AN ECONOMIC FRAMEWORK FOR DEBT RESTRUCTURING: THE CASE OF LEBANON

A Thesis

presented to

the Faculty of Business Administration and Economics

at Notre Dame University-Louaize

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Financial Risk Management

---

by

JENNIFER NERCESSIAN

APRIL 2022

Notre Dame University - Louaize

Faculty of Business Administration and Economics

Department of Accounting and Finance

We hereby approve the thesis of

Jennifer Nercessian

Candidate for the degree of Master of Science in Financial Risk Management (MSFRM)

Grade: A+

Dr. Viviane Naimy — Supervisor, Dean

Dr. Rim El Khoury — Reader

Dr. Roy Khoueiri — Chairperson, DAF

Table of Content

Acknowledgements

I would like to express my genuine appreciation to several parties for supporting me throughout my Graduate study. First and foremost, I wish to articulate my gratitude to my esteemed supervisor, Dr. Viviane Naimy, Dean of the Faculty of Business Administration and Economics (FBAE) at Notre Dame University Louaize, for her patience, insightful comments, unceasing ideas and helpful information that have assisted me tremendously at all times and empowered me to complete this research successfully. I could not have thought of having a better supervisor in my study.

I also wish to convey my sincere thanks to my reader Dr. Rim El Khoury, Associate Professor at the Faculty of Business Administration and Economics (FBAE) at Notre Dame University Louaize, for her continuous assistance, her remarkable support and plentiful experience.

Lastly, my gratitude also extends to my family and friends for their support and encouragement throughout my studies. More specifically, thank you Nermeen Abi Farraj/Hakim for always being there for me.

List of Tables

List of Figures

Abstract

Purpose: The purpose of this thesis is to find the best restructuring scenario for Lebanon through simulating what if analysis for local and external debts by taking an assumption of haircut percentages. These scenarios are taken at different estimates of the exchange rates. Additionally, this thesis will put in place reforms and recommendations aiming at promoting the neutralized sectors hoping to resolve the falling economy.

Design/methodology/approach: To reach our purpose, we designed a unique regression model for USD/LBP exchange rate estimates since the official, pegged rate of 1,507.5 USD/LBP has become obsolete due to the deteriorated fundamental economic and financial situation. The customized regression analysis incorporates the difference in Gross Domestic Product (GDP), Real Interest Rates (IR) and National Income (NI) between the United States and Lebanon as the explanatory variables and the exchange rate as the dependent variable. The GDP and NI are statistically significant unlike the IR. We opted to choose the cutoff date of August 20, 2021, since we were unable to constantly follow the exchange rate fluctuations that started at USD/LBP 8,450 beginning of January 2021, reached USD/LBP 32,000 in December 2021 then decreased to USD/LBP 21,000 by end of February 2022. Therefore, we generated USD/LBP exchange rates ranging between USD/LBP 4,000 and USD/LBP 47,000. Thereafter, using these rates alongside assumptions of haircut %, we get restructuring scenarios ranging between soft restructuring and aggressive restructuring. Under each scenario, we calculated Debt to GDP, revenues, expenses, and financing needs to choose the most suitable scenario.

Findings: We based our analysis on the debt to GDP ratio since the haircut application aims to lower Lebanon's hardship. As such, at USD/LBP 11,657.19 excluding financing needs, in Scenario 1, the ratio is 480% as of Nov-22 and will reach 271% by Nov-25 (dropping by 17% year on year). In Scenario 2, the ratio is 377% as of Nov-22 and will reach 179% by Nov-25. In Scenario 3, the ratio is 229% as of Nov-22 and will reach 96% by Nov-25. At USD/LBP 20,366.29 excluding financing needs, in Scenario 1, the ratio is 775% as of Nov-22 and will reach 438% by Nov-25. In Scenario 2, the ratio is 598% as of Nov-22 and will reach 303% by Nov-25. In Scenario 3, the ratio is 339% as of Nov-22 and will reach 158% by Nov-25. USD/LBP 46,817.29 excluding financing needs, in Scenario 1, the ratio is 1670% as of Nov-22 and will reach 945% by Nov-25. In Scenario 2, the ratio is 1,269% as of Nov-22 and will reach 679% by Nov-25. In Scenario 3, the ratio is 675% as of Nov-22 and will reach 345% by Nov-25.

Therefore, if the rate drops to levels close to USD/LBP 11,657.19, Scenario 2 with a 50% haircut on external debt is recommended. If the rate remains at levels close to USD/LBP 20,366.29, we recommend Scenario 3. Finally, if the rate reaches the pessimistic rate of USD/LBP 46,817.29, we recommend Scenario 3 and an increase in GDP growth rate higher than 25% yearly since the country will witness even higher inflation rates. Consequently, it is necessary for the country to take legal and administrative actions though the presence of few limitations. The government officials should work to provide a credible, resilient, and sustainable framework that will be quick and easy to implement in addition to an abrupt change in policies and domestic regimes.

Research limitations/implications: During the past 3 decades, all financial data predicted a collapse for Lebanon, not to mention, warned about the inevitable crisis we

are currently in. Corruption, mismanagement, and a lack in economic vision are a few of the factors that led to this dramatic outcome. For this reason, our limitations consist of the fact that very few researchers tackle the case of Lebanon and consider all facets the country encounters. Not to mention, the network of patronage where the political elites have long exploited the country's resources at their own convenience and are not putting in place any initiatives to find solutions. Also, debt restructuring has a huge impact on the domestic economy especially through the disruptions of the financial system which imposes negative effects on the banking sector. Needless to mention, the severe deterioration in exchange rate levels which hurts recovery measures and jeopardizes creditor negotiations. All these limitations along with the complexity of sovereign debt defaults which requires complicated decisions causes several uncertainties. However, this thesis and its outcomes will help ruling parties and future researchers to make informative decisions.

Originality/value: Through this thesis, we tailored a model to predict the closest estimates of the exchange rate. Thus, the added value of this thesis resides in devising and implementing a comprehensive model considered to be the first one to be suggested after the economic downfall. This unique regression model helped in estimating whether the current official level or the black-market level reflects reality. Therefore, the outcome of this thesis is novel and innovative.

Chapter 1: Introduction

1.1. General Background

Bank panic, hyperinflation, devaluation of the currency, rise in debt and recessions are not new topics that serve as major concerns globally. They are what define a crisis and what has led to disastrous effects. The most prominent examples include but are not limited to the stock market crash of 1929 and the financial crisis of 2008. Both affected major countries like the United States of America (USA), United Kingdom (U.K), and the European Union (EU) among others. Therefore, no country is immune to the harsh effects of a crisis, not even a small country like Lebanon.

Over the past year "Lebanon" has been a major headline of foreign news due to the severe economic conditions. To understand Haugbolle (2019), who came to a conclusion that Lebanon is starting to feel like a failed state rather than a middle-income democracy, we have to go back to the 1990s after the end of the civil war. To begin with, for decades, firstly, the government has followed budget and fiscal policies that have led to an unendurable amount of debt that exceeded 160% of the GDP in 2020. The aim was to rehabilitate the country's infrastructure through resorting to internal and external borrowing while offering high interest rates thus magnifying nation's debt that has grown at an average of 14% yearly for the past 25 years. The amplified debt along with the significant reliance on foreign imports are only a fraction of the problem. Secondly, for years, the country has been characterized by a current account deficit whereby imports ($19.98 billion at the end of 2018) far exceeded exports ($2.95 billion at the end of 2018) as per El Tabch (2018) and were always covered by having recourse to additional debt.

Lastly, not to mention the adopted fixed exchange rate regime that has deepened the debt burden as the Central Bank of Lebanon (BDL) has to always interfere to maintain the peg. Accordingly, all these factors have put Lebanon in a severe debt burden setting it on the list of the highest indebted states in the world in terms of Debt to GDP ratio (the third indebted country as of 2019 according to Shawish (2019)).

On the other hand, Lebanon has an advanced banking sector that now finds itself on a dark path. Lebanese banks, with total term and demand deposits peaking at $104 billion at the end of December 2018 as the Central Bank most recent statistics, serve as a vital component in keeping the country's economy in motion, through accepting diaspora deposits by offering high interest rates and supporting government finances and country's debt burden. To further demonstrate this, during the 2008 financial crisis, all wealthy expats chose to move their funds from foreign banks into local banks. In 2016, danger signs started to roam so the Central Bank initiated financial engineering operations targeted to swap Lebanese Lira for fresh dollars at very high interest rates exceeding 28%. It constituted transforming part of the debt in Lebanese Lira, which is a currency we can print, to dollars, thus threatening the entire banking system's capacity to pay back the dollar deposits in full. These operations fell under monetary policy objectives to keep the government afloat through siphoning dollars from local banks. Such operations were later perceived to be a Ponzi scheme as it depended on fresh borrowing to pay back the existing debt. The Central Bank then used these funds for government spending on imports and interest payments and assured the people that their deposits are safe. The government who was atop of this fraudulent system represents the same people currently asking for help. These circumstances aside from the influx of Syrians in search for jobs

(that constitute about 30% of the Lebanese population) affected the labor market. Thus, unemployment rose, corruption peaked and debt to GDP levels hit one of the highest in the world (152% of GDP hitting level of $81.2 billion in debt by the end of 2019). Therefore, the system broke because a country that relies heavily on overseas dollars now suffers from an acute dollar shortage. In 2019, red lights roamed when USA sanctioned Lebanon and rating agencies downgraded the state in several stages. Moreover, remittances sharply declined as oil prices collapsed and much of Lebanese diaspora live in oil producing countries. Additionally, due to the inability to provide key services, such as providing electricity, in October 2019, protestors took the streets in the hopes to form a corruption free state. The magnitude of the country's problems further amplified with the spread of Covid-19 in March 2020 and the horrific incident at the port of Beirut in August 2020. Consequently, as per Rickards (2020) for the first time in ages, the government missed a USD 1.2 Billion payment in March 2020 and a USD 2.7 Billion payment in April and June 2020.

The above-mentioned developments led to a run-on bank thus forcing banks to close for two consecutive weeks, blocking transfers abroad and imposing severe capital controls. Capital control is a major feature for debt crisis in emerging markets; however, it affected the unofficial exchange rate that started fluctuating reaching a high of USD/LBP 10,000 vs an official rate of USD/LBP 1507.5 due to the rise in demand on dollar to fund the huge amounts of imports. The Lebanese Pound is on a downward spiral, much like the hyperinflation during the years 1985 and 1992. Thus, something needs to be done. If history repeats itself, then a similar case will weaken the Lebanese Pound by 2,223% an equivalent to USD/LBP 46,751 according to Saliba et al (2020).

Following the default on payments, in May 2020, Lebanon hoped to negotiate terms with the International Monetary Fund (IMF) however, there is the question of the amount of cash that Lebanon needs. The country may have about a USD 100 Billion gap however, international donors' biggest bailout in history only constituted of USD 57 billion. According to Rickards (2020) however, the international donors that previously aided Lebanon are helpless in providing any aid. The USA refrains any aid that will indirectly assist illegal activities. Saudi Arabia finds its hands tied with the collapse in oil prices and its unwillingness to aid any party related to Iran. France has its own challenges including internal lockdowns, economic woes and the spread of Covid-19. China finds no strategic value to help Lebanon. Russia is unlikely to provide any aid due to its internal conflicts of low oil prices and Covid-19 and its external conflicts in Syria. Therefore, as per Rickards (2020) good faith bailout by international donors is highly unlikely not to mention the risk of another ruinous war as an additional red flag so why would countries finance Lebanon that is going to flatten shortly. Consequently, Lebanon can only negotiate with the IMF that suggested a bailout of $10 billion distributed over five years with the implementation of austerity measures. These measures included a bail in of the banking sector where some banks will close, and others will convert large deposits to equity and creditor's acceptance of a debt restructuring. This is aside from a refinancing and restructuring of the Central Bank and the government's debt. Another measure included the devaluation of the currency in several stages until the year 2024. Public expenditure cuts, from military and civil salaries to public sector pensions and early retirement, were also necessary aside from selling or leasing some of the public's state assets. Lebanon must also see an end to the electricity subsidies and an end to the fraud,

the corruption, the abuse, and the waste imposed by the government. The country must induce efforts to recover the dollars transferred to the outside in violation of the imposed capital controls. It should also enforce legislative changes relating to custom reforms, labor law, air quality, independent judiciary, tax collection reform, stock exchange privatization and laws concerning water treatment apart from the potential development of oil and natural gas. This external financing along with the abrupt changes are required to unlock another $11 billion promised by CEDRE. Hence, a $21 Billion could be available with the implementation of austerity measures, reorganization of fiscal and monetary reforms, a reconstruction of the banking system and an end of the money laundering (Rickards, 2020).

Overall, with a high debt to GDP ratio and a tenacious overall budget deficit, Lebanon is close to a complete collapse of the whole system. Where Lebanon heads from here is anyone's guess, but the country may be able to find ways to diminish the intensity of the current crisis. This may include stopping the increase in short term public debt and reducing the medium-term debt through imposing haircuts and estimating recovery values. This comes alongside reforms that might restrict corruption and enhance revenue collection.

1.2. Importance of the Study

This thesis will assess simulation techniques to estimate different scenarios to restructure Lebanon's public debt. The study will tackle the despair of public debt and suggest drastically stopping the increase of short-term debt and reducing the medium-term debt, which is actually absorbing the mainstream of the local financial resources. However,

since the amount of debt held is mostly internal, would it be feasible to apply haircuts in order to restructure the public debt or would imposing additional capital control save the country from a complete collapse of our financial system?

Additionally, this thesis suggests a recovery path that requires the adoption of a set of measures, such as the adoption of a realistic exchange rate. However, looking deeper into the current financial and economic crisis, this research is subject to limitations since existing literature is mostly descriptive and limited to newspaper articles. Also, it does not take into consideration the recent events that occurred. Therefore, the aim is to provide a scientific methodology hoping to be used by the Lebanese government officials, decision makers and economic analysts. It will add value by proposing a track that comprises a set of reforms in interest rate levels, taxing systems, administration, revenue regimes and expenditure regimes to reduce the budget deficit while inducing a surplus. Other measures consist of auditing the most recent outstanding debt before any restructuring process and engaging negotiations with creditors.

Therefore, this thesis will give a unique contribution to literature and suggest possible findings on means to restructure Lebanon's debt that may be important for future policies and subsequent research.

1.3. Purpose of the Study

The purpose of this thesis is to simulate three restructuring scenarios, each with a certain assumption of a target face value haircut of debt in percentage. The scenarios chosen range between a soft restructuring to an aggressive restructuring. Then using the change in exchange rate as a parameter, the results are concluded by debt to GDP levels. The

outcome will provide concrete scientific output, from which solutions and recommendations regarding the monetary and fiscal policies of the Lebanese exchange rate can be deduced. In addition, this thesis will put in place a reform scheme aiming at promoting the primary and secondary vital and productive sectors while neutralizing the current system that over-promoted the tertiary sector and reducing the budget deficit to zero (Naïmy, 2004)

Based on the above, this thesis will answer the following research questions;

1- What is the best scenario to restructure Lebanon's public debt?
2- What would be the impact of keeping a fixed exchange rate regime? Furthermore, if it is fixed what would be the paramount exchange rate?
3- What are the most suitable recommendations and reforms that would resolve the country's current falling economy?

This thesis is structured as follows. Chapter 2 will set forth the literature review concerning events that occurred in countries particularly Venezuela, Greece, Iceland and Argentina that share a similar situation of turbulence as that in Lebanon, when it comes to currency devaluation and economic shrinking. Thereafter, the chapter will move to discuss how each country seeks to outline a series of solutions for their burdens and how they have been able to move past their rock bottom and become the countries they are now. Chapter 3 continues with debating several author's methodologies concerning scenario analysis and currency valuation while collecting this thesis' required dataset. Chapter 4 moves to attribute the regression model to determine the country's suggested exchange rates and will use these estimates to calculate the real value of outstanding

public debt. Consequently, this thesis will simulate three restructuring scenarios; soft, strong, and aggressive; by assigning a percentage of haircut and an increase in tax revenue collection. Finally, Chapter 5 concludes the findings of this thesis and offers recommendations for future implications.

Chapter 2: Literature Review

Historically, numerous countries have navigated through economic crises similar to those witnessed in Lebanon. The significance of these events has given rise to extensive research examining the road to recovery through debt restructuring. Given these similarities, this chapter will first opt to describe the events that led to the defaults of Argentina, Greece, Iceland, and Venezuela and replicate the measures taken which will be paramount to understanding how Lebanon can navigate through its deteriorated state. Secondly, this chapter will examine the definition, elements and processes of debt restructuring along with country specific experiences. Lastly, it will interpret the concept of currency valuation and the merits of a fixed or a floating exchange rate.

2.1. Countries in Similar Situations

In 2019, Lebanon began suffering from depleted foreign deposits, loss in job opportunities and a 60% decrease in value of money amid a loss of confidence in the banking sector. The anguish that the country is going through has been witnessed historically in multiple countries. In the world of finance, we often quickly forget the tragedies of the past yet exploring their causes and effects is often a valuable lesson. After all, in a world of ever-changing rules, products and services, history is the one constant that can guide us through the ambiguity. The four most difficult economic crises in the world occurred either as a result of mismanagement and corruption like the case in Venezuela, or because of government debt crisis like Greece or due to a banking crisis

like Iceland or the product of relying on external financing to budget country's deficit like the case of Argentine. In Lebanon, we are facing a combination of these four crises.

2.1.1. Venezuela

One of these countries which filled the headlines and truly deserves attention is Venezuela that was once said to be the richest country in Latin America. As described by Epstein & Ausman (2019), it has the largest known oil reserves in the world and its democratic governance was once praised worldwide. Today, the country's democratic institutions and its economy are in shambles. The country has the highest inflation rate in the world heading towards 500,000% per annum making food and medicine inaccessible to most Venezuelans whose minimum wage decreased to $3 per month. This has put 90% of the population into poverty, 85% of medicine into scarcity and 60% of companies into shutting down. The depression lasted 5 years and the country's Gross Domestic Product (GDP) loss surpasses 50% which is a sharper drop than the one seen in the Great Depression in the US (30%) leading to an increase in the country's murder rate to become the most dangerous cities in the world.

To understand this decline, the authors went back to the privatization of several fundamental companies in the state, approximately 1000 companies between the years 2005 and 2017, leaving a small room for the private sector. Thus, the government had control of the prices, had access to foreign currency and had the power to force companies to sell at a loss. This led to a decrease in non-oil outputs like rice, corn, sugarcane, automotive and aluminum production. Everything was going well since oil prices are high and the massive amounts of imports veiled the decline in local production.

However, when exports of oil declined and imports fell, the shortage soared. What further deteriorated the situation were the unfair and illegal elections of 2017 when the country spiraled out of control during which Venezuela defaulted on its debt obligations. According to the research, this hardship was the result of poor socialism, corruption and personalism in leadership. The suggested road to recovery includes a complex debt restructuring of over $160 billion in foreign debt. Other than the fact that the country requires new leadership to impose reforms, new judiciary to reinstate the rule of law, new management in the most important Venezuelan oil and gas company (PDVSA) to feed the country, new management in the central bank to restore the confidence in the currency and new Armed Forces to enforce the law.

2.1.2. Greece

To understand the Greek crisis, Galanos, Kotios & Pavlidis (2011) go back to 2001 when Greece joined the eurozone. To meet one of the adoption principles, Greece was required to lower their debt to GDP ratio to 60%. The ratio level was much higher due to the massive tax evasion problem and the excess of government spending on social benefits and wages. Greece had to either cut expenses or miss out on the currency adoption unless there is a third option. That option included currency swaps, originally created by the US as an idea to mass government debt loads and sell them off to outside investors and decrease debt to GDP levels. Thus, Greece's adoption of the Euro currency boosted trade and allowed access to better financing since they had the chance to pay off debt on the financial strength of their fellow Eurozone members. Better financing meant more borrowing and further debt obligations but there was no problem since the economy was growing and there was plenty of EU money to budget the deficit. However, the 2008 real

estate crisis in the US triggered a global recession and severely hit Greece. Even though it was not the primary cause, yet it exacerbated the crisis and GDP fell as tourism and shipping slowed down with the Athens stock exchange plummeting while the currency is preventing Greece form stabilizing through monetary policies. Then in 2009, it turns out that the government is not portraying the full information that is needed to justify their books and its budget deficit is far worse than what it reported. Consequently, borrowing costs skyrocketed as the entire country's credibility smashed. In 2010, the country's credit rating dropped to junk putting Greece towards default as it drowned in public debt.

To bail Greece out in an attempt to save the EU from the ramifications of a Greek default, the Troika, formed of two EU entities (European Commission and European Central Bank) and the International Monetary Fund, has come as Pagones (2013) mention. The plan was to lend Greece €110 billion to avoid default, pay expensive creditors and force austerity measures through higher taxes and lower spending to bring the country back to a surplus and wait for the recession to blow over. Nevertheless, the bailout didn't fix the problem; in fact, the austerity measures put further pressure on GDP and increased debt to GDP ratio while the creditors drained all the money. In 2012, the Troika prepares the largest sovereign debt restructuring in history and decides to lend another €130 billion, to negotiate with the creditors for a cut down in the repayment and impose severer austerity measures. This has worked, the government reported a surplus after 2 years of further tax reforms, layoffs, and wage cuts. Unfortunately, these measures caused riots in the country and in 2015 the people voted for a new government who increased spending again and wanted to renegotiate the terms with the Troika. This was the beginning of a feud which instigated a liquidity crisis and a risk of a Greek exit from the EU. Ultimately, Greek

defaults in mid-2015 and becomes the 1st developed country to miss a payment with the IMF. The economy tumbles then banks and the stock exchange closed. With no more leverage to negotiate, Greece accepts the terms of new cuts and reforms and receives an €86 billion bailout leaving the country with one of the highest debt to GDP ratio.

2.1.3. Iceland

Gylfason et al. (2010) touch upon the suffer of Iceland from a banking collapse, between 2008 and 2011, that was larger than any other in history when measured as a percentage of country's GDP. Most analysts blame the free-market reforms such as financial liberalization, deregulation, tax cuts and privatization implemented in the 1990s for the crisis in Iceland after the widespread inflation and macroeconomic troubles in the 1980s. Those reforms consist of a first wave in the 60s composed of a cut in fishing subsidies that represent 40% of the government's federal budget. They also consist of devaluating the Krona as a way for Icelandic companies to better compete in international markets. Then during the 80s and 90s a second wave was implemented where the government stopped regulating interest rates which were typically not allowed to exceed inflation rates. Reforms of lowering tax rates abolish trade and capital controls were imposed. The next step was privatization of many state-owned companies and most importantly for our story, privatization of the banking system.

