Sovereign Credit Rating and Yield to Maturity of Government Eurobonds: The Case of the Lebanese Crises

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DEDICATION

To all my family and friends. I would like to dedicate to you this thesis. Getting to this point would not have been possible without your encouragement and support. Thank you.

A special dedication to my grandmother who was always here for me and who has passed away before the completion of this work.
ACKNOWLEDGMENT

I would like to thank my advisor Dr. Amine Abi Aad for his constant guidance, esteemed contribution and for the precious time he dedicated to help me finalize this thesis in its best form.

More thanks go to Dr. Jamal Maalouf for her valued input.
Sovereign Credit Rating and Yield to Maturity of Government Eurobonds: The Case of the Lebanese Crises

Jose Elie G. Torbey

ABSTRACT

Since 2019, Lebanon has been going through one of the worse financial, economic and social crises in centuries. The country is facing very high levels of poverty and unemployment, the local currency has lost more than 90% of its value, and, above all, people can no longer withdraw the money they have placed in Lebanese banks. The country, which is highly indebted, declared bankruptcy after the government announced that the state would not be honoring the payments on the Eurobonds it issued.

Looking at data since 2016, it was shown that a change in sovereign credit rating opposingy correlates with the yields to maturity of the government-issued Eurobonds in the case of Lebanon. Moreover, this study argues that both the GDP growth rate and the Inflation may positively moderate the previous relationship by strengthening the negative relationship between the sovereign credit rating and the yields to maturity of the Eurobonds.

Keywords: Lebanon, Credit Rating, Yield to Maturity, Eurobond, GDP, Inflation, CPI, Default
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.  Introduction</td>
<td>1</td>
</tr>
<tr>
<td>1.1.  Background of the Study</td>
<td>1</td>
</tr>
<tr>
<td>1.1.1.  Yield to Maturity</td>
<td>1</td>
</tr>
<tr>
<td>1.1.2.  Sovereign Credit Rating</td>
<td>2</td>
</tr>
<tr>
<td>1.2.  Statement of the Study</td>
<td>3</td>
</tr>
<tr>
<td>1.3.  Purpose of the Study</td>
<td>3</td>
</tr>
<tr>
<td>1.4.  Research Context</td>
<td>4</td>
</tr>
<tr>
<td>1.5.  Model</td>
<td>5</td>
</tr>
<tr>
<td>1.6.  Significance of the Study</td>
<td>6</td>
</tr>
<tr>
<td>1.7.  Thesis Division</td>
<td>6</td>
</tr>
<tr>
<td>II.  Literature Review</td>
<td>7</td>
</tr>
<tr>
<td>2.1.  Lebanon and its Banking Sector</td>
<td>7</td>
</tr>
<tr>
<td>2.1.1.  The birth of the Lebanese banking sector with Intra bank</td>
<td>7</td>
</tr>
<tr>
<td>2.1.2.  From the start of the civil war to the Taif Agreement</td>
<td>10</td>
</tr>
<tr>
<td>2.1.3.  The revival of the economy after the civil war:</td>
<td>12</td>
</tr>
<tr>
<td>2.1.4.  The killing of Rafiq Hariri and the 2006 war:</td>
<td>18</td>
</tr>
<tr>
<td>2.1.5.  Arab Uprising and Syrian Conflict</td>
<td>20</td>
</tr>
<tr>
<td>2.1.6.  Lebanon’s economy from 2006 to 2017</td>
<td>21</td>
</tr>
<tr>
<td>2.1.7.  Lebanon’s banking Sector up until 2017</td>
<td>24</td>
</tr>
<tr>
<td>2.2.  The Lebanese Crises of 2019</td>
<td>26</td>
</tr>
<tr>
<td>2.2.1.  From Hariri Jr.’s resignation in 2017 to the 2019 crises</td>
<td>26</td>
</tr>
<tr>
<td>2.2.2.  Financial Engineering</td>
<td>28</td>
</tr>
<tr>
<td>2.2.3.  The 2019 uprising</td>
<td>31</td>
</tr>
<tr>
<td>2.3.  Variables</td>
<td>34</td>
</tr>
<tr>
<td>2.3.1.  Sovereign Credit Rating</td>
<td>34</td>
</tr>
<tr>
<td>2.3.2.  Yields to Maturity</td>
<td>37</td>
</tr>
<tr>
<td>2.3.3.  Gross Domestic Product</td>
<td>38</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table 1: Evolution of the Real GDP from 1974 to 1985...............................................................11
Table 2: Evolution of interest rates on government bonds from 1992 to 1999 as a percentage....15
Table 3: Evolution of the budget deficit and public debt as a percentage of GDP (1993-2000)...16
Table 4: Macroeconomic data (2005-2015) in billions of dollars.................................................22
Table 5: Sovereign Credit Rating Criteria....................................................................................35
Table 6: Long-Term Sovereign Rating Rules..................................................................................36
Table 7: Short-Term Sovereign Rating Rules..................................................................................36
Table 8: Consolidated Data..............................................................................................................47
Table 9: Correlation Matrix.............................................................................................................49
LIST OF FIGURES

Figure 1: Model Applied

Figure 2: Evolution of the public debt as a percentage of GDP from 1971 to 2014

Figure 3: Inflation rate in% of GDP (1980-2015)

Figure 4: Public debt and Budget deficit (2000-2021) as% of GDP

Figure 5: Commercial Banks Assets Distribution

Figure 6: Deposits of commercial banks by residents

Figure 7: Average interest rates at banks and quarterly rates on T-bills

Figure 8: Bank loans to residents (billions of dollars)

Figure 9: Summary of the financial engineering policies cash flow

Figure 10: Visualization of the financial engineering policies

Figure 11: Black market LBP exchange rate versus official rate

Figure 12: Weighted average of effective YTM of Lebanese Eurobonds

Figure 13: Lebanon GDP in USD

Figure 14: Lebanon CPI – LBP

Figure 15: Lebanon CPI after adjusting to USD black market exchange rate

Figure 16: Results Summary
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABL</td>
<td>Association of Banks of Lebanon</td>
</tr>
<tr>
<td>BDL</td>
<td>Banque du Liban</td>
</tr>
<tr>
<td>CAS</td>
<td>Central Administration for Statistics</td>
</tr>
<tr>
<td>CPI</td>
<td>Consumer Price Index</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>LBP</td>
<td>Lebanese Pound</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>USD</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>YTM</td>
<td>Yield to Maturity</td>
</tr>
</tbody>
</table>
Chapter One

Introduction

1.1. Background of the Study

Since 2019, Lebanon has been facing what the World Bank has described as one of the worse financial, economic and social crises since the 1850s (World Bank, 2021). In fact, the local currency has lost more than 90% of its value. Additionally, people can no longer access their money in banks, as an informal capital control was quickly put in place. The state has been running its budget for years on deficit spending either by borrowing from international and local investors, spending depositors' money, or printing additional local currency leading to further inflation. This has led to losses in the financial sector estimated at around 70% to 90% of the deposits, and the yields to maturity of Eurobonds has skyrocketed when doubts arose on the ability of the government to repay its debt. In March 2020, the Lebanese government officially defaulted and ceased all payments related to its Eurobonds. There is a need to assess the crisis to try to understand how it has happened since it is unprecedented and cannot be compared to any other crisis that happened in the world in the last few decades.

1.1.1. Yield to Maturity

The Corporate Finance Institute defines the term, ‘Yield to Maturity’ (YTM), as “the speculative rate of return or interest rate of a fixed-rate security, such as a bond. The YTM is based on the belief or understanding that an investor purchases the
security at the current market price and holds it until the security has matured (reached
its full value), and that all interest and coupon payments are made in a timely fashion”
(2022). In other words, it is the effective rate of return of the security, based on its
market price, considering the expected and scheduled returns. For instance, in the case
of Lebanon, the government issued Eurobonds, which are foreign currency debt
instruments, paying a fixed interest, called a ‘coupon’, for each paper twice a year.
Upon maturity of the paper, the government will have to repay to its holder the initially
borrowed amount. When doubts arose on the ability of the State to repay its debt, the
prices of these papers decreased, as bond holders were willing to sell their Eurobonds
at loss to avoid taking the risk of the default; this would mean that they might not
receive their money. When the prices decreased, and since the amounts of the coupons
are fixed, and at maturity the full amount should be theoretically repaid, the return on
the Lebanese papers (which is the YTM) increased significantly.

1.1.2. Sovereign Credit Rating

The Corporate Finance Institute defines the term, ‘Credit Rating’, as “an
opinion of a particular credit agency regarding the ability and willingness [of] an entity
(government, business or individual) to fulfill its financial obligations in completeness
and within the established due dates. A credit rating also signifies the likelihood a
debtor will default. It is also representative of the credit risk carried by a debt
instrument – whether a loan or a bond issuance” (2022). It is a reflection of the
financial and economic situation, which can both be affected by the political and social
situation. Short-term credit rating reflects the likelihood that the borrower will default
within a year, while long-term credit rating reflects the likelihood that the borrower
will default at any time in the future (2022).
1.2. **Statement of the Study**

The aim of this study is to show the negative effect of sovereign credit rating on yields to maturity of government issued debt whereby an increase in credit rating will decrease the yields to maturity of the Eurobonds, and to demonstrate that a positive change both the Gross Domestic Product (GDP) and the Consumer Price Index (CPI) will also decrease the yields to maturity. It is pertinent to analyze these relationships in a certain way especially in the case of Lebanon and its crisis, as this will help shed a light on what triggered the crisis and what led to it. The study will additionally help in providing some recommendations to move forward, and try to address the crisis. There is a need for this research to be conducted not only because there are not many studies published on the matter, but also because the crisis is currently still ongoing and there has been very few publications in light of the constantly evolving context. In order to apply the model needed for this study to yield results, in the case of Lebanon, data was gathered from different trusted sources. They were then adjusted as per the fluctuating market conditions in order to yield proper results when analyzing.

