-average asset ratio; NPM is the after tax net income-to-total revenue ratio; Asset Utilisation is the total revenue-to-average asset ratio; IRS is the net interest margin-to-average asset ratio; Overhead Ratio is the non-interest income-to-general operating expenses ratio; Asset/Equity/Deposit/Loan growth is the year-to-year (percentage) growth; Asset/Deposit/Loan market share is the average of all acquiring/acquired banks assets/deposits/loans divided by total sector banking assets/deposits/loans; the other ratios are exactly as written.

Standard deviation in parentheses.

% positive is the proportion of banks in the sample that have performance measures above the sector mean.

*** Significantly different from zero at the 1% level.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

Regarding the credit risk, it is obvious that acquiring banks are much better in controlling their portfolio quality than acquired banks. The second ratio shows a difference of 113.36% and significant at the 5% level. The liquidity risk measures employed show a strong capability of classifying bidders and targets. Bidders have significantly higher liquidity than targets. The liquid assets-to-total asset ratio is higher for bidders by 14.59% and significant at the 1% level, and the loan-to-deposit ratio is less for bidder by 19.54% and also significant at the 1% level. Additionally, we notice that even compared to other banks, acquirers have higher liquidity shown by the positive difference between acquires mean and the sector mean (3.72%). These findings may give support to the cash-rich bidder theory, which suggests that bidder use their free cash to acquire other firms.

For growth, we find that acquiring banks' equity grow more than acquired banks. The difference is 112.18% and significant and the 5% level. The other three indicators do not show significant differences.

Finally, regarding the size of the acquirers and the targets, there is a significant difference between the two categories. The size of the acquiring banks and their market share is much larger than those of acquired banks. Therefore, it seems that (in general) larger banks target smaller banks and do not target banks from similar size. The difference in assets market share, deposits market share and loans market share are 3.07%, 3.08% and 2.64% and all are significant at the 1% level. Additionally, the difference in size is significant at the 1% level.

The above analysis shows us the characteristics of acquiring and acquired banks. The general conclusion is that acquiring banks are more profitable and more efficient than their target. Moreover, the riskiness of the bidders is significantly less than acquired banks. Thus, banks with good performance target poorly performing banks because they see an opportunity of benefiting from the target by restructuring it and improving its performance. All the above findings give support to *H1*.

4.7.1.2 The Logit Model Results

In the previous section, we have analysed the differences between acquiring and acquired banks during the last three years pre-merger using the sector-adjusted mean-difference between the two categories. In this section will use another technique to detect the difference between the two groups of banks one year pre-merger. This additional analysis will clarify more the different characteristics of acquiring and acquired banks with focus on acquired banks and their performance and efficiency.

We present several different models to avoid any multicoliniearity among the regressors. Besides, we include in each model the minimum possible number of variables to minimise the loss of degrees of freedom, due to the small size of the data set. The empirical findings are presented in Table 4.6. In general, the results reported in Table 4.6 are consistent with those in Table 4.5, with few differences. Firstly, the difference in profitability between the two groups of banks is obvious and ROE and NPM show a significant superiority for acquiring banks one year pre-merger at the 5% and 1% level successively. Note that NPM did not capture a significant effect for the three year-average in Table 4.5, which may suggests that the profitability of acquired banks deteriorates significantly before the acquisitions, which may represent a motive for the target shareholders to accept an acquisition offer. Another remark is that acquired banks have higher non-interest income relative to total revenue than acquiring banks, which is significant at the 5% level. This may represent a motive for acquiring banks to target banks with diversified income.

All the efficiency indicators show that one year prior to merger, acquired banks have (on average) poor performance. Cost-to-income ratio and cost-to-average asset ratio are significantly higher for acquired banks, at the 10% and 5% level successively. Moreover, the interest paid-to-interest received ratio shows that acquiring banks have better ability in controlling their spreads than target banks.

Regarding the adequacy of merged banks, acquiring banks report significantly higher equity-to-asset ratio significant at the 5% level and higher equity-to-risky asset ratio

significant at the 1% level. Additionally, the loan to equity ratio shows a significant difference at the 1% level. Thus, the three indicators implemented confirm that acquired banks have poor capital adequacy compared to acquiring banks one year prior to the merger.

