THE IMPACT OF MERGER AND ACQUISITION ACTIVITIES ON THE EFFICIENCY OF BANKS: THE CASE OF LEBANON

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Abstract

Merger and Acquisition activities are trends that have characterized the Lebanese banking sector over the last few decades. However, there is an ongoing debate over the impact of mergers and acquisitions on the performance of involved firms. Therefore, the aim of this thesis is to examine the impact of mergers and acquisitions on the efficiency of conventional banks in Lebanon.

The research philosophy adopted is the positivistic approach which is usually associated with deductive reasoning. The input-oriented Data Envelopment Analysis approach under Charnes, Cooper and Rhodes (CCR) and Banker, Charnes and Cooper (BCC) models is applied to analyse the efficiency of the 29 banks involved in merger and acquisition activities that have taken place in Lebanon during the period from 1996 till 2015. The input-oriented DEA approach is used with interest expenses, general expenses, total deposits, and number of employees as inputs, and interest income, non-interest income, and total loans as outputs.

The thesis also employs six management efficiency ratios; non-interest income to number of employees, non-interest income to total assets, net interest income to total assets, net operating income to total assets, net operating income to total equity and net interest income to total equity to compare the pre and post mergers and acquisitions performance of banks in order to identify the impact of mergers. The results are compared three years before and three years after the merger and acquisition activities.

The results of the DEA analysis indicate a negative impact on banks' efficiency of almost half of M&A operations under CCR, with no observed changes in efficiency scores before and after M&As for most operations under BCC. In ratio analysis, the results reveal a positive improvement in non-interest income to number of employees, net operating income to total assets, and net operating income to total equity ratios, with negative impact on net interest income to total assets and net interest income to total equity ratios. As for the non-interest income to total assets ratio the result is mixed.

This research serves as a preliminary initiative to narrowing the gap in the Lebanese literature, and a gate for other researchers in this field to emulate on. The findings of this study also serve as a guideline for decision makers on whether to reconsider or encourage these activities in the future.

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List of Abbreviations

ABL: Associate of Banks in Lebanon
BCC: Banker, Charnes and Cooper
BDL: Banque du Liban
BIT Bank: Banque de l'Industrie et du Travail
BLC Bank: Banque Libanaise pour le Commerce S.A.L
BLOM Bank: Banque du Liban et D'Outre Mer
Bn: Billion
CCR: Charnes, Cooper and Rhodes
CIB Bank: Cedrus Invest Bank
CRS: Constant Returns to Scale
DEA: Data Envelopment Analysis
DFA: Distribution Free Approach
DMU: Decision Making Unit
EVA: Economic Value-Added Approach
FATCA: US Foreign Account Tax Compliance Act
FDH: Free Disposal Hull
FFA Private Bank: formerly Financial Fund Advisors SAL
FRH: Free Replicability Hull
GDP: Gross Domestic Product
HSBC Bank: Hongkong and Shanghai Banking Corporation
IBL Bank: Intercontinental Bank of Lebanon
ICT: Information and Communication Technologies
LCB: Lebanese Central Bank
M&A: Merger and Acquisition
MENA: Middle East and North Africa Countries
N/A: Not Available
NECB Bank: Near East Commercial Bank
NIM: Net Interest Margin
OSDEA: Open Source Data Envelopment Analysis solver
OTE: Overall Technical Efficiency
PTE: Pure Technical Efficiency
RE: Relative Efficiency
ROA: Return on Assets
ROE: Return on Equity
SBM: Slack-Based Model
SE: Scale Efficiency
SFA: Stochastic Frontier Approach
SGBL Bank: Société Générale de Banque au Liban
TE: Technical Efficiency
TFA: Thick Frontier Approach
VRS: Variable Returns to Scale

Chapter One: Introduction

1.1 Research Purpose and Objectives.

1.1.1 Purpose of the research

In light of the inconclusive results in the literature into the impact of mergers and acquisitions on the performance of banks and the limited number of published studies in the Lebanese context, this research aims at examining the impact of merger and acquisition activities on the efficiency of banks in Lebanon.

Lebanese banks have been engaging in M&As over the last decades with more deals expected to take place in the coming years (ABL, 2018). However, in light of the inconclusive results in the literature establishing a clearer understanding on the impact of banks M&As on performance is of great importance given the essential role that the Lebanese banking sector plays in influencing the country's economic conditions (Ministry of Information, 2016).

1.1.2 Research Gap

There is no lack of research when we talk about mergers and acquisitions in general, but when we intend to concentrate our focus on these activities in the Lebanese banking sector, finding suitable literature becomes a challenge. As far as it is known, there are only five studies conducted on Lebanese banks. However, the findings of these studies cannot be relied upon for the following reasons; the studies of Khaddage (2003) and Sujud and Hachem (2018) examine the impact of one merger activity on the performance of banks and thus the results of the two studies cannot be generalized. Further, Khaddage (2003) used a one-year period in his study which is not sufficient to produce reliable results (Bernad et al., 2010). Likewise, the findings of Gattoufi et al. (2008) cannot be generalized as the sample study did not include all banks operating in the region. As for Osman et al. (2008), the aim of the study is to examine the efficiency of banks in Lebanon rather than assessing the impact of mergers and acquisitions on the performance of Lebanese banks. Furthermore, the sample study used by Awdeh and EL-Moussawi (2011) does not include all bank M&A activities in Lebanon, where the study was conducted in 2011 yet the period considered is till 2000 though a number of M&As have occurred during the two periods. Furthermore, the findings of these studies provided no conclusive answer about the impact of mergers and acquisitions on the

performance of banks in Lebanon. Therefore, this study aims to address this gap in the literature.

1.1.3 Research Problem

Despite that M&As are popular means of increasing or protecting market share, however, these strategies do not always deliver what is expected in terms of increased profitability or economies of scale. According to Bihari (2012) “History has failed to find convincing evidence of the advantages of mergers and acquisitions on banks and thus it questions the usefulness of M&As” (p.115). Furthermore, a review of literature shows no conclusive evidence on the impact of M&As on banks' performance, which creates a dilemma in the research community on whether the banking industry has undergone through massive restructuring based on a misguided belief of value gains or that shareholders as well as the public have not been told the truth about the real effects of M&A activities on both shareholders value and performance of banks (Elumilade, 2010). In line with this, the findings of the studies conducted in Lebanon provides no conclusive results into the impact of mergers and acquisitions on the performance of banks in Lebanon, which leaves the Lebanese literature in a debate regarding the real impact of these activities as well as the usefulness of these activities to the performance of banks.

1.1.4 Research Question

Lebanese banks have been engaging in bank mergers and acquisitions since decades with more deals expected to take place in the coming year due to the difficult financial situation the country is going through, and as the literature of bank M&A provides inconclusive results toward the impact of these activities on the performance of banks. Thus, this study aims to find an answer to whether merger and acquisition activities improve or deteriorate the efficiency of banks in Lebanon?

1.1.5 Research importance

Lebanese banks are the major players of financial intermediation in Lebanon and thus the banking sector occupies an important weight in the Lebanese economy (Blominvest, 2014) and plays a core role in financing it (Zreika, and Elkanj, 2011). Further, the Lebanese banking sector is perceived, by both government and economists, to be the backbone of the Lebanese economy for being an essential source of economic stability in Lebanon (The Daily Star Lebanon, 2015). Subsequently, as efficient banking sector contributes to a large extent to

achieving higher growth in any country's economy such studies are of high importance for policy makers and other parties depending on this sector (Sufian, 2006).

This research contributes to the current literature in three ways. First, there are limited number of studies about this topic in Lebanon, thus this study will address this gap in the literature. Second, this study will be the first, as far as it is known, to address all the merger activities that have taken place in Lebanon from 1996 till 2015 and will be the first to address such a long period. Third, previous studies provide inconsistent results when addressing the impact of M&A on banks performance, hence the answer to this debate is important for parties who rely on the banking sector.

1.1.6 Research objectives

The objectives of this research are:

1. To evaluate the current literature.
2. To study the merger activity of banking sector in Lebanon during the period from 1996 till 2015. That is to say, the merger activities that had taken place between the years 1999 and 2012.
3. Explore the different methodologies used to study the impact of merger and acquisition activities on banks' performance.
4. To apply Data Envelopment Analysis methodology with its Charnes, Cooper and Rhodes (CCR) and Banker, Charnes and Cooper (BCC) models.
5. To use financial ratios to support the results obtained from DEA.
6. To evaluate the outcomes in wider context.
7. To reduce the gap in the literature regarding the limited number of studies conducted in the Lebanese context.
8. To make a contribution to the literature regarding the inconclusive results about the impact of M&As on the performance of banks.

1.2 Background

1.2.1 History of the Lebanese banking System

After the First World War, the banking system in Lebanon was dominated by foreign banks' branches. The focus of these banks was on financing the foreign trade in Lebanon, leaving local banks with the responsibility of financing the domestic trade. In that period, local banks had a limited capital and their scope of activities was restricted to Lebanon. They were

heavily dependent on the receipt of deposits offering higher deposit rates of interest (BDL, 2019). However, with the establishment of the bank of Lebanon (BDL) in 1964, the banking system in Lebanon started to prosper and the differences between foreign and local banks began to minimize relatively, where foreign banks no longer monopolized the foreign financing of Lebanon, contributed to its domestic financing, and began competing for local deposits. Further, the Lebanese banking system witnessed the entry of 13 foreign banks and more than 40 Lebanese banks (BDL, 2019).

Prior to the establishment of BDL, banks operating in Lebanon were classified by the Ministry of Finance into three categories. The first includes the approved banks whose guarantees were accepted by the Lebanese government, the second is non-approved banks whose guarantees were not accepted, and the third category is the discount houses. Further, the Lebanese banking system lacked the existence of specific banking regulations and supervision where banks merely "abided by the Code of Commerce which regulated commercial business, with the exception of the Bank Secrecy Law enacted in 1956. Regulations, supervision, and control were only introduced with the enactment of the Code of Money and Credit and the establishment of BDL which was granted regulatory and supervisory authority over the banking system as part of its function to safeguard its soundness" (BDL, 2019). Thus, Banks and other financial institutions in Lebanon fall under the jurisdiction of BDL, the country's central bank, which is the bank regulatory authority. The Bank of Lebanon controls entry into the banking industry, defines the scope of banking activities and sets prudential regulations and codes of practice for banks.

The Lebanese banking sector started to witness exceptional growth starting from 1992 where its total deposits with commercial banks witnessed an increase from USD 6.5 billion at the end of 1992 to USD 33.9 billion at the end of 1999. Several factors had contributed to this growth among which are the strict banking secrecy law, the flow of the petrodollars from the Arab world, the free-market economy, and the free exchange-rate system (Peters et al., 2004). Further, the improvements in the political and social situations in Lebanon during the 1990s, following the end of the civil war, had also contributed to the growth of the banking sector. Additionally, Lebanese banks have been successfully accessing the international capital markets since 1996 (Databank, 2019).

The banking sector continued to grow despite all the local and regional turmoil in the country such as the Israeli onslaughts in 1996 and 2006, the assassination of former Prime Minister

Rafik Al-Hariri in 2005, and the Syrian turmoil erupted in 2011, where the consolidated banks' activity managed to pull out an 8.4% year-on-year growth throughout 2012, with total assets reaching US$ 181.3 billion at the end of 2012. Bank deposits, the traditional growth driver for the sector at large, registered a similar 8.8% yearly increase, moving from US$ 138.0 billion at end of 2011 to a new high of US$ 150.2 billion at the end 2012 (Bankdata, 2014), with a further growth by 8.5% during 2013 (Blominvest, 2014a).

The sector continued to prove its resilience in terms of growth and financial soundness, where its activity and profitability indicators were still heading upwards with total assets of commercial banks witnessing an increase of 13.48% to stand at USD 249.48 billion by December 2018 (Blom bank, 2018). This increase is mainly due to the financial engineering implemented by BDL since 2017 offering commercial banks appealing schemes to attract foreign currencies (Blom bank, 2018). Further, the total assets grew by 5.10% to stand at $262.20 billion by September 2019. However, this resilience has been coming to an end following the 17th of October 2019, the day where mass protests across the country have sparked calling for the resignation of the government, which have added to pressures in the financial system. It should be noted that the signs of the fragility of the banking sector started to appear before the uprising of October 17, where banks have been increasingly imposing tight restrictions on dollar withdrawals and transfers abroad since September 2019, and the signs of drying up of dollars started to appear.

Despite official assurances, by the governor of the central bank, that the local currency peg to the dollar will be maintained and there will be "no capital control and no haircut" when banks reopen (Al Arabiya, 2019), and that the Lebanese banks will not go bankrupt and deposits are secure as the central bank has $31 billion in liquidity and is ready to step in to secure liquidity demanded by banks for depositors, as well as insisting on that there would be no haircut on deposits (Asharq Al-Awsat, 2020). The Lebanese currency began to depreciate as the Lebanese pound has dropped by more than a third against the dollar on a parallel market that has become the only source of the dollar currency for most importers and traders (Asharq Al-Awsat, 2020). Further, depositors have been hit by tough capital controls, and banks have been imposing new restrictions on foreign currency accounts conversion and withdrawals, and blocking on nearly all transfers abroad. Moreover, banks started to gradually lower the withdrawal ceiling (LE COMMERCE, 2019); Blom bank lowered the weekly withdrawal ceiling from $2,500 to $500 for depositors with less than $100,000 in their accounts, and

Audi bank lowered the limit to $300 (Reuters, 2019). As a result, the banking system has lost the publics' confidence after being considered the cornerstone of Lebanon's stability for many decades.

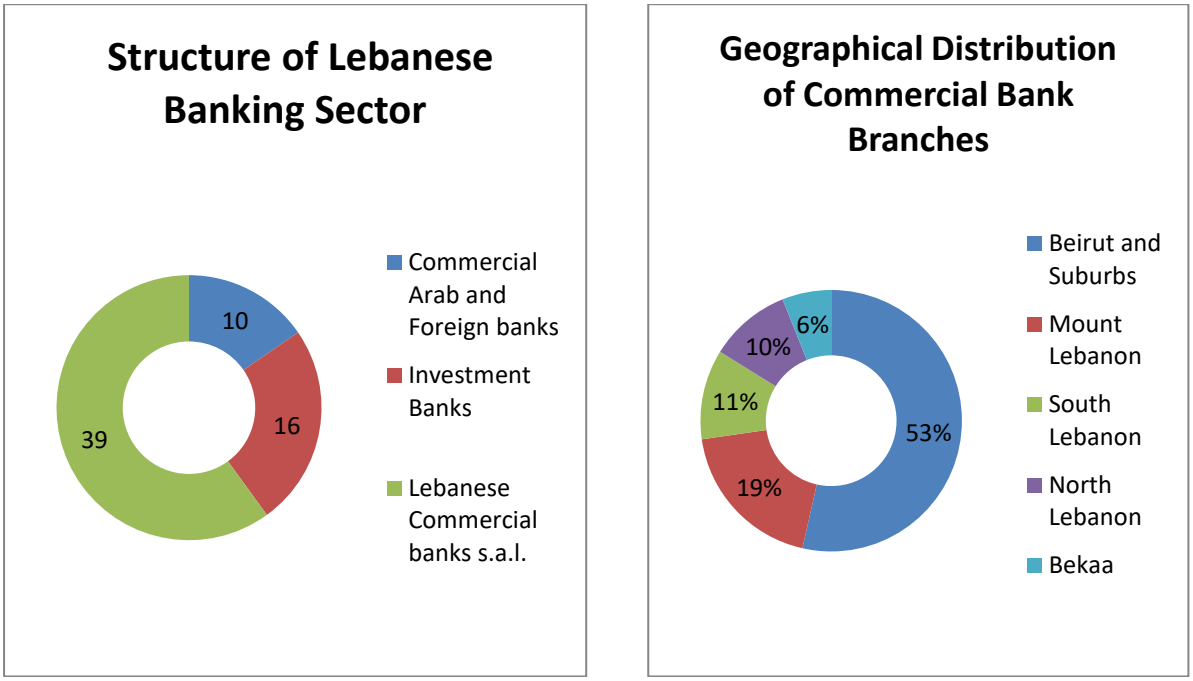
The Lebanese banking system is characterized by the presence of large number of banks of different sizes, nature and ownership structure. Over the past 50 years, the number of banks operating in Lebanon ranged between 60 to 92 banks distributed between Small, medium and large-size private owned commercial banks, Medium and long-term credit and investment banks, Islamic Banks, Lebanese banks, and foreign and mixed banks. It is also characterized by the significant openness to abroad, highly qualified human resources, Provision of traditional and modern services, and commitment to international norms and standards. Further, the banking sector is largely integrated in the Lebanese economy where it dominates financial intermediation and provides the financing needs of the domestic public and private sectors. It is also the main channel for capital inflows into Lebanon and involved in the financing of a large part of the current account deficit. Favourable and sustainable growth and performance is another characteristic of the Lebanese banking system along with its strong resilience to financial shocks and crisis (ABL, 2019).

The regulatory framework for banks in Lebanon is particularly robust with the application of appropriate standards of good governance. The banking system has a key role in Lebanon’s economy as they form the entry point for capital inflows that facilitate the region's development (Databank, 2019).

1.2.2 Structure of the Lebanese banking system

At the end of 2016, the number of banks operating in Lebanon reached 67 distributed between 50 commercial banks and 17 investment banks. During this period, the official list of banks was amended by removing each of Al-Ahli International bank S.A.L. and bank of Pharaon & Chiha from the list following the merger of the latter with Byblos bank S.A.L. Also, Near East Commercial bank merged with BIT Bank to become bank Saradar S.A.L. Add to that the acquisition of HSBC branches in Lebanon by BLOM bank in 2017 (ABL, 2017). By the end of 2017, the number of banks operating in Lebanon reached 65, distributed between 49 commercial (of which 10 Arab and foreign banks) and 16 investment banks. There are also 12 representative offices for foreign banks in Lebanon (chart 1.1). Banks operating in Lebanon have correspondent relationships with 183 banks in 82 cities around the world that facilitate financial transactions with other countries and vice versa (ABL, 2018).

Chart 1. 1 Structure of Lebanese banking sector, and Geographical distribution of commercial banks branches operating in Lebanon; End 2017



Source: Association of Banks in Lebanon (ABL, 2018) (authors own)

Lebanese banks manage a delicate balance between their external and internal expansion, taking into account regional geopolitical trends and political and economic situation in Lebanon. At the domestic level, banks are strengthening their role in enhancing financial inclusion and facilitating the Lebanese people's dealings with them by diversifying the loan portfolio for individuals and companies through offering retail and credit programs according to market requirements, and transferring payments through banking channels. This explains the spread of branches and ATMs in the domestic market and the diversity of payment cards. The network of bank branches reached 1,086 branches in Lebanon out of which 1,065 branches for commercial banks. The number of ATMs placed at customer service reached 1,902, and the total number of high-security payment and credit cards in circulation was approximately 2.6 million at the end of 2017 (ABL, 2018).

1.2.3 Role of the banking sector in Lebanese economy

The banking sector represents an overwhelming component of the financial sector and consequently, a major pillar of the Lebanese economy with a size (i.e., assets) equals to $249.5bn equivalent to 445% of GDP (Gross Domestic Product), at the end of 2018 (Byblos bank, 2019a). The banking sector plays pivotal roles in the Lebanese economy where banks

dominate the financial system and are the major providers of credit to individuals and businesses. The banking sector has also been a major source of financing for the Lebanese government, through purchases of treasury bills (Ministry of Information, 2016)

The banking sector is also a major financier for the public sector where it simultaneously funds the public deficit. Lebanon's gross public debt reached to $85.1bn at the end of 2018, out of which $51.6bn are denominated in Lebanese Pounds and $33.5bn denominated in foreign currency. BDL held 50.1% of the Lebanese pound-denominated public debt followed by commercial banks with 35.2% of the local debt (Byblos bank, 2019a)

Banks are the main channel for capital inflows into Lebanon and the main lenders to individuals and businesses, where Loans extended to the private sector reached $59.4bn at the end of 2018 which is equivalent to 106% of GDP, Loans to the resident private sector totalled $52.3bn equivalent to 93.2% of GDP, and credit to the non-resident private sector reached $7.1bn. In addition, claims on non-resident financial institutions reached $12bn and claims on the public sector stood at $33.6bn at end-2018 (Byblos bank, 2019a).

The Lebanese banking sector served as an essential source of economic stability in Lebanon carrying out public functions even when the state itself lacked the resources and political abilities to do so. This sector is perceived, by government and economists, as the backbone of the Lebanese economy as it has been a stable and sound participant in both the domestic and international economy demonstrating a history of openness and regulatory prudence (The Daily Star Lebanon, 2015).

1.2.4 Regional and International Upheavals

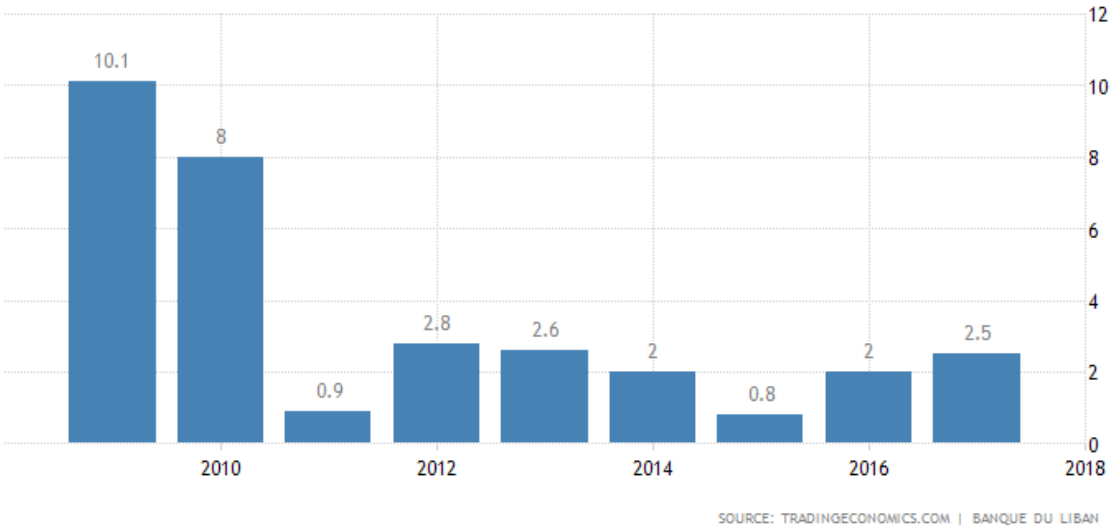
Lebanon is located in a region that has been subject to ongoing political and security concerns. Over the years, the Lebanese banking sector has been facing regional and international social and civil unrest such as Israeli “Grapes of wrath” military operation in 1996, the assassination of the late prime minister Rafic Al-Hariri in 2005, the July war led by Israel in 2006, the repercussions of the global slowdown following the 2007 crisis, and the Arab spring erupted in 2011, in addition to other regional turmoil such as the war in Syria and its effect on the region. These shocks had negatively affected the Lebanese banking sector as well as the Lebanese economy (Byblos bank, 2019b).

In 2005, following the assassination of the former Prime Minister Al-Hariri, Lebanon’s' real economy grew at a slower pace compared to previous years. This slow growth has been

witnessed in a wide range of economic sectors, including real GDP growth at 1.1%. The percentage change in real GDP dropped from 7.5% in 2004 to 2.7% in 2005 (Knoema, 2019). The Lebanese economy started to revive in the beginning of 2006 where the real GDP growth was 6%. However, the July war and the political tensions that followed the war have negatively impacted the economy where the real economic growth, according to banks' records, had been put back near ground 0.0% (Blominvest, 2014a; and Byblos bank, 2019b).

In 2011, Lebanon witnessed a severe transition from a high-gear recovery period into a relatively low-gear pattern of growth as shown below in *(Figure 1.1)*, due to both internal political tensions and neighbouring social upheavals (trading economics, 2019)

Figure 1. 1 Lebanese real GDP growth rate (%)



Source: trading economics.com

Lebanon's real GDP improved by 2.50% in 2017 compared to 2.0% in 2016 on the back of a recovering tourism activity and a strong banking system. GDP annual growth rate in Lebanon averaged 4.36 % from 1971 until 2017, reaching an all-time high of 83.28 % in 1977 and a record low of -56.99 % in 1976 (trading economics, 2019).

Despite of the continuous challenges faced by the Lebanese banking sector, from the slow economic activity, domestic and regional political uncertainties, pressure on profitability, increasing cost of complying with international laws and the capitalization requirements, tighter margins, fewer lending opportunities domestically and in their main foreign markets, low global interest rates and the elevated borrowing needs of the Lebanese government

(Byblos bank, 2018). However, the banking sector proved to be resilient, prior to the recent events, to all these shocks by remaining solid, profitable and highly liquid. Further, this sector has been able to continuously meet the financing needs of both the private and public sectors (Byblos Bank, 2019c), until the 17th of October 2019 where the banking system started to gradually lower its weekly withdrawal ceiling.

The difficult operating conditions surrounding the banks, prompted foreign banks to reconsider their presence in Lebanon and urged some small and medium-sized Lebanese banks to seek consolidation. Bank consolidation is believed to reinforce the sector's stability, enhance its immunity and profitability and improve efficiency and productivity. A number of new shareholders with good credibility, individuals and international financial institutions joined the capital of a number of Lebanese banks as part of their expansion plans and their intention to attain higher levels that help to take advantage of greater opportunities (ABL, 2018)

1.2.5 Bank merger and acquisition in Lebanon

Tracking back the history to 1991, Lebanon have witnessed many economic and political crises, and its banking sector went through many global and local turmoil which left the banks lagging behind several factors as size, technology, and competition (Hakim and Neaime, 1998). In that era, the banking sector constituted a large number of inefficient and undercapitalised banks due to the decline in the regulatory control and supervision over it (Awdeh and EL-Moussawi, 2011). Thus, in order to protect the sector from any possible crisis the Lebanese central bank decided to restructure the banking system, which could be done faster through consolidation processes.

In response to these factors and the turmoil in the local and regional markets which made it difficult for banks to operate, along with the lack of investment opportunities in Lebanon and the high cost associated with maintaining high levels of liquidity which makes it harder for banks to create profits, the banking sector engaged in merger and acquisition activities after realizing that it is the most efficient way to expand and grow in size (FFA private bank, 2015). The law facilitating M&As was designed for times like these; rather than having small banks be shunned from the market due to difficult times, consolidation steps in to preserve confidence in the sector (Blominvest Bank, 2014). Moreover, with new laws designed to combat money laundering such as FATCA (US Foreign Account Tax Compliance Act), the

cost of compliance has increased for local and correspondent banks, giving yet another incentive for consolidation (Blominvest bank, 2014).

The central bank took some measures in order to encourage banks to merge. One of the measures is tightening the capital requirements so that small and medium sized banks would be encouraged to merge with larger ones. Another measure was putting limitations on the number of branches that can be opened by a bank to only two per year which led many large banks seeking to expand their branch networks to acquire small and medium banks (Awdeh and EL-Moussawi, 2011). However, the most important measure was issuing law number 192 in 1993 with the purpose of eliminating unstable banks and thus stabilising the banking system gradually, in addition to reducing the number of lenders in the country (FFA private bank, 2015). This law was designed to help small yet well managed banks go through tough times and avoid liquidation (Blom Invest Bank, 2014). It has managed bank mergers and acquisitions and offered several incentives including tax benefits, soft loans that would cover the charges resulting from the operation such as the negative net asset value of the acquired bank, if any, and other financial incentives to merged banks in a clear attempt to invite for such operations (Khaddage, 2003). Under this Law, Lebanon witnessed the completion of more than 35 mergers and acquisitions, with the least but not last operation taken place in June 17, 2017 where BLOM bank acquired HSBC Bank Middle East Limited - Lebanon **(**The Lebanese International Business Council, 2017). The merger and acquisition activities that had taken place during the period of this study are listed in Table 1.1 below.

Table1. 1 Bank merger and acquisition activities in Lebanon

Parent Bank	**Acquired Bank**	**Operation**
Fransabank	United Bank of Saudia & Lebanon	Acquired in 2001
	Banque de la Békaa	Acquired in 2006
	Al Ahli International Bank (previously known as Bank of Kuwait & Lebanon)	Acquired in 2014
BLC Bank		Acquired in 2007
	United Bank of Lebanon	Acquired in 2000
	Lati Bank	Acquired in 2009
	Ahli Bank	Acquired in 2007
Société Générale (SGBL)	Inaash Bank	Acquired in 2000
	Lebanese Canadian Bank	Acquired in 2011
Crédit Libanais	American express bank limited	
Bank Audi	Banque Saradar	Merged in 2004
Bank of Beirut	Beirut Riyad Bank	Acquired in 2002
Intercontinental Bank of Lebanon (IBL)	BCP Oriel Bank	Acquired in 1999
Banca Di Roma	Capitalia	Acquired in 2002
Byblos Bank	Wedge Bank	Acquired in 2001
	ABN Amro Bank	Acquired in 2002
	Unicredit Banca di Roma	Acquired in 2008
First National Bank	Corporate Finance House group (CFH)	Acquired in 2014
BankMed	Allied Bank	Merged in 2006
Emirates Lebanon Bank	Banque de la Beqaa	Acquired in 2008
	BNPI	Merged in 2009
Al Madina Bank	Credit Commercial	Acquired in 1998
Cedrus Invest Bank	Standard Chartered	Acquired in 2014
Banque de l'Industrie et du Travail (BIT)	Near East Commercial Bank (NECB)	Merged in 2014
Blom Bank	HSBC Bank	Acquired in 2017

Source: Lebanese Central Bank website and bank websites (authors own)

Bank consolidation is thought to reinforce the sector's stability, enhance its immunity and profitability, and improve efficiency and productivity (ABL, 2018). Therefore, The Governor of the Lebanese central bank has been consistently encouraging banks to merge in both local and international market, excluding any mergers or acquisitions among the country's 11 leading lenders (The Daily Star Lebanon, 2015). The reasons behind this lie first in maintaining competition where the market would witness very little competition if only a few banks operate on the market. A second reason is that M&As would deliver better results if they are led by banks of similar or close sizes. If only large banks are the ones growing through M&A activity, a large gap would exist between large and small banks. This gap would negatively weight on the profit margins of small banks which can only attract

customers by charging low fees and commission on their offered services. This gap would also allow large banks to maintain wide profit margins due to the low competition levels (Blom Invest Bank, 2014).

1.3 Structure of the Thesis

This thesis consists of five chapters. The first chapter provides a background on the Lebanese banking sector and the merger and acquisition activities taken place among banks in Lebanon, then the research purpose, research gap, research problem, research question, research importance and research objectives are presented in the second part of the chapter.

The second chapter is a review of the literature which is divided into two sections: the first provides a background of bank merger activities in Lebanon. The second section reviews the literature of merger and acquisition activities, performance and efficiency, and relevant empirical studies into the impact of M&As on banks performance. This is followed by a summary of the chapter.

The third chapter is the Methodology and Methods which is divided into three sections. The first introduces research design and the broad research philosophies, and is divided into four subsections: the first is a literature review of the predominant research methods, the second reviews the different methodologies that have been used by other researchers to examine the performance impact of M&As. The choice of methodologies adopted in this research is provided in the third subsection, followed by a brief discussion on some ethical issues that must be taken into consideration when conducting a research in subsection four. The second section presents the methodology and is divided into two subsections; the first provides an overview of the DEA methodology over six subsections. The second consists of the sample of the study as well as the analysis technique that will be used to generate the results and perform the analysis, after which the chapter is summarized in section three.

The fourth chapter is the empirical results and analysis and is divided into four sections; the first introduces the methodologies used to address the impact of mergers and acquisitions on the efficiency of banks in Lebanon. The second describes the DEA program used in this research. The third section provides the technical efficiency scores generated from the DEA analysis under both CCR and BCC models along with the analysis. The fourth presents the results obtained using six management efficiency ratios. This is followed by a summary of the analysis of the results obtained using both DEA and management efficiency ratios.

The fifth chapter concludes the thesis. The chapter further highlights the limitations of this research and recommendations for future researches. It also presents the contribution of the thesis to both knowledge and practice.

Chapter Two: Literature Review

This chapter consists of two sections. The first is an introduction to bank mergers and acquisitions in Lebanon. The importance of this study as well as its contribution to the current literature will be reviewed. The second section reviews the literature of mergers and acquisition, and is divided into three subsections; the first presents the terminologies, types, history, and theoretical background of mergers and acquisitions. The second will define financial performance and efficiency, while the third subsection will be a review of the empirical studies of mergers and acquisitions. The latter subsection will be divided into five subsections presenting studies that found positive, negative, and insignificant changes in the performance of banks after M&As, the empirical studies in the Lebanese context, and the reasons behind the outcomes of M&As. A summary of the chapter is then provided.

2.1 Introduction

The topic of mergers and acquisitions (Hereinafter referred to as M&A) has been attracting a lot of researchers in the last two decades. This phenomenon attracts a lot of companies in different sectors of the market (Ahmed et al., 2018; Brueller et al. 2018; Gupta, 2018; Sahni and Gambhir, 2018; Singh, 2018; Soundarya et al., 2018; Ten Brug and Sahib, 2018; Anthony, 2019; Faff et al., 2019; Kim et al., 2019; and Orefice et al., 2019). One of the sectors that have been attracted is the banking industry (Anderibom and Obute, 2015; Chaudhary et al., 2016, Hang et al., 2016; Njogo et al., 2016; Obisesan and Ajayi, 2016; Tamragundi and Devarajappa, 2016; Cvetkoskaand Savić, 2017; Rahman et al., 2018; Sahni and Gambhir, 2018; Sujud and Hachem, 2018; Ombaka and Jagongo, 2018; Anthony, 2019; Sahu, 2019; and Tandon et al., 2019). Like other organizations, banks require new business opportunities for changing technological environment to enhance their performance which is possible through merger and acquisition (Berger et al., 1999; and Sujud and Hachem, 2018).

Lebanese banks like many banks across different countries have engaged in mergers and acquisitions in order to expand in the market, grow in size and become more competitive (Sujud and Hachem, 2018). Lebanese banking sector has been engaging in M&As as they consider these activities to be the most efficient way to expand and grow in size. Theoretically, larger size organization could achieve economies of scale and economies of scope (Sufian, 2006). However, there is an ongoing debate regarding whether getting bigger

in the banking sector is always better in terms of both performance and economic efficiency (Sufian, 2006; and Bin Dost et al., 2011).

Although other Lebanese sectors have engaged in M&A activity including the insurance, and information and communication technologies (ICT) industries (El-khoury and Mortada, 2011), however the focus of this study is on the banking sector for the following reasons; First of all, there is no lack of research when we talk about mergers and acquisitions in general. But when we intend to concentrate our focus on these activities in the banking sector in Lebanon, finding suitable literature becomes a challenge. Therefore, this study aims to fill this gap.

Second, while Lebanese banks are still to the current day engaging in M&As with more deals expected to take place, the literature provides no conclusive results on banks performance (in terms of financial and operating performance) after M&As (Beccalli and Frantz, 2009; Huian, 2012; Said, 2013; Abbas et al., 2014; Joash and Njangiru, 2015; and Ombaka and Jagongo, 2018), leaving the research community in an ongoing debate on whether these activities improve or deteriorate the performance of banks. Therefore, establishing a clearer understanding on the impact of banks M&As on performance is of great importance given the essential role that the Lebanese banking sector plays in influencing the country's economic conditions (The Daily Star Lebanon, 2015).

Yet another reason lays in the core role banking sector plays in financing the Lebanese economy (Zreika, and Elkanj, 2011). Since banks are the major players of financial intermediation, it is safe to say that the banking sector occupies an important weight in the Lebanese economy (Blominvest Report, 2014). The Lebanese banking sector is perceived by both government and economists to be the backbone of the Lebanese economy for being an essential source of economic stability in Lebanon (The Daily Star Lebanon, 2015). Subsequently, as efficient banking sector contributes to a large extent to achieving higher growth in any country's economy such studies are of high importance for policy makers and other parties depending on this sector (Sufian, 2006).

2.2 Literature review

This section will be divided into three subsections. The first defines the terminologies related to mergers and acquisitions, discuss the different types, and review the historical background of these activities. After that, the theoretical background of M&As including the reasons and

motivations behind these activities as well as the theories explaining them will be presented. The second subsection, defines the financial performance and the concept of efficiency. It also identifies the different types of efficiency. Finally, the literature and relevant empirical studies pertinent to the impact of M&As on banks performance will be presented in third subsection. The latter will be divided into five subsections; the first will present the studies that found significant positive changes in the performance of banks, followed by studies showing significant negative changes in the performance, and studies revealing insignificant changes in the post-merger performance of banks. The fourth subsection will present the empirical studies in the Lebanese context, and the reasons behind the inconclusive outcomes of M&As will form the last subsection.

2.2.1 Mergers and Acquisitions

2.2.1.1 Terminologies of M&A

In general, "Merger and Acquisition" is a term used to refer to the consolidation of companies. The terminologies 'Merger, Acquisition and Consolidation' are often confused in people's mind; hence it is necessary to have a clear understanding on these basic concepts (Mallikarjunappa and Nayak, 2007).

Merger is the combination of two corporations in which only one corporation survives and the merged one goes out of existence (Gaughan, 2007). Likewise, Sherman and Hart (2006) define merger as the combination of two or more companies in which the buying company absorbs the assets and liabilities of the selling company. Kishore (2009) distinguishes between merger, amalgamation, and absorption concepts which are usually mixed in the definition of merger; merger occurs when the shareholders of two companies decide to pool their company's resources under a common entity, if this merger resulted in one company losing its independent entity then it is called absorption, but if a new company is formed then it is called an amalgamation.

The difference between a merger and a consolidation is quite technical concerned with how the financial and legal transaction is structured (Bovee and Thill, 2001). In a merger, one company buys another or parts of another company and takes control of its property and liabilities, whereas in consolidation the combining companies dissolve and form an entirely new entity. Moreover, when two firms around the same size decide to combine the term consolidation applies to this process but if these firms have a significant difference in size

then it is more appropriate to use the term merger (Gaughan, 1996). In spite of these differences the two terms are often used interchangeably in the literature.

Similarly, although mergers and acquisitions are legally different transactions but most of the literature tends to treat these terms synonymously (Omoye and Aniefor, 2016). According to Sherman and Hart (2006), “the distinction in meaning of merger and acquisition may not really matter, since the net result is often the same: two companies that had separate ownership are now operating under the same roof, usually to obtain some strategic or financial objective. Yet the strategic, financial, tax and even cultural impact of a deal may be very different, depending on the type of transaction” (p.11).

Acquisition is defined as “A business combination which results in the creation of a new reporting entity formed from the combining parties, in which the shareholders of the combining entities come together in a partnership for the mutual sharing of the risks and benefits of the combined entity, and in which no party to the combination in substance obtains control over any other” (Taylor, 1987, p.12). It is also defined as an act of acquiring effective control by a company over the assets or management of another company without combining their businesses physically (Mallikarjunappa and Nayak, 2007). Moreover, when a firm takeover the share capital of another firm in exchange of cash, loan stock, or ordinary shares the term acquisition applies (Halpern, 1983; and Sherman, 2011).

Acquisition is considered as similar to a merger in terms of a takeover, when the leadership of the acquired company do not belief that there is any equality involved in the combination process. In the fact, one company is dominating the other and, in the practice, the acquired company goes out of existence. On the other hand, a merger implies egalitarianism and equality between the two firms, though one may be superior and powerful than the other in size (Cartwright & Cooper, 1996).

In general, despite the divergence between the terms 'Consolidation, Merger, and Acquisition' they are often used in the literature without distinction - an approach which will be followed in this thesis.

2.2.1.2 Types of M&A

The literature has discussed different types and models of M&As. Typically there are three broad types of merger operations which are horizontal, vertical and conglomerate mergers

(Sing and Montogomery, 1987; Weston et al., 2004; Brealey et al., 2006; Gaughan, 2007; Chand, 2009; and Avulala, 2015).

A horizontal merger is the combination of two similar organizations in the same industry or between two competitors (Oloye and Osuma, 2015). The primary aim of horizontal mergers is to diversify the risk and realize economies of scale in the production (Perry and Porter, 1985) remove the competition from the industry, enhance the position and dominance in the market as well as to grow and expand (Pezendolfer, 2003).

Vertical mergers occur when two or more firms with different production stages in a certain industry combine their operations (Arnold, 2011). There are two forms of vertical mergers these are the forward and backward M&A (Gupta, 2012). The main reason of this type of merger is to prevent any possible hold up problems that may decrease the efficiency and effectiveness of operations (Hitt et al., 2001). Generally, vertical mergers take place as a mean of combining assets to seize a sector of the market that neither company could manage on their own. These mergers are sometimes used to prevent competitors from having access to the sources of raw materials or the channel of distribution creating a sort of bottleneck problem (Cartwright and Cooper, 1996).

Conglomerate mergers occur when firms from different markets combine to enter into different fields of activity in the shortest time span and reduce financial risks through portfolio diversification (Weston et al., 2004; and Gaughan, 2007). This type of mergers has three groups which are product extension, market extension and pure conglomerates. Each group has different goals than the first two types of mergers; for instance, using diversification to decrease the risks and create an internal capital market (Weston et al., 2004).

In addition to these three types, Cartwright and Cooper (1992) discussed one more category called the concentric merger. In Concentric merger, the organization acquired is in an unfamiliar but related field into which the acquiring company wishes to expand (Cartwright and Cooper, 1992). Furthermore, Kishore (2009) grouped the types of M&A under three categories. The first group is classified based on the lines of business activity and includes horizontal, vertical, and conglomerate mergers which have been defined earlier.

The second one consists of friendly, hostile, and bailout M&As which are grouped on the bases of bid of controlling interest. Friendly M&A takes place when the management of

acquiring and target companies mutually and willingly agrees for takeover (Godbole, 2009). But when the acquisition is forced or against the will of the target management, it is called hostile M&A (Mallikarjunappa and Nayak, 2007). Whereas, Bailout M&As are resorted to bailout the sick companies, to allow the company for rehabilitation as per the schemes approved by the financial institutions (Kishore, 2009).

The last group consists of strategic, financial, reverse, downstream, upstream, defacto, cash, and short-form M&A which are classified on the basis of strategic transaction (Kishore, 2009). Strategic M&A involves operating synergies which means that two firms are more profitable when they are combined rather than separate. In financial M&A, there is a general belief from the bidder that the firm's stock price is lower than the value of the assets that the company possess. Reverse M&A occurs when a large and profitable firm merge with a small firm making losses. The Downstream M&A is the merger of a parent company with its own subsidiary, whereas the upstream M&A is the merger of a subsidiary company with its own parent company. Defacto M&A has economic effect of merger as per legal provisions, but is entered in the form of acquisition of assets. Cash M&A occurs when certain shareholders accept cash for their shares, while other shareholders receive shares in the surviving company. Finally, the Short-term M&A takes place when a parent company acquires the total voting power in a subsidiary (Kishore, 2009).

2.2.1.3 History of M&A

Mergers and acquisitions have had an important impact on the business environment for over than 110 years (Sudarsanam, 2003).

These activities have shown a cyclical pattern as they have often come in waves of activity motivated by different factors, such as the regulatory and economic factors. According to Mueller (2003) it is not certainly known why merger occurs in wave patterns. However, the literature has offered some explanations for this cyclical pattern. One explanation is provided by Gort's theory of disturbance which states that waves occur as a result of valuation differences among several firms. According to Gort (1969), when economic shocks occur such disturbance occurs. In line with this, Harford (2005) found that industry's shocks cause waves only if there is sufficient liquidity in the market as well as low cost of capital. Another explanation is the misevaluation of the market; when the market is over valuated there is a large possibility that mergers will occur in waves (Dong et al., 2006). When the stock market

is misevaluated, rational managers take advantage of these irrational misevaluations through mergers and acquisitions (Shleifer and Vishny, 2003). Likewise, Ang and Cheng (2006) stated that when firms are over valuated management are motivated to engage in acquisition activities. However, it has been shown that even in a rational model with efficient markets stock market booms can lead to merger waves (Rhodes-Kropf and Viswanathan, 2004).

In the past 100 years, six waves of mergers and acquisitions have taken place; these waves occurred in 1900s, 1920s, 1960s, 1980s, 1990s, and 2000s (Chand, 2009).

The first merger wave, occurred from 1890 to 1905, was generated by the development of financial market and the introduction of the Sherman Antitrust Act, 1890 (Stearns and Kenneth, 1996. This wave was characterized by the consolidation of industrial production which caused market monopoly (Singh, 2018). It was ended in 1905 after the equity market crash (Chand, 2009). It was the first wave of takeovers in US and the start of mergers around the world (Mueller, 2003).

After World War I, in the 1920s, the second wave occurred. Although its impact was not big compared to the first wave, yet it helped firms to merge and form strong institutions (Sudarsanam, 2003). This wave witnessed a significant number of vertical mergers putting the control of the production and distribution activities on the hand of one firm and subsequently forming oligopoly. This wave came to an end in 1929 due to a crash in the stock market (Chand, 2009).

The third wave took place after the World War II and was driven by growth motives through increasing market share. The pattern of this wave focused on diversification as well as conglomerate mergers (Schleifer and Vishny, 1991). This wave ended in 1973 due to the world economic recession which in turn was caused by the oil crisis (Chand, 2009).

The fourth wave was characterized by divestures, hostile takeovers, and new financial strategies as well as cross-border M&As (Martynova and Renneboog, 2005). It began in 1978 and ended in 1989 (Chand, 2009). This wave caused an extensive degree of academic analysis due to the ease in some restrictions by US government on takeovers and that this wave represents a return to specialization (Stearns and Kenneth, 1996).

The fifth wave is considered to be the largest among other waves in terms of both value and number of deals. A plausible explanation for this according to Sudarsanam (2003) is the

introduction of new technologies. This wave was characterised by the increasing amount of cross border deals (Martynova and Renneboog, 2005). It began in 1993 and ended in 2000 when the high-tech bubble collapsed and the equity market crashed (Schleifer and Vishny, 2003).

