AMERICAN UNIVERSITY OF BEIRUT

IS PUBLIC DEBT IN LEBANON A CHRONIC DISEASE?

by
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I would like to thank Professor Dagher as well for presenting and teaching me different applied and estimation methods and making the project come true.

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I would like to thank all my friends, especially ELIANORE and the "GA TEAM".

AN ABSTRACT OF THE PROJECT OF

Mario Rached for Master of Arts in Financial Economics
Major: Financial Economics

Title: Is Public Debt in Lebanon a Chronic Disease?

Recurrent budget deficit and public debt growth has long been important issues on the government agendas. Economic theories are, lately, trying to find solutions for the public debt since it imposes a burden on the economy and on the citizens' welfare. Public debt has been growing rapidly in Lebanon and reached an unexpected level. It is threatening the stability, economic and political stability, of the country. Over the past 17 years it increased by more than 1500% and reached USD51 billion by the end of 2009. The project's purpose is to present the root causes behind the public debt in Lebanon and see its evolution and its repercussions on the economy. Moreover, it tries to present what were the government's attempts to solve the debt problem and some of the conferences that were held to help this lovely country stand on its feet again. Public debt sustainability and welfare loss were estimated in the text. Debt, debt service and primary balance were forecasted for the 2032. Debt could be sustainable but it requires efforts from the policy makers.

CONTENTS

ILLUSTRATIONS

TABLES

CHAPTER I

INTRODUCTION

Before the civil war, Lebanon was one of the most dynamic and stable countries in the Middle East. It was bridging the gap between developed European world and the developing Middle Eastern world. It was seen as an attractive business center because of the economic stability and the secure business environment. However, this situation didn't last long because of the war, which had massively destroyed the infrastructure. Lebanon lost its vital role in the region and wasn't a safe place for investment because it became relatively risky. Slowly but surely, migration washed out the entrepreneurs and professionally skilled citizens. At that time, Lebanon didn't have access to foreign capital, the tax system was inefficient and the government had to finance its expenditures and the "cost of war" by external financing and debt measures. The central bank was offering crazy rates leading to a severe depreciation of the local currency and high external indebtedness. Several government official, politician and foreign investors doubled their wealth in a very short time. The debt has been escalating and debt-to-GDP ratio reached 180% because of governmental mismanagement and irrational spending and unsound policies.

A. Purpose and Scope

The purpose of the project is to see the evolution of the public debt and what were the government attempts, if it tried, to solve the debt problem. Moreover, twin

deficit, debt sustainability, the effect of debt service on debt and debt related welfare loss will be tested and estimated.

After a general introduction in chapter I., chapter II provides a review of the targets, goals of the central bank and the strategies used to reduce the budget deficit. Furthermore, it provides a historical overview of the Lebanese economy and the evolution of public debt taking into consideration other related, directly or indirectly, macroeconomic variables that come into play. It present a discussion of the most important conferences held to help Lebanon solve it public debt problem mainly Paris I (2002), II (2003) and III (2007).

Chapter III presents a literature review of the theories dealing with the economy and debt including the Keynesian approach, the Ricardian Equivalence Hypothesis and the Neoclassical model of debt. In addition, it presents the economic effects of public debt on investments, capital misallocation, savings, terms of trades and the price level.

After a literature review in chapter III, chapter IV tests the twin deficit hypothesis and checks if the relationship between current account deficit and budget deficit is bidirectional, unidirectional or there exists no relationship between the two variables under consideration. Moreover, it provides a review of scholars' major findings on the effect of debt on the economy and tests the sustainability of the debt in the case of Lebanon. It tries to estimate the effect of debt service on debt and the effect of debt on GDP (taken as a welfare measure). Sensitivity analysis was performed to see what the magnitude of debt would be had the government paid "normal" Treasury Bills rates. Finally, debt, debt service and primary balance were forecasted for 2032.

Chapter V summarizes the major findings and concludes with some public debt solutions and policy implications.

CHAPTER II

THE LEBANESE ECONOMY

A. Historical Overview

Before 1975, Lebanon was one of the best countries in the Middle East in terms of trade, economic life, social life, private sector, stability and security level and the like. It always used to play a very important role in connecting two different worlds: the developed European world and the undeveloped/underdeveloped/developing Middle Eastern one. Lebanon was the bridge between these two worlds. It was characterized by labor and capital mobility which made it relatively distinctive in the ME region. The economic stability and the secure environment made the country a highly attractive business center. What is meant by economic stability is basically balance of payment surplus, low rate of debt-to-GDP ratio, budget surplus/low budget deficit, low inflation rates, low rate of unemployment, a respectable level of economic growth, political stability, a stable currency.

From 1975 till mid 1990s, the period of the civil war, Lebanon lost its vital role in the Middle East. The civil war had negative drawbacks on the human and material capital. Industrial facilities and the infrastructures had their share of destruction. Foreigners stopped investing in Lebanon because the macroeconomic stability no more existed since Lebanon became a relatively risky country after all the destruction. The country experienced a loss in skills, entrepreneurial and professional skills, through the so called “brain drain”. In addition, Lebanon was almost isolated because it didn’t have the access to foreign capital. Moreover, the government had to spend a lot to rebuild the infrastructure and the “ground zero” buildings. It didn’t have enough resources. The tax

system was inefficient and weak and corruption was always finding its way in the Lebanese public sector. This basically led to the increase in the discrepancy between the budget revenues and expenditures. The government's first resort was the banking system. Since the banking system couldn't lend the government the amount it demanded, so it had basically no other choice than embracing some foreign financing. The government started spending and the central bank starting using expansionary/loose monetary policy when the economic activity was still sluggish. The private sector's confidence was still not recovered. This basically put pressure on the Lebanese currency and led to its depreciation and an increase in the overall price level. For the first 8 years of the civil war (1975-1983), the balance of the budget, the current account balance, the exchange rate and public debt stayed relatively stable and didn't fluctuate much. Inflation fluctuated between the 1% - 28% range for the period under consideration. Inflation wasn't stable because of the increase in domestic spending, effect of international inflation since Lebanon is a small country and is affected directly by world inflation and the increase in the cost of war. After 1982, the depreciation of the exchange rate and the inflation rate surged to reach unexpected high levels [1].

B. **Macroeconomic Developments 1970 – 2009**

1. Monetary Policy

a. Targets of the Monetary Policy

In Lebanon two intermediate targets of monetary policy can be identified: building up foreign reserve and controlling money supply especially monetary base.

i. Foreign Reserves

In relation to the accumulation of foreign reserve, the Central Bank has a direct intervention in the exchange rate market in order to defend the LBP by conducting open market operations i.e. buying and selling USD. Thus it is crucial for the BDL to accumulate foreign reserve especially the USD in order to assure the stability of the LBP and the fixed exchange rate (1507.5 Lira to the USD). Thus, by providing high interest return on deposits, the Central Bank reduced the pressure on the LBP and allowed the Central Bank to reconstitute its foreign reserve by buying USD. The increase in the foreign reserves of the BDL was accompanied by a decrease in the dollarization rate and an increase in capital inflow. Moreover, when the government issued euro bonds it contributed to maintain the reserves of the Central Bank.

ii. Money Supply

An arbitrary growth of the money supply has a direct effect on prices and on the value of the LBP, i.e. on inflation and exchange rate. Concerning the commercial banks, the excess in liquidity has been a major tool in hands of speculators against the national currency. Therefore, controlling the size and the growth of the liquidity is a major target for policy makers who also need to take into consideration normal liquidity needs of the banking sector, whether to meet customer's withdrawals or increased demand for credits in LBP.

Thus in order to be able to control the inflation growth rate in Lebanon, it is necessary to control money supply growth. This condition is necessary but not sufficient alone. Hence, restraining money supply growth is a major target of the monetary policy in Lebanon.

b. Goals

The monetary authorities aimed at achieving the following objectives, first to promote currency stability, second to fight inlfation in odrer to maintain the staibility of prices and finally to coordinate with financial authorities to help the government finance its deficit without resorting to borrowing from the Central Bank.

i. Currency Stability

Before 1998, the monetary policy in Lebanon aimed at maintaining and stabilizing the exchange rate with an average appreciation of 2 or 3 percent per year. However, since 1998, the exchange rate was fixed. The BDL was able to fixe the exchange rate and stabilize it using different instruments such as high interest rates and intervention in the exchange market. Thus by its intervention in exchange market, the lebanese Central Bank was able to reestablish the reputation of the LBP and made it immune to the domestic and regional disturbance.

ii. Inflation Control

Reducing inflation is always a major concern for governments in general and monetary authorities in particular not only for economic reasons, but also for political considerations. At the end of the civil war, the inflation was very high and since Riad Salame became the governor of the Central Bank, and combining his efforts with the governmental efforts, controlling inflation became a primary goal to achieve. In Lebanon price increases are closely linked to exchange rate fluctuation the 2 or 3 percent appreciation from 1993 until 1998. However, after the implementation of fixed

exchange rate in Lebanon the inflation was mostly linked to the fluctuation of the USD since our LBP was pegged against the USD. Also, the inflation is affected by the increase in the money supply, thus by controlling its growth the government and the Central Bank were able to reduce the inflation.

c. Budget Deficit Support

After the end of the civil war in the 1990, there was a huge expenditure supported by the government in order to reconstruct Lebanon, this situation was combined by limited resources of the government thus a huge deficit was taking place. In order to finance this increasing deficit and facing the exchange rate policy adopted in Lebanon, there was a close coordination between the BDL and the ministry of finance. The deficit is mainly financed by the issuance of treasury bills and the management of these bills and their interest rate was a task done by the Central Bank. At the time, high interest rates were required in order to attract foreign capitals and to channel these flows that are attracted by high interest rate on the LBP to the treasury bills.
The monetary authorities were able to manage the large deficit through the high interest rate which encourages banks to buy treasury bills without threatening the stability of the exchange rate.