Table 4.6: Regression Estimates for the Characteristic Differences between Acquiring and Acquired Banks

Variables	(1)	(2)	(3)	(4)
C	-0.50 (-0.51)	1.99*** (2.79)	2.44*** (3.43)	-1.16 (-1.50)
ROE	0.04** (2.14)			0.01 (1.50)
ROA		0.17 (0.47)		
NPM			0.07*** (3.16)	
AU	-1.01 (-1.35)			
IRS	0.37 (0.37)	-1.12 (-1.45)		
NNI-to-total revenue		-0.03** (-2.07)		
CI				-0.03* (-1.67)
CA			-0.75*** (-2.72)	
Interest paid-to-interest received		-0.22** (-2.15)		
Equity-to-asset ratio				0.04** (2.07)
Equity-to-risky asset ratio		0.10*** (2.86)		
Loan-to-equity ratio	-0.58*** (-2.82)		-0.43*** (-2.79)	
Bad debts-to-gross loan ratio		-0.51*** (-2.72)		0.18 (0.81)
Provisions-to-gross loan ratio	-0.01 (-0.33)		-0.03*** (-3.04)	
Liquid asset-to-total asset ratio		0.28*** (2.98)		
Asset growth	0.04 (1.07)			
Equity growth		0.02** (2.54)		
Deposit growth			-0.004 (-1.20)	
Loan growth		-0.001 (-0.03)	0.002 (0.18)	
Size	0.003*** (3.19)			0.003*** (3.61)
McFadden R-squared	0.6537	0.5469	0.5307	0.4525
Likelihood ratio	40.4166	33.8186	31.9411	27.2350
Prob(LR stat)	0.0000	0.0000	0.0000	0.0000
Observations with Dep = 0	23	23	23	23
Observations with Dep = 1	25	25	25	25
Total observations	48	48	48	48

Notes:
All regressions are estimated with the Logit model. For a sample of 25 bank mergers occurred between 1994 and 2002 we estimate the differences of pre-merger characteristics of acquiring and acquired banks.
ROE is the after tax net income-to-average equity ratio; ROA is the after tax net income-to-average asset ratio; NPM is the after tax net income-to-total revenue ratio; AU is the total revenue-to-average asset ratio; IRS is the net interest margin-to-average asset ratio; CI is the cost-to-income ratio; CA is the cost-to-average asset ratio; Asset/Equity/Deposit/Loan growth is the year-to-year (percentage) growth; Size is the total assets; the other ratios are exactly as written.
t-statistics in parentheses, are reported based on White's (1980) heteroskedasticity-consistent standard error.
*** Significantly different from zero at the 1% level.
** Significantly different from zero at the 5% level.
* Significantly different from zero at the 10% level.

Credit risk indicators show ability to classify merged banks and the differences are significant at the 1% level. Acquired banks report poor loan quality before the acquisition, which deteriorates their profitability and capital adequacy consequently as reported above. Again, the difference in liquidity between the two groups of banks, which is significant at 1%, may give support to the theory of cash-rich acquirers.

Regarding the growth indicators, the difference is only clear in equity growth. Finally, the difference in size is very obvious. Acquiring banks are significantly larger (at the 1% level) than their targets, maybe because it is easier to absorb and integrate smaller entities. Again, these findings overall give additional support to *H1*.

4.7.2 The Changes in Corporate Performance Associated With Mergers

In this section we analyse the effect of the merger on the banks' performance. The acquisition could affect the profitability, the efficiency, the riskiness or the growth of banks. We have cited in the review of the literature that the objectives of mergers are to achieve any of these targets. In the following, we will detect the changes in the performance measures of banks post-mergers. The empirical results are reported in Table 4.7.

In the first two columns we report the averages of all banks during the last three years before the merger and the three years after. We notice that there are differences between the reported figures. However, these differences could be again affected by firm-specific influences and/or industry-wide trends. To avoid this matter, we compare the pre-merger sector-adjusted measures and the post-merger sector-adjusted measures. The results are reported in the last five columns of Table 4.7. The fourth and the sixth columns show the proportion of banks that have higher measures than the sector mean. The differences (and their significance) are reported in the last column.