The last wave, which is the most recent, started in 2003 after the equity market crash of 2000. The sixth wave was larger than the previous waves, except for the fifth wave, as it consisted mainly of deals financed by cash. This wave was put to an end in 2007 when managers and investors expressed their concerns regarding the credit market (Alexandridis et al., 2011).

2.2.1.4 Theoretical background of M&A

Despite of the increasing interest by researchers in the topic of mergers and acquisitions, however the existing body of research still lacks a unified explanation for why mergers and acquisitions occur. According to the academic literature in banking and industrial economics, a variety of motivations drive M&A's, ranging from value maximisation to other external and managerial goals (Ayadi, 2008). Likewise, the strategic literature considers mergers to be driven by both value-maximizing theories and managerial theories (Seth, 1990; and Urio et al., 2012).

As for the value maximising theories, banking M&As have been justified in the literature on the basis that they increase the value for the shareholders. Theoretically, bank merger activities may create shareholder value by obtaining gains either through efficiency or market power (Ayadi, 2008). However, it is difficult to make a clear-cut conclusion whether mergers and acquisitions actually result in the creation of shareholder wealth or not because the findings of the empirical studies are mixed. For instance, some studies have found that these activities increase the wealth of shareholders such as the study by Aun (2009), while others found the opposite as the study conducted by Liargovas and Repousis (2011). These along with other studies will be discussed later on.

Managers can pursue other objectives than maximising shareholder value and seek to serve their own interests (Ayadi, 2008). For instance, M&A could be due to manager's desire of power, or to reduce their employment risk (Amihud and Lev, 1981). M&A activities can also be triggered by mimicry effect following the consolidation process initiated by competitors in the marketplace. Moreover, the acceleration of M&A operations could also result from a defensive reaction on the part of a few actors against competitors' initiatives (Ayadi, 2008).

Overall, the literature on theories of M&A shows that the motives of companies behind going for M&A are gaining operating and financial synergy, diversification, achieving economies of scale and scope leading to cost and profit efficiency, acquiring management skills, increase market power, and get tax benefits (Jensen, 1986; Vijgen, 2007; Jayadev and Sensarma, 2007; DePamphilis, 2010; and Weston et al., 2010). Amongst the many reasons cited for M&As some researchers consider that synergy or efficiency, hubris, and agency motives to be amongst the most important (Kiymaz and Baker, 2008; Liargovas and Repousis, 2011; and Babanazarov, 2012).

According to Trautwein (1990), the motives behind mergers and acquisitions have not received enough theoretical attention from researchers. Therefore, Trautwein (1990) provided a critical summary for seven theories on the motives behind mergers and acquisitions and subsequently grouped them into three groups depending on how plausible they are; the first group consists of the valuation, empire building, and process theories. Then the efficiency and monopoly theories form the second one. The last group includes both the raider and disturbance theories. Not all researchers have agreed with this grouping where some researchers argued that the efficiency theory should be considered the most plausible motive (Habeck et al., 2000).

The efficiency theory states that M&As occur only if attainable synergies expected to be generated are enough for both parties to achieve gains (Adegboyega, 2012). The value creation with positive returns for both parties suggested by the theory of efficiency when a merger deal is performed is supported by many researchers including Banerjee and Eckard (1998) and Klein (2001). According to this theory, there are three types of synergies that may increase the wealth of shareholders which are financial, operational and managerial synergies; Financial synergy is achieved when the cost of capital of the merging entities is reduced, whereas operational synergy appears in the form of revenue enhancements and cost reductions which are a result of economies of scale and scope (Gaughan, 2007). Economies of scale refers to the ability of reducing the per-unit costs of output, whereas economies of scope represent the ability of reducing the average costs per unit by producing more than one product simultaneously (Awdeh and EL-Moussawi, 2011). Managerial synergy is created when additional value is created through the decision makers' ability to integrate the two companies and create competitive advantage (Hitt, 2001). Many researchers have supported the theory of efficiency including Gattoufi et al. (2008), Mahadzir and Hasni (2009),

Elumilade (2010), Ravichandran and Alkhathlan (2010), and Abdul Kadir et al. (2011). These and other studies will be referred to later on in this chapter. In line with this, this research follows the financial economic theory which is centred on whether M&A operations create financial value (Haspeslagh and Jemison, 1991) which helps in answering the research question of this study on whether Lebanese banks engaging in mergers and acquisitions had achieved the gains stated in this theory or not.

Another motivation for M&As provided in the literature is that they are used as a tool of solving or avoiding banking crises (Hempel et al., 1994). Acquisition is considered to be the most efficient technique when banks seek to exit from the business or a certain market. It is also used by regulators as an effective strategy to avoid bank failure, as bankruptcy and liquidation have a negative impact on individual banks and the entire banking system of a country. For instance, the wave of bank failures that started in the early 1980s in the United States triggered a wave of bank M&As in order to avoid the liquidation of banks and to stop the collapse of more banks and subsequently the entire banking system (Hempel et al., 1994). This applies to the Lebanese context where mergers and acquisitions are used when a bank seeks to exit the Lebanese market such as the case with ABN AMRO bank and HSBC bank.

Most of the theories mentioned above have been found to explain some of the mergers that have been occurring over the last decade and thus are clearly relevant to a comprehensive understanding of what drives merger and acquisition activities (Andrade et al., 2001). And thus, no one single motive can provide a full explanation for mergers and acquisitions as they are motivated by a complex pattern of motives (Steiner, 1975). Hence, despite of the great importance of M&As to the firms and to the economy (Fuller et al., 2002), and the intense interest that has induced an extensive research, the existing empirical work on the motives of M&As is still inconclusive and the subject lacks a unified theoretical explanation (Babanazarov, 2012).

2.2.2 Financial Performance and Efficiency:

2.2.2.1 Financial Performance

Performance is a set of financial and nonfinancial indicators that offer information on the degree of achievement of objectives and results (Kaplan and Norton, 1993). It is a process that quantifies the efficiency and effectiveness of an action (Neely et al., 1995). Financial performance is a subjective measure of the ability of a firm to use its assets from its

primary mode of business to generate revenues. It is also used to measure a firm's overall health over a given period of time (Healy et al., 1992). According to Weston (2001), financial performance refers to the measure on how organizations carry out their activities in order to achieve their financial goals.

For banks, the determinants of financial performance are categorized into either internal or external variables to the banks. The internal variables are the specific characteristics of the bank that are related to the management decisions which affect the financial performance of the bank. The factors which are external to the bank and are beyond the control of the banks' management are known as the external variables (Athanasoglou et al., 2008).

There are many tools that are used to measure the performance, one of which is efficiency or, one can "adapt the techniques of the efficiency measurement literature to the problem at hand" (Lovell, 1995, p. 166).

2.2.2.2 Efficiency:

Efficiency is a term that is widely used in many aspects like technology and science such as economics, physics, biology and other sciences. However, efficiency is considered as a central concept in economics (Dang-Thanh, 2012), and is defined as the maximum potential ratio between the output and the input used in the production process (Cvilikas and Jurkonyte-Dumbliauskiene, 2016).

A broader concept of efficiency takes into consideration scale and scope economies, which, as previously mentioned, are one of the main motives behind mergers and acquisitions (Perry and Porter, 1985; Jensen, 1986; Pautler, 2001; Shanmugam and Nair, 2004; Sufian, 2006; Jayadev and Sensarma, 2007; Vijgen, 2007; DePamphilis, 2010; Weston et al., 2010; and Gupta, 2012).

2.2.2.2.1 Types of efficiency:

There are many types of efficiency; Relative Efficiency (RE), Technical Efficiency (TE), Allocative Efficiency (AE), Cost Efficiency (CE), Economic Efficiency (EE), and Pareto Efficiency. In this subsection, the types of efficiency relevant to this study are going to be defined.

2.2.2.2.1.1 Relative Efficiency (RE):

A firm is deemed to be efficient if and only if the performance of other peers failed to improve some of its inputs or outputs without worsening other inputs or outputs (Odeck, 2000).

2.2.2.2.1.2 Technical Efficiency (TE):

Technical efficiency measures the ability of a firm to maximize input for a certain number of outputs (Zreika, and Elkanj, 2011). In other words, given the same technology and the same external environment no waste of input resources is considered in producing the targeted outputs (Asmild et al, 2007). A firm is considered to be 100% technically efficient when it is operating at best practice. If the firm operates below the best practice levels, then the technical efficiency of the firms is measured as a percentage of the best practice (Bhagavath, 2009).

Technical efficiency is divided into Pure Technical Efficiency (PTE) and Scale Efficiency (SE) (Zreika and Elkanj, 2011). The ability of a firm to use inputs to produce as much output as possible avoiding any waste is called pure technical efficiency. That is to say, pure technical efficiency shows the ability of a firm to achieve maximum production under certain restrictions. On the other hand, the ability of a firm to work at its optimal scale is referred to as scale efficiency. Hence, the efficiency of a firm may also be affected by the scale. From the above definitions, technical efficiency can be regarded as the ratio of output over input (Qiu and Chen, 2006).

Reviewing the literature (Charnes and Cooper, 1985), it can be noticed that there is an agreement that Farrell (1957) introduced the modern measurement of economic efficiency. He launched the start of measuring efficiency through his study “the measurement of productive efficiency” (Zreika and Elkanj, 2011). Drawing upon the work of Debreu and

Koopmans in 1951 to define a simple measure of firm efficiency, Farrell (1957) proposed that the economic efficiency of a firm is a combination of its technical and allocative efficiency.

To measure the efficiency of a firm, Farrell (1957) suggested the use of either a parametric or non-parametric frontier approach. These approaches are used to measure efficiency in case of several inputs and outputs (Akin et al., 2009). Data Envelopment Analysis (DEA) is a nonparametric technique that is widely used in the literature for measuring efficiency (Gattoufi et al., 2008). This methodology will be used in this study to examine the impact of mergers and acquisitions on the efficiency of banks in Lebanon, and will be further discussed in details in the methodology chapter.

2.2.3 Literature review of empirical studies

Mergers and Acquisitions are being used in an accelerated pace all over the world as a strategy to grow larger in size, increase their market share and become more competitive through economies of scale (Pautler, 2001; Shanmugam and Nair, 2004; Gupta, 2012; and Anthony, 2019). Many Organizations across different countries seek to achieve larger size based on the belief that getting bigger is better. However, there is an ongoing debate regarding whether getting bigger in the banking sector is always better in terms of both performance and economic efficiency, although economies of scale and scope are often presented as the main triggers of merger activities (Mester, 1987; Humphrey, 1990; Berger et al., 1993; Vennet, 1994; Allen and Rai, 1996; Berger and Mester, 1997; Vennet, 2002; Ayadi and Pujals, 2005; Sufian, 2006; Altunbas and Marqués, 2008; Gattoufi et al., 2008; Bin Dost et al., 2011; and Huber, 2018).

In theory, a larger size could lead to economies of scale and economies of scope. When the average cost per unit decreases as output increases the bank operates with economies of scale given a certain size. In contrast, up to a certain size, diseconomies of scale occur when operating costs increase more proportionately than the production volume (Sufian, 2006).

It is far from certain that achieving a larger size means higher profitability, yet the competition toward a larger scale would probably lead to inefficiency (Ayadi and Pujals, 2005). Some studies found that after very large mergers occur the performance of very large banks deteriorates even when their dominance in the market increases. Therefore, for banks to increase their efficiency through economies of scale they should bind their network from

becoming too big (Bin Dost et al., 2011). Moreover, although M&A results in much bigger size, however size alone is not enough to ensure higher levels of efficiency, On the contrary size may become the biggest factor causing inefficiency such as the case of banking groups in Singapore (Sufian, 2006); mergers in Singapore have resulted in a much bigger banks however, during the period of study it was noticed that larger banks are underperforming compared with their smaller peers in terms of efficiency and thus it was found that size become the biggest factor resulting in the inefficiency of banks in Singapore. This is consistent with other studies that found that economies of scale exist up to modest size (Mester, 1987; and Vennet, 1994), and studies which found that medium sized banks are more efficient than large ones to some extent (Berger et al., 1993; Humphrey, 1990; Mester, 1987). In contrast, other researchers found that even large banks can realize economies of scale (Allen and Rai, 1996; Berger and Mester, 1997; and Vennet, 2002). It can be seen that many researchers are in line with the view that only up to a certain size banks can attain scale efficiency.

Another debate exists in the literature over the impact of mergers and acquisitions on the performance of involved firms. A review of M&A literature, particularly the one examining the impact on the performance in the banking sector, it can be seen that although many different methodologies have been used there are still no conclusive results regarding the impact of M&As on banking performance (Beccalli and Frantz, 2009; Huian, 2012; Said, 2013; Abbas et al., 2014; Joash and Njangiru, 2015; Ombaka and Jagongo, 2018; and Muhammad et al., 2019).

While many studies have found significant improvement in performance of banks engaged in M&As (Berger et al, 1999; Houston et al., 2001; Rahman and Limmack, 2004; Cornett et al., 2006; Altunbas and Marques, 2008; Usman and Obaidullah, 2010; Zahid and Shah, 2011; Anderibom and Obute, 2015; Njambi and Kariuki, 2018; and Sahni and Gambhir, 2018). Other researchers have argued that there is no evidence of such improvements (Pillof and Santomero, 1996; Vennet, 2002; De Long and De Young, 2007; Badreldin and Kalhoefer, 2009; Correa, 2009; and Obisesan and Ajayi, 2016). While other studies reported a deterioration of performance induced by bank M&As (Clark and Ofek, 1994; Dickerson et al., 1997; Focarelli et al., 2002; Kruse et al., 2002; Amel et al., 2004; Beccalli and Frantz, 2009; Kemal, 2011; Arshad, 2012; Ayadi et al., 2013; Abbas et al., 2014; and Chaudhary et al., 2016).

Accordingly, the literature of the empirical studies about the impact of mergers and acquisitions on the performance of banks, in this thesis, will be divided into three groups: studies that report a significant improvement in the performance of banks after M&As, others that reveal a significant deterioration in the performance of banks after M&As, and studies that demonstrate insignificant changes in the performance of banks after M&As. In addition, a fourth section will be provided to the empirical studies in the Lebanese context.

2.2.3.1 Studies that report a significant improvement in the performance of banks after M&As:

Most studies of bank M&A have been focused on the United States as it was the first country to witness bank M&A in the late 19th century (Hubbard, 2001). The trends in M&A activities in US banking sector have been examined by a large number of researchers using different methodologies.

Houston et al. (2001) took a sample of 64 bank mergers in US during the period 1985 to 1996 and found that the average pre-tax return on assets increased after merger which indicates that the operating performance of the banks had improved. Likewise, Lin et al. (2006) found that M&As in US banking firms increased firms' performance. Based on the findings they consider that most banking mergers can contribute to firm productivity, shareholders value and profitability, thus M&As can be an effective growth strategy for banking firms. Using different methodologies, Alsharkas et al. (2008) investigates the cost and profit efficiency effects of bank mergers on the US banking industry using Stochastic Frontier Approach and Data Envelopment Analysis. The empirical results indicate that mergers have improved the cost and profit efficiencies of banks and suggest that there is an economic rationale for future mergers in the banking industry. They also stated that mergers may allow the banking industry to take advantage of the opportunities created by improved technology. However, these results contradict with most of US literature (Bae and Aldrich, 2006; and Behr and Heid, 2011).

Moving from the US to the EU countries, Altunbas and Marques (2008) examined 207 domestic M&As that took place in the EU banking sector between 1992 and 2001, by analysing the accounting information of the banks under study where they found an improvement in the post-merger performance, especially in the case of cross-border M&As. Likewise, Diaz et al. (2004) examined the acquisition effect on the performance of European Union credit entities and found that these activities had a positive impact (statistically) on the

performance of bidder banks two to three years after the acquisitions. Using a balance-sheet ratios analysis and Cost and profit efficiency scores analysis, it was found that M&As have positive effects on performance of EU banks (Ayadi and Pujals, 2005). These finding were corroborated by Kapopoulos and Siokis (2005) and Fritsch (2007).

Khan (2011) studied the impact of M&As on the financial performance of Indian Banking Sector by comparing the financial parameters of selected banks pre and post mergers. The findings indicate that the banks have been positively affected by the event of M&As and suggest that merged banks can obtain efficiency and gains through mergers and acquisitions. Nedunchezhian and Premalatha (2013) used financial ratios and t-tests to examine the impact of mergers on the financial performance of commercial banks in India. Their study reveals that the overall performance of selected banks shows better improvement in most of the areas after mergers had taken place. In the same context, the impact of the merger deal between State Bank of India (SBI) and Centurion Bank of Punjab (Target Bank) that took place in 2008 was examined using financial and accounting ratios. Through comparing the pre- and post-merger performance, it was found that there is no significant improvement in the performance of the SBI bank as the merger was mainly in the interest of the public (Kotnal, 2016). According to the researcher this insignificant improvement is due to teething problems and the performance is expected to improve at later stages. The overall findings indicate that the banks have been positively affected by the event of merger. Overall, it should be noted that measures such as liquidity ratios, leverage ratios and others used in ratio analysis method give only one dimension of performance. Moreover, in this type of analysis, different measures can give contradictory results (Akin et al., 2009).

Mahadzir and Hasni (2009) found a positive impact of M&A on the efficiency and productivity of Malaysian commercial banks over the period from 1995 till 2005. They used the DEA methodology and found that banks experience higher efficiency scores after the merger. Likewise, using the DEA program to identify the effects of M&As on 9 Malaysian anchor banks over a 16 years' time period, Abdul Kadir et al. (2011) found that M&As has positive impact on the efficiency of Malaysian anchor banks. Results are matched with the findings of Liu and Tripe (2003) and Sufian (2004), as they found that most banks achieve efficiency gains after M&A. These findings are associated with Heron and Lie (2002) and Rahman and Limmack (2004) who found that the operating performance improves significantly after M&As.

Using a Malmquist index-based approach, Gattoufi et al. (2008) tracked the impact of mergers and acquisitions on the efficiency of commercial banks in Middle East and North Africa (MENA) Countries; the study shows a positive, though limited, impact of M&A on the overall efficiency of the commercial banking industry in MENA region. Their study is relevant to this thesis as it includes 24 merged banks in Lebanon in the sample studied. Compared with the number of banks taken from other countries in MENA region, the largest portion of this sample was taken from Lebanon. However, it should be noted that the sample study did not include all banks operating in the region therefore caution is needed when generalizing the results. Moreover, the limitations of this conclusion should be taken into consideration as there might be a lagging effect, positive or negative, during the coming years as indicated by the authors.

Abdulazeez et al. (2016) examined the effects of M&As on the performance of deposit money banks in Nigeria and found that M&As have a positive impact on the financial performance reflected in an enhancement in the efficiency of selected banks. Likewise, Anderibom and Obute (2015) studied the impact of mergers and acquisitions on the performance of commercial banks in Nigeria with a particular interest in United Bank for Africa. The period of the study covers the years of 2000 till 2010. The researchers evaluated the performance of banks before and after merger and acquisition activities using pair sample t-test. The results of the analysis show an enhancement in the performance of the United Bank of Africa after merger and acquisition except in terms of management competency. The overall analysis reveals that mergers and acquisitions had a significant positive impact on the performance of commercial banks in Nigeria. These conclusions are consistent with the findings of Adebayo and Olalekan (2012), Elumilade (2010), and Oloye and Osuma (2015).

Oloye and Osuma (2015) examined the impacts of mergers and acquisition on the performance of two commercial banks in Nigeria. They measured the financial efficiency of banks using shareholders fund and after-tax profit of the two banks. Their findings present merger and acquisition activity as an effective tool for ensuring the stability and profitability of the banking sector, they also found that shareholders fund contributed significantly to the after-tax profit of the two banks understudy, and that corporate restructuring has positively affected the capital adequacy of these banks. Assessing the performance of 2 Nigerian banks, it was found that M&A increases shareholders' funds, investor's confidence as well as financial stability and operational efficiency of the consolidated banks (Adegboyega, 2012).

The result of this study cannot be generalized as the sample size chosen is too small to be representative since it represents only 8% of Nigerian Banking Industry after consolidation exercise as mentioned by the author. Adebayo and Olalekan (2012) concluded that mergers and acquisitions had a significant positive impact on the performance of banks in Nigeria as well as on the growth of the real sector for sustainable development. This conclusion was derived after assessing the impact of mergers and acquisitions on the performance of 10 out of 24 Nigerian banks that were involved in merger activities. Further, Elumilade (2010) studied the impact of M&As on the efficiency of Nigerian banking industry and found that these activities improve banks efficiency and competitiveness.

Ntuli (2017) used an accounting-based measure to evaluate the performance of the acquisition of the Amalgamated Bank of South Africa (ABSA) that was acquired by Barclays bank Plc during 2006-2015. The period of the study is 2004-2015 which includes a period before, during and after the acquisition. The findings indicate that the acquisition of ABSA had a positive contribution to the South African national output which is reflected in the increase in profits from year to year. It was also found an increase in the share price of the acquired bank during the period from 2005 to 2015. Overall, it was concluded that the acquisition activity had a positive impact on the performance of the acquired bank.

Sahni and Gambhir (2018) examined the impact of merger and acquisition on the financial performance of selected commercial banks in India using CAMEL model over a 10 years period and found that mergers and acquisitions are beneficial for the banks involved in the study. Ravichandran and Alkhathlan (2010) studied the efficiency and performance of 7 banks in India and 1 bank from Saudi Arabia after M&As. The analysis of CRAMEL variables on the post-merger performance suggest that banks tend to improve their operational efficiency, but they have to concentrate on their profits as their profitability appeared to be in stake after the merger. According to Cornett et al. (2006), the operating performance of commercial banks increases significantly after M&As. Similarly, Hart and Apilado (2002) pointed that there is a significant improvement in profitability for merging banks post-merger.

Muhammad et al. (2019) used ratio analysis to compare the impact of pre- and post-merger and acquisition activities on the financial performance of banks in Pakistan during the period 2004-2015. The results indicate that liquidity, profitability and investment ratios of the banks are positively and significantly increased the performance after M&A. However, a negative

effect on the solvency ratios was indicated. Moctar and Xiaofang (2014) studied the impact of mergers and acquisitions on the financial performance of West African commercial Banks using liquidity ratio, performance ratios and investment valuation variables. The study indicated that mergers and acquisitions have significant positive effects on the liquidity of banks in both short and long term. It also shows a negative effect in short term and a positive effect in long term on the performance and investment valuation variables.

Joash and Njangiru (2015) used questionnaires with both open and closed ended questions to examine whether mergers and acquisitions have any impact on banks' performance in Kenya. Their study included the banks that have undergone through these activities between the period 2000 and 2014. Using SPSS (Statistical Package for the Social Sciences) to analyse the data collected from 14 banks, they found that that merger and acquisition activities increase the value of shareholders. They also found that, the main reasons why Kenyan banking sector engage in merger activities is to enlarge their market share and raise their profitability. However, the survey methodology lacks objectivity and is open to the bias of the respondent. Moreover, it is widely used when researchers are unable to find an objective measure or when they need to measure the perception of a certain action (Krishnakumar and Sethi, 2012).

Using correlations, descriptive statistics, and multiple regression analysis, Njambi and Kariuki (2018) examined the effects of mergers and acquisitions on the financial performance of financial institutions in Kenya and conclude that merger and acquisition improved the financial performance of commercial banks. In line with the results, Anthony (2019) conducted a comparative analysis of bank’s performance 5 years pre and 5 years post-merger periods to examine the impact of mergers and acquisitions on the financial performance of commercial banks in Kenya. The study revealed that mergers and acquisitions have a positive influence on the profitability of banks, return on equity ratio, capital adequacy ratio, and long-term solvency ratio.

Using both qualitative and quantitative approaches to explain M&A activity in the Vietnam banking sector during the period from 1990 till 2014 and its impact on the economy, Hang et al. (2016) found that M&A activities generally have made positive impacts on individual banks as well as the whole system.

Banks have been engaging in merger and acquisition activities as a strategy to grow larger in size, increase their market share, enhance their performance and become more competitive through economies of scale. The above studies have found that M&As significantly improve the performance of banks and thus were able to achieve such benefits. Hence, the findings of these studies add some support to the theory of efficiency followed in this thesis (Adegboyega, 2012).

2.2.3.2 Studies that report a significant deterioration in the performance of banks after M&As:

Although some studies resulted in an improvement in the performance of banks after mergers, however other studies found no improvement in the performance of banks, rather it was found that these activities deteriorate the performance of merged banks.

The financial performance of 10 banks in Pakistan has been evaluated through pre and post ratio analysis. The analysis shows a decrease in profitability, efficiency, liquidity, and leverage ratio(s) in most of the banks after M&As, so the study reveals no positive improvement in the financial performance after M&A (Abbas et al., 2014). Kemal (2011) used 20 vital accounting ratios to analyse the financial performance of Royal Bank of Scotland in Pakistan after merger over the period 2006-2009. The findings of the study show that M&A fails to improve the financial performance of the bank. Likewise, Arshad (2012) applied a total of 11 ratios under efficiency ratios, liquidity ratios and capital ratios to analyse the performance of Standard Chartered Bank of Pakistan and reached similar conclusion. However, as mentioned by the author this study was only focused on the effect of mergers with limited applicability of ratios due to the unavailability of financial statements before and after mergers.

Using a different methodology, Bin Dost et al. (2011) employed data envelopment analysis to assess the impact of mergers and acquisitions on two banks in Pakistan and found that the overall technical and scale efficiency was reduced whereas the pure technical efficiency ascended following the merger. Overall, they concluded that there was no improvement in the performance of merged banks. The sample study used is too small for the results to be generalized on the whole banking sector.

Liargovas and Repousis (2011) examine the impact of M&As on the performance of the Greek banking sector during the period 1996 to 2009 using event study methodology. The

analysis shows that bank M&As have no impact and do not create wealth. The researchers have also used twenty financial ratios to examine the operating performance of banks and found no improvement in the performance after M&As. Rezitis (2008) uses a generalized Malmquist productivity index on five merged banks in Greek and concludes that banks that participated in merging activity experienced a decline in technical efficiency and in total factor productivity. Hence, merged banks did not experience an improvement in performance. Likewise, Focarelli et al. (2002) find no evidence of an improvement in profits following mergers.

Said (2013) analyses the impact of M&As on the efficiency of merged banks in Tunisia using financial ratio analysis and Data Envelopment Analysis approach. The analysis of financial ratios reveals that banks were unable to generate profits from assets and in the return to shareholders post-mergers. The empirical findings from the DEA approach shows a slight improvement in the overall efficiency however, on average basis Tunisian banks remained totally inefficient and thus no further mergers are supported.

Sufian (2006) investigates the impact of M&As on the efficiency of domestic banks in Singapore using an event window study analysis and a non-parametric frontier approach, Data Envelopment Analysis. The findings of both methodologies show that the mean overall efficiency has improved post-merger compared with pre-merger, however it was found that size has become the biggest factor resulting in the inefficiency of the Singapore banking groups and thus further bank M&As are not supported. Dang-Thanh (2012) used the DEA analysis to examine the performance of Vietnamese banks during the period between 1990 and 2010 and found that with time the performance of banks decreases as their sizes increases. These findings are also evident by Amel et al. (2004) where they found that mergers and acquisitions in the financial sector are beneficial up to a relatively small size. These studies support the debate, previously presented, that getting bigger is not always better in terms of performance and efficiency of banks see for example: Humphrey (1990), Berger and Mester (1997), Vennet (2002), Ayadi and Pujals (2005), and Bin Dost et al. (2011).

Akinbuli and Kelilume (2013) conducted a survey on 20 CEO and managers over 10 banks to study the effects of M&As on growth and profitability in Nigeria. Using financial ratio analysis, they found that only some banks were able to achieve profitability and growth. Add to that, the operating efficiency of banks suffers at least in the short-term following merger

and acquisition. As mentioned previously surveys are rarely used to assess the impact of mergers on banks performance as banks relies on objective measures and usually surveys are used when researchers are unable to find an objective measure. In the same context and using the same methodology, Babalola and Ewetade (2016) investigated the significant relationship between mergers and acquisitions and the performance of Nigerian banks. They used paired sample t-test statistic to test their first hypothesis which states that "The introduction of mergers and acquisitions has no significant difference on bank performance before and after the consolidation policy", and correlation analysis to test the second hypotheses "There is no significant relationship between mergers and acquisitions and bank performance" (p.101). With a sample of 5 banks out of the 20 existing banks in Nigeria their analysis indicated a significant difference between bank performance before and after the introduction of mergers and acquisitions and revealed that there is a relationship between mergers and acquisitions and the performance of Nigerian banks, thus rejecting the null hypothesis of each of the two tested hypotheses. Although the study indicated the existence of significant relation between mergers and acquisitions and the performance of Nigerian banks, however it was not clear whether this relation is of positive or negative impact.

Donna (2014) scrutinized the impact of M&As on bank performance using two methodologies. The result of event study analysis shows negative performance changes of bidder banks following mergers and acquisitions. The financial ratio analysis shows statistically significant negative changes of performance of bidder banks following mergers and acquisitions. In line with these findings, Clark and Ofek (1994) found that the operating performance declines significantly following M&As. Further, Beccalli and Frantz (2009) also found deterioration in the profit efficiency of EU banks after using both standard accounting ratios and cost and alternative profit X-efficiency to examine the impact of M&As on the performance of banks under study.

The above studies do not add support to the theory of efficiency where mergers in these studies have neither generated gains nor enhanced the efficiency of banks involved in merger and acquisition activities. Therefore, as some studies were able to yield some benefits stemming from merger activities other studies have found that these activities affect the performance of banks negatively and thus do not support further merges. Moreover, these findings question the usefulness of these activities.

2.2.3.3 Studies that report insignificant changes in the performance of banks after M&As:

While some studies have found positive impact and others showed negative impact of merger and acquisition activities on the performance of banks, a third group of studies have found insignificant changes in banks' performance after M&As. This group will include studies that found insignificant (positive or negative) changes in performance and studies reporting mixed findings and thus found no clear effect on the performance of banks after mergers and acquisitions. Studies revealing insignificant changes in the operating performance after mergers include: Linder and Crane (1993), Rhoades (1994), Ghosh (2001), Sharma and Ho (2002), Haider et al. (2015), Lai et al. (2015), Chaudhary et al. (2016), Njogo et al. (2016), Obisesan and Ajayi (2016) and Tamragundi and Devarajappa (2016).

Lai et al. (2015) examined the impact of M&As on the financial performance and the level of efficiency of local banks in Malaysia. The researchers used financial ratio analysis, Data Envelopment Analysis, T-Value Testing and paired-sample t-test. The results of their analysis reveal no significant improvement in bank efficiency, productivity, cost saving, and financial performance after mergers and acquisitions. This is consistent with the results of DEA approach that shows no improvement after mergers in almost all the banks under study. In the same context, after analysing the financial performance and efficiency changes of Malaysian banking institutions after M&As using accounting data, Mat-nor et al. (2006) haven't found any significant difference to the level of efficiency and the financial performance of banks under study. They also used the DEA methodology which also confirmed the results of the financial ratio analysis. In line with this, Amel et al. (2004) found little evidence of any improvement in efficiency of US banks following mergers.

Chaudhary et al. (2016) examined the impact of mergers and acquisitions on the efficiency of the banking sector in Pakistan. They used Data Envelopment Analysis method to determine the technical efficiency, pure technical efficiency and scale efficiency of all the banks that have been merged or acquired during 2000 to 2009. The findings of the study reveal an insignificant decline in the average efficiency scores of the majority banks under study during the post-merger and acquisition period while the pure technical efficiency remains at maximum in all the periods. Likewise, Haider et al. (2015) assessed the M&As impact on the performance of banks in Pakistan. The results of the regression analysis indicate an insignificant impact in the post-merger performance and the t-test analysis supports the

findings that the performance of banks under study shows no significant improvement after mergers. The above findings are in line with the findings of other studies conducted on banks in Pakistan which reported either a decline, no-improvement or mixed results in the efficiency during the post-merger period such as: Bin Dost et al. (2011), Kemal (2011), Arshad (2012), and Abbas et al. (2014) although different bank cases, periods, or methodologies were used.

Ombaka and Jagongo (2018) used both questionnaires and ratio analysis to examine the impact of mergers and acquisitions on financial performance of 9 commercial banks in Kenya during the period between 2010 and 2017. The results recommended that banks should conduct thorough risk analysis and assess ability of their partners before engaging in merger or acquisition transactions.

San Ong et al. (2011) employed three methods (ratio analysis, t-test, and DEA method) to analyse the financial performance and efficiency changes of Malaysian commercial banks after M&As. The analysis revealed only a slight improvement in the financial performance of merged banks however, the overall financial performance of merged banks in Malaysia was not significantly different after mergers had taken place. This finding is also supported by Molyneux et al. (2011), and Pilloff and Santomero (1996) who found no significant gains neither in shareholder's value nor performance after merger activities. These findings contradict the value maximising theory which states that M&As increases shareholder value.

Tasci (2008) examined the M&A wave in Turkish banking sector that took place during 2004-2008 using case study methodology. The analysis showed that 3 of the banks were not able to increase their shares in the sector while other banks experienced significant increases following M&A. Capital adequacy ratios either increased or stayed around same levels while banks in control group had declining ratios over the period under study. Overall, he stated that there were no substantial improvements in the efficiency of the banks.

Obisesan and Ajayi (2016) scrutinized the impact of mergers and acquisitions on the performance of deposit money banks in Nigeria. However, using different methodologies as the Ordinary least square method and the Johansen Co integration technique over a period 2001 through 2014, their study indicated that merger and acquisition has no significant impact on the performance of banks under study. Njogo et al. (2016) used nine different financial ratios, from profitability to solvency ratios, to examine the impact of mergers and

acquisitions on the performance of deposit money banks in Nigeria. Using descriptive statistics and Paired samples test they analysed the performance of 10 banks before and after merger and acquisition activities occur. The results of their study revealed a significant difference in the performances of banks in the pre- and post-merger periods in terms of ROA, ROE, and LR (Liquidity Risk) but no significant impact in the performances in terms of the other variables. They added that it is currently impossible to clearly state whether mergers and acquisitions in the Nigerian banking sector had a positive impact on the banks performance.

Other studies assessing the performance impact of mergers and acquisitions on banks have found mixed results. Huian (2012) analysed the financial performance in terms of profitability of all Romanian banks involved in M&As during 1998-2008 using traditional accounting ratios. The researcher compared the post M&A performance for a 3-year period with the aggregate ratios from all Romanian banks and found mixed results. On one hand, bank M&A in Romania does not result in improved ROE or ROA in the post M&A 3-year period under review. On the other hand, merged banks report median net interest margin above industry. Likewise, Aun (2009) assessed the post-merger performance efficiency of Malaysian local banks to determine if there is any improvement in performance particularly in the areas of profitability, cost savings and shareholders' wealth.

Tamragundi and Devarajappa (2016) selected 6 Indian commercial banks that have undergone through merger activity during the period 2004 to 2008. They evaluated the impact of these activities on performance from three different perspectives; Share price performance, Physical Performance, and Financial Performance of merged banks. They used statistical tools as Mean, Standard deviation and T-Test to analyse the performance impact of mergers and testing the hypotheses. The analysis of physical performance of merged banks shows significant improvements while analysis of financial performance and share price performance of merged banks indicates mixed results. Therefore, they came out with the conclusion that although mergers are useful strategies for banks to achieve growth, expand their operations, serve more customers, and increase their liquidity, profitability as well as efficiency; however, mergers and acquisitions can't solve the overall growth and financial disturbances of banks.

Using comparison and ratio analysis to compare the pre- and post-merger performance, the analysis revealed mixed results. ROA does not improve after mergers, expense to revenue

ratio reveals inconclusive results whereas, expense to asset ratio seem to improve in almost all the banks under study. Moreover, shareholders wealth has also improved in most of the banks which add some support to the value maximising theory. Mylonidis and Kelnikola (2005) assessed the impact of merging activity on the overall financial performance of Greek banking system using both operating performance methodology and event study approach. The results of the event study methodology reveal that mergers create value on a net aggregate basis, and the findings of operating performance methodology indicates that the post-merger performance gains are not significant. These results were controversial when compared with the ratios of non-merging banks, where the merger program has a positive impact on banks' operating performance but it has a negative impact on liquidity measure. As previously mentioned, the use of financial ratio analysis can give contradictory results when different measures are used (Akin et al., 2009), which may account for the mixed finding revealed in the above-mentioned studies.

Bernad et al. (2010) evaluated the effects of 17 M&As on the long-run productivity of Spanish savings banks. Results show productivity improvement in almost half of the cases and negative or non-significant effects in the remaining savings banks following M&As. Using an event study approach, Bihari (2012) analysed the performance of four bank mergers in India which occurred during the period 1999-2008 using an event study methodology. The study shows that M&As have a positive effect on target banks and negative for bidder banks. This result matches the finding of Bendeck and Waller (2007).

Using different methodologies such as the DEA methodology and Tobit regression approach, Hahn (2004) examined the performance of Austrian banks that have engaged in M&A activities. The results of the DEA analysis reveal that the average level of efficiency is low with no improvement shown during the years under study. On the other hand, the regression analysis indicates that bank M&As have a positive impact on bank efficiency. However, the researcher suggests that due to the high credit risk estimated in the analysis bank efficiency is likely to be dragged down. Researchers have been using more than one methodology to assess the performance impact of banks M&A in order to better understand and get conclusive results about M&As impact. However, in the case of Hahn (2004), Mylonidis and Kelnikola (2005) and many other studies the use of multiple methodologies resulted in different and sometimes contradictory results. These findings do not support the view of

Amel et al. (2004) who considered that the use of multiple methods aid in more understanding about merger impact on performance.

Badreldin and Kalhoefer (2009) assessed the impact of M&As on 10 Egyptian banks over the period 2002-2007 using ratio analysis. They found that M&As have not had a clear effect on the profitability of banks in the Egyptian banking sector, therefore it was suggested that M&As have failed to improve the banking sector as desired. The sample size selected is relatively small to be representative. Add to that, the financial statements of two banks under study in two different years were not available for the analysis which made the researchers assume that these banks share the same average accounting data with the rest of banks in the missing years, which makes the analysis inaccurate and the results unreliable. According to Egger and Hahn (2010) selectivity and missing data have the potential of severely biasing the findings of merger analysis particularly when aimed at evaluating the effect of mergers on performance. This explains the lack of having a clear result about the effect of M&As activities on performance. In line with this, Liu and Tripe (2003) pointed that no clear conclusions could be drawn on possible public benefits from the mergers. They used DEA approach and accounting ratios to examine the impact of mergers oh the efficiency of 6 banks in New Zealand between 1989 and 1998. This study, as indicated by the researchers, lacks some bank data for the late 1980s and for 2000 which may explain the unclear effect of mergers as indicated by Egger and Hahn (2010).

Furthermore, Fuentes and Sastre (1999) used a set of financial ratios to study the pre and post mergers impact on the performance of Spanish banks and found no clear results regarding the improvements in the efficiency levels of the merged institutions. The researchers mentioned that they have used short period of time after merger in their analysis and didn't account for the long run effect. The short period of the study may account for the lack of clear-cut results on the effects of M&A. According to Amel et al (2004) Studies conducted on short post-merger periods might fail to detect value gains which only emerge fully after some years. This is also supported by De Young et al. (2009), Beccalli and Frantz (2009), and Bernad et al. (2010).

The impact of mergers and acquisitions on the performance of banking sector has been studied using different methodologies from Event-Study methodology (Liargovas and Repousis, 2011; and Bihari, 2012), to Accounting Return methodology (Arshad, 2012; Huian,

2012; and Abbas et al., 2014, to Data Envelopment Analysis methodology as in Gattoufi et al. (2008), Said (2013), and Lai et al. (2015).

Furthermore, some researchers have used multiple methodologies as in: Cornett et al. (2006) and Donna (2014). However, there are inconclusive results regarding the impact of these activities on the performance of banks. While many studies indicated significant improvement on bank's performance such as: Rahman and Limmack (2004), Houston et al. (2010), and Zahid and Shah (2011), others found significant deterioration of performance after mergers and acquisitions (Kemal, 2011; Ayadi et al., 2013; and Abbas et al., 2014). These inconclusive results on bank's performance left the research community in an ongoing debate on whether these activities improve or deteriorate the performance of banks. Therefore, more studies on this area are needed in order to add contribution to this debate.

2.2.3.4 Empirical studies in the Lebanese context:

Mergers and acquisitions have been increasing in Lebanon due to the banking industry's movement away from small-family owned businesses to large-corporate rivals competing to increase market share and recognize synergies (Osman et al. 2008). The banking sector has witnessed some remarkable deals of M&As, namely the acquisition of ABN AMRO bank by Byblos bank in 2002, merger between bank Audi and bank Saradar in 2004 to form the Audi Saradar group, and recently the acquisition of HSBC bank Middle East Limited by BLOM bank S.A.L. in 2017. The key driver of the growth in M&A activity in Lebanon is the improvement of the banking sector which was developed into a solid sector due to merger and acquisition activities (Zreika and Elkanj, 2011).

The issue of the impact of M&As on performance of Lebanese banks remains an understudied issue due to the limited number of published studies. As far as it is known there are only five studies on Lebanon: Khaddage (2003), Osman et al. (2008), Gattoufi et al. (2008), Awdeh and EL-Moussawi (2011), Sujud and Hachem (2018).

Khaddage (2003) assessed the impact of merger and acquisition activities on the Lebanese banking sector by conducting a case study on one M&A operation that took place between Byblos bank and ABN-Amro bank which was one of the largest foreign banks operating in Lebanon. He examined the growth status in terms of bank branches, employees, assets, customer deposits, profitability, and capital adequacy of Byblos bank before and after merger (dec2001-dec2002) and concluded that M&A had a positive impact on the banking sector, in

particular, and the national economy in general. The banks that grew bigger are now thinking of going regional. Also, the confidence in the banking system was restored. As a result, bank deposits rose in absolute real terms and as a ratio of GDP. The findings of this study cannot be relied upon for the following reasons. The first is concerned with the time period used in the analysis; a one-year period is not sufficient to produce reliable results since the gains from consolidation only emerge after some years (Focarelli and Panetta, 2003; Amel et al., 2004; Beccalli and Frantz, 2009; De Young et al., 2009; and Bernad et al., 2010). The second reason is that the author generalized the result of one merger on the whole banking sector and economy.

The second study implemented a DEA approach to measure the relative performance of Lebanese banks from 1997 to 2004. During this period some banks merged and others acquired, therefore their characteristics were investigated giving a close attention to their TE patterns (Osman et al., 2008). They observed that the majority (70%) of mergers and acquisitions includes a minimum of one Alpha efficient bank. These banks witnessed a 10% drop in the immediate TE value but they managed to gain back their full efficiency in most cases. However, other banking groups although involved efficient banks experienced a declining pattern in their average values of TE and were unable to regain their original technical efficiencies. According to the researchers, the reason may be that the increase in size of new merged units may be creating more complex operational problems that they do not have enough experience or able to handle well as compared to large-sized bank mergers.

This result supports the findings that size could become the biggest factor resulting in the inefficiency of banks, and thus contributes to the debate in the literature about whether getting bigger in the banking sector is always better. It is worth noting that this study is not aimed at assessing the impact of mergers and acquisitions on the performance of Lebanese banks rather it assessed the efficiency of merged and acquisitioned banks because they have occurred during the period of the study.

Gattoufi et al. (2008) studied the impact of mergers and acquisitions on the efficiency of commercial banks in MENA countries using an output-oriented DEA approach under both CRS and VRS assumptions. Their study includes a sample of 24 merged banks in Lebanon. The results of the analysis show a positive, though limited, impact of M&A on the overall efficiency of the commercial banking industry in MENA region. The sample study did not include all banks operating in the region therefore caution is needed when generalizing the

results. Further, the limitations of this conclusion should be taken into consideration as there might be a lagging effect, positive or negative, during the coming years as indicated by the authors.

Awdeh and EL-Moussawi (2011) examined the bank mergers experience in Lebanon between 1994 and 2002 where 25 bank merger operations took place. They used the standard ratios and the DEA methodologies to capture the effect of M&As on the operational performance in terms of profitability and efficiency. The results of the study show significant differences in performance between the acquiring and acquired banks. In general, the acquirers have been larger in terms of assets and market share, more profitable, more efficient, and have better capability in managing their credit risk. This supports the efficient management hypothesis which states that more efficient banks target underperforming ones. Moreover, by comparing the performance measures before and after bank mergers they observed insignificant improvement in profitability, efficiency, and capitalisation and on the other hand, they found some deterioration in productive efficiency and considerable increase in credit risk. However, they noticed an increase in both growth and market share.

The methodology used was appropriately presented and easy to emulate on, however the sample does not include all bank M&A activities in Lebanon. This study was conducted in 2011 yet the period considered is till 2000 though a number of M&As have occurred during the two periods, such as the acquisition of "Banque de la Békaa SAL" by Fransabank in 2003 which also acquired "BLC Bank SAL" in 2007 as well as "Banque Lati SAL" in 2010 (Fransabank Group, 2014). Hence, a more recent study including all merger activities is needed in order to draw more reliable conclusions.

The last and most recent published study in the Lebanese context, as far as it is known, is conducted by Sujud and Hachem (2018) who analysed the pre- and post-merger effects on financial performance of Audi-Saradar Group. They used ratio analysis to compare the performance of Audi-Saradar and paired sample t-test determines the significant differences in financial performance before and after the merger. The results revealed an improvement in return on assets, return on equity, and on the rate of return on shareholders' equity but the improvement was insignificant, whereas merger had significant positive impact on earnings per share. The results of this study cannot be generalized as mentioned by the authors because it is applied on one merger activity. Thus, they recommended a more detailed study that

includes all Lebanese banks that experienced merging or acquisition to assess the impacts of merger and acquisition on their profitability.

Overall, Khaddage (2003) and Sujud and Hachem (2018) studied the impact of one merger activity on the performance of banks and thus their results cannot be generalized on the entire banking sector. However, this thesis studies the impact of all mergers and acquisitions that have occurred during 1999 and 2012 so the results can be generalized on the banking sector in Lebanon. Further, Khaddage (2003) used a one-year period in his study which is not sufficient to produce reliable results (Bernad et al., 2010). To overcome this limitation, this study uses a 3 years period which is a sufficient period to realize the gains from mergers and to produce reliable results Focarelli and Panetta (2003), Bernard et al. (2010).