Before the privatization of 2001, the authors talk about how Iceland evolved to become one of the best educated and most comfortable societies on Earth relying only on farming and fishing. The banking system was always owned by the state and government officials decided who got loans. In fact, there was no way to borrow or obtain dollars without the

approval of a politician. This increased the corruption rate where the politically connected were able to get loans at low interest rates and the government passed on the losses to the public through increased bank fees or taxes. The process of privatization was done poorly since the banks were given to certain businessmen, who are friends with no experience in the banking sector, at low prices. So, they merely converted state monopolies to private ones benefiting from low reserve requirement. Not to mention, the Icelandic regulatory system was also said to be lacking the financial support in charge of regulating the banks. This was partly due to the banks that lured the best and most experienced people away by promising high salaries. The banks went on a lending spree and didn't take into account the risk of low-quality lending. In the 2000s, inflation was rising since Iceland's once humble currency became extremely valuable and local commodity prices increased. To control for inflation the government decided to raise interest rates, but that didn't work. People realized they could borrow from foreign markets at low interest like Japan and invest them in Icelandic banks at higher interest thus making a profit from interest rate differential. Icelanders were happy since they had no problem paying their foreign debt as long as the Krona was appreciating. In 2006, to beat the warnings of unsustainability, the oldest and second largest bank Landsbanki opened Icesave offering high interest rate accounts managed over the internet to 400,000 depositors in Britain and Netherlands. This amplified their foreign exposure.

In 2008 financial crisis, foreign markets froze, foreigners wanted their money back and banks around the world stopped interbank lending. Szymanik (2017) covers how this pushed the three largest banks in Iceland that have no foreign reserves to tumble. Being too big to fail, the government decided to let the banks fail and renationalize them. This

led to the rise of unemployment rates, increase in taxes on salaries that did not change and to the devaluation of the currency. As a result, people decreased their consumption due to their necessity to keep savings while others emigrated in search of jobs. Iceland chose to rescue its economy by refusing to pay its debt obligations to foreign countries.

2.1.4. Argentina

The republic of Argentina is undoubtedly one of the most iconic countries in the world and a model for developing countries as talked about by Zagha & Nankani (2005). About 115 years ago, Argentina was one of the richest countries on the planet. Its GDP per capita was almost triple the Japanese GDP however today it is the exact opposite. A century of military coups, populist governments, wars, ineptitudes and other circumstances marked the economic degradation of Argentina from being one of the richest countries to one of the most stagnant economies in the world and one of the worst in the continent just after Venezuela. In a way, Argentina has always been accompanied with constant economic swings. The truth is in the last few decades crises, devaluation, inflation and payment suspensions have become a common thing in the economy. Today, the country is still suffering from a deep recession with high poverty levels characterized by the highest inflation rates just after Venezuela. The decline of Argentina has put politicians, lawyers, economists and academics on a search to find plausible solutions for the country to recover. It seems that Argentina can't get out of a crisis without getting into another one.

To understand Argentina's story, the researchers went back to the past. For more than 30 years, the country witnessed radical changes in economic policies, from loose polies in

the 80s to economic liberation in the 90s. The country defaulted 3 times on their foreign debt over the last 3 decades due to years of corruption on the hands of politicians and other leaders. From one hand, the authors mention the need for Argentina to address the years of mismanagement, excessive government spending and the addiction of printing bills to throw money at any problem. This elevated problems in inflation, increasing prices and wages, which in turn spread unemployment like a plague contaminating the whole society, and workers started accepting deteriorating work conditions in fear of a layoffs. To recompense the economic and social problems that have emerged, the government kept approving all kinds of regulations like issuing debt in foreign currency and worked on maintaining an overvalued fixed exchange rate regime in an attempt to control inflation. By 2001, the country defaulted on its debt obligations, suffered from a blow in international credibility, devalued its currency and fell into a deep recession.

Following the 2001 default, Argentina attempted to use inaccurate GDP and inflation estimates to hide their declining reserves and their economic problems in fiscal deficits. This led to a loss in international trust and another default in 2014. That being the case, Thomas & Cachanosky (2016) find it interesting to study Argentina after its financial crisis in 2001 up to its default in 2014 and find key similarities and differences between the two separate lapses. Prior to both defaults, the authors notice a pattern in the country's economic condition when it comes to accumulated fiscal debt and deficits, alongside domestic policy mismanagement. However, the inability for Argentina to pay back its debt in 2001 was due to the financial distress whereas, the refusal of paying back in 2014 was due to the disputes over the bond contracts.

After being enlightened with the events that led to a crisis in each country separately, we must proceed with the studies conducted by researchers who have tried to design datasets on debt renegotiations and restructuring that might serve as a relevant outcome for the resolution of the debt burden, the currency crisis, the inflation drains or the banking crisis.

2.2. Debt Restructuring

Debt restructuring is a concept that has been there since the 1900s and has succeeded in rehabilitating debt burden, inflation drains and currency devaluations in several countries across history. For this reason, this section will discuss its definition, process, and costs to draw out its limitations as well as its capability of putting an end to a country's difficulties.

2.2.1. Definition and Elements

There is no one definition for sovereign debt restructuring, but according to Das, Papaioannou and Trebesch (2012), it refers to the exchange of sovereign debt instruments issued by a government with new debt instruments through legal processes. Restructuring has two main elements: debt rescheduling and debt reduction. Debt rescheduling consists of lengthening the maturity and lowering the interest rates of the existing instrument, while debt reduction consists of reducing an instrument's face value. However, both involve a haircut, as in, a loss in the present value. In most cases, as the authors set forth, debt restructuring occurs either after a government defaults, post default restructuring, or before a default, preemptive debt restructuring. In other cases, a default might not even trigger a debt restructuring if the government temporary misses a debt payment and

eventually repays it. The type, terms and timing of the debt exchange is decided by the negotiations set between the debtors and their creditors. When it comes to the process of debt restructuring, Das, Papaioannou and Trebesch (2012) find that the bond exchange activities can be implemented swiftly without credit coordination problems. According to their study, even ad-hoc exchanges worked fairly well for emerging markets. However, Buchheit et al. (2019) indicate that the process of restructuring can go wrong in so many ways due to the costs and complications of debt restructuring. It may take a long time to carry out, it may not contribute enough debt relief, or the creditors might view it as insufficient or as unnecessary. The key for the success of the debt workout process, according to the authors, is to find a reasonable balance between its constraints and conduct it efficiently and fairly since it is the only part the creditors will remember after the financial pain becomes a memory.

In addition to the above, the restructuring processes differ according to the type of debt as per Viterbo (2020). The most important bilateral debt is the Paris Club where the process begins as the country, who is unable to pay its debt, approaches the secretariat with the proof of payment difficulties, the need for debt relief and the acceptance of the IMF structural adjustment program. The Paris Club includes 22 permanent government members and other ad hoc participants who grant a debt relief depending on the country's income category and its financing gap. Therefore, decisions are tailored on a case-by-case basis. It also ensures that all creditors share an equal burden due to the clause of comparability of treatment where any breach in the clause will lead to the cancelation of the agreement of debt relief. The first type of granted debt relief is in the form of flow of payment where a temporary liquidity problem leads to rescheduling debt payments to

reduce the country's financing gap. The second type is in the form of stock of debt treatment and occurs when the country has a long-term liquidity problem thus providing an exit treatment like debt cancellation. Another club responsible for the negotiations with commercial banks and governments includes the London Club restructuring. The London Club is a Bank Advisory Committee of 10 to 20 bank representatives who negotiate the terms of the restructuring on behalf of the affected banks thus has no permanent members and requires an IMF adjustment program. The process begins once the government approaches its major bank creditors and asks them to organize a committee for negotiations who will later meet government officials on a regular basis. The Club is responsible for adopting appropriate procedures, verifying debtor's financial data, agreeing on the amount of outstanding debt, signing legal and confidential documents, and negotiating restructuring terms. Once all solvency and liquidity problems are addressed, an unanimity vote is required from all major and minor bank creditors or acceptance of banks that hold 95% of outstanding debt. Both Clubs were formed to restructure debts owed to bilateral creditors and to commercial banks, however, their use presently can be limited since an IMF support program is not always a precondition for debt restructuring discussion among other limitations like bondholder representation.

When it comes to the laws that govern the sovereign debt restructuring, Boorman et al. (2001) explain that they differ depending on the loan or bond a country has. These laws play a huge role on the restructuring mechanism since it predetermines the contractual provisions specifically whether the bonds contain a collection action clause (CACs) or not. This type of clause sets majority voting procedures, representation of credits in negotiations and limits the ability of individual credits to litigate against the government.

CACs are classified either as majority restructuring provisions or majority enforcement provisions. The fist category allows the majority of bondholders to change the bond's principal, interest and maturity and binds all the rest (75% should vote in favor). The second category can limit the minority from enforcing their rights of declaring the full amount of the bonds and initiating a litigation against the debtor.

Although CACs have the benefit of providing flexibility to issuers in managing the crisis and ensuring collective representation for bondholders, it has its own limitations as Delivorias (2019) states. CACs on a particular contract in a particular jurisdiction only apply on the creditors of that contract thus the rest may not respond to the terms offered. Another drawback is the fact that even though the supermajority voting stops from other creditor from terminating the restructuring yet their claims on old securities continue to exist and must be honored.

As we all know, debt restructuring can be costly on credits and even on the debtor country itself. From one hand, the default and restructuring processes might exclude the country from capital markets after the crisis, would decline output and trade and could endanger the country's financial stability which include domestic investors and banks. On the other hand, there is the spillover effect of the default on other fields of the country's economy specifically the foreign direct investment and the credit to the private sector.

The exclusion from capital markets post restructuring has been controversial. To understand this consequence, let us first define the concept of market access. It is a post default event when the public or the private sector gets positive transfers in the form of bonds or bank loans from the international capital market. Some authors like Richmond

& Dias (2009) show that some countries regain access immediately after default while others take longer periods of time. On average it takes 5.7 years for a partial access to the market and 8.4 years for a full access. The full access, however, depends on long term expectations, the size of the losses imposed on creditors and the regional difference. The MENA region for example, as believed by the researchers, take longer time span to regain market access than any other region. Furthermore, authors like Cruces & Trebesch (2011) hypothesis state that the higher the haircut, the higher the post restructuring spread and the longer the duration of market exclusion. It is true that a high haircut would implies a high degree of debt reduction today but also implies a punishment by capital markets tomorrow. Thus, when a country negotiates with its creditors, it should not only decide on the level of haircut but also on the possibility of credit access in the future since there is a possibility that imposing higher haircuts would put the country in a much worse shape than the one who imposes lower haircuts. Other authors like Guscina, Malik & Papaioannou (2017) design a methodological framework to assess the loss of market access and its temporary or structural nature. The framework uses debt sustainability indicators and market access indicators. Cases where debt sustainability indicator is below threshold while market indicator is not, then the loss of market access is said to be temporary. Other cases where debt sustainability indicators and market indicators breach their threshold, then the loss of market access is more permanent. However, cases where both indicators appear safe, then one should look at the state of the financial sector. The weaker the sector, the rapid the deterioration in investor confidence thus the higher the loss in market access.

The second consequence is related to the decline in output and trade especially since debt restructuring directly affects the dynamic of exports and imports. Asonuma, Chamon & Sasahara (2016) construct a panel regression and conclude that post default restructuring is associated with larger decline in imports and exports than preemptive default. Post default restructuring is also associated with a sharper and prolonged decrease in GDP, in real exchange rate and in foreign investments. Therefore, in general, restructuring is bad for growth unless the creditors allow the country to exit the default period and resolve its debt sustainability issue which is the case that Forni et al. (2016) mention as a final restructuring. Their methodology includes an OLS regression showing the correlation between restructuring and GDP growth. They find that final restructuring leads to a positive GDP growth of 0.8%. while nonfinal restructuring shows a negative impact on GDP.

As for the third and final consequence, sovereign debt restructuring has a strong effect on the financial position of banks as well as other financial institutions. The process might cause bank failures, bank recapitalization needs, credit crunch and low domestic lending. This was evident in the crises that occurred in Russia and Ecuador in 1998-2000 when restructuring was imposed after a default. The crisis scared the banking system as a huge number of banks became insolvent. In Russia, 50 banks were insolvent but very few had their license revoked and the Central Bank substantially supported the rest while entailing quasi fiscal costs. Quasi fiscal costs are prices taken at below than usual profit or at a loss. The insolvency of the banks was largely due to the investments in government securities which were written down after rescheduling. In Ecuador, on the other hand, the cost to recapitalize banks or cover deposits was more than $2.7 billion (almost 24% of

2000 GDP) while the fiscal benefit from a debt reduction was only $2.3 billion. This lost the trust of the public in the financial system due to the reduction in the real value of depositor's savings (IMF, 2002c).

We now shed light on schemes put in place by researchers concerning debt restructuring scenarios and lessons that could be crucial for future similar burdens. More specifically, this section discusses how researchers have designed scenarios of future levels of debt consequences, access to goods, hyperinflation, migration, and overall oil production in Venezuela. Then, debt rescheduling and debt reduction in Greece are also brought forward along with scenarios of restructuring which some authors found successful while others found the contrary. This crisis, as Xafa (2014) mentions, is very similar to that in Argentina which is why its recovery is also significant. Authors designed a semi small open economy model to set trajectories of restructuring, however, failed to incorporate change in exchange rate and incorporated sovereign debt. Finally, an important lesson is drawn from the case of Argentina that other countries can learn from.

2.2.2. Debt Restructuring in Venezuela

Concerning the debt restructuring in Venezuela, Moatti & Muci (2019) design a Baseline Balance of Payment framework that include projections of non-oil and oil goods and services imports and exports, current transfers (remittances), foreign investments oil or non-oil related, other possible flows and changes in the reserves. All these projections are assumptions taken according to theories and historical post crises recovery while imbedding a political and social target sustainable growth plan. As a second step, the researchers divide the public debt of Venezuela totaling $134 billion to build expectations

for the next 10 years. A total of $30 billion have been categorized as odious because they have been incurred by an authoritarian regime thus are no longer enforceable. The rest of the debt is assumed according to their estimations to either bare no or low interest. The third step consists of simulating four restructuring scenarios: the soft, the strong, the aggressive and the aggressive and odious debt scenarios. Under the soft scenario, a haircut on bonded debt of 52% to 74% is applied leading to the need for $93 billion in external funds yet external debt to GDP remains 130% by 2032 and external debt to current account exceeds 300%. Under the strong scenario, a haircut of 69% to 83% is applied leading to a need for $70 billion in external funds yet external debt to GDP falls to 125% by 2025 and 90% by 2032 and external debt to current account averages 360% by 2025 and 215% by 2032. Under the aggressive scenario, a haircut of 81% to 90% is applied leading to a need for $63 billion in external funds yet external debt to GDP decreases to 87% by 2025 and 50% by 2032 and external debt to current account settles at 250% by 2025 and 115% by 2032. Under the last scenario, it is assumed to have the same assumptions as the aggressive scenario except adding the odious debt dimension carrying the need of $62 billion in external funds. As a final step, the scholars test their results utilizing sensitivity analysis using three parameters that have major effects on the market: the exchange rate, market refinancing rate and oil prices.

Researchers conclude that a face value haircut, restructured debt instruments and large financial assistance are essential to regain confidence and attract foreign investors. The restructured debt instruments include value recovery instruments linked to oil prices also called oil warrants. The financial assistance and external debt restructuring should come

with specific policies and legal aspects like auditing the national debt and hiring a national debt committee among many others.

From a different viewpoint, Fuentes, Rogers & Di Natale (2018) believe that Venezuelan government regime highly effects the country's economic growth regarding real GDP, consumer price index (CPI), unemployment rate and government budget balance as a % of GDP. The first and base scenario is the same current regime with the adoption of limited reforms. This results in an average growth rate of -0.3% in real GDP and 68.6% in CPI during the years 2018-2023. Unemployment rate will decrease from 19.1% in 2018 to 9.2% in 2023 while government budget balance (% of GDP) will also decrease from -9.1% in 2018 to -4.9% in 2023. Oil production will decrease to 500,000 barrels a day which is one fifth the amount prior to the oil price crash. The second scenario is also the same regime, however, with no implemented reforms on currency and no reduction in gasoline subsidy. Oil production will decline even more to 300,000 barrels a day and hyperinflation will persist. Thus, results in an average growth rate of -2.1% in real GDP and 201.4% in CPI during the years 2018-2023. Unemployment rate will also decrease from 19.1% in 2018 to 10% in 2023 while government budget balance (% of GDP) will also decrease from -9.3% in 2018 to -6.4% in 2023. The third and final scenario mentioned by the authors is the imposition of a new regime, a cut in US sanctions, cut in government spending, increase in domestic interest rates and a loan from the IMF and restructuring of external debt. This results in an average growth rate of 5.5% in real GDP and 28.3 % in CPI during the years 2018-2023. Unemployment rate will decrease from 19.1% in 2018 to 6.3% in 2023 while government budget balance (% of GDP) will also

decrease from -8.9% in 2018 to -1.9% in 2023. These three scenarios, as per the researchers, are considered to be the three-potential outcomes for Venezuela's economy.

Other authors like Jatar et al. (2019) also believe that a change in the regime would inflict a significant impact on Venezuelan debt, access to goods, hyperinflation migration and overall oil production. For this reason, the authors study the different regime effects on the beforementioned economic results. Under the first scenario, scenario A, the current regime is the same thus a continuous decline in oil production for the next five years due to corruption, political instability, emigration of skilled workers and mismanagement. As for the debt, the regime will increase the country's indebtedness due to the need to restore domestic confidence by importing from abroad the things that cannot be produced at home thus using hard currencies in an aim to tame hyperinflation while attracting new investments. The hyperinflation will worsen indefinitely with the attempt to peg the local currency to the government issued cryptocurrencies backed by oil returns rather than using monetary and economic reforms while having shortages in basic goods and ongoing emigration of the population. However, there is one possibility that the country and emigration would stabilize and that is through the possibility of oil price increases. Under Scenario B, the most likely scenario, the military dictatorship takes over and the oil production will remain in shatters with a possibility of fast stability and slight increase in the next five years by imposing new reforms to attract foreign aids while finding cheaper debt sources from new allies like US and EU. Such reforms include opening the borders to trade thus increasing the availability of scarce goods and resulting in a change in the rate of emigration. The new regime will tend to abandon the local currency and adopt the US dollar to eliminate hyperinflation. However, this requires a willingness to

forget the position of the US as being one of the reasons for the country's economic war not to mention the need for an amount of currency reserves that may no longer exist due to the years of mismanagement. Under Scenario C, most extreme scenario, is the civil war where oil producing assets become the power of political control. The war will result in more debt and lower chances of payback thus no access to international markets and shortage in basic goods, while hyperinflation exacerbates due to the government's need to print more money. All these factors will instigate high levels of emigration.

2.2.3. Debt Restructuring in Greece

The second bailout package aimed to ensure debt sustainability and to regain competitiveness of Greece. The plan was put in motion as a 53.5% haircut on privately held government debt, 15% paid through the European Financial Stability Facility (EFSF) and the remaining 31.5% as new Greek bonds. The 53.5% corresponds to an amount of €109.7 billion. For the restructuring to take place, 95% of the creditors must agree to swap their existing bonds with either AAA EFSF notes, new bond with longer maturity (up to 30 years) and lower interest rate (ranging between 3% and 3.75%) or a GDP linked security. Therefore, the case of Greece included both debt rescheduling and debt reduction. Two scenarios were discussed by Dreger (2012). One, the baseline scenario, which assumes 50% debt reduction will have a debt burden of 129% of GDP in 2020. Second, the alternative scenario, which takes into account the political risk will have a debt burden of 159% of GDP in 2020. New set of measures accompanied the package. They include a 22% cut in minimum wages, cancelling holiday bonuses, public sector job cuts, pension cuts, privatization and measure that facilitate layoffs among other difficult structural reforms like improving the business environment and liberalization of

closed sectors. However, doubts on the success of the bailout arose since Greece has a high political uncertainty and a weak government administration not to mention, that the goal was to reduce the debt burden to 120.5% of GDP by 2020 which might be unreachable. Nevertheless, a debt restructuring was inevitable due to the country's insolvency.

Zettelmeyer, Trebesh & Gulati (2013) also stress on the fact that Greece's debt restructuring was successful and unavoidable specially since it was conducted in an orderly, quick and reasonable manner with the right amount of debt relief. However, like Xafa (2014) thinks that the restructuring framework for Greece was too late although it achieved an amount of debt relief of 66% of GDP. Moreover, authors like Gibson (2018) finds the crisis in Greece very similar to that in Argentina, despite occurring more than a decade apart, and designs the same semi-small open model to speculate what is necessary for Greece's recovery. The author selects consumption, exports, imports and GDP as parameters while leaving out inflation since it hasn't been an issue as long as Greece is in the EU. Through the synthetic counterfactual model, the author concludes that the country's membership in the EU has a negative effect on the economy. This might suggest that the country might benefit from free monetary policy, much like that in Argentina, however, it would release unpredictable consequences. Therefore, he suggests that Greece must find ways to begin outgrowing problems and discover its competitiveness since the austerity measures send the economy into despair.

2.2.4. Debt Restructuring in Argentina

To address the restructuring of Argentina, Gibson (2018) brings forward a semi small open economy model, first introduced by Proebsting (2017), and calibrates the model to integrate various aspects of the economy. The model comprises different equations like the utility function, the aggregate consumption equation, the nominal budget constraint, optimal wages function, the shocks formula among many others. Accordingly, the author sets a benchmark for the parameters used in each equation and then subjects the economy to a negative shock in total productivity since the country suffered a decline of 15% in 2001 and a positive shock in export demand due to the boom that was witnessed immediately after de-pegging of the peso in 2002. The model combines the size of total factor productivity of -15% and its duration is 0.5, and the size of the export demand shock of 15% with duration of 0.7. The outcomes of the model combine five most important parameters in any crises. The parameters are comprised of gross domestic product, inflation, imports, exports and consumption. Accordingly, the authors develop two trajectories for each parameter: the actual and the predicted. The semi small open economy model sets the predicted path which is assumed to follow the actual path in response to the two shocks simultaneously. The negative shock of the total factor productivity seems to be a major contribute to GDP collapse and the positive shock of the export demand happens to explain the shift in trade. The authors conclude with proving how the model fails to detect the change in the exchange rate and the following surge in inflation. The model also misses to capture other elements like elevated sovereign debt levels and stop in investment that led up to Argentine crisis.

Other researchers, mainly Cibils & Vuolo (2007) used the debt restructuring in Argentina to bring forward important lessons that other countries can learn from. The case of Argentina reveals that defaulting was not that disastrous, instead, it helped the country end the fixed exchange rate and freed up resources. Given the circumstances of what happened in the country, defaulting was the most sufficient option. It helped Argentina understand the necessity of scrutinizing a country's public debt and the process of taking new debt in order to avoid excessive indebtedness which are undesirable and costly. The strict scrutiny, as the author stresses, must be done by the congress, the parliament or any representative institution. Also, the process of debt restructuring should be based on an economy that expands due to a strong internal market through possessing productive investments. Another important lesson is the fact that defaulting on foreign lenders is much easier than defaulting on domestic ones since domestic bondholders can be powerful economic actors who might have political repercussions that lead to sever financial and economic consequences. The process of returning to foreign lenders as in the international capital market is not necessarily a sign of success or a sign of financial health since dependence on foreign capital does not guide to sustainable development. Instead, a strong state must develop economic policies of regulating and intervening in activities that aim towards economic growth. Finally, the authors insisted that the IMF is not capable of predicting a financial crisis and has a one size fits all approach which cannot be always taken as a rule.

After addressing how countries restructured their own debt and the guidance that were raised, we move towards currency valuation and the benefits or the drawbacks of certain rate regimes to reflect the case of Lebanon in the hopes of finding a suitable rate.

2.3. Literature Review about Currency Valuation

The similarities of the catastrophes between Lebanon and the four beforementioned countries, Venezuela, Greece, Iceland, and Argentina are remarkable. A thorough study related to each experience with regard to the events that led to the crises is a great starting point upon which we will try to develop a solution for the case of Lebanon. Actually, history is the one constant that serves as a base or a guide for analysis and suggestions.