1.3. **Purpose of the Study**

This is an exploratory study that seeks to show that both short-term and long-term sovereign credit ratings negatively affect the yields to maturity of the foreign currency sovereign debt in addition to showing the negative effect of a change in either the GDP or the CPI on the yields to maturity. This study will provide the reader with a better understanding of how the country reached such a point of crisis, will assess the current measures taken by the government to address it, and provide more efficient solutions to overcome it.
1.4. Research Context

Lebanon has been going through a severe financial, economic and social crisis since 2019, when the Banque du Liban (BdL) stopped allowing the banks holding accounts at its end to withdraw or transfer any amount from their available balances. In March 2020, when the government defaulted on the payment of its Eurobonds, their yields to maturity skyrocketed. The credit rating of Lebanon, which reflects the likelihood of the government to repay its debt based on the political, economic and financial situation of the country, was somewhat stable during the last few years with a slightly decreasing trend. When the crisis hit, in the last quarter of 2019, rating agencies began progressively decreasing the sovereign rating of Lebanon. In the meantime, yields to maturity of the Eurobonds were still increasing while the market price of the Eurobonds were dipping to record lows, as some investors were ready to sell their papers at 85% lower than the face value to cut their losses. During that time, the GDP in dollars decreased significantly in line with the devaluation of the national currency, with the UN Relief (2021) estimating that Lebanon’s GDP in 2021 reached USD 20.5 billion down from USD 53.6 billion in 2019 when the crises started. Finally, the country witnessed a galloping inflation in the national currency, however and up until the end of 2021 (as data was gathered for this study up until this date), when adjusted to the USD market price fluctuations, Lebanon witnessed a deflation, meaning that with the same amount of US dollars, residents can spend more.

Practically, to study the relationship between the credit rating and yields to maturity first and then to examine the effect of the GDP and the CPI on the YTMs, a correlation was applied on SPSS. In order to do so, data was gathered from different trusted sources: YTM and credit ratings were exported from the Bloomberg Terminal, the GDP and its forecast from a UN Relief report relying on data from World Bank
and the CPI from the International Monetary Fund (IMF), which relies on the figures of the official Central Administration for Statistics in Lebanon. Finally, to adjust the data as per the market value, the average rates were taken from Lira Rate, which reports the daily black market rates since the start of the crisis. This website was cited in several official UN reports and by major new agencies such as CNBC and CNN.

1.5. Model

This study will first seek to prove the negative relationship between the sovereign credit rating and the yields to maturity of government Eurobonds in the case of Lebanon, whereby any change in the credit rating affects the yields to maturity in the opposite direction. Then, this study will show that both the GDP and the inflation negatively affect the yields to maturity, meaning that an increase in GDP or in inflation will decrease the yields to maturity of the government Eurobonds. The model can be summarized as follow:

Figure 1: Model Applied
In order to prove the above model, a correlation matrix was applied.

1.6. Significance of the Study

The findings of this study will help in understanding the impact of each of the different variables on the Yields to Maturity, in order to determine how to properly address its sharp decline. The model will provide the impact of the change in each of the variables on the Yields to Maturity. This research will assess the current measures taken by the government to tackle the crisis, and propose more efficient measures based on the results of the applied model that will yield a higher impact. Addressing the GDP will have a stronger impact than addressing inflation.

1.7. Thesis Division

The thesis is divided into seven main chapters. The first chapter is the Introduction introducing the general idea of the study, its context, as well as the definition of the key terms and the introduction of the different hypotheses. It is followed by chapter Two which is the Literature Review. It includes a detailed background on Lebanon and its financial sector amid the crisis the country is going through, in addition to the presentation of the different variable; then the chapter addresses the gap in research both in the Lebanese financial sector and throughout the ongoing crises. Chapter Three discussed the model that will be applies in addition to exposing a similar previous application. Chapter Four consists of the model application for each of the four hypotheses. The Fifth chapter discussion and interpretation of the results. Finally, the last chapter, Chapter Six holds the conclusion and recommendations of the study.
Chapter Two

Literature Review

2.1. Lebanon and its Banking Sector

Lebanon achieved independence during World War II, on November 22, 1943, with the French army exiting Lebanon a few years later in 1946. Immediately, power was divided over the different sects, with each having a set quota (Cobban, 1985). For instance, the President had to be a Christian Maronite, the Prime Minister a Sunni Muslim and the Parliament Speaker a Shia Muslim. The parliament itself was also divided based on set quotas.

Up until the 1970s, Lebanon was economically prosperous, and an international and regional corporate, financial and touristic hub. However, politically and among the different sects, tensions were mounting progressively leading to the civil war.

2.1.1. The birth of the Lebanese banking sector with Intra bank

In the 1940s, after the Second World War, Lebanon had “36 local quasi-banks and 89 cooperative institutions” (Ashi and Ayache, 2002) most of which were affiliated to international institutions. In 1947, when the resolution was adopted to partition Palestine, Lebanese and Jordanian institutions played a major role in transferring the money of the Palestinians (Ghanem, 2018). In 1948, a top Palestinian banker, Yusif Beidas, moved to Lebanon along with his family and founded the International Trading Company along with local businessmen (Dib, 2014). The company first started as a representative for international firms in the region such as Ford and
Bechtel, and then grew to become the leader in currency exchange and a purchasing agent for international organizations such as the Red Cross and the UN. It gained monopoly in the exchange and transfers market forcing more than a 100 exchange shops to close and strengthening Lebanon’s position as a regional hub for transfers and exchange. In 1951, the company changed its legal status to a bank becoming part of the nine banks that were operating in Beirut, most of which were foreign. It became known as “Intra Bank”. The bank lobbied to pass the banking secrecy law in 1956 and seized the opportunity to grasp the deposits resulting from oil and gas as investors were fleeing from gulf countries due to political and military instability. Lebanese banks were also being used by foreign governments such as the CIA and the French government to fund wars and attacks (Safieddine, 2019). Intra Bank started using the deposits to invest heavily in the major sectors both locally and internationally. Locally, Intra contributed to the development of the major sectors, where it even sometimes gained monopoly by investing in media, telecommunication, logistics, airlines, freight, malls, construction, real estate, hotels, printing, art, and the Casino (Safieddine, 2019). During the 1960s Oil and Gas boom, the bank took advantage of the absence of major financial institutions in gulf countries and started paying very high interbank rates, grasping the deposits of regional banks, governments and large depositors. Internationally, the bank invested in real estate by buying a skyscraper in Manhattan and buildings in the Champs Elysees, London, Geneva, Italy, Africa and the Middle East. The bank opened dozens of international branches and acquired local banks in different countries, establishing a strong presence in the Middle East, Europe, North and South America and Africa (Safieddine, 2019). Beidas had the power to appoint politicians and government officials in several countries from France to Lebanon passing by Italy. In 1959, the Lebanese banks founded the Association of
the Banks of Lebanon (‘ABL’) (ABL, 2022), a lobby grouping all banks operating in Lebanon, and in 1963, the government founded the Banque du Liban, Lebanon’s central bank that started operating on April 1, 1964 (BDL, 2022). With the parliament drafting the Money and Credit Law that regulated the financial sector as well as the issuance of money and all sorts of payments, the ABL pressured the politicians to limit the constraints set by this law (Safieddine, 2019). For instance, while the law prevented banks to directly and heavily invest in real estate, it allowed them to establish companies outside of Lebanon and use them to invest in real estate.

Intra got to a point where it had more than 100 companies all over the world with more than 3000 employees and 15000 contractors (Ghanem, 2018).

With no control from the central bank, which did not have any official capacity to regulate or penalize any bank, Intra placed all its deposits in long-term investments or in loans to its shareholders (Ghanem, 2018).

With the high cost of the Vietnam War, the US increased its interest rates, and European banks did the same leading international banks to withdraw their deposit from Lebanese banks and place them in Europe and in the US. All major countries increased their rates further increasing the withdrawal of deposits from Lebanon. The final hit came from Gulf countries who engaged in the Yemeni war in 1962 and had to withdraw their deposits to cover the cost of the war. Intra bank, not being able to secure the requested amounts to be withdrawn, asked the president for a bailout and ceased payment; the word spread leading angry customers to attack all the branches of the bank (Safieddine, 2019). Consequently, the government decided to close all the banks for 3 days and bailed out all the banks except for Intra. As for Intra Bank’s customers, the government fully returned the small depositors’ money (below 15 thousand), partially settled some of the larger deposits, while the biggest depositors
became shareholders of Intra, which was transformed back into an investment company owning several entities such as Middle East Airlines, Casino du Liban, other local banks, many more companies and real estate. As for the international entities, most of them were taken over by the local regulators (Ghanem, 2018).

While the fall of Intra bank significantly hit the whole Lebanese banking sector, this bank itself was the reason for the original existence of strong banks in Lebanon. Its bankruptcy was a big hit for the whole sector however; the quick response of the government helped it to quickly overcome the hit to some extent. Even Intra bank was able to maintain a solid presence in the banking sector through subsidiary banks such as Bank Al Mashreq and Credit Libanais.