C. Public Debt and Macroeconomic Overview

Figure 2.1 illustrates the evolution of the exchange rate from 1970 till 2009. It is evident that the exchange rate between 1985 and 1992 was depreciated extensively and reached in September 1992 its all time highest 2,527 lira for the US dollar. Figure 2.2 describes the increase in the overall price level. It is clear that the uncontrollable

inflation reached in 1987 its all time highest level 487%. As the figures showed, in the 17-year period, prices were increasing, the interest rates on Treasury Bills increased and reached alarming level to an extent that an investor can almost double his wealth in three years, economic activity was slow, public debt-to GDP ratio has risen to unsustainable level and got out of control.

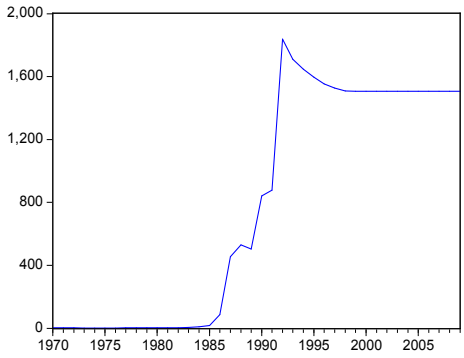

Fig. 2.1: Exchange Rate LP/USD

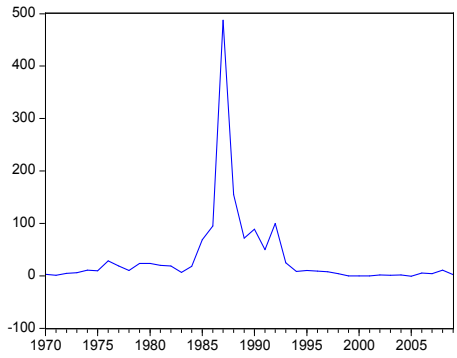

Fig. 2.2: Inflation Rates (in percent; 1995=100)

Source: Banque du Liban and the Lebanese Ministry of Finance.

The infrastructure was massively destroyed, the country was politically unstable and the government was unable to collect tax revenues due to the infrastructure's destruction; all these factors forced the government to find other ways of financing which was the debt, local public debt. The exchange rate increased exponentially. It started increasing in 1985 and increased by % from L.L.3/USD in 1983 to L.L.1838/USD in 1991. In 1992, the exchange rate and the inflation rate were the highest in the last two decades. Public debt reached almost 58% of GDP, around 3 billion USD. To create demand for LL denominated assets, the government started giving on its Treasury Bills interest rates reached which 34% in a time where the US dollar denominated assets were yielding around 5.5%. The government had to increase the interest rate to account for the riskiness of the country. Lebanon at that time,

coming out from a civil war, wasn't a safe place to invest in. In 1998, the monetary policy started to become ineffective because the central bank wanted to implement a fixed exchange rate system.

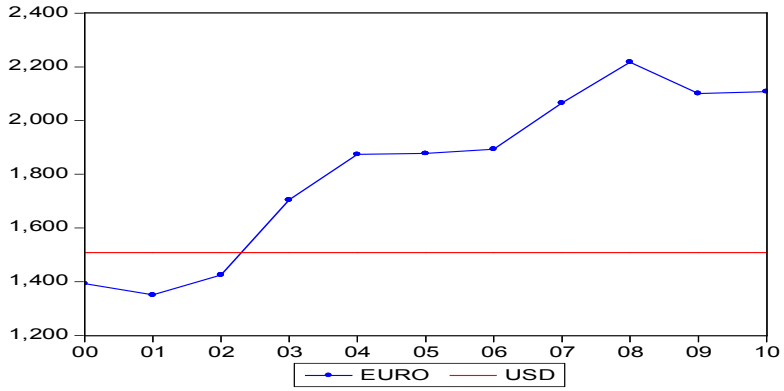

Fig. 2.3: Exchange Rates LP/USD and LP/Euro
Source: Banque du Liban.

The Lebanese pound was pegged to the USD and the exchange rate of the Lebanese Lira fluctuated between 1507.5 and 1525.5 per USD. Since then, the goal of the central bank didn't change and the Lira wasn't pegged to any currency or basket of currencies. Pegging the exchange rate to a single currency is not a healthy policy to implement. The country would be importing almost all the inflation of the country the currency is pegged to (USA in the case of Lebanese Lira). However, pegging the currency to a basket of currencies is healthier for the economy. Each currency will have its share of the basket. In general the basket's shares are directly related to the trade between the two countries. If one country had inflation in a given year, the effect of the inflation will only affect the country using the peg by the share of the country's currency in the basket. One should be cautious and not short sighted in interpreting the Lebanese exchange rate. It was almost fixed between 1998 and 2009. It was fixed relative to the USD and not to the Euro. The Lebanese Pound depreciated relative to the

Euro. The Lira was depreciated consequently relative to the Euro and in April 2008 it reached 2378.55 it all time highest (figure 2.3). This basically helped Lebanon in exporting some of its goods and services to Europe.

Due to the debt, the inflation started increasing in 1985. In 1985 the inflation rate was 69% increased to 95% in 1986 and reached almost 500% in 1987 then to decline to 155% in 1988 and then to decline steadily. In 1999 the inflation rate was almost zero. Public debt reached 40% of GDP in 1992 in a time where no reconstruction has taken place.

After that period and in 1992, a new government was established and price stability was one of its main objectives and in fact inflation declined to 30%, 9% and almost zero percent in 1993, 1994 and in 1995 respectively.

From basic macroeconomic principles, when the nominal interest rate is high and inflation is at a low level, almost zero, the real interest rate equals the nominal interest. That was the case of Lebanon. In 1993, the real interest rate was relatively high compared to international rates. The government had to increase the interest rate to make the investment in its treasury bills attractive and to account for the risk of the country's economy. Foreign capital inflow started increasing in Lebanon. Investor could almost double their wealth by investing in government treasury bills yielding out-of-mind returns.

The Central Bank had inflation (price stability) and exchange rate stability as its goals. The Central Bank did a great job and in fact it did achieve these goals. However, the treasury bills interest rate was increasing. The Central Bank wasn't acting "wisely" in that period. The reliance on local currency financing coupled with high interest rates

and unwise Central Bank acts led to the increase in government debt service which in turn led to a series of budget deficits that Lebanon still suffers from till 2009.

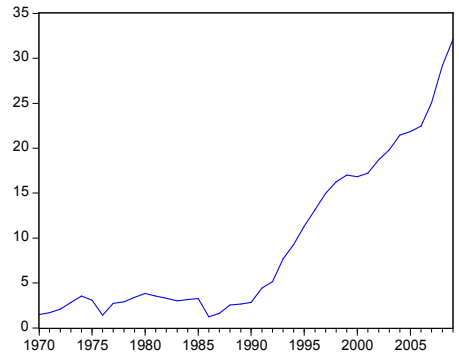

Fig. 2.4: GDP (in billions of USD)

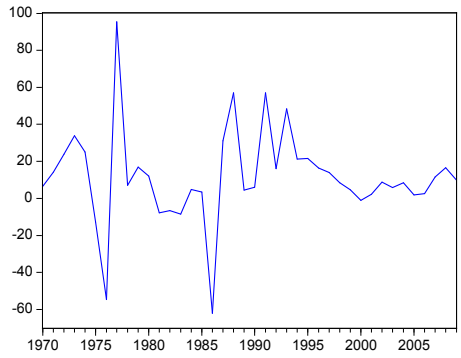

Fig. 2.5: GDP Growth (in percent)

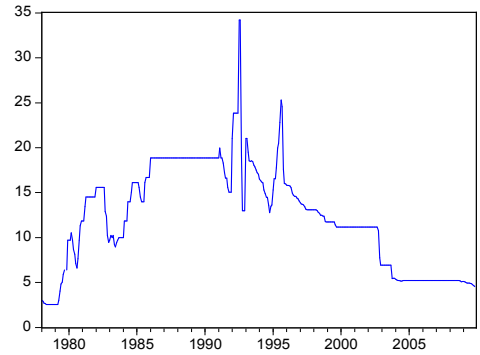

Fig. 2.6: 3-month Treasury Bills Rate (in percent)
Source: Banque du Liban.

The debt has been affecting the GDP of Lebanon since then. In 2000 GDP growth was almost negligible (around 0 percent). This was mainly because of government spending. Government spending increased the interest rates. Some private firms' projects became non profitable and were rejected. This is known as the crowding out effect when government spending reduces private investment.

The fiscal deficit and the debt service did have a negative effect on the economy. After 1995, the GDP growth rate declined then to increase again in a relatively sustainable fashion in 2005.

With the famous East Asian Financial crisis which occurred in 1997, Lebanon's borrowing power declined and had to embrace domestic debt. The new domestic debt was denominated in foreign currency. The newly issued debt had a higher interest rate compared to the world interest rate which exacerbated the problem, increased the debt service, affected negatively the budget balance, and Lebanon experienced a series of recurrent budget deficits which in turn were translated into public debt. Most of the debt was held by the banking sector (private commercial banks). Looking at the 3-month treasury bills graph, one could notice the high interest the government was offering for TB holders. It was far from what the international market was offering at that time.

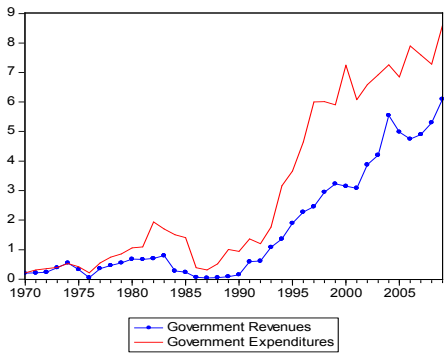

Fig. 2.7: Government Revenues and Expenditures (in billions of USD)

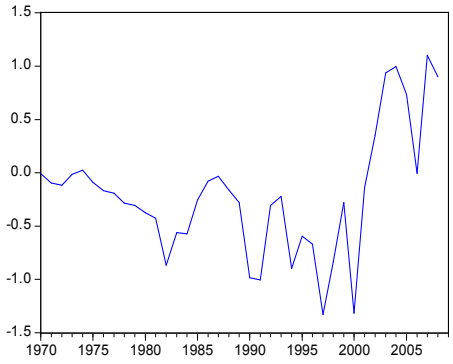

Fig. 2.8: Primary Balance (in billions of USD)

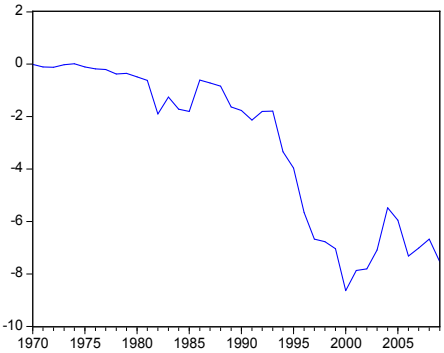

Fig. 2.9: Budget Deficit (in billions of USD)
Source: Banque du Liban and the IMF.