After exposing and scrutinizing these countries that witnessed debt restructuring, we move towards tackling our second research question that relates to currency valuation. This is vital since for more than 25 years, Lebanon has been known for its currency peg to the dollar and this topic has long been debatable. Therefore, we begin to describe the current case of Lebanon and then analyze the pros and cons of a fixed exchange vs a floating exchange rate.

2.3.1. Current Situation in Lebanon

All the above countries have similarities in terms of the overvaluation of their currency due to the fixed exchange rate regimes, the overreliance on foreign funds, corrupted politicians, and financial liberalization. Lebanon is no different, specifically when it comes to the overvaluation of the Lebanese Pound. The adoption of the fixed exchange rate in 1997 has long served as some kind of a debatable remedy at the expense of an excessive fee. According to Naimy (2004), the whole Lebanese economy was devoted to serve the fixity of the Lebanese Pound toward the US dollar without taking into consideration the economic rules that should orient and define such fixity (deficit to GDP, level of interest rates, growth rate, and public debt to GDP). This policy of fixity

does not promote the appropriate use of available resources or their modernization and development. Not to mention the cost of servicing the public debt that was further increased after the peg initiated a hike in interest rates where the Lebanese treasury bonds offered the highest return and became the most attractive investment in the country. This entire system, according to the author, distorted productive investments, drove people into poverty and turned the country into a rent seeking economy. Due to the Pound's overreliance on generated returns and its failure in becoming a real reserve currency, a loss in the permanent trust is provoked.

From another viewpoint, Khalil & Mikhael (2018) states that no matter what the cost of the peg is, it provides more advantages than disadvantages to emerging economies like Lebanon. The adoption of the peg was a result of the hit in hyperinflation in the 80s where authorities failed to respond in a way to control it mostly due to the increase in dollarization rate reaching a high of 76.3% in 2007. The implemented fixed exchange rate regime reduces the high uncertainty, minimizes inflation pressures and stabilizes price levels that might affect trade, investment and transaction costs. The peg gains importance when a small open economy like Lebanon is characterized by a high trade to GDP ratio, underdeveloped capital market, excessive support on foreign investments and corrupted policymakers. Its importance lies in taming inflation and increasing investors' confidence. The author somewhat embraces the fixity as it limits monetary policy which serves for the benefit of the country since otherwise the policymakers would have abused the system for their own personal gain through economic interventions like printing bills.

For years now, the entire Lebanese economy depended on the sustainability of this fixed exchange rate. Everything was going smooth as long as the central bank found ways to preserve the parity between the dollar and the purchase power of the Lebanese Lira through borrowing foreign funds or other market instruments that the bank saw fit. The breaking point was October 17, 2019 when protestors roamed the streets in the hope to end mismanagement and corruption. With these riots, came bigger burdens mainly the failure of the pegging system. As such, day after day, the currency seems to be losing its agility and the public seems to be losing their endurance as they suffer from the jumps in inflation rates and the spikes in the Lira rate. This rate seems to be taking many forms aside from its official rate of USD/LBP 1,507.5 once said to be a pillar of support, now, is just a key factor to an economic collapse. The other form comes in what is referred to as "Lollar" at USD/LBP 3,900 which is the rate used to withdraw foreign denominated deposits from commercial banks. The final form is the black-market rate reaching as high as USD/LBP 10,000 which is used to buy and sell the hard currency. The fluctuation in the black market is not comprehendible implying uncertainty of its real effective value. It might be due to the hidden political agendas that makes it extremely difficult to devise certain guidelines for exchange rate valuation. This disturbance has left policy makers, researchers and government officials contemplating on which rate correctly reflects the actual one.

One of whom is Saliba et al (2020) who explain that the current slide in the exchange rate is due to the lack of inflows because of the capital control, the absence of the IMF program and the increase of currency in circulation (from $0.9 billion per month in 2019 to $11.6 billion in 2020). At the current level of currency in circulation, Lebanon needs a

high trade surplus to bring the current account into a surplus, to raise USD into the country, to narrow the country's external position and to lower its debt levels. The authors measure the currency in circulation with an estimation of money velocity. By December 2020, if money velocity is taken at 1 then the FX misalignment is 194.2% an equivalence of USD/LBP 5,460. If money velocity is taken at 4.6, then the FX misalignment is 591.8% an equivalence of USD/LBP 13,551. If money velocity is taken at Lebanon's peak during the hyperinflation of 1987 of 18.6 then the FX misalignment is 2,223% an equivalence of USD/LBP 46,751. This slide alongside the increase in inflation has deflated domestic debt but increased the percentage of total debt to GDP since this comes at a cost of a depressed economy witnessing a sharp decline in GDP levels to $11-16 billion from $52 billion in 2019.

To be pragmatic, no matter what the real effective rate might be, Lebanon cannot continue with the pegging system and must find an alternative to the fixed exchange rate regime. Currently Lebanon's eyes turn towards a flexible exchange rate as the country plans to secure a $10 billion aid from the IMF after defaulting for the first time in the country's history in early 2020. At the current moment, government officials are too scared to float the currency; nevertheless, the peg is finished. At this point, the importance of examining what the obstacles of a fixed exchange rate comes to light since it will guide us to the next step of acquiring a clearer view of what form the Lebanese currency should take. Especially since what Kan (2007) brings up in his article poses a great concern to this paper. The author is convinced that traditional pegged rates based on fixed parity and extremely narrow fluctuations, as the case in Lebanon, have shown to be naturally unstable and open to huge speculative attacks.

2.3.2. Fixed Exchange Rate: Blessing or Curse

The choice of exchange rate regimes a country shapes has been a series of ongoing debates. This enigma has been perceived as a cause to major economic crises and has led researchers to believe that only the two extremes are sustainable, the fixed or the floating. This proposition is known as the bipolar view as Kan (2007) mentions in his article. Nevertheless, other economists, like himself, do still suggest that intermediate regimes are also viable options peculiarly for emerging markets.

To grasp the bipolar view, we have to go back to Obstfeld and Rogoff (1995) who envision those countries with integrated domestic and global capital markets cannot sustain intermediate regimes and are forced to choose either fixed or floating exchange regimes. Other authors like Williamson (2000) disagree through stating that intermediate regimes will continue to be practical options. However, with Caramazza & Aziz (1998), getting the right exchange rate is crucial for a developing country's economic stability and growth. During the periods of liberalization and globalization, several countries benefitted from the shift from fixed to flexible rate regime, however, incorporated more costs. From one hand, fixed rates enjoyed stable rates of inflation. From the other hand, some countries shifted from fixed to floating in order to lower inflation rates. In all cases, one cannot demonstrate that any regime ranks above the other when it comes to the terms of implications for macroeconomic performance especially that currency crashes are equally likely under the two regimes. The author also debates whether to peg the exchange rate to a single currency or to peg it to a basket of currencies. Pegging to a single currency makes the domestic currency vulnerable to that currency's fluctuation, while pegging to a basket of currencies would reduce this vulnerability. Whichever

regime a country chooses, according to the authors, countries need to adapt their exchange rate policies depending on the changing market conditions and challenges through sustainable economic fundamentals and robust banking sector for long term success. Edwards (1999) adds to that argument that countries choose their rate regime according to the political structure of the country. The author's model assumes that the fixed regime is more credible than the flexible one. Nonetheless, in the case when authorities abandon the pegged regime and devalue the currency they suffer from political costs. So, developing or middle-income counties that face more unstable political agendas tend to select more flexible rate regimes.

Calvo & Mishkin (2003) believe otherwise. They argue that the people lose faith in the value of money when the country takes on a huge debt burden and the central bank prints money recklessly. So, the country might choose to fix the rate in the hope to gain credibility in the national money. At the same time, the authors favor flexible rates since their country will have the power to deal with domestic economic concerns through monetary policies. But the authors summarize their point of view in stating that the debate of choosing an exchange regime misses the boat. The researchers decide to put the choice as a second order of importance in generating macroeconomic success since governments should first worry about setting institutions that people can rely on. This implies that less attention should be focused on which regime is preferable and more attention should be focused on deeper arrangements like institutional reforms that stimulate emerging countries to be less susceptible to crises. This concept is disputed in Yeyati & Sturzenegger (2003) paper who study the relationship between the exchange rate regime and economic growth. They find that for developing countries, the fixed

exchange regimes are connected with slower growth and higher output volatility. While Kan (2007) concludes that both fixed and floating rates pose serious problems on countries that are characterized with basic supervisory schemes, limited credibility and underdeveloped financial markets. Besides, Ghosh & Ostry (2009) declare that the peg has little benefit to emerging markets regarding inflation and growth since such regimes are highly associated with currency, banking, and debt crises. In sense, that it is true that the peg regime is associated with lower real exchange rate volatility, great trade openness and lower inflation however, it puts the currency at risk for overvaluation and constrains the use of macroeconomic policies thus hurts competitiveness. In case where the country is able to avoid loss of competitiveness and overvaluation, only then the peg regime would lead to a better growth performance versus the floating regime.

Another major study in this subject belongs to Duttagupta, Fernandez & Karacadag (2005) who iterate the need for intermediate regime especially in cases of transition. The authors mention the complication of the transition from fixed to floating whether it is gradual or not. A transition is set to be gradual when the country adopts intermediate types of regimes to reach the floating regime. Other transitions might be triggered by a sharp depreciation of the exchange rate. To achieve a proper transition, the authors stress on the existence of a liquid foreign exchange market, a reasonable policy set on the central bank for cases of intervention, a nominal anchor set to replace the fixed rate and a constructive system aimed to review and manage exchange rate risk. This is further emphasized by Kan (2007), who offers baskets and crawling pegs as transition regimes that are only adopted with a prior set exit strategy. Another important alternative, the researcher mentions, is the managed floating plus since it combines the features of a

flexible regime, in shock absorbing property and monetary policy independence, with a framework that addresses the vulnerability to sudden movements in exchange rate.

To conclude, there is no one best choice in exchange rate regime however, it is important to choose a regime that is coherent with a robust macroeconomic framework. It is also vital to grasp that the transition from a fixed regime to a floating regime, as is the case of Lebanon, requires an intermediate regime much like the managed floating plus introduced previously by Kan (2007). In the following chapter 3, we will expose the methodology used to calculate the country's debt relief taking into consideration that there haven't been any scientific papers conducting this type of analysis for Lebanon.

We move to the next chapter to discuss the preexisting methodologies of debt restructuring and revaluation while collecting this paper's dataset.

Chapter 3: Procedures & Methodology

3.1. Introduction

As highlighted in the literature review, there are very few scientific papers that discuss how Lebanon is able to restructure its debt, lower inflation levels or figure out the best value for the exchange rate. Therefore, in this chapter, we introduce and explain the chosen methodology. Then, we move to elucidate the importance of putting in motion plans of calculating the correct amount of outstanding debt, mostly in local currency and partly in foreign currency at a predetermined exchange rate. The third part identifies the levels of haircut or debt relief for the purpose of negotiating with creditors. we conclude

with using Saliba et al. (2020) estimates in the calculation of the currency exchange rate which widens existing models to incorporate political, financial, and social realities.

3.2. Methodology

3.2.1. Background

As demonstrated, several authors have tried to put in place a common methodology that might be applicable on all economic crises specifically related to resolving a country's debt burdens since debt is central to the proper functioning of "modern economy". However, all have talked about making this debt more manageable whether through debt consolidation, debt rescheduling, debt reprofiling or debt restructuring. The latter, nevertheless, is a process that is usually filed when a country is in a financial hardship. For this reason, many believe that debt restructuring might untangle the current state that Lebanon faces. As put by Kraemer (2020), developing countries much like Lebanon tend to be reluctant in seeking debt restructuring and prefer carrying the crushing debt burdens due to the fear of an exclusion from the capital markets. However, history concerning sovereign debt restructuring has revealed that delays in the process will steer the path towards a deeper crisis for the debtor country, towards a larger haircut for creditors and towards an extension in excluding the country from capital markets. Consequently, it is essential to understand the process of restructuring which is clarified by Das et al. (2012) who provide the following timeline for the process of restructuring starting from the point of distress all the way towards the final phase of restructuring as shown in the figure below.

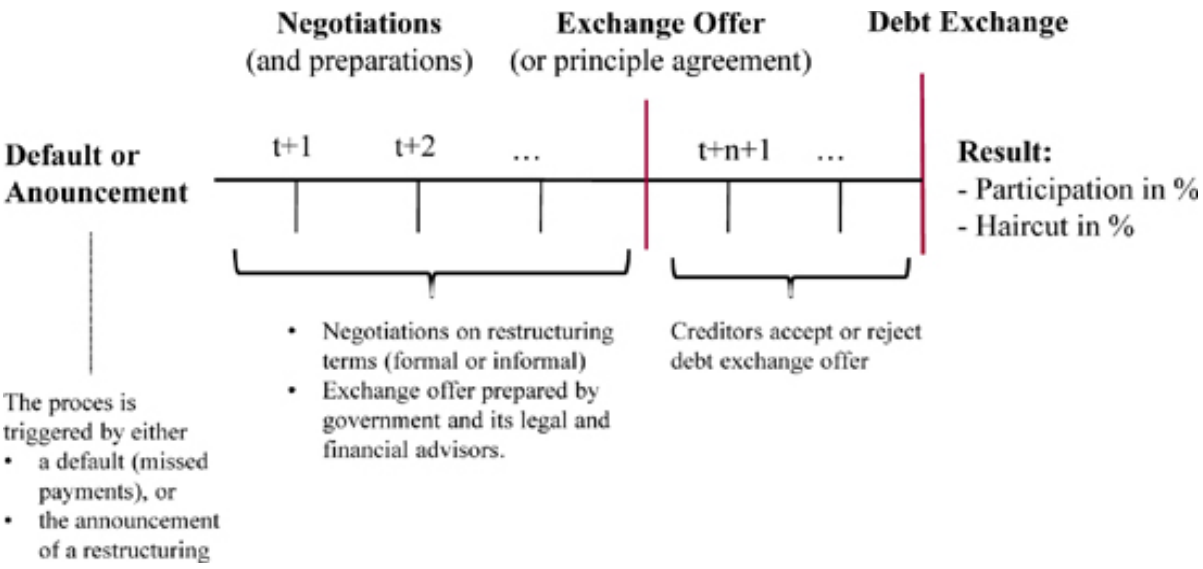

Figure 1: The process of debt restructuring
Source: Das et al. (2020)

According to the author, the episode begins at the starting phase as soon as the government defaults on the debt payment or as soon as it announces a debt restructuring. Then, the country begins negotiations with the creditors, which can either be with the help of advisors or bilaterally like the Paris Club. The negotiations or the preparation part is important since it will provide a debt relief if all parties agree on the terms of the debt exchange that takes months or years and coincides with macroeconomic adjustments aside from evaluating a country's financial situation. Therefore, it is vital that the country verifies the value and characteristics of its total debt claims including all outstanding loans, debt instruments and bonds. The characteristics according to the authors include the amortization schedule, the interest and coupon rates, the face and market value, the currency of the instruments, the enhancements which might include collateral and all legal clauses. All these lay a foundation for a detailed analysis on the required debt relief, the macroeconomic adjustments and the financing gap which assists the country in

developing a restructuring proposal. Here the creditors decide whether to accept or reject the given offer. Finally, after the creditors' acceptance, the implementation phase consists of exchanging the old debt with a new debt instrument and will put the country back on track. As for the duration of restructuring, it takes approximately 30.9 months for bank debt restructurings while 13.1 months for bond restructurings. However, the author leaves room for debating whether restructuring really does put an end to the distress. In all cases, a country cannot keep defaulting on its debts without negotiating with its creditors.

3.2.2. Scenario Analysis

In the case of Lebanon, the country will pass through this process to get to a result that everyone is hoping for. Since the process of restructuring comes in many forms and has different consequences for debtors and creditors, the paper will put in place three sets of scenarios that might produce a better model of the best possible relief the country is in need for. This will be built through an in-depth gathering of data from Banque Du Liban, the Ministry of Finance, the IMF and the World Bank which will lay the foundation for the plausible scenarios. Therefore, the chosen methodology for this paper will be the scenario analysis.

As defined by many authors, a scenario is a path of developments and a description of possible future situations that might arise. Lindgren & Bandhold (2003) stress that a scenario is not a forecast of an unsurprising projection of the present rather, it is a well worked answer to "what would happen if …". According to the authors, a forecast conceals risk while a scenario makes risk management applicable through providing qualitative different direction. The scenario models, as per The World Bank Treasury

(2017), also quantifies cost and risk while providing input for identifying a preferred composition of debt and risk exposure.

Similar to the analysis conducted by Moatti & Muci (2019), we will begin segregating Lebanon's public debt by creditor and type (local and foreign). Then, we will construct three scenarios each with a different level of haircut. Lastly, we will simulate the future levels of debt and GDP.

The Lebanese authorities suggested a recovery plan in April 2020 which includes firstly expenditure reduction measures from reforms in electricity sector (represents 2.9% of GDP) and reduction in personnel costs to 9.1% of GDP, secondly revenue enhancing measures from tax increases and revenue deposits at BDL and finally public debt restructuring. The later includes a scenario of suspending interest and principal payment of Eurobonds, rollover of the maturities of domestic debt with a reduced payment of interest while still maintaining the payments to multilateral and bilateral partners (a total of USD 2 billion). This scenario, according to the authorities, will reduce debt to GDP ratios as follows,

Figure 2: Evolution of Debt to GDP after discounts of domestic debt and Eurobonds
Source: Lebanese Authorities

As seen, it is very crucial to savvy the amount of debt held by a government, the value of haircut or debt relief that must be applied, and the real effective exchange rate in order to project the required scenarios.

3.2.3. Calculation of Debt Relief

When it comes to the values of the haircut, many researchers argue that it is not the same as the calculation of the debt relief. To calculate the debt relief for any of the elements of sovereign debt restructuring, Sturzenegger & Zettelmeyer (2008) and Cruces & Trebesch (2011) bring forward two approaches. The first approach is widely used since it does not require comprehensive knowledge regarding the characteristics of an old debt instrument. In this methodology, debt restructuring involves exchanging the old debt with a new debt instrument where the present value of the latter is compared to the full-face value of the old debt. This results in the following equation,

$$H_{Mt}^{i} = 1 - \frac{Present\ Value\ of\ the\ New\ Debt\ (r_t)}{Face\ Value\ of\ the\ Old\ Debt} \qquad (1)$$

Where for any country i, H_M is the value of the haircut at a certain point in time t, considered to be the time when the country exits default, and at a rate r_t. This equation was refined by Sturzenegger & Zettelmeyer (2008) and suggested the second approach,

$$H_{SZt}^{i} = 1 - \frac{Present\ Value\ of\ the\ New\ Debt\ (r_t)}{Face\ Value\ of\ the\ Old\ Debt\ (r_t)} \qquad (2)$$

According to the above, the only difference that exists is the fact that the old instrument in the second equation is discounted to the present value at the same rate r_t. Furthermore, the H_{SZt}^{i}approach provides a better estimate that takes into consideration the part of the

debt that was previously restructured. Cruces & Trebesch (2011) use a sample of 180 restructuring operations implemented in 68 countries covering the years 1970 till 2010. Their data is collected from IMF sources, the Institute of International Finance and various World Bank reports. The sample is selected under the criteria that the restructuring is only on public guaranteed debt, is only distressed debt exchange, is with foreign private creditors, is medium and long term and is implemented effectively. The results of the findings show that the average estimate of the haircut is 37% where half of the haircuts implemented are as high as 53% and the other half is as low as 23%. The debt relief is typically lower than the haircut. For this reason, Sturzenegger & Zettelmeyer (2008) suggest that debtor countries must use a lower discount rate since during a country's evaluation of its debt, it must take into consideration that it will repay the debt. While from the creditor's point of view, the assumption takes into consideration the riskiness and the probability that the country will not pay.

For this reason, knowing the value of a country's debt is vital to move to the second part of the process of restructuring which involves negotiating with the creditors. For Lebanon, the public debt in local currency is known and can be mitigated however, as mentioned previously, the existence of several exchange rates makes it difficult to specifically assess the amount of public debt in foreign currency. Therefore, it is also necessary to get the most efficient exchange rate for the currency.

3.2.4. Estimation of the Exchange rate

Although the Lebanese Lira is not a floating currency yet, the fluctuation seen is not comprehendible implying uncertainty of its real effective value. This uncertainty might

be due to the hidden political agendas that make it extremely difficult to devise certain guidelines for exchange rate valuation. According to Hanke (2021), nothing is fixed unless the currency is fixed and the only way to do this is through assigning a currency board exchange and changing the laws that govern the central bank. As a first step, the central bank should stop printing bills for 30 days and let the rate fluctuate freely. After this period, experts will set the correct exchange rate at an appropriate level such that the Lebanese Lira will be 100% backed by US dollar reserves.

To establish an appropriate rate, many researchers have recognized certain methodologies in the hope of estimating a real value of a country's exchange rate. One of the most common methods consists of the Purchasing Power Parity (PPP) also known as the law of one price, which must explain the value of the exchange rate between two currencies. In other words, economists tend to say that the cost of a basket of goods and services in one country, when converted to a foreign currency, a person should be able to buy that exact basket in that foreign country. Therefore, the adjustments that occur in the exchange rate are a result of a price differential, or inflation differential, between two countries. The PPP has flaws since it can result in overvaluation against some currencies and undervaluation against others. Nevertheless, this method is a widely used tool for guidance concerning the direction of the exchange rate (McCormick, 2017).

Other models of valuation, based on several IMF research papers, include approaches to examine the extent to which the real exchange rate is misaligned from its equilibrium value. Clark et al. (1994) furnish a framework, macroeconomic balance approach (MB), to calculate the equilibrium exchange rate, which employs macroeconomic indicators that would position internal and external equilibrium. The internal balance represents the

combination of the real domestic demand and the real exchange rate when the economy is at full employment. It is upward sloping since when the exchange rate appreciates, the demand shifts from domestic to imported goods and the demand of domestic goods by foreign exporters decreases. External balance represents the combination of the domestic demand and the exchange rate at which the current account is at its equilibrium level. It is downward sloping since higher demand worsens the current account and thus depreciates the exchange rate. The point of intersection of the two balances determines the real exchange rate. The advantage of this approach is that it provides a framework that considers the interactions between the current account and net foreign assets and the interaction between domestic prices and nominal exchange rate.

Two alternative approaches inspect the consistence of the real effective exchange rate with the economic fundamentals. Williamson (1994) improved this MB approach method and introduced the Fundamental Equilibrium Exchange Rate (FEER) where the real exchange rate is consistent with macroeconomic balance and brings the current account balance equal to the capital account balance or capital flows such that both accounts are set at full employment values. The equilibrium value assures a simultaneous achievement between the internal and external balance. This gives the following equation:

$$FEER = \frac{(-KA - b_0 - b_2 y_h - b_3 y_f)}{b_1} \qquad (3)$$

Where FEER is the real effective exchange rate, KA is the capital account in the medium term; y_h and y_f are the home and foreign aggregate demand corresponding the country's current account at full employment. The constants are b_0, b_1, b_2 and b_3 such that $b_1<0$, $b_2<0$ and $b_3>0$. This approach takes into consideration that we are in ideal economic

conditions meaning that the estimates are subjective because we have no universal standards for the estimation of price elasticity. Moreover, the output of the country, the current account and the capital account models are based on estimates and judgements.