2.1.2. From the start of the civil war to the Taif Agreement

The Lebanese civil war began in 1975. It was not a "conventional" civil war between a government and an opposition group; multitude of local and non-local actors took part in the conflict, and the society polarized according to their confessional belonging (O'balance, 1999). The war lasted for fifteen years and while it saw no clear winner at the time, the Syrian regime and its local allies gained significant power while their opposition weakened significantly. The war caused disastrous consequences to the economy and population. According to the Lebanese historian Fawwaz Traboulsi (2012), the toll in human lives following the 1990 peace accords was estimated to be 71,328 dead and 97,184 wounded. Several international agencies estimate that the displaced were between 600,000 and 800,000 (a fifth of the population at the time) and that 900,000 people emigrated (30% of the population) (Labaki & Bou Rjeili, 1994). Until 1992, more than half of the telephone lines were down, electricity was only available a few hours a day, and 80% of the available water
was contaminated. The infrastructure situation saw the port and airport of Beirut (the main ones in Lebanon) completely in ruins, only 1,000 of the 3,270 km of roads in Lebanon were passable, and a very high number of houses were destroyed (Labaki & Bou Rjeili, 1994).

The situation of the national economy was no better: due to the repeated bombings during the conflict, the industrial sector was at the brink of disappearance, the GDP shrank significantly, and the population was hit by alarming levels of poverty. Table 1 below shows the decrease in real GDP since the start of the civil war in 1975, as by 1976, real GDP had shrunk by around 47.5%.

Table 1: Evolution of the Real GDP from 1974 to 1985.

<table>
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<tr>
<th>YEAR</th>
<th>REAL GDP</th>
<th>REAL GDP INDEX*</th>
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<tr>
<td>1974</td>
<td>8,137</td>
<td>100.0</td>
</tr>
<tr>
<td>1975</td>
<td>7,471</td>
<td>91.8</td>
</tr>
<tr>
<td>1976</td>
<td>4,272</td>
<td>52.5</td>
</tr>
<tr>
<td>1977</td>
<td>6,027</td>
<td>74.1</td>
</tr>
<tr>
<td>1978</td>
<td>6,132</td>
<td>75.4</td>
</tr>
<tr>
<td>1979</td>
<td>6,331</td>
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<tr>
<td>1980</td>
<td>6,660</td>
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<tr>
<td>1981</td>
<td>6,637</td>
<td>81.6</td>
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<tr>
<td>1982</td>
<td>6,013</td>
<td>73.9</td>
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<tr>
<td>1983</td>
<td>5,880</td>
<td>72.3</td>
</tr>
<tr>
<td>1984</td>
<td>5,464</td>
<td>67.2</td>
</tr>
<tr>
<td>1985</td>
<td>4,931</td>
<td>60.6</td>
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*BASELINE YEAR 1974 = 100


According to data from the General Workers Union (Lebanon's main trade union), in 1991, about 30% of the population was unemployed and about 85% lived below the
poverty line (Le Monde, 1990). Added to these factors was a substantial capital flight, which complicated the situation in the banking sector. The Gulf War of 1990 further complicated the situation, whereby the country witnessed a drastic decrease in exports to the countries involved in the conflict and as a result, the loss of additional jobs. The fiscal situation was equally worrying: the budget deficit, as a percentage of GDP, increased from 3% in 1975 to 32.3% in 1989, becoming one of the highest among Middle Eastern countries (Saleh, 2004). Consequently, the public debt began to increase at an average rate of 66% per annum between 1976 and 1983, coming to represent the 99.8% of GDP in 1990 (Saleh, 2004). The national currency also sharply depreciated from a relatively strong and healthy rate of LBP 2.3 per USD right before the civil war started to a rate exceeding LBP 1,700 per USD in 1992 (Mahfouz, 2017).

The civil war ended after the Taif agreement was signed and approved by the Lebanese parliament in the last quarter of 1989. The agreement amended the political representation of the different sects by guaranteeing an equal power and representation in the state for both Christians and Muslims from one side and for the Christian Maronite president and Muslim Sunni Prime minister from another side (O’balance, 1999).

2.1.3. The revival of the economy after the civil war:

Starting in 1982, and after the civil war, the militias that were participating in the war became part of the institutions by re-establishing themselves as parties. About 20,000 militiamen were integrated into the national army, police and public administration, while some leaders became part of Omar Karami’s first government (Picard, 1996). In other terms, the 1990s only made the 1980s formal.
In September 1991, the Security and Defense Treaty gave the Syrian army military control in Lebanon, with the Syrian regime placing their most loyal allies in different key positions.

At that time, Rafiq Hariri, a successful Saudi Lebanese businessman with excellent ties to the Saudi royal circle, rose as a political leader in Lebanon. He formed, in 1992, a government of 30 ministers, 20 of whom were new faces in politics with some of them being representatives of the new economic and financial elite: men with great experience in the business world but with few exceptions, no political experience. He introduced Lebanon into the international financial circuit to grasp large national and international investments (Saudi in particular) (Hourani, 2015 and Baumann, 2012) by completely reforming the tax system, implementing monetary policies, proceeding with the partial privatization of public institutions, launching public–private partnership (PPP), liberalizing trade and entirely restructuring the public administration. Some of the most notable privatizations and PPP are the reconstruction and development pf Beirut under the company Solidere (Becherer, 2005), Sukleen waste management, and the mobile telecommunication operators Mic 1 and Mic 2 (Kostanian, 2021). Hariri placed people he trusted to head key institutions such as the central bank, the ministry of finance, the council for development and reconstruction, major municipalities (such as Beirut), the Investment Development Authority of Lebanon and many others. Having total administrative and financial control over all these organizations helped him avoid both internal and external inspection. Lebanon was quickly able to implement major reform packages requested by the international community and restructure and re-activate the public institutions (Sanchez, 2016).
Hariri appointed himself as Finance Minister at the same time of being Prime Minister of the government to control the economic and fiscal policies as well as public expenditure. He launched a tax reform and decreased the direct taxes from average income taxes of around 30% to around 10% (Azzi, 1998), increased the indirect ones and improved the collection process (Sanchez, 2016). Bank deposits, interest revenues and state issued instruments remained untaxed to encourage these types of investments.

The reconstruction of the different regions after the war was divided over different political leaders, with Hariri handling the reconstruction of Beirut, by founding Solidere, a new company in which he was the major shareholder, which privatized and reconstructed the capital’s city center. Reconstruction was handled by Hariri’s companies, or his allies’. The management of basic services and major infrastructures was also handled by Hariri and his allies through build-operate-transfer agreements (BOT) granting private companies the concession to finance, build, manage and operate these services (Leenders, 2004).

In 1993, in order to reorganize and modernize the central bank, he appointed as Governor Riad Salameh, a senior former banker and executive at Merrill Lynch, who still heads the institution up until the writing of this thesis. According to Baumann (2012), Salameh was the main person responsible for planning and implementing the major macroeconomic reforms carried out after Hariri's rise to power. In order to attract foreign investors, he decided to make the local currency more attractive, and opted for a monetary policy of pegging the LBP to the USD in order to guarantee the stability of the national currency and to control inflation. Two strategies were adopted to succeed despite the unstable political and economic context: first, the central bank constituted large foreign currency reserves and
investment to create confidence and strength in the national currency; second, the rates of the treasury bonds were increase significantly to encourage people to place their money in LBP, and in Lebanon as per the table 1 below.

**Table 2: Evolution of interest rates on government bonds from 1992 to 1999 as a percentage.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Interest at 3 months</th>
<th>Interest at 6 months</th>
<th>Interest at 12 months</th>
<th>Interest at 24 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>22.39</td>
<td>23.93</td>
<td>26.94</td>
<td>29.51</td>
</tr>
<tr>
<td>1993</td>
<td>18.27</td>
<td>19.95</td>
<td>21.43</td>
<td>25.33</td>
</tr>
<tr>
<td>1994</td>
<td>14.09</td>
<td>17.21</td>
<td>18.68</td>
<td>19.24</td>
</tr>
<tr>
<td>1995</td>
<td>18.88</td>
<td>20.65</td>
<td>24.60</td>
<td>23.28</td>
</tr>
<tr>
<td>1996</td>
<td>15.19</td>
<td>18.88</td>
<td>20.65</td>
<td>22.79</td>
</tr>
<tr>
<td>1997</td>
<td>13.09</td>
<td>14.30</td>
<td>16.83</td>
<td>12.68</td>
</tr>
<tr>
<td>1998</td>
<td>11.77</td>
<td>13.21</td>
<td>14.84</td>
<td>16.19</td>
</tr>
<tr>
<td>1999</td>
<td>12.12</td>
<td>12.12</td>
<td>13.14</td>
<td>14.64</td>
</tr>
</tbody>
</table>

Source: Data processed by Sanchez, 2016 based on the work of Jomaa, 2015.

These measures were considered successful, as the LBP reached 1,507.5 to the dollar in 1998 (Mahfouz, 2017) down from around 2,600 in the end of 1992 (Erbas, Mazarei, Eken & Cashin, 1995), a value that remains “official” today upon the drafting of this thesis.

The reconstruction, coupled with the cost of pegging the national currency and paying high interest rates required the state to borrow excessively; according to the data set out by Dibeh (2005), the Lebanese public debt at the end of 1992 amounted to 3 billion
USD dollars, representing 34% of GDP. It was sustainable considering the reserves of foreign currency and gold that the Central Bank owned from one side, and the projected increase in Tax revenues and in the GDP resulting from the reconstruction and development from another side. However, the physical and political reconstruction projects in addition to the expenditure on public sector salaries and indemnities, led to a steady increase in the budget deficit and exponential debt, financed through the issuance of more government bonds at very high interest rates. This led Lebanon to become one of the most indebted countries in the world. As Table 2 shows, the ratio of public debt to GDP steadily increased during the years following the first Hariri government, corresponding to the realization of the reconstruction projects: the budget deficit, which amounted to 23.6% of GDP in 2000, was ranked among the most negative in the world.