Likewise, the findings of Gattoufi et al. (2008) cannot be generalized as the sample study did not include all banks operating in the region. Add to that, this study is concentrated on the MENA region rather than on Lebanon. However, the focus of this study is on all the bank merger and acquisition activities that have been taken place in Lebanon. As for Osman et al. (2008), the aim of the study is to examine the efficiency of banks in Lebanon rather than assessing the impact of mergers and acquisitions on the performance of Lebanese banks as in this thesis.

Furthermore, the sample study used by Awdeh and EL-Moussawi (2011) does not include all bank M&A activities in Lebanon, where the study was conducted in 2011 yet the period considered is till 2000 though a number of M&As have occurred during the two periods, without providing an explanation for such exclusions. Therefore, to overcome this limitation this thesis aimed at covering all the merger activities.

Overall, this thesis attempts to address the gap in the literature by overcoming the limitations of previous studies through considering a longer period of study in an attempt to include all the M&A activities that have taken place in Lebanon, in order to draw a more reliable and generalized results.

Furthermore, these studies provide different findings; the study of Khaddage (2003) found a positive impact on the banking sector, however these results cannot be relied on as the author studied the impact of M&A on one bank and generalized the result on the whole sector, while the study of Osman et al. (2008) showed that some banks were unable to gain back their original TE efficiencies before merger with a declining pattern in TE average values.

Moreover, Awdeh and El-Moussawi (2011) found that, on average, merger operations do not add significant value to the acquiring banks. Likewise, the study of Sujud and Hachem (2018) found insignificant impact of merger activity on banks profitability. Therefore, more studies in this area are needed to have a clearer answer on the real impact of these activities on banks performance. Hence, this thesis, as far as it is known, will be the first to cover this number of bank merger activities over such a long period.

2.2.3.5 Reasons behind the inconsistent outcomes of M&As

As there are no conclusive results regarding the benefits stemming from these activities, a lot of questions have been raised by researchers in an attempt to understand the reason for such results which made it questionable why M&As are being used till the current day? It was suggested that mergers have continued because they were being undertaken in the interest of the management rather than the shareholders (Urio et al., 2012). It was also questioned whether the spectacular ongoing M&A wave in the MENA-region is a wise shift in banking industry or is it an arguable drift triggered by contamination? (Gattoufi et al., 2008), and whether the industry has followed a path of massive restructuring on a misguided belief of value gains? (Elumilade, 2010)

The Literature has provided some possible explanations for the alteration between the econometric evidence and bankers' beliefs. One possibility is that the lack of clear-cut results on the effects of M&A could reflect difficulties in measuring the improvements in efficiency (Amel et al., 2004). A second possibility is that the deals that have occurred in the past might have prevented the involved firms in an M&A from taking advantage of all the benefits of the deal due to strict regulation (Amel et al., 2004). A third alternative is the time period being studied (Beccalli and Frantz, 2009; and De Young et al., 2009), which tend to be short (Bernad et al., 2010). Studies conducted on short post-merger periods might fail to detect value gains which only emerge fully after some years (Amel et al., 2004). Hence longer time period (up to five years) is needed to realise efficiency gains of consolidation (Focarelli and Panetta, 2003). However, Leepsa and Mishra (2013) observed that there are no convincing facts that whether the inconsistency in the results from M&A studies is because of the different time frame used in the studies, the parameters they have chosen or the difference in the country of acquirer and target.

Other explanations provided are; selectivity and missing data which have the potential of severely biasing the findings of merger analysis particularly when aimed at evaluating the

effect of mergers on performance (Egger and Hahn, 2010), mergers often occur in waves which makes it hard to separate the effect of a single deal from transformations experienced by the industry as a whole (Ayadi, 2008), absence of best practices guidelines for planning and executing increasingly large and complex acquisitions (De Long and De Young, 2007), failure in considering the mean-reversion behaviour in industry-adjusted performance (Knapp et al., 2006), the increases in the levels of market concentration resulting from mergers and acquisitions of banks may have had adverse effects on regional competition and post-merger efficiency, thus it may have partly offset the performance gains resulting from merger activities (Heffernan, 2005), the difficulties of integrating broadly dissimilar institutions (Vennet, 2002; and Altunbas and Ibanez, 2004). Moreover, some of this difference could be due to a continuation of firm specific performance before the merger or to economy wide and industry factors (Healy et al., 1992).

Some researchers attributed the lack of convergence in the results to a lack of consistency in methodology (Maditinos et al., 2009; and Bernad et al., 2010). This is evident in the literature presented above, where several academic studies have used a wide range of methodologies, yet no conclusive results were found (Ayadi and Pujals, 2005). This is also supported by Krishnakumar and Sethi (2012) who found that research conclusions differ depending on the method selected for performance evaluation, which is an important factor for researchers and practitioners to consider while drawing conclusions on acquisition success or failure.

Finally, the more plausible explanation offered for this puzzling evidence in the literature centres around agency problems. As agency problems exist between managers and shareholders M&As could be mainly driven by non-value maximizing motives such as managerial hubris (Amel et al., 2004). This view is in line with Pilloff and Santomero (1996) and Gorton and Rosen (1995) who stated that the plausible explanation for the lack of significant improvement in the performance of banks is that mergers have been driven by other motivations such as the managerial hubris or empire building by entrenched CEOs. Add to that, Tuch and O'Sullivan (2007) pointed that hubris may explain the continuing negative impact of acquisitions.

While there has been a significant amount of research on M&As, there appears to be little consensus as to the reasons for outcomes achieved from them (King et al., 2004; Stahl et al., 2005; De Young et al., 2009; and Hitt et al., 2009).

2.3 Conceptual Framework

Mergers and Acquisitions are trends that have been characterising the Lebanese banking sector over the last decade with more deals expected in the coming years. However, a review of literature provides no conclusive evidence on the impact of merger activities on the performance of banks, which created a dilemma in the research community on whether the banking industry has undergone through massive restructuring based on a misguided belief of value gains or that shareholders as well as the public have not been told the truth about the real effects of M&A activities on both shareholders value and performance of banks (Elumilade, 2010). Thus, establishing a clearer understanding on the impact of M&As on the performance of banks in Lebanon is of great importance for policy makers and parties relying on this sector.

Lebanese banks like many banks across different countries have engaged in merger activities to increase market power (Sujud and Hachem, 2018), gain operating and financial synergy, and achieve economies of scale and scope leading to cost and profit efficiency as indicated by the theory of efficiency. The efficiency theory states that M&As occur only if attainable synergies expected to be generated are enough for both parties to achieve gains (Adegboyega, 2012). According to this theory, there are three types of synergies that may increase the wealth of shareholders which are financial, operational and managerial synergies; Financial synergy is achieved when the cost of capital of the merging entities is reduced, whereas operational synergy appears in the form of revenue enhancements and cost reductions which are a result of economies of scale and scope (Gaughan, 2007). The efficiency theory centres around whether M&A creates financial value and thus serves the objective of this study, which is to examine the impact of M&A's on the efficiency of banks in Lebanon.

The performance impact of mergers and acquisitions has been examined through a wide range of methodologies. The most popular and widely used methods were event study methodology and key performance indicators. However, the limitations of these methods coupled with the changing nature of the banking industry has made performance evaluations even more difficult, increasing the need for more flexible alternative forms of financial analysis (Yannick et al., 2016). Thus, the literature suggested the use of either a parametric or non-parametric frontier approach to measure the efficiency of firms. Each of the two approaches has its own advantages and shortcomings with respect to the other. However, researchers found out that the non-parametric approaches are best applied to industries with

imprecise technologies, such as the service sector, due to their simplicity and flexibility (Charnes et al, 1978), and thus are more adequate than parametric models to rank the efficiency of banking institutions (Savitalkova (2014).

The advantages of DEA over other methodologies and the extensive review of literature have helped in determining the DEA approach as an appropriate methodology for this study. DEA has been preferred because it is a simple method that can ensure consistent performance assessment (Krishnakumar and Sethi, 2012) and is capable of solving multiple inputs and outputs and provides a complete picture of performance of units under study (Akin et al., 2009). DEA also allows the analysis of whether the DMU is efficient, identifies the causes of inefficiency and how the DMU can improve its efficiency (Řepková, 2014). Furthermore, DEA has been chosen for the following reasons: Firstly, Lebanese banks operate in a competitive market and the relative efficiency is a key indicator for measuring the performance of banks in competitive market (Gattoufi et al., 2008). Secondly, DEA has been increasingly used by majority of researchers for studying M&As impact on the performance of banks particularly when the sample size to be studied is small (Sufian, 2008). Thirdly, this method is suitable if the banks under study differs in size and in Lebanon these activities take the form of large banks acquiring medium and small sized banks since the merger between the 11 large banks is not permitted by the governor of the Lebanese central bank in order to maintain the competition in the market.

In general, there are two models for DEA: the CCR model and the BCC model. The CCR model was introduced by Charnes, Cooper, and Rhodes (1978) and is designed with the assumption of constant return to scale. Banker, Charnes and Cooper (1984) extended the CCR model through allowing for variable returns to scale (VRS) and referred to the new model as the BCC model. Both models have been used individually or mutually to study the efficiency of banks.

After choosing the DEA models and approaches, the input and output variables must be specified based on one of two approaches, the production approach or the intermediation approach (Yannick et al., 2016). After an intensive review of the DEA literature, it was found that the intermediation approach is the most frequently used in the banking sector (Naimy and Chukri, 2016), as it is found to be more appropriate for evaluating the efficiency of the entire financial institutions (Said, 2013). Furthermore, the banking sector in Lebanon is still traditional in its form and is viewed by the central bank as a main channel for funds which

needs ongoing development efforts (Gattoufi et al., 2008). Thus, the intermediation approach which views bank as an intermediary of funds between savers and investors is convenient for the study. Therefore, this study adopts the input-oriented approach with interest expenses, general expenses, total deposits, and number of employees as inputs and interest income, non-interest income and total loans as outputs, under both CCR and BCC DEA models to analyse the efficiency of banks involved in merger and acquisition activities in Lebanon.

In addition to the DEA methodology, six management efficiency ratios were chosen based on the inputs and outputs used in the DEA analysis in an attempt to obtain a more conclusive result of the impact of merger activities on the efficiency of banks in Lebanon. These ratios are: non-interest income to number of employees, non-interest income to total assets, net interest income to total assets, net operating income to total assets, net operating income to total equity, and net interest income to total equity ratios. The use of multiple methodologies in a single study is in line with other researchers including Sujud and Hachem (2018), Njambi and Kariuki (2018), and Ombaka and Jagongo (2018), on the basis that using a variety of imperfect methods gives the clearest possible picture of the impact of M&As on the efficiency performance of merged entities (Amel et al., 2004).

2.4 Summary

Despite of the importance and the intense interest in the topic of merger and acquisition that has induced an extensive research, the existing empirical work on the motives of M&As is inconclusive (Babanazarov, 2012). However, mergers theories are centred on shareholder value improvement, efficiency enhancement and the boost of operating synergies and managerial motives (Gattoufi, 2009; and Ombaka and Jagongo, 2018).

Most studies of bank M&A have been focused on the United States as it was the first country to witness bank M&A in the late 19th century (Hubbard, 2001). These activities have been examined by a large number of researchers using a wide range of methodologies but their findings have not been conclusive (Ayadi and Pujals, 2005). The findings from European and other single countries study tended to confirm the findings of the US studies. These inconclusive results created a dilemma in the research community on whether the banking industry has undergone through massive restructuring based on a misguided belief of value gains or that shareholders as well as the public has not been told the truth by financial regulators and operators about the real effects of M&A activities on both shareholders value and performance of banks (Elumilade, 2010).

Several explanations have been provided in the literature for the alteration between what bankers believed they could achieve from gains after mergers and the evidence provided by economists, yet the more plausible explanation offered for this puzzling evidence centres around agency problems such as managerial hubris and empire building (Bernad et al., 2010).

Banks merger and acquisition have been constantly encouraged by the Lebanese Central bank who issued a law number 192 to manage these activities and offered several incentives such as soft loans to merged banks. Bank consolidation in Lebanon takes the form of large banks acquiring small or medium-sized ones as the central bank prevents any M&As among the country's 11 leading lenders in order to maintain competition (Allen, 1990). In spite of the importance given by the central bank for M&A activities however the number of studies assessing the impact of these activities have been rare.

As far as it is known, there are only five published studies in Lebanon. The studies of both Sujud and Hachem (2018) and Khaddage (2003) cannot be generalized, while the focus of the study of Osman et al. (2008) was on assessing the efficiency of Lebanese banks in general and not on the impact of mergers of the efficiency of banks. Similarly, the study of Gattoufi et al. (2008) was focused on the MENA area in general rather than on Lebanon. This leaves the Lebanese literature with only one published study (Awdeh and EL-Moussawi, 2011); however, this study does not include all the merger activities that had taken place in Lebanon. Furthermore, these studies provided different findings; the study of Khaddage (2003) found a positive impact on the banking sector, whereas the study of Gattoufi et al. (2008) showed a positive, though limited, impact of M&A on the overall efficiency of the commercial banking industry in MENA region. On the other hand, the findings of Osman et al. (2008) showed that some banks were unable to gain back their original TE efficiencies before merger with a declining pattern in TE average values, whereas Awdeh and EL-Moussawi (2011) found that, on average, merger operations do not add significant value to the acquiring banks. Likewise, Sujud and Hachem (2018) study found insignificant positive impact on the profitability of the bank.

In light of the inconclusive results in the literature and the limited number of studies on Lebanon which also provided mixed results, it is difficult to determine the impact of M&As on the performance of Lebanese banking sector. Hence, more studies in this area considering a longer period of study as well as including all the M&A activities that have taken place till the current day are needed in order to draw a reliable conclusion.

After reviewing the literature of merger and acquisition and the studies examining the impact of these activities on performance of banks, the next chapter will present the research design and the adopted methodology in this thesis.

Chapter Three: Methodology and Methods

Lebanese banking sector have been characterized by the trends of mergers and acquisitions in the last two decades. However, the impact of these activities on banks' performance has not been conclusive in the literature although a wide range of methodologies have been used. The methodology chosen is the data envelopment analysis which relies on mathematical data. Further, the positivistic research philosophy has been adopted.

This chapter is divided into three different sections; the first section introduces the research design and the broad research philosophies, and is divided into three sub-sections; the first reviews the qualitative, quantitative, and mixed method of research along with the different strategies employed by each paradigm. The second will review the predominant research methods and the different methodologies that have been used by other researchers to examine the performance impact of M&As. The methodology adopted in this study will be presented in subsection three, followed by a brief discussion on some ethical issues that must be taken into consideration when conducting a research in subsection four.

The second section introduces the methodologies adopted in this thesis to study the impact of M&As on banks performance. This section is divided into three sub-sections. The first provides a background on DEA methodology, its mathematical formation, models and approaches. The second presents the ratios analysis technique used to support the results of the DEA methodology. The third consists of the sample of the study as well as the analysis technique that will be used to generate the results and perform the analysis. The chapter is then summarized in the third section.

3.1 Research Design

Research design is the overall strategy chosen to arrange in a coherent way the various components of the research so as to make sure that the research problem is addressed effectively; it includes a blueprint for gathering, measuring and analysing data. The main concern of research design is to make sure that researchers are able through the evidences they have obtained to answer their research question and test theories through minimal level of ambiguity (nyu.edu, 2013). Research design articulates the type of data required and the methods to be used in collecting and analysing these data which will help in answering the proposed research question under study.

In general, there are two broad research philosophies which are positivism and constructivism. Social constructivist approach seeks to explain a certain phenomenon based on the perspectives of the individuals participating in the study (Creswell, 2003). In this study the aim is to examine the impact of mergers and acquisitions on the financial performance of banks. One of the key drivers of banks' performance is efficiency which refers to the ability of the bank in generating revenue from a given amount of assets (Sufian et al., 2008). Hence, this study relies on accounting or numerical data and thus objective rather than subjective measures such as in constructivist approach. Further, the intention of social constructivism is to develop a theory (Creswell, 2003), whereas the intentions here is to examine whether M&As improve banks' performance through achieving efficiency gains as stated by the theory of efficiency. Therefore, the use of this approach is eliminated and the positivistic approach is adopted.

The positivistic approach seeks to provide rational explanations for the phenomena being studied through identifying, measuring and evaluating it (Neville, 2007). The ontological assumption taken by this approach is that the reality is external and objective (Kulatunga et al., 2007). Based on this assumption, positivism adopts the epistemological stance which states that the phenomena under investigation must be studied using objective rather than subjective methods (Easterby-Smith et al, 2002).

This approach is usually associated with deductive reasoning (Easterby-Smith et al., 2002) as the latter is used to look for causal links between the research variables through deducting a certain theory or hypothesis (Saunders et al, 2003). Hence, the deductive approach will be followed through measuring the impact of M&A on banks performance, testing the findings, and then deducing whether these activities enhance banks efficiency as stated by the efficiency theory or not. The major research strategies associated with positivistic/deductive approach are experiments, surveys, and correlational studies (Creswell, 2003). This study is largely dependent on secondary data that are mostly obtained from Bilanbanques published books which provide the financial data of banks operating in Lebanon.

3.1.1 Research Methods

Research methods are described in many different ways and at various levels, yet the most fundamental is the philosophical level (Clark, 1998). The philosophical aspects underpinning methods facilitate the categorization of research methods into paradigms. The concept of

"paradigm" is defined by Kuhn (1970) as "the underlying assumptions and intellectual structure on which research and development in a field of inquiry is based".

Paradigm is the claim of knowledge which means that when researchers start a project, they make claims about what is knowledge (ontology), how it could be known (epistemology), what values go into it (axiology), how to write about it (rhetoric), and the processes for studying it (methodology) (Creswell, 2003).

In general, there are three broad approaches to research; these are the Quantitative, qualitative and mixed methods approach (Johnson and Christensen, 2008). Researchers usually select the qualitative approach to answer research questions which requires textural data, and the quantitative approach for those requiring numerical data, whereas mixed method approach is selected for questions that require both types of data (Williams, 2007).

3.1.1.1Qualitative research approach

Qualitative research, also called social constructivism or naturalistic inquiry, is an inductive process used to identify patterns, concepts, and relationships (Raines, 2013). This approach assumes that individuals develop subjective meanings which are socially and historically constructed for their experiences or events in order to identify patterns (Creswell, 2003). Qualitative research is aimed at explaining theoretically the reality as perceived by participants through rich and in-depth examination of a certain phenomenon (Morse, 1996).

There are six strategies in qualitative approach which are phenomenology, ethnography, grounded theory studies, case study, and narrative research (Creswell, 2003); Phenomenological studies focus on the human experience and rely on the descriptions provided by the people involved in the study about what they have experiences (Donalek, 2004). Ethnographic studies collect primarily observational data from a certain cultural group for a long period of time (Creswell, 2003) and usually these data are collected from the most knowledgeable people about the culture being studied (Leininger, 1985). The third strategy is the Grounded theory which is a method for collecting and analysing data in order to develop a broad and abstract theory about a specific process, action, or interaction that is grounded in the perception of people engaging in the phenomena under study (Creswell, 2003). Case studies are in-depth examinations of events, activities, processes, institutions, or people (Stake, 1995). This method provides a systematic way for exploring events, collecting and analysing data, as well as reporting the findings (Yin, 2009). The last strategy is the Narrative

research which is a form of inquiry where participants tell researchers about the life events they have experienced, after which researchers recall and arrange these experiences in a narrative form where the aspects of both participants' and researchers' life are combined in a narrative form (Clandinin and Connelly, 2000).

In this study, qualitative approach will not be used as the aim is examining the impact of mergers and acquisitions on the financial performance of banks, thus this study relies on accounting/numerical data and thus objective rather than subjective measures such as in qualitative approach. Further, qualitative approach is mainly used to develop a theory (Creswell, 2003), whereas the intention is to test the findings with respect to the theory of efficiency which states that M&As improve banks' performance through achieving efficiency gains.

3.1.1.2 Quantitative research approach

The quantitative research is an approach used to collect measure and analyse numerical data (Balnaves and Caputi, 2001). It typically begins with a reading of literature in order to develop the theoretical frame work of the researched question which should be specific and measurable (Raines, 2013). After that the researcher formulates a hypothesis for testing, observing and collecting data to analyse them statistically, and finally make conclusion about the tested hypothesis (Jackson, 2009).

Quantitative research is an objective method that does not rely or influenced by time (Raines, 2013). This approach is hard to design but highly structured and detailed, and the results are easily gathered, arranged and presented statistically. Moreover, qualitative research centrally aims at minimizing the impact of external factors through keeping the research variables under control (Burnes and Grove, 2001). This approach uses a deductive reasoning which means that it starts from a specific point and ends with deducing more generalized conclusions. Therefore, compared with other methods using a similar sample of population the findings from this approach are more generalized (Raines, 2013).

The quantitative research employs three main strategies of inquiry which are Experiments, correlational studies, and Surveys (Creswell, 2003). An experiment is simply trying new things or making adjustments on an existing process and comparing the results with the existing standards. The goal of an experiment is to assess the cause and effect relationship between variables, both dependent and independent, in a controlled environment.

There are three criteria for a true experiment which are control, manipulation, and randomization (Bailey, 1997). In some cases, it is not feasible to meet all these criteria, therefore a quasi-experimental approach is used in an attempt to uncover the causal relationship. In both experimental and quasi-experimental studies, data are collected with highly structured instruments such as a forced-answer questionnaire, survey, or measurements such as physiologic function obtained with a standardized procedure (Raines, 2013).

Correlation research assesses the relationship between the research variables. This strategy enables researchers to determine the strength and direction of the occurring relationships between the research variables, without manipulation. Correlation research can be retrospective, prospective, or descriptive (Fitzgerald et al., 2004). Data-collection procedures based on the focus of the study may include chart review, survey questionnaire, or direct observation.

Survey research such as questionnaires or structured interviews is used to numerically describe the attitudes, trends, or perspective of a sample of population. These instruments collect data about the issue being studied and the relationships between the research variables. Surveys can take many forms such as descriptive, longitudinal, correlational, or comparative form.

Descriptive surveys describe behaviours, attitudes, knowledge, or events at a single point, whereas a longitudinal survey collects data at multiple points. Correlational surveys look at relationships between variables, and comparative surveys look at differences. The variables used in this method are described through descriptive statistics and the relationship between these variables is communicated using inferential statistics (Raines, 2013).

3.1.1.3 Mixed Method approach

The mixed method approach, also known as hybrid, combined, integrated, and multi-method research (Creswell and Plano Clark, 2007), is a process for collecting and analysing data through employing both qualitative and quantitative approaches in the same study so that the research question or problem is better understood (Creswell, 2012). The strategies employed by this approach include collecting numeric and text information data either in a sequential or simultaneous way.

The basis from employing mixed methods is to benefit from the strengths and lessen from the weaknesses of either approach alone (Johnson and Onwuegbuzie, 2004). For instance, if a researcher is interested in forming a detailed view of how individuals perceive certain phenomena and generalizing the results on a large population, the researcher can use the mixed method approach and capture the better of the two approaches (Raines, 2013). Add to that, as qualitative approach involves developing theories and quantitative approach is used to test theories (Lichtman, 2006; and Johnson and Christensen, 2008) researchers can mix the two approaches in one study by using qualitative method to develop a theory and then quantitative to test that theory which will aid in a better understanding of the topic under study than either type by itself (Creswell, 2003).

To sum up, qualitative and quantitative approaches are employed to examine a certain research question in an attempt to find answers for it. However, in order to be more able to choose the approach that best suits the research question under study, the difference between the two approaches must be understood. For more elaboration and wider understanding, the main factors differentiating the qualitative and quantitative research approaches will be illustrated in Appendix (A).

3.1.2 Review of methodologies used by other researchers

The performance impact of mergers and acquisitions has been examined through a wide range of methodologies. The most popular and widely used method is the event-study methodology which examines the changes in stock market prices around the period of the announcement of the merger. The rationale behind the use of this methodology is that the market can predict the success of mergers and reacts positively to it (Awdeh, and El-Moussawi, 2011). Studies conducted using this methodology assess the impact of M&A announcement on the abnormal returns of target and bidder entities to find out if these activities create shareholder value (Bernad et al, 2010). Studies analysing the impact of M&As on banks performance using event study analysis include: Olson and Pagano (2005), Braggion et al. (2010), Liargovas and Repousis (2011), Molyneux et al. (2011) and Bihari (2012).

Researchers have been using this methodology because it directly measures the value for shareholder and measures are not subject to manipulation. Add to that, it provides an easy measurement for listed companies and shows the impact of both actions of companies and market competitors (Lubatkin and Hugh, 1987). Proponents of event study argue that as this

method relies on market data it measures the value of the merger of two independent firms more accurately than the accounting method and that the reaction of the market is more likely to be a better indicator of the real economic effects of the announced deal (Pilloff and Santomero, 1996). However, the limitations and drawbacks of this study are much more than its benefits.

A major drawback is that the movement of stock prices is based on investors' expectations of the benefits and costs of M&As and not on actual value creation as cited in Vennet (1996), Capron (1999), Cybo-Ottone and Murgia (2000), Beitel and Schiereck (2001), Lepetit et al. (2004), and Maditinos et al. (2009). It has been also criticized for assuming that the capital market is efficient while some markets may experience inefficiency in certain periods of time (Krishnakumar and Sethi, 2012) and for depending on the assumption of perfect foresight which contradicts the concept of consolidation process (Bernad et al., 2010).

The findings of this methodology are sensitive to the time and period chosen for the study. Moreover, it is difficult to detect the impact of acquisitions on stock price when a relatively larger firm acquires a smaller one (Krishnakumar and Sethi, 2012). Another limitation is that the samples used in event studies tend to be restricted to the availability of financial market data which is mostly available only for public and very large firms (Bernad et al., 2010). Further limitations of this methodology are presented in the studies conducted by Pilloff and Santomero (1996), Ayadi and Pujals (2005), Mylonidis and Kelnikola (2005) and De Young et al (2009). These limitations in general and the lack of accessibility to all financial market data in particular, exclude the use of this methodology in this study.

The next popular methodology that has been used to a large extent is the accounting return which compares the financial ratios of institutions before and after merger and acquisition takes place to determine the changes in performance (Mylonidis and Kelnikola, 2005; Chronopoulos et al., 2013; Lai et al., 2015; Njogo et al., 2016; Ntuli, 2017; Ombaka and Jagongo, 2018; Sujud and Hachem, 2018; Anthony, 2019; and Muhammad et al., 2019). Banks' performance is usually measured in terms of profitability through return of equity (ROE), return on assets (ROA), and net interest margin (NIM) measures (Mylonidis and Kelnikola, 2005).

The results of these studies remain mixed, where some of these studies indicate improvements in performance of banks after mergers and acquisitions as in: Cornett and

Tehranian (1992), Kumar and Bansal (2008), Kithitu et al. (2012), Nedunchezhian and Premalatha (2013), Sahni and Mehandiratta (2013), Ntuli (2017), Anthony (2019), and Muhammad et al. (2019). While others conclude that mergers and acquisitions do not improve the performance of banks (Kemal, 2011; Arshad, 2012; Abbas et al., 2014; and Lai et al., 2015). Yet other studies found mixed results as exemplified in Badreldin and Kalhoefer (2009), Huian (2012), Njogo et al. (2016), Ombaka and Jagongo (2018) and Sujud and Hachem (2018). The strengths of this methodology lay in being fairly straightforward and in that accounting, performance can be directly measured and the data needed are both easy to understand and obtain (Pilloff and Santomero, 1996; and Badreldin and Kalhoefer, 2009). Moreover, it measures the actual outcome of M&A activities and is subject to neither market inefficiency nor market perception (Harrison et al., 1991).

Although accounting data are intended to measure actual performance, yet they may be inaccurate from an economic perspective. This method relies on historical data and do not take market value into consideration. Add to that, mergers and acquisitions may not be the only reason for the changes in the pre- and post-merger performance as other events, which may have occurred during the period chosen for studying the impact of M&As, may have induced the observed changes. Therefore, if these irrelevant events are not accounted for the conclusion drawn on the impact of mergers on performance is perceived to be improper (Pilloff and Santomero, 1996). Moreover, this approach is affected by the use of different accounting methods for recording M&As (Beccalli and Frantz, 2009; Liargovas and Repousis, 2011; and Krishnakumar and Sethi, 2012), its measures are open to manipulation, and the appropriate time lag used to detect any improvement in the performance is not clear (Liargovas and Repousis, 2011).

The most commonly used ratios in the accounting method are ROA and ROE. The former shows bank's ability to make profit from assets and is considered to be a good indicator for assessing the performance of banks, but it does not account for the off-balance sheet operations profits (Ayadi and Pujals, 2005). As for ROE, it has the advantages of being easily accessible to, assessing the financial return of investments directly, and for comparing the performance of two different firms even from different sectors (Huian, 2012). This measure has the disadvantage that the denominator may vary substantially across banks even those of identical size due to mixing between equity and debt and total capital of the firm also (Ayadi and Pujals, 2005). Furthermore, accounting ratios give only one dimension of performance,

thus the use of different measures may lead to contradictory results (Akin et al., 2009). Further limitations of ratio analysis could be seen in Mylonidis and Kelnikola (2005).

According to Kemal (2011), accounting ratios are considered to be a convenient and reliable analytical tool despite of its limitations. However, Tanko (2008) argues that this method is considered to be inappropriate for measuring the performance of sensitive institutions such as banks since it does not identify the peculiarities of the banking sector in terms of using multiple inputs to produce multiple outputs.

In addition to the above methods, a more recent methodology has been increasingly used to measure the performance impact of M&As called Data Envelopment Analysis (DEA). This approach was developed by Charnes, Cooper and Rhodes (Charnes et al., 1978) to evaluate the performance of a set of peer entities called Decision Making Units (DMUs) which convert multiple inputs into multiple outputs (Cooper et al., 2011). The assumptions required in this method are minor which allowed its use in cases that have been complicated to other methodologies due to the complex relations between the multiple inputs and multiple outputs involved in DMUs. Moreover, it has been used as a new methodology in order to offer new insights (Cooper et al., 2000) into M&A activities which have been constantly evaluated by either event study or accounting ratios. Furthermore, this methodology has increasingly been the most preferred approach for studying M&As impact on the performance (efficiency) of banks particularly when the sample size to be studied is small (Sufian, 2008).

Studies using DEA choose inputs and outputs data needed to measure the efficiency of banks based on two main approaches. The first is called the production approach which views banks as producers who use labour and capital (inputs) to generate deposits and loans (output) (Zreika and Elkanj, 2011). The second approach is called the intermediation approach which views banks as intermediaries who use labour and capital to collect deposits and transform them into loans (Akin et al., 2009). Further, according to Berger and Humphrey (1997) the production approach might be more suitable for studies evaluating the efficiencies of branches, whereas the intermediation approach might be more appropriate for evaluating the efficiency of the entire financial institutions.

DEA has been widely used to measure the performance impact of M&As on banks, see for example: Sufian (2004), Mat-nor et al. (2006), Gattoufi et al. (2008), Rezitis (2008), Tanko (2008), Mahadzir and Hasni (2009), Singh (2009), Abdul Kadir et al. (2011), Awdeh and EL-

Moussawi (2011), Bin Dost et al. (2011), San Ong et al. (2011), Said (2013), Lai et al. (2015), Chaudhary et al. (2016), Yannick et al. (2016), Maniati and Sambracos (2017), and Wanke et al. (2017), because it is a simple method (Mahadzir and Hasni, 2009), it can ensure consistent performance assessment (Krishnakumar and Sethi, 2012) and is capable of solving multiple inputs and outputs and enables to see complete picture of performance of a company (Akin et al., 2009).

DEA has also the advantage that it uses actual sample data to derive the efficiency frontier against which each unit in the studied sample can be evaluated. Hence, no prior assumptions are required about the production function, and it does not require a particular functional form on the data in determining the most efficiency units (Pasiouras, 2008). Instead, the production frontier is generated by a mathematical programming algorithm which also calculates the optimal DEA efficiency score for each firm (Yue, 1992). This specificity extends measure of technical efficiency to units that have production functions that are difficult to estimate, such as banks. Indeed, banks make complex products and services with multiple inputs and outputs, at very disparate scales, which make it difficult to theoretically determine their efficient frontier (Yannick et al., 2016). Another advantage of DEA is that it works particularly well in studies dealing with small samples (Ludwin and Guthrie, 1989).

"DEA is most valuable in complex situations where there are multiple outputs and inputs, which cannot be readily analysed with other techniques like ratios, and where the number of service organization units being evaluated is so numerous that management cannot afford to evaluate each unit in depth" (Sherman and Zhu, 2006, p.58). The advantages of DEA over other methodologies resulted in its widespread application in over 50 different industries (Sowlati and Paradi, 2004).

Despite the aforementioned there are some limitations when using this technique. The major limitation of DEA is that "it does not allow for random error or exceptional performance, as recorded in DMUs' accounting data: all deviations from the estimated efficient frontier are thus identified as x-inefficiency. Exceptional events unrelated to the fundamental economic performance of the DMU can cause its apparent efficiency to be overstated, thus making other DMUs look comparatively inefficient (Berger and Humphrey, 1997; and Bauer et al., 1998). According to Sufian (2006) the main weakness of DEA is its assumption that the data are error free, and that efficiency analyses is restricted to the set of samples used in the study,

which means that the DMU which will be found in the analysis to be efficient cannot be compared with other DMUs from outside the sample being studied.

In contrast with Mahadzir and Hasni (2009) who stated that DEA is a simple method, Krishnakumar and Sethi (2012) stated that DEA is more complex than the other methodologies as the input and output variables needed must be selected carefully, and that this technique could require certain proprietary data which may not be available to external researchers. In line with this, Liu and Tripe (2003) observed that DEA analysis is sensitive to variables chosen for studying the performance of banks. Another limitation of DEA is that hypothesis tests are difficult because it is a non-parametric method (Thagunna and Poudel, 2012). This seems to be an appropriate criticism since DEA does not give estimates that can be easily validated with traditional statistical techniques. However, to overcome this shortcoming some researchers have recommended bootstrapping which allows the estimation of confidence intervals (Grosskopf et al., 2000).

Other recent methodologies used as performance measurements include Economic Value Added (EVA) approach which uses the market values of acquirer and acquired companies before acquisition as well as the acquisition premium in order to detect the future level of annual operating performance necessary to justify M&A activities (Krishnakumar and Sethi, 2012), Innovative Performance approach which measures the impact of acquisitions on innovation outputs as measured by the patenting frequency of the acquiring firm (Krishnakumar and Sethi, 2012), and the Residual Income approach which compares the fundamental value of acquirers before and after M&As (Guest et al., 2010). Add to that, some researchers suggested the use of balance score card method (Capasso and Meglio, 2007; and Krishnakumar and Sethi, 2012) to overcome the limitations of accounting data and event study methods to give a complete picture on the impact of M&As on firm's performance. These methodologies have been used to measure M&As impact on performance of companies. However, none of the reviewed studies have used these methodologies to study the impact of M&As on the performance of banks.

Furthermore, quite few researchers have used two other methodologies to measure the impact of M&As on banks performance. The first is Case Studies as exemplified in Fuentes and Sastre (1999) and Khaddage (2003), this approach is normally selected to study a small sample of M&As to determine what have contributed to the success or failure of M&As. The second method is Surveys as in: Akinbuli and Kelilume (2013), Joash and Njangiru (2015)

and Ombaka and Jagongo (2018), this methodology is used when researchers are unable to find an objective measure or when they need to measure the perception of a certain action but it lacks objectivity and is open to the bias of the respondent (Krishnakumar and Sethi, 2012).

While all research methodologies have shortcomings, using a variety of imperfect methods across countries and industries gives the clearest possible picture of the impact of M&As on the efficiency performance of merged entities (Amel et al., 2004). In line with this, King et al (2004) stated that there is a need to make changes in the research methods that have been used in studying the performance impact of M&A and that the use of multiple methods is required. Furthermore, Krishnakumar and Sethi (2012) in their extensive review of M&A literature over the last three decades to depict the wide range of methodologies used to measure the performance impact of M&As, found that the results from event study alone cannot be relied upon to determine the success or failure of mergers and acquisitions, rather this method can be used as a supplement to other methodologies.

As a result, many researchers have been using multiple methodologies to study the performance impact of M&As on banks (Lai et al., 2015; Hang et al., 2016; Sujud and Hachem, 2018; Njambi and Kariuki, 2018; and Ombaka and Jagongo, 2018). Some of which used accounting performance measures along with event study approach as they are perceived to be complementary rather than substitute methods. For instance, as the analysis of stock prices may fail to detect that unprofitable mergers occur the analysis of accounting ratios wont, and as the latter may not be capable of identifying why unprofitable mergers occurred the stock price analysis wont (Fridolfsson and Stennek, 2005). In line with this, some researchers stated that it is necessary to use these two methods together in order to clearly understand the performance impact of M&As. Studies that have used both methods include: Mylonidis and Kelnikola (2005), Cornett et al. (2006), Sharma (2010) and Donna (2014). However, both methods share the limitation of failing in determining the true fundamental value of mergers and acquisitions (Guest et al., 2010).

Moreover, the majority of studies combined two methodologies through comparing pre and post-merger performance measures of simple accounting data with more complicated frontier-based approach as DEA (cost or profit efficiency) as exemplified in Liu and Tripe (2003), Ayadi and Pujals (2005), Mat-nor (2006), Ayadi and Arnaboldi (2008), Sufian et al. (2008), Beccalli and Frantz (2009), Awdeh and El-Moussawi (2011), San Ong et al. (2011), Adegboyega (2012), Said (2013) and Lai et al. (2015). Yet few studies on banks performance

after M&A used Event study and DEA analysis such as (Sufian, 2006). A summary of some of the studies and methodologies used to examine the impact of M&As on banks' performance is provided in Appendix (B).

According to Krishnakumar and Sethi (2012), the results of the studies using multiple techniques on the same set of mergers and acquisitions also yielded contradictory results. This contradicts the view of Amel et al. (2004) who considered that the use of multiple methods aid in more understanding of merger impacts on performance.

3.1.3 The Choice of Methodology

Performance evaluation and efficiency measurement is an important issue for organizations and managers as it helps in identifying any inefficiencies and eliminating them. Measuring the performance of banks has been widely based on a number of key performance indicators. however, these indicators do not provide a complete picture of banks' performance. Further, in light of all the limitations of relying on accounting data and event study methodologies and the criticism these methods received (*part two subsections 2.3*), there is a need for future researches that focus on other methodologies in evaluating the impact of M&As on performance (Liargovas and Repousis, 2011). Likewise, King et al. (2004) identified the need for changing the research methods to offer new insights into the literature after finding, in their survey of literature of studies on acquisition performance between 1921 and 2002, that most of these studies have used event study and accounting methodologies. In line with this, Sowlati and Paradi (2004) identified the need for "a more sophisticated method than the traditional performance measurement techniques" (p.6) in order to have a meaningful overall measure of banks' efficiency.

The changing nature of the banking industry has made performance evaluations even more difficult, increasing the need for more flexible alternative forms of financial analysis (Yannick et al., 2016). This is supported by Akin et al. (2009) who stated that an efficiency measurement method other than ratio and regression analysis techniques is required and suggested the use of DEA methodology as it solves multiple inputs and outputs and provides a complete picture of performance of an entity. Likewise, Krishnakumar and Sethi (2012) suggested further inclusion of DEA in M&A literature as it is considered to be a satisfactory technique for measuring efficiency (Weill, 2004).

Data Envelopment Analysis is a non-parametric technique which has proven to be useful for evaluating the efficiency of service units (Sowlati and Paradi, 2004). However, to measure the efficiency of a firm, Farrell (1957) suggested the use of either a parametric or non-parametric frontier approach.

Parametric approaches are econometric approaches that compare the efficiency of a unit (bank) with that of a "best practice" bank which is determined using banks' inputs and outputs. Parametric techniques demand explicit assumptions about the function that converts inputs into outputs (Varias and Sofianopoulou, 2012). They require the use of mathematical equations to form the efficient frontier along which all efficient banks should operate (Yannick et al., 2016). The deviation from this frontier indicates that the bank is inefficient. The commonly used parametric approaches include Stochastic Frontier Approach (SFA), Distribution Free Approach (DFA), and Thick Frontier Approach (TFA) (Paradi and Zhu, 2013).

Non-parametric approaches are linear programming methods that measure the efficiency of a decision-making unit (bank) with multiple inputs and outputs. The best practice frontier among the banks is established based on comparison process (Sowlati and Paradi, 2004), without relating to any functional form hypothesis (Varias and Sofianopoulou, 2012). This frontier determines the relative performance of a bank and weigh against the best practice bank in the sample (Al-Faraj et al., 1993). The banks located on this frontier are considered to be efficient units whereas the rest are deemed to be inefficient (Yannick et al., 2016). The distance of a bank from the frontier determines the level of banks' inefficiency (Novickytė, and Droždz, 2018). Non parametric approaches include Data Envelopment Analysis (DEA) and Free Disposal Hull (FDH) (Bin Dost et al., 2011).

Each approach has its own advantages and shortcomings with respect to the other. For instance, the stochastic frontier approach allows for random error whereas the data envelopment analysis method does not allow for random error or exceptional performance and this is considered as a major limitation (Liu and Tripe, 2003). On the other hand, parametric approaches require an explicit formation of the production function or cost function of units (Dang-Thanh, 2012). Although the estimation of the production function gives information about confidence intervals and deviations, however, "if the functional form is mis specified, measured efficiency may be confounded with the specification error" (Berger and Humphrey, 1997, p.179). In contrast, the nonparametric approach does not

require any prior assumptions on the functional relationship of inputs and outputs, which makes it more flexible compared to the parametric approach (Charnes et al., 1978; Fare et al., 1994; and Sowlati and Paradi, 2004), and best suits the non- production organizations (Dang-Thanh, 2012). As a result, researchers found out that it is better to use the parametric methods in industries that have well-defined technologies in order to minimize the risk of misspecification. The non-parametric approaches are best applied to industries with imprecise technologies, such as the service sector, due to their simplicity and flexibility (Charnes et al, 1978). According to Savitalkova (2014) non-parametric techniques are more adequate than parametric models to rank the efficiency of banking institutions.

Due to the advantages of non-parametric methods over other methodologies, DEA has gained the interest of both researchers and managers (Varias and Sofianopoulou, 2012) which resulted in the widespread application of this technique. In fact, the most intensively studied sector in the DEA literature is probably the banking sector see for example: Sherman and Gold (1985), Brockett et al. (1997), Bhattacharyya et al. (1997), Titko et al. (2014), Lai et al. (2015), LaPlante and Paradi (2015), Alrafadi et al. (2016), Chaudhary et al. (2016), Naimy and Chukr (2016), Yannick et al. (2016), Du et al. (2017), Eskelinen (2017), Maniati and Sambracos (2017) and Novickytė and Droždz (2018). According to Cooper et al. (2011), 225 applications of DEA have been identified in the banking industry between 1997 and 2010. Furthermore, DEA has increasingly been the most preferred approach for studying the impact of M&As on the efficiency of banking sector (Sufian, 2004; Mat-nor et al., 2006; Tanko, 2008; Singh, 2009; San Ong et al., 2011; Said, 2013; Lai et al., 2015; Chaudhary et al., 2016; and Wanke et al., 2017).

DEA has been used as a new methodology in order to offer new insights (Cooper et al., 2000) into M&A activities which have been constantly evaluated by either event study or accounting ratios which have yielded inconsistent results. DEA has been preferred because it is a simple method (Mahadzir and Hasni, 2009) that can ensure consistent performance assessment (Krishnakumar and Sethi, 2012) and is capable of solving multiple inputs and outputs and provides a complete picture of performance of units under study (Akin et al., 2009). DEA also allows the analysis of whether the DMU is efficient, identifies the causes of inefficiency and how the DMU can improve its efficiency (Řepková, 2014). Furthermore, this methodology has increasingly been preferred for analysing banks' efficiency after M&As

especially if the size of the studied sample is small (Yeh, 1996; Avikran, 1999; Liu and Tripe, 2002; and Sufian, 2008).

The advantages of DEA over other methodologies and the extensive review of literature (presented in this chapter and chapter four) have helped in determining the DEA approach as an appropriate methodology for this study. In addition, DEA has been chosen for the following reasons; Firstly, Lebanese banks operate in a competitive market and the relative efficiency is a key indicator for measuring the performance of banks in competitive market (Gattoufi et al., 2008). Secondly, DEA has been increasingly used by majority of researchers for studying M&As impact on the performance of banks particularly when the sample size to be studied is small (Sufian, 2008). Thirdly, this method is suitable if the banks under study differs in size and in Lebanon these activities take the form of large banks acquiring medium and small sized banks since the merger between the 11 large banks is not permitted by the governor of the Lebanese central bank in order to maintain the competition in the market.

Due to the mixed results obtained from DEA methodology (*Chapter 4, part 3*), six management efficiency ratios were chosen based on the inputs and outputs used in the DEA analysis in an attempt to obtain a more conclusive result. These ratios are non-interest income to number of employees, non-interest income to total assets, net interest income to total assets, net operating income to total assets, net operating income to total equity, and net interest income to total equity ratios.

3.1.4 Ethics Discussion and Consideration

Ethical considerations in research are of great importance and understanding the basics of ethical research is critical because it may affect the research. There are many broad ethical areas that a researcher needs to take into consideration when conducting a research such as, informed consent, voluntary participation, confidentiality and anonymity, and Potential for Harm (Connelly, 1987).

Informed consent is an indispensable part in the research process because it makes sure that any individual willing to participate in the research must fully understand what he is participating in and whether any negative consequences could occur due to his participation. Respondents should be invited to participate in the research and should be informed that they are free to participate or not and that no negative consequences will arise in case they do not want to (Connelly, 2014). Anonymity means that the participants are anonymous which

means that researchers do not know who the participants are, whereas confidentiality requires that researchers do not reveal the identity of participants under any circumstances (Connelly, 2014). Finally, there are many ways where participants could be harmed from their participation; this harm could be physical, social, emotional, or psychological (Connelly, 1987). However, this study is conducted on banks and seeks no information from individuals as it relies on secondary data taken from BILANBANQUES published books, so, no harm is supposed to occur.