To avoid this judgement, an extended FEER is determined by replacing KA with the difference between the desired saving and investment at full employment. There is also the assumption that over time the real effective exchange rate will converge to the FEER method exchange rate. Therefore, the current exchange rate is over or undervalued when compared with the exchange rate developed by FEER.

A potential alternative to the FEER approach is BEER or Behavioral Equilibrium Exchange Rate brought forward by MacDonald & Clark (1998). It aims to use a more empirical approach based on the effect of fundamental variables on the exchange rate over the short and medium term to calculate the equilibrium exchange rate. This approach measures the exchange rate misalignment between two currencies based on random disturbances, the effect of transitory factors and how far away the economic fundamentals are from their sustainable values. Under this method, the equation of total misalignment tm explains the behavior of the real exchange rate through:

$$tm_t = q_t - \beta Z_t \qquad (4)$$

Where q_t is the actual value of the real exchange rate, β is a vector coefficient and Z_t a vector of fundamental economic variable, which can act in the medium and long term. The choices of the variables used in BEER depends on the belief of what might affect the exchange rate quantitatively for example the price of imports and exports and

qualitatively for example the result of a political election. Therefore, BEER clarifies the cyclical movement in the real exchange rate.

After several research, the IMF with Lee et al. (2008) developed the Consultative Group on Exchange Rate Issues (CGER) to provide an assessment for a country's exchange rate through three complementary methodologies based on the idea of equilibrium where internal and external balance is consistent. The methodologies include the macroeconomic balance approach, the equilibrium real exchange rate approach and the external sustainability approach. The first approach, the macroeconomic balance approach (MB), consists of calculating the real exchange rate that is adequate to close the gap between the underlying current account and the estimated current account norm. The current account norm, which is generally equals to savings minus investments, uses several determinants. These determinants include the fiscal balance, the net foreign assets and the oil balance as a ratio to GDP. Other determinants are the demographics as the ratio of the population above 65 to those between the age of 30 and 64, the economic growth and the economic crises. Each determinant is a ratio estimated by using panel econometric techniques that include 54 advanced and emerged economies covering the years 1973 until 2004. As a last step for this approach, the adjustment of the real exchange rate is through applying the current account elasticity calculated as [(export to GDP ratio) x (export elasticity)] – [(import to GDP ratio) x (import elasticity-1)]. Therefore, the country with more trade openness is able to close the current account gap with lower exchange rate adjustment.

The second approach, according to the authors, is the equilibrium real exchange rate approach (ERER). Through panel regression techniques using dynamic ordinary least

squares methodology consisting of a sample of 48 countries over the years 1980 until 2004, the authors first estimate an equilibrium relationship between the real exchange rate and a set of six fundamentals. These fundamentals comprise of net foreign assets, productivity differential, commodity terms of trade, government consumption to GDP, trade restriction index and price controls. The net foreign assets are NFA at the end of the period divided by average exports and imports. The productivity differential is the difference in output of workers in tradable and non-tradable production that has a positive effect of ERER. The commodity terms of trade appreciate the exchange rate since it divides the weighted average of main commodity exports prices by the weighted average of main commodity imports prices. As for the trade restriction index, the authors use it as a dummy variable since trade restrictions may increase domestic prices and thus appreciate the real exchange rate. For price controls, the consumer price index (CPI) is used as a proxy. After setting the correct coefficients for each fundamental, the ERER calculates two sets of exchange rate based on the current estimated value and projected medium-term value of these fundamentals. As a last step, the adjustment of exchange rate is the difference between the country's current exchange rate and the two equilibrium values.

To complement the two other approaches, the external sustainability approach is also a part of the CGER assessments. It does not rely on econometric estimation; rather it requires assumptions about the inflation rate, rates of return on external assets and liabilities and potential growth rates of a given economy. It involves calculating ratios of current account or trade to GDP that would put the net foreign asset in equilibrium for a given benchmark through the following equation:

$$ca^S = \frac{g+\pi(1+g)}{(1+g)(1+\pi)} b^S \quad (5)$$

Where ca^S is the current account balance that stabilizes net foreign asset, g is the real GDP growth rate, π is the inflation rate and b^S is the NFA benchmark level chosen arbitrary. Then the authors compare this value with the country's expected current account or trade balance over the medium term. Finally, an adjustment to the exchange rate will close the gap between the current account balance and the equilibrium NFA.

As per Lee et al (2008), those three approaches tend to yield similar results however, this may not always be the case due to the differences in the fundamentals used in each approach. Therefore, the authors stress on not imposing one particular methodology but using several methodologies to complement each other and arrive at an exchange rate assessment.

Another measure to value a currency is the Real Effective Exchange Rate (REER). REER is a calculation to measure the real value of a currency relative to major currencies by computing it against the weighted average of a basket of foreign currencies, which include trading partners. In other words, it calculates the number of units of domestic goods that is equivalent to buy 100 units of foreign goods. This will result in Nominal Effective Exchange Rate (NEER) that takes into account the change in price levels. To get REER, the value is adjusted for inflation of every currency in the basket by dividing it by a price deflator to reflect the actual purchasing power of the currency. REER reflects the performance of this currency with respect to itself in the past and to other currencies. This method is important when evaluating country's trade capabilities and competitiveness with the other currencies. It also evaluates the equilibrium value of the

currency such that a REER value above 100 means that the currency is overvalued while an amount below 100 then the currency is undervalued. For this methodology, the calculation involves a selected base period and a basket of exchange rates expressed with respect to the currency, which will be evaluated by REER (i.e. The US $). A country's REER is set to be a benchmark for trade competitiveness in such a way that an increase in REER indicates a loss in competitiveness since imports become cheaper while exports become expensive. This creates a bias in REER since the wise calculation of imports and exports values set by the country determines the trade weights used in the calculation. However, REER is important in measuring the appreciation/depreciation of the home currency relative to the trading partners (Agnes, 2019).

The question is which of the existing framework gives the best estimate for an exchange rate. An analysis conducted by Saadaoui (2016) stresses that the FEER methodology is a medium run concept and a natural candidate of global imbalance resurgence. Nevertheless, it has its own limitation and labeled as normative since there is no one unique method to determine the equilibrium. Zorzi et al. (2020) evaluate the three most popular methodologies, PPP, BEER and MB and suggest that the real exchange rate given by PPP is the most effective for the long run. The BEER approach, through the evolution of economic fundamentals, explains a slow-moving exchange rate thus is more insightful. However, this exchange rate is generally not far from that given by PPP. The MB is the least accurate among all since it has only normative dimensions and unreliable predictions. The authors conclude that a larger set of fundamentals should be included to develop the comprehensive models.

Taking into consideration that Lebanon has a lack in transparency and available data. Thus, applying one of the above methodologies would be difficult and impossible. Authors like Saliba et al (2020) has put a fair value estimate of USD/LBP through the compass methodology. This method is valid for emerging markets in providing an equilibrium exchange rate by converging the external current account to levels aligning with the country's fundamentals. The methodology puts a ceiling for the long-term current account norm per GDP at -3% and its FX elasticity as a range between 0.1 and 0.18 where 0.1 is the most appropriate. The authors came up with the conclusion of a current account balance at a REER of 1,500 of USD -2,972 million or -22.6% of GDP with GDP level of USD 52.7 billion in the third quarter of 2019. In the fourth quarter of 2019, as in, the beginning of the slide of USD/LBP with an appreciation of -33.3%, the current account norm is USD -2,547 million or -19.3% of GDP at the same GDP level. Nonetheless, this approach proposes a negative current account value to be the current account norm, which is not realistic given that Lebanon's net international investment position is negative. Therefore, the external sustainability approach, according to the authors, happens to be most efficient for the case of Lebanon since the country is a debtor economy encompassing a high-risk premium and a lower rate of return on external assets vs external liabilities. For simplification, the calculated equilibrium exchange rate assumes that the currency in circulation (times the money velocity) is converted to USD even if in practice that is not the case. As mentioned previously, the authors set different fair values of USD/LBP each with a different estimation of currency in circulation, money velocity and degree of passthrough. The below table summarizes the authors'

outcomes, where 1,1a,2,2a and 3 are outcomes at an estimate of the compass methodology while the rest are based on the EB approach.

	Fair Value USD/LBP (Fx passthrough 0%)	Fair Value USD/LBP (Fx passthrough 35%)
Iteration 1	2,611	2,147
Iteration 1a	2,751	2,240
Iteration 2	3,152	2,550
Iteration 2a	3,253	2,613
Iteration 3	3,329	2,682
Stable Net Foreign Assets	2,666	2,173
Jun-20 CC and MV=1	4,713	3,701
Jun-20 CC and MV=4.6	10,234	7,954
Dec-20 CC and MV=1	5,460	4,259
Dec-20 CC and MV=4.6	13,551	10,488
Dec-20 CC and MV=18.6	46,751	34,900

Legend:
CC = Currency in Circulation
MV = Money Velocity

Table 1: USD/LBP exchange rate fair value under different methodologies (Source: Saliba et al. (2020))

To develop the authors' own fair value estimates we need to understand the Money velocity (MV) which is a method used to measure the frequency upon which one unit of a currency is needed to purchase domestic produced goods and services at a given period of time. It is known as a measure of how quickly money circulation is in the economy where a higher value indicates that more transactions are taking place between individuals. It is also the number of times a dollar is spent to purchase goods and services. Thus, Mcmahon (2011) develops the following ratio,

$$MV = \frac{Gross\ Domestic\ Product\ (GDP)}{Country's\ Money\ Supply} \tag{6}$$

Where money supply is said to be the short-term money that is available immediately which include cash, checking accounts, demand deposits and NOW accounts. Amadeo (2021) on the other hand thinks of MV as how hard every USD 1 works to increase a country's economic output when taking nominal GDP. This the ratio becomes as follows,

$$MV = \frac{Nominal\ GDP}{Money\ Supply} \quad (7)$$

Where nominal GDP is used since money supply measure also does not account for inflation. Additionally, money supply uses either M1 or M2. M1 consists of currency, checks and checking account deposits whereas M2 is a broader measure that adds certificate of deposits (under USD 100,000), saving accounts and money market funds.

As for the second legend that the authors use, the degree of passthrough, is important to understand the dynamics of inflation and as a result, guiding monetary policy. This is the case since it is the degree of dependance of domestic prices respond to exchange rate movements. Ha, Stocker & Yilmazkuday (2019) highlights the importance of correctly estimating the exchange rate passthrough ratio knowing that it is the percentage of increase in consumer prices per 1% depreciation in the effective exchange rate. The impact of currency movement on the increase in prices should be the basis for a policy response from the central bank. In emerging markets, the risk of a policy misstep if the passthrough rate to inflation is not properly heightened is more frequent. As per the authors, the lack of exchange rate flexibility can exacerbate global shocks, promote speculative attacks and makes it harder to credibly anchor inflation expectations. In turn, inflation becomes more sensitive to exchange rate fluctuations and restricts the effectiveness of monetary policy. Finally, the authors' findings indicate that the independence of the central bank can significantly simplify the role of stabilizing inflation following major currency movements and allows for more effective use of the exchange rate as a shock buffer.

3.3. Data

In order to apply the above methodology, we acquire our dataset from the World Bank and the central bank of Lebanon. To execute the beforementioned, we obtain the levels of GDP from the World Bank and the levels of money supply, external and internal debt levels from BDL. We analyze yearly time series data for Lebanon covering the periods from 1993 till 2019.

After data collection, we move to the following chapter that suggests a new scheme for the restructuring of debt in Lebanon. Taking into consideration that the official rate is no longer applicable and the haircut on depositors are already in place, we will determine the optimal amount of outstanding debt and the superlative level of haircuts the country can withhold at different exchange rate levels.

Chapter 4: Findings

Based on the previous chapter which provided an in-depth explanation of the methodology to be used, Chapter 4 presents the findings thereby proposing different levels of exchange rate, through a regression analysis taking into consideration Gross Domestic Product (GDP), Real Interest Rates (IR) and National Income (NI) in order to find the optimal level of outstanding debt. Subsequently, once the optimal level of debt is estimated, we proceed to simulate several restructuring scenarios.

4.1. Determination of exchange rate

As previously mentioned, the country's exchange rate fluctuates heavily causing it to rely on the black-market. Accordingly, over the past two years, Lebanon's fundamental economic and financial situation has deteriorated to an extent whereby the official, pegged rate of 1,507.5 USD/LBP, has become obsolete. For this reason, we are obliged to generate different rates to determine a rational outstanding debt. In order to do so, the following section will start by developing a regression model whereby three explanatory variables, Gross Domestic Product (GDP), Real Interest Rates (IR) and National Income (NI), affect the dependent variable "Y" which in this case is the exchange rate.

4.1.1. Development of the Regression Model

In order to develop a regression model, as highlighted above, the endogenous variable $y_{\frac{USD}{LBP}}$ will be considered as the USD/LBP exchange rate. Moreover, the exogenous variables are:

i. $X_{IR} = i_{us} - i_{LB}$ → the difference in the real interest rate between United States and Lebanon.

ii. $X_{GDP} = GDP_{US} - GDP_{LB}$ → the difference in GDP growth rate between United States and Lebanon

iii. $X_{IN} = IN_{US} - IN_{LB}$ → the difference in national income growth rate between United States and Lebanon.

Based on the above, the equation takes the following form to reach a consensus in USD/LBP rate.

$$y_{\frac{USD}{LBP}} = k + a\,X_{IR} + b\,X_{GDP} + c\,X_{IN} \quad (8)$$

Whereby k, a, b and c are constants. The data was collected from the World Bank, Federal Reserve Economic Data (FRED) and U.S. Bureau of Economic Analysis for X_IR, X_GDP and X_IN covering the years 1989 till 2019, thus generating 31 observations. It is worth mentioning that the data for the interest rate of Lebanon was missing for the year 2020, hence, an average of the last five years was used. Using the software EViews we obtained the following values for the constants:

Dependent Variable: EXCHANGE_RATE
Method: Least Squares
Date: 08/21/21 Time: 14:50
Sample: 1990 2020
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1524.264	39.15646	38.92752	0.0000
DIFFERENCE_GDP_GROWTH_RATE	1561.952	519.3018	3.007793	0.0056
DIFFERENCE_IN_INCOME_GROWTH_RA	-1572.211	605.4408	-2.596804	0.0150
DIFFERENCE_IN_INTEREST_RATE	453.5047	395.5916	1.146396	0.2617

R-squared	0.264376	Mean dependent var	1489.387
Adjusted R-squared	0.182640	S.D. dependent var	194.0941
S.E. of regression	175.4765	Akaike info criterion	13.29280
Sum squared resid	831383.8	Schwarz criterion	13.47783
Log likelihood	-202.0384	Hannan-Quinn criter.	13.35312
F-statistic	3.234516	Durbin-Watson stat	0.777555
Prob(F-statistic)	0.037789		

Figure 3: Eviews Outcome for regression equation $y_{\frac{USD}{LBP}} = k + a\,X_{IR} + b\,X_{GDP} + c\,X_{IN}$

As evident in the above outcome, based on the p-value, GDP and NI are statistically significant and thus have an impact on USD/LBP exchange rate. However, the coefficient of GDP has a positive impact on USD/LBP exchange rate which means a depreciation in

the value of the currency, whereas the negative coefficient on NI implies the opposite impact. On the other hand, IR was shown to be statistically insignificant. This may be due to the fact that the impact of IR is mitigated in countries whereby inflation rates are high.

Next, we obtained the below fitted versus actual plot in figure 4. It is evident that during the years 1990 and 1992 the actual USD/LBP exchange rate varied drastically from the fitted assumption. Nevertheless, from 1992 onwards while the actual exchange rate was not exactly equal to the fitted value, it remained within an acceptable range. Lastly, we can note a sudden variance between the fitted and the actual exchange rates during the years 2003 and 2004. This may be due to the political instability that the country witnessed, arising from the multiple assassinations of renowned politicians during these years.

obs	Actual	Fitted	Residual
1990	695.089	1414.48	-719.387
1991	928.228	1160.84	-232.616
1992	1712.79	1718.67	-5.88285
1993	1741.36	1497.44	243.925
1994	1680.07	1500.33	179.745
1995	1621.41	1500.64	120.775
1996	1571.44	1418.20	153.244
1997	1539.45	1495.89	43.5566
1998	1516.13	1470.63	45.4982
1999	1507.50	1477.44	30.0650
2000	1507.50	1460.07	47.4310
2001	1507.50	1418.65	88.8526
2002	1507.50	1425.41	82.0851
2003	1507.50	1280.68	226.821
2004	1507.50	1724.92	-217.423
2005	1507.50	1529.84	-22.3373
2006	1507.50	1515.93	-8.42816
2007	1507.50	1576.69	-69.1851
2008	1507.50	1512.71	-5.20926
2009	1507.50	1503.77	3.72966
2010	1507.50	1465.17	42.3291
2011	1507.50	1508.80	-1.29820
2012	1507.50	1518.79	-11.2916
2013	1507.50	1516.37	-8.87462
2014	1507.50	1482.06	25.4377
2015	1507.50	1528.94	-21.4379
2016	1507.50	1507.18	0.31549
2017	1507.50	1524.98	-17.4838
2018	1507.50	1519.31	-11.8111
2019	1507.50	1509.08	-1.57811
2020	1507.50	1487.07	20.4318

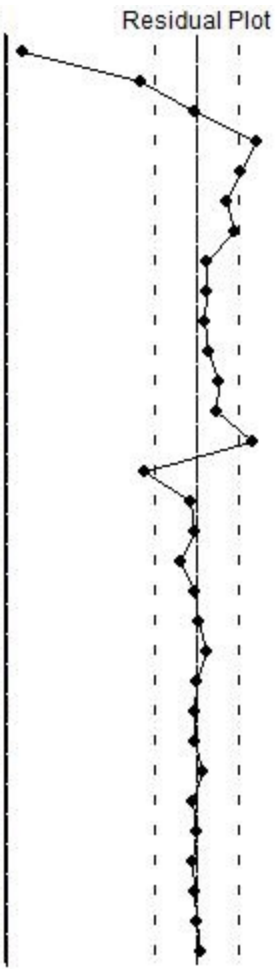

Figure 4: Eviews actual versus fitted regression outcome

4.1.2. Suggestions of different levels of exchange rates

Following the above outcomes, we get the following equation that only includes the values of the constants k, b and c;

$$y_{\frac{USD}{LBP}} = 1{,}524.264 + 1{,}561.952\ X_{GDP} - 1{,}572.211\ X_{IN} \qquad (9)$$

Nevertheless, the constant "k" with a value of 1,524.264 is considered to be undervalued since the official rate of USD/LBP 1507.5 has become obsolete. For this reason, a different estimate should be taken in order to reach a correct value of the exchange rate.

To get these estimations, data is collected from Lira rate, a platform which indicates the daily black-market rate of the Lebanese Pound since January 2021 till July 2021. The estimates are as follows, E1: k_1= 3,900 which is the withdrawal rate of the current USD deposits in local banks, E2: k_2= 8,450 which is the opening 2021 LBP rate, E3: k_3= 9,958.43 which is the average YTD March (first quarter) LBP rate, E4: k_4= 11,590.9 which is the average YTD June (second quarter) LBP rate, E5: k_5= 20,300 which is the August LBP rate, E6: k_6= 46,751 which is the estimate used by Saliba et al. (2020) if the money velocity reaches its peak levels during 1987. These estimates are summarized in the below table.

Constant	Value
E1: k_1	3,900
E2: k_2	8,450
E3: k_3	9,958
E4: k_4	11,591
E5: k_5	20,300
E6: k_6	46,751

Table 2: Different values for constant k in eq (9)

In addition to the above, we also have different estimates of X_{GDP} and X_{IN}, whereby we follow an assumption that Lebanon is like any other emerging country that has normal growth rates as in the case of the four before analyzed countries Venezuela, Greece, Iceland and Argentina. We calculate the average of the difference in GDP growth rate between United States and Venezuela covering the years 1990-2014 to be 1.85%. While the average of the difference in NI growth rate is -6.86%. As for Greece, the average of the difference in GDP and NI growth rates over the years 2007-2020 generates to be 5.22% and -1.71% respectively. When it comes to Iceland, for the years 1996-2020, average difference GDP growth rate is 1.00% while average difference NI growth rate is

-1.13%. Finally, for Argentina, the average difference GDP growth rate is 4.43% and the average difference NI growth rate is -3.90% for the years 1990-2020. Plugging these estimates in equation (7) will get the following results for USD/LBP exchange rate.

Values for Y	Venezuela	Greece	Iceland	Argentina
X_{GDP} =	1.85%	5.22%	1.00%	2.10%
X_{NI} =	-6.86%	5.13%	-1.13%	-3.90%
E1: k_1	4,036.79	3,900.97	3,933.36	3,994.05
E2: k_2	8,586.79	8,450.97	8,483.36	8,544.05
E3: k_3	10,095.22	9,959.40	9,991.79	10,052.48
E4: k_4	11,727.69	11,591.87	11,624.26	11,684.95
E5: k_5	20,436.79	20,300.97	20,333.36	20,394.05
E6: k_6	46,887.79	46,751.97	46,784.36	46,845.05

Legend:	
k_1 =	3,900
k_2 =	8,450
k_3 =	9,958
k_4 =	11,591
k_5 =	20,300
k_6 =	46,751
b =	1,561.95
c =	-1,572.21

Table 3: Result of eq $y_{\frac{USD}{LBP}} = k + 1{,}561.952\ X_{GDP} - 1{,}572.211\ X_{IN}$ *at different estimates*

4.2. Estimation of Lebanon's outstanding debt

To further complement the regression model of the exchange rate, this section will begin by identifying the appropriate existing and five-year forecast amount of debt in both foreign and local currency. Subsequently, we estimate these amounts at different rates reflected in table 3 from the previous section. Accordingly, we will simulate various restructuring scenarios.

4.2.1. Valuation of Lebanon's Current and Expected Debt

According to the "Lebanese Government Financial Recovery Plan" issued in April 2020, the aggregate losses amount to 241 trillion LBP where 73 trillion LBP are losses due to fiscal deficits, 66 trillion LBP are related to losses incurred from the financial engineering of the central bank, 40 trillion LBP are related to the losses by banks, 62 trillion LBP are

losses in banks and central bank balance sheets at a rate of 3,500 USD/LBP. According to Moody's Analytics, as of March 2021, Lebanon has 131 trillion LBP in outstanding public debt, where 75 trillion LBP are domestic while 37 billion USD are foreign as per Table 4 below.

Lebanon: Government					
	Reference	**Last**	**Previous**	**Units**	**Frequency**
Outstanding Public Debt	Mar-21	130,784	130,781	Bil. LBP, NSA	Monthly
Outstanding Public Debt – Domestic	Mar-21	75,487	75,759	Bil. LBP, NSA	Monthly
Outstanding Public Debt – Foreign	Mar-21	36,681	36,472	Mil. USD, NSA	Monthly

Table 4: Moody's Analytics Lebanon - Outstanding Public Debt - Foreign

However, as per the data collected from Banque Du Liban (BDL), Lebanon is exposed to 129 trillion LBP as of November 2020. This is divided into 58% in net local currency and 42% in foreign currency compared to 83% and 17% respectively in 1994. To correctly assess the amount of debt the country is exposed to, we use the forecast formula on excel and project the figures over the next 5 years (2021-2025). This formula takes the following syntax form, "=forecast (x, known_y, known_x)" where x is the value at a certain date to calculate the prediction while known_y is the range of dependent values and known_x is the range of independent values. The function aims to predict estimates based upon existing values using linear regression. This is illustrated in figure 5 below which shows the evolution of the public debt since November 1994 in local currency LBP, knowing that the foreign debt is at the official rate of 1507.5 USD/LBP.