While Lebanon's debt was insignificant before the civil war, the country started to issue significant debt in 1975 in the local currency. It was only later when Hariri came in power that the borrowings increased to record levels and the government started to issue foreign currency debt by issuing Eurobonds (Credit Libanais, 2016).

**Table 3: Evolution of the budget deficit and public debt as a percentage of GDP from 1993 to 2000.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Deficit / GDP (%)</th>
<th>Debt / GDP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>9.0 %</td>
<td>34.4 %</td>
</tr>
<tr>
<td>1994</td>
<td>19.3 %</td>
<td>43.5 %</td>
</tr>
<tr>
<td>1995</td>
<td>15.6 %</td>
<td>51.3 %</td>
</tr>
<tr>
<td>1996</td>
<td>18.2 %</td>
<td>19.9 %</td>
</tr>
<tr>
<td>1997</td>
<td>23.6 %</td>
<td>96.6 %</td>
</tr>
<tr>
<td>1998</td>
<td>14.1 %</td>
<td>105.4 %</td>
</tr>
<tr>
<td>1999</td>
<td>14.4 %</td>
<td>120.0 %</td>
</tr>
<tr>
<td>2000</td>
<td>23.6 %</td>
<td>141.0 %</td>
</tr>
</tbody>
</table>

Source: Dibeh, G., 2005
This policy severely limited economic growth by increasing the country indebtedness in an alarming way. Economists such as Georges Corm (2003) and Ghassan Dibeh (2005) argued that there were irregularities in the management of government bonds and in the change of interest rates: the interest on the debt was established before the start of the auctions and not in relation to supply and demand (Corm, 2003). Consequently, they deduced that the policy of over-indebtedness at high interest rates did not have exclusively macroeconomic objectives, as officially stated, but rather that it acted as a mechanism for illicit enrichment of the political and financial class. At first, the public debt was almost entirely held internally. In 1994, Hariri started issuing Eurobonds to try to capture international investments, and to try to decrease the interest expense of the state, as the USD interest rates were much lower. The share of Eurobonds from the total public debt started becoming significant in the years 2000s (Dibeh, 2005).
Despite slowing growth and high levels of poverty and unemployment, the government had international trust, which resulted in financial and economic support. According to Haddad (1996), 28% of Lebanese families lived below the poverty line while Baumann (2012) estimated that, in 1997, 32.1% of Lebanese households did not reach the basic living standards. As per numbers compiled by the UN, 35% of Lebanon's families were unable to meet their basic needs and that 7.09% lived in extreme poverty (Abla & Masri, 2005).

### 2.1.4. The killing of Rafiq Hariri and the 2006 war:

In 2004, the Syrian regime started pressuring politicians to increase its influence, pushing Rafiq Hariri to resign, and the UN to issue and approve the resolution 1559 which requested the withdrawal of Syrian occupation from Lebanon and renewed the request for disarmament of Hezbollah (UN Security Council, 2004), a Syrian ally and armed party, classified as terrorist organization by the US and the most occidental countries. On February 14, 2005, Rafiq Hariri was assassinated in a bombing in the city center of Beirut. A special UN-backed court later found members of Hezbollah guilty of carrying the bombing (UN, 2020). In the weeks following the assassination, thousands of Lebanese took to the streets to protest the incident, accusing Syria of being the architect of the murder and demanding the withdrawal of Syrian troops present in Lebanon. This huge movement combined with the mounting international pressure led to the withdrawal of the 40 thousand Syrian soldiers from Lebanon, 28 years after their arrival. Lebanon was divided between the “March 8” and “March 14” partisans (Picard, 2012). Around 800 thousand “March 8” partisans representing pro-Syrian regime and pro-Hezbollah, protested on March 8, 2005, to express solidarity with the Syrian army. Millions of “March 14” partisans protested 6 days later against
the Syrian regime’s occupation (Fisk, 2012). The following year witnessed several bombings and assassination attempts of officials and journalists having an anti-Syrian regime stance, some of which were successful.

Close allies of Hariri maintained control of the government increasing public debt and increasing public spending, limiting the negative impact of the unstable situation on the economy; in fact, while growth decreased at first, the economy was quick to pick up, with growth increasing significantly in 2006 (World Bank, 2007).

In July 2006, members of Hezbollah executed 8 Israeli soldiers and kidnapped two others in a border area, starting a war with Israel. The severe violence of the Israeli response which destroyed most of the Lebanese civil infrastructure, killed more than a thousand people and displaced more than a million Lebanese citizen (Relief Web - UN OCHA, 2007), led to an increased pressure to end the conflict. The UN council resolution 1701 was adopted 34 days after the start of the conflict decreeing a ceasefire on both sides, the withdrawal of the Israeli army from Lebanon, the establishment of a larger security zone controlled by the UN in the south of Lebanon and the total disarmament of Hezbollah UN Security Council, 2006). The resolution does not mention in any way the violence perpetrated by the Israeli army during the conflict (Fisk, 2010).

The results of the war were catastrophic on the Lebanese side: both the economic and environmental damage were significant in a context characterized by an economic recovery (Elias, 2015). The World Bank estimated that the cost of the 2006 war at USD 729 million adding that Lebanon would need 3 years to complete the reconstruction (World Bank, 2013). Among the destructions caused by the Israeli bombs are the Beirut airport, important water and fuel depots, power plants, 630 km of roads, 145 bridges, 65,000 shops and 900 factories (Elias, 2015).
2.1.5. Arab Uprising and Syrian Conflict

Following the Arab uprising, a civil war erupted in Syria in 2011 displacing millions, and leading to a substantial influx of Syrian nationals towards Lebanon which, in 2014, reached one million individuals, making Lebanon the country with the highest concentration of refugees in the world compared to the local population (UNHCR, 2014). The influx of people precipitated the collapse of the already inadequate basic services and infrastructure (Khaled, 2014) and increased pressure on the already insufficient services (Charafeddine, 2016). According to data compiled by the World Bank, in 2012 alone, the total fiscal cost of Syrian refugees that Lebanon had to support amounted to $ 2.6 billion (World Bank, 2013).

The Syrian conflict had a disastrous impact on the Lebanese economy. The real estate sector witnessed a stagnation of prices and a sharp decline in the number of transactions (Credit Libanais, 2013). According to a study published by the Banque Du Liban (2016), investors from the Gulf and the diaspora decreased their investments following the conflict in Syria and consequently, the demand in the real estate sector dropped. On the other hand, the Lebanese residents who rented houses or commercial properties faced an increase in the prices resulting from the increase in demand created by the influx of the Syrian population. In addition, the increase in the labor force led to an increased competition in the job market, leading to further unemployment among Lebanese nationals in addition to the high unemployment rates already witnessed among the Syrian refugees who had fled to Lebanon (Charafeddine, 2016). In 2016, one in five Lebanese became unemployed and when considering the foreign labor force (mostly constituted of Syrians) unemployment rate reached 34% (Cherri, Gonzalez & Delgado, 2016). Unemployment among young Lebanese reached
56% as it became much harder to even find low paying jobs (Cherri, Gonzalez & Delgado, 2016).

A study conducted by Dibeh, Fakih and Marrouch (2020) showed however that both the Syrian refugees displacement and the intensity of the Syrian conflict did not have a negative impact on the tourism sector in Lebanon. A study carried out by Credit Libanais in 2013 revealed that, between 2010 and 2013, the influx of tourists to Lebanon fell by 65%. This drop is mostly associated to the lack of investments in infrastructure and other tourism-related facilities that are necessary for a constant growth in this industry.

2.1.6. Lebanon’s economy from 2006 to 2017

Despite the political and security instabilities, Lebanon managed to overcome the various crises whether internal, regional or international. The pegging of the LBP at the rate of 1507.5 kept inflation at very low levels as shown below.

**Figure 3: Inflation rate (1980-2015)**

To do so, the central bank needed a constant flow of foreign money that arrived through foreign direct investments and remittances from workers abroad attracted by the high interest rates. A 2012 study by the World Bank confirmed that the reason that Lebanon not to fall into financial crises during that period is the continued inflow of capital into Lebanon's banks (World Bank, 2012). In fact, since the post-war period, Lebanon's economic growth rates have depended on the foreign capital influx, as shown in table 3.

Table 4: Macroeconomic data (2005-2015) in billions of dollars (nominal figures).

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>21.3</td>
<td>21.8</td>
<td>24.6</td>
<td>28.8</td>
<td>35.1</td>
<td>38</td>
<td>40.1</td>
<td>43.2</td>
<td>44.4</td>
<td>45.7</td>
<td>46.9</td>
</tr>
<tr>
<td>Foreign capital</td>
<td>14.6</td>
<td>16</td>
<td>17.4</td>
<td>25.1</td>
<td>35.7</td>
<td>41.6</td>
<td>45.2</td>
<td>45.2</td>
<td>42.8</td>
<td>43.4</td>
<td>40.5</td>
</tr>
<tr>
<td>Foreign Currency reserves</td>
<td>9.8</td>
<td>10.2</td>
<td>9.8</td>
<td>17.1</td>
<td>25.7</td>
<td>28.6</td>
<td>30.8</td>
<td>30</td>
<td>31.7</td>
<td>32.4</td>
<td>30.6</td>
</tr>
</tbody>
</table>

Source: Republic of Lebanon, Ministry of Economy and Trade, 2015

Even during the 2008 financial crisis that hit the whole world, banks’ inflows of money increased, Lebanon recorded a record influx of tourists from all over the world (+ 46% from 2008 to 2009) and the real estate sector saw a significant growth after the 2006 summer war (Ministry of Economy and Trade, 2015).