Firstly, regarding the effect of mergers on the profitability of the involved banks, we notice that – indeed – it has improved post-merger. The sector-adjusted ROE has improved by 11.89% and is significant at the 5% level. Additionally, the sector-adjusted ROA and net profit

margin have improved by 0.35% and 13.46% respectively, and both are significant at the 10% level. The other three measures do not show a significant change. Thus, we can claim that the merger has enhanced banks' profitability and this gives support to *H3*. A remark emerges is that the non-interest income of merged banks has increased post-merger. We notice that pre-merger, the consolidated entity had higher ratio than the sector mean by 3.03%, and the ratio of the acquiring banks post-merger became 6.96%. Which means that acquiring banks benefit from their targets to diversify their income towards non-traditional banking activities.

Second, regarding the effect of mergers on the efficiency of merged banks, it is obvious that they have a significant constructive effect. We see a significant reduction in the first three ratios. The cost-to-income ratio decreased by 22.62% and the cost-to-average assets ratio decreased by 0.39% and both are significant at the 10% level. The staff expenses-to-average assets ratio decreased by 0.30% and is significant at the 5% level. The main source of cost reduction maybe the redundancies following the mergers. This gives additional support to *H3*.

For capital adequacy, the enhancements are not significant. There is a (weak) positive improvement in the capitalisation of merged banks. Note that compared to the sector, the consolidated entity had lower equity-to-asset ratio by 1% and lower equity-to- risky asset ratio by 0.42%. These two ratios had improved post-merger where the first ratio had became only 0.12% less than the sector mean and the second ratio became higher the sector mean by 0.04%.

On the other hand, we notice that the credit risk has increased and the quality of the new entity's loan portfolio has deteriorated post-merger. The bad debts and provisions-to-gross loans ratio has increase by 0.90% and is significant at the 10% level. This may be due to the fact that acquiring banks had targeted banks with higher credit risk and consequently they had to increase provisions for the target's (stressed) borrowers. Thus, absorbing the loan portfolios has forced acquiring banks to increase their provisions for bad debts. Besides, we notice that only 43% of the consolidated entities had provisions for doubtful loans-to-gross loans ratio higher than the sector average, whereas 65% of the merged banks have higher ratio

post-merger. Regarding the liquidity risk, we see an improvement. The loan-to-deposit ratio has decreased by 3.14% and is significant at the 10% level. Additionally, compared to the entire banking sector, there is also an improvement in merging banks liquidity. Overall, there is an improvement in the riskiness of the merged firms and this gives support to *H3*.