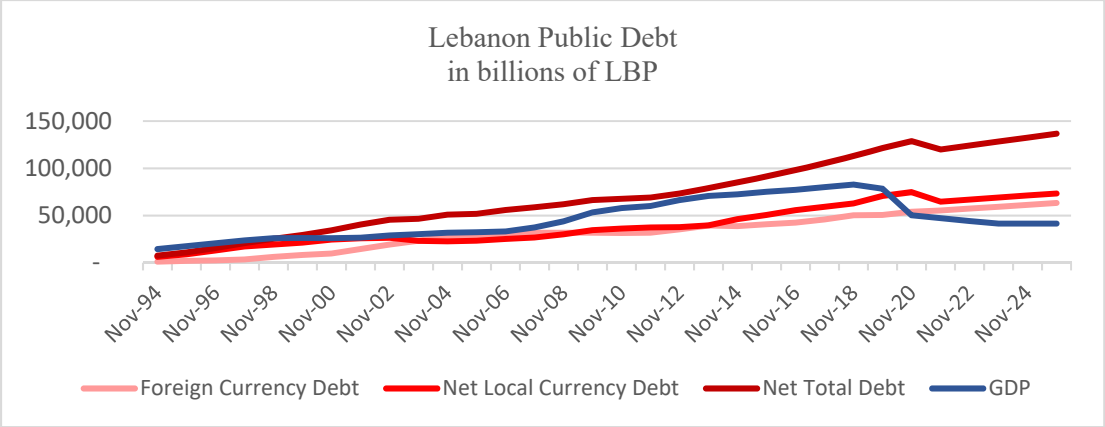

Figure 5: Evolution of Lebanon Debt 1994-2020 in billions of LBP (Source: BDL)

As seen above, debt has grown over the past 30 years in a linear form, however, it was not fully compensated by a linear increase in GDP levels. It is worth mentioning that since the beginning of the crisis (Nov-19), the net total debt peaked at its highest point in 30 years while GDP saw a sharp drop. As for the five-year projection, it was performed using the forecast formula on excel. However, in reality, the devaluation of the currency has aided the debt burden held by the government since the biggest bulk that was denominated in local LBP has drastically decreased. In a sense that, effectively, the country no longer carries LBP 129 trillion which was equivalent to $85 billion, it currently holds significantly less as projected based on various scenarios in the following section.

4.2.2. Quotation of Debt as a Function of Different Levels of Exchange Rates and of GDP

4.2.2.1. Quotation of Debt

Depending on the rates in section 4.1.2 in Table 3, we get several quotations for debt. At each level, we consider that Lebanon's fundamentals, in terms of GDP and NI growth

rates as per the assumptions also taken from Table 3 are close to those of Venezuela, Greece, Iceland and Argentina respectively. Therefore, we use the above estimates of the exchange rates of each country to provide us with the below calculation of debt levels. To get the Net Total Debt amount in billions of LBP we use equation (10) as,

$$Net\ Total\ Debt_{in\ billion\ of\ LBP} = External\ Debt * rate + Internal\ Debt \quad (10)$$

Whereby, external debt is debt denominated in USD, rate is the estimated exchange rate given in Table 3 and internal debt is debt denominated in LBP.

4.2.2.2. GDP Expectations and Assumptions

The values of Pessimistic GDP in billions of LBP is assumed to decrease by 6.29% for the next 3 years (2021-2023) due to the stagflation of the economy and then remains the same at 0% growth for the last two years (2024-2025). The assumption of -6.29% rate is calculated as the average of GDP growth rate for Lebanon for the last five years (2016-2020), when the economy was in recession, by using equation (11)

$$Average\ GDP\ Growth\ Rate_{2016-2020} = \frac{2.5\%+3.8\%+3.4\%-5.4\%-35.8\%}{5} = -6.29\% \quad (11)$$

Therefore, to illustrate, the GDP on 11/2021 was calculated using the below formula (12)

$$GDP_{Nov-21} = GDP_{Nov-20} * (1 + Average\ GDP\ Growth\ rate\ _{2016-2020}) = 50{,}325 + (1 - 6.29\%) = LBP\ 47{,}159\ billion \quad (12)$$

Moreover, the GDP on 11/2024 was estimated using formula (13)

$$GDP_{Nov-24} = GDP_{Nov-23} * (1 + 0\%) = 41{,}413 + (1 - 0\%) = LBP\ 41{,}413\ billion \quad (13)$$

Whereas the value of Nominal GDP in billions of LBP assumes a growth. This is the case since, nominal GDP takes into consideration the price levels in an economy. According to Krugman (2021), inflation causes nominal GDP to rise even as production decreases. Effectively Lebanon is witnessing high levels on inflation which decreases the number/quantity of goods and services that we can buy however, increases the prices of goods and services drastically. Therefore, it might cause a nominal growth on GDP levels. Thus, we calculate these levels using eq (12) but with the Average GDP Growth Rate being an estimate of 25% for the next five years. Debt to GDP is calculated by equation (14),

$$Debt\ to\ GDP = \frac{Net\ Total\ Debt_{in\ billions\ of\ LBP}}{GDP} \quad (14)$$

	Venezuela						
	Rate	**Period**	**Net Total Debt** *In Billions of LBP*	**GDP** *In Billions of LBP*	**Debt to GDP**	**Nominal GDP** *In Billions of LBP*	**Debt to Nominal GDP**
E1: k_1	*4,036.79*	Nov-21	212,848.77	47,159.41	451.3%	62,906.56	338.36%
	4,036.79	Nov-22	220,406.12	44,192.74	498.7%	78,633.19	280.30%
	4,036.79	Nov-23	227,963.48	41,412.69	550.5%	98,291.49	231.93%
	4,036.79	Nov-24	235,541.54	41,412.69	568.8%	122,864.37	191.71%
	4,036.79	Nov-25	243,098.89	41,412.69	587.0%	153,580.46	158.29%
E2: k_2	*8,586.79*	Nov-21	379,870.60	47,159.41	805.5%	62,906.56	603.86%
	8,586.79	Nov-22	393,485.12	44,192.74	890.4%	78,633.19	500.41%
	8,586.79	Nov-23	407,099.63	41,412.69	983.0%	98,291.49	414.18%
	8,586.79	Nov-24	420,751.44	41,412.69	1016.0%	122,864.37	342.45%
	8,586.79	Nov-25	434,365.95	41,412.69	1048.9%	153,580.46	282.83%
E3: k_3	*10,095.22*	Nov-21	435,242.20	47,159.41	922.9%	62,906.56	691.89%
	10,095.22	Nov-22	450,864.80	44,192.74	1020.2%	78,633.19	573.38%
	10,095.22	Nov-23	466,487.40	41,412.69	1126.4%	98,291.49	474.60%
	10,095.22	Nov-24	482,152.80	41,412.69	1164.3%	122,864.37	392.43%
	10,095.22	Nov-25	497,775.40	41,412.69	1202.0%	153,580.46	324.11%
E4: k_4	*11,727.69*	Nov-21	495,167.06	47,159.41	1050.0%	62,906.56	787.15%

	11,727.69	Nov-22	512,962.88	44,192.74	1160.7%	78,633.19	652.35%
	11,727.69	Nov-23	530,758.69	41,412.69	1281.6%	98,291.49	539.98%
	11,727.69	Nov-24	548,603.26	41,412.69	1324.7%	122,864.37	446.51%
	11,727.69	Nov-25	566,399.08	41,412.69	1367.7%	153,580.46	368.80%
E5: k_5	*20,436.79*	Nov-21	814,861.54	47,159.41	1727.9%	62,906.56	1295.35%
	20,436.79	Nov-22	844,251.29	44,192.74	1910.4%	78,633.19	1073.66%
	20,436.79	Nov-23	873,641.04	41,412.69	2109.6%	98,291.49	888.83%
	20,436.79	Nov-24	903,111.31	41,412.69	2180.8%	122,864.37	735.05%
	20,436.79	Nov-25	932,501.05	41,412.69	2251.7%	153,580.46	607.17%
E6: k_6	*46,887.79*	Nov-21	1,785,827.38	47,159.41	3786.8%	62,906.56	2838.86%
	46,887.79	Nov-22	1,850,429.85	44,192.74	4187.2%	78,633.19	2353.24%
	46,887.79	Nov-23	1,915,032.33	41,412.69	4624.3%	98,291.49	1948.32%
	46,887.79	Nov-24	1,979,811.79	41,412.69	4780.7%	122,864.37	1611.38%
	46,887.79	Nov-25	2,044,414.27	41,412.69	4936.7%	153,580.46	1331.17%

Table 5: Lebanon Debt and Debt to GDP for the next 5 years in LBP and USD under Venezuela assumption

Under the assumption that Lebanon's fundamentals are close to Venezuela's, we can see that the calculated exchange rates range between USD/LBP 4,036.75 and USD/LBP 46,887.75. Whereby, the respective Net Total Debt is LBP 212,847 billion and LBP 2,044,412 billion. In addition, Debt to GDP grew from 451% to 4,937% mainly due to the increase in exchange rate by 1,061%, which directly inflated Net Total Debt while GDP remained at the same level. When GDP increases by 25%, Debt to Nominal GDP grew from 338% to 1331%.

	Greece						
	Rate	**Period**	**Net Total Debt** *In Billions of LBP*	**GDP** *In Billions of LBP*	**Debt to GDP**	**Nominal GDP** *In Billions of LBP*	**Debt to Nominal GDP**
E1: k_1	*3,900.97*	Nov-21	207,863.08	47,159.41	440.8%	62,906.56	330.43%
	3,900.97	Nov-22	215,239.63	44,192.74	487.0%	78,633.19	273.73%
	3,900.97	Nov-23	222,616.17	41,412.69	537.6%	98,291.49	226.49%
	3,900.97	Nov-24	230,012.93	41,412.69	555.4%	122,864.37	187.21%
	3,900.97	Nov-25	237,389.47	41,412.69	573.2%	153,580.46	154.57%
E2: k_2	*8,450.97*	Nov-21	374,884.92	47,159.41	794.9%	62,906.56	595.94%
	8,450.97	Nov-22	388,318.62	44,192.74	878.7%	78,633.19	493.84%
	8,450.97	Nov-23	401,752.33	41,412.69	970.1%	98,291.49	408.74%
	8,450.97	Nov-24	415,222.84	41,412.69	1002.6%	122,864.37	337.95%
	8,450.97	Nov-25	428,656.54	41,412.69	1035.1%	153,580.46	279.11%
E3: k_3	*9,959.40*	Nov-21	430,256.51	47,159.41	912.3%	62,906.56	683.96%
	9,959.40	Nov-22	445,698.30	44,192.74	1008.5%	78,633.19	566.81%
	9,959.40	Nov-23	461,140.10	41,412.69	1113.5%	98,291.49	469.16%
	9,959.40	Nov-24	476,624.19	41,412.69	1150.9%	122,864.37	387.93%
	9,959.40	Nov-25	492,065.98	41,412.69	1188.2%	153,580.46	320.40%
E4: k_4	*11,591.87*	Nov-21	490,181.38	47,159.41	1039.4%	62,906.56	779.22%
	11,591.87	Nov-22	507,796.38	44,192.74	1149.0%	78,633.19	645.78%
	11,591.87	Nov-23	525,411.39	41,412.69	1268.7%	98,291.49	534.54%
	11,591.87	Nov-24	543,074.66	41,412.69	1311.4%	122,864.37	442.01%
	11,591.87	Nov-25	560,689.66	41,412.69	1353.9%	153,580.46	365.08%
E5: k_5	*20,300.97*	Nov-21	809,875.86	47,159.41	1717.3%	62,906.56	1287.43%
	20,300.97	Nov-22	839,084.80	44,192.74	1898.7%	78,633.19	1067.09%
	20,300.97	Nov-23	868,293.74	41,412.69	2096.7%	98,291.49	883.39%
	20,300.97	Nov-24	897,582.70	41,412.69	2167.4%	122,864.37	730.55%
	20,300.97	Nov-25	926,791.64	41,412.69	2237.9%	153,580.46	603.46%
E6: k_6	*46,751.97*	Nov-21	1,780,841.70	47,159.41	3776.2%	62,906.56	2830.93%
	46,751.97	Nov-22	1,845,263.36	44,192.74	4175.5%	78,633.19	2346.67%
	46,751.97	Nov-23	1,909,685.03	41,412.69	4611.4%	98,291.49	1942.88%
	46,751.97	Nov-24	1,974,283.19	41,412.69	4767.3%	122,864.37	1606.88%
	46,751.97	Nov-25	2,038,704.85	41,412.69	4922.9%	153,580.46	1327.45%

Table 6: Lebanon Debt and Debt to GDP for the next 5 yrs in LBP and USD under Greece assumption

Under the assumption that Lebanon's fundamentals are close to Greece's, we can see that the calculated exchange rates range between USD/LBP 3,900.97 and USD/LBP

46,751.97 whereby, the respective Net Total Debt is LBP 207,863.08 billion and LBP 2,038,704.85 billion. In addition, Debt to GDP grew from 441% to 4,923% mainly due to the increase in exchange rate by 1098%. Whereas Debt to Nominal GDP grew from 330% to 1327%.

	Iceland						
	Rate	**Period**	**Net Total Debt** *In Billions of LBP*	**GDP** *In Billions of LBP*	**Debt to GDP**	**Nominal GDP** *In Billions of LBP*	**Debt to Nominal GDP**
E1: k_1	*3,933.36*	Nov-21	209,052.24	47,159.41	443.3%	62,906.56	332.32%
	3,933.36	Nov-22	216,471.92	44,192.74	489.8%	78,633.19	275.29%
	3,933.36	Nov-23	223,891.59	41,412.69	540.6%	98,291.49	227.78%
	3,933.36	Nov-24	231,331.58	41,412.69	558.6%	122,864.37	188.28%
	3,933.36	Nov-25	238,751.26	41,412.69	576.5%	153,580.46	155.46%
E2: k_2	*8,483.36*	Nov-21	376,074.08	47,159.41	797.5%	62,906.56	597.83%
	8,483.36	Nov-22	389,550.91	44,192.74	881.5%	78,633.19	495.40%
	8,483.36	Nov-23	403,027.74	41,412.69	973.2%	98,291.49	410.03%
	8,483.36	Nov-24	416,541.49	41,412.69	1005.8%	122,864.37	339.03%
	8,483.36	Nov-25	430,018.32	41,412.69	1038.4%	153,580.46	280.00%
E3: k_3	*9,991.79*	Nov-21	431,445.67	47,159.41	914.9%	62,906.56	685.85%
	9,991.79	Nov-22	446,930.59	44,192.74	1011.3%	78,633.19	568.37%
	9,991.79	Nov-23	462,415.51	41,412.69	1116.6%	98,291.49	470.45%
	9,991.79	Nov-24	477,942.85	41,412.69	1154.1%	122,864.37	389.00%
	9,991.79	Nov-25	493,427.77	41,412.69	1191.5%	153,580.46	321.28%
E4: k_4	*11,624.26*	Nov-21	491,370.54	47,159.41	1041.9%	62,906.56	781.11%
	11,624.26	Nov-22	509,028.67	44,192.74	1151.8%	78,633.19	647.35%
	11,624.26	Nov-23	526,686.80	41,412.69	1271.8%	98,291.49	535.84%
	11,624.26	Nov-24	544,393.31	41,412.69	1314.6%	122,864.37	443.08%
	11,624.26	Nov-25	562,051.45	41,412.69	1357.2%	153,580.46	365.97%
E5: k_5	*20,333.36*	Nov-21	811,065.02	47,159.41	1719.8%	62,906.56	1289.32%
	20,333.36	Nov-22	840,317.08	44,192.74	1901.5%	78,633.19	1068.65%
	20,333.36	Nov-23	869,569.15	41,412.69	2099.8%	98,291.49	884.68%
	20,333.36	Nov-24	898,901.35	41,412.69	2170.6%	122,864.37	731.62%
	20,333.36	Nov-25	928,153.42	41,412.69	2241.2%	153,580.46	604.34%
E6: k_6	*46,784.36*	Nov-21	1,782,030.86	47,159.41	3778.7%	62,906.56	2832.82%

	46,784.36	Nov-22	1,846,495.65	44,192.74	4178.3%	78,633.19	2348.24%
	46,784.36	Nov-23	1,910,960.44	41,412.69	4614.4%	98,291.49	1944.18%
	46,784.36	Nov-24	1,975,601.84	41,412.69	4770.5%	122,864.37	1607.95%
	46,784.36	Nov-25	2,040,066.63	41,412.69	4926.2%	153,580.46	1328.34%

Table 7: Lebanon Debt and Debt to GDP for the next 5 yrs in LBP and USD under Iceland assumption

Under the assumption that Lebanon's fundamentals are close to Iceland's, we can see that the calculated exchange rates range between USD/LBP 3,933.39 and USD/LBP 46,784.39 whereby, the respective Net Total Debt is LBP 209,053 billion and LBP 2,040,067 billion. In addition, Debt to GDP grew from 443% to 4,926% mainly due to the increase in exchange rate by 1089%. Whereas Debt to Nominal GDP grew from 332% to 1328%.

	Argentina						
	Rate	**Period**	**Net Total Debt** *In Billions of LBP*	**GDP** *In Billions of LBP*	**Debt to GDP**	**Nominal GDP** *In Billions of LBP*	**Debt to Nominal GDP**
E1: k_1	*3,994.05*	Nov-21	211,279.79	47,159.41	448.0%	62,906.56	335.86%
	3,994.05	Nov-22	218,780.25	44,192.74	495.1%	78,633.19	278.23%
	3,994.05	Nov-23	226,280.70	41,412.69	546.4%	98,291.49	230.21%
	3,994.05	Nov-24	233,801.71	41,412.69	564.6%	122,864.37	190.29%
	3,994.05	Nov-25	241,302.16	41,412.69	582.7%	153,580.46	157.12%
E2: k_2	*8,544.05*	Nov-21	378,301.63	47,159.41	802.2%	62,906.56	601.37%
	8,544.05	Nov-22	391,859.24	44,192.74	886.7%	78,633.19	498.34%
	8,544.05	Nov-23	405,416.85	41,412.69	979.0%	98,291.49	412.46%
	8,544.05	Nov-24	419,011.61	41,412.69	1011.8%	122,864.37	341.04%
	8,544.05	Nov-25	432,569.22	41,412.69	1044.5%	153,580.46	281.66%
E3: k_3	*10,052.48*	Nov-21	433,673.22	47,159.41	919.6%	62,906.56	689.39%
	10,052.48	Nov-22	449,238.92	44,192.74	1016.5%	78,633.19	571.31%
	10,052.48	Nov-23	464,804.62	41,412.69	1122.4%	98,291.49	472.88%
	10,052.48	Nov-24	480,412.97	41,412.69	1160.1%	122,864.37	391.01%
	10,052.48	Nov-25	495,978.67	41,412.69	1197.6%	153,580.46	322.94%
E4: k_4	*11,684.95*	Nov-21	493,598.09	47,159.41	1046.7%	62,906.56	784.65%
	11,684.95	Nov-22	511,337.00	44,192.74	1157.1%	78,633.19	650.28%
	11,684.95	Nov-23	529,075.92	41,412.69	1277.6%	98,291.49	538.27%

	11,684.95	Nov-24	546,863.43	41,412.69	1320.5%	122,864.37	445.10%
	11,684.95	Nov-25	564,602.35	41,412.69	1363.4%	153,580.46	367.63%
E5: k_5	*20,394.05*	Nov-21	813,292.56	47,159.41	1724.6%	62,906.56	1292.86%
	20,394.05	Nov-22	842,625.41	44,192.74	1906.7%	78,633.19	1071.59%
	20,394.05	Nov-23	871,958.26	41,412.69	2105.5%	98,291.49	887.11%
	20,394.05	Nov-24	901,371.48	41,412.69	2176.6%	122,864.37	733.63%
	20,394.05	Nov-25	930,704.32	41,412.69	2247.4%	153,580.46	606.00%
E6: k_6	*46,845.05*	Nov-21	1,784,258.41	47,159.41	3783.5%	62,906.56	2836.36%
	46,845.05	Nov-22	1,848,803.98	44,192.74	4183.5%	78,633.19	2351.17%
	46,845.05	Nov-23	1,913,349.55	41,412.69	4620.2%	98,291.49	1946.61%
	46,845.05	Nov-24	1,978,071.96	41,412.69	4776.5%	122,864.37	1609.96%
	46,845.05	Nov-25	2,042,617.54	41,412.69	4932.3%	153,580.46	1330.00%

Table 8: Lebanon Debt and Debt to GDP for the next 5 yrs in LBP and USD under Argentina assumption

Under the assumption that Lebanon's fundamentals are close to Argentina's, we can see that the calculated exchange rates range between USD/LBP 3,994.05 and USD/LBP 46,845.05 whereby, the respective Net Total Debt is LBP 211,279 billion and LBP 2,042,618 billion. In addition, Debt to GDP grew from 448% to 4,932% mainly due to the increase in exchange rate by 1073%. Whereas Debt to Nominal GDP grew from 335% to 1330%.

The above analysis can be summarized in the following Table 9, where we take an average of Net Total Debt over the next 5 years under the 6 estimations and the 4 countries. For example, to calculate the amount of Net Total Debt under the estimate E1 in Venezuela shown in Table 9 we take the amounts under E1: k_1 when the rate was USD/LBP 4,036.75 as presented previously in Table 5 then calculate Net Total Debt in USD at the equivalent rate under the different assumptions to get equation (15),

$$Net\ Total\ Debt_{E1} = \frac{52.73+54.60+56.47+58.35+60.22}{5} = US\$\ 56.47\ billion \qquad (15)$$

While the average exchange rate is obtained through calculating the average of the exchange rates under estimation E1 for the four countries. Therefore, to get the average exchange rate under E1 we use the following formula (16)

$$Average\ Exchange\ Rate_{E1} = \frac{4{,}036.75+3{,}900.97+3{,}933.36+3{,}994.05}{4} = \frac{USD}{LBP}3{,}966.29 \quad (16)$$

	Net Total Debt				Average Exchange Rate
	In Billions of US$				*USD/LBP*
	Venezuela	**Greece**	**Iceland**	**Argentina**	
E1	56.47	57.07	56.92	56.66	3,966.29
E2	47.41	47.54	47.51	47.45	8,516.29
E3	46.21	46.30	46.28	46.24	10,024.72
E4	45.26	45.33	45.31	45.28	11,657.19
E5	42.75	42.77	42.77	42.76	20,366.29
E6	40.84	40.85	40.85	40.85	46,817.29

Table 9: Lebanon Net Total Debt and average over the next 5 years under different estimation and country

As seen above, the choice of different country's fundamentals leads to the same outcome where the tremendous devaluation in LBP exchange rate enormously affects debt in USD. It is also worth mentioning the effect of the degree of devaluation of the exchange rate on the estimation of Net Total Debt in USD. Hence, Table 10 calculates the percentage of devaluation as we move from E1 to E2, E2 to E3 and so forth under different country fundamentals. Therefore, E2 vs E1 under Venezuela is calculated by taking the exchange rates under E2 and E1 from table 3 and applying the following equation (17)

$$Exchange\ rate\ devaluation_{E2\ vs\ E1} = \frac{8{,}586.79}{4{,}036.79} - 1 = 112.7\% \quad (17)$$

Furthermore, since the fundamentals are analogous, we calculated their average by using formula (18),

$$Average_{E2\ vs\ E1} = \frac{112.71+116.64+115.68+113.92}{4} = 114.7\% \quad (18)$$

Exchange Rate devaluation					
	Venezuela	Greece	Iceland	Argentina	Average
E2 vs E1	112.71%	116.64%	115.68%	113.92%	114.74%
E3 vs E2	17.57%	17.85%	17.78%	17.65%	17.71%
E4 vs E3	16.17%	16.39%	16.34%	16.24%	16.28%
E5 vs E4	74.26%	75.13%	74.92%	74.53%	74.71%
E6 vs E5	129.43%	130.29%	130.09%	129.70%	129.88%

Table 10: Exchange rate devaluation across the different estimations

As we move from E1 (with an average rate close of USD/LBP 3,966) to E2 (with a rate close to USD/LBP 8,516) with a devaluation of 114.7%, Net Total Debt decreases by 16.4%. While as we move from E5 (with a rate close to USD/LBP 20,366) to E6 (with a rate close to USD/LBP 46,817) with a devaluation of 129.88%, Net Total Debt decreases by 4.5% only. This is evident as the local debt denominated in LBP becomes obsolete and the dollar denominated debt is not impacted by the severe devaluation.