Although this study does not involve any contact with individuals but there are other ethical concerns that should be taken into consideration such as plagiarism and academic fraud (Connelly, 1987). Plagiarism involves taking contents from someone else's work and presenting it as one's own, hence proper citation and adequate academic referencing should be paid special attention in order to avoid plagiarism. Another ethical issue is the academic fraud which means that researchers/students may intentionally make up the data, results and even both, or may write inaccurate conclusions on purpose (Connelly, 1987). In this study data will be collected from BILANBANQUES published books and results will be generated using an Open Source Data Envelopment Analysis Software. Therefore, the ethical issues discussed will be taken into consideration when collecting data and generating the results.

3.2 Methodology

This section is divided into two sub-sections. The first provides an overview of the DEA methodology over six subsections; the first defines DEA and its background, the second identifies the two basic models of DEA followed by the mathematical formulation of each model, the fourth presents a review of studies that have used DEA to either measure the efficiency of banks or to measure the impact of mergers and acquisitions on the efficiency of banks, the fifth subsection presents the two approaches of DEA after which the input and output variables of the study are chosen. The second consists of the sample of the study as well as the analysis technique that will be used to generate the results and perform the analysis.

3.2.1 Data Envelopment Analysis

3.2.1.1 Definition and Background

Data Envelopment Analysis is a "relatively new "data oriented" approach for evaluating the performance of a set of peer entities called Decision Making Units (DMUs) which convert

multiple inputs into multiple outputs" (Cooper et al., 2011, 1). This definition eliminates the need for information about prices and assumptions about the weights of inputs and outputs. It also eliminates the need for explicit specification of relations between inputs and outputs. DEA is also defined as a "non-stochastic, non-parametric, linear programming-based method" that measures the relative efficiency of homogeneous entities using the same inputs and outputs (Naimy and Chukri, 2016, p.43). It is an "empirically based methodology that eliminates the need for some of the assumptions and limitations of traditional efficiency measurement approaches" (Bowlin, 1998, p.3).

DEA was first introduced in the literature as a mathematical programming model by Charnes, Cooper, and Rhodes (1978), who built on the earlier work of Farrell (1957). Farrell (1957) stressed on the need for developing some actual measurements of efficiency. He argued that although the attempts that have been made to solve this problem usually produced careful measurements of some or all of the inputs and outputs of the industry, however they failed to combine these measurements into any satisfactory measure of efficiency. Furthermore, the later attempts that have been made to construct "indices of efficiency" which compares the weighted average of inputs with output, have eventually run into index number problems. In response to these problems, Farrell proposed an activity analysis approach that takes into account all inputs and avoids index number problems at the same time. His measures were intended to be general and "applicable to any productive organization from a workshop to a whole economy" (Farrell, 1957, p.254).

Farrell's approach had been restricted to single output cases and his attempts to extend it to multiple outputs have failed to provide what was required for applications to large data sets (Cooper et al., 2011). In response to this, Charnes et al. (1978) extended Farrell's multiple inputs single output measure of technical efficiency to a multiple input multiple output measure under the assumption of constant returns to scale (CRS); That is to say, they developed the CCR DEA model. This model had been extended by Banker, Charnes, and Cooper (1984) to allow for variable returns to scale (VRS) through the use of additional constant variable, the new model is called the BCC DEA model. DEA has been subject to further methodological extensions which resulted in the development of several models such as the advanced Slack-Based Model (SBM), Free Disposal Hull (FDH), and Free Replicability Hull (FRH) models (Cook and Zhu, 2008).

Since the DEA was first developed, it has been extensively applied in performance evaluation of DMUs in different industries such as hospitals, universities, schools, military operations, bank branches, and commercial banks, etc. (Charnes et al., 1994; Adler et al., 2002; Staníčková and Skokan, 2013; He et al., 2018; Henriques et al., 2018; Stefko et al., 2018; Daraio et al., 2019; and Nahangi et al., 2019).

3.2.1.2 DEA Models

Basically, there are two models for DEA: the CCR model and the BCC model. The CCR model was introduced by Charnes, Cooper, and Rhodes (1978) who expanded Farrell's efficiency measurement concept from multiple inputs and one output to multiple inputs and multiple outputs (Lin et al., 2009). The CCR evaluates efficiency and recognizes the source and level of inefficiency (Alrafadi et al., 2016). This model is designed with the assumption of constant return to scale, which means that outputs change in direct proportion to the change in inputs regardless of the size of the DMU (Liu and Tripe, 2003). The CRS assumption also indicates that there is no relationship between the DMU's scale of operations and efficiency, and it delivers the overall technical efficiency (Sufian, 2004).

The CRS assumption is only suitable when every included DMU is operating at best possible level. However, this may not be possible in all the cases as DMUs in practice might face either economies or diseconomies of scale (Chaudhary et al., 2016). Therefore, if the CRS assumption is applied in the case where not all DMUs are operating at best possible level, the computed technical efficiency will be corrupted by scale efficiencies (Sufian, 2004). In order to overcome this issue, Banker, Charnes and Cooper (1984) extended the model through allowing for variable returns to scale (VRS) and referred to the new model as the BCC model. Further, the new model decomposed the technical efficiency into pure technical efficiency and scale efficiency (Chaudhary et al., 2016).

Both models have been used individually or mutually to study the efficiency of banks. Some studies favour the CRS assumption over the VRS as it allows the comparison between small and large banks (Noulas, 1997). Using the VRS assumption in a sample which includes large banks increases the possibility for these banks to appear as being efficient simply because there are no truly efficient banks (Berg et al., 1991). Further, Liu and Tripe (2003) mentioned that that under VRS each unit is compared only against other units of similar size, rather than against all other units. Hence, the VRS is more suitable when the samples are large. Soteriou

and Zenios (1999) argue that when applying the VRS assumption caution must be taken for two reasons; the first is that the orientation of the model (whether input or output orientation) becomes important, and the second is that the use of weights restriction under this assumption may lead to some other problematic results (Allen, 1997).

On the contrary, other studies argue in favour of VRS rather than CRS. For instance, Casu and Molyneux (2003) argued that CRS is only appropriate when all DMUs are operating at an optimal scale, which might not be the case if there is imperfect competition or any regulatory requirements (Alrafadi et al., 2016). According to Stanickova and Skokan (2013) VRS provides a more realistic expression of economic reality and factual relations existing in countries, and thus allow researchers to better identify more efficient units. The VRS is more preferred than the CRS because it envelops the data points more tightly than the CRS and thus produces technical efficiency scores greater than or equal to the measures calculated under the CRS assumption (Alrafadi et al., 2016). Another preference for the VRS over the CRS assumption is that when the banking system is more developed than the banks are more likely to face non-constant returns to scale (Wheelock and Wilson, 1999).

In this study, as in Osman et al. (2008), Gattoufi et al. (2008), Naimy and Chukri (2016) and Maniati and Sambracos (2017) among others the efficiency of banks undergone through merger and acquisition activities in Lebanon will be obtained under both CRS and VRS assumptions.

DEA models are also classified as input-oriented, output-oriented, or additive (both inputs and outputs are optimized in the best interest of the evaluated unit) based on the direction of the projection of the inefficient unit onto the frontier surface (Osman et al., 2008). Under the input-oriented model technical efficiency is defined in terms of a minimum set of inputs needed to produce a given output, or in terms of maximum output obtainable from a given set of inputs under the output-oriented model (Charnes et al., 1994). In the first model, DEA aims at maximising the outputs while constraining the inputs whereas in the second model the aim is to minimize the inputs while keeping outputs at their current level (Zhang and Garvey, 2008). By doing that, the most efficient units will envelop an optimal frontier whereas the remaining units are considered as relatively inefficient (Dang-Thanh, 2012).

The input-oriented DEA models are the most frequently used in measuring bank efficiency (Yang, 2009; Nigmonov, 2010; Zreika and Ekanj, 2011; Arshinova, 2011; and Titko et al.,

2014). According to Osman et al. (2008), the input-oriented DEA model is frequently used because it takes into consideration the reduction in the cost for a given bank's operations. However, the most common reason is that bank managers have higher control over managing inputs rather than outputs (Fethi and Pasiouras, 2010; and Maniati and Sambracos, 2017). This is an arguable point of view for Ouenniche and Carrales (2018) who considered that some outputs could be improved by adopting a more focused commercial strategies and marketing campaigns. They also expected to have more important insights from the output-oriented DEA analysis. However, it was concluded that the results obtained from output-oriented approach are in line with the input-oriented ones in terms of scale efficiency. In line with this, Coelli et al. (2005) found no difference in the results obtained under both input and output-oriented DEA models in terms of technical efficiency under the CCR approach. Likewise, other researchers found that input-oriented and output-oriented DEA models generate similar results (Ramanthan, 2007; Othman et al., 2016; and Maniati and Sambracos, 2017), and thus no misleading interpretations of DEA score if either one model is chosen (Ramanthan, 2007). This conclusion was derived after using both input-oriented and output-oriented models to calculate DEA efficiency score for 55 banks in the Gulf Cooperation Council where both models generated similar results.

Based on the above findings and the reviewed literature (*section 2.4*), this study will adopt the input-oriented approach under both CCR and BCC DEA models to analyse the efficiency of banks involved in merger and acquisition activities in Lebanon.

3.2.1.3 Mathematical Modelling of DEA

DEA is defined by Jacobs (2001) as "the ratio of the weighted sum of outputs of a trust to its weighted sum of inputs" (p.106). Efficiency is defined as the ratio of the actual quantity of output, relative to a maximal feasible quantity of input (Bryce, 1996). To put these words into application, suppose that there are ***n*** DMUs (in this case banks) to be assessed, and each DMU uses up varying quantities of ***m*** different inputs to attain ***s*** different outputs. The efficiency scores for a DMU_0 can be achieved by solving the following mathematical programming problem: (Cooper et al., 2011)

$$max_{u,v}\ \theta_0 = \frac{\sum_{r=1}^{s} u_r Y_{rj}}{\sum_{i=1}^{m} v_i X_{ij}} -$$

Subject to the following constraints:

$$\frac{\sum_{r=1}^{s} u_r Y_{rj}}{\sum_{i=1}^{m} v_i X_{ij}} - \leq 1 \qquad j = 1,2, \dots, n$$

$$u_r, v_i \geq 0 \ \ \forall r, i$$

Where:

Y_{rj} = is the amount of jth output produced by the DMU0

X_{ij} = is the amount of the ith input used by the DMU0

u_r = weight allocated to the output

v_i = weight allocated to the input

s = number of outputs of the unit

m = number of inputs to the unit

n = number of units

θ = this symbol is used to denote the efficiency measure (score) consistent with the original DEA literature.

In DEA some units are considered to be efficient while others are regarded as non-efficient (Alrafadi et al., 2016). "The best practice units are relatively efficient and are identified by a DEA efficiency rating of θ = 1. The inefficient units are identified by an efficiency rating of less than 1 (θ < l). DEA will provide an efficiency rating that is generally denominated between zero and 1, which will interchangeably be referred to as an efficiency percentage between the range of zero and 100%. The upper limit is set as 1 or 100% to reflect the view that a unit cannot be more than 100% efficient." (Sherman and Zhu, 2006, p.59).

This problem yields to an infinite number of solutions since if (u^*,v^*) is an optimal solution, then (αu^*,αv^*) is also optimal for any positive α. Using this fact, Charnes and Cooper (1962) proposed a linear transformation of this optimization problem, and called it the CCR model. Given that the resultant problem is linear, we are now able to divide the optimization into sub-problems by which we choose to vary the input only or the output only in order to

achieve the maximization. However, for the purpose of this study, the input-oriented model will be adopted

The transformed linear input-oriented programming problem is expressed as:

$$\max Z_0 = \sum_{r=1}^{s} \mu_r Y_{r0}$$

Subject to:

$$\sum_{i=1}^{m} \mu_r Y_{rj} - \sum_{i=1}^{m} v_i X_{ij} \leq 0$$
$$\sum_{i=1}^{m} v_i X_{i0} = 1$$
$$\mu_r, v_i \geq 0 \ \ \forall r, i$$

A dual of this problem had already been suggested by Farrell (1957) and is as such:

$$\theta^* = min\theta$$

Subject to:

$$\sum_{j=1}^{n} \lambda_j X_{ij} \leq \theta X_{i0} \qquad \forall i$$
$$\sum_{j=1}^{n} \lambda_j Y_{rj} > Y_{r0} \qquad \forall r$$
$$\lambda_j \geq 0 \qquad \forall j$$

Now adding a constraint on the above dual problem will transform it into the BCC model.

It is represented as such:

$$\theta^* = min\theta$$

Subject to:

$$\sum_{j=1}^{n} \lambda_j X_{ij} \leq \theta X_{i0} \qquad \forall i$$
$$\sum_{j=1}^{n} \lambda_j Y_{rj} > Y_{r0} \qquad \forall r$$
$$\sum_{j=1}^{n} \lambda_j = 1$$
$$\lambda_j \geq 0 \qquad \forall j$$

The use of this model will provide the BCC efficiency scores (referred to as pure technical efficiency scores) for each DMU (Alrafadi et al., 2016).

3.2.1.3 Empirical studies

Data Envelopment analysis has been extensively used in the literature for evaluating banks' efficiency using different models, approaches, and input-output variables (Maniati, 2017).

This section will review some of these studies giving the main attention to the models, approaches, and input-output variables that have been used. The reviewed studies are divided into two sections; the first includes studies that have used DEA to measure the efficiency of

banks, whereas the second deals with studies using DEA to examine the impact of mergers and acquisitions on the efficiency of banks.

3.2.1.3.1 Studies using DEA to measure the efficiency of banks

Sherman and Gold (1985) argued that there is a need to use analytic techniques that provide insights beyond those given from financial ratio analysis when the efficiency of bank branches is intended to be measured and evaluated. Hence, they were the first to apply the DEA method to measure the efficiency of banks (Brockett et al., 1997; Saad and El-Moussawi, 2009; Thagunna and Poudel, 2012; Paradi and Zhu, 2013; and Henriques et al., 2018) as it provides useful insights in locating inefficient branches by explicitly considering the mix of services provided and the resources used to provide these bank services.

In their study "Bank branch operating efficiency: Evaluation with Data Envelopment Analysis", Sherman and Gold (1985) used the CRS model to analyse the operating efficiency of 14 branches of a saving bank in the United States. They employed three inputs and one output. The choice of inputs and outputs was based on the production approach. The inputs are employees, expenses and space, and the only output is the number of transactions. The analysis of their study revealed that six branches out of the 14 were operating inefficiently. The results of the DEA were found, by the management of the bank, to provide meaningful insights that could not be obtained using other methods which concentrates on ways to improve productivity. Based on the results, it was suggested that DEA represents a beneficial complement to other techniques for improving the efficiency of bank branches.

Aly et al. (1990) used the CCR model to measure the technical, scale, and allocative efficiency of 322 independent banks in USA. The inputs chosen for the study are the number of full-time staff, fixed asset, capital and loanable fund, whereas the outputs are real estate loan, commercial and industrial loan, consumer loan, miscellaneous loan, and current deposit. Another early study was conducted by Yue (1992) who evaluated the relative efficiency of 60 Missouri commercial banks for the period 1984 to 1990 using two alternative DEA models: the CCR model and the additive DEA model. As the inputs and outputs in DEA represent the role and activities of the bank, the researcher followed the intermediary approach. The chosen outputs are interest income, non-interest income and total loans, as they represent the banks' revenues and major business activities. On the other hand, banks' inputs include interest expenses, non-interest expenses, transaction deposits, and non-transaction deposits, which are the source of loanable funds for the bank to invest in assets.

Elyasiani and Mehdian (1995) used DEA to compare the efficiency performance between small and large U.S. commercial banks. They measured the technical efficiency of 150, randomly chosen, small banks and 150 medium and large banks. Following the intermediation approach, the inputs chosen are; time saving deposit, current deposit, fixed assets and capital lease, and the number of full-time staff, while the outputs include investment, real estate loan, commercial and industrial loans, and miscellaneous loan.

Staub et al. (2010) examined the efficiency of Brazilian banks in terms of cost, technical, and allocative efficiencies during the period between 2000 and 2007. To measure the efficiency of banks, they employed the intermediation approach with three inputs and outputs. The inputs include purchased funds, capital (operational expenses net of personnel expenses) and labour (personnel expenses), whereas the outputs are deposits, loans and investments. The results of the analysis suggest that Brazilian banks have low levels of economic efficiency compared to banks in other countries particularly Europe and US.

Dang-Thanh (2012) used an output-oriented CRS model to analyse the performance of the Vietnamese banking system. The value of total deposits was used as an input, while the output is the value of credits, value of gross domestic product of the nation, and value of money supply to the financial market in the year.

Thagunna and Poudel (2012) analysed the efficiency levels of banks in Nepal using both output oriented CCR and BCC models. They have followed the intermediation approach with Total Deposits, Interest Expense, and Operating non-interest expense as inputs, whereas the outputs are Total Loans (Loans, Advances and Bills Purchase), Interest Income, and Operating non-interest income. The study revealed no significant differences between the results of CCR and BCC models. Overall, the efficiency level of banks in Nepal is found to be relatively stable.

Varias and Sofianopoulou (2012) measured the efficiency of 19 biggest commercial banks in Greece in 2009 using the input oriented VRS model. The choice of input and output variables was based on a combination of intermediation approach (for inputs) and the Sealey and Lindley (1977) approach (for outputs). The inputs used are; interest expenses/deposits, other overhead expenses/fixed assets, and personnel expenses/total assets. The outputs are loans, other earning assets, and deposits.

Yannick et al. (2016) assessed the technical efficiency of 14 banks in Côte d'Ivoire for the period of 2008 to 2010. Following the intermediation approach with loans as an output, and deposits as an input, and taking into consideration both the CRS and VRS DEA models, their analysis indicated that Ivorian banks do not operate efficiently in terms of loans allocation. Their analysis attributed the source of this inefficiency to the incompatibility of the production scale.

Maniati and Sambracos (2017) examined the technical efficiency of 71 banks operating world-wide in the maritime sector from 2005 to 2010 using both CRS and VRS models. They have used total expenses (excluding staff cost), staff cost and deposits as inputs versus only one output which is net shipping loans as it best reflects the profitability of the banks. The findings of their analysis indicated that most banks are technically inefficient with a technical efficiency score higher under VRS model than under the CRS.

Henriques et al. (2018) used data envelopment analysis to evaluate the efficiency of 37 Brazilian banks for the period 2012 to 2016. Using the intermediation approach in the selection of inputs and outputs, the results reveal that large banks are not necessarily the most efficient ones, and that the efficiency of the banking sector can be increased when adopting policies that increase the participation of small banks.

Ram and Messing (2019) examined the technical efficiency of 13 commercial banks in Ethiopia for the period 2010 to 2017 using both CRS and VRS DEA models. Their study revealed that 6 out of the 13 banks are efficient banks under constant return to scale, while 12 banks are efficient under variable return to scale.

Although DEA has been extensively used in the literature to measure the efficiency of banks in countries all over the world, however the empirical studies focusing on Lebanese banks have been quite few. As far as it is known, there are five published studies that have implemented DEA to measure the efficiency of Lebanese banks.

The most recent study in the Lebanese context, as far as it is known, is the one conducted by Naimy and Chukri (2016) where they implemented the Data Envelopment Analysis model to measure the efficiency and productivity of the Lebanese banking sector after the 2007 financial crisis and the 2011 Arab Spring. They computed the technical efficiencies of 24 Lebanese commercial banks for the years 2008, 2011 and 2013 using both the BCC and the CCR Models. Following the intermediation approach, which assumes that the bank collects

deposits to transform them into loans and investments using labour and capital factors, they chose number of employees, total interest expense and number of branches as inputs versus total interest income and total non-interest income as outputs. Their analysis revealed that most banks recorded better efficiency results in 2013 than in either 2011 or 2008 under both the CCR and BCC models.

With the aim of identifying whether banks are working at full efficiency or not and to detect the changes in efficiency for banks operating in Lebanon after 2007 financial crisis, the data envelopment analysis has been applied to 40 banks operating in Lebanon. Zreika and Elkanj (2011) measured the technical efficiency of the banks over the two sub-periods 2002-2006 and 2006-2009. Following the production approach of DEA, they used banks' deposits and loans as outputs and labour and capital as inputs. The results of their analysis revealed that the efficiency of banks have increased after the financial crisis in small, medium, and large banks. However, in small banks the technical efficiency recorded the lowest scores and medium sized banks have struggled with pure technical efficiency. As for large banks, they are ranked as the most efficient in terms of technical efficiency, scale and pure technical efficiency despite of the decrease in scale efficiency scores. Furthermore, most of the large banks are found to be operating at a decreasing return to scale whereas, most of small and medium banks are operating at an increasing return to scale. According to these findings, encouraging mergers and acquisitions among small and medium sized banks may result in great benefits to the Lebanese banking sector. The researchers mentioned that they have used unbalanced data due to missing data for some banks, which questions the reliability of the analysis, as missing data have the potential of severely biasing the findings of the analysis particularly when aimed at evaluating performance (Egger and Hahn, 2010).

In the same context, Saad and El-Moussawi (2009) used CCR DEA approach and stochastic frontier analysis to assess the cost efficiency of Lebanese commercial banks. Their study included a sample of 43 commercial banks over a period from 1992 to 2005. In their choice of inputs and outputs, the researchers followed the intermediation approach proposed by Sealey and Lindley (1977). Earning assets, other earning assets, and off-balance sheet were the three outputs that were used to measure the production of the banks. On the other hand, deposits, fixed assets, and work were the three factors of production. The result reveals an improvement in the cost efficiency of Lebanese Banks.

In addition to the above studies, Osman et al. (2008) used Data Envelopment Analysis approach to measure the relative performance of Lebanese banks. This study and the study conducted by Awdeh and EL-Moussawi (2011) who also implemented DEA to calculate the various components of the productive efficiency of Lebanese banks will be further discussed in the following section as they deal with bank mergers and acquisitions.

3.2.1.3.2 Studies using DEA to measure the impact of M&As on banks' efficiency

Wanke et al. (2017) used two-stage input-oriented CRS model to analyse the efficiency of South African banks. They used both the production and the intermediation approach to identify banks' inputs and outputs. Under the production approach, they used employees, fixed assets, and operational expenses as inputs with deposits and loans as outputs. On the other hand, deposits and loans are treated as inputs under the intermediation approach and are minimized to attain certain level of productive outputs such as interest and non-interest income.

Chaudhary et al. (2016) used the input-oriented CRS model to analyse the impact of M&As on the efficiency of banking sector in Pakistan. They used three different input-output approaches; Income-Based model, Loan-based Model and Intermediation Approach in order to investigate the efficiency from different angles. The inputs chosen under the intermediation approach are labour, physical capital and financial capital, while the outputs are loan & advances and investments. In the same geographical context, Bin Dost et al. (2011) used both input-oriented CRS and VRS models to assess the impact of mergers and acquisitions on two banks in Pakistan. Based on their review of literature, availability of data, and theoretical consideration they employed the intermediation approach with deposits and assets as inputs, and investments and advances as outputs.

Said (2013) analysed the impact of M&As on the efficiency of merged banks in Tunisia using financial ratio analysis and Data Envelopment Analysis approach. Under the DEA approach, the input-oriented model assuming a variable return to scale was used to determine the efficiency scores. Further, the researcher adopted the intermediation approach as it was found to be more relevant for financial institutions. The inputs chosen for the analysis are capital (operational expenses net of personnel expenses), labour (personnel expenses), and purchased funds, whereas the outputs included are real estate loans, commercial and industrial loans, consumer loans, and all other loans.

Hahn (2004) used an input-oriented DEA model to analyse the impact of M&As on the performance of Austrian banks. The intermediation approach was chosen with two inputs and two outputs. The first input is total costs which include interest expenses, non-interest expenses, and employee expenses, while the second input is total deposits. The chosen outputs include total loans and other earnings.

Sufian (2004) used input-oriented DEA approach to analyse the technical and scale efficiency of Malaysian commercial banks that have undergone through merger activities. The intermediation approach has been chosen with three inputs and two outputs to analyse the technical and scale efficiency of Malaysian commercial banks before, during and after merger and acquisition activities. The inputs used are capital, labour, and deposits, while the outputs are total loans and Investment and dealing securities. Likewise, Mat-nor et al. (2006) used the intermediation approach to analyse the impact of M&As on Malaysian banks. However, the inputs and outputs chosen were different. As for the inputs, total deposit, interest expense and overhead expense were chosen whereas the outputs are total loan and total income.

Mahadzir and Hasni (2009) used labour, total deposit and fixed assets as inputs and total loans, other earning assets and other operating incomes as outputs to analyse the impact of merger on efficiency and productivity in Malaysian commercial banks. San Ong et al. (2011) used interest expenses and non-interest expenses as inputs, and non-interest income as outputs. Following the intermediation approach, Abdul Kadir (2011) used overhead expenses (Personnel, Marketing, Administrative and General); interest expenses, deposits from customers and taxation as inputs whereas the outputs were cash and Short-term Funds, deposits with the banks and financial institutions, loans and advances, total securities and interest income and revenue. These studies share the same geographical context and methodology however different input and output combinations were used. This may be due to the fact that there is little agreement in the literature over what a bank produces and what means efficiency (Gattoufi et al., 2004).

Liu and Tripe (2003) used the CCR DEA model to investigate the impact of mergers and acquisitions on the efficiency of 6 banks in New Zealand. They used the intermediation approach with three models of input and output combinations. The inputs used in the three models are interest expense and non-interest expense, but the outputs differ. In the first model, net interest income and non-interest income are used as outputs; the second model

uses customer deposits, net loans and advances operating income, whereas the third model uses deposits, loans and advances, and operating income as outputs.

The most recent published study in Lebanon with regards to the impact of merger and acquisition, as far as it is known, is conducted by Awdeh and EL-Moussawi (2011). They examined the effect of M&As on the profitability and efficiency of banks in Lebanon during the period between 1994 and 2002 using standard ratios and the DEA methodologies. With respect to the DEA methodology, they have used the production approach with interest paid, staff expenses, and general operating expenses as inputs versus total earning assets, total deposits, and off-balance sheet items as outputs. Comparing the performance measures before and after bank mergers they observed insignificant improvement in profitability, efficiency, and capitalisation. They also found some deterioration in productive efficiency and considerable increase in credit risk. However, they noticed an increase in both growth and market share.

Osman et al., (2008) used the input-oriented CRS and VRS DEA models to measure the relative performance of Lebanese banks from 1997 to 2004. After conducting their intensive review of the literature on DEA performance in the banking sector they followed the intermediation approach as it was found to be the most frequently used approach. This approach is usually used with general expenses, interest expenses and deposits as possible inputs and assets, loans and income as possible outputs. Following the literature, they have used interest expenses, general expenses, total deposits, number of employees, and number of branches as inputs, and interest income, non-interest income and total loans as outputs. The researchers have added the number of branches to their choice of inputs in an attempt to capture the size and working environment of the banks. They stated that the more branches a bank has the greater is the accessibility to customers.

Gattoufi et al. (2008) used an output-oriented DEA approach under both CRS and VRS assumptions to track the impact of mergers and acquisitions on the efficiency of commercial banks in MENA Countries. Their study includes a sample of 24 merged banks in Lebanon. As the banking sector in MENA is still traditional in its form, the researchers adopted the intermediation approach with two inputs and two outputs. The inputs are the interest expenses and operating expenses. The outputs considered in the study are interest incomes and operating incomes. The results of the analysis show a positive, though limited, impact of M&A on the overall efficiency of the commercial banking industry in MENA region.

3.2.1.4 DEA Approaches

Perhaps the most important step in using DEA is the selection of appropriate inputs and outputs (Yue, 1992). This is partially true for banks because there is an on-going debate in the banking literature over the appropriate inputs and outputs for banks; According to Sufian (2008) the definition and measurement of inputs and outputs in the banking sector remains a contentious issue among researchers. Because of the absence of a defined rule for choosing the inputs and outputs of banks, different researchers have used varied input-output models depending on the requirements of their studies and the role of the banks under study and their activities (Chaudhary et al., 2016). Likewise, Bergendahl (1998) stated that "There have been almost as many assumptions of inputs and outputs as there have been applications of DEA" (p. 235).

Previous applications of DEA to banks generally have adopted one of two approaches to justify their choice of inputs and outputs, the production approach and the intermediate approach (Sealey and Lindley, 1977; Sherman and Gold, 1985; Berger and Humphrey, 1992; Yue, 1992; Miller and Noulas, 1996; Avkiran, 1999; Bin Dost et al., 2011; Abdul Kadir, 2011; Zreika and Elkanj, 2011; Awdeh and EL-Moussawi, 2011; Thagunna and Poudel, 2012; Said, 2013; Naimy and Chukri, 2016; and Yannick et al., 2016).

The production approach views banks as firms that employ labour and capital to produce loans, deposits, and other assets to customers (Wanke et al., 2017), thus possible inputs may include labour, material, space, information systems and possible outputs may include number of transactions, documents processed or number of deposits and loan accounts (Das and Ghosh, 2005). However, under the intermediation approach banks are considered as financial intermediaries that transform deposits, purchase funds, and labour into loans and other assets (Wanke et al., 2017), so possible inputs may include general expenses, interest expenses and deposits, whereas possible outputs may include assets, loans and income (Osman et al., 2008). More specifically, deposits are treated as an input under the intermediation approach and an output under the production approach.

According to Berger and Humphrey (1997), the production approach might be more suitable for studies evaluating the efficiencies of branches, since bank branches basically process customer documents and bank funding, whereas the investment decisions are mostly not under the control of branches. Whereas, the intermediation approach might be more

appropriate for evaluating the efficiency of the entire financial institutions as it is inclusive of interest expenses which compose a large portion (as high as one-half to two-thirds) of bank total costs depending on the phase of the interest rate cycle (Berger and Humphrey, 1997; Sathye, 2001; Sufian, 2004; Pasiouras, 2008; and Said, 2013).

After an intensive review of the DEA literature, it was found that the intermediation approach is the most frequently used in the banking sector (Yue, 1992; Elyasiani and Mehdian, 1995; Thagunna and Poudel, 2012; Said, 2013; Yannick et al., 2016; and Naimy and Chukri, 2016), as it is found to be more appropriate for evaluating the efficiency of the entire financial institutions (Said, 2013). Furthermore, the banking sector in Lebanon is still traditional in its form and is viewed by the central bank as a main channel for funds which needs ongoing development efforts (Gattoufi et al., 2008). Thus, the intermediation approach which views bank as an intermediary of funds between savers and investors is convenient for the study. Therefore, this study adopts the intermediate approach (described in details in Berger and Humphrey (1997) to assess the impact of mergers and acquisitions on the efficiency of banks in Lebanon.

3.2.1.5 DEA Input and Output Variables

Following the reviewed literature, the intermediation approach is most frequently used with deposits, interest expenses and non- interest expenses as inputs and loans, interest incomes and non-interest incomes as outputs see for instance: Yue (1992), Yildirim (2002), Avkiran (2004), Kao and Liu (2004), as it assumes that the bank collects deposits using the labour and capital to transform them into loans and investments (Naimy and Chukri, 2016).

Hence, the input variables chosen in this study are interest expenses, general expenses, total deposits, and number of employees. Whereas the output variables are interest income, non-interest income and total loans (see table 1 below). The input-output variables chosen are in line with the variables chosen in the Gattoufi et al. (2008) and Osman et al. (2008) studies except for the number of branches.

Table 3. 1 DEA Inputs and Outputs for Measuring Bank's Performance

DEA Inputs	Interest expenses, General expenses, Total Deposits, and Number of employees.
DEA outputs	Interest income, Non-interest income, and Total loans.

Source: authors own

Starting with bank's inputs, interest expenses include deposits and similar accounts from banks and financial institutions, deposits from H.O. branches, parent co. sister inst & sub. deposits from customers and creditor accounts, deposits from related parties, cash contribution to capital and subordinated loans, certificates of deposits, bonds and financial instruments with fixed income, other interest and similar charges, and interest on leasing contracts. General expenses include staff expenses, and other operating expenses. Total deposits consist of sight deposits, time deposits, saving accounts, net creditor accounts, debtor accounts and cash collateral and, related parties accounts. The number of employees represents the number of staff operating within Lebanon. The bank's output consists of Interest income which includes Lebanese treasury bills, deposits and similar accounts in banks and financial institutions, deposits in H.O. branches, parent co., sister inst & sub., bonds and financial instruments with fixed income, loans and advances to related parties, other interest and similar income, and interest on leasing contracts. Non-interest income consists of net commission received**,** income from variable securities**,** profit on marketable securities**,** profit on financial fixed assets**,** profit on foreign exchange**,** profit on financial instruments**,** other revenue**,** net extraordinary income. The last output is total loans which include commercial loans, other loans to customers, overdraft accounts, net debtor accounts, creditor accounts and cash collateral, loans and advances to related parties, and doubtful loans.

3.2.2 Ratio Analysis

To provide more support to the above results, six management efficiency ratios were chosen based on the inputs and outputs used in the DEA analysis. Despite the limitations mentioned in chapter 3 (subsection 3.1.2), however, it is still considered to be a convenient and reliable analytical tool. The ratios used are: Non-interest income to number of employees, Non-interest income to total assets, Net interest income to total assets, Net operating income to total assets, Net operating income to total equity, and Net interest income to total equity.

The non-interest income to number of employee's ratio measures the amount of non-interest income generated per employee. The higher this ratio the more the earnings the bank generates per employee. According to Bodla and Verma (2007), this ratio is among the significant factors influencing bank profitability. Non-interest income to total assets ratio indicates how efficient the firm is using its assets to generate non-interest income. Thus, a

higher ratio indicates how efficient the firm is using its assets to generate non-interest earnings.

Net interest income to total assets ratio indicates how efficient the firm is using its assets to generate interest income. Net interest income is the excess of interest earned over interest expended (Gowri and Malepati, 2016). A higher ratio indicates that the bank is generating more profit relative to its assets. The net operating income to total assets ratio indicates the efficiency in the utilization of assets to generate profit, a higher ratio denotes income-generating capacity and efficiency of management.

The net operating income to total equity ratio indicates how efficient the firm is using its equity to generate earnings. A higher ratio indicates the efficiency in the utilization of equity to generate profit. The net interest income to total equity ratio indicates how efficient the firm uses its equity to generate earnings. The higher this ratio the higher the profits generated.

The ratios of net interest income to total assets, net operating income to total assets, and net operating income to total equity are considered as the most common measure of bank performance (Abbas et al., 2014; Adam, 2014; Nuhiu et al., 2017; and Gowri and Malepati, 2017) and often described as a primary ratio in evaluating the financial performance of banks (Adam, 2014).

3.2.3 Data sample and analysis technique

3.2.3.1 Sample Study

Tracking back the history to 1991, Lebanon have witnessed many economic and political crises, and its banking sector went through many global and local turmoil which left the banks lagging behind several factors as size, technology, and competition (Hakim and Neaime, 1998). In response to these factors and the revival needs of the country, coupled with the central bank limitation on the number of branches that can be opened by a bank, the banking sector engaged in merger and acquisition activities after realizing that it is the most efficient way to expand and grow in size (FFA private bank, 2015).

The Central bank facilitated these processes with financial incentives and managed them under a law numbered 192 in 1993, under which Lebanon witnessed the completion of more than 35 bank mergers and acquisition, with the least but not last operation taken place in June 17, 2017 where BLOM bank S.A.L fully acquired all assets and liabilities of HSBC bank

Middle East Limited - Lebanon **(**The Lebanese International Business Council, 2017). The mergers and acquisitions that have taken place among banks in Lebanon since 1996 till the current day are provided in table 1.1 in section 1.5 in the introduction chapter

The objective of this study is to cover all bank merger and acquisition activities that had taken place in Lebanon. However, as the BILANBANQUE published books are only available for the year 2015, and as the data of the following years are not available for all banks included in the study, this study will cover the period from 1996 till 2015. There was an attempt to obtain the data from other sources such as individual bank statements available on each banks' websites, however it was difficult to find all the information required where some banks post data up to only 5 years and thus data prior to this are not available, further the data for recent years found were not audited and thus may be subject to further amendments as stated by banks. Further, the cost of obtaining data from other sources was not affordable. Therefore, this study was left with one source of data which is the BILANBANQUE published books. Bilanbanques books are published by the Bankdata financial services company that was established in Lebanon in 1986, and managed to establish a solid reputation of being a unique, independent and trustworthy source of information on Lebanese banks. These books could be found in bank branches and some University Libraries in Lebanon. However, the largest series of these books are found at the American University of Beirut and are only allowed to be used within the premises of the AUB library.

Further, Bank Al-Madina which acquired Credit Commercial bank in 1998 is excluded from the study as the bank had been closed. The merger of United Bank of Lebanon and the acquisition of Capitalia bank by Banca Di Roma in 2002 were excluded from the study because the data required are not available. Add to that, the Corporate Finance House group (CFH) that had been acquired in 2014 by First National Bank is excluded from the sample because Islamic banks do not handle earned or paid interest. This leaves the study with 29 banks**.** Furthermore, as this study compares the results based on a 3 years period before M&A and 3 years post M&A, merger activities that had taken place before the year 1999 and beyond 2012 are excluded which leaves the study with 11 merger activities.

Therefore, the sample study in this investigation includes the 11 mergers and acquisitions that have taken place in Lebanon from 1999 till 2012. It is worth noting that, the merger and

acquisition activities are "full mergers" which means that the acquiring banks have fully absorbed their targets and formed one entity after the merger.

3.2.3.2 Sample description

The sample study intended to be covered in this investigation includes all banks involved in merger and acquisition activities during the period from 1999 till 2012. After the exclusion of some banks as mentioned in the above section, this section provides a description of the banks included in this study.

1. Fransabank: It was first established in Beirut, in 1921, as a full branch of one of the major French banks, Crédit Foncier d'Algérie et de Tunisie (C.F.A.T.). Fransabank acquired United Bank of Saudi & Lebanon S.A.L. in 2001. It also acquired all the shares of Banque de la Békaa S.A.L. in 2006 and then sold it to Bank of Sharjah to become the Emirates bank of Lebanon or Emirates Lebanon Bank in 2008. It also acquired Ahli International Bank S.A.L. in 2014 (Fransabank, 2019). The data of Ahli international bank for the years from1996 till 1999 are unavailable, however as the required data is 3 years before and after the year of merger which in this case year 2014, the missing data will not affect the analysis. However, as the merger occurred in year 2014 and the period of the study ends in 2015 then the data needed are out of the studied period and thus will be excluded.
2. BLC Bank: previously named by Banque Libanaise pour le Commerce S.A.L.., started its banking activities in 1950. It was merged with Union Bank of Lebanon (UBL) Group in 2000, and was acquired by the Qatar Supreme Council for Economic Affairs and Investment which increased its capital by 100 million dollars in early 2006. United Bank of Lebanon was created in 1997 following the mergers of the following three small banks; Ark financial group merged with Litex Bank in 1998. Then Unibank merged with Ark Financial Group in 1998. After which Al-Moughtareb Bank & National Trust Bank merged under United Bank of Lebanon in 1999. This bank was merged in 1999 and then fully acquired in 2000 by BLC. So as this bank started its activity in 1997 and fully acquired in 2000, the data of this bank are available for the two years period 1998 and 1999. In 2009, BLC Bank acquired 100% of Lati Bank shares. These activities resulted in BLC bank to be ranked as an Alpha Group Bank in Lebanon in 2009 (BLC Bank, 2019).

3. Société Générale de Banque au Liban: the bank was known as SGLEB and then by SGBL from 2001 till the current day, was established in 1953. It acquired Globe Bank S.A.L. in 1992 and Banque J. Geagea S.A.L. in 1997. The bank further acquired Inaash Bank S.A.L. in 2000, where the latter had acquired Lebanese Pakistani Bank in 1997. Further, SGBL acquired certain assets and liabilities of the Lebanese Canadian Bank (LCB) in 2011, thus strengthening its position among the top-rated banks in Lebanon (SGBL, 2019).
4. Credit Libanais Banque: was established in 1961, as a Lebanese joint stock company. The bank acquired both First Phoenician bank and Capital Trust bank in 1994 (Credit Libanais, 2019). However, these activities are not included in the study because they are out of the studied period which starts from 1996.
5. Bank Audi S.A.L.: was founded in 1830, and was incorporated in its present form in 1962 as a private joint stock company with limited liability. On 29 March 2004, Bank Audi signed a merger acquisition agreement with Banque Saradar, a US$ 2 billion assets bank, in a transaction deemed the largest "Mergers and Acquisitions" deal of its time in the MENA region (Bank Audi Group, 2019). The two banks merged under the name of Audi-Saradar Group.
6. Bank of Beirut was founded in 1963 and was called Reality Business Bank S.A.L. and then renamed as Bank of Beirut S.A.L. in 1973. In 2002, the bank acquired Beirut Riyad Bank S.A.L. which is a medium-sized Lebanese bank (Bank of Beirut, 2019).
7. Intercontinental Bank of Lebanon (IBL): In 1961, the Bank was incorporated as a Société Anonyme Libanaise (joint stock Company) under the name “Development Bank S.A.L.”. In 1999, the Bank acquired the total share capital of BCP Oriel Bank, and consequently all branches of the acquired bank are to this day operating under Intercontinental Bank of Lebanon (IBL, 2019).
8. Byblos Bank: the bank was established in 1950 under the name Société Commerciale et Agricole Byblos Bassil Freres and Co. And then the company changed its name to Byblos bank S.A.L. in 1963 after the registration with Central bank of Lebanon. In 2001 the bank acquired Wedge Bank Middle East's Lebanon branch. It also acquired the assets and liabilities of ABN AMRO Bank N.V.'s Lebanon branch in 2002. In 2008, the bank also acquired Unicredit Banco di Roma's Lebanon branch. Moreover, Byblos bank has also acquired Banque Pharaon and Chiha, Lebanon's oldest bank, in 2016. However, the latter activity is not included in the study as the period of the study ends in 2015 (Byblos Bank, 2019).

9. BankMed: Bankmed's roots date back to 1944 when it was first established as a credit institution called “Banque Naaman et Soussou". In 1970, the name of the Bank changes to “Banque de la Méditerranée” and then to "BankMed" in 2005. In 2006, Allied Bank merged into Bankmed. Allied bank was acquired by Groupé Méditerranée in 2001 then merged with Bankmed in 2006 (Bankmed, 2019).
10. Emirates Lebanon Bank: In 1944, BNCI "A" (Banque Nationale pour le Commerce et l'Industrie Afrique) opened in Beirut, and then merged with CNEP (Comptoir National d'Escompte de Paris) in an establishment called BNP "Banque Nationale de Paris" in 1966. In 1973, Bank of Sharjah was established. The bank then acquired the license of Banque de la Bekaa S.A.L. in 2007 from Fransabank. In May 2008, Banque de la Beqaa S.A.L. becomes Emirates Lebanon Bank S.A.L. Furthermore, in September 2008, the Central Bank of Lebanon approves Emirates Lebanon Bank S.A.L.'s acquisition of BNPI Lebanon (Emirates Lebanon Bank, 2019). As this bank was established in 2008 and the acquisition activity took place also in 2008 so no data exists 3 years before the operation and thus the bank is excluded.
11. Cedrus Invest Bank (CIB): Cedrus Invest Bank was established in Beirut in 2011. On the 1st of March, 2015, CIB completed the acquisition of Standard Chartered SAL from Standard Chartered Bank, and Cedrus Bank was subsequently born. Cedrus Group is currently the fastest growing banking group in Lebanon with a shareholders' equity exceeding USD 330 million, a total balance sheet exceeding USD 1.3 Billion and an off-balance sheet business exceeding USD 1 billion, on consolidated basis (Cedrus Invest Bank, 2019). As the merger occurred in 2015 which is the end of the studied period this operation will be excluded
12. Banque de l'Industrie et du Travail (BIT): BIT Bank was founded in Beirut in 1960. In 2014, Banque de l'Industrie et du Travail S.A.L (BIT) and Near East Commercial Bank S.A.L (NECB) have merged and united under one organization called Saradar Bank* S.A.L (SARADAR Bank, 2019).
13. Banca Di Roma: Acquired Capitalia bank in 2002. The data of this bank are not available and therefore it is excluded from the study (Bilanbanques book, 2015).

3.2.3.3 Analysis technique

The annual balance sheets and income statements used to construct the variables for this empirical analysis are taken from banks' financial statements that are reported in BILANBANQUEs' published books and banks' websites. The results will be generated using

OSDEA which is an Open Source Data Envelopment Analysis Software that can solve many different types of DEA problems.

In this study, the efficiency of banks involved in merger and acquisition activities will be measured and compared over the time period from 1996 till 2015. The performance of banks will be compared based on pre- and post-merger periods. In the literature, it is agreed that studies conducted on short post-merger periods might fail to detect value gains which only emerge fully after some years (Amel et al., 2004; Wong, 2009). Hence, longer time period (up to five years) is needed to realise efficiency gains of consolidation (Focarelli and Panetta, 2003). This is also supported by De Young et al. (2009), Beccalli and Frantz (2009), Bernad et al. (2010) and Kumar and Bansal (2012), who consider that the performance effects of mergers and acquisitions can only be valued in the long run. In line with this, Ahmad (2007) pointed out that a longer period of study should provide a better picture. However, Altunbaş and Marqués (2008) pointed out that longer time period may have negative effect because of other external economic factors and suggested that a two years period before and two years after the M&A are sufficient to avoid alteration and inaccuracy of results. This is supported by other researchers among which are: Diaz et al., (2004), Badreldin and Kalhoefer (2009), Aun (2009), and Abbas et al. (2014), who found that merged banks need at least 2 years to achieve cost efficiency or improvement in performance, and Achtmeyer (1994) who suggested that two years are enough for the benefits of M&A to materialize.

Following Rhoades (1998), the data will be compared three years before and after the mergers. This choice is based on the common agreement among the experts that about half of any efficiency gains should be apparent one year after mergers whereas all gains should be realized within three years after the merger and acquisition (Said, 2013).