Table 4.7: Changes of Performance Measures Post-merger

Performance measures	Bank means		Sector-adjusted means				Difference
	Pre-merger	Post-merger	Pre-merger	% positive	Post-merger	% positive	
Profitability							
ROE	10.25 (30.06)	10.73 (27.06)	-8.99 (29.51)	53	2.90 (17.92)	62	11.89**
ROA	0.76 (1.66)	0.16 (2.33)	-0.36 (1.63)	35	-0.01 (0.48)	45	0.35*
Net profit margin	27.66 (93.45)	11.22 (75.71)	-14.67 (36.80)	40	-1.21 (12.91)	50	13.46*
Asset utilisation	4.09 (1.59)	3.08 (1.10)	0.28 (1.52)	65	0.13 (0.64)	65	-0.15
IRS	2.92 (0.76)	2.34 (1.02)	0.03 (0.68)	45	0.13 (0.64)	50	0.10
Non-interest income-to-total revenue	23.89 (27.60)	30.56 (42.01)	3.03 (17.39)	40	6.96 (44.11)	50	3.93
Efficiency							
Cost-to-income ratio	83.52 (88.25)	73.91 (36.65)	25.24 (86.34)	55	2.62 (15.80)	57	-22.62*
Cost-to-average assets ratio	2.80 (1.52)	2.32 (1.30)	0.64 (1.49)	55	0.26 (0.65)	55	-0.39*
Staff expenses-to-average assets ratio	1.61 (1.04)	1.11 (0.44)	0.43 (1.01)	55	0.13 (0.36)	52	-0.30**
Overhead efficiency	43.44 (16.56)	41.30 (14.63)	-1.90 (16.54)	30	-3.84 (13.09)	30	-1.94
Interest paid to interest received	73.10 (5.54)	73.68 (9.09)	0.98 (5.30)	56	0.77 (7.55)	29	-0.21
Capital adequacy							
Equity-to-asset ratio	5.26 (8.96)	6.23 (3.51)	-1.00 (8.96)	57	-0.12 (3.38)	45	0.88
Equity-to-risky asset ratio	11.60 (18.68)	13.23 (7.12)	-0.42 (18.57)	57	0.04 (6.92)	55	0.46
Loan-to-equity ratio	6.03 (3.38)	4.54 (2.28)	0.85 (2.37)	52	0.44 (2.41)	48	-0.41
Deposit-to-equity ratio	15.13 (7.63)	14.63 (7.85)	1.05 (5.94)	48	2.34 (8.19)	45	1.30
Credit risk							
Bad debts & provisions-to-gross loans ratio	1.15 (1.26)	1.92 (3.41)	0.10 (1.13)	48	0.99 (3.42)	50	0.90*
Provisions for doubtful loans-to gross loans	19.43 (26.01)	31.71 (12.28)	6.75 (25.10)	43	14.37 (40.04)	65	7.62
Liquidity risk							
Liquid assets-to-total assets ratio	63.57 (6.47)	67.84 (8.00)	-0.67 (5.72)	62	0.12 (6.96)	70	0.79
Loan-to-deposit ratio	38.58 (11.01)	31.30 (8.40)	0.94 (0.95)	43	-2.20 (7.73)	25	-3.14*
Growth							
Assets	29.40 (22.80)	19.82 (19.32)	7.39 (19.91)	85	6.61 (18.93)	71	-0.78
Equity	52.19 (74.42)	9.09 (59.60)	14.99 (70.98)	70	-5.13 (62.44)	48	-20.12*
Deposits	27.31 (17.74)	20.10 (20.99)	5.96 (15.44)	80	7.13 (20.58)	57	1.18

Loans	28.48 (22.76)	12.15 (19.59)	5.16 (17.88)	75	5.56 (16.19)	57	0.40
Market Share							
Assets	3.76 (2.55)	4.35 (2.72)					0.59
Deposits	3.77 (2.56)	4.28 (2.68)					0.50
Loans	3.44 (2.28)	3.96 (2.52)					052

Notes:

For a sample of 25 bank mergers occurred between 1994 and 2002 we estimate the differences of pre-merger and post-merger average performance measures of the consolidated entities. To test the significance of the differences we compare the test-statistic $z = (\bar{x}_1 - \bar{x}_2) \Big/ \sqrt{s_1^2/n_1 + s_2^2/n_2}$, to the critical z* of the three standard levels of significance (1%, 5% and 10%). $\bar{x}$ is the average pre-merger/post-merger performance measure, s^2 is the variance of pre-merger/post-merger performance measure and n is the number of observations.

ROE is the after tax net income-to-average equity ratio; ROA is the after tax net income-to-average asset ratio; NPM is the after tax net income-to-total revenue ratio; Asset Utilisation is the total revenue-to-average asset ratio; IRS is the net interest margin-to-average asset ratio; Overhead Ratio is the non-interest income-to-general operating expenses ratio; Asset/Equity/Deposit/Loan growth is the year-to-year (percentage) growth; Asset/Deposit/Loan market share is the average of pre-merger/post-merger consolidated entities' assets/deposits/loans divided by total sector banking assets/deposits/loans; the other ratios are exactly as written.

Standard deviation in parentheses.

% positive is the proportion of banks in the sample that have performance measures above the sector mean.

** Significantly different from zero at the 5% level.

* Significantly different from zero at the 10% level.