After reaching the above estimations, we move to the next section to specify the three beforementioned restructuring scenarios. These scenarios range between soft restructuring, strong restructuring, and aggressive restructuring.

4.3. Simulation of Debt Restructuring Scenarios

In this section, we move to suggest three scenarios for restructuring Lebanon's enormous debt. Under each scenario we will calculate a remaining amount of debt after applying a proposed percentage of haircut given the different USD/LBP exchange rates. Then we will divide this amount by the GDP and compare it with the levels of revenues the country has in terms of tax collection. Moreover, we will be able to recommend financing needs and/or an increase in revenue collection. It is also worth mentioning that under all subsequent scenarios, the country has the cooperation of its creditors.

To proceed with the scenarios, we use different assumptions especially on application of haircut percentages on internal and external debts. Makoff (2015) presents a classification structure for debt restructuring that mentions a 15%-30% haircut on the present value of a country's debt under a soft restructuring scenario much like the case of Ukraine in 2000s. A 30%-50% haircut under medium restructuring like what happened in Ecuador in 2000s. A 50%-75% haircut under hard restructuring like the case in Argentina in 2005. This paves the way for the assumptions where we use different haircut percentages under the three scenarios according to Table 11.

% Haircut	Soft Restructuring	Strong Restructuring	Aggressive Restructuring
External Debt	30%	50%	75%
Internal Debt	15%	30%	50%

Table 11: % Haircut assumptions under the three scenarios

Other assumptions include GDP and Nominal GDP levels taken as discussed in section 4.2.2, revenues expected to increase along a linear trend and expenses are in stagnant decrease. Moreover, currently the black-market rate exceeds USD/LBP 20,000. Accordingly, we base our outcomes from the scenarios at USD/LBP 11,657.19 (a very optimistic rate), USD/LBP 20,366.29 (a close to reality rate) and USD/LBP 46,817.29 (a very pessimistic rate).

4.3.1. Assumptions Under Soft Restructuring

The following section will introduce the assumptions estimated under the soft restructuring scenario using the parameters mentioned in table 12. This scenario includes three set of outcomes to understand the effect of applying a percentage of haircut on internal or external debt on debt to GDP levels.

Assumption Summary Scenario 1	Haircut Levels on Internal and External Debt	GDP Growth Rate	Nominal GDP Growth Rate	Revenues	Expenses	Rate 1	Rate 2	Rate 3
Outcome No. 1	*H external = -30% H internal = 0%*	*-6.29% for 2021-2023 and 0% for 2024-2025*	*25% over the next 5 years*	*50% growth yearly for 5 years*	*Stagnant decrease*	*11,657.19*	*20,366.29*	*46,817.29*
Outcome No. 2	*H external = -30% H internal = -15%*					*11,657.19*	*20,366.29*	*46,817.29*
Outcome No. 3	*H external = 0% H internal = -15%*					*11,657.19*	*20,366.29*	*46,817.29*

Table 12: Assumptions under the soft restructuring scenario

4.3.1.1. Haircut Application Assumption

Once we apply the assumptions of haircut levels on internal and external debt under Rate 1 as given in Table 12, we get the following tables 13,14 and 15 over the next 5 years.

Outcome No. 1		Rate 1	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	11,657.19	364,205.26	47,159.41	772%	62,906.56	579%
External Debt H=	Nov-22	11,657.19	377,251.66	44,192.74	854%	78,633.19	480%
-30.00%	Nov-23	11,657.19	390,298.06	41,412.69	942%	98,291.49	397%
Internal Debt H=	Nov-24	11,657.19	403,380.20	41,412.69	974%	122,864.37	328%
0.00%	Nov-25	11,657.19	416,426.60	41,412.69	1006%	153,580.46	271%

Table 13: Scenario 1 outcome No.1 under Rate 1 with 30% haircut on external debt and 0% on internal debt

Outcome No. 2		Rate 1	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	11,657.19	354,505.37	47,159.41	752%	62,906.56	564%
External Debt H=	Nov-22	11,657.19	367,224.26	44,192.74	831%	78,633.19	467%
-30.00%	Nov-23	11,657.19	379,943.15	41,412.69	917%	98,291.49	387%
Internal Debt H=	Nov-24	11,657.19	392,696.88	41,412.69	948%	122,864.37	320%
-15.00%	Nov-25	11,657.19	405,415.77	41,412.69	979%	153,580.46	264%

Table 14: Scenario 1 outcome No.2 under Rate 1 with 30% haircut on external debt and 15% on internal debt

Outcome No. 3		Rate 1	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	11,657.19	482,879.38	47,159.41	1024%	62,906.56	768%
External Debt H=	Nov-22	11,657.19	500,253.84	44,192.74	1132%	78,633.19	636%
0.00%	Nov-23	11,657.19	517,628.29	41,412.69	1250%	98,291.49	527%
Internal Debt H=	Nov-24	11,657.19	535,050.35	41,412.69	1292%	122,864.37	435%
-15.00%	Nov-25	11,657.19	552,424.81	41,412.69	1334%	153,580.46	360%

Table 15: Scenario 1 outcome No.3 under Rate 1 with 0% haircut on external debt and 15% on internal debt

As seen, the application of a 30% haircut on external debt with no haircut on internal debt resulted in Restructured Debt to GDP levels of 772%-1006% and debt to Restructured Nominal GDP of 579%-271% for the next five years. However, a 15% haircut on internal debt only, resulted in 1,024%-1,334% in Restructured Debt to GDP levels and a 768%-360% in Restructured Debt to Nominal GDP levels. When applying both haircut percentages, Restructured Debt to GDP levels over the next five years ranged between 752%-979% and Restructured Debt to Nominal GDP ranged between 564%-264%. Therefore, a haircut on external debt has a higher effect on Restructured Debt to GDP/Debt to Restructured Nominal GDP than a haircut on internal debt, moreover, Restructured Total Debt was highly impacted with the application of both haircuts together than on a standalone basis.

We move forward to applying Rate 2 and the assumptions of haircut levels from Table 12 to get Tables 16,17 and 18 over the next 5 years.

Outcome No. 1		**Rate 2**	**Restructured Total Debt**	**GDP**	**Restructured Debt to GDP**	**Nominal GDP**	**Restructured Debt to Nominal GDP**
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
External Debt H= *-30.00%*	Nov-21	20,366.29	587,991.39	47,159.41	1247%	62,906.56	935%
	Nov-22	20,366.29	609,153.55	44,192.74	1378%	78,633.19	775%
	Nov-23	20,366.29	630,315.70	41,412.69	1522%	98,291.49	641%
Internal Debt H= *0.00%*	Nov-24	20,366.29	651,535.83	41,412.69	1573%	122,864.37	530%
	Nov-25	20,366.29	672,697.98	41,412.69	1624%	153,580.46	438%

Table 16: Scenario 1 outcome No.1 under Rate 2 with 30% haircut on external debt and 0% on internal debt

Outcome No. 2		Rate 2	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	20,366.29	578,291.51	47,159.41	1226%	62,906.56	919%
External Debt H=	Nov-22	20,366.29	599,126.15	44,192.74	1356%	78,633.19	762%
-30.00%	Nov-23	20,366.29	619,960.79	41,412.69	1497%	98,291.49	631%
Internal Debt H=	Nov-24	20,366.29	640,852.51	41,412.69	1547%	122,864.37	522%
-15.00%	Nov-25	20,366.29	661,687.15	41,412.69	1598%	153,580.46	431%

Table 17: Scenario 1 outcome No.2 under Rate 2 with 30% haircut on external debt and 15% on internal debt

Outcome No. 3		Rate 2	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	20,366.29	802,573.86	47,159.41	1702%	62,906.56	1276%
External Debt H=	Nov-22	20,366.29	831,542.25	44,192.74	1882%	78,633.19	1057%
0.00%	Nov-23	20,366.29	860,510.64	41,412.69	2078%	98,291.49	875%
Internal Debt H=	Nov-24	20,366.29	889,558.39	41,412.69	2148%	122,864.37	724%
-15.00%	Nov-25	20,366.29	918,526.78	41,412.69	2218%	153,580.46	598%

Table 18: Scenario 1 outcome No.3 under Rate 2 with 0% haircut on external debt and 15% on internal debt

Under Rate 2, the Restructured Debt to GDP and Restructured Debt to Nominal GDP perceives to be higher than that at Rate 1 due to the change in exchange rate that directly affects the external debt while the rest of the assumptions remained the same. This same phenomenon will be seen as we move to Rate 3 that will give tables 19,20 and 21.

Outcome No. 1		Rate 3	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	46,817.29	1,267,667.48	47,159.41	2688%	62,906.56	2015%
External Debt H=	Nov-22	46,817.29	1,313,478.54	44,192.74	2972%	78,633.19	1670%
-30.00%	Nov-23	46,817.29	1,359,289.60	41,412.69	3282%	98,291.49	1383%
Internal Debt H=	Nov-24	46,817.29	1,405,226.17	41,412.69	3393%	122,864.37	1144%
0.00%	Nov-25	46,817.29	1,451,037.23	41,412.69	3504%	153,580.46	945%

Table 19: Scenario 1 outcome No.1 under Rate 3 with 30% haircut on external debt and 0% on internal debt

Outcome No. 2		Rate 3	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	46,817.29	1,257,967.60	47,159.41	2667%	62,906.56	2000%
External Debt H=	Nov-22	46,817.29	1,303,451.15	44,192.74	2949%	78,633.19	1658%
-30.00%	Nov-23	46,817.29	1,348,934.69	41,412.69	3257%	98,291.49	1372%
Internal Debt H=	Nov-24	46,817.29	1,394,542.85	41,412.69	3367%	122,864.37	1135%
-15.00%	Nov-25	46,817.29	1,440,026.40	41,412.69	3477%	153,580.46	938%

Table 20: Scenario 1 outcome No.2 under Rate 3 with 30% haircut on external debt and 15% on internal debt

Outcome No. 3		Rate 3	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	46,817.29	1,773,539.70	47,159.41	3761%	62,906.56	2819%
External Debt H=	Nov-22	46,817.29	1,837,720.81	44,192.74	4158%	78,633.19	2337%
0.00%	Nov-23	46,817.29	1,901,901.93	41,412.69	4593%	98,291.49	1935%
Internal Debt H=	Nov-24	46,817.29	1,966,258.88	41,412.69	4748%	122,864.37	1600%
-15.00%	Nov-25	46,817.29	2,030,439.99	41,412.69	4903%	153,580.46	1322%

Table 21: Scenario 1 outcome No.3 under Rate 3 with 0% haircut on external debt and 15% on internal debt

Consequently, the application of a haircut on external debt on a standalone basis has biggest effect on Restructured Debt to GDP levels versus the application of a haircut on internal debt only and the combination of both. For this reason, under soft restructuring, we will continue the proceeding sections by only taking Outcome No.1. Additionally, taking the Nominal GDP instead of the preservative GDP will decrease debt to GDP levels for the next five years., whereas it is not the case in the latter.

The next section will add to the above, revenue and expenses assumptions also available in Table 12, to get the financing needs required for Lebanon.

4.3.1.2. Revenues & Expenses Assumptions

As for the second assumption, the country should partly cover its debt using its revenues from tax collection and the remaining uncovered debt from external/internal financing sources. For this reason, data of revenues and expenses are collected from the Ministry of

Finance Lebanon and are compared to the amount of the remaining debt after application of the beforementioned haircut.

To note that expenses far exceed revenues and these estimations do not take into consideration any increase/decrease that should be taken by the Lebanese government. Therefore, it is important in the soft restructuring scenario to take assumptions of an increase in revenues and a stagnant decrease in expenses as mentioned in Table 12. Therefore, revenues are projected to increase by 50% yearly growth rate for the next five years (2021-2025), while expenses are considered to remain constant to limit the growth in government expenses. Revenues are expected to escalate as much since on one hand they must exceed expenses, while on the other hand, reforming tax collection to become fair and efficient is a vital part against the current financial crisis that should create a sustainable and dynamic growth. Needless to say, according to Ghanem (2019), the government imposed 10% tariffs on dumped products that enter the country at a price lower than local production and 2% tax on others. These taxes are currently there to compensate for the harsh devaluation which is expected to further deteriorate. It is also worth mentioning that revenues are considered to be collected in LBP since they are related to taxes (goods and services, income, capital gains, international trade, customs and others), administration fees and income from government properties. On the other hand, expenses are partly in USD and mostly in LBP since part of government expenses are related to interest payments on foreign debt. Consequently, we calculate Net Expenses as the difference between total expenses and interest payment on foreign debt in billion LBP. Thereafter, we assume that Net Expenses remain constant with 0% growth at LBP 16,943 billion as per Dec-20. As for the interest payments, they are

historically (1998-2020) converted to USD at USD/LBP 1,507.5 since this was the rate that the government used to pay for foreign creditors. Then, in 2021 till 2025, these amounts are forecasted using a linear regression and are subject to the 30% haircut used on foreign debt under soft restructuring. We finally get Table 22,

	Revenues	Net Expenses Excluding Interest Payment	Of which Interest Payment: Foreign
	In Billion LBP	*in billion LBP*	*in billion USD*
Dec-21	20,528	16,943	1,334
Dec-22	30,792	16,943	1,305
Dec-23	46,189	16,943	1,277
Dec-24	69,283	16,943	1,248
Dec-25	103,925	16,943	1,220

Table 22: Revenues and Expenses Assumptions under soft restructuring

Finally, we take the above assumptions of revenues and expenses to calculate our financing needs under soft restructuring. Therefore, to get the below Table 23, 24 and 25, we take Net Total Debt under Outcome No.1 discussed in section 4.3.1.1 from tables 13,16 and 19. We take revenues from table 22. While expenses are taken using equation (19).

$$Expenses_{billion\ of\ LBP} = Net\ Expenses\ Excluding\ Interest\ Payment + of\ which\ interest\ payment: Foreign * Rate \quad (19)$$

We calculate financing needs as,

$$Financing\ needs_{2022} = Net\ Total\ Debt_{2022} - Revenues_{2021} + Expenses_{2021} + Financing\ needs_{2021} \quad (20)$$

Finally, the Net Total Debt After Restructuring is calculated as,

$$Net\ Total\ Debt\ After\ Restructuring_{2022} = Restructured\ Debt_{2022} + Financing\ needs_{2022} \quad (21)$$

		Rate 1	Restructured Total Debt	Revenues	Expenses	Financing needs	Net Total Debt After Restructuring
		USD/LBP	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*
External Debt H= *-30.00%* Internal Debt H= *0.00%*	Nov-21	11,657.19	364,205.26	20,528.33	32,493.11		
	Nov-22	11,657.19	377,251.66	30,792.49	32,158.25	389,216.44	766,468.10
	Nov-23	11,657.19	390,298.06	46,188.74	31,824.00	780,880.26	1,171,178.31
	Nov-24	11,657.19	403,380.20	69,283.11	31,492.06	1,169,895.72	1,573,275.92
	Nov-25	11,657.19	416,426.60	103,924.66	31,161.18	1,548,531.27	1,964,957.87

Table 23: Financing needs under Rate 1 soft restructuring assumptions

The same process is done for Rate 2 and Rate 3 which results in Table 24 and 25.

		Rate 2	Restructured Total Debt	Revenues	Expenses	Financing needs	Net Total Debt After Restructuring
		USD/LBP	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*
External Debt H= *-30.00%* Internal Debt H= *0.00%*	Nov-21	20,366.29	587,991.39	20,528.33	44,110.34		
	Nov-22	20,366.29	609,153.55	30,792.49	43,525.31	632,735.56	663,528.05
	Nov-23	20,366.29	630,315.70	46,188.74	42,941.34	1,275,784.07	1,321,972.81
	Nov-24	20,366.29	651,535.83	69,283.11	42,361.41	1,924,072.50	1,993,355.61
	Nov-25	20,366.29	672,697.98	103,924.66	41,783.32	2,569,848.79	2,673,773.45

Table 24: Financing needs under Rate 2 soft restructuring assumptions

		Rate 3	Restructured Total Debt	Revenues	Expenses	Financing needs	Net Total Debt After Restructuring
		USD/LBP	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*
External Debt H= *-30.00%* Internal Debt H= *0.00%*	Nov-21	46,817.29	1,267,667.48	20,528.33	79,393.82		
	Nov-22	46,817.29	1,313,478.54	30,792.49	78,048.97	1,372,344.04	1,450,393.01
	Nov-23	46,817.29	1,359,289.60	46,188.74	76,706.56	2,778,890.12	2,855,596.68
	Nov-24	46,817.29	1,405,226.17	69,283.11	75,373.45	4,214,634.12	4,290,007.57
	Nov-25	46,817.29	1,451,037.23	103,924.66	74,044.56	5,671,761.69	5,745,806.25

Table 25: Financing needs under Rate 3 soft restructuring assumptions

The more we move towards a rate of USD/LBP 46,817.29, the higher our net total debt, the higher the interest payment on that debt and the more the country requires financing needs. After applying the financing needs, the Net Total Debt After Restructuring increases further and further. We move to the following section to summarize the outcome of the above assumptions.

4.3.1.3. Soft Restructuring Overall Assumption Summary

Under the assumptions we used from Table 12, the country's financing needs range at an average of LBP 3,888,523 billion under Rate 1, LBP 6,402,440 billion under Rate 2 and LBP 14,037,629 billion under Rate 3. The application of financing need has increased Debt to GDP levels as presented in Table 26. Additionally, these financing needs cannot be collected from domestic markets or domestic creditors. Simply because of the loss in trust in the government, the fact that domestic creditors have no power in controlling where the funds will go to and the issue that most creditors' money are already in the banking system where they are not able to withdraw any of their funds. Thus, we have converted these needs to billions of USD also available in Table 26.

Date	Rate	Financing needs	Net Total Debt After Restructuring	Net Total Debt After Restructuring to GDP	Net Total Debt After Restructuring to Nominal GDP
		In Billions of USD	*In Billions of LBP*	*In Percentage*	*In Percentage*
Nov-22	11,657.19	33.39	766,468.10	1734.38%	974.74%
Nov-23	11,657.19	66.99	1,171,178.31	2828.07%	1191.54%
Nov-24	11,657.19	100.36	1,573,275.92	3799.02%	1280.50%
Nov-25	11,657.19	132.84	1,964,957.87	4744.82%	1279.43%
Nov-22	20,366.29	31.07	663,528.05	1501.44%	843.83%
Nov-23	20,366.29	62.64	1,321,972.81	3192.19%	1344.95%
Nov-24	20,366.29	94.47	1,993,355.61	4813.39%	1622.40%
Nov-25	20,366.29	126.18	2,673,773.45	6456.41%	1740.96%
Nov-22	46,817.29	29.31	1,450,393.01	3281.97%	1844.50%
Nov-23	46,817.29	59.36	2,855,596.68	6895.46%	2905.23%
Nov-24	46,817.29	90.02	4,290,007.57	10359.16%	3491.66%
Nov-25	46,817.29	121.15	5,745,806.25	13874.51%	3741.24%

Table 26: Financing needs in USD and Net Total Debt After Restructuring under soft restructuring assumptions

Therefore, after applying a 30% haircut on external debt and taking financing needs, the country's debt to GDP would increase to four digits %, thus driving the country to further and further devaluation and hardships. Consequently, we conclude the following. Firstly,

as mentioned in Section 4.3, the average rates of USD/LBP 3,966 and USD/LBP 8,516 are now obsolete. Secondly, a haircut on external debt has a higher effect than that on internal debt. Thirdly, the estimations of GDP, revenues and expenses are not accurate since this requires a clear picture of government reforms and tangible decision making among many other factors. This makes our analysis difficult. Finally, financing needs are extremely high to an extent that even if revenues far exceed expenses, Net Total Debt After Restructuring to Nominal GDP still show an average of more than 1,000% under all rates.

For these reasons, we will continue our study for Scenario 2 and 3 to only applying a haircut on external debt under Rates 1, 2 and 3. Additionally, we will take the same estimations of GDP, Nominal GDP, revenues, and expenses to conclude. Financing needs will no longer be taken into consideration since Lebanon is better off without these needs. As for Net Total Debt After Restructuring, we will be using a different equation assumption. With these conclusions we will move forward to the next sections.

4.3.2. Assumptions Under Strong Restructuring

The following section will present the assumptions under the strong restructuring scenario using the parameters mentioned in Table 27.

Assumption Summary Scenario 1	Haircut Levels on Internal and External Debt	GDP Growth Rate	Nominal GDP Growth Rate	Revenues	Expenses	Rate 1	Rate 2	Rate 3
Outcome No. 1	*H external = -50% H internal = 0%*	*-6.29% for 2021-2023 and 0% for 2024-2025*	*25% over the next 5 years*	*50% yearly growth for 5 years*	*Stagnant decrease*	*11,657.19*	*20,366.29*	*46,817.29*

Table 27: Assumptions under the strong restructuring scenario

These assumptions are similar to what was used in Scenario 1, however, we implemented a higher haircut percentage on external debt, 50%.

4.3.2.1. Haircut Application Assumption

The simulation for the next 5 years is also done using Rates 1, 2 and 3 as per Table 27 to get the following outcomes. As discussed in section 4.3.1.1, application of a haircut only on external debt has the biggest effect on Restructured Total Debt. Also, the increase in the USD/LBP exchange rate will automatically decrease internal debt levels. For these reasons, we will continue looking at Outcome No.1 that shows a 50% haircut only on external debt and base our analysis accordingly.