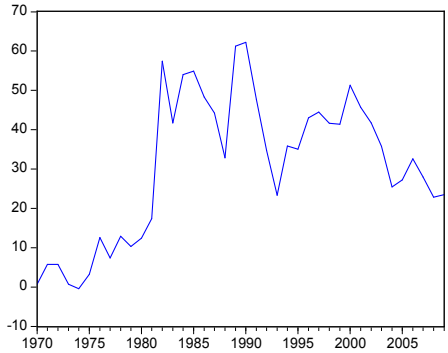

Fig. 2.10: Budget Deficit to GDP (in percent)

After that period, the government took the public debt problem seriously and put it as one of its main objectives. One of the proposed strategies was to increase revenues and decrease expenditures. This strategy would, slowly but surely, decrease the outstanding debt and hence in turn decrease the debt service, hence an improvement in the fiscal balance.

Looking at the figure 2.7, it is evident that budget revenues were increasing especially after 1990. However, government expenditures were increasing as well and the gap has been widening. In 1982, the government spending increased sharply relative to the previous 7 years of war to decline and then to rise again in 1987 and to skyrocket in 1993 after the heavy spending on infrastructure. However, the tax revenues were increasing but relatively decreasing compared to the heavy spending of the government.

Excluding the debt service (i.e. looking at only the budget revenues and expenditures), the primary deficit has been increasing through time. This is a piece of evidence reinforcing the idea that without taking into consideration debt service, the Lebanese economy was weak and still weak. One should not forget that Lebanon is a

small resource poor country. Given this fact, Lebanon should rely heavily on its banking sector, tourism and remittances inflows. The primary deficit problem should be taken more seriously because it will put upward pressure on the interest rates which in turn would be translated into high debt service, low GDP growth and an increase in the public debt. That is exactly what was happening in the previous period. Figure 2.8 illustrates the primary deficit or surplus for the period under consideration. Looking at the graph, it is evident that there was a period or primary deficit which ranged from 1970 till 2001 and then the primary balance started to witness a primary surplus for the past 8 years. This, maybe, was the result of the "reform" and policies changes not to forget the help done by the countries which helped Lebanon in Paris I, Paris II and later on Paris III. If the economy continues to grow or at least meats the balanced budget goal the public debt will start to decrease gradually and the burden will get smaller and smaller through time. Looking at figure 2.9, one can see that the budget balance has been almost negative from 1970 till 2009. This budget deficit phenomenon implies that in the period under consideration, the tax system and the government revenues have been lower than it spending. The government should start looking at new ways to increase its revenues or decrease its spending. Some of the new ways would be to impose new taxes, to enforce the collection of taxes and reform its existing tax system. Figure 2.10 illustrates the public deficit-to GDP for the period under consideration. The ratio was negative for almost the whole period and reached its trough in 1985 of almost 40%. After 1985 it started declining to go back to where it was in 1970.

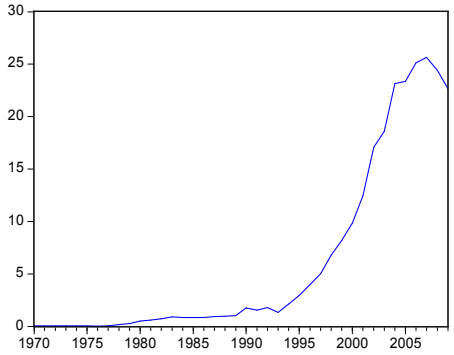

Fig. 2.11: Foreign Debt (in billions of USD)

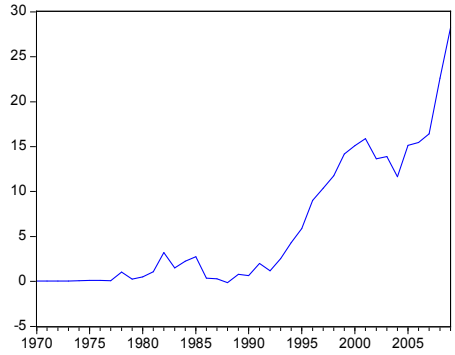

Fig. 2.12: Domestic Debt (in billions of USD)

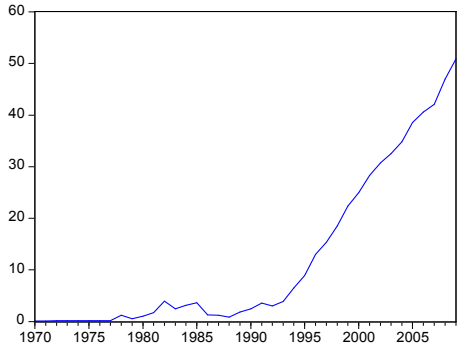

Fig. 2.13: Total Public Debt (in billions USD)

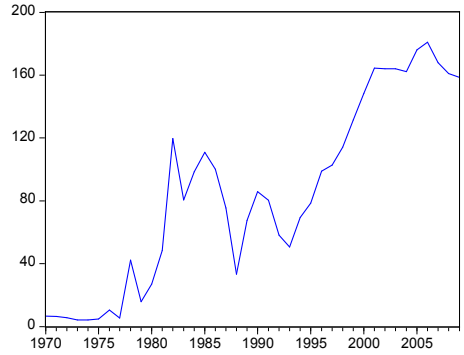

Fig. 2.14: Total Debt-to-GDP (in of percent)

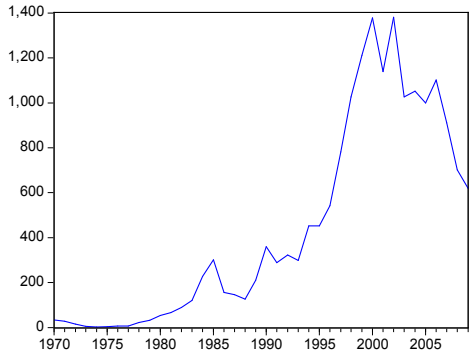

Fig. 2.15: Total debt-to- Exports (in percent)
Source: Banque du Liban, Ministry of Finance and IMF.

Public debt has been increasing in the past 10 years because if the increase in government spending and high debt service. The increase in government revenue didn't catch up with the increase in spending. Debt to GDP ratio reached 181% in 2006. This was the result of what the government has been doing after the end of the civil war in 1992. Total debt service reached USD5.5 billion. For this problem of high debt service, Paris I conference was held. In 2002 debt service reached USD6.15 billion and Paris II conference was held to reduce the debt service as well and in 2007 Paris III conference. These conferences will be discussed extensively in subsequent sections.

Total debt was increasing at a steady pace and reached USD52 billion by the end of 2009. Debt to GDP ratio decreased in the previous years and stood at 156% in 2009. The debt structure of Lebanon was changing recently from 50% of debt being foreign debt in 2000 to almost 40% in 2009. In 2009 the remaining 60% was in the form of domestic debt mainly held by the private sector, the Central Bank and private commercial banks. The government has been restructuring its debt (i.e. converting short term high debt service domestic debt with long term low debt service foreign debt.

Figures 2.13 and 2.14 are illustrations of the public debt and its ratio when compared to GDP. In 1982, spending increased and this increase was from the debt received by the government. It was all basically internal debt. Then debt started increasing in an uncontrollable way in 1992 till 2009. The problem is not the debt. The problem is the amount of debt relative to GDP and the burden of repaying the debt and it servicing. If an economy can meet all its expenses and pay the debt servicing and part of the debt each year, there won't be a problem because every year the debt servicing will be less and the principal to be repaid, which is the debt, would be less and less.

This wasn't the case of Lebanon. Lebanon went into a vicious circle. In the beginning it was offering crazy rates on TB. It couldn't meet the interest payment each year on the debt, and started to borrow more and spend on infrastructure. Then Lebanon reached a point where it has to borrow, can't pay any of the principle and not being able to pay the service of the debt. It used to defer interest payments or issue new Treasury bills with higher interest rate to cover the due debt servicing payments. Most of the debt was issued in form of short term debt because investors were reluctant to hold the risky assets of the Lebanese government for longer period of time. The government started to issue foreign currency denominated debt. The foreign debt or external debt is worse than the domestic debt. It has a negative effect on export earnings because it degrades the reserves of the central bank since the debt should be paid from foreign exchange. With time, interest started accumulating and the amount of debt was increasing round-the-clock and reached 51 billion US dollar in 2009. Figure 2.17 is an illustration of the current situation in Lebanon concerning the accumulation of reserves. The foreign debt to exports ratio has been increasing at an exponential rate for almost 30 years and reached almost 14%in 2000. After 2002 it started it started declining steadily and reached around 8%. This phenomenon can be interpreted as the source of the central bank accumulation of reserves.