An interesting remark is that banks do not achieve growth after the merger. Regarding assets, deposits and loans, there is no significant difference between the pre- and the post-merger growth. Whereas for equity, the difference is negative and significant at the 10% level, showing that merger affects negatively the equity growth. Therefore, it could be argued that the merger does not generate a growth, and may in fact decelerate it. This gives opposite evidence against *H2*, which suggested that banks achieve growth through mergers. Consistently, we notice that the changes in merging banks market shares are not significant. This may suggests that the expansion in acquiring banks' market share is only the additional share of the target, and post-merger there is no significant expansion in the market share.

4.8 Conclusion

We have analysed the bank mergers experience in Lebanon in this chapter. Between 1994 and 2002, 25 bank merger operations occurred. Firstly, we have compared the characteristics of acquiring and acquired using two techniques. The first technique was comparing the average performance of the two groups of banks, and the second technique based on implementing a Logit Model. Both techniques show a significant differences between the two categories, where acquiring banks have been larger, more profitable and more efficient, and have better capability in risk management. This suggests that large and efficient banks target small and inefficient banks because they represent potential cases for performance improvement and cost cut on one hand and because they are easy to be "absorbed" and integrated on the other.

Secondly, we have compared the performance measures of merged banks pre- and post-merger in order to detect the benefit of merger. We have found that – on average – the merger operations under study show a significant enhancement in profitability, efficient and liquidity risk. Conversely, the credit risk deteriorates and growth decelerates post-merger.

Finally, we have an interesting remark regarding the effect of banks mergers on concentration. The literature has linked theoretically bank M&As and concentration, however,

there is no empirical evidence for this. In our case study (Lebanon) we have noticed that the wave of consolidations that have eliminated about 35% of the banks has increased the concentration (top 5 banks assets) from 36.35% at the end of 1994 to 43.87% at the end of 2003. Besides the top 10 banks assets has increased from 60.87% to 66.83% during the same period. In fact, this increase in concentration was not considerable and the effect of the merger wave was limited by the openness of the Lebanese banking system to the entry of foreign banks.

Appendix 4.A: Summary of the Cited Empirical Studies

Study	Market	Period	Sample	Findings
Allen and Cebenoyan (1991)	U.S.	1980-1987		- The most entrenched managers pursue the most active acquisition policy, while the least entrenched managers undertake the fewest acquisitions - Bidders stock returns depend upon whether on the insider stake and/or shareholder concentration. - The most entrenched managers are more likely to use cash to finance acquisitions, whilst the least entrenched managers are most likely to use stocks
Avkiran (1999)	Australia	1986-1995	23 banks	- Relative efficiency can be an indicator of likelihood of bank failure or becoming a target
Baradwaj et al. (1990)	U.S.	1980-1987	24 targets and 23 acquiring banks	- Target banks of hostile bids reported positive and significant CARs - Bidders reported negative CARs - Hostile bidders reported more negative CARs than non-hostile bidders
Cakici et al. (1996)	U.S.	1983-1992	112 bank acquisitions	- Positive and significant CARs for foreign acquiring firms - Bidder CARs are inversely related to relative size
Chamberlain (1998)	U.S	1981-1987	50 acquiring and 180 acquired banks	- An improvement in net interest margin, and reduce in premises and salaries expenses. - An increase in non-interest expenses - Large acquisitions are associated with improved operating performance, whereas small acquisitions are not
Cornett and Tahranian (1992)	U.S.	1982-1987	15 large interstate and 15 large intrastate bank mergers	- Insignificant increase in ROA and significant increase in ROE - Insignificant increase in capital adequacy - Insignificant improvement in credit risk, liquidity risk and interest-rate risk - Insignificant improvement in efficiency - A significant positive correlation between stock returns and performance improvement
Corvoisier and Gropp (2002)	OECD	1991-1999	246 Herfindahl index/interest margins pairs	- For loans, a higher margin of 100-200 basis points - For deposits, a lower margin of 100-200 basis points
Cybo-Ottone and Murgia (2000)	14 European markets	1988-1997	72 bank acquisitions	- A positive and significant positive abnormal returns at the time of deal's announcement. - Positive abnormal returns for the following transactions: commercial banks, focused transactions, combinations with insurance companies, domestic transactions, small deals.
Hart and Apilado (2002)	U.S.	1994-1997	158 bank mergers	- Acquirers reported negative insignificant CARs - Targets reported positive CARs - A positive (insignificant) correlation between profitability improvements and stock returns - Significant improvement in ROA after the merger