The capital inflows were not enough to heal the damage of the growing public debt, as the budget deficit kept growing, and was being financed by either issuing more debt instruments, or by the creation of money through seigniorage, whereby the central bank was creating more money to finance the state’s deficit.
As the country was running on budget deficit, and the capital inflow was not a solution to finance the gap, Lebanon had to resort to international aid and bailouts from other countries. After the civil war, they were first received to finance the reconstruction of the infrastructures (Helbling, 1996), then, a few years later, they became conditioned to implementing basic reforms, and later deposits started being placed at the central bank to increase the foreign currency deposits and help stabilize the Lira (Dibeh, 2007). Lebanon received tens of billions of US dollars through numerous conferences and programs and the funding did not stop coming even when the promises of the previous conferences were not implemented. This created a strong and dangerous dependence for Lebanon on international aid.

During this period (2006-2017), both Iran and Saudi Arabia increased their influence in Lebanon, while the rivalry between the two states was increasing, especially with the Yemeni War that indirectly opposed the two countries. Iran continued developing its nuclear program despite the objection of the international community. This led to increased pressure through economic siege and sanctions on Iran and its allies in Lebanon (Levitt, 2019).
2.1.7. Lebanon’s banking Sector up until 2017

Banks in Lebanon are mainly classified as either commercial banks or investment banks (Zoulgina, 2020). Before the 2019 crisis, the number of commercial banks having at least five branches across the country reached 50 banks while there were 15 investment banks. In total there were 65 banks operating in Lebanon having around 1079 branches. Relying on data from BDL, bank deposit reached at that time USD 175 billion, out of which, only USD 55 billion were placed in LBP while around USD 120 billion were in foreign currency (Zoulgina, 2020). The sector employed more than 26,000 different people.

Lebanon’s banking sector prospered in the years 2000 as it was able to attract increasing foreign deposits. In 2008, the country and its financial sector were not affected by the financial crisis that collapsed the world economy and several international banks. In fact, banks in Lebanon were used to working in politically, socially and economically unstable situations and were considered, at the time, to be adopting a conservative approach in banking (Zoulgina, 2020). Required reserve at the central bank were set at 15% (Khalife, Yammine & El Bazi, 2022) while banks were instructed to invest in the government through different circulars and laws. For instance, as per Zoulgina (2020) they need to keep at least 30% of their deposits in their accounts, and since placements outside of Lebanon are highly limited as per the regulation, this amount is mainly placed at the central bank. These deposits are the ones that constitute the loss in the financial sector that will be detailed later since the deposits were spent by the state and are not available anymore to be returned to banks and the depositors. Moreover, several laws required banks to directly lend the state a portion of the deposits and place a portion at the central bank. This led banks to have around 75% of the deposits deposited or invested in the state either directly through
treasury bonds and Eurobonds, or indirectly at the central bank (Khalife, Yammine & El Bazi, 2022)

**Figure 5: Commercial Banks Assets Distribution**

![Commercial Banks Assets Distribution](image)

Source: Khalife, Yammine & El Bazi, 2022
2.2. The Lebanese Crises of 2019

2.2.1. From Hariri Jr.’s resignation in 2017 to the 2019 crises

Several experts attributed the start of Lebanon’s economic and financial collapse to the enigmatic resignation of Saad Hariri (Baumann, 2017; Hassan, 2019; Atallah, 2017) son of former Prime Minister Rafiq Hariri. Hariri resigned after a trip to Saudi Arabia that coincided with a large campaign of mysterious arrests in Saudi Arabia launched by the crown prince Mohamad Bin Salman to strengthen his position. The relationship between Hariri and the Kingdom had deteriorated as Hariri was presiding a government that included Hezbollah and its allies, and he had previously facilitated the election of Michel Aoun, who is part of the March 8 coalition, in October 2016. After the intervention of French president Emanuel Macron who officially invited Hariri, he withdrew his resignation and remained prime minister up until his resignation at the start of the 2019 uprising.

This event was considered the beginning of a crisis, and confidence in the Lebanese market decreased. Data from the BDL showed that the growth rate dropped from 3% in 2016 to 0.25% at the end of 2017 (Banque du Liban, 2018). This led many investors to withdraw their deposits from Lebanese banks.

The graphs below prepared by the Financial Times relying on the data of the BDL show the immediate impact that the event had on the Lebanese economy. Hariri’s “resignation” in 2017 led to a sharp decrease in bank deposits who in turn started significantly increasing the interest rates. Consequently, lending dropped in line with the increasing interest rates.
Figure 6: Deposits of commercial banks by residents

Source: Financial Times, 2019

Figure 7: Average interest rates at banks and quarterly rates on T-bills

Source: Financial Times, 2019
2.2.2. Financial Engineering

In order to counter the decrease in foreign exchange reserves, the central bank adopted financial engineering policies starting from the end of 2017. These are transactions that aimed at incentivizing capital flows in order to keep the reserves of the central bank at high levels and hence give confidence in the Lebanese market and prevent the collapse of the exchange rate. It was originally considered a temporary system designed to allow the government to implement structural reforms (Dibeh, 2020). In practice, the policies provide for subsidies to commercial banks that deposit foreign currency in the BDL, thus creating a huge fiscal cost and a system similar to the Ponzi scheme: the costs paid by the BDL in order to attract dollars did not generate enough profit to repay interest, which was paid with the new investments.

A 2016 censured IMF report that was not made public up until 2021 (Harari & Fayol, 2021) and the 2019 IMF Annual Report for Lebanon highlight the unsustainability of financial engineering policies through the practical example of the costs incurred by the BDL, as follows:

Figure 8: Bank loans to residents (billions of dollars)

Source: Financial Times, 2019
"... for each new deposit at the BdL in USD, a bank would earn a 6.5 percent interest in USD and in addition have an opportunity to borrow a slightly larger amount in LBP at 2 percent and redeposit it at the BdL at 10.5 percent for 10 years” (IMF, 2019).

**Figure 9: Summary of the financial engineering policies cashflow**

Source: Abdel Samad, 2021
With the foreign currency liabilities of the BDL increasing, and with increasing pressure on the LBP, the central bank could not print more money to maintain the peg. The currency peg allowed Lebanese residents to benefit from a stronger purchasing power and hence consume imported goods, which consequently meant that the dollars were going back out of the country. The financial engineering scheme was the solution adopted to recapture foreign currency inflows.

Immediately, in the very short term after the implementation of the financial engineering scheme, Lebanon’s Balance of Payments rose from a deficit of USD 1.65 billion to an increase of USD 0.37 billion, the central bank’s net foreign reserves surged by USD 4.1 billion, and the portfolio of foreign securities increased as well.
(Chbeir 2018). However, these policies coupled with mounting sanctions from the US created a lack of confidence that led to a capital flight from Lebanese banks. The “net” foreign currency reserves fell from USD 38 billion in the end of 2018 to USD 11 billion in 2022, a record low since the establishment of the pegging system in 1997 (Abadi, 2019) (Bassam & Azhari, 2022). At that time, banks were generating most of their profits from interest revenue on public debt as well as from financial engineering, while the state needed the banks’ deposits to finance these expenses similarly to a Ponzi scheme (Rivlin, 2019).

This time, when requesting from the international community to provide the country with aid, grants and additional loans, donors pledged to give Lebanon USD 17.25 billion on condition that the government implements basic reforms from taxation to the restructuring of the public sector, privatization, improve basic infrastructure such as electricity, water and telecommunication and further liberalize the country. The country failed to implement any of the requested reforms, and therefore, did not receive any of the pledged amounts (Hayek, 2018).

2.2.3. The 2019 uprising

On October 17, 2019, the government of Saad Hariri tried to implement a package of economic reforms that included a massive increase in the taxation of basic goods and services; on the night of the same day, protests erupted all over Lebanon blocking all the main roads, protesting the corruption and failure all the political class and requesting the resignation of the government (Guechati & Chami, 2022). Hariri’s government effectively resigned a few days later. The crisis shed the light on the corruption of the government, further revealed the weaknesses of the current system, and eventually, decreased confidence in the financial sector (Rickards, 2020).
During the first few weeks of this “uprising” banks and businesses closed, and as the situation was unstable, ATMs were not being always replenished. People could no longer easily withdraw their money from the banks. When the banks reopened, the Banque du Liban stopped providing them with USD banknotes; consequently, all the banks had set arbitrary limitations on the USD withdrawals as they were draining their foreign correspondent banks’ accounts. The local currency had already started devaluing a few months prior to the protests. The shortage of dollars crippled the economy as the country is highly dependent on imports and is highly dollarized. The central bank assured that it would keep providing dollars at the official rate for the imports of necessities such as fuel, medicine, wheat and rice (Alsharq el Awsat, 2020).

The currency kept devaluing sharply in the absence of reform plan. The Consumer Price Index (CPI) reflecting the increase in the cost of living for individuals earning their salaries in LBP increased significantly since the start of the crises. Public sector salaries were not subject to any amendments despite the market rate exceeding LBP 29,000 to the US dollar in July 2022.
In March 2020, Prime Minister Hassan Diab announced that Lebanon would not be paying the upcoming instalment of Eurobonds, and later in that month, the finance minister confirmed that Lebanon would default on the payment of more than USD 30 billions of Eurobonds for the first time in the history of Lebanon (Bloomberg, 2020).