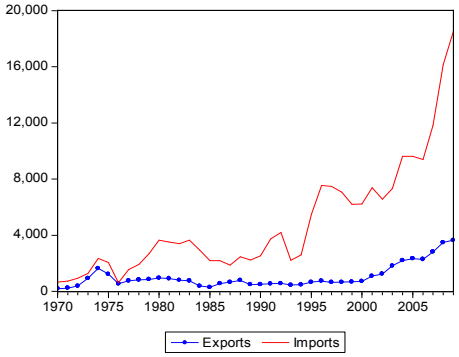

Fig. 2.16: Imports and Exports (in billions of USD)
Source: Banque du Liban and IMF

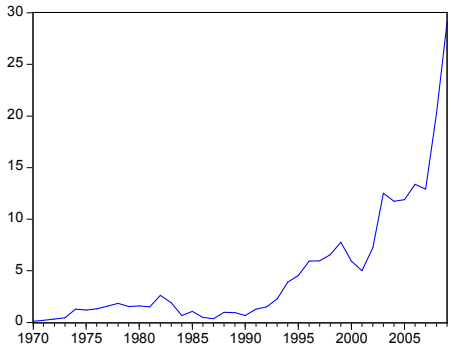

Fig. 2.17: Total Reserves Excluding Gold (in billions of USD)

To be able to pay the foreign debt, the central bank should have enough foreign reserves. The source of foreign reserves is basically the exports of goods and services where foreign currency is injected into the economy. Figure 2.16 illustrates the evolution of exports and imports through time. The exports have been almost stable till 2005 then they began to increase at a slow pace. The imports, on the other hand, have been increasing through times and reached USD16,142 million their all times highest value in 2008. Figure 2.17 illustrates the evolution of reserves at the central bank without taking into account the gold. By looking at the graph it is evident that the reserves have been increasing though time and reached USD 29,102 million in 2009 their all time highest value. The central bank has been accumulating foreign reserves to be able to maintain the peg of the Lebanese lira vis-à-vis the USD. By accumulating an important reserves amount, the central bank can also control the supply and demand of the local currency without having a shortage of reserves, hence it has a higher "margin of safety". The Lebanese still believe that the central bank is credible and will never abandon its goal and embrace a flexible/floating exchange rate system. Once the public think that the central bank is no more credible, no one would hold Lebanese lira. It becomes like a hot potato where everyone is throwing it to the other. To maintain the

peg, the central bank has to buy lira and sell dollar by engaging in open market operation. As long as this series of transactions continue, the reserves deplete and eventually the central bank has no power on the currency and a floating exchange rate system would be adopted.

D. **Aid Conferences**

When the government realized that there is no way Lebanon could solve its debt problem on its own, it called several developed and developing countries for help. Several summits and conferences we held to assist Lebanon. The most notable ones were Paris I, Paris II and Paris III.

1. ParisI

The debt situation in Lebanon reached uncontrollable level in 2000 and in 2001 Paris I conference was held to help the Lebanese government reduce its expenditures, non-interest expenditures. And, in fact, the goal was met and expenditures declined by 22% in 2001. Moreover, another goal was to increase government revenues. Unfortunately, in 2001, the Lebanese economy was sluggish and going into a recession and custom duties and the taxing system were affected severely. As a result, in 2002, the Value Added Tax (VAT) was introduced for several the following reasons [2]:

- VAT would contribute in reducing the deficit and reducing the debt accumulated during the war and post-war period.

- It would help in ensuring a stable and continuous economic growth and financial and monetary stability.

- The taxing system in Lebanon relied on custom duties and tariffs. To implement the trade obligations (Arab Trade Union, EU, WTO…), the government had to reduce custom duties and tariffs and introduce and implement a new tax on consumption to increase government revenues.

- The VAT is an indirect tax levied on the consumer, not the producer nor the seller. The person that bears the burden at the end is the end consumer

- A wide list of goods and services is exempted from paying the VAT. These goods and services basically fall in the necessities category. Because there is a wide list of exempted goods and services.

- The Value Added Tax is already implemented in more than 125 countries and it is one of the best, if not the best, among the indirect tax alternatives.

- It doesn't discriminate against investments.

- It is the first element in the tax reform undertaken by the government in Lebanon after the end of the civil war.

2. Paris II

The debt maturity and high debt servicing costs exacerbated the problems of the Lebanese economy. Lebanon was unable to attract-low cost long-term debt. Moreover, in 2002, the foreign reserves of the Central Bank were depleted which could have resulted in a currency crisis implying that the Lebanese economy would be working with a flexible/floating exchange rate system. To counteract these problems, Paris II conference was held with the main objective of restructuring the debt stock portfolio.

Paris II conference was held in Paris one day after the independence day of Lebanon, on the 23rd of November 2002. 22 major countries assisted in the conference and Lebanon was accorded USD4.4 billion at low interest rate compared to other interest rate Lebanon was paying. Almost 45% were given in the form of government guarantees, 19.3% in the form of Treasury Bills and 29.5% to finance investment projects.

Paris II conference was fruitful for Lebanon and resulted in debt management and reduction of USD3.1 billion. 7 countries helped Lebanon, 6 of them issued Eurobonds totaling in USD1.85 billion. These Eurobonds had a maturity period of 15 years, 5 years grace period for principle repayment and a coupon rate of 5% paid twice a year (semiannually). France contributed by a loan of Euro 500 million at USD/Euro 1.08 i.e. USD 540 million. The loan has the same maturity and the same coupon rate; however, it has a 3-year grace period for principle repayment instead of 5. The purpose of the USD3.1 billion new issued debt is to replace the maturing debt at that year (table 2.1).

a. Agreements

The following agreements were reached by the government and the Central Bank. USD830 million Lebanese Pounds-denominated Treasury bills and USD1.04 billion Dollar-denominated Eurobonds were exchanged for 4 percent coupon Eurobond with a 5 year grace period for amortized principle repayment and 15 year maturity period. Already matured USD430 million of principle repayment Treasury Bills and interest held by the Central Bank were rolled over into a 4 percent 5 year special

Treasury Bills. It was agreed to cancel USD1.79 billion worth of 2 year Lebanese Pounds-denominated Treasury bills which were due to the Lebanese Treasury.

Table 2.1: Summary of Lender Country Contributions

Creditor	Amounts Received	Date of Receipt of Funds	Type of Financing	Terms
Malaysia	US$300 million	Dec. 27, 2002	Eurobonds	Issue Price: 100 percent Final maturity date: 15 years from issue date Coupon rate**: 5 % per annum payable semi-annually in arrear Amortization of Principal: Redeemable in 20 equal semiannual payments starting from year 6 (grace period of 5 years) Representations, warranties, and covenants: As per the issuer's Global MTN program Listing: Luxembourg Stock Exchange
Sultanate of Oman	US$50 million	Dec. 30 2002		
United Arab Emirates	US$300 million	Jan. 15, 2003		
Kuwait	US$300 million	Jan. 22, 2003		
Kingdom of Saudi Arabia	US$700 million	Mar. 7, 2003		
State of Qatar	US$200 million	May. 27, 2003		
France French Treasury and Agence Francaise de Développement (AFD)	US$540 million*	Mar. 3, 2003	Loan through AFD	15-year maturity Coupon rate**: 5 % per annum payable semi-annually 3-year grace period for principal repayment.
Total Lender Country Contributions	**US$ 2,390 million**			

Notes:

* Counter value of contributions in Euro at USD/Euro 1.08 rate.

** This coupon rate represents a spread of approximately 85 basis points above 10-year US treasuries at the time of the Paris II conference. This represents a major improvement given that the average cost of the Republic's foreign currency debt was at around 9.2% before Paris II, i.e. a spread of 505 basis points for shorter maturities.

Source: Ministry of Finance

Table 2.1 illustrates three main concerns. It presents the contribution of each of the 7 creditor countries, the amount of the loan, and the terms of the loan. The total foreign credit received after Paris II amounted to USD2,390 million with the major contributor being the Kingdom of Saudi Arabia by providing Lebanon with USD700 million.

Table 2.2: Paris II Eurobonds: Central Bank, Bilateral Lenders and Commercial Banks' Scheme

Eurobond	Issue amount	Outstanding amount	Coupon rate (percentage)	Issue date (month/day/ year)	Maturity date (month/day/ year)
Central Bank and bilateral lenders (USD millions)					
$1,870 due December 2017[a]	1,870,000,000	1,870,000,000	4	12/31/2002	13/31/2017
$950 due December 2017[b]	950,00,000	950,00,000	5	12/27/2002	12/27/2017
$700 due March 2018[c]	700,000,000	700,000,000	5	3/7/2003	3/7/2018
$200 due March 2018[d]	200,000,000	200,000,000	5	5/27/2003	5/27/2018
Total	3,720,000,000				
Commercial banks:					
January 2003:$ tranche	77,313,000	77,313,000	-	4/16/2003	1/18/2005
February 2003:$ tranche	72,580,000	72,580,000	-	4/16/2003	2/18/2005
February 2003:€ tranche	16,027,000	19,584,994,	-	4/16/2003	2/18/2005
March 2003:$ tranche	109,330,000	109,330,000	-	4/16/2003	3/18/2005
April 2003:$ tranche	54,851,000	54,851,000	-	4/22/2003	4/18/2005
April 2003:€ tranche	71,486,000	87,355,892	-	4/22/2003	4/18/2005
May 2003:$ tranche	108,831,000	108,831,000	-	5/20/2003	5/18/2005
May 2003:€ tranche	148,737,000	181,756,614	-	5/20/2003	5/18/2005
Total	659,155,000				

Source: Ministry of Finance, Government of Lebanon.
Notes: Amounts calculated according to a euro/dollar exchange rate of 1.222. A dash (–) indicates that the amount is nil or negligible.
a-Banque du Liban. b-Kuwait, Oman, Malaysia and United Arab Emirates. c-Saudi Arabia. d-Qatar.

Table 2.2 presents the new debt issued after Paris II conference. Commercial banks also had their share in Paris II conference. They subscribed a 2 year zero coupon

Eurobond worth USD3.6 billion. 85% of the commercial banks share, Around USD3.06 billion, was done in cash transfer and securities maturing in months; while the remaining 15%, USD540 million, was done in the form of securities maturing in more than a 3 month period. Thanks to Paris II conference, interest rates on Treasury Bills decreased by more than 30%. The securities exchange operation in terms of the trench size of the zero-coupon Eurobond issued, the currency, the issuance and the maturity dates are highlighted in table. The cash-type operation lasted for 3 months from May till August 2003 [3].