Houston and Ryngaert (1994)	U.S.	1985-1991	153 bank mergers	- Bidders tend to be more profitable than other banks - Bidders reported negative CARS - Targets reported positive CARS - In-market mergers report higher CARs - Stock payments results negative CARS
Ely and Song (2000)	US	1989-1995	60 banks with assets more than $5 billion	- Bidders target underperforming firms - Corporate control resolves agency problem because current managers would be replaced
Eun et al. (1996)	U.S.	1979-1990	225 foreign bank acquisitions	- Negative CARs for acquirers but different across countries of acquirers - Positive CARs for U.S. targets
Focarelli and Pozzolo (2001)				Cross-border acquisitions is positively correlated to: - Degree of trade openness - The size of the banking sector - The average national ROA Cross-border acquisitions is negatively correlated to: - The size of the stock market - The average rate of inflation
Focarelli et al. (2002)	Italy	1985-1996	253 banks	Mergers - Drop in ROA and ROE - Drop in equity - Decrease in asset growth rate - Rise in labour and operating costs - Increase in the share of fee income - Drop of loans to small business Acquisitions - Decrease ROA for acquirers, increase for acquired - Improvement of credit risk for acquired bank - Drop in loans to small business
Gelos and Roldos (2004)	8 emerging markets	1994-1999	636 banks	- M&As did not increase the concentration
Gilligan and Smirlock (1984)	U.S.	1973-178		- Banks with less than $25 million in deposits are characterised by increasing returns to scale. - Large banks are characterised by diseconomies of scale
Grullon et al (1997)	US	1981-1990	146 bank mergers	- The method of payment is determined by the relative size of merging banks and the capital adequacy of acquirer - The target's stock price reacts more favourably when (1) its capital ratio is low, (2) its size is smaller, (3) the bidder's profitability is higher, and (4) the bidder and the target are in the same state. - The bidder's stock price reacts more favourably when (1) the method of payment is cash rather than stock, (2) the premium paid to the target's shareholders is low,

				and (3) the target is in the same state
Hadlock et al. (1999)	U.S.	1982-1992	84 bank acquisitions and matched sample of banks	- Banks with high level of management ownership are less likely to be acquired - A high rate of management turnover following a merger
Kwan (2003)	Hong Kong, Indonesia, Malaysia, Philippines, Singapore, South Korea and Thailand	1992-1999	164 publicly held financial institutions	- Liquidity rises banks operating costs
Madura and Wiant (1994)	U.S.	1983-1987	152 bank acquisitions	- Acquirers reported negative abnormal returns following the merger - Multiple acquirers reported less negative abnormal returns than single acquirers
Peristiani (1997)	US	1980-1990	4,900 bank mergers	- In market mergers do not yield a significant performance improvements - Banks that incur an increase in non-accrual loans suffer a substantial deterioration in post merger profitability - Acquiring banks realise higher gains in profitability, scale economies, and operating costs when they absorb under-performing targets.
Pilloff (1996)	U.S.	1982-1991	48 bank mergers	- Insignificant positive correlation between stock returns and performance improvement
Rhoades (1993)	U.S.	1981-1986	898 bank mergers	- Horizontal mergers do not result in efficiency gains - Rapidly growing firms tend to experience an increase in their total expense ratio after the merger - Acquiring banks are more efficient than target banks
Rose (1987)	U.S.	1970-1980	138 acquired banks and 138 non-acquired banks	- Acquired banks have lower ROE and ROA than non-acquired banks. - Acquired banks are more conservatively managed, they have higher government securities-to-total asset ratios and lower loan-to-asset ratios investments - Acquired banks reported lower equity ratios
Saunders et al. (1990)	U.S.	1979-1985	38 bank holding companies	- Stockholder controlled banks are more risky than managerially controlled banks - Risk taking differences between stockholder and managerially controlled banks increase during periods of relative deregulation
Shaffer (1993)	US		9 pair banks	-megamergers do not reduce costs
Shawky et al. (1996)	US	1982-1990	320 bank acquisitions	- Merger premiums are higher for: (1) smaller size targets, (2) targets with higher ROE, (3) targets with higher leverage, (4) targets in different state than the bidder, and (5) transactions carried out through exchange of stock as opposed to a cash purchase.
Vennet (1996)	EC	1988-1993	492 bank M&As	Domestic acquisitions - Drop in ROA and ROE - Significant decrease in credit quality Domestic mergers - Insignificant increase in ROA and ROE