In 2020, banks saw the COVID-19 lockdown as an opportunity to stop all cash payments in USD as their foreign correspondent banks accounts were drained. The Banque du Liban kept the official rate at 1507.5 while the market rate was skyrocketing. The central bank unable to return their deposits to the banks started issuing circulars to allow withdrawals from foreign currency accounts in LBP at a rate higher than the official rate, however, much lower than the market rate (Reuters, 2020).

The central bank continued using its foreign currency reserves to finance the imports of basic goods from one side, the deficit of the Electricity from another side.
and also tried to intervene in order to try to control or at least reduce the devaluation of the national currency. In 2022, the Prime Minister Najib Mikati estimated that the losses in the financial sector exceeded USD 70 billion (Reuters, 2022), while the central bank governor stated that the reserves that remains at the central bank in June 2022 are around USD 11 billion (Reuters, 2022).

2.3. Variables

2.3.1. Sovereign Credit Rating

There are three major international rating agencies in the financial scene: Moody’s, Standard and Poor's and Fitch. They started operating in the twentieth century. Their ratings represent the likelihood of a borrower to commit to its obligations or to default. Sovereign credit rating started being issued in 1974. They assess the creditworthiness of a country (Bashir, Masood & Sahi, 2017). The sovereign credit rating requires a comprehensive assessment if different criteria as listed by Standard and Poor's (2002):
Sovereign credit rating is issued separately for long-term obligations and for short-term obligations. Moreover, ratings are classified in three categories: Upper Investment Grade, Lower Investment Grade and Speculative Grade. “Investment grade issues are considered acceptable by institutional investors” (Bashir, Masood & Sahi, 2017).

In order to include the credit rating in the model, numerical values were allocated as per below scale:

### Table 5: Sovereign Credit Rating Criteria

| Political Risk                                                                 | • Form of government and adaptability of political institutions  
|                                                                              | • Extent of popular participation  
|                                                                              | • Orderliness of leadership succession  
|                                                                              | • Degree of consensus on economic policy objectives  
|                                                                              | • Integration in global trade and financial system  
|                                                                              | • Internal and external security risks  
| Income and Economic Structure                                                | • Living standards, income, and wealth distribution  
|                                                                              | • Market versus non-market economy  
|                                                                              | • Resources endowments and degree of diversification  
| Economic Growth Prospects                                                    | • Size and composition of savings and investment  
|                                                                              | • Rate and pattern of economic growth  
| Fiscal Flexibility                                                           | • General government operating and total budget balances  
|                                                                              | • Tax competitiveness and tax-raising flexibility  
|                                                                              | • Spending pressures  
| Public Debt Burden                                                           | • General government financial assets  
|                                                                              | • Public debt and interest burden  
|                                                                              | • Currency composition and structure of public debt  
|                                                                              | • Pension liabilities  
|                                                                              | • Banking, corporate and other contingent liabilities  
| Price Stability                                                              | • Trends in price inflation  
|                                                                              | • Rates of money and credit growth  
|                                                                              | • Exchange rate policy  
|                                                                              | • Degree of central bank autonomy  
| Balance of Payments Flexibility                                              | • Impact of fiscal and monetary policies on external accounts  
|                                                                              | • Structure of the current account  
|                                                                              | • Composition of capital flows  
| External Debt and Liquidity                                                  | • Size and currency composition of public external debt  
|                                                                              | • Importance of banks, public and private entities as contingent liabilities  
|                                                                              | • Maturity structure and debt service burden  
|                                                                              | • Level and composition of reserves and other public external assets  
|                                                                              | • Debt service track record  

Source: Standard and Poor's, 2002
### Table 6: Long-Term Sovereign Rating Rules

<table>
<thead>
<tr>
<th>S&amp;P</th>
<th>Moody’s</th>
<th>Fitch</th>
<th>Linear Break</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Upper Investment Grade</strong></td>
<td></td>
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</tr>
<tr>
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<td>Baa3</td>
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<td>BB+</td>
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</tr>
<tr>
<td>BB</td>
<td>Ba2</td>
<td>BB</td>
<td>10</td>
</tr>
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<td>BB-</td>
<td>Ba3</td>
<td>BB-</td>
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<td>CCC-</td>
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<td>CC</td>
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</tr>
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<td>C</td>
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</tr>
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<td>DDD/DD/D</td>
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</tr>
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</table>

Source: Bashir, Masood & Sahi, 2017

### Table 7: Short-Term Sovereign Rating Rules

<table>
<thead>
<tr>
<th>S&amp;P</th>
<th>Fitch</th>
<th>Linear Break</th>
<th>Moody’s</th>
<th>Linear Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1+</td>
<td>F1+</td>
<td>6</td>
<td>P-1</td>
<td>3</td>
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<tr>
<td>A-1</td>
<td>F1</td>
<td>5</td>
<td>P-2</td>
<td>2</td>
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<td>F2</td>
<td>4</td>
<td>P-3</td>
<td>1</td>
</tr>
<tr>
<td>A-3</td>
<td>F3</td>
<td>3</td>
<td>Not prime</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>C</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Bashir, Masood & Sahi, 2017
2.3.2. Yields to Maturity

The yield to maturity of a security represents the effective rate of return of the security, based on its market price, considering that all the expected and scheduled returns are met. In the case of Lebanon, while the yields to maturity kept at stable level throughout the years, they started increasing first after the “resignation” of Saad Hariri, however they started skyrocketing at the start of the crisis in 2019 exceeding the 100% mark (Bloomberg, 2022). The chart below shows the weighted average of effective yields of Lebanese Eurobonds, based on market price.

Figure 12: Weighted average of effective YTMs of Lebanese Eurobonds

Source: Cbonds, 2022

Throughout this context we will seek to prove the following hypothesis:

H1: A change in short-term credit rating affects the yields to maturity of foreign currency sovereign debt in the opposite direction.

H2: A change in long-term credit rating affects the yields to maturity of foreign currency sovereign debt in the opposite direction.
2.3.3. Gross Domestic Product

Despite the unstable context Lebanon has been going through since the end of the civil war, Lebanon’s GDP grew significantly throughout the year, up until the 2019 crisis, whereby the (World Bank, 2021) estimated that country’s nominal GDP witnesses a 63% decrease in 2021 to USD 20.5 billion from its level in 2018 of USD 55 billion. This led to a direct sharp increase in poverty rates.

Figure 13: Lebanon nominal GDP in USD

Source: World Bank (2021) and UN Relief Projections (2021)

Throughout this context we will seek to prove the following hypothesis:

H3: A change in gross domestic product opposingly affects the yields to maturity of foreign currency sovereign debt.

2.3.4. Inflation

Since the 2019, Lebanon has been in galloping inflation: the local currency lost more than 90% of its value in less than 2 years while salaries failed to be adjusted. Relying on data published by the IMF (2021), we can see for an average earning citizen in Lebanon, quarterly inflation reached 505% in October 2021 when compared with the start of the crises in October 2019.
However, since Lebanon is a highly dollarized country, inflation can be also measured. If the same citizen was earning a salary in “fresh” dollars, and while proceeding with the adjustment based on the exchange rate fluctuations, we can see that people earning a salary in USD have a stronger purchasing power as prices decreased in light of the crises and devaluation. Taking the same example mentioned previously, a person earning the same salary in “real” USD in October 2021 will only need to spend on average half of what they usually spent to maintain the same “lifestyle”.

Throughout this context we will seek to prove the following hypothesis:

H4: A change in inflation (after removing the effect of the national currency devaluation) opposingly affects the yields to maturity of foreign currency sovereign debt.

### 2.4. Gap in Research

There is a significant gap in research when it comes to studying the Lebanese financial sector from one side, and when examining the 2019 crises from another side. In fact, data related to Lebanon itself is not always available or accurate. Figures related to the financial sector were published by the Lebanese central bank and from the banks themselves. After the crises erupted in 2019 banks stopped publishing their detailed figures and the accuracy of the data published by central bank was questioned especially considering the evolving market conditions and the sharp devaluation of the...
national currency. Moreover, the crises that started in 2019 is recent and is still ongoing, hence, the lack of available papers addressing it.
Chapter Three

Model: Correlation Matrix

3.1. Correlation Matrix

A correlation matrix is a table showing the different correlation coefficients for different variables. This matrix displays the different correlations between all the possible combinations of two variables. It helps to identify different patterns in a large sets of data as well as to summarize different relationships.

The correlation coefficient is nothing but $\frac{\text{COV}(X, Y)}{\text{VAR}(X) \times \text{VAR}(Y)}$. In other terms, it is the covariance but on a scale of -1 to +1. When the correlation coefficient is close to +1, then we have an almost perfect positive correlation between X and Y. When the correlation coefficient is closer to -1, then we have an almost perfect negative correlation between X and Y. If X and Y are negatively correlated, it means that when X increases in value, Y will decrease in value and vice versa. X and Y move in opposite directions. The coefficient of the correlation will determine how strong the negative correlation is. For instance, a correlation coefficient equal to -0.99 will show a negative correlation, which is stronger than a correlation coefficient of -0.25. If X and Y are positively correlated, it means that when X increases in value, Y will increase in value as well. X and Y move in the same direction. The coefficient of the correlation will determine how strong the positive correlation is. For instance, a correlation coefficient equal to +0.99 will show a positive correlation, which is stronger than a correlation coefficient of +0.25.
3.2. Similar Studies

Masood and Sahi (2017) have studied similar hypotheses for both Ireland and Greece while they were going through debt crises by analyzing quarterly data to assess the influence of sovereign credit rating on the bond yields to maturity. Their study also examined the impact of the change in different variables including the GDP and the inflation on the yields to maturity. The results showed that in both the cases of Ireland and Greece, credit rating negatively affected the yield to maturity of the bonds. The study also demonstrated in both countries that the GDP negatively affected the yields to maturity of the bonds.