Outcome No. 1		**Rate 1**	**Restructured Total Debt**	**GDP**	**Restructured Debt to GDP**	**Nominal GDP**	**Restructured Debt to Nominal GDP**
Strong Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	11,657.19	278,622.59	47,159.41	591%	62,906.56	443%
External Debt H=	Nov-22	11,657.19	288,565.28	44,192.74	653%	78,633.19	367%
-50.00%	Nov-23	11,657.19	298,507.96	41,412.69	721%	98,291.49	304%
Internal Debt H=	Nov-24	11,657.19	308,477.89	41,412.69	745%	122,864.37	251%
0.00%	Nov-25	11,657.19	318,420.57	41,412.69	769%	153,580.46	207%

Table 28: Scenario 2 outcome No.1 under Rate 1 with 50% haircut on external debt and 0% on internal debt

As seen, the application of a 50% haircut on external debt with no haircut on internal debt under Rate 1 resulted in Restructured Debt to GDP levels of 591%-769% and Restructured Debt to Nominal GDP of 443%-207% for the next five years. Whereby, Restructured Total Debt increases from LBP 278,623 to 318,421 billion. We move forward and apply the same assumptions under Rate 2 and Rate 3 to get Outcome No.1.

Outcome No. 1		Rate 2	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	20,366.29	438,469.83	47,159.41	930%	62,906.56	697%
External Debt H=	Nov-22	20,366.29	454,209.48	44,192.74	1028%	78,633.19	578%
-50.00%	Nov-23	20,366.29	469,949.13	41,412.69	1135%	98,291.49	478%
Internal Debt H=	Nov-24	20,366.29	485,731.91	41,412.69	1173%	122,864.37	395%
0.00%	Nov-25	20,366.29	501,471.56	41,412.69	1211%	153,580.46	327%

Table 29: Scenario 2 outcome No.1 under Rate 2 with 50% haircut on external debt and 0% on internal debt

Under Rate 2, the Restructured Debt to GDP and Restructured Debt to Nominal GDP perceives to be higher than that at Rate 1 due to the change in exchange rate that directly affects the external debt while the rest of the assumptions remained the same. This same phenomenon will be seen as we move to Rate 3 that will give Table 30.

Outcome No. 1		Rate 3	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Soft Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	46,817.29	923,952.75	47,159.41	1959%	62,906.56	1469%
External Debt H=	Nov-22	46,817.29	957,298.76	44,192.74	2166%	78,633.19	1217%
-50.00%	Nov-23	46,817.29	990,644.78	41,412.69	2392%	98,291.49	1008%
Internal Debt H=	Nov-24	46,817.29	1,024,082.15	41,412.69	2473%	122,864.37	834%
0.00%	Nov-25	46,817.29	1,057,428.17	41,412.69	2553%	153,580.46	689%

Table 30: Scenario 2 outcome No.1 under Rate 3 with 50% haircut on external debt and 0% on internal debt

To take a step further, we will add the revenue and expenses assumptions to get Net Total Debt After Restructuring.

4.3.2.2. Revenues & Expenses Assumptions

In this section, we also take the assumptions of revenue and expenses as used in Scenario 1 through applying a linear forecast on revenue and a 50% haircut on expenses of which interest payment to foreign debt.

	Revenues	Net Expenses Excluding Interest Payment	Of which Interest Payment: Foreign
	In Billion LBP	*In Billion LBP*	*In Billion LBP*
Dec-21	20,528	16,943	953
Dec-22	30,792	16,943	901
Dec-23	46,189	16,943	851
Dec-24	69,283	16,943	804
Dec-25	103,925	16,943	759

Table 31: Revenues and Expenses Assumptions under strong restructuring

Finally, we take the above assumptions of revenues and expenses to calculate our debt after strong restructuring. Therefore, we take Restructured Total Debt under Outcome No.1 in Tables 28,29, 30, Revenues from Table 31 and calculate Expenses using equation (19) where "Net expenses excluding interest payment" and "of which interest payment: foreign" are from Table 31. Additionally, we calculate Net Total Debt After Restructuring using equation (20) as,

$$Net\ Total\ Debt\ After\ Restructuring_{2022} = Restructured\ Total\ Debt_{2022} - Revenues_{2021} + Expenses_{2021} \quad (22)$$

This process is worked out under Rates 1, 2 and 3.

		Rate 1	Restructured Total Debt	Revenues	Expenses	Net Total Debt After Restructuring
		USD/LBP	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*
	Nov-21	11,657.19	278,622.59	20,528.33	28,050.33	
External Debt H=	Nov-22	11,657.19	288,565.28	30,792.49	27,440.91	296,087.27
-50.00%	Nov-23	11,657.19	298,507.96	46,188.74	26,861.84	295,156.38
Internal Debt H=	Nov-24	11,657.19	308,477.89	69,283.11	26,311.70	289,150.99
0.00%	Nov-25	11,657.19	318,420.57	103,924.66	25,787.59	275,449.17

Table 32: Net Total Debt after Restructuring under Rate 1 strong restructuring assumptions

		Rate 2	Restructured Total Debt	Revenues	Expenses	Net Total Debt After Restructuring
		USD/LBP	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*
External Debt H= *-50.00%* Internal Debt H= *0.00%*	Nov-21	20,366.29	438,469.83	20,528.33	36,348.35	
	Nov-22	20,366.29	454,209.48	30,792.49	35,283.64	470,029.50
	Nov-23	20,366.29	469,949.13	46,188.74	34,271.95	474,440.28
	Nov-24	20,366.29	485,731.91	69,283.11	33,310.80	473,815.12
	Nov-25	20,366.29	501,471.56	103,924.66	32,395.12	465,499.25

Table 33: Net Total Debt after Restructuring under Rate 2 strong restructuring assumptions

		Rate 3	Restructured Total Debt	Revenues	Expenses	Net Total Debt After Restructuring
		USD/LBP	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*
External Debt H= *-50.00%* Internal Debt H= *0.00%*	Nov-21	46,817.29	923,952.75	20,528.33	61,550.83	
	Nov-22	46,817.29	957,298.76	30,792.49	59,103.33	998,321.27
	Nov-23	46,817.29	990,644.78	46,188.74	56,777.68	1,018,955.62
	Nov-24	46,817.29	1,024,082.15	69,283.11	54,568.22	1,034,671.09
	Nov-25	46,817.29	1,057,428.17	103,924.66	52,463.30	1,042,713.28

Table 34: Net Total Debt after Restructuring under Rate 3 strong restructuring assumptions

The more we approach a rate of USD/LBP 46,817.29, the higher our Restructured Total Debt and the higher the interest payment on that debt. Under Rates 1 and 2, the Net Total Debt After Restructuring seems to be decreasing as we move from 2022 to 2025, while under Rate 3 this value increases. This is due to the high USD/LBP exchange rate which decreases the gap between revenues and expenses decreases as we move from Rate 1 to Rate 3. We move to the following section to summarize the outcome of the above assumptions.

4.3.2.3. Strong Restructuring Overall Assumption Summary

Under the assumptions we used from Table 27, the Debt to GDP levels will become as presented in Table 35.

Date	Rate	Net Total Debt After Restructuring	Net Total Debt After Restructuring to GDP	Net Total Debt After Restructuring to Nominal GDP
		In Billions of LBP	*In Percentage*	*In Percentage*
Nov-22	11,657.19	296,087.27	669.99%	376.54%
Nov-23	11,657.19	295,156.38	712.72%	300.29%
Nov-24	11,657.19	289,150.99	698.22%	235.34%
Nov-25	11,657.19	275,449.17	665.13%	179.35%
Nov-22	20,366.29	470,029.50	1063.59%	597.75%
Nov-23	20,366.29	474,440.28	1145.64%	482.69%
Nov-24	20,366.29	473,815.12	1144.13%	385.64%
Nov-25	20,366.29	465,499.25	1124.05%	303.10%
Nov-22	46,817.29	998,321.27	2259.02%	1269.59%
Nov-23	46,817.29	1,018,955.62	2460.49%	1036.67%
Nov-24	46,817.29	1,034,671.09	2498.44%	842.12%
Nov-25	46,817.29	1,042,713.28	2517.86%	678.94%

Table 35: Net Total Debt After Restructuring to GDP under strong restructuring assumptions

Therefore, after a 50% haircut on external debt, Net Total Debt After Restructuring averages for the next five years at LBP 288,960 billion under Rate 1 and LBP 470,946 under Rate 2 While its ratio to GDP averages 687% and 1,119% under Rates 1 and 2 respectively. As we move towards a more optimistic GDP (Nominal GDP), these percentages seem to decrease to averages of 273% and 442%. At the pessimistic rate of USD/LBP 46,817, which is the rate that we seem to be heading towards, the country's Debt after Restructuring to GDP exceeds 2,000% and less than 1,000% when compared to Nominal GDP.

After which, we move towards the last scenario to conclude our study.

4.3.3. Assumptions Under Aggressive Restructuring

This section presents the assumptions of the last restructuring scenario, the aggressive scenario, by using the parameters mentioned in Table 36.

Assumption Summary Scenario 1	Haircut Levels on Internal and External Debt	GDP Growth Rate	Nominal GDP Growth Rate	Revenues	Expenses	Rate 1	Rate 2	Rate 3
Outcome No. 1	*H external = -75% H internal = 0%*	*-6.29% for 2021-2023 and 0% for 2024-2025*	*25% over the next 5 years*	*50% yearly growth for 5 years*	*Stagnant decrease*	*11,657.19*	*20,366.29*	*46,817.29*

Table 36: Assumptions under the aggressive restructuring scenario

These assumptions are similar to what was used in Scenario 1 and 2, however, with an increase in the haircut percentage on external debt to 75%.

4.3.3.1. Haircut Application Assumption

The simulation for the next 5 years is also done under Rates 1, 2 and 3 as per Table 36 to get the following outcomes. As discussed in section 4.3.1.1, application of a haircut only on external debt has the biggest effect on Net Total Debt. Also, the increase in the USD/LBP exchange rate will automatically decrease internal debt levels. For these reasons, we will continue looking at Outcome No.1 that shows a 75% haircut only on external debt and also base our analysis accordingly.

Outcome No. 1		Rate 1	Restructured Total Debt	GDP	Restructured Debt to GDP	Nominal GDP	Restructured Debt to Nominal GDP
Aggressive Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
External Debt H= *-75.00%* Internal Debt H= *0.00%*	Nov-21	11,657.19	171,644.25	47,159.41	364%	62,906.56	273%
	Nov-22	11,657.19	177,707.30	44,192.74	402%	78,633.19	226%
	Nov-23	11,657.19	183,770.34	41,412.69	444%	98,291.49	187%
	Nov-24	11,657.19	189,850.00	41,412.69	458%	122,864.37	155%
	Nov-25	11,657.19	195,913.04	41,412.69	473%	153,580.46	128%

Table 37: Scenario 3 outcome No.1 under Rate 1 with 75% haircut on external debt and 0% on internal debt

As seen, the application of a 75% haircut on external debt with no haircut on internal debt under Rate 1 resulted in Restructured Debt to GDP levels of 364%-473% and Restructured Debt to nominal GDP of 273%-128% for the next five years. Whereby,

Restructured Total Debt increases from LBP 171,644 to 195,913 billion. We move forward and apply the same assumptions under Rate 2 and Rate 3 to get Outcome No.1.

Outcome No. 1		**Rate 2**	**Restructured Total Debt**	**GDP**	**Restructured Debt to GDP**	**Nominal GDP**	**Restructured Debt to Nominal GDP**
Aggressive Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	20,366.29	251,567.87	47,159.41	533%	62,906.56	400%
External Debt H=	Nov-22	20,366.29	260,529.40	44,192.74	590%	78,633.19	331%
-75.00%	Nov-23	20,366.29	269,490.93	41,412.69	651%	98,291.49	274%
Internal Debt H=	Nov-24	20,366.29	278,477.01	41,412.69	672%	122,864.37	227%
0.00%	Nov-25	20,366.29	287,438.54	41,412.69	694%	153,580.46	187%

Table 38: Scenario 3 outcome No.1 under Rate 2 with 75% haircut on external debt and 0% on internal debt

Under Rate 2, the Restructured Debt to GDP and Restructured Debt to Nominal GDP perceives to be higher than that at Rate 1 due to the change in exchange rate that directly affects the external debt while the rest of the assumptions remained the same. This same phenomenon will be seen as we move to Rate 3 that will give Table 39.

Outcome No. 1		**Rate 3**	**Restructured Total Debt**	**GDP**	**Restructured Debt to GDP**	**Nominal GDP**	**Restructured Debt to Nominal GDP**
Aggressive Restructuring		*USD/LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Percentage*	*In Billions of LBP*	*In Percentage*
	Nov-21	46,817.29	494,309.33	47,159.41	1048%	62,906.56	786%
External Debt H=	Nov-22	46,817.29	512,074.04	44,192.74	1159%	78,633.19	651%
-75.00%	Nov-23	46,817.29	529,838.75	41,412.69	1279%	98,291.49	539%
Internal Debt H=	Nov-24	46,817.29	547,652.13	41,412.69	1322%	122,864.37	446%
0.00%	Nov-25	46,817.29	565,416.84	41,412.69	1365%	153,580.46	368%

Table 39: Scenario 3 outcome No.1 under Rate 3 with 75% haircut on external debt and 0% on internal debt

Thereafter, we move and add the revenue and expenses assumptions to get Net Total Debt After Restructuring.

4.3.3.2. Revenues & Expenses Assumptions

In this section, we also take the assumptions of revenue and expenses as used in Scenarios 1 and 2 through applying a linear forecast on revenue with a 75% haircut on expenses of which interest payment to foreign debt.

	Revenues	Net Expenses Excluding Interest Payment	Of which Interest Payment: Foreign
	In Billion LBP	*In Billion LBP*	*In Billion LBP*
Dec-21	20,528.33	16,943	476
Dec-22	30,792.49	16,943	430
Dec-23	46,188.74	16,943	389
Dec-24	69,283.11	16,943	351
Dec-25	103,924.66	16,943	316

Table 40: Revenues and Expenses Assumptions under aggressive restructuring

Finally, we take the above assumptions and calculate our get Net Total Debt After Restructuring under Scenario 3. Therefore, we take Restructured Total Debt under Outcome No.1 in Tables 37,38,39, Revenues from Table 40 and calculate Expenses using equation (19) where "Net expenses excluding interest payment" and "of which interest payment: foreign" are from Table 38. Additionally, we calculate Net Total Debt After Restructuring using equation (22). This process is worked out under Rates 1,2 and 3.

		Rate 1	Restructured Total Debt	Revenues	Expenses	Net Total Debt After Restructuring
		USD/LBP	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*
External Debt H= *-75.00%* Internal Debt H= *0.00%*	Nov-21	11,657.19	171,644.25	20,528.33	22,496.84	
	Nov-22	11,657.19	177,707.30	30,792.49	21,960.75	179,675.81
	Nov-23	11,657.19	183,770.34	46,188.74	21,475.17	174,938.60
	Nov-24	11,657.19	189,850.00	69,283.11	21,034.23	165,136.43
	Nov-25	11,657.19	195,913.04	103,924.66	20,632.38	147,664.17

Table 41 : Net Total Debt after Restructuring under Rate 1 aggressive restructuring assumptions

		Rate 2	Restructured Total Debt	Revenues	Expenses	Net Total Debt After Restructuring
		USD/LBP	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*
External Debt H= *-75.00%* Internal Debt H= *0.00%*	Nov-21	20,366.29	251,567.87	20,528.33	26,645.85	
	Nov-22	20,366.29	260,529.40	30,792.49	25,709.24	266,646.93
	Nov-23	20,366.29	269,490.93	46,188.74	24,860.88	264,407.67
	Nov-24	20,366.29	278,477.01	69,283.11	24,090.53	257,149.15
	Nov-25	20,366.29	287,438.54	103,924.66	23,388.44	242,245.95

Table 42: Net Total Debt after Restructuring under Rate 2 aggressive restructuring assumptions

		Rate 3	Restructured Total Debt	Revenues	Expenses	Net Total Debt After Restructuring
		USD/LBP	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*	*In Billions of LBP*
External Debt H= *-75.00%* Internal Debt H= *0.00%*	Nov-21	46,817.29	494,309.33	20,528.33	39,247.10	
	Nov-22	46,817.29	512,074.04	30,792.49	37,094.04	530,792.81
	Nov-23	46,817.29	529,838.75	46,188.74	35,143.87	536,140.30
	Nov-24	46,817.29	547,652.13	69,283.11	33,373.00	536,607.27
	Nov-25	46,817.29	565,416.84	103,924.66	31,759.07	529,506.73

Table 43: Net Total Debt after Restructuring under Rate 3 aggressive restructuring assumptions

The more we move towards a rate of USD/LBP 46,817.29, the higher our Restructured total debt and the higher the interest payment on that debt. Under the Rates 1, 2 and 3, Net Total Debt After Restructuring is decreasing for the next five years. Thus, the increase in revenues has partially compensated the increase in debt after applying a 75% haircut on external debt. We move to the following section to summarize the outcome of the above assumptions.

4.3.3.3. Strong Restructuring Overall Assumption Summary

Under the assumptions we used from Table 36, the country's Debt to GDP levels will become as presented in Table 44.

Date	Rate	Net Total Debt After Restructuring	Net Total Debt After Restructuring to GDP	Net Total Debt After Restructuring to Nominal GDP
		In Billions of LBP	*In Percentage*	*In Percentage*
Nov-22	11,657.19	179,675.81	406.57%	228.50%
Nov-23	11,657.19	174,938.60	422.43%	177.98%
Nov-24	11,657.19	165,136.43	398.76%	134.41%
Nov-25	11,657.19	147,664.17	356.57%	96.15%
Nov-22	20,366.29	266,646.93	603.37%	339.10%
Nov-23	20,366.29	264,407.67	638.47%	269.00%
Nov-24	20,366.29	257,149.15	620.94%	209.30%
Nov-25	20,366.29	242,245.95	584.96%	157.73%

Nov-22	46,817.29	530,792.81	1201.09%	675.02%
Nov-23	46,817.29	536,140.30	1294.63%	545.46%
Nov-24	46,817.29	536,607.27	1295.76%	436.75%
Nov-25	46,817.29	529,506.73	1278.61%	344.77%

Table 44: Net Total Debt After Restructuring to GDP under aggressive restructuring assumptions

Therefore, after a 75% haircut on external debt, Net Total Debt After Restructuring to GDP and to Nominal GDP will decrease moderately for the next 5 years.

The following section will conclude the three Scenarios used for the case of Lebanon.

4.4. Conclusion for Restructuring Scenarios

For a while now, the public has been talking about two important factors. One, the need for external financing is a must to exit this financial crisis. Two, the country's current debt is no longer there, due to the harsh devaluation. However, after conducting studies in the previous sections, it shows that these two factors are wrong. The country is not in need of external financing since this financing will drive the country to worse positions. Additionally, the harsh devaluation has pushed Debt to GDP to extremely high levels.

To conclude on the soft, strong, and aggressive restructuring, we will look at the scenario summary for the year 2022 and compare in Table 45.

Scenario Summary Year 2022				
Rates	***Scenario***	***Net Total Debt After Restructuring***	***Net Total Debt After Restructuring to GDP***	***Net Total Debt After Restructuring to Nominal GDP***
11,657.19	**Soft**	766,468	1734%	975%
11,657.19	**Strong**	296,087	670%	377%
11,657.19	**Aggressive**	179,676	407%	228%
20,366.29	**Soft**	663,528	1501%	844%
20,366.29	**Strong**	470,029	1064%	598%
20,366.29	**Aggressive**	266,647	603%	339%
46,817.29	**Soft**	1,450,393	3282%	1845%
46,817.29	**Strong**	998,321	2259%	1270%
46,817.29	**Aggressive**	530,793	1201%	675%

Table 45: Summary of the three scenarios for the year 2022

Under Rate 1, a highly optimistic rate, we see a 61% decrease in Net Total Debt After Restructuring between Scenario 2 (Sc2) and Scenario1 (Sc1) with a 1,000 percentage points (pp) and 61pp decrease in its ratio to GDP and Nominal GDP respectively. As we move from Sc1 to Sc3, these percentages become 77%, 1,328pp and 77pp respectively. Under Rate 2, a rate close to today's, Net Total Debt After Restructuring decreases by 29% between Sc2 and Sc1 and 60% between Sc3 and Sc1. Whereas, Net Total Debt After Restructuring to GDP decreases by 438pp and Net Total Debt After Restructuring to Nominal GDP decreases by 29pp. Under Rate 3, the rate we are heading towards, an aggressive restructuring shows the lowest Net Total Debt After Restructuring of LBP 530,793 billion and its ratio to Nominal GDP of 675%. The application of the haircuts in the above scenario is for an important purpose. Most of the studies on debt restructuring and haircuts rely on debt sustainability. As in, debt restructuring should reduce debt to GDP ratio to a sustainable level. Edwards (2015) gathered data on 180 restructurings between 1978 and 2010 to understand the phenomenon of debt sustainability and the appropriateness of a haircut percentage after debt restructuring. The author suggested averages for acceptable haircuts summarized in Table 46.

	Mean	Median	Standard deviation
All episodes	37.00%	32.10%	27.30%
Bank loans	37.10%	37.60%	21.60%
Bond exchanges	36.90%	31.70%	27.90%
Africa	46.50%	39.50%	29.40%
Asia	32.60%	34.00%	17.90%
Europe	30.00%	19.70%	26.40%

Table 46: Summary statistics for haircuts, 1978–2010
Source: Edwards (2015)

It is evident that all episodes required an average of 37% haircut during debt restructuring which, according to the author, is an acceptable level for countries to use. However, for the case of Lebanon, the haircuts applied with slight increase in other estimates under the

three scenarios will not be sufficient to exit this crisis. Rather the country must increase its revenues and GDP drastically to be able to cover the restructured debt. This requires a huge amount of clear and rigid reforms and policies which will be discussed in Chapter 5.

Chapter 5: Conclusion

5.1. Summary & Main Findings of the Thesis

Several aspects have been discussed in this thesis to reach the ultimate goal of restructuring the debt in Lebanon. The findings exceptionally contribute to existing literature by suggesting ways to restructure the exacerbated debt and paving importance for future research. Elevated debt and economic downturns are not unique to Lebanon. Several other countries have witnessed similar turmoil of bank panic, hyperinflation, devaluation, and the rapid rise of debt. As such, this thesis builds on how some of those countries were able to achieve some kind of debt relief. Starting with Venezuela, the country required a face value haircut, restructuring of debt instruments and large financial assistance. Greece required large bailouts from international organizations and emphasis on its competitiveness to outgrow its problems since the measures might send the economy into despair. On the other hand, Argentina proved that defaulting was not a disaster; instead, it helped the country move into a flexible exchange rate system and freed up its resources.