				Cross border acquisitions - Significant efficiency improvement for acquired banks
Zhang (1997)	U.S.	1980-1990	128 assisted acquisitions and 387 unassisted acquisitions	- Assisted acquirers reported higher CARs than non-assisted ones. - Repeated acquirers reported significant positive CARs, first time acquirers reported insignificant CARs

Appendix 4.B: Calculation of Control Variables

Ratio	Description
Profitability indicators	
ROE	After tax net income divided by average equity
ROA	After tax net income divided by average assets
Net profit margin	After tax net income divided total revenue
Asset utilisation	Total revenue divided by average assets
IRS	Net interest margin divided by average assets
Non-interest income-to-total revenue	
Efficiency indicators	
Cost-to-income ratio	
Cost-to-average asset ratio	
Staff expenses-to-average asset ratio	
Overhead efficiency	Non-interest income divided by general operating expenses
Interest paid-to-interest received	
Capital adequacy indicators	
Equity-to-asset ratio	
Equity-to-risky asset ratio	
Loan-to-equity ratio	
Deposit-to-equity ratio	
Credit risk indicators	
Bad debts and provisions-to-gross loan ratio	
Provisions for doubtful loan-to-gross loan ratio	
Liquidity risk indicators	
Liquid assets-to-total asset ratio	Cash and central bank + T-bills + marketable securities + deposits with head office and branches and with the other banks divided by total assets
Loan-to-deposit ratio	
Growth indicators	
Asset growth	Year-to-year percentage growth

Equity growth	Year-to-year percentage growth
Deposit growth	Year-to-year percentage growth
Loan growth	Year-to-year percentage growth
Market share indicators	
Asset market share	Bank assets divided by sector total assets
Deposit market share	Bank deposits divided by sector total assets
Loan market share	Bank loans divided by sector total assets
SIZE	Natural log of assets

5 Conclusion

This study has tackled three different aspects of banking in Lebanon. These three aspects were bank performance, bank capital and bank mergers. There is an extensive body of literature both theoretical and empirical on these issues, however, we found that some points had not been explored and we could add to the literature, or in fact fill some gaps in it, by finding answers to some questions we have proposed. We believe that our findings are useful for banks and for regulators. We employed the Lebanese banking system as a case study for our empirical analysis because we believe that its features and characteristics that have been explained and analysed in details previously, allow us to extract many lessons about banking in emerging markets.

Our first subject/chapter was Bank Performance. We were interested in analysing the performance of domestic and foreign banks operating in an emerging market, their similarities and differences. As mentioned before, the literature showed that foreign banks are more efficient than domestic banks, without explaining "what are" those domestic banks. We, based on some theories and some previous evidence, proposed several hypotheses that were subject to empirical investigation. In this chapter we used a panel data containing almost the entire population of banks operating in the Lebanese market between 1993 and 2003. Regarding the issue of bank performance, our results have extended the literature in many ways. Firstly, we showed that although they operate in the same market, domestic banks' and foreign banks' profitability is determined differently and factors that are important in shaping their profitability are different. We have focused here on the effect of macroeconomic factors and found that foreign banks are less affected by these factors than domestic banks. Second, we found that the efficiency superiority of foreign banks over domestic ones could be translated into better profitability – at least in an emerging market. Finally, we found that the subsidiaries of foreign banks were more profitable than domestic banks acquired by foreign

banks/investors, which may suggest that it is better for a foreign bank willing to enter a new market to establish a new subsidiary/branch from scratch rather than acquiring an "existing player". This could be due to the fact that foreign banks/investors usually target underperforming banks hoping that they will turn it around for better; however, it seems that the acquired banks continue to perform poorly even in the long run. Finally, another new finding was the effect of institutional ownership on bank performance. Our empirical results show that the institutional ownership in banks has a constructive effect on their profitability and banks that have institutional investors enjoy higher profitability than other banks.