In the model that we will be applying in Lebanon, we will be assessing the role of the sovereign credit rating on the government issued Eurobonds in USD in order to get exact results, since the local currency treasury bills are barely traded, and their prices is announced by the central bank. Moreover, the different exchange rates applied would have complicated getting an accurate application of the model. Even in the case of the USD Eurobonds, data was unified as per the USD market fluctuations for consistency: in fact, the GDP and the CPI were adjusted to the market fluctuations, meaning that the GDP was considered in “real” USD, and the CPI was measured as if individuals in Lebanon were earning their salaries in “fresh” US dollars.
Chapter Four

Model Application

In this chapter, we will be applying the correlation matrix to prove the proposed hypothesizes.

4.1. Data Collection

The data used in this study consists of the short-term and long-term sovereign rating for Lebanon, the Lebanese Gross Domestic Product (GDP), the Lebanese Consumer Price Index (CPI) and the Yield to Maturity (YTM) of the Lebanese Sovereign Eurobonds. This data was observed on a quarterly basis from January 2016 to December 2021, for a total of 24 observations. Moreover, to treat some limitations of the GDP and CPI caused by the sharp devaluation of the Lebanese Pound over the period of this study, we have accounted for the average USD/LBP exchange rate of each quarter.

4.1.1. Sovereign Ratings

Both the short-term and long-term sovereign ratings for Lebanon were considered in this study. For the purpose of fitting qualitative ratings in our regression model - notably those of Standard & Poor’s, Fitch and Moody’s - we used the linear break equivalent which is a numerical scale ranging from 0 to 6 for short-term ratings and from 0 to 21 for long-term ratings.

The short-term sovereign rating used was the one reported by Standard & Poor’s (S&P), as it is the only one available for Lebanon, which ranges from D for the lowest ratings to A-1+ for the best ratings. Using the linear break equivalent, we observe that
over the period studied, the short-term sovereign rating of Lebanon ranges between 0 and 2 (D and B).

As to Lebanon’s long-term sovereign rating and in order to avoid a divergence across agencies, we used the arithmetic mean of the linear break equivalent for the ratings reported by Standard & Poor’s, Fitch and Moody’s. For instance, an S&P rating of 6 (B-), Moody’s rating of 7 (B2) and Fitch rating of 7 (B) resulted in an average rating of 6.67 during the first quarter of 2016. We observe that during the period of the study, the average long-term sovereign rating of Lebanon ranges between 0.33 and 6.67.

While all rating data and reports are made public by agencies, we have collected this data from the Bloomberg Terminal.

4.1.2. Gross Domestic Product

The data used for the Lebanese Gross Domestic Product was collected from the World Bank Database on a quarterly basis from January 2016 to March 2020. It was then converted from LBP to USD using the USD/LBP exchange rate. Accounting for the exchange rate is crucial to observe accurate figures of the GDP, for better consistency in the model, which are coherent with the socio-political situation of Lebanon and reflective of the domestic production; especially after the deterioration in the Lebanese Pound value since October 2019.

The GDP from April 2020 to December 2021 was forecasted by the UN agency Relief Web, based on data from the World Bank. The forecast was conducted by assuming continuous quarterly declines in GDP from March 2020 ranging between 5% and 15%, amidst the economic depression Lebanon is going through. The quarterly GDP were consistent with previous quarterly trends. The GDP forecasts were already done in real USD as per the market rate. The data was then adjusted to reflect a year-on-year overall GDP growth similar to previous annual trends.
4.1.3. Consumer Price Index

The Lebanese Consumer Price Index (CPI) was imported from the International Monetary Fund database (IMF) on a quarterly basis from January 2016 to December 2021 and has a base of 100 for the year 2013. The GDP, the CPI data was available in Lebanese Pounds and had to be converted to US Dollars to avoid biased results. Since the official exchange rate still stands at LBP 1,507.5 for the dollar, we divided all figures by this rate before multiplying them by the real exchange rate charged to consumers. This conversion should reflect more accurately the deflationary effect of the LBP devaluation on USD priced products whereby the nominal USD value of imported goods decreases as the crisis is deepening while their LBP price increases as the currency depreciates. Since our study assesses the role of the CPI on the YTMs of USD denominated Eurobonds, we needed to consider the CPI in the same currency, which is USD, hence, the CPI was adjusted based on the real USD market rate. For instance, we observe that a consumer’s basket priced in LBP is 184% more expensive during the first quarter of 2021 than it was in 2013. However, this basket becomes 47% cheaper in 2021 than it was in 2013 when controlling for the exchange rate. This means that if an individual in Lebanon earned in the first quarter of 2021 the same salary in LBP that he earned back in 2013, his purchasing power significantly decreased since what for each LBP 100,000 he used to spend, he would spend on average around LBP 184,000 to maintain the same lifestyle. On the contrary, if this person earned the same salary in USD, taking into consideration the market fluctuations, for each USD 100 spent, they would need on average to spend only USD 47 to keep the same lifestyle.
4.1.4. Yield to Maturity

The metric used to measure the yield to maturity of Lebanese foreign currency sovereign debt is the “Average Lebanon Sovereign Eurobonds YTM” as published by Bloomberg on their terminal. The index calculates the weighted average of effective yields of Lebanese sovereign Eurobonds, based on market price. The YTM data was collected quarterly from January 2016 to December 2021 and has a range of 101.8 percentage points over the period of the study.

4.1.5. Gathered Data

The data gathered as described previously can be observed in the table below:

Table 8: Consolidated Data

<table>
<thead>
<tr>
<th>Date</th>
<th>Short-Term Rating</th>
<th>Long-Term Rating</th>
<th>Inflation - CPI</th>
<th>LBP USD Rate</th>
<th>CPI Constant FX Rate</th>
<th>Inflation Quarterly Growth</th>
<th>Quarterly GDP (USD Billion)</th>
<th>YTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Jan-16</td>
<td>2</td>
<td>6.67</td>
<td>95.92</td>
<td>1,507.50</td>
<td>95.92</td>
<td>-0.16%</td>
<td>13.09</td>
<td>6.50%</td>
</tr>
<tr>
<td>1-Apr-16</td>
<td>2</td>
<td>6.67</td>
<td>94.81</td>
<td>1,507.50</td>
<td>94.81</td>
<td>-1.16%</td>
<td>12.01</td>
<td>6.50%</td>
</tr>
<tr>
<td>1-Jul-16</td>
<td>2</td>
<td>6.33</td>
<td>96.27</td>
<td>1,507.50</td>
<td>96.27</td>
<td>1.54%</td>
<td>12.87</td>
<td>6.64%</td>
</tr>
<tr>
<td>1-Oct-16</td>
<td>2</td>
<td>6.33</td>
<td>97.06</td>
<td>1,507.50</td>
<td>97.06</td>
<td>0.82%</td>
<td>13.07</td>
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</tr>
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<td>6.33</td>
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<td>1,507.50</td>
<td>98.93</td>
<td>1.93%</td>
<td>13.40</td>
<td>6.90%</td>
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<td>99.66</td>
<td>1,507.50</td>
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<td>0.74%</td>
<td>12.34</td>
<td>6.09%</td>
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<td>103.89</td>
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<td>1,507.50</td>
<td>104.99</td>
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<td>107.68</td>
<td>1,507.50</td>
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<td>0.32%</td>
<td>14.13</td>
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<td>2</td>
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<td>6.00</td>
<td>108.02</td>
<td>1,507.50</td>
<td>108.02</td>
<td>0.32%</td>
<td>14.13</td>
</tr>
<tr>
<td>1-Apr-19</td>
<td>2</td>
<td></td>
<td>5.67</td>
<td>109.28</td>
<td>1,507.50</td>
<td>109.28</td>
<td>1.17%</td>
<td>13.27</td>
</tr>
<tr>
<td>1-Jul-19</td>
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<td>5.67</td>
<td>109.00</td>
<td>1,507.50</td>
<td>109.00</td>
<td>-0.26%</td>
<td>13.27</td>
</tr>
<tr>
<td>1-Oct-19</td>
<td>2</td>
<td></td>
<td>5.00</td>
<td>108.85</td>
<td>1,587.41</td>
<td>103.37</td>
<td>-0.14%</td>
<td>14.39</td>
</tr>
<tr>
<td>1-Jan-20</td>
<td>1</td>
<td></td>
<td>3.33</td>
<td>115.54</td>
<td>1,902.14</td>
<td>91.57</td>
<td>6.15%</td>
<td>12.67</td>
</tr>
<tr>
<td>1-Apr-20</td>
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<td>0.67</td>
<td>128.35</td>
<td>2,394.37</td>
<td>80.81</td>
<td>11.09%</td>
<td>9.60</td>
</tr>
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<td>1-Jul-20</td>
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<td>0.67</td>
<td>206.83</td>
<td>4,190.17</td>
<td>74.41</td>
<td>61.15%</td>
<td>8.16</td>
</tr>
<tr>
<td>1-Oct-20</td>
<td>0</td>
<td></td>
<td>0.33</td>
<td>251.50</td>
<td>7,683.50</td>
<td>49.34</td>
<td>21.60%</td>
<td>7.34</td>
</tr>
<tr>
<td>1-Jan-21</td>
<td>0</td>
<td></td>
<td>0.33</td>
<td>284.04</td>
<td>7,980.76</td>
<td>53.65</td>
<td>12.94%</td>
<td>6.61</td>
</tr>
<tr>
<td>1-Apr-21</td>
<td>0</td>
<td></td>
<td>0.33</td>
<td>330.97</td>
<td>10,078.48</td>
<td>49.51</td>
<td>16.52%</td>
<td>5.74</td>
</tr>
<tr>
<td>1-Jul-21</td>
<td>0</td>
<td></td>
<td>0.33</td>
<td>414.97</td>
<td>13,449.76</td>
<td>46.51</td>
<td>25.38%</td>
<td>5.45</td>
</tr>
<tr>
<td>1-Oct-21</td>
<td>0</td>
<td></td>
<td>0.33</td>
<td>613.96</td>
<td>18,250.14</td>
<td>50.71</td>
<td>47.95%</td>
<td>4.90</td>
</tr>
</tbody>
</table>

**4.2. Model Analysis & Results**

In this section we will be testing for the Hypotheses we have proposed for this study.