3.3 Summary

Research design is the overall strategy chosen to coherently arrange the various components of the research so as to make sure that the research problem is addressed effectively. The positivistic approach that seeks to provide rational explanations for the phenomena being studied through identifying, measuring and evaluating it (Neville, 2007) was adopted in this thesis.

The topic of bank merger and acquisition has been studied by many researchers whom interest was in determining whether these activities improve the bank performance or destroy

it. The interest in this area was mainly driven by the inconclusive results provided in the literature about the impact of M&As on performance.

Researchers have examined this impact using a wide range of methodologies. The most popular was the event-study methodology followed by the accounting return methodology (Krishnakumar and Sethi, 2012). However, researchers expressed the need for other approaches in order to offer new insights into the findings of M&As impact on performance, and suggested the use of data envelopment analysis methodology. Due to the advantages of this methodology over other methodologies, DEA has become the most preferred approach for studying M&As impact on the performance of banks (Maniati and Sambracos, 2017).

The methodology chosen in this study is the DEA approach. The choice was based on the intensive review of literature, and the advantages of this approach over other methodologies. Further, DEA is found to be the most preferred approach for studying M&As impact on the performance of banks particularly when the sample size to be studied is small (Sufian, 2008), it is suitable if the banks under study differs in size, and it can ensure consistent performance measurement (Krishnakumar and Sethi, 2012). Furthermore, six management efficiency ratios are used to support the results of DEA methodology.

Data Envelopment Analysis with its models and approaches has been widely used in measuring the efficiency of banks as well as in studying the impact of mergers and acquisitions on the performance of banks. Some studies have used the CCR model such as Sherman and Gold (1985) and Wanke et al. (2017), few others used the BBC model see for example Said (2013), and other researchers have used both CCR and BBC models (Yue, 1992; Naimy and Chukri, 2016; and Maniati and Sambracos, 2017).

In most of the DEA studies it can be seen that the input-oriented DEA model is the frequently used model to measure the efficiency of banks (Wanke et al., 2017). This is mainly regarded to the general belief that bank managers have their most control over the inputs rather than the outputs (Maniati, 2017). However, a number of studies have adopted the output-oriented model such as Thagunna and Poudel (2012).

In the choice of input and output variables two approaches dominates the banking literature; the intermediation and production approaches. While some studies use the production approaches (Zreika and Elkanj, 2011), the intermediation approach dominates the banking

literature (Naimy and Chukri, 2016). Moreover, few other researchers have used both approaches (Wanke et al., 2017).

Based on the reviewed literature, the input oriented CCR and BCC models are chosen to analyse the efficiency impact of the 29 bank mergers and acquisitions that have taken place in Lebanon from 1996 till 2015. The intermediation approach was chosen with interest expenses, general expenses, total deposits, and number of employees as inputs, whereas the outputs are interest income, non-interest income, and total loans.

This chapter provided a brief overview of the research design and the broad research philosophies adopted in this study. It also reviewed the predominant research methods and the different methodologies that have been used by other researchers to examine the performance impact of M&As. The next section of the chapter provided a background of the DEA methodology, presented the CCR and BCC DEA models along with the mathematical formulation of each model. It also provided a review of studies that have used DEA to either measure the efficiency of banks or to measure the impact of mergers and acquisitions on the efficiency of banks. The following chapter will present the empirical results and analysis of results obtained from both DEA methodology and ratio analysis.

Chapter Four: Empirical Results and Analysis

This Chapter is divided into four sections. The first introduces the methodologies used to address the impact of mergers and acquisitions on the efficiency of banks in Lebanon, followed by a description of the DEA program used in the study in the second section. The third section provides the technical efficiency scores generated from the DEA analysis under both CCR and BCC models along with the analysis. The fourth section presents the results obtained using six management efficiency ratios. Further a conclusion of the analysis of results obtained using both DEA and management efficiency ratios are provided at the end of the chapter.

4.1 Introduction

For the purpose of investigating the impact of merger and acquisition activities on the efficiency of banks in Lebanon, this study employs DEA methodology to obtain the relative efficiency scores of the 29 banks that have undergone through merger and acquisition activities in Lebanon over a period of 19 years; namely, 1996-2015.

The technical efficiency scores of banks are measured by assuming intermediation approach using both CCR and BCC DEA models. The two models evaluate the efficiency of units for any number of inputs and outputs. The CCR assumes a constant return to scale whereas BCC extends the latter model by assuming a variable return to scale. The CCR model reveals one set of efficiency score (CCR- efficient) for each bank for each year under study, and the BCC model is used to obtain the efficiency scores (BCC-efficient) of each bank using the same input- output variables in order to investigate the sources of inefficiency. Using DEA input-oriented approach (refer to section 3.2.1.5), the efficiency scores for both CRS and VRS models are calculated for each bank under study. The impact of mergers and acquisitions on banks' efficiency is analysed by comparing the results three years before and three years after the mergers for analysing the difference between pre-merger and post-merger efficiency. Accordingly, data is divided into two groups; pre- and post-merger data, according to each individual bank’s merger period.

In addition to the DEA analysis, six management efficiency ratios: non-interest income to number of employees, non-interest income to total assets, net interest income to total assets,

net operating income to total assets, net operating income to total equity, and net income to total equity were chosen and analysed three years before and three years after the merger and acquisition activities had taken place to add support to the analysis.

4.2 DEA Program description

OSDEA is an open source Data Envelopment Analysis application which can solve many different types of DEA problems. The program has the ability to accommodate unlimited number of variables (inputs/outputs) with unlimited number of DMUs (banks) and solves problems from up to 40 DEA models.

After importing the raw data and choosing the DEA models (CCR and BCC) and specifying their characteristics (input oriented), the results generated are organized in various Excel worksheets (tabs) (See Appendix C.1). The nine appeared worksheets are labelled by model details, raw data, variables, objectives, projections, lambdas, peer group, slacks, and weights respectively. The results of efficiency analysis are found in the "objectives" worksheet, target inputs and outputs in the “Projection” worksheet, and the number of inefficiencies in the “Slack” worksheet. This information can be used to analyse the inefficient DMU, for examples, where the source of inefficiency comes from and by how much could improve an inefficient unit to the desired level.

The results generated for the year 2015 using CCR Model will be taken as an example to provide a more detailed explanation about these worksheets. In the objective’s worksheet (Appendix C.2), the efficiency scores of banks under study are reported. The results reveal that 8 banks have an efficiency score of 100 and thus are considered to be efficient. Bank SGBL, Crédit Libanais, Bank of Beirut and BankMed have scores less than 100 and thus are identified as inefficient. These banks can improve their efficiency, or reduce their inefficiencies proportionately, by reducing their inputs (since the model used is the input-oriented). Although these banks are considered inefficient however, they are very close to an efficiency frontier. For instance, SGBL bank can improve its efficiency by reducing certain inputs up to only 1% (100 - 99). Likewise, BankMed needs an input reduction of 1% to be 100% efficient. Similarly, Bank of Beirut, and Crédit Libanais bank need an input reduction of 2% and 5% respectively to be 100% efficient. These input reductions are called total inefficiencies which consists both the number of proportional reductions, and an amount called “Slack” for those banks that are not able to reach the 100% efficiency score despite the proportional reductions (Ozcan, 2014).

In the slack worksheet (Appendix C.3) it is observed that only inefficient banks have slacks. Slacks represent the leftover amount by which an input (input-oriented model) can be reduced to attain technical efficiency after all inputs have been reduced in equal proportions to reach the production frontier (Ozcan, 2014). For SGBL bank to achieve efficiency its total loans must increase by 2245854 L.L. Crédit Libanais bank must decrease the number of employees by approximately 14 employees. However, despite this reduction it would not achieve efficiency. In this case, no other input can be reduced, thus to achieve efficiency, the bank should also increase both the amount of non-interest income and total loans by 2268 L.L and 21835 L.L respectively. As for Bank of Beirut to achieve efficiency it needs to decrease its total deposits by approximately 5968166 L.L and increase the amount of non-interest income by 11538 L.L. BankMed needs to further reduce its interest expenses by approximately 1179 L.L. to become efficient.

The peer group worksheet (Appendix C.4) provides the benchmark banks that inefficient banks need to catch up with. As for efficient banks, these banks are considered to be their own benchmarks such as the case with Fransabank, BLC bank, Bank Audi-Saradar group, IBL bank, Byblos bank, BankMed, Emirates Lebanon Bank, Cedrus bank, and Saradar bank. The benchmarks of inefficient banks could be one or many of the efficient banks. For instance, the benchmarks for SGBL are BLC bank, Bank Audi-Saradar group, IBL bank, Cedrus bank, and Saradar bank. Likewise, Crédit Libanais bank needs to catch up with Fransabank, BLC bank, and IBL bank. The benchmarks of BankMed are BLC Bank, Bank Audi-Saradar group, IBL, Byblos Bank, and Cedrus Bank. Finally, the peer groups of Bank of Beirut are BLC bank, Bank Audi-Saradar group, IBL bank, and Emirates Lebanon Bank. This means that each inefficient bank should decrease their inputs in a similar proportion to their peer groups in order to become efficient. The lambda (λ) values are the raw weights assigned to the fully efficient units that operate closer to the corresponding inefficient one. Taking SGBL bank as an example, the best peer to be looked up to is Cedrus bank; however, the closest peer to the bank is bank Audi-Saradar group where it only needs a weight of 0.1 to become efficient.

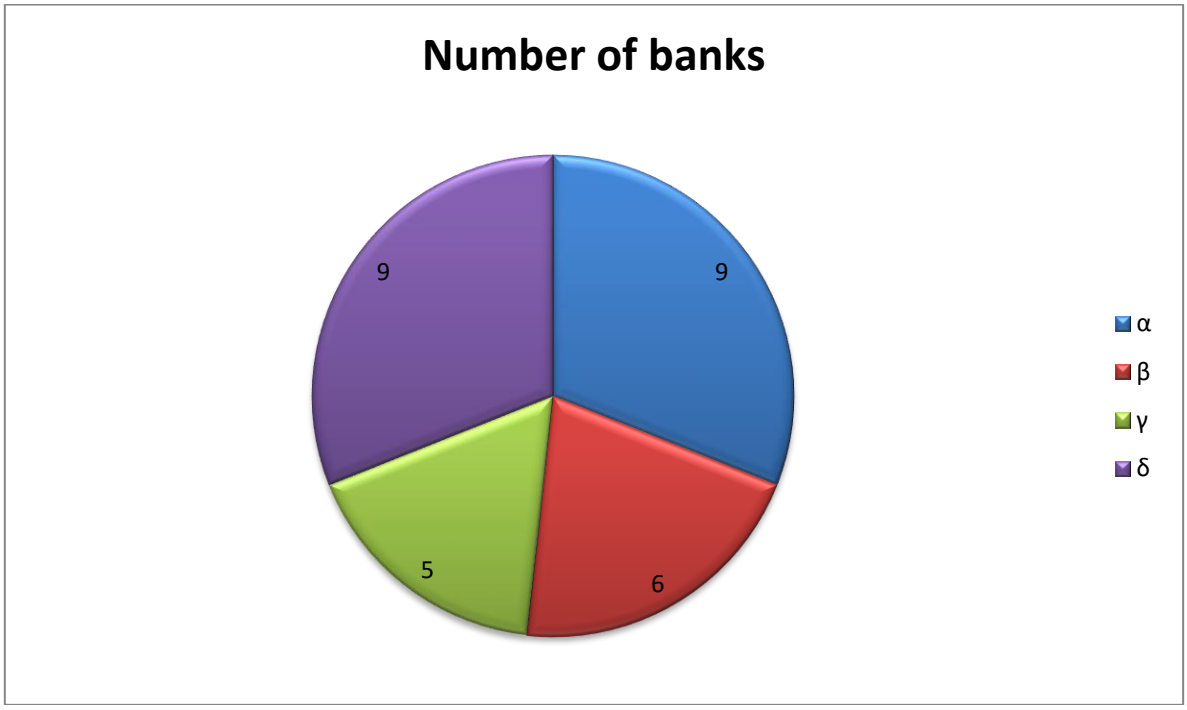
The software utilized can run the analysis for a single year. Therefore, the results were conducted for each year of the analysis in a separate excel sheet under each CCR and BCC DEA models. Then the final results of each DEA model are combined for comparison.

4.3 DEA Results and Analysis

The results obtained from input-oriented DEA model under both CRS and VRS assumptions are presented in Tables 4-1 and 4-2 respectively. The results are analysed and presented in charts. Further, the average efficiency scores for the three years period, according to each individual bank's merger period, before and after the merger and acquisition activities had taken place are calculated under each model and presented in Tables 4-3 and 4-4 respectively.

The number of banks included in this study is 29. This number varies from one year to another, during the period of the study, dropping from 24 in 1996 to 12 in 2015 due to merger and acquisition activities. Add to that, not all banks were operating in the first year of the study, 1996; for instance, United Bank of Lebanon started operating in 1998, Standard Chartered bank in 2000, Emirates Lebanon bank in 2008, and Cedrus Invest bank in 2012. The 29 banks are further classified into four different groups (G) according to their customer deposit size; the first being the Alpha (α) group (Banks with customer deposits above US $2billion), then the Beta (β) group (Banks with customer deposits between US$ 500 million and US$ 2 billion), followed by the Gamma (γ) group (Banks with customer deposits between US$ 200 million and US$ 500 million) and finally the Delta (δ) group (Banks with customer deposits below US$ 200 million) (Bilanbanques, 1996-2015). Since this thesis studies the impact of M&As activity and as each merger occurred in a different time period, the group classification of each bank is taken three years prior to the year of merger or acquisition activity. Out of the 29 banks included in the study, 9 banks belong to α group, 6 to β group, 5 to γ group, and 9 banks to δ group (See Chart 4.1 below).

Chart 4. 1 Number of banks in each banking group



The results generated are organized in two separate tables; the first table provides the TE scores obtained assuming CRS, while the second provides TE scores obtained using VRS assumption. The tables provide the technical efficiency (TE) results in column 3 to 22 for each year (y) of the studied period labelled in the first row. For space purposes, the years are shortened to 96 instead of 1996, 00 for year 2000, 01 for 2001, and 10 for 2010 and so on... The banks involved in the study are named in the first column with each corresponding classification group (G) in column 2. The last column provides the overall TE averages (Avg.). The overall technical efficiency average obtained from CRS model is abbreviated by OTE whereas PTE refers to the pure technical efficiency average obtained from VRS model. The number of banks that were operating in each year is presented in row 32, followed by the number of efficient banks in the last row.

4.3.1 CRS and VRS Results Analysis

Table (4-1) and Table (4-2) below provide the yearly TE values in %, to study the effect of mergers and acquisitions over the 20 years period, calculated using an input-oriented CRS and VRS DEA models respectively.

Table 4. 1 TE Scores using CRS DEA Model

CRS Input-Oriented DEA Model	**Y**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03**	**04**	**05**
Bank name	**G**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**
Fransabank	α	100	100	100	72	100	100	100	100	97	66
United bank of Saudia & Lebanon	δ	100	100	100	100	100					
Banque de la Békaa	δ	100	100	95	51	100	100	100	100	100	100
Al Ahli International Bank	ϒ					100	79	79	99	91	100
BLC Bank	β	100	90	100	84	64	72	66	99	93	65
United bank of Lebanon	δ				84						
Lati Bank	δ	100	84	93	84	100	100	100	100	89	69
Société Générale de Banque au Liban	β	100	90	97	80	100	100	99	97	96	96
Inaash Bank	δ	85	79	84	82						
Lebanese Canadian Bank	α	90	93	90	64	93	91	92	100	100	53
Crédit Libanais	α	100	92	90	91	94	95	100	97	96	78
Bank Audi	α	100	92	97	96	100	100	100	100	100	100
Banque Saradar	α	100	87	100	100	100	100	100	100		
Bank of Beirut	α	100	92	100	100	100	100	99	99	100	88
Beirut Riyad Bank	β	100	100	91	100	100	100				
Intercontinental Bank of Lebanon	α	100	92	100	100	93	96	100	100	100	61
BCP Oriel Bank	ϒ	100	100	100							
Byblos Bank	α	100	89	100	100	100	99	97	100	100	100
Wedge Bank	δ	86	89	88	64	92					
ABN Amro	β	100	100	100	99	100	100				
BankMed	α	100	100	100	100	100	100	100	100	90	100
Allied Bank	δ	100	75	93	100	93	100	94	98	100	100
Emirates Lebanon Bank	β										
BNPI	β	100	100	100	100	100	100	100	100	100	100
Cedrus Invest Bank	δ										
Standard Chartered	ϒ					100	100	100	100	100	100
Banque de l'Industrie et du Travail	ϒ	100	73	87	75	96	98	98	100	86	87
Near East Commercial Bank	δ	100	100	88	100	100	100	100	90	96	29
Banca Di Roma	ϒ	100	82	100	100	100	100	100	100	100	100
number of banks		24	24	24	24	24	22	20	20	19	19
number of efficient banks		21	9	12	11	17	15	12	13	10	9

[1]

[1] The letter Y stands for the Year of the studied period.
The average of the yearly technical efficiency scores is abbreviated by Avg.
TE: technical efficiency, OTE: overall technical efficiency, PTE: pure technical efficiency
G: classification group name; α: Alpha, β: Beta, ϒ: Gamma, and δ: Delta

Table 4. 1 TE Scores using CRS DEA Model (continued)

CRS Input-Oriented DEA Model	**Y**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**Avg.**
Bank name	**G**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**OTE**
Fransabank	α	99	90	96	56	100	100	99	100	100	100	94
United bank of Saudia & Lebanon	δ											100
Banque de la Békaa	δ											95
Al Ahli International Bank	ϒ	96	100	100	52	100	100	100	100			93
BLC Bank	β	96	97	94	77	96	90	96	100	100	100	89
United bank of Lebanon	δ											84
Lati Bank	δ	81	78	76								89
Société Générale de Banque au Liban	β	100	100	89	99	100	78	100	100	100	99	96
Inaash Bank	δ											83
Lebanese Canadian Bank	α	100	93	100	94	100						90
Crédit Libanais	α	93	100	99	100	97	97	89	96	97	95	95
Bank Audi	α	100	100	100	100	100	100	100	100	100	100	99
Banque Saradar	α											98
Bank of Beirut	α	100	100	100	100	100	100	91	100	98	98	98
Beirut Riyad Bank	β											98
Intercontinental Bank of Lebanon	α	100	100	100	74	100	100	100	100	100	100	96
BCP Oriel Bank	ϒ											100
Byblos Bank	α	100	100	100	76	98	100	93	100	100	100	98
Wedge Bank	δ											84
ABN Amro	β											100
BankMed	α	100	100	100	100	100	100	100	100	100	100	100
Allied Bank	δ											95
Emirates Lebanon Bank	β			100	100	100	100	100	100	100	100	100
BNPI	β	100	100									100
Cedrus Invest Bank	δ							100	100	100	100	100
Standard Chartered	ϒ	100	100	100	100	100	100	100	100			100
Banque de l'Industrie et du Travail	ϒ	87	90	98	67	91	97	96	95	96	100	91
Near East Commercial Bank	δ	100	97	93	100	100	93	78	88	89		92
Banca Di Roma	ϒ	77	76									95
number of banks		17	17	16	15	15	14	15	15	14	12	
number of efficient banks		10	10	9	7	11	9	8	12	10	9	

Table 4. 2 TE scores using VRS DEA Model

VRS Input-Oriented DEA Model	**Y**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03**	**04**	**05**
Bank name	**G**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**
Fransabank	α	100	100	100	86	100	100	100	100	100	66
United bank of Saudia & Lebanon	δ	100	100	100	100	100					
Banque de la Békaa	δ	100	100	95	51	100	100	100	100	100	100
Al Ahli International Bank	ϒ					100	80	79	100	91	100
BLC Bank	β	100	100	100	95	64	78	69	100	100	73
United bank of Lebanon	δ				84						
Lati Bank	δ	100	84	93	84	100	100	100	100	89	69
Société Générale de Banque au Liban	β	100	98	97	85	100	100	100	100	100	100
Inaash Bank	δ	85	79	84	82						
Lebanese Canadian Bank	α	90	93	90	64	93	92	93	100	100	53
Crédit Libanais	α	100	98	90	100	95	97	100	98	100	78
Bank Audi	α	100	100	100	100	100	100	100	100	100	100
Banque Saradar	α	100	97	100	100	100	100	100	100		
Bank of Beirut	α	100	92	100	100	100	100	100	99	100	88
Beirut Riyad Bank	β	100	100	96	100	100	100				
Intercontinental Bank of Lebanon	α	100	92	100	100	93	96	100	100	100	61
BCP Oriel Bank	ϒ	100	100	100							
Byblos Bank	α	100	100	100	100	100	100	100	100	100	100
Wedge Bank	δ	86	90	88	64	93					
ABN Amro	β	100	100	100	99	100	100				
BankMed	α	100	100	100	100	100	100	100	100	100	100
Allied Bank	δ	100	78	95	100	94	100	95	100	100	100
Emirates Lebanon Bank	β										
BNPI	β	100	100	100	100	100	100	100	100	100	100
Cedrus Invest Bank	δ										
Standard Chartered	ϒ					100	100	100	100	100	100
Banque de l'Industrie et du Travail	ϒ	100	73	87	99	96	98	99	100	86	87
Near East Commercial Bank	δ	100	100	88	100	100	100	100	90	96	29
Banca Di Roma	ϒ	100	82	100	100	100	100	100	100	100	100
number of banks		24	24	24	24	24	22	20	20	19	19
number of efficient banks		21	12	13	13	17	16	15	17	15	10

Table 4. 2 TE scores using VRS DEA Model (continued)

VRS Input-Oriented DEA Model	**Y**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**Avg.**
Bank name	**G**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**TE**	**PTE**
Fransabank	α	100	94	100	72	100	100	100	100	100	100	96
United bank of Saudia & Lebanon	δ											100
Banque de la Békaa	δ											95
Al Ahli International Bank	ϒ	96	100	100	52	100	100	100	100			93
BLC Bank	β	96	100	96	77	98	98	100	100	100	100	92
United bank of Lebanon	δ											84
Lati Bank	δ	81	78	76								89
Société Générale de Banque au Liban	β	100	100	100	100	100	100	100	100	100	100	99
Inaash Bank	δ											83
Lebanese Canadian Bank	α	100	94	100	100	100						91
Crédit Libanais	α	96	100	99	100	98	98	91	96	99	95	96
Bank Audi	α	100	100	100	100	100	100	100	100	100	100	100
Banque Saradar	α											100
Bank of Beirut	α	100	100	100	100	100	100	100	100	100	98	99
Beirut Riyad Bank	β											99
Intercontinental Bank of Lebanon	α	100	100	100	74	100	100	100	100	100	100	96
BCP Oriel Bank	ϒ											100
Byblos Bank	α	100	100	100	93	100	100	100	100	100	100	100
Wedge Bank	δ											84
ABN Amro	β											100
BankMed	α	100	100	100	100	100	100	100	100	100	100	100
Allied Bank	δ											96
Emirates Lebanon Bank	β			100	100	100	100	100	100	100	100	100
BNPI	β	100	100									100
Cedrus Invest Bank	δ							100	100	100	100	100
Standard Chartered	ϒ	100	100	100	100	100	100	100	100			100
Banque de l'Industrie et du Travail	ϒ	87	90	98	67	91	97	97	95	96	100	92
Near East Commercial Bank	δ	100	97	93	100	100	93	78	93	94		92
Banca Di Roma	ϒ	77	76									95
number of banks		17	17	16	15	15	14	15	15	14	12	
number of efficient banks		11	11	11	11	12	10	12	12	11	10	

Looking at the yearly technical efficiency scores in Tables 4.1 and 4.2 it can be observed that banks that are efficient under CRS model are also efficient in VRS model. However, banks which are inefficient under CRS maybe efficient under VRS model. For instance, BLC, Bank Audi, and Byblos bank are inefficient under CRS in 1997 while efficient under VRS. Further, looking at the average efficiency scores OTE and PTE, Banque de la Bekaa, Bank Audi, Banque Saradar, and Byblos Bank are CRS inefficient but VRS efficient. Accordingly, more efficient DMUs can be obtained from VRS model. This is in line with Mester (2003), Moormann (2008) and Othman et al. (2016) who found that VRS model is more flexible than CRS model which allows for more efficient units. Likewise, Alrafadi et al. (2016) state that the technical efficiency scores obtained from VRS model are greater than or equal to those obtained from CRS model because VRS envelops the data points more tightly than the CRS.

Looking at the average efficiency scores, the number of fully efficient banks under CRS model are 8 out of 29 banks, out of the 8 banks 3 banks belong to beta group, 2 banks belong for each gamma and delta groups, while 1 bank belongs to alpha group. Whereas under VRS model the number of efficient banks is 11 banks out of which 4 banks belong to alpha group, 3 banks to beta group and 2 banks for each delta and gamma groups (See Charts 4.2 and 4.3 below). These figures indicate that the number of efficient banks is relatively small in both models which are explained by the fact that Lebanese banking sector, during the period of the study, constituted a large number of inefficient and undercapitalised banks due to the decline in the regulatory control and supervision over it (Awdeh and EL-Moussawi, 2011). This in turn might explain one of the primary motivations behind Lebanese banks engaging in mergers and acquisitions.

Chart 4. 2 Number of efficient banks according to the average efficiency scores (OTE) under CRS Model

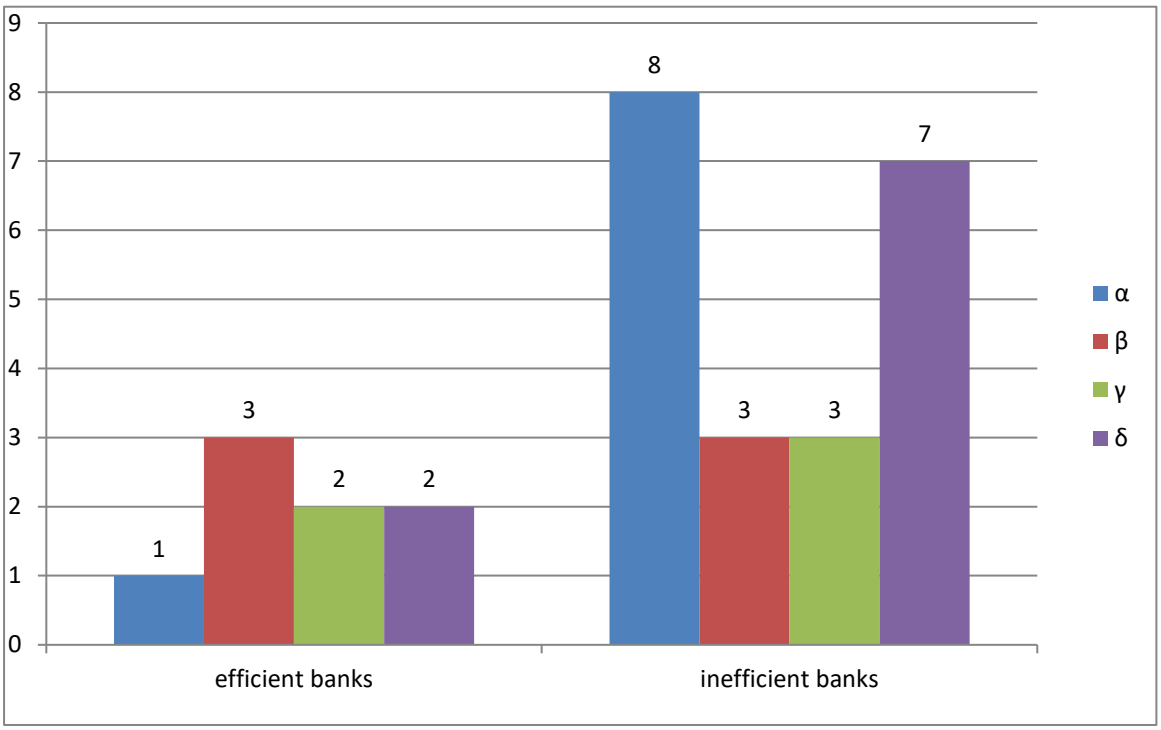
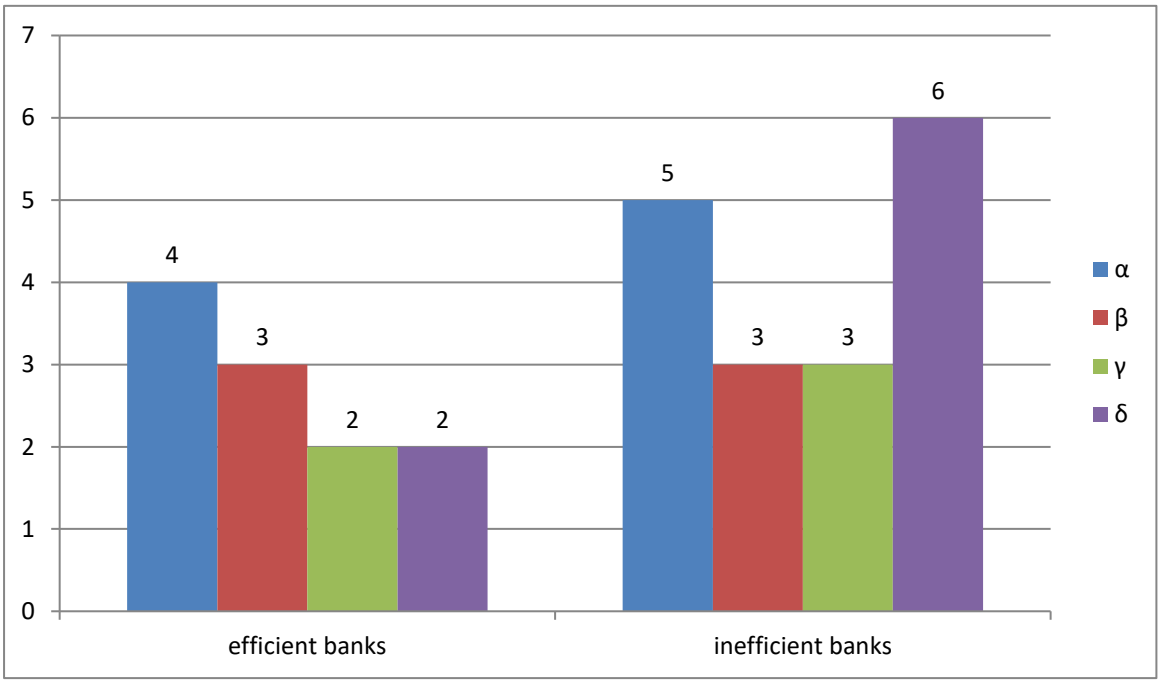


Chart 4. 3 Number of efficient banks according to the average efficiency scores (PTE) under VRS Model



In the process of restructuring the banking sector through mergers and acquisitions, the governor of the central bank did not permit any merger among the Lebanese largest banks (alpha group banks) to maintain competition in the market. This explains why almost all the merger and acquisition activities take the form of a large bank acquiring a medium or smaller bank. An exception to this decision was the merger of bank Audi and Saradar Bank in 2004 where both banks belong to alpha group banks. This merger was the first of its kind in Lebanon were both institutions maintained to operate separately but under one bank called Audi-Saradar group. According to both banks, the aim of this merger was to create a large Lebanese banking group that will serve the domestic economy and sustain a dynamic regional development strategy (The Daily Star Lebanon. 2004). However, the two banks demerged after six years (Saradar, 2019). According to Bao (2017), in most cases demerger improves the efficiency and financial situation of the institution. Looking at the TE scores of bank Audi it can be seen that the bank continued to work at full efficiency.

Looking back at the TE scores it can be noted that the majority of banks belonging to the alpha group show higher TE averages with a lowest TE average of 90% and 91% belonging to Lebanese Canadian bank under CRS and VRS models respectively, and highest average TE of 100% belonging to BankMed under CRS and to Audi bank, Saradar bank, Byblos bank and BankMed under VRS model. This explains why most M&As include an alpha group bank which means that the acquirers are larger in size (in terms of assets), and add support to the decision of the central bank regarding the merger of larger banks with medium or smaller sized ones as referred to in the previous paragraph.

Lebanon is located in a region that has been subject to ongoing political and security concerns. These shocks had negatively affected the Lebanese economy as well as its banking sector (Byblos bank, 2019b). For instance, the impact of the assassination of former Prime Minister Rafik Al-Hariri in 2005 coupled with the July war in 2006 had severely hit the Lebanese economy where the real economic growth had been put back nearly to 0.0% (Byblos bank, 2019b), and the overall massive losses from the war have been estimated at $ 9.5 billion or 40% percent of GDP (Social Watch, 2019). As for banks, reserves came under major pressure while deposits witnessed slight outflows (FFA, 2008). Likewise, looking at the TE scores of banks for the year 2005 it can be noticed that it declined in most of banks with a remarkable decline in certain banks such as Lebanese Canadian bank, IBL and

Fransabank where the TE declined from 100% to 53, 61, and 66 respectively under both CRS and VRS models.

Despite the aforementioned shocks, the Lebanese economy proved to be resilient with the help of the financial system. The Lebanese economy relied heavily on the strength of its financial system and the high level of foreign reserves at the Central Bank ($1.62 bn and $19.24 bn in 2005 and 2006 respectively) to overcome the consequences of the July war. As such, the consolidated balance sheets of the commercial banks showed a yearly increase of 3.7% in assets to $70.3bn. Customer deposits and loans rose by 3.9% and 3.3% to $57bn and $19bn respectively. In parallel, capital funds of Lebanese banks improved by 36% in 2006 after registering a 10.4% growth in 2005 (Blom bank, 2006), mainly due to banks' increases in capital with the approaching application of the Basel II Accord in Lebanon by 2008. This explains the increase in the TE scores of the majority of banks in year 2006 under CRS and VRS models.

The performance of the Lebanese banking sector improved to record an outstanding performance in 2008 during the worldwide financial crisis. The deposits inflows grew at a rapid pace during this year where USD 10.5 bn of customer deposits were added, out of which USD 2.6 bn were added in the last quarter of 2008, where the financial crisis was at its peak. This explains the unnoticeable changes in TE scores during the years 2007 and 2008 (FFA private bank, 2008). According to Zreika and Elkanj (2011), the Lebanese banks remained safe and unaffected with the financial crisis due to the legislations taken by Lebanese banks which restricts banks' executives from investing in high risk structured products.

However, the impact of the financial crisis may have had a slightly delayed effect as there is a clear decline in TE scores of majorities of banks in year 2009, a decline that is rather sharpest than the decline witnessed in 2005. For instance, the TE score of Fransabank declined from 96 to 56 under CRS and from 100 to 72 under VRS models, Byblos bank from 100 to 67 and 93 under CRS and VRS respectively. AlAhli bank had a declining TE score from 100 to 52, IBL from 100 to 74, and BIT bank from 98 to 67 under both models. Further, BLC bank experienced a decline in TE score from 94 and 96 to 77 under CRS and VRS models respectively.

Moving from shocks and financial crisis, some banks experienced a decline in TE scores which might be due to the act of merger and acquisition operations, as the decline was reported during the year these activities took place. For instance, the TE score of BLC bank decreased from 84% in 1999 to 64% in 2002 under CRS model and from 95% to 64% under VRS model. This decrease might be attributed to that this bank acquired a less efficient bank. Likewise, Byblos bank acquired a less efficient bank in its first merger activity in 2001 and experienced a slight decline in its efficiency from 100% before the merger to 99% during the year of the merger and to 97% the year that follows. However, the bank remained 100% under both mergers under VRS model. Further, Bank of Beirut also experienced a slight decline in efficiency score from 100% to 99% in 2002 under CRS while remained 100% efficient under VRS model. The decline in efficiency scores during mergers is likely attributed to that the increase in size of the new merged banks maybe creating more complex operational problems that these banks have not enough experience that helps them deal with such situation in comparison with large bank mergers (Osman et al., 2008).

According to some researchers, there is an agreement among the experts that about half of any efficiency gains should be apparent after one year whereas all gains should be realized within three years after the merger (Rhoades, 1998; Sufian, 2008; and Said, 2013). However, the results obtained in this study show that the efficiency of some banks started to improve four years following the merger. For instance, after acquiring Banque de la Békaa in 2006, the yearly TE scores of Fransabank under CRS decreased from 99% during the year of the merger to 56% three years following the merger and it was not until the fourth year (2010) that the bank started to work at full efficiency (100%). This significant drop might be attributed to the impact of the financial crises. This also applies under VRS model where the bank was not able to work at its full efficiency until the fourth year following the M&As.

Likewise, Bank of Beirut experienced an increasing and decreasing pattern in its yearly TE scores after acquiring Beirut Riyad Bank, where the TE score increased from 99% following the merger to 100% and then decreased to 88% three years after the merger under both CRS and VRS models, and it was not until the fourth year that the bank started to work at full efficiency. Furthermore, following the acquisition of Lati bank in 2009, BLC bank only achieved 100% TE score in 2013, i.e., the fourth year following the merger. This result supports the findings of Urio (2008) who stated that, "the third year after merger is on the average the one that produces most frequently positive gains in efficiency. This is an

indication that it takes around that time for mergers to start showing post-merger performance improvements, which may then continue in the following years. Presumably, in the first two years after merger the combined firm dwells on integration issues, and is able to overcome most of its challenges and start operating profitably thereafter" (p. 195).

This study examines the impact of M&As on 29 banks in Lebanon. These banks form 19 merger and acquisition operations. Out of which, the impact of 8 operations on the efficiency of banks cannot be determined due to either data unavailability, or that the data are out of the range of the studied period. For instance, the merger of Fransabank and Al Ahli International Bank took place in 2014 and the period of the study is till 2015 so data 3 years after merger are out of the studied period. This is also the case with the acquisition of Standard Chartered Bank by Cedrus Invest Bank in 2014 and the merger between Banque de l'Industrie et du Travail and Near East Commercial Bank in 2014. Likewise, the two acquisition activities of First Phoenician bank and Capital Trust bank by Credit Libanais in 1994 are excluded because the studied period starts from 1996. Furthermore, the merger of Emirates Lebanon bank took place in late 2008 the same year the bank was established so data 3 years before merger is not available. The data of United Bank of Lebanon are available only two years prior to merger and thus is excluded. That is to say, the mergers included in this study are the one that have occurred between the years 1999 and 2012. The last excluded operation is the acquisition of Capitalia bank by Banca Di Roma in 2002 which is excluded because the data of Capitalia bank are not available.

Accordingly, the study is left with 11 operations. The average technical efficiency scores of the acquiring banks three years before and three years after the M&As under CRS and VRS models are presented in Tables 4.3 and 4.4 respectively. The average technical efficiency scores of the acquired banks are presented only three years before the M&As as these merger and acquisition activities are "full mergers" which means that the acquiring banks have fully absorbed their targets and formed one entity after the merger.

Table 4. 2 Average efficiency scores in % before and after M&A obtained from CRS Model

Bank	3 years pre-M&As	2 years pre-M&As	1-year pre-M&As	**Avg. Pre-M&As**	1st year post-M&As	2nd year post-M&As	3rd year post-M&As	**Avg. post-M&As**
FRANSABANK								
1st merger	100	72	100	**91**	100	100	97	**100**
United bank of SAUDIA	100	100	100	**100**				
2nd merger	100	97	66	**87**	90	96	56	**81**
Banque de la Bekaa	100	100	100	**100**				
BLC bank	96	97	94	**96**	96	90	96	**94**
LATI bank	81	78	76	**78**				
SGBL								
1st merger	90	97	80	**89**	100	99	97	**98**
INAASH bank	79	84	82	**82**				
2nd merger	89	99	100	**96**	100	100	100	**100**
Lebanese Canadian bank	100	94	100	**98**				
Bank Audi	100	100	100	**100**	100	100	100	**100**
Banque Saradar	100	100	100	**100**				
Bank of Beirut	100	100	100	**100**	99	100	88	**96**
Beirut Riyad bank	100	100	100	**100**				
IBL Bank	100	92	100	**97**	93	96	100	**96**
BCP Oriel bank	100	100	100	**100**				
Byblos bank								
1st merger	100	100	100	**100**	97	100	100	**99**
Wedge bank	88	64	92	**81**				
2nd merger	100	100	99	**100**	100	100	100	**100**
ABN AMRO bank	99	100	100	**100**				
BankMed	100	90	100	**97**	100	100	100	**100**
Allied bank	98	100	100	**99**				

Table 4. 3 Average efficiency scores in % before and after M&A obtained from VRS Model

Bank	3 years pre-M&As	2 years pre-M&As	1-year pre-M&As	**Avg. Pre-M&As**	1st year post-M&As	2nd year post-M&As	3rd year post-M&As	**Avg. post-M&As**
FRANSABANK								
1st merger	100	86	100	**95**	100	100	100	**100**
United bank of SAUDIA	100	100	100	**100**				
2nd merger	100	100	66	**89**	94	100	72	**89**
Banque de la Bekaa	100	100	100	**100**				
BLC bank	96	100	96	**97**	98	98	100	**99**
LATI bank	81	78	76	**78**				
SGBL								
1st merger	98	97	85	**93**	100	100	100	**100**
INAASH bank	79	84	82	**82**				
2nd merger	100	100	100	**100**	100	100	100	**100**
Lebanese Canadian bank	100	100	100	**100**				
Bank Audi	100	100	100	**100**	100	100	100	**100**
Banque Saradar	100	100	100	**100**				
Bank of Beirut	100	100	100	**100**	99	100	88	**96**
Beirut Riyad bank	100	100	100	**100**				
IBL Bank	100	92	100	**97**	93	96	100	**96**
BCP Oriel bank	100	100	100	**100**				
Byblos bank								
1st merger	100	100	100	**100**	100	100	100	**100**
Wedge bank	88	64	93	**82**				
2nd merger	100	100	100	**100**	100	100	100	**100**
ABN AMRO bank	99	100	100	**100**				
BankMed	100	100	100	**100**	100	100	100	**100**
Allied bank	100	100	100	**100**				

Out of the 11 operations, 4 operations had a positive impact on the efficiency of banks (first merger of Fransabank, both mergers of SGBL, and BankMed) under CRS model, while only 3 operations had a positive impact under VRS model (first merger of Fransabank, 1st merger of SGBL, and BLC bank). This result contradicts the results of other studies which have used DEA to analyse the merger impact on banks' efficiency and concluded that merger had a positive impact on banks' performance. Among these studies is the study of Wanke et al.

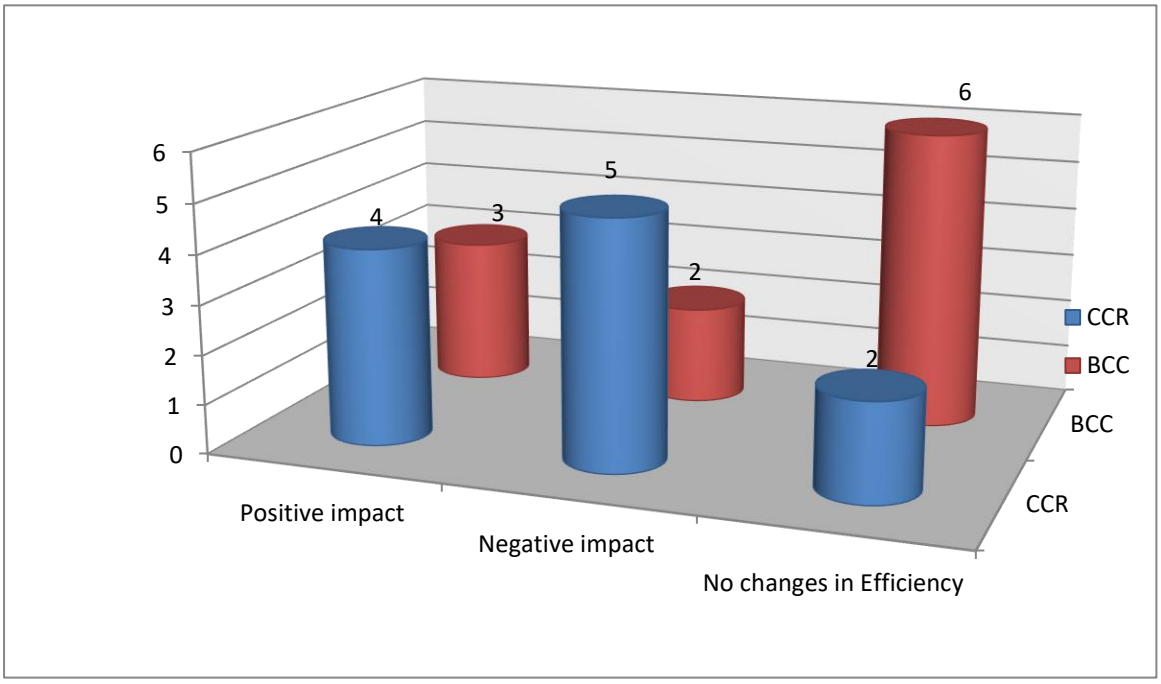
(2016) who studied the impact of M&As on the efficiency of South African banking industry and found that the vast majority of the M&As are beneficial in terms of both the technical efficiency effect and overall merger effect. Likewise, AbdulKadir et al. (2011) found that M&As have a positive impact on more than half of the banks involved in their study. Further, Gattoufi et al. (2008) found that M&A have a positive impact on half the banks with a slight deterioration in only 2 out of the 10 banks under study. This contradictory result may be due to that merger and acquisition activities have not yielded the expected outcome.

Further, 5 operations under CRS indicated negative impact on efficiency (2nd merger of Fransabank, merger of BLC bank, Bank of Beirut, IBL, and 1st merger of Byblos bank) with only 2 operations indicating negative impact under VRS (Bank of Beirut and IBL bank). This contradicts the results of other studies which have used DEA to analyse the merger impact on banks' efficiency and found concluded that mergers had a negative impact on banks. Among these studies are the study of Chaudhary et al. (2016) who used three models of DEA and these models show a decline in efficiency of banks after merger compared to pre-merger. Likewise, the results of the studies of Rezitis (2008) and Bin Dost et al. (2011) indicate a decline in the overall TE of banks under study. In line with this, Ayoubi (2008) implemented a DEA approach to measure the relative performance of Lebanese banks, using the same set of inputs and outputs used in this research, the researcher concludes that the mergers and acquisitions among other banking groups even if they involve efficient banks, they are not managing to gain back their original TE efficiencies before merger with a declining pattern in TE average values. The contradictory results may be due to that these activities have almost made no difference to the efficiency of banks in Lebanon, as the impact of merger on the efficiency of banks in Lebanon had been insignificant.