As for Lebanon, this thesis gives a unique contribution to existing literature and suggests possible findings on means to restructure the country's debt that may be important for future policies and subsequent research. In this regard, we pioneered a study to suggest

the best restructuring scenario while considering the soft, strong, and aggressive ones. To reach this end, the thesis elucidates the importance of putting in motion plans of calculating the correct amount of outstanding debt, mostly in local currency and partly in foreign currency at a predetermined exchange rate. However, the existence of several exchange rates, the lack of data and the absence of transparency made it challenging to come up with accurate and objective results. Since the official, pegged rate of 1,507.5 USD/LBP has become obsolete due to the deteriorated fundamental economic and financial situation, we tailored a model to predict the closest estimates of the exchange rate. Thus, the added value of this thesis resides in devising and implementing a comprehensive model considered to be the first one to be suggested after the economic downfall. We customized a regression analysis that incorporates the difference in Gross Domestic Product (GDP), Real Interest Rates (IR) and National Income (NI) between the United States and Lebanon as the explanatory variables and the exchange rate as the dependent variable. The GDP and NI are statistically significant unlike the IR. We opted to choose the cutoff date of August 20, 2021, since we were unable to constantly follow the exchange rate fluctuations that started at USD/LBP 8,450 beginning of January 2021, reached USD/LBP 32,000 in December 2021 then decreased to USD/LBP 21,000 by end of February 2022. Thus, in our equation, the constant k was allotted 6 estimates: E1: k_1= 3,900 which represents the withdrawal rate of the current USD deposits in local banks, E2: k_2= 8,450 which is the opening 2021 LBP rate, E3: k_3= 9,958.43 which is the average YTD March (first quarter) LBP rate, E4: k_4= 11,590.9 which is the average YTD June (second quarter) LBP rate, E5: k_5= 20,300 which is the August LBP rate, E6: k_6= 46,751 which is the estimate used by Saliba et al. (2020) if the money velocity reaches its peak

levels during 1987. These exchange rates were chosen as a representative sample of the black-market rates at the time of writing the thesis and which covers the period of exchange rate fluctuations between 2021 and August 2021. Due to the constant changes of the rate, we were unable to continuously update our outcomes and had to choose a cutoff date which is August 20, 2021. Consequently, all our analysis was performed based on these rates and therefore any change would require a simple adjustment in the estimation outcome, not in the structure of the analysis. Using the six estimates alongside the different assumptions of X_{GDP} and X_{IN}, we generated USD/LBP exchange rates ranging between USD/LBP 4,000 and USD/LBP 47,000. Taking these rates with the assumptions of haircut % under soft restructuring (Scenario 1) of 30% on external debt and 15% on internal debt, under strong restructuring (Scenario 2) of 50% on external debt and 30% on internal debt and under aggressive restructuring (Scenario 3) of 75% on external debt and 50% on internal debt led us to get several quotations for the existing and five-year forecast amount of GDP and debt in both foreign and local currency. Currently the black-market rate exceeds USD/LBP 20,000 therefore, we base our outcomes from the scenarios corresponding to USD/LBP 11,657.19 (a very optimistic rate), USD/LBP 20,366.29 (a close to reality rate) and USD/LBP 46,817.29 (a very pessimistic rate). Additionally, the application of a haircut on external debt on a standalone basis has biggest effect on the Restructured Debt to GDP levels versus the application of a haircut on internal debt only and the combination of both. For this reason, under all scenarios we proceeded with a haircut implemented only on external debt.

As a further step to the above, we added revenues that are projected to increase by 50% yearly for the next five years (2021-2025), while expenses are designed to remain constant to limit the growth in government's expenses. The purpose is to recommend external financing needs calculated after deducting the country's revenues, adding its expenses and previous year financing needs to current net total debt. Accordingly, after applying the before mentioned to Scenario 1, the country's debt to GDP increased to four digits %, thus driving the country to further devaluation and hardships. The average rates of USD/LBP 3,966 and USD/LBP 8,516 are currently obsolete. Given the fact that a haircut on external debt has a higher effect than on internal debt, we proceeded with Scenario 2 and 3 which only apply haircut on external debt. We are conscious that the estimations of GDP, revenues and expenses are subjective and may not be totally accurate since this requires awareness of the government reforms and tangible decision-making processes among many other factors. The financing needs are extremely high to an extent that even if revenues exceed expenses, Net Total Debt After Restructuring to Nominal GDP still shows an average of more than 1,000% under all rates. Therefore, few opted to disregard the financing needs since Lebanon is better off without these needs.
To choose the most suitable restructuring scenario, we based our analysis on the debt to GDP ratio since the haircut application aims to lower Lebanon's hardship. GDP values are taken either at a pessimistic or optimistic scenarios. The pessimistic value assumes a decrease of 6.29% for the next 3 years (2021-2023) due to the stagflation of the economy and then remains the same for the last two years (2024-2025). The assumption of -6.29% rate is calculated as the average of GDP growth rate for Lebanon for the last five years (2016-2020), when the economy was in recession. The optimistic value, Nominal GDP,

assumes a growth especially since effectively Lebanon is witnessing high levels of inflation which decreases the number/quantity of goods and services that we can buy however, increases the prices of goods and services drastically. Inflation causes nominal GDP to rise even with a decrease in the production levels. Therefore, the decision is taken based on the restructured Debt to the Nominal GDP. As such, at USD/LBP 11,657.19 excluding financing needs, in Scenario 1, the ratio is 480% as of Nov-22 and will reach 271% by Nov-25 (dropping by 17% year on year). In Scenario 2, the ratio is 377% as of Nov-22 and will reach 179% by Nov-25. In Scenario 3, the ratio is 229% as of Nov-22 and will reach 96% by Nov-25. At USD/LBP 20,366.29 excluding financing needs, in Scenario 1, the ratio is 775% as of Nov-22 and will reach 438% by Nov-25. In Scenario 2, the ratio is 598% as of Nov-22 and will reach 303% by Nov-25. In Scenario 3, the ratio is 339% as of Nov-22 and will reach 158% by Nov-25. USD/LBP 46,817.29 excluding financing needs, in Scenario 1, the ratio is 1670% as of Nov-22 and will reach 945% by Nov-25. In Scenario 2, the ratio is 1,269% as of Nov-22 and will reach 679% by Nov-25. In Scenario 3, the ratio is 675% as of Nov-22 and will reach 345% by Nov-25.

In a nutshell, if the rate drops to levels close to USD/LBP 11,657.19, Scenario 2 with a 50% haircut on external debt is recommended. If the rate remains at levels close to USD/LBP 20,366.29, we recommend Scenario 3. Finally, if the rate reaches the pessimistic rate of USD/LBP 46,817.29, we recommend Scenario 3 and an increase in GDP growth rate higher than 25% yearly since the country will witness even higher inflation rates. **Therefore, the haircuts applied with slight increase in other estimates under the three scenarios will not be sufficient to exit this crisis**. Rather the country must increase its revenues and GDP drastically to be able to cover the restructured debt.

It should rely on haircut of external debt, reformation of tax collection mechanisms, sharp increase in revenues and drastic decrease in government spending. This requires a huge amount of clear and rigid reforms and policies.

5.2. Limitations of the Research

The thesis has several limitations given that very few researchers tackle the case of Lebanon and consider all facets the country encounters. Over the last two years, this country has faced a lot of difficulties. These difficulties range between a rise in public protests, an outbreak of Covid 19, a rapid increase in consumer prices, a blast in Port of Beirut and a plague in political corruption. Currently, more than 60% of the population is living in poverty and people are still trying to recover from the tragedy of the explosion. Not to mention that political corruption has been a major contributor to the lack of reform initiatives.

Another limitation is the fact, as mentioned by Allen (2002) that debt restructuring has a huge impact on the domestic economy especially through the disruptions of the financial system which imposes negative effects on the banking sector. From one side, the assets of the banks are directly affected since they contain amounts of restructured assets, non-performing loans, and lack of liquid assets affected by the interbank market. From another side, banks witness deposit withdrawals and interbank credit lines disruption. Not to mention the deposit freeze, the interest rate hikes and the unhedged on/off balance sheet exposures to exchange rate risk which highly affect a bank's income position. Also, the pressure from depositors' flight to quality where depositors shift their savings to foreign owned and healthier banks. All these factors coerce the banking system into a

collapse and cause overall financial instability making it harder for the country to adjust once restructuring is adapted. For these reasons, no haircut is imposed on internal debt.

The severe deterioration in exchange rate levels which hurts recovery measures and jeopardizes creditor negotiations is yet another limitation. From one side, if the exchange rate keeps on deteriorating, this paper's outcomes regarding debt to GDP levels and financing needs will be altered. Also, the severe devaluation affects the creditors' decision in debt restructuring especially that stability and confidence are crucial requirements in the case of negotiations. It will also exacerbate the social tension which in turn impairs any chance of improvement. This devaluation made it very difficult for us to derive estimates of the rate that will help us to correctly calculate our country's debt levels especially since the rate is fluctuating faster than our study. Not to mention, the absence of accurate data on GDP, internal/external debt, interest rates and national income among others.

Other limitations include the network of patronage where the political elites have long exploited the country's resources at their own convenience. Not to mention the fractured politics that is vulnerable to any foreign interference making the country very sensitive to any shock that might disrupt any form of recovery.

Finally, it is crucial to mention that sovereign debt defaults are very complex and require complicated decisions which include economic, political, and legal roots that are beyond the scope of this thesis.

5.3. Recommendations and Future Implications

Lebanon's debt restructuring will play a vital role in the economic recovery of the country. The debt restructuring is one of the most complex processes in history given the levels of corruption, the hyperinflation, the devaluation of the Lebanese pound, the non-productive aspect of the Lebanese economy, etc. Therefore, the literature and findings emphasize the need for a credible, decisive, and urgent change to the policy regime through institutional and legal reforms in order to safeguard domestic expectations. This requires appointing a committee in charge of auditing BDL financial statements which will provide transparency on correct amount of domestic and external obligations. Consequently, the government should assign a legal and financial advisor responsible for negotiating with external and internal creditors to secure a credible restructuring scenario that correctly suggests investor's expectation of recovery rates.

According to Buckley (2009), when it becomes necessary, the country should declare bankruptcy, just as it becomes necessary for any individual. However, the bankruptcy should be fair, open, and acknowledged where the measures are the least dishonorable to the debtor and least harmful to the creditor. Also, the essence of a national bankruptcy law is needed to ensure that debtors have adequate shelter and food while creditors safeguard the maximum return. Conversely, Heskett (2011) confirms that filing for such bankruptcies would only put the country in a far worse situation, largely because of the enormous social costs that comes with it. Aids from one country to another, the selling of national assets, and the delay of commitments to give a leeway for a resolution are all possible remedies that can be used to avoid any despair. Consequently, and for the case of Lebanon, the decision to file for bankruptcy is a controversial topic that should be

thoroughly studied before making such decision. Like Moatti & Muci (2019) recommendations for the case of Venezuela, to we suggest draft a new law to adopt the restructuring framework after filing for Chapter 15 bankruptcy to protect from assets seizures. This decision might give a positive impact for the short term when it comes to government debt and external payments. However, in the long term, the country may face severe consequences related to ceasing the potential of external financing and diminishing the population and government's asset valuation.

Additionally, the modeled framework along with the analysis of the existing literature allowed us to conclude that Lebanon, like other countries experiencing hyperinflation, will need the help of international financial support and substantial debt relief measures including face value haircuts. This will be facilitated through the IMF which will construct a macroeconomic framework for a recovery plan as per the fund's internal objectives while choosing a debt burden matrix to understand the country's ability for debt sustainability. Furthermore, the committee, mentioned previously, can also leverage the existence of oil in the Mediterranean Ocean to secure this international support. A further study can estimate and analyze revenues from this leverage that might lower/deplete the need of external financing since the latter is no longer a solution for the country as concluded from our study.

On top of the latter, the key is to find an exchange rate unification to cease the existence of official, banking, subsidized and black-market rates while imposing tight fiscal and monetary policies. Relying on a floating rate needs healthy and productive sectors which the country does not have and cannot rely on. Therefore, we propose fixing a new revaluated rate calculated through a model similar to the model proposed in this thesis.

Other recommendations might be the introduction of taxes on extreme wealth whereby only a small percentage of the population may cover all existing debt levels. Taxes can also be used to support social spending on education and health. Bifani et al. (2021) believe that a massive surge in VAT rates is not favored. This is due to the tax policies in Lebanon, where taxes tend to fall on the poor and middle class. For this reason, we propose reforms to shift this tax burden towards the rich by revamping the tax revenue structure to become fair. It starts with disciplining the customs administration in revenue collection and urgently changing the currency rate of tax and custom collection from the official rate of USD/LBP 1507.5 to an adjusted exchange rate. Reforms also involve imposing taxes on capital held by Lebanese residents living abroad. Although, it is quite hard to collect information on the size of the residents abroad yet, the tax reform package should improve information collection and prove citizens the willingness for progression. It is also worth mentioning that tax reforms include taxing all types of revenues which include wages, salaries, dividends, capital gain, commercial, property, land, interests, and professional revenues. A minimum of 30%-40% marginal tax rate on these revenues and a 20%-25% on corporate taxes must be implemented.

In conclusion, Lebanon is a small country that can easily put in place reform schemes aiming at promoting the primary and secondary vital and productive sectors. Any delays in finding building blocks of reforms and legislative decisions to curb the rent seeking economy, will only magnify this country's burdens. The catastrophic events we see today are only the tip of the iceberg.

References

Agnes. (2019, July 8). Calculating REER - Real Effective Exchange Rates for assessing trade competitiveness and relative value. *Finance Training Course*.

Allen, M. (2002). Sovereign Debt Restructurings and the Domestic Economy Experience in Four Recent Cases. *International Monetary Fund*.

Amadeo, K. (2021). *Velocity of Money The Reasons Why Everyone Is Hoarding Cash Now.* New York City: the balance.

Asonuma, T., Chamon, M., & Sasahara, A. (2016). *Trade Costs of Sovereign Debt Restructurings: Does a Market-Friendly Approach Improve the Outcome?* Washington, D.C: IMF Working Paper 16/222.

Authorities, L. (2020). *The Lebanese Government's Financial Recovery Plan.* Beirut: The Lebanese Authorities.

Bifani, A., Daher, K., Assouad, L., & Diwan, I. (2021). *Which Tax Policies for Lebanon? Lessons from the Past for a Challenging Future.* Paris: Arab Reform Initiative.

Boorman, J., Gianviti, F., Fisher, M., Hagan, S., & Liu, Y. (2001). *Involving the Private Sector in the Resolution of Financial Crises Restructuring International Sovereign Bonds.* Prepared by the Policy Development and Review and Legal Departments of the IMF.

Buchheit, L., Chabert, G., DeLong, C., & Zettelmeyer, J. (2019). How to Restructure Sovereign Debt: Lessons from Four Decades. *Peterson Institute for International Economics, Working Paper No. 19-8*, 26 Pages.

Buckley, R. P. (2009). The Bankruptcy of Nations: An Idea Whose Time Has Come. *The International Lawyer Vol. 43, No. 3*, 1189-1216.

Calvo, G. A., & Mishkin, F. S. (2003). The Mirage of Exchange Rate Regimes for Emerging Market Countries. *Journal of Economic Perspectives, Vol. 17, No. 4*, 99-118.

Caramazza, F., & Aziz, J. (1998). Fixed or Flexible? Getting the Exchange Rate Right in the 1990s. *IMF Economic Issues, No. 13*.

Cibils , A., & Lo Vuolo , R. (2007). At Debt's Door: What Can We Learn from Argentina's Recent Debt Crisis and Restructuring? *Seattle Journal for Social Justice, Vol. 5, No. 2, Article 33*, 755-795.

Clark, P., Bartolini, L., Bayoumi, T., & Symansky , S. (1994). Exchange Rates and Economic Fundamentals: A Framework for Analysis. *nternational Monetary Fund Occasional Paper*, 26 pages.

Cruces, J. J., & Trebesch, C. (2011). Sovereign Defaults: The Price of Haircuts. *CESifo Working Paper No. 3604*.

Das, U. S., Papaioannou, M. G., & Trebesch, C. (2012). Sovereign Debt Restructurings 1950-2010: Concepts, Literature Survey, and Stylized Facts. *IMF Working Paper No. 12/203*, 128 Pages.

Delivorias, A. (2019). *Single-limb collective action clauses: A short introduction.* Strasbourg: European Parliamentary Research Service.

Dreger, J. (2012). Why Is Sovereign Debt Restructuring a Challenge? The Case of Greece. *Bruges European Economic Policy Briefings No. 24*, 35 Pages.

Duttagupta, R., Fernandez, G., & Karacadag, C. (2005). Moving to a Flexible Exchange Rate How, When, and How Fast? *IMF Economic Issues, No. 38*.

Edwards, S. (1999). The Choice of Exchange Rate Regime in Developing and Middle. In T. Ito, & A. O. Krueger, *: Changes in Exchange Rates in Rapidly Development Countries: Theory, Practice, and Policy Issues, Vol. 7* (pp. 9-28). Chicago: University of Chicago Press.

Epstein, N. E., & Ausman, J. (2019). The Devastating Venezuelan Crisis. *Surgical Neurology International, 10:145*.

Forni, L., Palomba, G., Pereira, J., & Richmond , C. (2016). Sovereign Debt Restructuring and Growth. *IMF Working Paper 2016/147*.

Fuentes, J. P., Rogers, J., & Di Natale, M. (2018). *In No Good Hands: The Venezuela Crisis and Consequences for South America.* New York: Moody's Analytics.

Galanos, G., Kotios, A., & Pavlidis, P. (2011). Greece and the Euro: The Chronicle of an Expected Collapse. *Intereconomics Vol. 46, No 5*, 263-269.

Ghosh, A. R., & Ostry, J. D. (2009). Choosing an Exchange Rate Regime. *IMF Finance and Development, Vol 49, No 4*, 38-40.

Gibson, E. (2018, April 4). A Tale of Two Crises: Argentina and Greece. *LSA*, pp. 1-43.

Guscina, A., Malik, S., & Papaioannou, M. G. (2017). Assessing Loss of Market Access: Conceptual and Operational Issues. *IMF Working Paper 2017/246*.

Gylfason, T., Holmström, B., Korkman, S., Söderström, H. T., & Vihriälä, V. (2010). From Boom to Bust: The Iceland Story. In *Nordics In Global Crisis Vulnerability and resilience* (pp. 137-166). Yliopistopaino, Helsinki: Taloustieto Oy.

Ha, J., Stocker, M., & Yilmazkuday, H. (2019). Inflation and Exchange Rate Pass-Through. *World Bank Policy Research Working Paper No. 8780*, 42 Pages.

Hanke, S. (2021, March 3). Currency boards or central banks? A crash course on currency boards and the peg system with Professor Steve Hanke. *Executive*.

Haugbolle, S. (2019, Feb 20). Lebanon Is Facing an Economic and Environmental Disaster. *Foreign Policy*.

Heskett, J. (2011). Is it Time for a National Bankruptcy? *Harvard Business School Working Knowledge* .

IMF. (2002c). *Sovereign Debt Restructurings and the Domestic Economy Experience in Four Recent Cases*. Retrieved from International Monetary Fund: https://www.imf.org/external/NP/pdr/sdrm/2002/022102.pdf

Jatar, J., Rong, W., Singer, A., Meoller, C. T., & Manger, M. (2019). *Scenario Analysis Based on the Regime Change of Venezuela.* Toronto: Global Economic Policy Lab.

Kan, E. O. (2007). Choice Of Exchange Rate Regimes For Developing Countries:Better Be Fixed Or Floating? *International Business & Economics Research Journal, Vol. 6, No. 12*.

Khalil, A., & Mikhael, M. (2018). Why the Peg is the Best Option for Lebanon? *BlomInvest Bank* .

Kraemer, M. (2020). African Countries Need Not Fear Default. *Project Syndicate*.

Lee, J., Milesi-Ferretti, G. M., Ostry, J., Prati, A., & Ricci , L. A. (2008). *Exchange Rate Assessments: CGER Methodologies.* Washington, D.C: International Monetary Fund.

Lindgren, M., & Bandhold, H. (2003). *Scenario Planning The link between future and strategy.* London: Palgrave Macmillan.

MacDonald, R., & Clark, P. B. (1998). Exchange Rates and Economic Fundamentals : A Methodological Comparison of BEERs and FEERs. *IMF Working Paper No. 98/67*, 38 Pages.

Makoff, G. D. (2015). Debt Reprofiling, Debt Restructuring and the Current Situation in Ukraine. *Centre for International Governance Innovation Papers No. 63*.

McCormick, M. (2017). Benchmarking Fair Value in G10 FX . *Market Musings*, 1-7.

Mcmahon, T. (2011). *What is the velocity of money?* InflationData.com.

Moatti, T., & Muci, F. (2019). *An Economic Framework for Venezuela's Debt Restructuring.* Cambridge: Second Year Policy Analysis - Harvard Kennedy School.

Naïmy, V. Y. (2004). A Proposed Restricting Of Lebanese Public Debt To Promote Economic Growth. *International Business & Economics Research Journal Vol 3, No 8*, 15-26.

Obstfeld, M., & Rogoff, K. (1995). The Mirage of Fixed Exchange Rates. *Journal of Economic Perspectives, Vol. 9, No. 4*, 73-96.

Pagones, J. (2013). The European Union's Response to the Sovereign Debt Crisis: Its Effect on Labor Relations in Greece. *Fordham International Law Journal Vol 36, Issue 5*, 1518- 1553.

Proebsting, C. (2017). A Baseline Semi-Small Open Economy Model. 1-9.

Richmond, C., & Dias, D. (2009, July 1). *Duration of Capital Market Exclusion: An Empirical Investigation*. Retrieved from SSRN Electronic Journal: 10.2139/ssrn.1027844

Rickards, J. (2020, August). Crisis in Lebanon Anatomy of a Financial Collapse. *Foundation For Defense of Democracies Press*, pp. 1-58.

Saadaoui, J. (2016). Global Imbalances: Should We Use Fundamental Equilibrium Exchange Rates? *Economic Modelling, Vol. 47*, 33 Pages.

Saliba, J. M., MacFarlane, A., Brauer, J., & Jeric, J. (2020, July 06). Lebanon - the ghost of hyperinflation past. *BofA Global Research*, pp. 1-27.

Sturzenegger, F., & Zettelmeyer, J. (2008). Haircuts: Estimating Investor Losses in Sovereign Debt Restructurings, 1998-2005. *Journal of International Money and Finance*, 780-805.

Szymanik, E. (2017). Iceland After The Crisis – Opportunities And Threats For Development. *Poslovna Izvasnost Zagreed, GOD. XI (2017) BR. 2*, 133-142.

Thomas, C., & Cachanosky, N. (2016). Argentina's Post -2001 Economy and the 2014 Default. *Quarterly Review of Economics and Finance, Vol. 60*.

Viterbo, A. (2020). The Role of the Paris and London Clubs: Is It under Threat? *The Hague Centre for Studies and Research in International Law and International Relations Series, Vol. 20*, 295-329.

Williamson, J. (1994). *Estimating Equilibrium Exchange Rates.* Washington, DC: Institute for International Economics.

Williamson, J. (2000). *Exchange Rate Regimes for Emerging Markets: Reviving the Intermediate Option.* Washington, DC.: Peterson Institute for International Economics.

WorldBank. (2017). *Government Debt Management: Designing Debt Management Strategies.* Washington DC: The World Bank Treasury - Public Debt Management Advisory.

Xafa, M. (2014). Sovereign Debt Crisis Management Lessons from the 2012 Greek Debt Restructuring. *Centre for International Governance Innovation, No. 33*.

Yeyati, E. L., & Sturzenegger, F. (2003). To Float or to Fix: Evidence on the Impact of Exchange Rate Regimes on Growth. *American Economic Review, Vol. 93, No. 4*, 1173-1193.

Zagha, R., & Nankani, G. (2005). *Economic Growth in the 1990s Learning from a Decade of Reform.* Washington, D.C.: The World Bank.

Zettelmeyer, J., Trebesch, C., & Gulati, M. (2013). The Greek Debt Restructuring: An Autopsy. *Peterson Institute for International Economics, 13-8*.

Zorzi, M., Cap, A., Mijakovic, A., & Rubaszek, M. (2020). The predictive power of equilibrium exchange rate models. *European Central Bank Working Paper Series No 2358*.