In the second chapter (Bank Capital) we were interested in assessing the validity of some theories on bank capital that the literature has proposed. The aim was to test if regulators and banks can rely on these theories when analysing bank capital and its determinants. The literature argues that – among other issues – bank capital is determined by market forces more than regulation, that banks may use their capital to signal confidence, that banks adjust their capital according to the economic cycle etc. We studied a panel data set of almost all the Lebanese commercial banks between 1993 and 2003. Firstly, we found that these theories do hold and our results are similar (when the data set is taken entirely) to other studies. We assumed that some/all of these theories may not hold if we split the data set in different ways. We split the panel in two ways: (1) the cross sections according to ownership (domestic vs. foreign), and the time series, the period, according to the change in capital requirements. By doing this, we were able to obtain several empirical results that could extend the literature in many ways. Firstly, we found that the determinants of domestic bank capital are different from those of a foreign bank. Secondly, we found that the cyclicality theory does not hold in two cases: (a) foreign banks do not adjust their capital according to the economic cycle of the host country, and (b) when capital requirements become tighter, domestic bank capital loses its cyclicality. [75] Thirdly, regarding the theory of signalling, we found that it does not apply for foreign banks at all – at least in an emerging market – and these banks do not use their capitalisation level as a signal for confidence.

[75] In fact, we found that it became counter-cycle.

Another interesting finding in this chapter was the effect of institutional ownership in domestic banks on their capitalisation. We found that domestic banks that have institutional ownership were able to meet the new capital requirements implemented by the central bank more than other banks. This shows the importance of institutional ownership in the domestic banks of emerging markets and should represent a motive for banks to expand their shareholders base and allow/encourage institutional investors to invest in them.

In the third chapter (Bank Mergers), we were motivated by assessing the experience of bank mergers in an emerging market. There is a large body of literature on bank merger in developed market that explains the motives of bank mergers and their outcome. By reviewing the literature on developed markets, we were able to understand why banks consolidate and the important role market forces play in this phenomenon. The market under study has witnessed the highest number of bank mergers among all the other emerging markets and thus, represented a good case study for bank mergers in emerging markets. We found that bank consolidations in this market were motivated (at least) by three objectives: (1) the encouragement of the bank supervisors (regulators) who believe that creating larger and healthier entities is more beneficial for the banking system and the national economy. (2) Larger and good performing banks target smaller and underperforming ones, assuming that they will be better run under their management. And (3) acquiring banks target banks that have higher non-interest income and non-traditional banking activities in order to benefit from them to diversify their income. The regulator played an important role in our case study by providing merging banks with incentives on one hand and by "pushing" banks to consolidate through several regulations, e.g. capital requirements, branch opening restrictions etc, on the other. The effect of regulatory assistance for merged banks may have a constructive effect, where the overall results of our case study show a significant improvement in the performance of merged banks. Finally, the literature has argued – theoretically – that increasing growth could be one motive behind mergers. However, there was no empirical support for it. We have investigated this issue empirically and tried to find a support for it. Our results contradict this theory and show that mergers do not necessary trigger growth and all that acquiring banks gain is the market share of the target bank.

Finally, it is important to mention that we have dropped the effect of acquisitions on domestic banks' performance from our analysis due to the limited number of these acquisitions, which implies a difficulty in testing the significance of the differences between the pre- and the post-acquisitions performance measures. However, we have covered this issue partially in the first and the second empirical chapters, where we have tested the profitability and the capitalisation of these banks. As mentioned in the above two sections we see that acquired banks do not realise higher ROE or ROA post-acquisition. Moreover, we have seen that they have lower equity-to-asset ratio than the other domestic banks. This difference, however, diminishes with tighter capital requirements.

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