We will be using correlation matrix to show the negative effect of sovereign ratings on Yield to Maturity. Moreover, the matrix will allow us to see the negative effect of the GDP on the yields to maturity and the negative effect of inflation after removing the effect of the currency depreciation on the yields to maturity. In other terms, any increase in sovereign credit ratings, GDP or Inflation (adjusted to the USD) should lead to a decrease in the yields to maturity.

The following correlation matrix was obtained on SPSS:
Table 9: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>STR</th>
<th>LTR</th>
<th>GDP</th>
<th>INFLATION</th>
<th>YTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>STR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LTR</td>
<td>0.991**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>0.934**</td>
<td>0.920**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFLATION</td>
<td>0.923**</td>
<td>0.910**</td>
<td>0.974**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YTM</td>
<td>-0.967**</td>
<td>-0.969**</td>
<td>-0.950**</td>
<td>-0.936**</td>
<td></td>
</tr>
</tbody>
</table>

All the results in the matrix were highly significant with p-values<0.01. The matrix showed that the short-term sovereign credit rating, the long-term sovereign credit rating, the GDP and the inflation factoring out the effect of the currency devaluation were all highly positively correlated. Moreover, all of these variables are individually negatively correlated with the yields to maturity of the Lebanese Eurobonds.
Chapter Five

Discussion

5.1. Interpretation

The results obtained from the model can be summarized as follows:

Figure 16: Results Summary

The correlation coefficient of short-term rating and the yields to maturity is -0.967. This indicates that there is an almost perfect negative correlation. We can hence
expect that if short-term rating increases, the yields to maturity will almost certainly decrease.

The correlation coefficient of long-term rating and the yields to maturity is -0.969. This indicates that there is an almost a perfect negative correlation. We can hence expect that if long-term rating increases, the yields to maturity will almost certainly decrease.

The correlation coefficient of Gross Domestic Product and the yields to maturity is -0.950. This indicates that there is an almost a perfect negative correlation. We can hence expect that if the GDP increases, the yields to maturity will almost certainly decrease.

The correlation coefficient of inflation considering an earning in USD and the yields to maturity is -0.936. This indicates that there is an almost a perfect negative correlation. We can hence expect that if inflation increases, the yields to maturity will almost certainly decrease.

The correlation coefficient of short-term rating and long-term rating is 0.991. The correlation coefficient of short-term rating and Gross Domestic Product is 0.934. The correlation coefficient of short-term rating and inflation considering an earning in USD is 0.923. The correlation coefficient of long-term rating and Gross Domestic Product is 0.920. The correlation coefficient of long-term rating and inflation considering an earning in USD is 0.910. The correlation coefficient of Gross Domestic Product and inflation considering an earning in USD is 0.974.

This indicates that there is an almost a perfect positive correlation between the four variables short-term rating, long-term rating, Gross Domestic Product and inflation.
considering an earning in USD. We can hence expect that if any of these variables increases, all the others would increase too.

5.2. Practical Implications

Practically, the previous results indicate that an increase in Lebanon’s sovereign credit rating should negatively affect the yield to maturity of the Lebanese Eurobonds, which would increase their value and would significantly help the economy.

Moreover, an increase in either the GDP or the CPI when removing the effects of the local currency devaluation should also lead to a decrease in the yields to maturity of the Eurobonds.

The credit rating is issued after credit agencies conduct a comprehensive assessment of the country’s situation and ability to fulfill its obligations. If the government completes a recovery plan that would get the support of the borrowers and successfully starts implementing the requested reforms, rating agencies might revise Lebanon’s rating.

As for the yields to maturity of the Eurobonds, any percentage decrease would mean an increase in their prices. Since the biggest holders of Eurobonds are Lebanese banks and the central bank, this would mean that any increase in the price of the Eurobonds would increase their foreign currency assets. Data from the Bloomberg terminal showed that in July 2022, the outstanding Eurobonds totaling around USD 30 billion traded at a bid price ranging between USD 6 and USD 6.5, while they have a face value of USD 100. The USD 30 billion are therefore now worth less than USD 1.9 billion.
In other words, in order to properly address the current crises Lebanon has been going through, the government need to work on increasing the GDP first. Credit rating cannot be raised unless the government restores confidence and the financial losses are properly addressed with the creditors. Currently the government and the central bank have been spending most of the country’s foreign currency reserves (the small remaining part of the depositors money) in order to try to stabilize the exchange rate, instead of investing the money in the economy or repaying people their money, hence increasing the GDP. The current measures are certainly inefficient, as billions of dollars are not being allocated properly while they could have certainly relaunched the whole economy.

Since both the GDP and the inflation explain the macroeconomic climate, they would certainly affect the relationship between the sovereign credit rating and the yields to maturity of the Eurobonds by strengthening this relationship. This can be shown later while conducting regression analyses on a larger sample with these variables as moderators.

5.3. Limitations

The main limitations faced while conducting this study were related to data. In fact, there is a lack of data when it comes to Lebanon. For instance, several variables could have been tested in addition to the GDP and the CPI. While some of these data were not even available, some figures were published by official agencies but were completely inaccurate. With the central bank keeping the official exchange rate at 1507.5 while the market rate exceeded 29,000 in July 2022, transactions are recorded at multiple rates, completely falsifying the figures. Moreover, after the crises, the government through its national bureau for statistics ceased the publication of several basic indicators that would have eventually further helped in studying the crises.
With the lack of data, the sample only included 24 entries. More entries would have been needed to run different regression analyses first, and then to test for moderation. Finding a control variable that acts as a moderator for a regression could help us better understand the relationship between a regressor and an outcome and decrease biasness for this regression. In order to test for the validity of a moderator - if a moderator can significantly predict an outcome (Y) - we must prove that the relationship between the predictor and outcome changes as the moderator changes.

5.4. Future Research

For future research, regression analyses for the different variables should be conducted first, and then, different control variables can be tested to check for moderators for the regressions. This would help us better assess and understand numerically the relationships, and evaluate the impact of the change in other variables on these relationships.

The GDP currently being available in billions of US dollars, a regression analysis would require to convert its figures to get the quarterly GDP growth.

Considering the limited data available, and with more papers being published amidst the ongoing crises, more research regarding different key variables of the crises is necessary in order to understand its different aspects. I believe further study is needed to evaluate the impact of the crises in the financial sector amidst the sharp devaluation and the move towards a cash-based economy. Moreover, while conflicting numbers are being published by the central bank, it is necessary to properly evaluate the losses of the financial sector as it is necessary before the establishment of any recovery plan ought to deal with the losses.
Chapter Six

Conclusion

Lebanon has been going through one of the worse economic, financial and social crises in centuries. There are numerous reasons for this crisis from corruption to political instability and tremendous public deficit financed by debt. When the state became unable to borrow more money, the central bank started financing the deficit by printing even more money, while keeping the exchange rate pegged. To stabilize the currency, the BDL spent the money deposited at its end. People could no longer access their money placed in Lebanese banks since the deposits of the banks at the central bank were no longer available, and the government failed to repay its debt.

Since the start of the crises, Lebanon’s GDP plummeted and the currency started devaluing sharply. Residents that were earning a salary “real” in US dollars became able on average to spend more as prices in dollars were down due to the decrease in the price of the currency. Moreover, when doubts arose on the willingness of the government to repay the Eurobonds at maturity, their prices plunged while their yields to maturity started skyrocketing.

In this study, a correlation matrix was conducted in order to show the negative relationship between the change in credit rating and the yield to maturity of the Lebanese government Eurobonds first, and then, to show that both the GDP and the inflation, after eliminating the effect of the currency depreciation, also negatively impact he yields to maturity. The different models applied were highly significant with p-values < 0.01. The results showed that when Lebanon’s sovereign credit rating changes, the yields to maturity of the Lebanese Eurobonds will change in the opposite
direction. Moreover, any increase in the GDP would lead to a decrease in the YTM. Additionally, any increase in the inflation (in USD - after eliminating the effect of the currency depreciation) would also lead to a drop in the YTM of Lebanese Eurobonds.

Lebanon cannot overcome the crises unless the proper reforms are taken to address the economic growth, and hence the GDP from one side, and stabilize the exchange rate, and hence reduce the changes on inflation from another side. The financial sector was hit with tremendous losses that need to be addressed through a proper recovery plan that would reinstate confidence in the state.
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