Table 2.3: Primary Market Treasury Bill Rates

	End of October 2002	End of January 2003	End of December 2009
3-month Treasury bills	11.18%	6.96%	4.55%
6-month Treasury bills	12.12%	8.18%	5.72%
12-month Treasury bills	13.43%	9.13%	5.73%
24-month Treasury bills	14.64%	9.41%	6.42%
36-month Treasury bills			7.23%
60-month Treasury bills			7.74%

Source: Banque du Liban

Looking at table 2.3, it is evident how the interest rates have been evolving through time. The end of October 2002 and End of January 2003 dates were not chosen randomly. They have been chosen to emphasize the effect of Paris II conference in reducing the interest rates. In the case of the 3-month Treasury Bills, in a 3 month period, the interest rate decreased by implying a decrease of 38% from 11.18% to 6.96%. The interest rates on the 6, 12 and 24-month Treasury Bills before and after Paris II conference decreased as well.

Table 2.4:Certificate of Deposit Yields

Length of Maturity*	End-October 2002	End-December 2002	October/November 2003
45 Days	9.50%	6.75%	4.40%
60 Days	10.25%	7.50%	4.89%
6 Months	11.15%	8.75%	6.36%
1 Year	11.90%	9.155	7.00%
2 Years	-	-	8.00%
3 Years**	-	-	9.00%
5 Years	-	-	9.25%

Source: Banque du Liban
Notes: * Two, three and five year maturity CDs were introduced in 2003.
** Following QI 2003, BDL began issuing a portion of its Lebanese Pounds 3 year CDs at a discount, in return for US dollars at a rate of 12%. These CDs are not taken into consideration in the calculation of the yields.

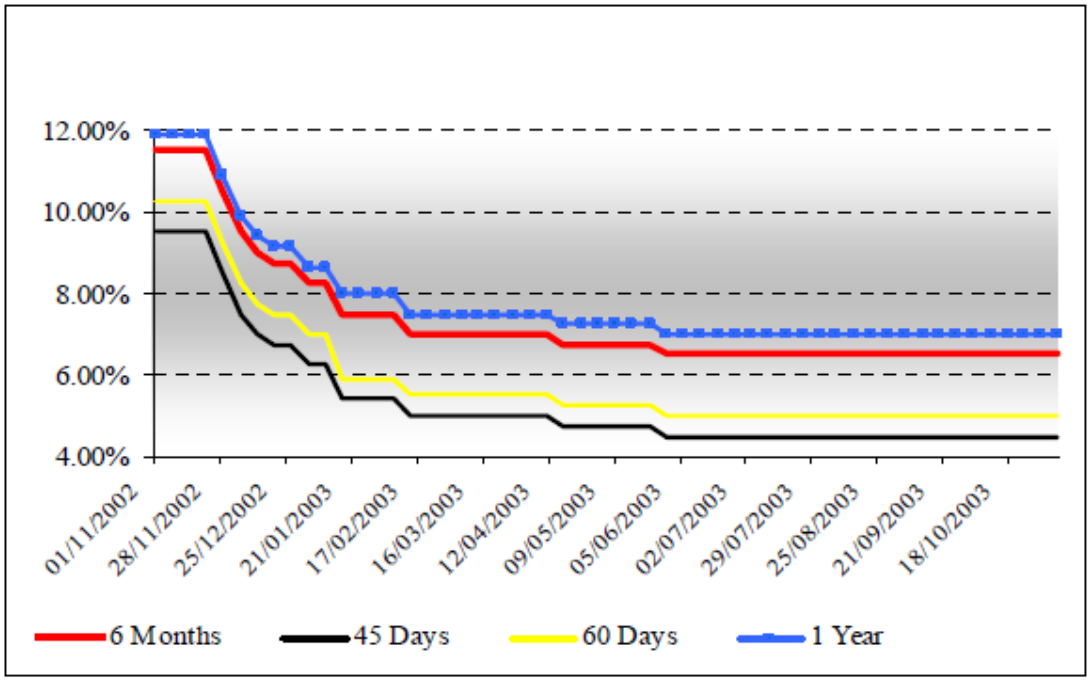

Fig. 2.18: Certificate of Deposits Yields Before and After Paris II
Source: Banque du Liban

Table 2.4 and figure 2.18 illustrate the evolution of the certificate of deposit rates before and after Paris II conference. It is evident that the rate has decreased dramatically after the conference. This should have helped the Central bank and the

Lebanese government to have the ability to pay part of the debt or at least its servicing from the interest payment saved due to the decline in the rates of the certificate of deposit and the treasury bill rate.

Table 2.5: Summary of Fiscal Performance
(in billions of L.L.)

	2002 Jan-Oct	2003 Jan-Oct	Change 2002-2003	% change
Budget revenue	4,543	5,208	665	14.60%
Budget expenditures	7,071	7,417	346	4.90%
o/w Debt service	3,825	4,018	193	5.00%
Budget (deficit)/surplus	-2,528	-2,209	319	-12.60%
in % of budget expenditures	-35.80%	-29.80%		
Budget primary (deficit)/surplus	1,297	1,809	512	39.50%
in % of budget expenditures	18.30%	24.40%		
Treasury receipts	386	369	-17	-4.40%
Treasury payments	1,330	1,469	139	10.55%
Total budget and treasury receipts	4,390	5,578	648	13.10%
Total budget and treasury payments	8,401	8,886	485	5.80%
Total cash (deficit)/surplus	-3,471	-3,308	163	-4.70%
in % of total expenditures	-41.30%	-37.20%		
Primary (deficit)/surplus	354	710	356	100.60%
in % of total expenditures	4.20%	8.00%		

Source: Ministry of Finance (MOF), Directorate General of Finance (DGF).

From table 2.5 several conclusions could be drawn. First, there was an improvement in the fiscal performance in 2003 which was translated into a primary surplus of LL 710 billion in the first 10 months of 2003, a more than 100 percent

increase compared to the previous year. Moreover, the budget deficit decreased by 12.6% for the period under consideration. The decrease in budget deficit resulted from the increase in government revenue by more than the increase in its expenditures while taking into consideration the debt service. Comparing the debt service between 2002 and 2003, one could see that it increased by LL 193 billion in the first 10 months of 2003 compared to the same period of 2002. The high debt service bill was mainly due to the interest expenses which were still based on the high rates prior to the Paris II conference. The re-profiling of debt helped the government in saving around LL 800 billion for 2003 taking into consideration if no re-profiling option has been available.

3. Paris III

Paris III conference was held in Paris on the 25th of January 2007. The World Bank pledged to support Lebanon by giving the government USD700 million in loans. The private sector also had a share; it received USD275 million in loans as well via the International Finance Corporation. The agreement was in the form of a Reform Implementation Development Policy Loan (RIDPL), where the disbursement of additional loans is restricted to the government commitment on executing the reform. The first RIDPL focuses on the power sector mainly the EDL and other sectors. Unlike other lending forms, where the government used to receive the loans as an upfront payment, this form, the RIDPL, helps basically reducing the public debt and implementing a real reform to the sectors under consideration [4].

The first loan received was for the energy/power sector. The amount received was USD100 million. Principle was to be paid twice per year, each payment being 5

percent of the loan, and the rate was the LIBOR plus a fixed spread. The loan had a 5-year grace period and a 15-year maturity period [4].

a. The Public Sector

The public sector's supports are classified into budget support, project financing and in kind contributions.

i. Budget Support

Table 2.6: Government Support (in millions of USD)

	Budgetary Support	*Project Financing*	*BDL*	*Total*
Grants	981	198	-	1,179
Loans	1,403	2,486	75	3,964
Total	2,383	2,684	75	5,143

Source: Paris III first progress report

The government was estimated to receive USD2,383 million in budgetary support where soft loans would have been USD1,403 million and USD981 million in the form of in kind transfers, technical assistance and cash [5].

USD2,684 million were designated for financing projects. These money were in the form of soft loans (KSA's pledge amounted for USD1,000 million) and USD196 million in the form of loans at 1% interest rate . The central bank received USD75 million[5].

As of December 31 2009, the government received around 80% of the pledges already agreed on in Paris III conference in 2007. Out of the 80%, 77% were in the forms of loans and the remaining in the form of grants.

Table 2.7: Government Support (in millions of USD)

	Budget Support	Project Financing	BDL	In-kind	Total
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4,329	Loans	[illegible]	2,949	43	
5,621	Total	[illegible]	3,449	43	362

Source: Paris III eleventh progress report

The commitment for budget support (i.e. signed pledges) amounted to USD2,134 million and around 75% of the pledges were received by the government. USD200 million are to be devoted by the World Bank. Budget support disbursement increased after the L.L.300 tax levied on every gasoline liter. The Arab Monetary Fund disbursed USD32 million for foreign debt servicing [6].

ii. Project Financing

Signed project agreements increased from USD1047 million to USD1382 million and disbursement increased from USD97 million to USD264 million [6].

After 3 years, commitments to project financing stood at 40% while disbursement stood at 19%. These were the results of the slow decision making and slow ratification by parliament. There still exists unutilized funds amounting to USD2,053 million [6].

iii. In-kind Contribution

USD305 million of the committed USD328 million in-kind contribution were fulfilled [6].

Table 2.8: In-kind Transfers (in millions of USD)

Country	In-kind	Signed	Fulfilled
United States	286	286	286
Egypt	44	15	15
Turkey	20	20	0
Greece	5	1,3	1,3
China	4	4	0
South Korea	1	0	0
Brazil	1	1	1
Malaysia	1	1	1
Total	**362**	**328**	**304**

Source: Paris III eleventh progress report

b. The private sector

Table 2.9: Private Sector Support (in millions of USD)

	Support to the Private Sector	*UNIFIL / UN / NGOs*
Grants	-	231
Loans	1,279	-
Total	1,279	231

Source: Paris III first progress report

The private sector, via the government long term loans and subsidies, received around USD40 million. The private sector was dedicated USD1,279 million. They were in the form of government loans which in turn increased the access to credit for the small and medium enterprises (SME) [5].