The negative impact indicated for some of the aforementioned banks may be due to an event of war or political instability the country experienced during a year within the three years period following the merger. The efficiency score of Bank of Beirut declined from 100 to 88% in the third year following the merger causing the overall TE average to decline from 100 to 96% under both DEA models and thus indicating a negative impact. This year happens to be in 2005; the year in which the late Lebanese prime minister was assassinated. In 2009, three years following the second merger of Fransabank, the efficiency score of the bank remarkably declined from 96% to 56% under CRS, and from 100% to 66% under VRS. This decline may be attributed to the late impact of the financial crises previously mentioned.

The remaining 2 operations under CRS show no changes in average efficiency scores before and after mergers (Audi bank and 2nd merger of Byblos bank) whereas under VRS model 6 operations had no observed impact on efficiency scores (2nd merger of Fransabank, 2nd merger of SGBL, Audi bank, both mergers of Byblos bank, and BankMed), refer to Chart 4.4 below. The results of the VRS model support the findings of Mat-nor et al. (2006) who find that merger and acquisition does not show any significant difference to the level of efficiency and the financial performance of the banking institutions in Malaysia. In line with this, Lai et al. (2013) used DEA approach to study the impact of mergers and found that most of the banks have no positive improvement and some remained unchanged.

Chart 4. 4 Impact of M&A operations on banks' efficiency under CRS and VRS models



Overall, almost half of M&As indicated a negative impact on the efficiency of banks under CRS, whereas no observed changes in efficiency scores before and after M&As were indicated for most operations under VRS. Further, the changes in efficiency scores, whether positive or negative are almost insignificant for many banks. So, it may be concluded that mergers and acquisitions have insignificant impact on the efficiency of banks, which supports the results of other researchers such as San Ong et al. (2011) who found that banks' merger in Malaysia does not bring significance difference on the financial performance after the merger. Likewise, Straub (2007) concluded that mergers and acquisitions often fail to add significantly to the performance of the banking sector.

Since it is difficult to have a conclusive result about the impact of mergers and acquisitions on the efficiency of banks, a number of ratios were chosen, based on the inputs and outputs used in DEA analysis, in an attempt to attain more conclusive results.

4.4 Ratio Analysis

To provide more support to the above results, six management efficiency ratios were chosen based on the inputs and outputs used in the DEA analysis. These ratios are:

Ratio 1: Non-interest income/ number of employees

Ratio 2: Non-interest income/ total assets

Ratio 3: Net interest income/ total assets

Ratio 4: Net operating income/ total assets

Ratio 5: Net operating income/ total equity

Ratio 6: Net interest income/ total equity

The data are collected three years before and three years after the merger as well as the year of the merger for the merging banks, and three years before the merger for the acquired banks. The results are provided in the appendices (Appendix D). After calculating the ratios using Microsoft Office Excel, the average ratios three years before and three years after the mergers of each bank are calculated and presented in Tables 4-5 to 4-16 below. The results of non-interest income to number of employees' ratio are provided in Million L.L. per employee, in % return on assets for the non-interest income to total assets, net interest income to total assets, and net operating income to total assets ratios, and in percentage return on equity for the last two ratios.

Table 4. 4 Average results of non-interest income to number of employees' ratio for acquiring banks (Million L.L)

Non-interest income / Number of employees Ratio								
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre-M&As	**Avg. Pre-merger**	1st year post M&As	2nd year post M&As	3rd year post M&As	**Avg. post-merger**
Bank AUDI	41.9	52.9	81.4	**58.7**	91.2	90.9	86.7	**89.6**
Bank of BEIRUT	50.6	47.5	45.4	**47.8**	57.8	63.0	56.6	**59.1**
BANKMED	55.2	47.0	78.9	**60.4**	99.6	94.4	123.4	**105.8**
IBL Bank	12.0	38.7	14.9	**21.9**	27.3	22.5	21.8	**23.8**
BLC bank	49.2	49.4	28.0	**42.2**	63.3	56.7	37.3	**52.4**
BYBLOS Bank								
First merger	32.5	28.6	31.2	**30.8**	27.5	48.2	67.4	**47.7**
Second merger	28.6	31.2	31.5	**30.4**	48.2	67.4	80.8	**65.5**
FRANSABANK								
First merger	21.4	19.6	23.4	**21.4**	15.8	8.5	25.2	**16.5**
Second merger	8.5	25.2	36.8	**23.5**	26.3	42.2	37.1	**35.2**
SGBL Bank								
First merger	31.6	19.1	16.9	**22.5**	34.2	33.2	38.5	**35.3**
Second merger	56.2	68.0	111.6	**78.6**	45.8	80.8	89.4	**72.0**

It is observed that the change in the averages of non-interest income to employee ratio during the post-merger period over pre-merger period is positive for 9 operations (Bank Audi, Bank Beirut, BankMed, BLC, IBL bank, first merger of SGBL, second merger of Fransabank, and both mergers of Byblos bank) while it is negative for the first merger of Fransabank and 2nd merger of SGBL. This indicates that the majority of banks were able to generate more income per employee after merger and thus are more efficient compared to pre-merger.

Table 4. 5 Average results of non-interest income to total assets ratio for acquiring banks (%)

Non-interest income/ Total Assets **Ratio**								
Bank	3 years pre-M&As	2 years pre-M&As	1year pre-M&As	**Avg. Pre-merger**	1st year post M&As	2nd year post M&As	3rd year post M&As	**Avg. post-merger**
Bank AUDI	0.7	0.9	1.1	**0.9**	1.1	1.1	1.1	**1.1**
Bank of BEIRUT	0.8	0.7	0.6	**1.0**	1.0	1.0	1.0	**1.0**
BANKMED	0.7	0.6	0.9	**1.0**	1.0	1.0	1.0	**1.0**
IBL Bank	1.0	3.1	1.0	**2.0**	1.0	0.0	0.0	**1.0**
BLC bank	1.0	1.0	0.0	**1.0**	1.0	1.0	0.0	**1.0**
BYBLOS Bank								
First merger	0.7	0.6	0.6	**1.0**	1.0	1.0	1.0	**1.0**
Second merger	0.6	0.6	0.6	**0.6**	1.0	1.0	1.0	**1.0**
FRANSABANK								
First merger	0.5	0.4	0.4	**0.4**	0.3	0.1	0.4	**0.3**
Second merger	0.1	0.4	0.6	**0.4**	0.4	0.7	0.6	**0.5**
SGBL Bank								
First merger	0.9	0.5	0.5	**1.0**	1.0	1.0	1.0	**1.0**
Second merger	1.0	1.0	2.0	**1.0**	0.8	7.4	0.7	**3.0**

As for the non-interest income to total assets ratio, 4 operations recorded a positive improvement in ratio averages (Bank Audi and the second merger of each Byblos, Fransabank, and SGBL banks). 2 operations (IBL and first merger of Fransabank) show a decrease in ratio averages post-merger. The remaining 5 operations recorded no change in ratios post-merger.

Table 4. 6 Average results of net interest income to total assets ratio for acquiring banks (%)

Net interest income/ Total Assets **Ratio**								
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre-M&As	**Avg. Pre-merger**	1st year post M&As	2nd year post M&As	3rd year post M&As	**Avg. post-merger**
Bank AUDI	2.1	2.5	2.0	**2.2**	1.8	2.1	2.0	**2.0**
Bank of BEIRUT	1.9	1.9	1.8	**1.9**	1.3	1.8	1.7	**1.6**
BANKMED	1.6	1.1	1.0	**1.0**	1.0	2.0	2.0	**2.0**
IBL Bank	4.8	4.5	3.9	**4.0**	2.0	2.0	2.0	**2.0**
BLC bank	1.4	1.9	2.2	**1.8**	2.0	1.9	2.0	**2.0**
BYBLOS Bank								
First merger	3.3	3.1	3.0	**3.0**	2.0	2.0	1.0	**2.0**
Second merger	3.1	3.0	2.3	**2.8**	2.0	1.0	2.0	**2.0**
FRANSABANK								
First merger	3.0	2.9	2.7	**2.9**	2.6	2.8	1.9	**2.4**
Second merger	3.0	2.0	2.0	**2.0**	2.0	2.0	2.0	**2.0**
SGBL Bank								
First merger	2.9	2.5	2.6	**2.7**	2.2	2.3	1.8	**2.1**
Second merger	2.4	2.1	2.2	**2.2**	2.2	18.1	1.8	**7.4**

The net interest income to total assets ratio significantly decreased after merger and acquisition activities for 7 operations including an insignificant decrease for 2 operations. Only 3 operations recorded a positive impact (BankMed, BLC, and the second merger of SGBL), one of which the increase was not significant. The second merger of Fransabank recorded no change in net interest income to total assets ratio post-merger. This significant deterioration in net interest income to total assets ratio in majority of operations (7 out of 11) shows that there is a decrease in management efficiency in employing available assets to generate earnings.

Table 4. 7 Average results of net operating income to total assets ratio for acquiring banks (%)

Net operating income/ Total Assets Ratio								
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre-M&As	**Avg. Pre-merger**	1st year post M&As	2nd year post M&As	3rd year post M&As	**Avg. post-merger**
Bank AUDI	0.2	0.1	0.5	**0.3**	0.4	0.6	3.1	**1.4**
Bank of BEIRUT	0.3	0.2	0.1	**0.2**	0.3	0.3	0.1	**0.2**
BANKMED	0.4	0.3	0.2	**0.3**	1.8	2.5	2.6	**2.3**
IBL Bank	0.1	0.0	0.1	**0.0**	0.1	0.0	0.1	**0.1**
BLC bank	0.2	2.7	3.2	**2.0**	3.1	2.7	25.6	**10.4**
BYBLOS Bank								
First merger	0.1	0.0	0.1	**0.1**	0.1	0.3	0.4	**0.3**
Second merger	0.0	0.1	0.0	**0.0**	0.3	0.4	0.4	**0.4**
FRANSABANK								
First merger	0.1	0.1	0.1	**0.1**	0.1	0.1	0.4	**0.2**
Second merger	0.1	0.4	0.5	**0.3**	2.3	2.8	2.5	**2.5**
SGBL Bank								
First merger	0.1	0.1	0.2	**0.1**	0.1	0.1	0.1	**0.1**
Second merger	3.7	3.3	3.9	**3.6**	4.1	24.2	2.3	**10.2**

The net operating income to total assets ratio recorded an increase in majority of operations (9 out of 11) with 2 operations recording no changes in averages (Bank of Beirut and the first merger of SGBL). This increase indicates the efficiency in the utilization of assets to generate profit. These results contradict the results of net interest income to total assets ratio.

Table 4. 8 Average results of net operating income to total equity ratio for acquiring banks (%)

Net operating income/ Total Equity Ratio								
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre-M&As	**Avg. Pre-merger**	1st year post M&As	2nd year post M&As	3rd year post M&As	**Avg. post-merger**
Bank AUDI	3.00	1.12	8.46	**4.19**	5.23	4.88	29.81	**13.31**
Bank of BEIRUT	4.66	2.75	2.10	**3.17**	4.66	4.07	1.71	**3.48**
BANKMED	3.56	2.30	2.02	**2.63**	22.72	33.61	24.21	**26.85**
IBL Bank	4.97	0.06	0.43	**1.82**	5.86	1.10	1.71	**2.89**
BLC bank	7.05	36.50	39.57	**27.71**	36.39	32.67	34.85	**34.64**
BYBLOS Bank								
First merger	1.02	0.60	0.89	**0.83**	1.69	4.71	7.68	**4.69**
Second merger	0.60	0.89	0.52	**0.67**	4.71	7.68	8.96	**7.12**
FRANSABANK								
First merger	0.77	0.74	1.01	**0.84**	0.94	1.09	5.29	**2.44**
Second merger	1.09	5.29	6.76	**4.38**	32.53	31.59	25.08	**29.73**
SGBL Bank								
First merger	1.62	1.93	3.59	**2.38**	2.39	2.09	2.93	**2.47**
Second merger	40.69	43.34	40.24	**41.42**	39.52	30.74	31.22	**33.83**

The net operating income to total equity ratio also recorded an increase in the majority of operations (10 out of 11) post-merger activity, including insignificant increase in 3 operations, whereas only 1 operation recorded a decrease which is the second merger of SGBL. This indicates that banks are using their assets efficiently to generate profit.

Table 4. 9 Average results of net interest income to total equity ratio for acquiring banks (%)

Net interest income/ Total Equity Ratio								
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre-M&As	**Avg. Pre-merger**	1st year post M&As	2nd year post M&As	3rd year post M&As	**Avg. post-merger**
Bank AUDI	32.43	30.66	30.96	**31.35**	22.56	17.25	19.06	**19.62**
Bank of BEIRUT	31.21	32.14	32.87	**32.08**	21.16	26.81	20.12	**22.69**
BANKMED	14.78	9.40	8.66	**10.95**	14.07	24.00	15.08	**17.71**
IBL Bank	289.82	45.81	28.28	**121.30**	95.05	58.00	65.23	**72.76**
BLC bank	40.87	25.10	27.79	**31.25**	23.40	23.23	27.82	**24.81**
BYBLOS Bank								
First merger	41.54	39.58	40.41	**40.51**	33.95	27.46	30.11	**30.51**
Second merger	39.58	40.41	34.37	**38.12**	27.46	30.11	31.43	**29.67**
FRANSABANK								
First merger	41.09	40.58	37.73	**39.80**	34.10	38.72	27.85	**33.56**
Second merger	38.72	27.85	26.42	**30.99**	25.57	25.45	19.51	**23.51**
SGBL Bank								
First merger	68.59	59.24	48.39	**58.74**	42.81	41.35	39.89	**41.35**
Second merger	26.81	27.59	22.73	**25.71**	21.31	22.95	23.49	**22.58**

The net interest income to total equity ratio recorded a decrease in the majority of operations where 10 banks indicated a decrease in the averages post-merger compared to pre- merger activities with only BankMed recording an improvement in the average efficiency score, which indicates that management are not able to use their assets efficiently to generate earnings. The results are illustrated in Chart 4.5 below.

Table 4. 10 Average results of non-interest income to number of employee's ratio for acquired banks (Million L.L)

Non-interest income / Number of employees' ratio				
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre-M&As	**Avg. Pre-merger**
ABN AMRO Bank	28.32	35.10	36.81	**33.41**
ALLIED Bank	16.19	17.05	24.36	**19.20**
Banque de la BEKAA	22.14	21.66	31.35	**25.05**
BCP ORIEL Bank	108.45	137.74	147.52	**131.24**
BEIRUT RIYAD Bank	28.71	26.01	25.33	**26.68**
INAASH Bank	15.59	14.05	17.41	**15.69**
Banque LATI	22.93	29.72	24.76	**25.80**
Lebanese Canadian Bank	43.51	57.17	68.57	**56.42**
Banque SARADAR	37.44	55.01	88.55	**60.33**
United Bank of SAUDIA	17.23	15.45	11.11	**14.60**
WEDGE Bank	16.09	10.24	13.15	**13.16**

It can be noticed that most of the banks were able to generate non-interest income per employee before engaging in M&A activities except for Beirut Riyad bank, Banque Lati, United bank of Saudia and Wedge bank where they experienced a decline in non-interest income to number of employees' ratio. Referring to the results presented in Table 4.5 it can be noticed that Fransabank experienced a decline in this ratio after acquiring United bank of Saudia. However, the other acquiring banks (Byblos bank, BLC, and bank of Beirut) had not been affected by the decline experienced by the acquired banks.

Table 4. 11 Average results of non-interest income to total assets ratio for acquired banks (%)

Non- interest income / Total assets Ratio (%)				
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre-M&As	**Avg. Pre-merger**
ABN AMRO Bank	0.47	0.54	0.66	**0.56**
ALLIED Bank	0.68	0.61	0.79	**0.69**
Banque de la BEKAA	0.44	0.45	0.66	**0.52**
BCP ORIEL Bank	8.42	9.30	11.69	**9.81**
BEIRUT RIYAD Bank	0.96	0.83	0.82	**0.87**
INAASH Bank	1.02	0.73	0.82	**0.86**
Banque LATI	0.58	0.72	0.52	**0.60**
Lebanese Canadian Bank	0.45	0.48	0.54	**0.49**
Banque SARADAR	0.74	0.80	1.05	**0.86**
United Bank of SAUDIA	1.18	0.84	0.47	**0.83**
WEDGE Bank	0.77	0.44	0.50	**0.57**

Most of the banks were able to make efficient use of their assets to generate non-interest income except for Beirut Riyad Bank, Inaash Bank, Banque Lati, and United Bank of Saudia.

Table 4. 12 Average results of net interest income to total assets ratio for acquired banks (%)

Net interest income / Total Assets ratio				
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre-M&As	**Avg. Pre-merger**
ABN AMRO Bank	2.45	2.36	2.77	**2.53**
ALLIED Bank	2.60	2.37	2.39	**2.45**
Banque de la BEKAA	3.10	2.27	1.88	**2.42**
BCP ORIEL Bank	4.75	4.50	2.77	**4.01**
BEIRUT RIYAD Bank	0.09	0.10	0.10	**0.10**
INAASH Bank	2.22	1.56	1.32	**1.70**
Banque LATI	1.13	0.96	0.98	**1.02**
Lebanese Canadian Bank	1.79	1.56	1.72	**1.69**
Banque SARADAR	2.10	2.24	1.97	**2.10**
United Bank of SAUDIA	2.57	0.18	0.16	**0.97**
WEDGE Bank	2.39	2.52	2.16	**2.36**

Almost all the acquired banks were not able to make efficient use of their assets to generate earnings. This might explain the results presented in Table 4.7 where the majority of banks under study experienced a significant deterioration in net interest income to total assets ratio after engaging in merger operations.

Table 4. 13 Average results of net operating income to total assets ratio for acquired banks (%)

Net operating income / total assets Ratio				
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre- M&As	**Avg. Pre-merger**
ABN AMRO Bank	0.12	0.18	0.19	**0.16**
ALLIED Bank	0.05	0.07	0.18	**0.10**
Banque de la BEKAA	0.06	0.21	0.37	**0.21**
BCP ORIEL Bank	0.16	0.17	0.20	**0.18**
BEIRUT RIYAD Bank	0.06	0.06	0.05	**0.06**
INAASH Bank	0.08	0.04	0.06	**0.06**
Banque LATI	0.09	1.64	1.59	**1.11**
Lebanese Canadian Bank	1.83	1.69	1.88	**1.80**
Banque SARADAR	0.13	0.17	0.38	**0.23**
United Bank of SAUDIA	0.26	0.06	0.05	**0.12**
WEDGE Bank	0.10	0.05	0.05	**0.07**

Unlike the results of net interest income to total assets ratio presented previously, the results in this table show that the majority of banks were able to use their assets efficiently to

generate profit. This is also the case with the acquiring banks where the majority of merger operations (9 out of 11) recorded an increase in the net operating income to total assets ratio

Table 4. 14 Average results of net operating income to total equity ratio for acquired banks (%)

Net operating income / total equity Ratio				
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre- M&As	**Avg. Pre-merger**
ABN AMRO Bank	3.54	5.28	4.73	**4.52**
ALLIED Bank	1.16	1.53	4.22	**2.30**
Banque de la BEKAA	0.62	1.75	2.70	**1.69**
BCP ORIEL Bank	2.28	2.76	1.47	**2.17**
BEIRUT RIYAD Bank	1.34	1.20	1.14	**1.22**
INAASH Bank	1.14	1.03	1.98	**1.38**
Banque LATI	0.73	12.32	13.85	**8.96**
Lebanese Canadian Bank	26.67	24.63	27.26	**26.19**
Banque SARADAR	2.27	2.81	6.62	**3.90**
United Bank of SAUDIA	3.98	1.24	1.78	**2.33**
WEDGE Bank	1.17	0.55	0.72	**0.81**

Out of the 11 banks under study 5 operations recorded a decrease in this ratio. However, referring to Table 4.10 it can be seen that 9 out the 11 acquiring banks were able to make efficient use of their assets to generate profit

Table 4. 15 Average results of net interest income to total equity ratio for acquired banks (%)

Net interest income / total equity Ratio				
Bank	3 years pre-M&As	2 years pre-M&As	1-year pre- M&As	**Avg. Pre-merger**
ABN AMRO Bank	71.24	70.71	69.34	**70.43**
ALLIED Bank	55.51	53.32	54.76	**54.53**
Banque de la BEKAA	32.35	19.26	13.87	**21.83**
BCP ORIEL Bank	67.07	71.52	20.70	**53.10**
BEIRUT RIYAD Bank	19.73	21.67	20.58	**20.66**
INAASH Bank	31.12	41.38	42.97	**38.49**
Banque LATI	9.01	7.18	8.57	**8.26**
Lebanese Canadian Bank	26.07	22.80	24.88	**24.58**
Banque SARADAR	37.21	37.53	34.21	**36.32**
United Bank of SAUDIA	39.08	3.97	5.69	**16.24**
WEDGE Bank	27.90	30.90	29.16	**29.32**

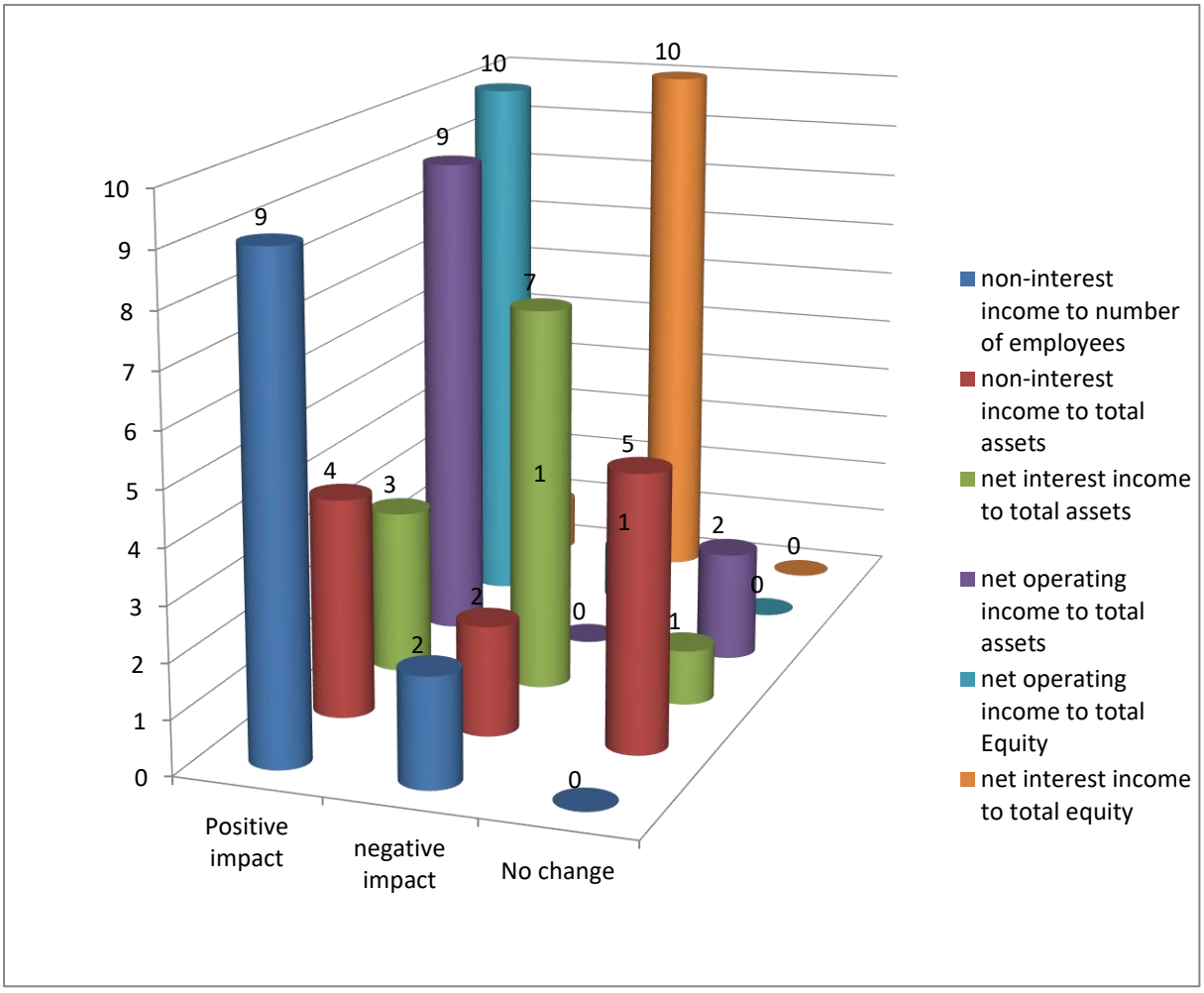
The majority of banks (10 out of 11) were not able to make efficient use of their assets to generate earnings with only INAASH Bank experiencing a slight increase. This result is in line with the results obtained for the acquiring banks, where also 10 banks indicated a

decrease in the averages post-merger compared to pre- merger activities with only BankMed recording an improvement in the average efficiency score.

It is noticed that Beirut Riyad Bank and United Bank of Saudia experienced a decline in all the six ratios employed, which means they were not able to make efficient use of their resources to generate profit. This inefficiency may have caused the acquiring banks to experience inefficiency in some of the ratios in turn. For instance, Fransabank (the acquiring bank of United Bank of Saudia) had a negative impact in most of the ratios, and Bank of Beirut (the acquiring bank of Beirut Riyad Bank) experienced a mixed impact between positive, negative, and no changes in some of the ratios. On the other hand, although Lati bank was unable to utilize its resources efficiency to generate profit in most of the ratios, however the mergers activity had a positive impact on BLC bank where it recorded a positive improvement in 4 out of the 6 ratios.

Referring back to the results of the acquiring banks, it can be noted that bank Audi, bank Med, BLC, and the second merger of each of Byblos bank and Fransabank indicated a positive impact in majority of ratios (4 out of 6 ratios) and 5 out of 6 ratios for Bank Med indicated an improvement in average scores. The results of bank Audi, supports to a certain extent the results of Sujud and Hachem (2018) who found a positive impact on the financial performance of Audi-Saradar Group. Using ratio analysis, their results show that return on assets and return on equity improved but only insignificantly, with a significant positive impact on earnings per share. The first merger of Fransabank indicated a decline in the average scores before and after the merger in 4 out of the 6 ratios. On the other hand, it is difficult to determine the overall impact of mergers on bank of Beirut, IBL, first merger of Byblos bank, and the two mergers of SGBL banks where the results were positive in half of the ratios and negative in the other half for IBL and second merger of SGBL banks, and equally mixed between positive, negative, and no change in average scores for bank of Beirut and first merger of SGBL bank, whereas the first merger of Byblos bank recorded a positive impact in 3 ratios and negative in 2 ratios with no change in average scores in 1 ratio.

Chart 4. 5 The impact of M&As on banks using Ratio Analysis.



Overall, the ratios of non-interest income to number of employees, net operating income to total assets, and net operating income to total equity indicated a positive improvement and thus M&As has a positive impact on the efficiency of these banks. However, the net interest income to total assets and net interest income to total equity ratios indicate a negative impact which means that M&A had a negative impact on the efficiency of these banks. As for the non-interest income to total assets ratio the result is mixed between 4 operations indicating a positive impact, 5 operations recording no changes in the efficiency of banks, with only two operations indicating a negative impact.

The negative impact of net interest income to total assets and net interest income to total equity ratios could be explained by the way that merger and acquisition activities are financed, changing the capital structure of the acquiring bank. The decrease in net interest

income to total assets ratio is usually from earning low interest income rate or that the lending activities of the bank is too low. As for the net interest income to total equity ratio, the decrease is attributed to that most banks finance their acquisitions using equity, which might suggest that banks engage in mergers and acquisitions when their profits are at the peak but are expected to decline in the future (Houston and Reyngaert, 1994). Furthermore, this decline in net interest income ratios indicate that the banks are relying on non-interest sources of funds which is evident in the increase in the non-interest income to total asset ratio in most banks. The decline in net interest income ratios could also indicate that the banks are facing limitations in generating income due to either a relatively stable population or an increasingly intense competition or both level (Sun et al., 2017). In this case, banks have to develop the non-interest income business in order to increase their total income.

The overall ratio results of each bank indicate that minority of merger operations (1 out of 11) has a negative impact on the efficiency of banks. This result supports the results of other researchers, who used ratio analysis to examine the impact of M&As on banks' performance, among which Kithitu et al. (2012), Nedunchezhian and Premalatha (2013), and Sahni and Mehandiratta (2013), and found that most operations recorded a positive improvement in efficiency of banks post-merger. However, this contradicts the results of other researchers who used ratio analysis to examine the post-merger performance of banks and found that M&As had a negative impact on the financial performance of banks (De Long and De Young, 2007; Kemal, 2011; Arshad, 2012; and Abbas et al., 2014). In line with this, Aktaş (2018) studied the performance changes of nine banks that were involved in merger and acquisition activities in Turkey and found that these activities have a diminishing effect on the asset quality, management capability, market risk, and liquidity ratios.

Both DEA and Ratio Analysis revealed mixed results regarding the impact of M&As on the efficiency of banks, where it was positive for some banks and negative or insignificant for others. This supports the results of other studies amongst which the study of Ghosh and Dutta (2016) that surveyed the literature of M&A and found that there is positive, negative as well as mixed impact on the financial performances of the acquirer and target firms of India.

The DEA results revealed a negative impact on almost half of operations (5 out of 11) under CRS model, whereas VRS model and ratio analysis revealed a positive impact on 5 out of 11 operations. However, the results of Ratio analysis also revealed a mixed impact on another 5

operations. Further, no changes in efficiency for 2 operations under CRS and 4 operations under VRS were revealed.

The two methods yielded opposite results, for instance, the impact of mergers on the efficiency of Bank of Beirut was negative under both CRS and VRS models, however it is mixed under ratio analysis. Likewise, as DEA analysis revealed a positive impact on the efficiency of the first mergers of Fransabank and SGBL banks, it was mixed under ratio analysis. Further, as no change in efficiency was indicated for Audi bank and the second merger of Byblos bank under DEA analysis, the impact was positive under ratio analysis. However, if ratio analysis to be compared with each of the DEA models separately, few common results would be found; the impact of mergers on the efficiency of BLC bank was positive under BBC model and majority of ratios (non-interest income to number of employees, net interest income to total assets, net operating income to total Assets, and net operating income to total equity ratios). Further, the impact of merger on the efficiency of Bank Med was positive under CRS model and majority of ratios (5 out of 6) with only the ratio of non-interest income to total assets recording no changes.

The contradictory result from the two different methods in the same set of mergers and acquisitions is in line with the results of other studies such as: Liu and Tripe (2003), Sufian et al. (2008), Ayadi and Arnaboldi (2008) and Krishnakumar and Sethi (2012). These contradictory results add to the inconclusive results found in the literature of mergers and acquisitions in the banking sector. On the other hand, this contradicts the view of Amel et al. (2004) who considered that the use of multiple methods aid in more understanding of merger impacts on performance. However, other studies that have used both ratio analysis and DEA have yielded similar results such as the study of Lai et al. (2015) who found no significant improvement in Malaysia Local banks' overall financial performance post-merger. Likewise, Said (2013) found that the mergers have not resulted in generating profits from assets or in return to shareholders post-merger. This result was compatible with DEA approach which found that Tunisian banks remained, on average, totally inefficient. Furthermore, Mat-nor et al. (2006), Awdi and El-Moussawi (2011) and San Ong et al. (2011) found that the merger operations do not add significant value to the banks under both ratio and DEA analysis. Thus, these studies support the aforementioned view of Amel et al. (2004).

In light of the mixed results obtained by Ratio analysis and DEA methodology, or at least what can be considered as insignificant impact of mergers and acquisitions on the efficiency

of banks in Lebanon, a question can be raised about why these strategies are still being used and supported by the Lebanese central bank. Although Lebanese banks like all banks around the world are motivated by financial synergies expected from mergers and acquisitions, however, one of the main motives behind the continuous use of M&A strategies is to avoid banking crisis. Referring back to the 90's, banks in Lebanon were lagging behind several factors as size, technology, and competition (Hakim and Neaime, 1998) and the banking sector constituted a large number of inefficient and undercapitalised banks (Awdeh and EL-Moussawi, 2011). Thus, in order to protect the sector from any possible crisis the Lebanese central bank decided to restructure the banking system, which could be done faster through consolidation processes.

The lack of investment opportunities in Lebanon and the high cost associated with maintaining high levels of liquidity which made it harder for banks to create profits, is yet another reason behind the banking sector engaging in merger and acquisition activities (FFA private bank, 2015). Furthermore, as Lebanon is located in a region that has been subject to ongoing political and security concerns, which made it difficult for banks to operate and thus prompted foreign banks to reconsider their presence in Lebanon and urged some small and medium-sized Lebanese banks to seek consolidation. For instance, when HSBC bank considered leaving the Lebanese market the central bank arranged M&A deal with Blom bank in 2017. Acquisitions are being considered as the most efficient way for banks to exit the market, and are being used to protect the banking sector from possible crisis including bankruptcy and liquidation (Hempel et al., 1994).

4.5 Summary

This chapter examined the impact of mergers and acquisitions on the efficiency of the 29 banks in Lebanon using both DEA methodology and ratio analysis.

The DEA methodology was employed in its CRS and VRS DEA models assuming intermediation approach. Comparing the results, it can be seen that most of M&A activities indicated similar results under both models; the merger activities of bank of Beirut and IBL bank indicated negative impact on the efficiency scores of banks under both models. The first merger activity of both Fransabank and SGBL bank indicated a positive impact on efficiency. Further, no changes in efficiency scores pre- and post-merger activities of bank Audi and the second merger of Byblos bank were indicated under both CRS and VRS models. Further, comparing the average efficiency scores three years before and three years after the merger, it

is observed that almost half of the operations indicate a negative impact on the efficiency of banks under CRS, whereas no observed changes in efficiency scores before and after M&As is indicated for most operations under VRS. Further, the changes in efficiency scores, whether positive or negative are almost insignificant for many banks. So, it may be concluded that mergers and acquisitions have insignificant impact on the efficiency of banks

In ratio analysis, six management efficiency ratios were chosen based on the inputs and outputs used in the DEA analysis. The ratios used are non-interest income to number of employees, non-interest income to total assets, net interest income to total assets, net operating income to total assets ratios, net operating income to total equity and net interest income to total equity. The data are collected three years before and three years after the merger as well as the year of the merger for the merging banks and three years before the merger for the acquired banks.

Three out of the six ratios; non-interest income to number of employees, net operating income to total assets, and net operating income to total equity indicate a positive improvement in majority of operations which indicates that majority of banks were able to make efficient use of their resources to generate more profit post-merger compared to pre-merger period. On the other hand, the net interest income to total assets and net interest income to total equity ratios indicate a negative impact in the majority of operations. The non-interest income to total assets ratio the result is mixed between 4 operations indicating a positive impact, 5 operations recording no changes in the efficiency of banks, with only two operations indicating a negative impact.

The results of DEA analysis reveal a negative impact on almost half of operations (5 out of 11) under CRS model, whereas VRS model and ratio analysis show a positive impact on 5 out of 11 operations. However, the results of Ratio analysis also show a mixed impact on another 5 operations. Further, no changes in efficiency for 2 operations under CRS and 4 operations under VRS are revealed. Overall, the two methodologies yield opposite results where the impact of mergers on the efficiency of Bank of Beirut is negative under both CRS and VRS models, ratio analysis show mixed results. Likewise, as DEA analysis show a positive impact on the efficiency of the first mergers of Fransabank and SGBL banks, it is mixed under ratio analysis. Further, as no change in efficiency for Audi bank and the second merger of Byblos bank is observed under DEA analysis, the impact is positive under ratio analysis. Both DEA and Ratio Analysis reveal mixed results regarding the impact of M&As

on the efficiency of banks, where it was positive for some banks and negative or insignificant for others.

Some researchers consider that the use of multiple methods aid in better understanding of merger impacts on performance Amel et al. (2004). This is supported by the studies of Matnor et al. (2006), Awdi and El-Moussawi (2011), San Ong et al. (2011), Said (2013) and Lai et al. (2015) who yielded the same results under both DEA and ratio analysis. However, this contradicts other studies who found contradictory results from the two different methods in the same set of mergers and acquisitions (Liu and Tripe, 2003; Sufian et al., 2008; Ayadi and Arnaboldi, 2008; and Krishnakumar and Sethi, 2012). These contradictory results add to the inconclusive results found in the literature of mergers and acquisitions in the banking sector.

Measuring the financial performance of firms after M&As is based on the assumption that when the assets of two entities are combined the comparison between the pre and post accounting data provides an accurate measure for the created synergies. The strengths of this methodology lay in being fairly straightforward, and that accounting performance can be directly measured and the data needed are both easy to understand and obtain (Badreldin and Kalhoefer, 2009). However, there are also several criticisms see for example: Mylonidis and Kelnikola (2005) and Harrison and Rouse (2016). For instance, in ratios only two dimensions of operation are considered which are described by the numerator and denominator. To add more dimensions to the analysis several ratios should be aggregated, however in this case the weights used for aggregation are subjective.

Furthermore, ratios usually indicate the presence of efficiency problems, but to know the source of inefficiencies further analysis is required. These problems can be solved using DEA, which calculates an aggregate measure of efficiency and provides information about efficiency improvement possibilities (Koltai and Uzonyi-Kecskés, 2017). A major advantage behind using DEA approach to measure performance is to identify opportunities for possible efficiency improvements by looking at the differences between efficient banks and inefficient ones (Mousa, 2015). Moreover, Tanko (2008) argues that ratio analysis is considered to be inappropriate for measuring the performance of sensitive institutions such as banks since it does not identify the peculiarities of the banking sector in terms of using multiple inputs to produce multiple outputs. The changing nature of the banking industry has made performance evaluations even more difficult, increasing the need for more flexible alternative forms of

financial analysis such as DEA methodology (Yannick et al., 2016; and Yaw-Shun et al., 2014).

The next chapter concludes the thesis.

Chapter Five: Conclusion

This Chapter will review the purpose, research questions, objectives, and importance of this study. It will also review the main findings of this research. Further, the limitations of this research will be highlighted and recommendations for future researchers will be presented. The thesis is then concluded with presenting the contribution of this research to both knowledge and practice. After which, the references and appendices are provided.

Mergers and acquisitions have been increasing in Lebanon due to the movement in the banking sector from small-family owned businesses to large banks competing to increase their shares in the market and achieve synergies. However, the impact of M&As on performance of Lebanese banks remains an understudied issue due to the limited number of published studies. Hence, the purpose of this thesis was to fill this gap in the literature. Further, determining what impact does mergers and acquisitions have on the efficiency of Lebanese banks is of great importance giving the critical role that banking sector plays in affecting the Lebanese economy. Add to that, such studies are important for policy makers and parties depending on this sector.

The studies conducted in the Lebanese context provided different findings; the study of Khaddage (2003) found a positive impact on the banking sector, while the study of Osman et al. (2008) showed that some banks were unable to gain back their original technical efficiencies before merger. Moreover, Awdeh and El-Moussawi (2011) found that, on average, merger operations do not add significant value to the acquiring banks. Likewise, the study of Sujud and Hachem (2018) found insignificant impact of merger activity on banks profitability. The findings of these studies support the inconclusive results in the literature regarding the impact of mergers and acquisitions on the performance of banks. Therefore, more studies in this area are needed to have a clear answer to the real impact of merger activities on the performance of banks. Further, as the findings of these studies cannot be generalized, this thesis aimed to overcome these limitations by conducting a study with which the results are both reliable and can be generalized.

Based on the intensive review of the literature, the input-oriented DEA approach in its CRS and VRS models are chosen to analyse the efficiency impact all bank mergers and acquisitions that have taken place in Lebanon from 1999 till 2012. The choice of input and output variables was based on the intermediation approach with interest expenses, general

expenses, total deposits, and number of employees as inputs, and interest income, non-interest income, and total loans as outputs.

The technical efficiency scores from 1996 to 2015 were calculated for all banks under study using CRS and VRS models. Comparing the results, the findings support the conclusion of other researchers regarding VRS model being more flexible than CRS model and thus allowing for more efficient units (Mester, 2003; Moormann, 2008; Othman et al., 2016; and Alrafadi et al., 2016). It was also noted that majority of banks belonging to an alpha group show a higher TE average than other bank groups which explains why most M&As in Lebanon include an alpha group bank. Further, unlike the findings of some researchers that about half of any efficiency gains should be apparent after one year whereas all gains should be realized within three years after the merger (Rhoades, 1998; Sufian, 2008; Said, 2013), the results obtained in this research show that the efficiency of some banks started to improve four years following the merger.

The average technical efficiency scores of banks were calculated three years before and three years after the merger activity. The results of CRS DEA model reveal a negative impact on the efficiency of banks for 5 operations, with 4 operations indicating a positive impact on banks' efficiency, whereas the technical efficiency of 2 out of the 11 operations remained unchanged after merger compared with pre-merger TE scores. On the other hand, the results of the VRS model reveal no observed impact on efficiency scores of 6 operations, with a positive impact on 3 operations, while the remaining 2 operations had a negative impact on the efficiency of banks. Overall, under the CRS DEA model almost half of M&As indicated a negative impact on the efficiency of banks, whereas no observed changes in efficiency scores before and after M&As were indicated for most operations under VRS DEA model. Further, the changes in efficiency scores, whether positive or negative, are almost insignificant for many banks. Hence, based on the DEA results it may be concluded that mergers and acquisitions have insignificant impact on the efficiency of banks in Lebanon.

For the purpose of having a more conclusive result on the impact of mergers on the efficiency of banks in Lebanon, six management efficiency ratios were also used. The ratios were chosen based on the inputs and outputs used in DEA methodology. The results revealed a positive improvement in non-interest income to number of employees, net operating income to total assets, and net operating income to total equity ratios which indicates that majority of banks were able to make efficient use of their resources to generate more profit post-merger

compared to pre-merger period. However, the net interest income to total assets and net interest income to total equity ratios indicate a negative impact in the majority of operations. As for the non-interest income to total assets ratio the result was mixed between 4 operations indicating a positive impact, 5 operations recording no changes in the efficiency of banks, with only two operations indicating a negative impact.

To answer the research question on whether M&A improves or deteriorates the efficiency of banks, it was found that M&A deteriorates the performance of banks under CCR-DEA approach with no changes in performance under BCC-DEA approach which questions the usefulness of these activities. On the other hand, these activities improve the performance of banks under ratio analysis technique where most of the used ratios indicated a positive impact. The mixed findings under different methodologies support the inconclusive results in the Literature of the impact of mergers and acquisitions on the performance of banks. It also supports the mixed results obtained by the studies that have examined the impact of mergers and acquisitions on the performance of Lebanese banks.

5.1 Limitations of the thesis

The path of conducting this research included multiple road bumps, which are expected, that can be classified into Technical and Non-Technical Limitations.

5.1.1 The Technical limitations are embodied in:

- Limited access to data: The DEA methodology and Ratio analysis both depend on sensitive data from the financial statements that are disclosed by banks, and thus the accuracy of this data is dependent on the conscience of these banks and their audits.
- Scarce of data resources: The aforementioned data are available in couple of sources. One of which is bank's websites, however the data for years prior to the last 5 years are difficult to get access to, add to that the data of acquired banks are no longer available on websites. Other sources were highly expensive, which left the researcher with a single source of publicly printed bank statements (Bilanbanque) that were available in the library of the American University of Beirut.
- Exclusions: Due to the scarcity of data resources explained above, some data were missing from both Bank's websites and Bilanbanques' books which lead to the exclusion of these banks from the study sample.

- Error Exposure when analysing Big Data: The big sample size of the data used in this research introduce some challenges. For instance, the limitation of sources discussed above forced the manual entry of these large data figures and thus exposing the data to manual errors as well as it is time consuming.

5.1.2 The Non-Technical limitations lie in:

- Time Management: Being a full-time employee in a governmental institution limited the time available to be dedicated for the research.
- Distance learning: The job mentioned above entitles the employee to remain in their home country. The physical absence of the supervisors means that they may not be available when needed due to other commitments and schedules. Thus, the difficulty in communications and the necessity to follow up personally on the course of this research forced several trips back and forth from Lebanon to the UK on the expense of time and money.
- Restriction on source availability: As mentioned in the previous technical limitations that access to the source (Bilanbanque) was exclusive for AUB, an extra difficulty lied in the restriction of this source to the perimeter of the university's library. Meaning that any attempt to retrieve lost data or acquire new ones was both time and effort consuming.

The aforementioned limitations did not affect the reliability of the results and analysis.

5.2 Future recommendations

Researchers interested in this field of study are advised to build up on the methodology of this thesis but including the banks that were excluded from this research in an attempt to obtain more conclusive results on the impact of mergers and acquisitions on the efficiency of banks in Lebanon. It would also be interesting to examine the efficiency of banks that were not involved in merger activities using the same methodology used in this research to be compared with the results of this study in order to gain more insights over the real impact of merger and acquisition activities.

5.3 Contribution to Knowledge

Mergers and acquisitions have had an important impact on the business environment for decades, and the literature of mergers and acquisitions have been enriched with the increasing

number of researches. However, finding suitable literature into the impact of merger and acquisition activities on performance of banks in the Lebanese context is a real challenge. As far as it is known, there are only five published studies in this area. Thus, the scarcity in the Lebanese literature is alarming giving the important weight that the Lebanese banking sector has in the Lebanese economy. Therefore, this study contributes to the body of knowledge by closing this gap in the literature.

Another contribution of this research lies in the limitations of the available studies which highlight the need for further studies in the Lebanese context. The results of these studies were found to be neither reliable nor can be generalized. Therefore, this research overcomes the limitations of the previous studies through generating more reliable results that can be generalized. That being said, this research contributes to the body the knowledge by being the first study in Lebanon, to the best of our knowledge, which covers all the mergers activities that took place in the time frame between 1999 till 2012.