USD231 million were designed to reach non-governmental institution like NGO and United Nations agencies [5].

Out of these loans and grants, the power sector was allocated USD282 million, the water sector (water and waste water) as allocated USD150 million, government social sector was allocated USD100 million and USd30 million for schools and hospitals, and USD20 million for assistance in privatization [5].

USD 1,460 million were pledged but the private sector signed USD1,536 million agreements by the end of 2009. This was basically the result of additional loans beyond the pledges because of the increase in the private sector's demand. Disbursement increased by 31% at the end of 2009 (year-over-year change) [6].

c. NGO and Social Support

The United Nations signed agreements increased by USD4 million and most of them were disbursed. Social organization support were committed and pledge amount increased by USD5 million to reach USD104 million [6].

CHAPTER III
LITERATURE REVIEW

A. Keynesian Approach of Fiscal Deficit

The Keynesian theory basically states that consumers are not rational enough to save all the tax cut. They will save a fraction of the tax cut which is the marginal propensity to save. From one side the government revenues, hence savings, declined because of the tax cut. From the other side, the nation's savings declined because citizens spent a fraction of the tax cut and didn't save the whole tax cut. As a result, we have a budget deficit, which in turn will put an upward pressure in the interest rates. This can be shown using a simple open economy IS-LM framework. Once the interest rate increases, the country will face capital inflow leading to an appreciation of the exchange rate. The appreciation in turn would lead to a decrease in exports and an increase in imports, since the good and commodities are cheaper abroad, which will affect negatively the current account. The budget deficit leads to a current account deficit; this is known as the twin deficit hypothesis. The twin deficits theory can be summarized as follows: first, there exists a positive relationship between the budget deficit and the current account deficit positive relationship exists between current account and budget deficit. Second, a unidirectional Granger causality exists and runs from budget deficit to current account deficit and not the other way around. Hutchison and Pigott [7], Rosenweigh and Tallman [8], Ibrahim and Kumah [9], Dibooglu [10], Anoruo and Ramchander [11], Vamvoukas [12], Piersanti [13], Akbostanci and Tunc [14], Leachman and Francis [15], Saleh et al. [16] and Kim and Kim [17] found sufficient evidence to support the twin deficits hypothesis.

B. The Ricardian Equivalence Hypothesis

The Ricardian Equivalence Hypothesis, which Barro [18] worked on, doesn't hold empirically because it is based on rigid/unrealistic assumptions. The assumptions are the following: first, citizens are rational forward looking implying they will save all the tax cut. This assumption also implies the way the debt is financed doesn't matter for citizens, the government can run a budget deficit today or tax today. Second, free financial markets exists implying people can borrow the amount they want at the interest they banks borrow at. Third, the government taxes every citizen the same amount, lump sum tax. If all the listed assumptions hold, there won't be any relationship between budget deficits and current account deficits. In other words, changes in budget deficit don't have any effect on the real interest rates (hence savings and investments), capital inflow, the exchange rate and the current account deficit/surplus. Miller and Russek [19], Enders and Lee [20], Evans and Hasan [21], Bilgili and Bilgili [22] and Kaufmann et al. [23] concluded that there is no link between the two deficits and support the Ricardian Equivalence Hypothesis.

C. The Neoclassical Model of Debt

In the case of internal debt, the above discussed model assumed that there is no welfare loss, only a transfer from one group to another. However, debt does affect welfare even if the debt was internal debt. The government has to levy taxes to pay off the debt. The taxing policy would distort savings and consequently investments. The model also doesn't take into consideration the capital stock left for future generations. If the government wants to undergo a new project it has two options to finance it: taxes or debt. If it chose taxation, most of the resources come at the expense of consumption.

If it chose debt, most of the resources come at the expense of private investment. This is known as the crowding-out effect. When the government wants to finance the project through debt, and since there is a limited pool of resources available for investment, it competes with the private sector over the acquisition of resources. The demand for credit increases which leads to an increase in the cost of debt i.e. the interest rate. Due to this increase, some projects become unprofitable. Debt financing leaves the future generations with less capital stock implying a welfare loss for future generations. According to Diamond [24], external debt, in the long-run, has two effects both arising from the taxes needed to finance the interest payments. The consumption level of the taxpayer is reduced due to the effect of taxes on income. Moreover, taxes reduce capital stock and savings, which is mainly caused by the reduction in disposable income. Internal debt not only has both of these effects but also further reduction in the capital stock arising from the substitution of government debt for physical capital in individual portfolios.

D. Economic effects of public debt

The fiscal deficit and its growth have many negative effects on the economic performance of a country. The deficit would eventually be translated into public debt. Public debt service will start eating out part of the potential growth of the economy hence impeding its productive capacity. Instead of investing in profitable projects, the money would be directed toward debt service hence affecting negatively welfare in the economy. Theoretically the fiscal deficit, hence debt, would have negative effects on interest rates channel affecting mainly savings and investments, price level and current account.

1. The crowding out effect

In theory, interest rates and budget deficits are positively related. This relationship can be seen in loanable funds market because budget deficit will influence the demand and supply of the funds. The demand for these funds is mainly composed of three players being households, firms and the government. When the government demands more funds, it puts upwards pressure on the interest rate because government demand is relatively huge compared to the other 2 players' demand. More and more projects become less profitable, as a result, the government demand crowds out private investments.

According to Barro [25] and the Ricardian Equivalence hypothesis, the crowding out effect is not relevant and doesn't make sense. For him, tax financing or deficit financing lead to the same outcome. If the government did finance its projects through deficit, consumers are assumed to be forward looking and will adjust their current consumption and increase their current savings because later, when the government wants to pay back its debt and the interest accrued on the debt, they have to pay higher taxes. Current savings would increase by an amount equal to the current deficit. If this was the supply of loanable funds (savings) would be equal to the demand of loanable funds (deficit). Hence the crowding out effect doesn't exist in this scenario.

2. Capital Stock Misallocation

According to Samuelson and Nordhaus [26], when the government runs a deficit, it has to issue bonds to finance the deficit. Internal resources would be directed to finance the debt. Instead of investing in profitable capital increasing investments, resources have been allocated in non productive investment being bonds and

mortgages. Consequently, future standards of living would be less than otherwise would have been had the resources been allocated and invested in a growth producing/enhancing investments.

3. Degradation of Savings and Investments

Savings, basically, are composed of private and public savings. If the government spends less than its revenues, total national saving would increase. If it spends more than its revenues, savings would decline. As savings decline, fewer resources would be available for investments leading to a reduction in the economic growth and welfare.

4. Paradox of Thrift

This concept contradicts the Ricardian Equivalence hypothesis because as people realize the debt financing policy of the government, they save more and consume less. As they do so, aggregate demand would fall, total savings would fall, total investments would fall, consequently, economic growth and welfare would fall.

5. Deterioration in the Terms of Trade

Budget deficit increases the interest rates in the economy. Bonds become an attractive investment to foreigners because they are yielding higher return compared to the world interest rate. They start buying bonds by converting foreign currency to local currency hence putting upward pressure in the exchange rate. The local currency would appreciate, and the country starts importing more and exporting less because goods and services abroad are relatively cheaper. This scenario applies to an economy operating in

a flexible/floating exchange rate regime. In a fixed exchange rate regime, no deterioration would take place because the exchange rate is fixed. However, the central bank foreign reserve stock would increase.

6. ***Inflation/Hyperinflation***

Debt financing, if done properly, should not increase the price level in a given economy. Sometimes governments try to finance their spending by printing money i.e.seignorage. Financing through money will definitely lead to inflation, sometime to hyperinflation, because it will increase the stock of money. This increase would be translated to an increase in the aggregate demand which will, in turn, increase prices.

This hypothesis is rejected by Sargent and Wallace [27]. They argued that, unlike debt financing, money financing will not generate inflation in the long run. The cost of running a deficit in the short run is running a deficit in the long run and this deficit has to be financed by either method. According to them, in the long run, if debt becomes unsustainable, the government has either to increase taxes or to let the inflation rates to rise to be able to meet the debt obligations.

CHAPTER IV
EMPIRICAL RESULTS

We would start by testing the twin deficit theory and see if it holds in the case of Lebanon because we assume that the accumulation of debt goes back to the deficit of the government and its inability to pay its expenses and the debt service.

A. Twin Deficit

1. Random walk testing

To check if a relationship exists between the 2 macroeconomic indicators, a random walk check for every series should be done. A random walk series is defined as a non mean reverting series. The best guess of tomorrow's value is simply today's one. A random walk series is a non stationary series (not an I(0) series) and should be differenced to become stationary. The number of differences is dependent on the type of the series. In general, economic series are I(1) or I(2). The test by which we test the stationarity of the series is the Augmented Dickey Fuller test (ADF) [28].

$$\Delta y_t = \alpha + \beta t + (\gamma - 1) y_{t-1} + \sum_{j=1}^{p} \lambda_j \Delta y_{t-j} + \varepsilon_t \quad (1)$$

Where α is a constant, β is the coefficient of the time trend and *p* is the number of the autoregressive terms. If α and β are both equal to zero, this implies that we are modeling a random walk series. However, if only β is equal to 0, this implies we are modeling a random walk series with a drift.

After checking for stationarity of the budget balance series using ADF test, and going from general to specific (including both an intercept and a trend, an intercept term only, and neither of the two and testing for the level), the test let us conclude that a unit root exists. After going from general to specific but testing for unit root in the 1st difference we had the following output:

Table 4.1: Unit Root Testing for the Change in the Budget Balance

Null Hypothesis: The change in budget balance series has a unit root
Exogenous: None
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.261289	0.0000
Test critical values:	1% level	-2.624057	
	5% level	-1.949319	
	10% level	-1.611711	

*MacKinnon (1996) one-sided p-values.

H_0: the series has a unit root H_1: the series is stationary

The p-value is 0.0000 implying the series is stationary. It is an I(1) series and should be differenced once to become stationary. It was modeled as a random walk series because an intercept and a trend terms were not included.