Lebanese banks have been engaging in M&As over the last decades with more deals expected to take place in the coming years (ABL, 2018). However, there is an ongoing debate in the literature over the real impact of these activities on banks performance. Therefore, the results of this research contribute to the existing debate in the literature regarding the real impact of these activities. Furthermore, the studies conducted on Lebanese banks provided mixed results and thus inconclusive answer on whether these activities improve or deteriorates the performance of banks. Therefore, establishing a clearer understanding on the impact of banks M&As on performance is of great importance given the essential role that the Lebanese banking sector plays in influencing the country's economic conditions. Moreover, a clear answer to this debate helps decision makers decide whether to encourage further mergers or not.

Finally, this study also contributes to the body of knowledge in shedding light on the Data Envelopment Analysis methodology which is still considered an unfamiliar approach among Lebanese researches. Due to the advantages of non-parametric methods over other methodologies, DEA has gained the interest of both researchers and managers (Varias and Sofianopoulou, 2012) which resulted in the widespread application of this technique. In fact, the most intensively studied sector in the DEA literature is probably the banking sector (Novickytė and Droždz, 2018). However, from the handful studies in the Lebanese literature,

only two studies have used DEA to examine the impact of mergers on the performance of banks, with another two studies using it to assess the efficiency of Lebanese banks in general.

5.4 Contribution to Practice

Merger and acquisition activities have been continuously encouraged by the governor of the Lebanese central bank on the belief that it is the most efficient way to develop the performance of small banks, increase their ability to grow and prosper in the market, and become more competitive through economies of scale. However, there is a debate in the literature over the real impact of these activities on the performance of banks, and a dilemma in the research community on whether the banking industry has undergone through massive restructuring based on a misguided belief of value gains or that shareholders as well as the public have not been told the truth about the real effects of M&A activities on both shareholders value and performance of banks (Elumilade, 2010). Thus, establishing a clearer understanding on the impact of M&As on the performance of banks in Lebanon is of great importance for policy makers and every party relying on this sector.

The main contribution of this study to practice lies in the findings, as they serve as a guideline for decision makers on whether to reconsider or encourage these activities in the future. Despite that merger and acquisition activities are continuously adopted by the Lebanese central bank, even in the difficult times the banking sector is currently facing the central bank is considering these activities as a strategy to restructure and reform the banking sector so it can survive the current shock, however these activities do not always deliver what is intended in terms of financial performance. The findings of this study show that these activities have insignificant impact on the financial performance of banks, which recommends that decision makers and central bank should reconsider the use of these activities.

The efficiency of banks is one of the most important issues in the financial market due to the major impact it has on the banking sector, which in turn affects the whole monetary system and thus the entire economy (Alrafadi et al., 2016). Therefore, information about the efficiency of banks is of high importance, especially if it allows policy makers to identify any deficiencies in banks' operations upon which necessary actions are taken. That being said, the methodology used in this study allows management to objectively identify the best practitioners and the areas in need of improvement within the bank’s complex operating situations (Paradi and Zhu, 2013). It also identifies the best practice frontier and indicates

targets for inefficient units to improve (Sowlati and Paradi, 2004). Therefore, another contribution to practice lies in the findings obtained from DEA application. The results obtained from DEA methodology identify the inefficient banks and indicate the source and the number of inefficiencies in banks. Thus, this information help decision makers in banks to determine the actions needed to treat the inefficiency factors and improve the inefficient bank to the desired level.

This study intends to help both academics researchers and policy makers, where researchers can use this study to gain more information about mergers and acquisitions and their impact on the financial performance of banks, and decision makers can use the results of this study to find out whether they are able to achieve the intended outcomes from mergers or not and thus decide whether to reconsider or continue using these activities in the future.

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Appendices

Appendix A: Differences between qualitative and quantitative research methods

Criteria	Qualitative Research	Quantitative Research
Objective/Purpose	To understand and interpret social interactions.	To test hypotheses, look at cause and effect, and make predictions.
Group Studied	Smaller and not randomly selected.	Larger and randomly selected.
Variables	Study of the whole not variables	Specific variables studied
Type of data collected	Words, images, or objects.	Numbers and statistics.
Form of Data Collected	Qualitative data such as open-ended responses, interviews, participant observations, field notes, and reflections.	Quantitative data based on precise measurements using structured and validated data-collection instruments.
Type of Data Analysis	Identify patterns, features, themes.	Identify statistical relationships
Objectivity and Subjectivity	Subjectivity is expected.	Objectivity is critical.
Role of Researcher	Researcher and their biases may be known to participants in the study, and participant characteristics may be known to the researcher.	Researcher and their biases are not known to participants in the study, and participant characteristics are deliberately hidden from the researcher (double blind studies).
Results	Particular or specialized findings that is less general.	General findings that can be applied to other populations.
Scientific Method	Exploratory or bottom–up: the researcher generates a new hypothesis and theory from the data collected.	Confirmatory or top-down: the researcher tests the hypothesis and theory with the data.
View of Human Behavior	Dynamic, situational, social, and personal.	Regular and predictable.
Most Common Research Objectives	Explore, discover, and construct.	Describe, explain, and predict.
Focus	Wide-angle lens; examines the breadth and depth of phenomena.	Narrow-angle lens; tests a specific hypothesis.
Nature of Observation	Study behavior in a natural environment.	Study behavior under controlled conditions; isolate causal effects.
Nature of Reality	Multiple realities; subjective.	Single reality; objective.
Final Report	Narrative report with contextual description and direct quotations from research participants.	Statistical report with correlations, comparisons of means, and statistical significance of findings.

Appendix B: Summary of some of the studies and methodologies used to examine the impact of M&As on banks' performance

Table B.1: Review of studies using Event Study methodology

Review of studies using Event Study methodology		
Results	**Period / measures**	**Summary**
No improvement in performance after merger	Window: ten days prior to the announcement of a merger and acquisition	Liargovas, and Repousis (2011) studied the impact of mergers and acquisitions on performance of the Greek banking sector
	Window: 3 years post-merger Period: 1987 - 2000	Olson and Pagano (2005) Studied the impact of bank mergers on the long run performance of US banks
Improvement in performance after merger	Measure: CAR Windows: 2 days and 3 days Sample: 84 transactions from seven countries. Period: 1998-2005	Ma, Pagan, Chu (2011) analyzed of stock responses to two different types of banking M&A deals, specifying M&A and diversifying M&A, we find that specifying M&A deals incur positive cumulative abnormal returns (CAR) in both two-day and three-day windows without controlling for firm size. Diversifying M&A deals incur positive CAR in two different event windows
	Sample: 132 bank mergers Period: 1998-2009	Molyneux, Goddard and Zhou (2011) took a sample of 132 of M&As involving banks in emerging markets in Asia and Latin America to assess the impact of these activities on shareholders' value.
	Window: from the last business day of the month before the provisional merger agreement was signed until the last business day of the month in which the agreement was signed. Sample: 167 takeovers Period: Forty Years from 1885 until 1925	Braggion, Dwarkasing and Moore (2010) studied the effects of bank mergers and acquisitions in the UK and found positive wealth effects for bidders and targets in the month of the M&A announcement
Mixed results	Window: from -40 days to the date of announcement to 40 days. Sample: 4 mergers Period: from 1999 to 2008.	Bihari (2012) assessed whether mergers and acquisitions are beneficial for the Indian banks. The combined effect is positive for target banks and negative for bidder banks

Source: author's own elaboration

Table B.2: Review of studies using Accounting Return methodology

Review of studies using Accounting Return methodology		
Results	**Period / measures**	**Summary**
No improvement in performance after merger	Measures: Profitability, Efficiency, Leverage, and Liquidity ratios. Sample: 10 banks	Abbas et al. (2014) evaluated the financial performance of banks in Pakistan after M&A
	Measures: 11 ratios under efficiency ratios, liquidity ratios and capital ratios Period: 2004-2006 before merger and 2007-2009 after the merger	Arshad (2012) analyzed the performance of Standard Chartered Bank of Pakistan using quantitative and cross sectional study ratio.
	Measures: 20 financial ratios of profitability, liquidity, assets management, leverage, and cash flows	Kemal (2011) analyzed the performance of Royal Bank of Scotland
Improvement in performance after merger	Measures: ROE, Capital adequacy ratios, and Solvency ratios Period: 5 years before and 5 years after the merger	Anthony (2019) studied the effects of mergers and acquisitions on the financial performance of commercial banks in Kenya.
	Measures: liquidity, profitability, investment, and solvency ratios. Period: 2004-2015	Muhammad et al. (2019) performed a comparative analysis of the impact of pre and post M&A on the financial performance of banks in Pakistan
	Measures: CAMEL model; Capital adequacy, Earning quality, Asset Quality, Management quality and liquidity ratios. Period: 10 years period	Sahni and Gambhir (2018) evaluated the impact of Merger and Acquisition on the financial performance of selected commercial banks in India
	Measure: profitability ratios; Return on Assets (ROA), Return on Equity (ROE), Return on Investment (ROI), and Debt to Equity Ratio (DER). Period: 2004-2015 ; before, during, and after merger and acquisition	Ntuli (2017) evaluate the performance of the South African banking institution that was acquired by Barclays Plc. The major finding is that the acquired ABSA is doing better than at the pre-acquisition stage and the share price of the acquired ABSA has been increasing since 2005 to 2015
	Period: pre-merger period (2003-2006) and post-merger period (2008-2011)	Nedunchezhian and Premalatha (2013) analyzed the impact of financial performance of commercial Banks after mergers in India.
	Measures: Liquidity ratios, Solvency ratios, and Profitability ratios Sample: 1 bank	Sahni and Mehandiratta (2013) studied the impact of merger on the operating profit of the ICICI Bank. They found that merger has increased the liquidity and profitability position of ICICI bank in

		India.
	Sample: 74 cases of M&A	Kumar and Bansal (2012) studies the impact of mergers and acquisitions on corporate Long term performance in India.
	Measures: EPS, ROA and ROE Period: 1997 to 2010 Sample: 6 banks	Kithitu, Cheluget, Keraro, and Mokamba (2012) analyzed the pre- and post-performance measures to determine whether M&As have any impact on the performance of commercial banks in Kenya.
	Measures: Operating income, ROA Sample: 30 large bank mergers Period: 1982-1987	Cornett and Tehranian (1992) assessed the performance of 30 large US bank mergers (acquisition prices of at least $100 million)
Mixed results	Measures: Sample: 13 banks	Njogo et al. (2016) evaluated the impact of mergers and acquisitions which started in 2005 on the performance of deposit money banks in Nigeria. The results revealed that it is still impossible to clearly state whether mergers and acquisitions in the Nigerian banking sector had a positive impact on the banks performance.
	Measures: ROE and ROA ratios Window: 3-year period post M&A. Period: 10 years from 1998 to 2008	Huian (2012) assessed the post M&A financial performance and profitability of Romanian Banks. The findings were mixed. On one hand, bank M&A in Romania does not result in improved ROE or ROA in the post M&A 3-year period under review. On the other hand, merged banks report media NIM above industry.
	Measure: Basic ROE Scheme Period: 2002-2007.	Badreldin and Kalhoefer (2009) studied The Effect of Mergers and Acquisitions on Bank Performance in Egypt. They found that not all banks that have undergone deals of mergers or acquisitions have shown significant improvements in performance and return on equity when compared to their performance before the deals. That is to say, M&A have not had a clear effect on the profitability of banks in the Egyptian banking sector.

Source: author's own elaboration

Table B.3: Review of studies using Data Envelopment Analysis

Review of studies using Data Envelopment Analysis (DEA)		
Results	**Period / measures**	**Summary**
No improvement in performance after merger	Measure: input oriented measure under CRS assumption Period: 2000 to 2009	Chaudhary et al. (2016) investigated the effect of M&As upon banking sector efficiency in Pakistan. The findings of study show a decline in average efficiency scores for majority of the sample banks during post-merger/acquisition period
	Measures: technical and scale efficiency Sample: 2 bank mergers	Bin Dost, Ahmad, and Warraich, (2011) assessed the impact of mergers and acquisitions on two banks in Pakistan.
	Period: 8 years from 1997 till 2004	Ayoubi (2008) assessed the impact of M&A activities on Lebanese banks
	Measure: Malmquist productivity index. Sample: 10 banks (5 merged) Period: 1993-2004	Rezitis (2008) investigated the effect of M&As the Greek banking. The result of the study showed negative effect on efficiency and total factor productivity.
Improvement in performance after merger	Measure: production and the intermediation approach	Wanke et al. (2016) analyzed the impact of M&A on Banks in South Africa. The analysis affirms that the vast majority of the M&As analyzed in the South African banking industry are beneficial not only in terms of the overall merger effect, but also with respect to the technical efficiency effects
	Sample: 9 anchor banks Period: 16 years	Abdul Kadir et al. (2011) identify the effects of the consolidation program on 9 Malaysian anchor banks
	Measures: efficiency scores and Malmquist productivity index Period: from 1995 till 2005.	Mahadzir and Hasni, (2009) assessed the Impact of merger on efficiency and productivity in Malaysian commercial banks
	Measure: Malmquist index based approach	Gattoufi et al. (2008) tracked the impact of mergers and acquisitions on the efficiency of commercial banks in MENA Countries
	Measure: Malmquist productivity Period: 5 years	Tanko (2008) analyzed the efficiency effect of M&As on Nigerian commercial banks
	Sample: 10 domestic commercial banks Period: 1998-2003	Sufian (2004) studied the efficiency effects of bank M&As in a developing economy: Evidence from Malaysia. Their results suggested small and medium size banks have benefited the most from the merger and expansion via economies of scale. On the other hand, our results suggest that the larger banks should shrink to benefit from scale advantages.
Mixed results	Measures: profit efficiency and cost efficiency	Singh (2009) examined the efficiency benefits of mergers among few scheduled commercial banks in India

	Period: 2000-2001	

Source: author's own elaboration

Table B.4: Review of studies using other methodologies

Review of studies using other methodologies		
Results	**Methodology**	**Summary**
No improvement in performance after merger	Method: survey conducted on Sample: 20 CEO and managers over 10 banks	Akinbuli and Kelilume (2013) studied the effects of M&As on corporate growth and profitability in Nigeria
Improvement in performance after merger	Method: Questionnaire Sample: 14 banks Period: 2000 - 2014	Joash and Njangiru (2015) analyze whether the merger had any effect on the banks' performance in Kenya. The study found out that the mergers and acquisitions raised the shareholders' value of the merged/acquiring banks in Kenya
	Method: case study approach Sample: Byblos bank Period: before and after merger (dec2001-dec2002)	Khaddage (2003) assessed the impact of merger and acquisition activity on the Lebanese banking sector
Mixed results	Method: Case study approach Measures: changes in a set of financial ratios in terms of Efficiency, profitability and strength of consolidated institutions Period: from 1988 till 1997	Fuentes and Sastre (1999) studied the impact of M&As on the performance of Spanish banking industry. The mergers analyzed in this study give no clear results as regards improvements in the profit-generating capacity or efficiency levels of the merged institutions.

Source: author's own elaboration

Table B.5: Review of studies using multiple methodologies

Review of studies using multiple methodologies		
Results	**Methods**	**Summary**
No improvement in performance after merger	1. Accounting data (Financial ratios) Measures: profitability ratios liquidity ratio, market-based performance, cost saving ratios and leverage ratios. 2. DEA Also applied T-Value testing and paired sample T-test. Period: pre-merger (1999-2001) and post-merger (2002-2010) Sample: 8 local banks	Lai et al. (2015) investigated the level of efficiency and financial performance of Malaysia local banks after the banking sector's merger and acquisition in year 2000
	1. Event study 2. Accounting data (Financial ratios)	Donna (2014) studied the impact of M&As on Bank Performance The result of event study analysis shows negative but not significant performance changes of bidder banks following mergers and acquisitions the financial ratio analysis shows statistically significant negative changes of performance of bidder banks following mergers and acquisitions
	1. Accounting ratio analysis 2. Data Envelopment Analysis approach	Said (2013) studied the Performance and efficiency effect of all Tunisian bank 3 years before and after mergers and acquisitions (5 mergers and acquisitions)
	1. Accounting data (ratio analysis) 2. DEA approaches Sample: 25 banks	Awdeh and EL-Moussawi (2011) studied the operational performance in terms of profitability and efficiency of Lebanese banks engaged in M&A activities
	1. Accounting data (ratio analysis) Also applied T-tests 2. DEA method	San Ong et al. (2011) analyzed the financial performance and efficiency changes of Malaysian commercial banks after M&As
	1. Accounting data Measures: ROE and ROA 2. Event study (bank stock prices)	Bryant (2008) assessed the overall performance changes of six mergers (two mergers for each bank) announced between 1998 and 2004
	1. Accounting data	Mat-nor et al.(2006) analyzed the financial performance and efficiency changes of Malaysian

	2. DEA analysis	banking
	1. Event study (3 year window) 2. Data Envelopment Analysis	Sufian (2006) investigated the effects of mergers and acquisitions on Singapore domestic banking groups' efficiency
	1. Accounting data 2. Event study analysis	Mylonidis and Kelnikola (2005) assessed the impact of merging activity on financial performance and operating performance of Greek banking system Consistent with the international literature, OP results do not provide much evidence of performance gains resulting from bank mergers. Nevertheless, merged banks seem to outperform the group of non-merging banks. The event study approach indicates that mergers create value on a net aggregate basis.
Improvement in performance after merger	1. correlations analysis 2. descriptive statistics 3. multiple regression	Njambi and Kariuki (2018) assess the effects of mergers and acquisitions on financial performance of financial institutions in Kenya. The study concludes that commercial firms' financial performance improves with the merger and acquisition.
	1. qualitative (descriptive) approach 2. quantitative approaches	Hang et al. (2016) studied the impact of mergers on the performance of banks in Vietnam. The study concluded that M&As have a positive impact on Vietnam commercial banking system, and has achieved its target in terms of: reducing NPLs, increasing competence, stabilization and safety.
	1. Ratio technique 2. Inferential statistical tools. Measures: Operational efficiency, Financial stability and Shareholders funds. Sample: 2 banks	Adegboyega (2012) assessed the impact of M&As on 2 consolidated banks in Nigeria using both quantitative and qualitative methods
	1. Accounting data 2. Stock return data Period: 1990-2000	Cornett et al. (2006) examined operating performance around commercial bank mergers.
	1. Balance-sheet ratios analysis Measures: cost, profitability, risk and activity ratios. 2. DEA approach Measures: Cost and profit efficiency scores analysis	Ayadi and Pujals (2005) studied the impact of Banking mergers and acquisitions in the EU on the performance of banks

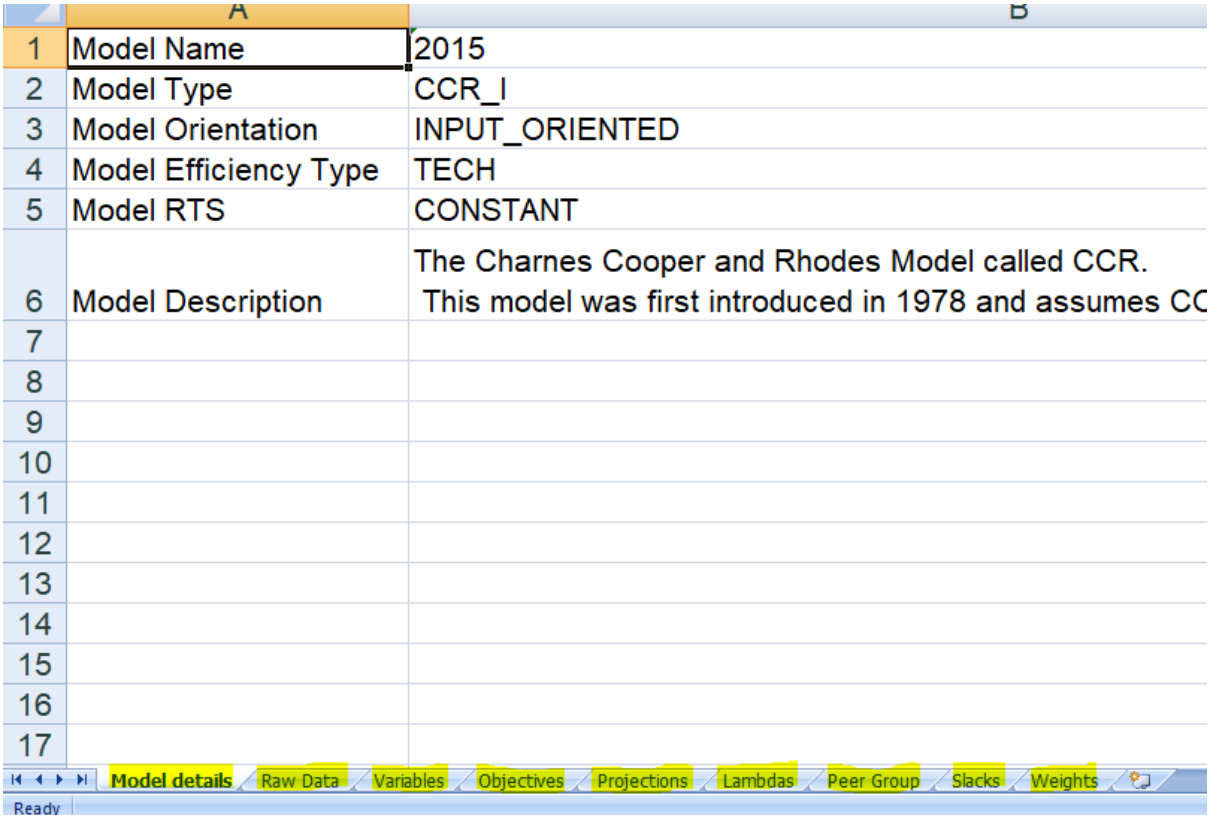
Mixed results	1. Questionnaires 2. Ratios Sample: 9 banks (3 mergers and 6 acquisitions) Period: 2010-2017	Ombaka and Jagongo (2018) examined the influence of mergers and acquisitions on financial performance of commercial banks in Kenya. the study recommends that firms should conduct thorough risk analysis and assess ability of their partners before engaging in mergers or acquisitions transactions
	1. Ratio analysis 2. paired sample t-test	Sujud and Hachem (2018) analyzed the pre- and post-merger effects on financial performance of Audi-Saradar Group. The results reveal that ROA and ROE improved but only insignificantly. The merger had no significant positive impact on the rate of return on shareholders' equity and on return on assets. Earnings per share increased significantly after the merger. The merger had significant positive impact on earnings per share.
	1. Comprehensive approach Measures: cost and profit efficiency. 2. Accounting ratios analysis Sample: 714 deals involving EU acquirers and targets located throughout the world Period: 1991-2005	Beccalli and Frantz (2009) analyzed the impact of M&As on banking performance in Europe and found that M&A operations are associated to a slight deterioration in profit efficiency and contemporaneously to a pronounced improvement in cost efficiency in the 6 years after the deal. Moreover, these changes exhibit a particularly negative trend for cross-border deals: in domestic deals, cost efficiency improves more markedly than in cross-border deals, and profit efficiency remains unchanged instead of diminishing
	1. Accounting data (Financial ratios) Measures: profitability 2. DEA analysis Measures: cost and profit efficiency Sample: 71 merger transactions Period: 1996-2000	Ayadi and Arnaboldi (2008) studied the impact of M&As on banking performance in Europe
	1. A Joint Estimation of Non-Parametric and Parametric Analysis 2. Financial Ratios Analysis	Sufian et al. (2008) assessed the efficiency and Bank Merger in Singapore. A Joint Estimation of Non-Parametric and Parametric approach showed that merges resulted in higher mean overall efficiency of Singapore banks. Ratio analysis indicated that Merger has not resulted in a higher profitability of the Singapore banking groups post-merger.

	1. Accounting ratios analysis 2. DEA analysis Sample: 6 banks	Liu and Tripe (2003) studied bank mergers and efficiency gains of New Zealand banks. In a majority of cases the merger led to an increase in efficiency. However, no clear conclusions could be drawn on possible public benefits from the mergers.

Source: author's own elaboration

Appendix C: CCR DEA Excel Worksheets for year 2015

C.1: Excel worksheets (Tabs) for the input-oriented CCR model results



	A	B
1	Model Name	2015
2	Model Type	CCR_I
3	Model Orientation	INPUT_ORIENTED
4	Model Efficiency Type	TECH
5	Model RTS	CONSTANT
6	Model Description	The Charnes Cooper and Rhodes Model called CCR. This model was first introduced in 1978 and assumes CC
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Model details | Raw Data | Variables | Objectives | Projections | Lambdas | Peer Group | Slacks | Weights

Ready

C.2: Objective worksheet for the year 2015 under CCR Model

	A	B	C	D
1	DMU Name	Objective Value	Efficient	
2	Fransabank	1	Yes	
3	United Bank of Saudia & Lebanon	0		
4	Banque de la Bekaa	0		
5	Al Ahli International Bank	0		
6	BLC Bank	1	Yes	
7	United Bank of Lebanon	0		
8	Lati Bank	0		
9	Société Générale (SGBL)	0.986010703		
10	Inaash Bank	0		
11	Lebanese Canadian Bank	0		
12	Crédit Libanais	0.950852358		
13	Bank AudiSaradar group	1	Yes	
14	Banque Saradar	0		
15	Bank of Beirut	0.980821976		
16	Beirut Riyad Bank	0		
17	Intercontinental Bank of Lebanon (IBL)	1	Yes	
18	BCP Oriel BanK	0		
19	Byblos Bank	1	Yes	
20	Wedge Bank	0		
21	ABN Amro Bank	0		
22	BankMed	0.967010957		
23	Allied Bank	0		
24	Emirates Lebanon Bank	1	Yes	
25	BNPI	0		
26	Cedrus Bank	1	Yes	
27	Standard Chartered	0		
28	Saradar Bank (BIT and NECB)	1	Yes	
29	NECB	0		
30	Banca Di Roma	0		
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Model details | Raw Data | Variables | **Objectives** | Proje

C.3: Input 0and Output Slacks worksheet for the year 2015 under CCR Model

DMU Name	(I)Interest expenses	(I)General expenses	(I)Total deposits	(I)Number of employees	(O)Interest income	(O)Noninterest income	(O)Total loans
Fransabank	0	0	0	0	0	0	0
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Bekaa	0	0	0	0	0	0	0
Al Ahli International Bank	0	0	0	0	0	0	0
BLC Bank	0	0	0	0	0	0	0
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	0	0	0	0	0	0	0
Société Générale (SGBL)	0	0	0	0	0	0	2245854.398
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	0	0	0	0	0	0	0
Crédit Libanais	0	0	0	13.87799934	0	2267.959907	21834.947
Bank AudiSaradar group	0	0	0	0	0	0	0
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	0	0	5968166.186	0	0	11538.02586	0
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	0	0	0	0	0	0	0
BCP Oriel BanK	0	0	0	0	0	0	0
Byblos Bank	0	0	3.2452E-09	0	0	0	0
Wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	1179.297656	0	0	0	0	0	0
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	0	0	0	0	0	0	0
Cedrus Bank	0	0	0	0	0	0	0
Standard Chartered	0	0	0	0	0	0	0
Saradar Bank (BIT and NECB)	0	0	0	0	0	0	0
NECB	0	0	0	0	0	0	0
Banca Di Roma	0	0	0	0	0	0	0

C.4: Peer group worksheet for the year 2015 under CCR Model

	A	B
3	United Bank of Saudia & Lebanon	
4	Banque de la Bekaa	
5	Al Ahli International Bank	
6	BLC Bank	BLC Bank.
7	United Bank of Lebanon	
8	Lati Bank	
9	Société Générale (SGBL)	BLC Bank, Bank AudiSaradar group, Intercontinental Bank of Lebanon (IBL), Cedrus Bank, Saradar Bank (BIT and NECB).
10	Inaash Bank	
11	Lebanese Canadian Bank	
12	Crédit Libanais	Fransabank, BLC Bank, Intercontinental Bank of Lebanon (IBL).
13	Bank AudiSaradar group	Bank AudiSaradar group.
14	Banque Saradar	
15	Bank of Beirut	BLC Bank, Bank AudiSaradar group, Intercontinental Bank of Lebanon (IBL), Emirates Lebanon Bank.
16	Beirut Riyad Bank	
17	Intercontinental Bank of Lebanon (IBL)	Intercontinental Bank of Lebanon (IBL).
18	BCP Oriel BanK	
19	Byblos Bank	Byblos Bank.
20	Wedge Bank	
21	ABN Amro Bank	
22	BankMed	BLC Bank, Bank AudiSaradar group, Intercontinental Bank of Lebanon (IBL), Byblos Bank, Cedrus Bank.
23	Allied Bank	
24	Emirates Lebanon Bank	Emirates Lebanon Bank.
25	BNPI	
26	Cedrus Bank	Cedrus Bank.
27	Standard Chartered	
28	Saradar Bank (BIT and NECB)	Saradar Bank (BIT and NECB).
29	NECB	
30	Banca Di Roma	
31		
32		

Model details | Raw Data | Variables | Objectives | Projections | Lambdas | Peer Group | Slacks | Weights

Appendix D: Raw data of each bank for each year under study for DEA Analysis

D.1: Raw data for the year 1996

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninterest income	(O) Total loans
Fransabank	175196	15115	1829402	700	240898	22898	558071
United bank of Saudia & Lebanon	9558	4190	92348	132	16565	1032	64546
Banque de la Békaa	13225	2351	112574	64	18416	312	30967
Al Ahli International Bank	0	0	0	0	0	0	0
BLC Bank	70932	6823	858951	463	97203	6434	328453
United bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	2360	997	22544	25	3001	1363	11943
Société Générale (SGBL)	148939	17578	1720839	642	198366	19880	720254
Inaash Bank	8152	3892	82919	108	11938	848	30789
Lebanese Canadian Bank	23806	6203	273861	130	32839	1797	105933
Crédit Libanais	106048	16803	1052925	775	157458	18666	223360
Bank Audi	232606	22116	2390819	678	319639	16453	814037
Banque Saradar	60243	10247	824271	424	90002	9883	374089
Bank of Beirut	37259	6123	581640	165	52259	5416	212650
Beirut Riyad Bank	64500	17854	688245	367	8891	9293	404419
Intercontinental Bank of Lebanon (IBL)	4938	1145	66401	67	8610	807	30534
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	179448	42839	1725283	595	264794	16998	693079
Wedge Bank	16772	6162	178025	120	22768	1973	65704
ABN Amro	36347	10029	529922	125	52365	2986	242410
BankMed	343962	42821	2881048	681	435624	23035	1727850
Allied Bank	15237	4950	227315	324	26322	7772	85094
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	99647	13484	1538872	232	145640	12846	503709
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	0	0	0	0	0	0	0
Banque de l'Industrie et du Travail (BIT)	21037	7363	261247	81	27384	4957	138156
Near East Commercial Bank (NECB)	5523	2241	49924	67	8414	3438	18070
Banca Di Roma	8525	1828	135980	57	14676	1236	36683

D.2: Raw data for the year 1997

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninterest income	(O) Total loans
Fransabank	196165	40302	2137952	691	296771	14701	682583
United bank of Saudia & Lebanon	1121	4971	111185	144	16671	16245	92286
Banque de la Békaa	14428	3109	127895	62	19058	997	34892
Al Ahli International Bank	0	0	0	0	0	0	0
BLC Bank	78433	27775	965387	523	125204	14604	450202
United bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	2390	1052	27418	25	3408	353	14801
Société Générale (SGBL)	177942	36926	2160712	657	248629	20775	878980
Inaash Bank	13550	4942	156483	138	18150	2152	84646
Lebanese Canadian Bank	23806	6203	306029	126	37942	2461	102210
Crédit Libanais	128596	39678	1321351	798	181885	15412	328860
Bank Audi	269177	59383	3235356	867	372397	28878	1216540
Banque Saradar	82289	27760	1063629	430	121025	8316	503382
Bank of Beirut	62606	13436	902338	183	86720	7116	313147
Beirut Riyad Bank	80659	19420	815433	370	100780	12927	482599
Intercontinental Bank of Lebanon (IBL)	5316	2694	64541	64	8945	2477	35599
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	204342	50355	3017700	1063	304463	22554	1289896
Wedge Bank	19882	6241	201550	126	26606	2421	77833
ABN Amro	44503	13350	638690	141	63436	5031	289767
BankMed	453767	43942	4199684	663	586679	14795	2120062
Allied Bank	18273	11485	256041	324	28939	6062	101262
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	99647	13484	1538872	232	145640	12846	503709
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	0	0	0	0	0	0	0
Banque de l'Industrie et du Travail (BIT)	23524	7670	301288	183	31692	2922	136705
Near East Commercial Bank (NECB)	8070	4100	79307	73	12147	1326	30544
Banca Di Roma	7588	4901	140775	61	12804	1872	41263

D.3: Raw data for the year 1998

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninterest income	(O) Total loans
Fransabank	238579	45363	2587207	707	337747	15109	878344
United bank of Saudia & Lebanon	14325	4109	131476	126	19040	2171	117415
Banque de la Békaa	16246	3180	156790	60	21539	797	41313
Al Ahli International Bank	0	0	0	0	0	0	0
BLC Bank	90780	37160	1165633	614	149635	15235	575021
United bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	2666	1199	29661	25	3717	504	15022
Société Générale (SGBL)	218484	38201	2446325	681	291237	13017	954280
Inaash Bank	26378	7532	298167	207	32616	2909	131642
Lebanese Canadian Bank	33469	8659	411395	141	44852	2676	134391
Crédit Libanais	158479	40567	1791896	762	210336	17841	422526
Bank Audi	328778	73785	3657469	880	459817	30819	1296211
Banque Saradar	137718	40502	1563672	455	190871	22825	974923
Bank of Beirut	85286	16553	1720287	498	118077	8855	640628
Beirut Riyad Bank	90260	20408	881294	378	104355	11130	526005
Intercontinental Bank of Lebanon (IBL)	4198	2694	69176	62	7873	922	30808
BCP Oriel Bank	6790	5674	77459	78	9516	11506	21182
Byblos Bank	379146	81581	3799585	1045	550129	33927	1426819
Wedge Bank	21148	5527	221323	127	27521	2045	87811
ABN Amro Bank	55240	15230	813202	156	76587	6008	358857
BankMed	539560	49199	4653991	665	668003	17303	2485842
Allied Bank	21953	12373	299582	320	34544	6117	124185
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	116614	27162	1796824	246	163131	8273	632480
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered Bank	0	0	0	0	0	0	0
Banque de l'Industrie et du Travail (BIT)	31254	7741	337840	183	38176	3422	157217
Near East Commercial Bank (NECB)	10933	4394	267517	76	15751	1609	55459
Banca Di Roma	7653	4555	147517	64	13924	1556	65530

D.4: Raw data for the year 1999

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninterest income	(O) Total loans
Fransabank	269917	43988	3115260	777	385252	15198	1086808
United bank of Saudia & Lebanon	18910	3977	161149	110	19278	1699	112347
Banque de la Békaa	20423	2964	216653	59	27401	718	43992
Al Ahli International Bank	0	0	0	0	0	0	0
BLC Bank	107198	44095	1383036	622	139737	12840	578935
United bank of Lebanon	37439	19177	501344	198	39357	4934	26001
Lati Bank	2851	1296	32229	26	3939	326	14511
Société Générale (SGBL)	217537	50864	2589094	892	296855	15061	1228124
Inaash Bank	42074	10981	438143	252	49136	4387	176272
Lebanese Canadian Bank	44380	9978	524258	168	57920	3172	159038
Crédit Libanais	204996	60319	2656225	819	274226	26976	720831
Bank Audi	373269	100996	5844321	1174	514555	49148	1749409
Banque Saradar	160982	51611	1947249	519	215922	19431	898398
Bank of Beirut	159279	38026	2006211	417	211810	21100	757873
Beirut Riyad Bank	90929	21780	938155	370	101381	9989	503558
Intercontinental Bank of Lebanon	20373	11526	273620	142	353288	2668	99594
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	403443	85214	3799585	113	574553	32448	1455786
Wedge Bank	21930	5741	241840	123	29173	1259	97463
ABN Amro	63094	17248	879004	182	89882	5155	433298
BankMed	433468	62552	5216160	1025	555869	18547	3438205
Allied Bank	26508	1251	360972	268	36215	5387	130784
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	87252	27897	1549372	238	135155	7011	596077
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered bank	0	0	0	0	0	0	0
Banque de l'Industrie et du Travail (BIT)	29192	9768	348791	192	39395	2621	157291
Near East Commercial Bank (NECB)	20812	5301	180920	84	25753	2320	60707
Banca Di Roma	7852	5727	149031	78	12909	1542	83674

D.5: Raw data for the year 2000

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninteres t income	(O) Total loans
Fransabank	307344	50981	3634762	817	428246	19097	1086872
United bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Békaa	20584	3170	230742	59	28285	947	44263
Al Ahli International Bank	10920	3795	255084	141	16372	885	110347
BLC Bank	119673	67131	1548923	830	114081	8394	359768
United bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	2983	1372	33442	25	4164	431	15652
Société Générale (SGBL)	217843	55369	2937491	971	294788	41177	1324909
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	54843	11198	645875	198	70743	4078	226057
Crédit Libanais	202357	61674	2871089	877	283466	29848	777586
Bank Audi	356942	131934	6388818	1259	551913	66568	1985990
Banque Saradar	126232	51836	2091494	392	186315	21563	811454
Bank of Beirut	188617	35251	3391651	432	248760	20509	934656
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon	32886	9797	578290	156	46552	4259	160024
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	425949	88470	4825691	1150	605926	35859	1572582
Wedge Bank	24393	6171	279075	124	31513	1632	100280
ABN Amro Bank	72996	18400	955199	193	102752	6774	444639
BankMed	442293	91377	5268759	1018	581737	27203	2772440
Allied Bank	27448	13179	428097	258	40697	4715	126349
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	46337	32393	1231781	220	94979	13886	606777
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	0	0	103453	89	0	0	27395
Banque de l'Industrie et du Travail (BIT)	28019	9845	369529	189	39469	2634	158231
Near East Commercial Bank (NECB)	18180	6136	184104	83	23777	3051	61381
Banca Di Roma	5116	6224	136832	79	10784	2172	83262

D.6: Raw data for the year 2001

DMU Name	(I)Interest expenses	(I)General expenses	(I)Total deposits	(I)Number of employees	(O)Interest income	(O)Noninterest income	(O) Total loans
Fransabank	297590	53152	3818477	847	406947	21961	1072776
United Bank of Saudia and Lebanon	0	0	0	0	0	0	0
Banque de la Békaa	20423	2964	216653	59	27401	718	43992
Al Ahli International Bank	17112	11481	292021	146	21422	1991	97385
BLC Bank	141094	54141	1488864	565	131178	2913	513703
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	2747	1294	32784	26	3661	618	12973
Société Générale (SGBL)	205862	61594	2549759	971	281874	33184	1267127
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	67518	14790	952954	277	88839	5516	246526
Crédit Libanais	204996	60319	2656225	819	274226	26976	720831
Bank Audi	373269	100996	5844321	1174	514555	49148	1749409
Banque Saradar	160982	51611	1947249	519	215922	19431	898398
Bank of Beirut	180744	33098	2474975	456	238811	20705	837546
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon	43814	9811	692969	164	60942	3689	193347
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	424468	93244	5469819	1231	582598	38741	1520850
Wedge Bank	0	0	0	0	0	0	0
ABN Amro	62346	18725	904091	197	92802	7251	491274
BankMed	433468	62552	5216160	1025	555869	18547	3438205
Allied Bank (acquired by Groupe Mediterrane 20012006)	26508	1251	360972	268	36215	5387	130784
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	87252	27897	1549372	238	135155	7011	596077
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	0	0	127436	89	0	0	37671
Banque de l'Industrie et du Travail (BIT)	29192	9768	348791	192	39395	2621	157291
Near East Commercial Bank (NECB)	20812	5301	180920	84	25753	2320	60707
Banca Di Roma	7852	5727	149031	78	12909	1542	83674

D.7: Raw data for the year 2002

DMU Name	(I)Interest expenses	(I)General expenses	(I)Total deposits	(I)Number of employees	(O)Interest income	(O)Noninterest income	(O) Total loans
Fransabank	289396	56681	4054390	895	423825	14161	1039328
United bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Békaa	20584	3170	230742	59	28285	947	44263
Al Ahli International Bank	20482	8892	301747	142	24683	3009	95110
BLC Bank	119673	67131	1548923	566	114081	8394	359768
United bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	2316	1476	34760	27	3398	636	13843
Société Générale (SGBL)	155470	72791	2682298	945	236877	31369	1230127
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	95283	21328	1451141	335	127965	7123	301534
Crédit Libanais	202357	61674	2871089	877	283466	29848	777586
Bank Audi	356942	131934	6388818	1259	551913	66568	1985990
Banque Saradar	126232	51836	2091494	392	186315	21563	811454
Bank of Beirut	198262	68552	3391651	604	300143	20098	934656
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	53194	10916	896402	179	76694	3894	219556
BCP Priel Bank	0	0	0	0	0	0	0
Byblos Bank	405708	100150	6482276	1456	569193	40109	1800909
wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	442293	91377	5268759	1018	581737	27203	2772440
Allied Bank	27448	13179	428097	258	40697	4715	126349
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	46337	32393	1231781	220	94979	13886	606777
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	0	0	105907	91	0	0	51725
Banque de l'Industrie et du Travail (BIT)	28019	9845	369529	189	39469	2634	158231
Near East Commercial Bank (NECB)	18180	6136	184104	83	23777	3051	61381
Banca Di Roma	5116	6224	136832	79	10784	2172	83262

D.8: Raw data for the year 2003

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Nonintere st income	(O) Total loans
Fransabank	294402	65293	5027328	1010	466685	8599	882063
United bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Békaa	14462	2602	215467	55	19339	1724	27575
Al Ahli International Bank	19565	8039	334855	139	28587	3884	78123
BLC Bank	105705	49885	1886256	546	153335	22870	337166
United bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	2577	1503	49121	27	4317	572	16033
Société Générale (SGBL)	148833	74789	2955100	952	218743	36609	1206044
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	133082	28541	2240700	440	174385	26171	363311
Crédit Libanais	211696	75932	4026104	1015	304705	44369	899056
Bank Audi	428448	152337	9039824	1381	640435	112427	2074127
Banque Saradar	119353	54573	2364506	392	178108	21800	900376
Bank of Beirut	266845	55210	3814427	603	340994	34839	939346
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	142990	16952	2056292	222	180444	12088	344247
BCP Oriel	0	0	0	0	0	0	0
Byblos Bank	444368	108311	7420001	1354	626677	65328	1779595
Wedge Bank	0	0	0	0	0	0	0
ABN Amro	0	0	0	0	0	0	0
BankMed	404194	94149	5517203	1026	526171	56650	2314191
Allied Bank	29026	13992	505911	256	44804	4144	135222
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	28357	27796	1057851	216	64229	10803	495159
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	0	0	108275	71	0	0	52020
Banque de l'Industrie et du Travail (BIT)	24851	10700	438918	189	37777	2335	171356
Near East Commercial Bank (NECB)	9699	6086	184183	83	12318	2589	31604
Banca Di Roma	3660	6672	131187	80	7708	2723	78428

D.9: Raw data for the year 2004

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Nonintere st income	(O) Total loans
Fransabank	297633	74342	5755459	1078	431542	27164	993659
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Békaa	15504	2654	218406	52	20784	1028	21210
Al Ahli International Bank	17289	9231	373487	149	27452	2911	78984
BLC Bank	150041	57752	2736134	600	217021	27943	520722
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	2735	1482	61606	27	4281	493	17226
Société Générale (SGBL)	136099	85240	3631724	989	224719	41712	1308289
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	153213	32803	2960547	500	224890	6614	429652
Crédit Libanais	249672	81319	4348533	1054	362613	40017	979662
Bank Audi-Saradar group	535749	227017	1326342 0	1903	765093	174009	3265546
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	242998	54077	4275286	630	354243	39664	1058703
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	149452	19464	2114201	232	199555	7413	305546
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	436923	113742	8254350	1358	587138	91553	2020869
Wedge Bank	0	0	0	0	0	0	0
ABN Amro	0	0	0	0	0	0	0
BankMed	387289	97150	6161165	1027	484408	48316	1838806
Allied Bank	14720	30498	612585	250	47136	4262	125888
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	37984	28296	1068773	219	75524	10969	499432
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	5173	9499	112143	80	12593	3014	56188
Banque de l'Industrie et du Travail (BIT)	27933	10928	490033	193	37583	3616	187098
Near East Commercial Bank (NECB)	11509	7833	178151	82	13659	3337	32125
Banca Di Roma	3203	6666	122	80	5440	1630	7764000

D.10: Raw data for the year 2005

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninterest income	(O) Total loans
Fransabank	331192	85329	6155801	1147	480802	42201	1202766
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Békaa	8015	2200	28251	5	11815	1477	27575
AL Ahli International Bank	19182	9938	376005	150	32484318	3013	110274
BLC Bank	142769	53496	2230415	497	191357	24551	287854
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	3308	1549	57291	27	4459	660	13997
Société Générale (SGBL)	153519	95804	3392638	1102	249708	49455	1234123
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	186990	41401	3502591	530	260429	16406	480283
Crédit Libanais	211696	75932	4026104	1147	304705	44369	899056
Bank Audi-Saradar group	675040	254790	14906942	2040	995149	186035	3720066
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	250349	58985	4278366	684	361676	38717	1143906
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	157388	24000	2410360	249	207807	8436	309316
BCP Oriel bank	0	0	0	0	0	0	0
Byblos Bank	482979	131721	8510975	1482	661004	119799	2243108
Wedge bank	0	0	0	0	0	0	0
ABN Amro bank	0	0	0	0	0	0	0
BankMed	380635	89896	6144478	989	469135	78073	1972687
Allied Bank (acquired by Groupe Mediterrane 20012006)	0	0	0	0	0	0	0
Emirates Lebanon Bank	0	0	0	0	0	0	0
BNPI	28357	27796	1057851	216	64229	10803	495159
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	4174	10528	123827	86	13673	3713	77615
Banque de l'Industrie et du Travail (BIT)	31217	12499	538599	195	41570	2750	201475
Near East Commercial Bank (NECB)	11067	5942	180718	75	13658	270	27544
Banca Di Roma	2619	6353	102582	77	6447	1345	61093