Doing the same test for the current account series, and going from general to specific, a unit root was found for the series under consideration. After going from general to specific but testing for unit root in the 1st difference the following output was obtained:

Table 4.2: Unit Root Testing for the Change in the Current Account Balance

Null Hypothesis: The change in current account series has a unit root
Exogenous: None
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.223698	0.0000
Test critical values:	1% level	-2.627238	
	5% level	-1.949856	
	10% level	-1.611469	

*MacKinnon (1996) one-sided p-values.

The probability value is 0.0000 implying the series now is stationary. The same conclusion was reached for both series.

2. Cointergration testing

a. The Engle-Granger Approach

The series were not differentiated because we wanted to test for cointegration. Having two or more non stationary series is a basic requirement for cointegration to exist. Cointegration is defined as a long term relationship between non stationary series. Even though they are non stationary, their error term may be a stationary process. Had we differentiated the series, we would have flushed out the long term relationship if it existed between the 2 variables in the first place. Since we have a 2-variable model, we can use Engle and Granger test. Engle and Granger [29] developed a two-step procedure, which is only used to see if a cointegration exists between 2 non stationary time series. To make sure that our cointegration test is valid we want to test for cointegration using another test developed by Søren Johansen [30]. There are two types Johansen test, either with trace or with eigenvalue, and the inferences might be a

little bit different. The null for trace test is the number of cointegration vector $r \leq ?$, for eigenvalue test is $r = ?$ We will use these trace method to test for cointegration between Lebanon's current and budget account deficits.

As we said, the Engle-Granger consists of a two-step procedure. First, we have to run the following two regressions:

$$Budget\ deficit_t = \beta_0 + \beta_1\ Current\ account\ deficit_t + \varepsilon_t \quad (2)$$

$$Current\ account\ deficit_t = \beta_0 + \beta_1\ budget\ deficit_t + u_t \quad (3)$$

After running these two regressions, we want to see if the error term is stationary or not. So basically what we will be doing is the simple augmented Dickey Fuller test (ADF). However, in the ADF we won't include an intercept and a trend term.

$$\Delta\varepsilon_t = \theta_0 \varepsilon_{t-1} + \sum_{j=1}^{p} \theta_j\ \Delta\varepsilon_{t-j} + \varphi_t \quad (4)$$

$$\Delta u_t = \theta_0 u_{t-1} + \sum_{j=1}^{p} \theta_j\ \Delta u_{t-j} + \Psi_t \quad (5)$$

H_0: the series are not cointegrated H_1: the series are cointegrated

After we ran the following test, we got the following result for equation 4:

Table 4.3: Testing if the Budget Balance and the Current Account Balance Are Cointegrated Using EG

Null Hypothesis: The residuals series of budget balance regressed on the current account balance has a unit root
Exogenous: None
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.776352	0.0067
Test critical values:	1% level	-2.625606	
	5% level	-1.949609	

	10% level	-1.611593

*MacKinnon (1996) one-sided p-values.

and the following results for equation5:

Table 4.4: Testing if the Current Account Balance and the Budget Balance Are Cointegrated Using EG

Null Hypothesis: The residuals series of the current account balance regressed on the budget balance has a unit root
Exogenous: None
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.330034	0.0209
Test critical values:	1% level	-2.625606	
	5% level	-1.949609	
	10% level	-1.611593	

*MacKinnon (1996) one-sided p-values.

Now we can say that the two series are not cointegrated since the computed t-statistics belongs to the rejection region when compared to the critical values of the Engle-Granger coinetgration critical values table. They are less than the 5% α (with lags -3.17).

b. The Johansen Approach

We now want to test for cointegration using the Johansen cointegration approach. Assuming a linear deterministic trend we got the following output with 6 lags:

Table 4.5: Testing if the Budget Balance Series and the Current Account Balance are Cointegrated Using Johansen Testing Method

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.281868	12.35873	15.49471	0.1405
At most 1	0.021764	0.770169	3.841466	0.3802

The Johansen test also makes us reach the same conclusion as Engle-Granger test hence we could say that the series are not cointegrated. We could say that there exists no long term relationship between the budget deficit and the current account deficit over the period under consideration.

3. Causality Testing

Now we want to test for causality using the granger causality approach. The idea behind this test is if event X comes before event Y then X should precede Y. Basically it helps us test the following hypotheses:

- Current account deficit causes budget deficit
- Budget deficit causes current account deficit
- Both deficits cause each other
- The two deficits are independent

Before doing any test, we should check how many lag we have to include in the granger causality test. The following table tells us that we should include only 9 lags according to the Final Prediction Error, and Akaiki Information Criterion, Schwarz Criterion and Hannan Quinn Information Criterion.

Table 4.6: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-105.8839	NA	3.613024	6.960254	7.052770	6.990412
1	-67.52905	69.28626	0.394266	4.743810	5.021356	4.834283
2	-61.76481	9.669049	0.353425	4.629988	5.092564	4.780776
3	-60.23264	2.372383	0.418653	4.789203	5.436810	5.000307
4	-54.20282	8.558462	0.374140	4.658246	5.490884	4.929666
5	-48.97952	6.739734	0.356326	4.579324	5.596992	4.911059
6	-47.48432	1.736365	0.438404	4.740924	5.943623	5.132974
7	-38.65358	9.115609	0.343053	4.429263	5.816992	4.881628
8	-22.50266	14.58792*	0.172100	3.645333	5.218093	4.158013
9	-12.37158	7.843418	0.132211*	3.249779*	5.007570*	3.822775*

After including 4 lagged values for each of the variables based on the criteria listed above, we ran the following regressions:

$$y_t = \varphi_0 + \alpha_1 y_{t-1} + \cdots + \alpha_9 y_{t-9} + \beta_1 x_{t-1} + \cdots + \beta_9 x_{t-9} + \varepsilon_t \quad (6)$$

$$x_t = \varphi_1 + \Psi_1 y_{t-1} + \cdots + \Psi_9 y_{t-9} + \theta_1 x_{t-1} + \cdots + \theta_9 x_{t-9} + \mu_t \quad (7)$$

Here we are trying to see if $\beta_1 = \ldots = \beta 9 = 0$ and if $\Psi_1 = \ldots = \Psi_9 = 0$

The null hypothesis is *x* that does not Granger-cause *y* in the first regression and that *y* does not Granger-cause *x* in the second regression. Where x_t is the current account and y_t is the budget balance. The test results are given by:

Table 4.7: Causality Testing

Null Hypothesis:	Obs	F-Statistic	Prob.
Current account does not Granger Cause Budget balance	31	6.59895	0.0018
Budget balance does not Granger Cause Current account		1.77081	0.1760

We cannot reject the hypothesis that budget deficit does not Granger cause current account deficit since the probability is 0.1760 which is greater than 5% α.

However, we do reject the hypothesis that current account does not Granger cause budget deficit (probability 0.0018 as compared to 5% α). We can say that in the short run the current account deficit is causing the budget deficit. Therefore it appears that Granger causality runs one-way from current account deficit to budget deficit and not the other way. Hence the twin deficits theory doesn't hold in the case of Lebanon over the period under consideration.

B. Public Debt Effects

The public debt has taken a lot of importance lately because emerging economies have been experiencing debt, increased debt level, and scholars and policy makers are interested whether debt and fiscal imbalances are sustainable or not. One of the literature that focuses on debt, budget deficit and the revenues and expenditures of the government is the Present Value Constraint known as PVC approach. Empirical studies on debt sustainability gained popularity after the financial and debt crisis the world witnessed.

The first framework used tries to test if the fiscal macroeconomic variables used are stationary. Stationarity implies that the budget balance is a mean reverting series mainly around zero (balanced budget). If that was the case, debt would grow but the growth would be bounded implying the debt is sustainable.

The second framework used tests if the expenditures and revenues of the government are cointegrated i.e. they have a long term relationship and drift together at roughly the same rate. If that was the case, the government could cover its expenses from revenues generated and debt would be sustainable since the deficit would be sustainable.

1. Debt Sustainability Stylized Facts

Using the first framework, Hamilton and Flavin [31] found that US debt is sustainable. Tests were done on a series made of 22 observations ranging from 1962 till 1984. Treham and Walsh [32,33], Kremers [34] using different US samples also reached the same conclusion of Hamilton and Flavin.

Others like Smith and Zin [35], Buiter and Patel [36], Baglioni and Cherubini [37] and Makrydakis [38] did the tests on different samples, some were monthly samples and some were yearly ones, and on different countries and did find that debt was unsustainable in the countries tested.

Testing the sustainability using cointegration techniques, i.e. using the first framework, Haug [39], Ahmed and Rogers [40] and Crowder [41] using different countries and samples, yearly or quarterly samples, did find that debt was sustainable. On the other hand, Papadopoulus and Sidiropoulos [42] found that debt was unsustainable for 5 countries belonging to the European Union.

The studied countries were developed ones. Emerging economies sometimes print money to finance their budget deficit i.e. seignorage revenue. Moreover, regime change occurs more frequently in emerging countries compared to developed economies. These structural breaks should be accounted for by using dummy variables in order to estimate the cointegration relationship, if any exists, correctly.

The model what will be used is the Ricardian Equivalence Theorem Barro [43]. It is based on 2 constraints: and inter-temporal budget constraint and a transversality condition.

The budget constraint can be stated as follows:

$$B_{t+1} = (1+r)B_t + G_t - R_t \quad (8)$$

Where:

B_t is the public debt (local and foreign/external debt)

rB_t is the debt service

G_t is the government spending

R_t is the government revenues

This equation states that future debt is a function of the outstanding debt, debt service, and the fiscal deficit/surplus. If there is a budget deficit, the debt will increase because the expenses would be financed through debt. If there is a surplus, it would be used to pay back the debt service and part of the debt.