D.11: Raw data for the year 2006

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Nonintere st income	(O) Total loans
Fransabank	382224	92793	6500858	1191	559824	28478	1290940
united bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Békaa	0	0	0	0	0	0	0
Al Ahli International bank	26455	11498	408899	151	37502	3740	139814
BLC Bank	137743	41340	2207067	492	185113	24187	286081
United bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	3953	1643	77147	27	5160	684	14472
Société Générale (SGBL)	149411	118507	3887694	1157	273676	64979	1468215
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	225162	46349	3868060	571	304326	22474	735869
Crédit Libanais	249672	81278	4354298	1060	362603	36395	981276
Bank Audi Saradar group	809810	319114	1785954 5	2691	1248216	244680	4877082
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	295396	67048	4845245	711	432710	37522	1241591
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	149452	194634	2114207	232	199555	7413	305546
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	584265	150769	9463992	1728	811188	98450	2645034
Wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	491607	115998	7042439	961	598961	83989	2162238
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	8722	13185	1105266	204	19122	3097	632345
BNPI	37984	29120	1068772	219	75523	10970	499432
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	6825	10751	142804	83	18175	3617	88129
Banque de l'Industrie et du Travail (BIT)	31805	13751	623531	196	43797	3297	200961
Near East Commercial Bank (NECB)	8760	6183	191766	74	12731	3695	25852
Banca Di Roma	2742	9387	112727	43	5440	911	48694

D.12: Raw data for the year 2007

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Nonintere st income	(O) Total loans
Fransabank	439876	115768	9306113	1741	632873	45741	2156208
United bank of Saudia &Lebanon	0	0	0	0	0	0	0
Banque de le Bekaa	0	0	0	0	0	0	0
Al Ahli International Bank	30626	5340	473937	157	42617	4296	162970
BLC Bank	142769	43064	2230416	497	191357	24554	287854
United bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	4300	1566	75163	25	5293	744	13110
Société Générale (SGBL)	176160	49749	5510297	1335	324883	90719	2100773
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	250905	55465	4524513	585	333652	31002	1002133
Crédit Libanais	270409	83121	4819537	1361	385872	54989	1150330 7
Bank Audi Saradar group	1004997	449369	2155590 5	3872	1525548	289978	7684632
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	390298	47668	7425795	1038	551498	112143	2707163
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon	157388	22375	2410360	249	207807	8436	309316
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	753113	109513	1566702 8	2433	1141893	183352	4819148
Wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	653969	183918	1044076 1	1390	809106	138389	3083429
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	38796	10259	1318929	205	72229	10317	682248
BNPI	42802	26847	1008256	212	78166	22842	538909
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	6678	11201	174424	97	18297	5323	92270
Banque de l'Industrie et du Travail (BIT)	31540	4936	656394	206	43381	5361	183799
Near East Commercial Bank (NECB)	9183	2457	240821	83	14073	3937	31755
Banca Di Roma	2843	4324	99624	43	5560	936	38431

D.13: Raw data for the year 2008

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninterest income	(O) Total loans
Fransabank	514885	198972	10778087	1978	805086	83435	2586188
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Bekaa	0	0	0	0	0	0	0
Al Ahli International Bank	33811	6197	570034	195	50910	3861	189943
BLC Bank	130600	52478	2612765	530	196407	14817	415347
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	4670	1751	90429	25	5839	619	11365
Société Générale (SGBL)	149411	118507	3887694	1157	273676	64980	1468215
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	271207	59887	5295192	590	382605	27718	1474057
Crédit Libanais	415572	55530	9178792	1557	600027	68189	2943403
Bank Audi -Saradar group	1270772	253274	37097210	5051	2080223	671773	12692177
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	448621	64516	11280372	1414	645047	134015	4697584
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	247099	16117	5193278	332	298856	68302	931880
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	840373	116137	19174417	2716	1264737	271725	6028914
Wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	682141	253983	11129391	1530	942412	144461	4650699
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	46001	10322	1526264	198	91653	10946	887233
BNPI	0	0	0	0	0	0	0
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered Bank	5629	12366	188572	114	19833	4368	106756
Banque de l'Industrie et du Travail (BIT)	31956	5569	696248	214	49581	2449	237866
Near East Commercial Bank (NECB)	12142	4097	407120	95	18074	6155	65847
Banca Di Roma	0	0	0	0	0	0	0

D.14: Raw data for the year 2009

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Nonintere st income	(O) Total loans
Fransabank	571955	223446	13587124	2496	887942	92524	3480742
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Bekaa	0	0	0	0	0	0	0
AL Ahli International Bank	39389	14000	682722	195	55929	3359	179556
BLC Bank	148804	17587	3428477	615	226662	32609	716887
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	0	0	0	0	0	0	0
Société Générale (SGBL)	176160	125218	5510297	1335	324883	90719	2100773
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	327096	63878	6696944	665	449779	38016	1912503
Crédit Libanais	335827	39151	7278105	1361	4933190	54989	1944299
Bank Audi Saradar group	1241820	192192	34650176	4400	1880992	472016	10170680
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	390298	47668	7425795	1038	551498	112143	2707163
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon	193733	32414	3554836	294	253833	23072	402446
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	753113	264777	15667028	2433	1141893	183352	4819148
Wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	652259	128314	12261111	1665	911898	205504	4706562
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	38796	10259	1318929	205	72229	10317	682248
BNPI	0	0	0	0	0	0	0
Cedrus Invest Bank (no data)	0	0	0	0	0	0	0
Standard Chartered	4368	13841	192330	116	17936	5467	120667
Banque de l'Industrie et du Travail (BIT)	31540	4936	656394	206	43381	5361	183799
Near East Commercial Bank (NECB)	9183	2457	240821	83	14073	3937	31755
Banca Di Roma	0	0	0	0	0	0	0

D.15: Raw data for the year 2010

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Nonintere st income	(O) Total loans
Fransabank	615926	85587	15198534	2702	1009312	150553	4736343
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Bekaa	0	0	0	0	0	0	0
AL Ahli International Bank	38104	5199	705276	174	59459	10492	193958
BLC Bank	164046	67579	3924914	637	260230	40305	1036367
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	0	0	0	0	0	0	0
Société Générale (SGBL)	203105	154519	6120766	1353	373826	150257	2128722
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	364637	80088	7952261	739	524695	50672	2672608
Crédit Libanais	366038	47644	8529376	1491	554399	89735	2483586
Bank Audi Saradar group	1293927	232579	37458092	4838	2032265	595134	12885421
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	367693	57301	9022858	1162	586114	122579	3507634
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon	216143	15876	4428090	317	287715	33406	743322
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	796751	142144	18051466	2719	1224014	256899	5685240
Wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	687773	160704	13218490	1788	972522	242281	5292507
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	45059	10218	1457976	194	83393	10372	815063
BNPI	0	0	0	0	0	0	0
Cedrus Invest Bank (no data)	0	0	0	0	0	0	0
Standard Chartered	4056	15485	184644	120	17985	6756	112583
Banque de l'Industrie et du Travail (BIT)	32272	5269	719307	205	48062	3228	220379
Near East Commercial Bank (NECB)	9182	3334	316531	85	15058	5097	40598
Banca Di Roma	0	0	0	0	0	0	0

D.16: Raw data for the year 2011

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninterest income	(O) Total loans
Fransabank	713432	104724	17374768	3074	1136082	177816	6497295
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Bekaa	0	0	0	0	0	0	0
Al Ahli International Bank	35212	5882	71117	176	38104	613	203292
BLC Bank	225469	108428	5446106	907	351838	51455	2306963
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	0	0	0	0	0	0	0
Société Générale (SGBL)	345730	183486	12867785	1945	570466	81336	4334305
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	0	0	0	0	0	0	0
Crédit Libanais	415572	55530	9178792	1557	600027	68189	2943403
Bank Audi -Saradar group	1270772	253274	37097210	5051	2080223	671773	12692177
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	448621	64516	11280372	1414	645047	134015	4697584
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	247099	16117	5193278	332	298856	68302	931880
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	840373	116137	19174417	2716	1264737	271725	6028914
Wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	678107	143419	12079766	1954	1004822	212951	5260185
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	46001	10322	1526264	198	91653	10946	887233
BNPI	0	0	0	0	0	0	0
Cedrus Invest Bank	0	0	0	0	0	0	0
Standard Chartered	3185	18787	189179	117	16608	4089	112583
Banque de l'Industrie et du Travail (BIT)	31956	5569	696248	214	49581	2449	237866
Near East Commercial Bank (NECB)	12142	4097	407120	95	18074	6155	65847
Banca Di Roma	0	0	0	0	0	0	0

D.17: Raw data for the year 2012

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninterest income	(O) Total loans
Fransabank	800017	110456	19695946	3227	1309933	177816	7295043
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Bekaa	0	0	0	0	0	0	0
AL Ahli International Bank	35212	5882	71117	176	38104	613	203292
BLC Bank	264058	40750	6470302	968	420891	51455	2677240
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	0	0	0	0	0	0	0
Société Générale (SGBL)	1830	1092	5965313	1775	5300	81335	2494561
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	0	0	0	0	0	0	0
Crédit Libanais	440652	63899	10193831	1557	629874	92216	3328744
Bank Audi-Saradar group	1344819	291959	40207500	5070	2208584	795687	15642000
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	502194	86651	13260945	1523	764280	122327	5186796
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	302087	67	5891009	332	396759	184218	1266251
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	884216	139891	19967531	2572	1274746	279121	6195104
Wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	749056	168366	13907902	2115	1066171	212950	6056491
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	46001	10322	1526264	198	91653	10946	887233
BNPI	0	0	0	0	0	0	0
Cedrus Invest Bank	272	2207	8103	117	4189	5500	10422
Standard Chartered	3185	18787	189179	117	16608	4089	112583
Banque de l'Industrie et du Travail (BIT)	35935	5214	755065	215	54465	3000	282983
Near East Commercial Bank (NECB)	12142	4097	407120	95	18074	6155	65847
Banca Di Roma	0	0	0	0	0	0	0

D.18: Raw data for the year 2013

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Nonintere st income	(O) Total loans
Fransabank	851947	115232	19665519	3265	1376005	147106	7978979
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Bekaa	0	0	0	0	0	0	0
AL Ahli International Bank	0	0	0	0	0	0	0
BLC Bank	275887	42586	6455694	961	452913	31959	2828498
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	0	0	0	0	0	0	0
Société Générale (SGBL)	632649	97921	15278776	1775	985171	143386	4627123
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	0	0	0	0	0	0	0
Crédit Libanais	459401	59671	10438788	1591	665693	86841	3918607
Bank Audi-Saradar group	1736257	836403	46118217	2890	2724485	600060	2206482 2
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	578546	103344	15337800	1611	877737	180832	5722234
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	334586	23895	6484801	362	406130	22861	1377281
BCP Oriel	0	0	0	0	0	0	0
Byblos Bank	945955	126961	21960271	2535	1295959	307986	6800582
Wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	696165	193606	15516318	2207	1028134	356580	6765955
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	57784	8842	1643602	200	95011	16529	894977
BNPI	0	0	0	0	0	0	0
Cedrus Invest Bank	558	2991	7138	27	4937	5387	12414
Standard Chartered	2585	8125	160392	110	13192	4089	91375
Banque de l'Industrie et du Travail (BIT)	37761	5983	830281	242	56625	3582	321753
Near East Commercial Bank (NECB)	15524	6017	475867	109	26806	9087	136952
Banca Di Roma	0	0	0	0	0	0	0

D.19: Raw data for the year 2014

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninterest income	(O) Total loans
Fransabank	930226	126425	21253245	3416	1482411	200126	8825032
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Bekaa	0	0	0	0	0	0	0
Al Ahli International Bank	0	0	0	0	0	0	0
BLC Bank	277828	43232	6461038	980	475389	37872	2924025
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	0	0	0	0	0	0	0
Société Générale (SGBL)	737162	108875	17072648	1858	1134010	166111	5570622
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	0	0	0	0	0	0	0
Crédit Libanais	495624	60288	11237014	1631	706234	84047	4305330
Bank Audi-Saradar group	2211970	1007360	53413209	3117	3422205	765591	25775338
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	656869	107613	16520465	1733	997235	113927	6292140
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	361961	27026	7178772	365	425957	21244	1570149
BCP Oriel bank	0	0	0	0	0	0	0
Byblos Bank	1049537	132159	23377789	2531	1413234	324717	7127196
Wedge bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	807632	166801	17208934	2408	1205356	272632	7154127
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	61755	8844	1721695	196	97387	13780	885177
BNPI	0	0	0	0	0	0	0
Cedrus Bank (previously Cedrus Invest Bank)	851	4424	68646	30	5643	7959	27400
Standard Chartered	0	0	0	0	0	0	0
Banque de l'Industrie et du Travail (BIT)	41227	6125	854873	239	56222	10330	309217
Near East Commercial Bank (NECB)	21109	7796	672167	144	31837	12947	211355
Banca Di Roma	0	0	0	0	0	0	0

D.20: Raw data for the year 2015

DMU Name	(I) Interest expenses	(I) General expenses	(I) Total deposits	(I) Number of employees	(O) Interest income	(O) Noninterest income	(O) Total loans
Fransabank	1011252	118978	24533806	3493	1561333	200125	9480044
United Bank of Saudia & Lebanon	0	0	0	0	0	0	0
Banque de la Bekaa	0	0	0	0	0	0	0
Al Ahli International Bank	0	0	0	0	0	0	0
BLC Bank	287208	42646	907918	1020	476999	37872	2875197
United Bank of Lebanon	0	0	0	0	0	0	0
Lati Bank	0	0	0	0	0	0	0
Société Générale (SGBL)	810987	140573	18679877	1906	1204837	166111	5929958
Inaash Bank	0	0	0	0	0	0	0
Lebanese Canadian Bank	0	0	0	0	0	0	0
Crédit Libanais	553896	59932	12231766	1700	782704	87436	4458356
Bank Audi-Saradar group	2307795	418378	52990507	6891	3771477	663272	26812807
Banque Saradar	0	0	0	0	0	0	0
Bank of Beirut	705869	98446	18031733	1835	1050695	119434	6407623
Beirut Riyad Bank	0	0	0	0	0	0	0
Intercontinental Bank of Lebanon (IBL)	398498	19621	7349488	365	458555	21243	1540758
BCP Oriel Bank	0	0	0	0	0	0	0
Byblos Bank	1102771	139187	24658431	2531	1489087	337471	7399641
Wedge Bank	0	0	0	0	0	0	0
ABN Amro Bank	0	0	0	0	0	0	0
BankMed	880946	183332	17541708	2408	1331331	277362	7408845
Allied Bank	0	0	0	0	0	0	0
Emirates Lebanon Bank	61755	8844	1721695	196	97387	13780	885177
BNPI	0	0	0	0	0	0	0
Cedrus Bank	971	4910	26754	35	9317	8050	43688
Standard Chartered	0	0	0	0	0	0	0
Saradar Bank (BIT and NECB)	51214	10007	1820310	70	71061	3108	688023
NECB	0	0	0	0	0	0	0
Banca Di Roma	0	0	0	0	0	0	0

Appendix E: Raw data for Acquiring banks 3years before, during, and 3 years after M&As for Ratio Analysis, and 3 years before M&As for acquired banks

E.1: Bank Audi

Ratio/year	2001	2002	2003	2004	2005	2006	2007
Non-interest income	49148	66568	112427	174009	186035	244680	289978
Number of employees	1174	1259	1381	1903	2040	2691	3343
Ratio 1	**41.86**	**52.87**	**81.41**	**91.44**	**91.19**	**90.93**	**86.74**
Non-interest income	49148	66568	112427	174009	186035	244680	289978
Total Assets	6885118	7768099	10698232	15790674	17304351	21362784	26107626
Ratio 2 (%)	**0.71**	**0.86**	**1.05**	**1.10**	**1.08**	**1.15**	**1.11**
Net interest income	141286	194971	211987	229343	320110	438407	520550
total assets	6885118	7768099	10698232	15790674	17304351	21362784	26107626
Ratio 3 (%)	**2.05**	**2.51**	**1.98**	**1.45**	**1.85**	**2.05**	**1.99**
Net Operating income	13047	7121	57903	86682	74232	124051	814097
Total Assets	6885118	7768099	10698232	15790674	17304351	21362784	26107626
Ratio 4 (%)	**0.19**	**0.09**	**0.54**	**0.55**	**0.43**	**0.58**	**3.12**
Net Operating income	13047	7121	57903	86682	74232	124051	814097
Total Equity	435611	635830	684651	1023221	1418748	2542110	2730658
Ratio 5 (%)	**3.00**	**1.12**	**8.46**	**8.47**	**5.23**	**4.88**	**29.81**
Net interest income	141286	194971	211987	229343	320110	438407	520550
Total Equity	435611	635830	684651	1023221	1418748	2542110	2730658
Ratio 6 (%)	32.43	30.66	30.96	22.41	22.56	17.25	19.06

E.2: Bank of Beirut

Ratio/Year	1999	2000	2001	2002	2003	2004	2005
Non-interest income	21100	20509	20705	20098	34839	39664	38717
Number of employees	417	432	456	604	603	630	684
Ratio 1 (Million L.L.)	**50.6**	**47.47**	**45.41**	**33.27**	**57.78**	**62.96**	**56.6**
Non-interest income	21100	20509	20705	20098	34839	39664	38717
Total Assets	2694231	3109424	3239347	5129766	5499797	6202504	6505799
Ratio 2 (%)	**0.78**	**0.66**	**0.64**	**0.39**	**0.63**	**0.64**	**0.6**
interest income	52331	60143	58067	101881	74149	111245	111327
total assets	2694231	3109424	3239347	5129766	5499797	6202504	6505799
Ratio 3 (%)	**1.94**	**1.93**	**1.79**	**1.99**	**1.35**	**1.79**	**1.71**
Net Operating income	7817	5154	3715	1990	16338	16899	9464
Total Assets	2694231	3109424	3239347	5129766	5499797	6202504	6505799
Ratio 4 (%)	**0.29**	**0.17**	**0.11**	**0.04**	**0.3**	**0.27**	**0.15**
Net Operating income	7817	5154	3715	1990	16338	16899	9464
Total Equity	167654	187107	176655	230808	350437	415005	553354
Ratio 5 (%)	**4.66**	**2.75**	**2.10**	**0.86**	**4.66**	**4.07**	**1.71**
Net interest income	52331	60143	58067	101881	74149	111245	111327
Total Equity	167654	187107	176655	230808	350437	415005	553354
Ratio 6 (%)	**31.21**	**32.14**	**32.87**	**44.14**	**21.16**	**26.81**	**20.12**

E.3: BankMed

Ratio/year	2003	2004	2005	2006	2007	2008	2009
Non-interest income	56650	48316	78073	83989	138389	144461	205504
Number of employees	1026	1027	989	961	1390	1530	1665
Ratio 1 (Million L.L.)	**55.21**	**47.05**	**78.94**	**87.4**	**99.56**	**94.42**	**123.43**
Non-interest income	56650	48316	78073	83989	138389	144461	205504
Total Assets	7628358	8114588	8849783	9835240	13769431	14391006	15956180
Ratio 2 (%)	**0.74**	**0.6**	**0.88**	**1**	**1**	**1**	**1**
Net interest income	121977	93144	88500	107353	155137	260272	259639
Total assets	7628358	8114588	8849783	9835240	13769431	14391006	15956180
Ratio 3 (%)	**1.6**	**1.15**	**1**	**1**	**1**	**2**	**2**
Net Operating income	29373	22842	20627	31870	250584	364486	416879
Total Assets	7628358	8114588	8849783	9835240	13769431	14391006	15956180
Ratio 4 (%)	**0.39**	**0.28**	**0.23**	**0.32**	**1.82**	**2.53**	**2.61**
Net Operating income	29373	22842	20627	31870	250584	364486	416879
Total Equity	825193	991387	1021948	857319	1102701	1084487	1722173
Ratio 5 (%)	**3.56**	**2.30**	**2.02**	**3.72**	**22.72**	**33.61**	**24.21**
Net interest income	121977	93144	88500	107353	155137	260272	259639
Total Equity	825193	991387	1021948	857319	1102701	1084487	1722173
Ratio 6 (%)	**14.78**	**9.40**	**8.66**	**12.52**	**14.07**	**24.00**	**15.08**

E.4: BLC Bank

E.4.1 First merger of BLC bank

First Merger							
Ratio/year	1997	1998	1999	2000	2001	2002	2003
Non-interest income	14604	15235	12840	N/A	2913	8394	22870
Number of employees	523	614	622	N/A	565	566	546
Ratio 1 (Million L.L)	**27.92**	**24.81**	**20.64**		**5.16**	**14.83**	**41.89**
Non-interest income	14604	15235	12840	N/A	2913	8394	22870
Total Assets	1222618	1425464	1929503	N/A	1715831	1773976	2275513
Ratio 2 (%)	**1.19**	**1.07**	**0.67**		**0.17**	**0.47**	**1.01**
Net interest income	56862	58855	32539	N/A	-9916	3568	47630
Total assets	1222618	1425464	1929503	N/A	1715831	1773976	2275513
Ratio 3 (%)	**4.65**	**4.13**	**1.69**		**-0.58**	**0.2**	**2.09**
Net Operating income	2639	2883	2047	N/A	-2840	3969	14344
Total Assets	1222618	1425464	1929503	N/A	1715831	1773976	2275513
Net Operating income	2639	2883	2047	N/A	-2840	3969	14344
Total Equity	121852	129855	151009	N/A	-65622	-20413	35151
Ratio 5 (%)	**2.17**	**2.22**	**1.36**		**4.33**	**-19.44**	**40.81**
Net interest income	56862	58855	32539	N/A	-9916	3568	47630
Total Equity	121852	129855	151009	N/A	-65622	-20413	35151
Ratio 6 (%)	**46.66**	**45.32**	**21.55**		**15.11**	**-17.48**	**135.50**

E.4.2 Second merger of BLC bank

Second Merger							
Ratio/year	2006	2007	2008	2009	2010	2011	2012
Non-interest income	24187	24554	14817	32609	40305	51455	36060
Number of employees	492	497	530	615	637	907	968
Ratio 1 (Million L.L)	**49.16**	**49.4**	**27.96**	**53.02**	**63.27**	**56.73**	**37.25**
Non-interest income	24187	24554	14817	32609	40305	51455	36060
Total Assets	3317916	2611858	2972046	3908259	4674791	6656864	7679811
Ratio 2 (%)	**1**	**1**	**0**	**1**	**1**	**1**	**0**
Net interest income	47370	48588	65807	77858	92720	126369	156,833
Total assets	3317916	2611858	2972046	3908259	4674791	6656864	7679811
Ratio 3 (%)	**1.43**	**1.86**	**2.21**	**1.99**	**1.98**	**1.9**	**2.04**
Net Operating income	8171	70652	93702	116769	144204	177758	1964667
Total Assets	3317916	2611858	2972046	3908259	4674791	6656864	7679811
Ratio 4 (%)	**0.25**	**2.71**	**3.15**	**2.99**	**3.08**	**2.67**	**25.58**
Net Operating income	8171	70652	93702	116769	144204	177758	196467
Total Equity	115918	193551	236809	344,395	396278	544106	563,752
Ratio 5 (%)	**7.05**	**36.50**	**39.57**	**33.91**	**36.39**	**32.67**	**34.85**
Net interest income	47370	48588	65807	77858	92720	126369	156,833
Total Equity	115918	193551	236809	344,395	396278	544106	563,752
Ratio 6 (%)	**40.87**	**25.10**	**27.79**	**22.61**	**23.40**	**23.23**	**27.82**

E.5: Byblos Bank

E.5.1 First Merger of Byblos bank

First Merger							
Ratio/Year	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Non-interest income	33928	32448	35859	38741	40109	65328	91553
Number of employees	1045	1133	1150	1231	1456	1354	1358
Ratio 1	**32.47**	**28.64**	**31.18**	**31.47**	**27.55**	**48.25**	**67.42**
Non-interest income	33928	32448	35859	38741	40109	65328	91553
Total Assets	5142088	5475147	6048097	7010902	7971415	9069359	10504505
Ratio 2(%)	**0.66**	**0.59**	**0.59**	**0.55**	**0.5**	**0.72**	**0.87**
Net interest income	170982	171110	179977	158130	163485	182309	150215
Total assets	5142088	5475147	6048097	7010902	7971415	9069359	10504505
Ratio 3 (%)	**3.33**	**3.13**	**2.98**	**2.26**	**2.05**	**2.01**	**1.43**
Net Operating income	4180	2595	3943	2400	8120	31251	38299
Total Assets	5142088	5475147	6048097	7010902	7971415	9069359	10504505
Ratio 4 (%)	**0.08**	**0.05**	**0.07**	**0.03**	**0.1**	**0.34**	**0.36**
Net Operating income	4180	2595	3943	2400	8120	31251	38299
Total Equity	411644	432291	445323	460037	481558	663878	498814
Ratio 5 (%)	**1.02**	**0.60**	**0.89**	**0.52**	**1.69**	**4.71**	**7.68**
Net interest income	170982	171110	179977	158130	163485	182309	150215
Total Equity	411644	432291	445323	460037	481558	663878	498814
Ratio 6 (%)	**41.54**	**39.58**	**40.41**	**34.37**	**33.95**	**27.46**	**30.11**

E.5.2 Second Merger of Byblos bank

Second Merger							
Ratio/Year	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Non-interest income	32448	35859	38741	40109	65328	91553	119799
Number of employees	1133	1150	1231	1456	1354	1358	1482
Ratio 1	**28.64**	**31.18**	**31.47**	**27.55**	**48.25**	**67.42**	**80.84**
Non-interest income	32448	35859	38741	40109	65328	91553	119799
Total Assets	5475147	6048097	7010902	7971415	9069359	10504505	11344913
Ratio 2(%)	**0.59**	**0.59**	**0.55**	**0.5**	**0.72**	**0.87**	**1.06**
Net interest income	171110	179977	158130	163485	182309	150215	178025
Total assets	5475147	6048097	7010902	7971415	9069359	10504505	11344913
Ratio 3 (%)	**3.13**	**2.98**	**2.26**	**2.05**	**2.01**	**1.43**	**1.57**
Net Operating income	2595	3943	2400	8120	31251	38299	50771
Total Assets	5475147	6048097	7010902	7971415	9069359	10504505	11344913
Ratio 4 (%)	**0.05**	**0.07**	**0.03**	**0.1**	**0.34**	**0.36**	**0.45**
Net Operating income	2595	3943	2400	8120	31251	38299	50771
Total Equity	432291	445323	460037	481558	663878	498814	566367
Ratio 5 (%)	**0.60**	**0.89**	**0.52**	**1.69**	**4.71**	**7.68**	**8.96**
Net interest income	171110	179977	158130	163485	182309	150215	178025
Total Equity	432291	445323	460037	481558	663878	498814	566367
Ratio 6 (%)	**39.58**	**40.41**	**34.37**	**33.95**	**27.46**	**30.11**	**31.43**

E.6 Fransabank

E.6.1 First Merger of Fransabank

First Merger							
Ratio/Year	1998	1999	2000	2001	2002	2003	2004
Non-interest income	15109	15198	19097	21961	14161	8599	27164
Number of employees	707	777	817	847	895	1010	1078
Ratio 1 (Million L.L)	**21.37**	**19.56**	**23.37**	**25.93**	**15.82**	**8.51**	**25.2**
Non-interest income	15109	15198	19097	21961	14161	8599	27164
Total Assets	3321971	3988741	4466793	4685687	5156503	6162870	7002702
Ratio 2 (%)	**0.45**	**0.38**	**0.43**	**0.47**	**0.27**	**0.14**	**0.39**
Net interest income	99168	115335	120902	109357	134429	172283	133909
Total assets	3321971	3988741	4466793	4685687	5156503	6162870	7002702
Ratio 3 (%)	**2.99**	**2.89**	**2.71**	**2.33**	**2.61**	**2.8**	**1.91**
Net Operating income	1870	2089	3235	3845	3724	4849	25436
Total Assets	3321971	3988741	4466793	4685687	5156503	6162870	7002702
Ratio 4 (%)	**0.06**	**0.05**	**0.07**	**0.08**	**0.07**	**0.08**	**0.36**
Net Operating income	1870	2089	3235	3845	3724	4849	25436
Total Equity	241345	284202	320430	353085	394183	444978	480820
Ratio 5 (%)	**0.77**	**0.74**	**1.01**	**1.09**	**0.94**	**1.09**	**5.29**
Net interest income	99168	115335	120902	109357	134429	172283	133909
Total Equity	241345	284202	320430	353085	394183	444978	480820
Ratio 6 (%)	**41.09**	**40.58**	**37.73**	**30.97**	**34.10**	**38.72**	**27.85**

E.6.2 Second Merger of Fransabank

Second Merger							
Ratio/Year	2003	2004	2005	2006	2007	2008	2009
Non-interest income	8599	27164	42201	28478	45741	83435	92524
Number of employees	1010	1078	1147	1191	1741	1978	2496
Ratio 1 (Million L.L)	**8.51**	**25.2**	**36.79**	**23.91**	**26.27**	**42.18**	**37.07**
Non-interest income	8599	27164	42201	28478	45741	83435	92524
Total Assets	6162870	7002702	7466026	7881801	10897694	12745195	16300030
Ratio 2 (%)	**0.14**	**0.39**	**0.57**	**0.36**	**0.42**	**0.65**	**0.57**
Net interest income	172283	133909	149610	177600	192997	290201	315987
Total assets	6162870	7002702	7466026	7881801	10897694	12745195	16300030
Ratio 3 (%)	**2.8**	**1.91**	**2**	**2.25**	**1.77**	**2.28**	**1.94**
Net Operating income	4849	25436	38282	20296	245552	360255	406175
Total Assets	6162870	7002702	7466026	7881801	10897694	12745195	16300030
Ratio 4 (%)	**0.08**	**0.36**	**0.51**	**0.26**	**2.25**	**2.83**	**2.49**
Net Operating income	4849	25436	38282	20296	245552	360255	406175
Total Equity	444978	480820	566367	654121	754905	1140499	1619465
Ratio 5 (%)	**1.09**	**5.29**	**6.76**	**3.10**	**32.53**	**31.59**	**25.08**
Net interest income	172283	133909	149610	177600	192997	290201	315987
Total Equity	444978	480820	566367	654121	754905	1140499	1619465
Ratio 6 (%)	**38.72**	**27.85**	**26.42**	**27.15**	**25.57**	**25.45**	**19.51**

E.7 SGBL Bank

E.7.1 First Merger of SGBL Bank

First Merger							
Ratio/Year	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Non-interest income	20775	13017	15061	41177	33184	31369	36609
Number of employees	657	681	892	971	971	945	952
Ratio 1 (Million L.L.)	**31.62**	**19.11**	**16.88**	**42.41**	**34.18**	**33.19**	**38.45**
Non-interest income	20775	13017	15061	41177	33184	31369	36609
Total Assets	2422857	2866380	3029434	3840003	3387293	3509104	3802709
Ratio 2 (%)	**0.86**	**0.45**	**0.5**	**1.07**	**0.98**	**0.89**	**0.96**
Net interest income	70687	72753	79319	76945	76011	81408	69910
Total assets	2422857	2866380	3029434	3840003	3387293	3509104	3802709
Ratio 3 (%)	**2.92**	**2.54**	**2.62**	**2**	**2.24**	**2.32**	**1.84**
Net Operating income	1674	2367	5878	1760	4248	4123	5142
Total Assets	2422857	2866380	3029434	3840003	3387293	3509104	3802709
Ratio 4 (%)	**0.07**	**0.08**	**0.19**	**0.05**	**0.13**	**0.12**	**0.14**
Net Operating income	1674	2367	5878	1760	4248	4123	5142
Total Equity	103062	122816	163932	167696	177536	196882	175250
Ratio 5 (%)	**1.62**	**1.93**	**3.59**	**1.05**	**2.39**	**2.09**	**2.93**
Net interest income	70687	72753	79319	76945	76011	81408	69910
Total Equity	103062	122816	163932	167696	177536	196882	175250
Ratio 6 (%)	**68.59**	**59.24**	**48.39**	**45.88**	**42.81**	**41.35**	**39.89**

E.7.2 Second Merger of SGBL Bank

Second Merger							
Ratio/Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Non-interest income	64980	90719	150976	81336	81335	143386	166111
Number of employees	1157	1335	1353	1945	1775	1775	1858
Ratio 1 (Million L.L.)	**56.16**	**67.95**	**111.59**	**41.82**	**45.82**	**80.78**	**89.4**
Non-interest income	64980	90719	150976	81336	81335	143386	166111
Total Assets	5081983	7179097	7726540	15697398	10296959	1949669	22618948
Ratio 2 (%)	**1.28**	**1.26**	**1.95**	**0.52**	**0.79**	**7.35**	**0.73**
Net interest income	124266	148722	170721	224736	230046	352522	396848
Total assets	5081983	7179097	7726540	15697398	10296959	1949669	22618948
Ratio 3 (%)	**2.45**	**2.07**	**2.21**	**1.43**	**2.23**	**18.08**	**1.75**
Net Operating income	188591	233626	302195	287207	426573	472185	527413
Total Assets	5081983	7179097	7726540	15697398	10296959	1949669	22618948
Ratio 4 (%)	**3.71**	**3.25**	**3.91**	**1.83**	**4.14**	**24.22**	**2.33**
Net Operating income	188591	233626	302195	287207	426573	472185	527413
Total Equity	463453	539050	751021	783216	1079347	1536192	1689301
Ratio 5 (%)	**40.69**	**43.34**	**40.24**	**36.67**	**39.52**	**30.74**	**31.22**
Net interest income	124266.00	148722.00	170721.00	224736.00	230046.00	352522.00	396848.00
Total Equity	463453.00	539050.00	751021.00	783216.00	1079347.00	1536192.00	1689301.00
Ratio 6 (%)	**26.81**	**27.59**	**22.73**	**28.69**	**21.31**	**22.95**	**23.49**

E.8 IBL Bank

Ratio/Year	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Non-interest income	807	2477	922	2668	4259	3689	3894
Number of employees	67	64	62	142	156	164	179
Ratio 1 (Million L.L.)	**12.04**	**38.7**	**14.87**	**18.79**	**27.3**	**22.49**	**21.75**
Non-interest income	807	2477	922	2668	4259	3689	3894
Total Assets	77248	80645	93106	352208	658990	777763	1010038
Ratio 2 (%)	**1.04**	**3.07**	**0.99**	**0.76**	**0.65**	**0.47**	**0.39**
Net interest income	3672	3629	3674	14955	13665	17129	23500
Total assets	77248	80645	93106	352208	658990	777763	1010038
Ratio 3 (%)	**4.75**	**4.5**	**3.95**	**4.25**	**2.07**	**2.2**	**2.33**
Net Operating income	63	5	56	230	843	324	617
Total Assets	77248	80645	93106	352208	658990	777763	1010038
Ratio 4 (%)	**0.08**	**0.01**	**0.06**	**0.07**	**0.13**	**0.04**	**0.06**
Net Operating income	63	5	56	230	843	324	617
Total Equity	1267	7921	12993	18919	14377	29535	36026
Ratio 5 (%)	**4.97**	**0.06**	**0.43**	**1.22**	**5.86**	**1.10**	**1.71**
Net interest income	3672	3629	3674	14955	13665	17129	23500
Total Equity	1267	7921	12993	18919	14377	29535	36026
Ratio 6 (%)	**289.82**	**45.81**	**28.28**	**79.05**	**95.05**	**58.00**	**65.23**

E.9 ABN Amro Bank

Ratio/Year	1999	2000	2001
Non-interest income	5155	6774	7251
Number of employees	182	193	197
Ratio 1 (Million L.L)	**28.32**	**35.1**	**36.81**
Non-interest income	5155	6774	7251
Total Assets	1093791	1259100	1101212
Ratio 2 (%)	**0.47**	**0.54**	**0.66**
Net interest income	26788	29756	30456
total assets	1093791	1259100	1101212
Ratio 3 (%)	**2.45**	**2.36**	**2.77**
Net Operating income	1333	2223	2076
Total Assets	1093791	1259100	1101212
Ratio 4 (%)	**0.12**	**0.18**	**0.19**
Net Operating income	1333	2223	2076
Total Equity	37603	42081	43924
Ratio 5 (%)	**3.54**	**5.28**	**4.73**
Net interest income	26788	29756	30456
Total Equity	37603	42081	43924
Ratio 6 (%)	**71.24**	**70.71**	**69.34**

E.10 Allied Bank

Ratio/Year	2003	2004	2005
Non-interest income	4144	4262	5798
Number of employees	256	250	238
Ratio 1 (Million L.L.)	**16.19**	**17.05**	**24.36**
Non-interest income	4144	4262	5798
Total Assets	605824	702201	733006
Ratio 2 (%)	**0.68**	**0.61**	**0.79**
Net interest income	15778	16638	17485
total assets	605824	702201	733006
Ratio 3 (%)	**2.6**	**2.37**	**2.39**
Net Operating income	329	476	1347
Total Assets	605824	702201	733006
Ratio 4 (%)	**0.05**	**0.07**	**0.18**
Net Operating income	329	476	1347
Total Equity	28421	31203	31929
Ratio 5 (%)	**1.16**	**1.53**	**4.22**
Net interest income	15778	16638	17485
Total Equity	28421	31203	31929
Ratio 6 (%)	**55.52**	**53.32**	**54.76**

E.11 Banque de la Bekaa

Ratio/Year	2003	2004	2005
Non-interest income	1262	1213	1724
Number of employees	57	56	55
Ratio 1 (Million L.L.)	**22.14**	**21.66**	**31.35**
Non-interest income	1262	1213	1724
Total Assets	286117	269106	259425
Ratio 2 (%)	**0.44**	**0.45**	**0.66**
Net interest income	8870	6099	4877
total assets	286117	269106	259425
Ratio 3 (%)	**3.1**	**2.27**	**1.88**
Net Operating income	171	555	950
Total Assets	286117	269106	259425
Ratio 4 (%)	**0.06**	**0.21**	**0.37**
Net Operating income	171	555	950
Total Equity	27417	31666	35168
Ratio 5 (%)	**0.62**	**1.75**	**2.70**
Net interest income	8870	6099	4877
Total Equity	27417	31666	35168
Ratio 6 (%)	**32.35**	**19.26**	**13.87**

E.12 BCP Oriel Bank

Ratio/Year	1996	1997	1998
Non-interest income	6507	9504	11506
Number of employees	60	69	78
Ratio 1 (Million L.L.)	**108.45**	**137.74**	**147.52**
Non-interest income	6507	7504	11506
Total Assets	77248	80645	98400
Ratio 2 (%)	**8.42**	**9.3**	**11.69**
Net interest income	3672	3629	2726
total assets	77248	80645	98400
Ratio 3 (%)	**4.75**	**4.5**	**2.77**
Net Operating income	125	140	193
Total Assets	77248	80645	98400
Ratio 4 (%)	**0.16**	**0.17**	**0.2**
Net Operating income	125	140	193
Total Equity	5475	5074	13166
Ratio 5 (%)	**2.28**	**2.76**	**1.47**
Net interest income	3672	3629	2726
Total Equity	5475	5074	13166
Ratio 6 (%)	**67.07**	**71.52**	**20.70**

E.13 Beirut Riyad Bank

Ratio/Year	1999	2000	2001
Non-interest income	10623	9180	8940
Number of employees	370	353	353
Ratio 1 (Million L.L.)	**28.71**	**26.01**	**25.33**
Non-interest income	10623	9180	8940
Total Assets	1111607	1103991	1094981
Ratio 2 (%)	**0.96**	**0.83**	**0.82**
Net interest income	10474	11474	10869
total assets	1111607	1103991	1094981
Ratio 3 (%)	**0.09**	**0.1**	**0.1**
Net Operating income	711	634	600
Total Assets	1111607	1103991	1094981
Ratio 4 (%)	**0.06**	**0.06**	**0.05**
Net Operating income	711	634	600
Total Equity	53098	52954	52811
Ratio 5 (%)	**1.34**	**1.20**	**1.14**
Net interest income	10474	11474	10869
Total Equity	53098	52954	52811
Ratio 6 (%)	**19.73**	**21.67**	**20.58**

E.14 Inaash Bank

Ratio/Year	1997	1998	1999
Non-interest income	2152	2909	4387
Number of employees	138	207	252
Ratio 1 (Million L.L.)	**15.59**	**14.05**	**17.41**
Non-interest income	2152	2909	4387
Total Assets	210962	398628	534769
Ratio 2 (%)	**1.02**	**0.73**	**0.82**
Net interest income	4691	66238	7062
total assets	210962	398628	534769
Ratio 3 (%)	**2.22**	**16.62**	**1.32**
Net Operating income	172	155	326
Total Assets	210962	398628	534769
Ratio 4 (%)	**0.08**	**0.04**	**0.06**
Net Operating income	172	155	326
Total Equity	15074	15074	16434
Ratio 5 (%)	**1.14**	**1.03**	**1.98**
Net interest income	4691	6238	7062
Total Equity	15074	15074	16434
Ratio 6 (%)	31.12	41.38	42.97

E.15 Lati Bank

Ratio/Year	2006	2007	2008
Non-interest income	619	743	619
Number of employees	27	25	25
Ratio 1 (Million L.L.)	**22.93**	**29.72**	**24.76**
Non-interest income	619	743	619
Total Assets	107087	103690	119082
Ratio 2 (%)	**0.58**	**0.72**	**0.52**
Net interest income	1206	993	1169
total assets	107087	103690	119082
Ratio 3 (%)	**1.13**	**0.96**	**0.98**
Net Operating income	97	1703	1888
Total Assets	107087	103690	119082
Ratio 4 (%)	**0.09**	**1.64**	**1.59**
Net Operating income	97	1703	1888
Total Equity	13378	13821	13635
Ratio 5 (%)	**0.73**	**12.32**	**13.85**
Net interest income	1206	993	1169
Total Equity	13378	13821	13635
Ratio 6 (%)	**9.01**	**7.18**	**8.57**

E.16 Lebanese Canadian Bank

Ratio/Year	2008	2009	2010
Non-interest income	27718	38016	50673
Number of employees	637	665	739
Ratio 1 (Million L.L.)	**43.51**	**57.17**	**68.57**
Non-interest income	27718	38016	50673
Total Assets	6220402	7843546	9308159
Ratio 2 (%)	**0.45**	**0.48**	**0.54**
Net interest income	11398	122683	160058
total assets	6220402	7843546	9308159
Ratio 3 (%)	**0.18**	**1.56**	**1.72**
Net Operating income	113938	132567	175357
Total Assets	6220402	7843546	9308159
Ratio 4 (%)	**1.83**	**1.69**	**1.88**
Net Operating income	113938	132567	175357
Total Equity	427244	538187	643342
Ratio 5 (%)	**26.67**	**24.63**	**27.26**
Net interest income	111398	122683	160058
Total Equity	427244	538187	643342
Ratio 6 (%)	**26.07**	**22.80**	**24.88**

E.17 Saradar Bank

Ratio/Year	2001	2002	2003
Non-interest income	19431	21563	31257
Number of employees	519	392	353
Ratio 1 (Million L.L.)	**37.44**	**55.01**	**88.55**
Non-interest income	19431	21563	31257
Total Assets	2610932	2686688	2986607
Ratio 2 (%)	**0.74**	**0.8**	**1.05**
Net interest income	54939	60083	58755
total assets	2610932	2686688	2986607
Ratio 3 (%)	**2.1**	**2.24**	**1.97**
Net Operating income	3359	4492	11369
Total Assets	2610932	2686688	2986607
Ratio 4 (%)	**0.13**	**0.17**	**0.38**
Net Operating income	3359	4492	11369
Total Equity	147653	160087	171741
Ratio 5 (%)	**2.27**	**2.81**	**6.62**
Net interest income	54939	60083	58755
Total Equity	147653	160087	171741
Ratio 6 (%)	**37.21**	**37.53**	**34.21**

E.18 United Bank of Saudia

Ratio/Year	1998	1999	2000
Non-interest income	2171	1699	1100
Number of employees	126	110	99
Ratio 1 (Million L.L.)	**17.23**	**15.45**	**11.11**
Non-interest income	2171	1699	1100
Total Assets	183241	203337	233587
Ratio 2 (%)	**1.18**	**0.84**	**0.47**
Net interest income	4715	368	368
total assets	183241	203337	233587
Ratio 3 (%)	**2.57**	**0.18**	**0.16**
Net Operating income	480	115	115
Total Assets	183241	203337	233587
Ratio 4 (%)	**0.26**	**0.06**	**0.05**
Net Operating income	480	115	115
Total Equity	12065	9273	6473
Ratio 5 (%)	**3.98**	**1.24**	**1.78**
Net interest income	4715	368	368
Total Equity	12065	9273	6473
Ratio 6 (%)	**39.08**	**3.97**	**5.69**

E.19 Wedge Bank

Ratio/Year	1998	1999	2000
Non-interest income	2044	1259	1631
Number of employees	127	123	124
Ratio 1 (Million L.L.)	**16.09**	**10.24**	**13.15**
Non-interest income	2044	1259	1631
Total Assets	266863	287128	328919
Ratio 2 (%)	**0.77**	**0.44**	**0.5**
Net interest income	6373	7243	7121
total assets	266863	287128	328919
Ratio 3 (%)	**2.39**	**2.52**	**2.16**
Net Operating income	268	130	175
Total Assets	266863	287128	328919
Ratio 4 (%)	**0.1**	**0.05**	**0.05**
Net Operating income	268	130	175
Total Equity	22841	23440	24421
Ratio 5 (%)	**1.17**	**0.55**	**0.72**
Net interest income	6373	7243	7121
Total Equity	22841	23440	24421
Ratio 6 (%)	**27.90**	**30.90**	**29.16**