Solving the equation forward and taking expectation, one gets the following:

$$Bt = \sum_{t=1}^{\infty} E_t \frac{(R_t - G_t)}{(1+r)^t} + \lim_{t\to\infty}\left(\frac{B_t}{(1+r)^t}\right) \quad (9)$$

As t goes to ∞, the second right hand side term in the above equation would converge to zero for the transversality condition to be valid. This is known as the non Ponzi Game. For this non Ponzi Game to be satisfied the debt growth should be smaller than the interest rate growth.

$$B_t = \sum_{t=1}^{\infty} E_t \frac{(R_t - G_t)}{(1+r)^t} \quad (10)$$

Had the second right hand side wasn't equal to zero, a bubble term is introduced. The bubble term is $A(1+r)^t$. A is the constant term in the following regression:

$$B_t = A + B_{t-i} - R_{t-j} + G_{t-j} \quad (11)$$

Where i ϵ [1,t] and j ϵ [0,t].

A turned out to be insignificant when it was tested empirically.

Haug [39] found that if the primary deficit and public debt series are cointegrated, the non Ponzi Game constraint would be satisfied implying that:

$$\lim_{t\to\infty}\left(\frac{B}{(1+r)^t}\right) = 0 \quad (12)$$

Hamilton and Flavin [31] rejected the hypothesis of non-stationarity of public debt and the primary balance series.

According to Hakkio and Rush [44], a cointegrating relationship does exist between government revenues and government spending (including debt service), implying they are not stationary and have a unit root.

Arranging equation 8, we get the following:

$$(B_{t+1} - B_t) = rB_t + G_t - R_t \quad (13)$$

The left hand side term should be stationary because it is the differenced series of the public debt series. The government spending (including debt service) and government revenues should be cointegrated for the LHS term to be satisfied. According to Trehan and Walsh [32, 33], budget deficit (total) should be stationary. This implies that government deficit will not grow unlimitedly and fiscal policy is sustainable. Deficit will converge to zero hence the transversality condition would be satisfied. Moreover, according to them, for the deficit to be sustainable, the cointegrating relationship should be equal to one, otherwise deficit is not sustainable. However, Quintos [45] proved that the cointegrating relationship would be equal to one if only the case is of perfect sustainability. Any relationship being between zero and one would be weakly sustainable. The closer the cointegrating relationship to one, the better.

When testing for cointegration between 2 variables and having a small sample, one can get 2 different results. One variable could be cointegrated with the other one while the other one wouldn't be cointegrated with the first variable. However, as the sample size goes to infinity, one should get identical results and reach the same conclusion. Engle Granger and Johansen cointegration method will be used. Engle Granger method will be used while using Dynamic Ordinary Least Squares (DOLS) i.e. taking lags and lead variables. Stock and Watson [46] and Saikkonen [47] proved that this method has a superior performance than OLS in small samples and is asymptotically equivalent to Johansen maximum likelihood estimator.

The regression to be tested is of the form:

$$R_t = \alpha + \beta G_t + \sum_{i=-j}^{j} \Delta G_{t-i} + \varepsilon_t \quad (14)$$

The lead and lag difference account for any endogenous feedback between the government expenditures and revenues. If the error tem is identically and independently distributed (i.i.d.), use DOLS. If the error term exhibits serial correlation, Dynamic Generalized Least Squares (DGLS) method should be used. If the error term turned out to stationary, the two series would be cointegrated. The vector of cointegration estimated would be:

$$VC = R_t - \alpha - \beta G_t \quad (15)$$

Debt would not be sustainable if no cointegration exists. However, if cointegration does exist, the variables should be modeled by an Error Correction Model (ECM) of the following form:

$$\Delta R_t = C + \sum_{i=1}^{m} \varphi_i \Delta R_{t-i} + \sum_{j=1}^{n} \Psi_j \Delta G_{t-j} + \lambda VC_{t-1} + \mu_t \quad (16)$$

Table 4.8: Unit Root and Stationarity Testing

	Revenues	Expenditures	Total Expenditures	Budget Balance	Debt	Mackinnon Critical values 1%	5%
Constant and time trend							
ADF (1)	-0.755606	-1.57861	-1.474655	-1.973325	0.831659	-4.22	-3.52
ADF FD (1)	-5.963635**	-6.65885**	-5.167997**	-5.485322**	-4.944189**	-4.2	-3.52
Constant							
ADF (1)	1.617688	0.497206	0.872929	-0.356982	5.654504	-3.61	-2.94
ADF FD (1)	-5.240457**	-6.440757**	-4.917293**	-5.531972**		-3.6	-2.93

Total expenditures are government expenditures +debt service
FD is the first difference; ADF is the Augmented Dickey–Fuller. The numbers in parentheses are the proper lag lengths based on the Akaike Information Criterion (AIC).
** Strong rejection of the null hypothesis of non-stationarity at the1% level of significance;
For most variables the time trend variable is statistically insignificant.

Total government expenditures (including debt service) and government revenues are tested for stationarity (I(0) processes) using the Augmented Dickey-Fuller method. Stationarity implies that the series are mean reverting. If that was the case, fiscal balance, hence public debt, is sustainable.

Looking at table 4.8**,** it is evident that the series tested for existence of unit roots are revenues, expenditures, total expenditures, budget balance and debt. It is apparent that all the series have a unit root since all the computed values for the ADF statistic, including a trend and a constant or only a constant, are below the critical values of the 1% and 5% level of significance. However, after differencing each series once, all the series became stationary implying that all the series had one root. Trehan and Walsh [32, 33] stated if total government expenditures and government revenues are non stationary processes, it is a sign of unsustainable budget balance, hence public debt. Moreover, this non stationarity implies that the transversality condition is violated because the second right hand side in equation 9 is not equal to zero and it will never converge to zero.

However, their conclusion is a bit rigid. One could have 2 non-stationary series and still get a stationary process if they have a cointegrating relationship which will let them move in the same direction and more or less by the same magnitude. Hakio and Rush [44] did ratify this concept.

As stated above, Dynamic OLS would be used in this section. 2 models will be tested: one excluding debt service and the other including the debt service in the government expenditures.

Based on the Akaike Information Criterion (AIC), 6 lags were included in equation 14. The residuals were saved and tested for unit root using the ADF approach.

Table 4.9: Testing if the Government Revenues and the Government Expenditures (Excluding Debt Service) Are Cointegrated Using EG

Null Hypothesis: ε_t has a unit root
Lag Length: 0 (Automatic based on AIC, MAXLAG=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.108946	0.0031
Test critical values:	1% level	-2.653401	
	5% level	-1.953858	
	10% level	-1.609571	

*MacKinnon (1996) one-sided p-values.

One should be confused here and should compare the computed t-statistic with the special Engle-Granger critical values to check if the residuals series has a unit root or not. The critical value for no lags and with 5% significance level is -3.37. Hence we have enough evidence to say that the two series being the government revenues and expenditures are not cointegrated. In this case the debt is unsustainable.

Based on the Akaike Information Criterion (AIC), 1 lag was included in the Engle-Granger equation stated above. The residuals were saved and were tested for unit root using the ADF procedure.

Table 4.10: Testing if the Government Revenues and the Government Expenditures (Including Debt Service) Are Cointegrated Using EG

Null Hypothesis: ε_t has a unit root
Lag Length: 0 (Automatic based on AIC, MAXLAG=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.448073	0.0158
Test critical values:	1% level	-2.628961	
	5% level	-1.950117	
	10% level	-1.611339	

*MacKinnon (1996) one-sided p-values.

In this case, when the debt service was included in the expenditures, the computed t-statistic is smaller than the critical value at the 5% level even smaller than the 10% level of significance (-3.3). Hence we don't have enough evidence to conclude that the two series being the government revenues and total expenditures are cointegrated. In this case, public debt in Lebanon would not be sustainable. In both cases the debt would be unsustainable.

2. The Effect of Debt Service on Debt

To see the effect of debt service on debt, a simple equation was estimated.

$$\text{Debt} = \text{Debt service} + \varepsilon_t \quad (17)$$

However, this equation cannot be tested because the debt and the debt service series have unit roots. Hence, Box-Jenkins, ARIMA(1,1,1), method was used. To catch the effect of debt service on the debt and isolate the effect of the previous debt and the previous error terms, the previous debt and the previous error terms had to be included in the model.

$$\Delta\text{Debt} = \Delta\text{Debt service} + \text{MA}(1) + \text{AR}(1) + \varepsilon_t \quad (18)$$

MA(1) and AR(1) terms were included in the model after doing the diagnostic check of the error terms and making sure they don't exhibit serial correlation.

Table 4.11: Regression of Debt on Debt Service (ARIMA(1,1,1)

	Coefficient	Std. Error	t-Statistic	Prob.
Δ(Debt Service)	2.386523	0.543712	4.389312	0.0001
AR(1)	1.037529	0.041130	25.22544	0.0000
MA(1)	-0.655083	0.159248	-4.113606	0.0002

From table 4.11, it is evident that the effect of an increase of one billion USD in debt service will increase the debt in Lebanon by USD 2.3865 billion.

3. Debt Related Welfare Loss

To see the welfare loss due to public debt, the following equation was estimated:

$$GDP = Debt + \mu_t \quad (19)$$

However, this equation cannot be tested because the GDP and the debt series have unit roots. Hence, Box-Jenkins [48], ARIMA(1,1,0), method was used. To catch the effect of debt on GDP and isolate the effect of the previous debt and the previous error terms, the previous debt had to be included in the model.

$$\Delta GDP = \Delta Debt + AR(1) + \mu_t \quad (20)$$

AR(1) term was included in the model after doing the diagnostic check of the error terms and making sure they don't exhibit serial correlation.

Table 4.12: Regression of GDP on Debt (ARIMA(1,1,0)

	Coefficient	Std. Error	t-Statistic	Prob.
Δ(Debt)	0.429933	0.099135	4.336859	0.0001
AR(1)	0.332337	0.176439	1.883579	0.0677

From table 4.12, it is evident that the effect of an increase of one billion USD in debt will decrease the GDP in Lebanon by USD 0.43 billion. One should be keen in interpreting the coefficient. The coefficient is positive, but this is mainly due to the fact that the series of public debt is positive, but debt in itself is a liability and should be negatively related to GDP.

C. Projections of Future Debt and Primary Balance Levels

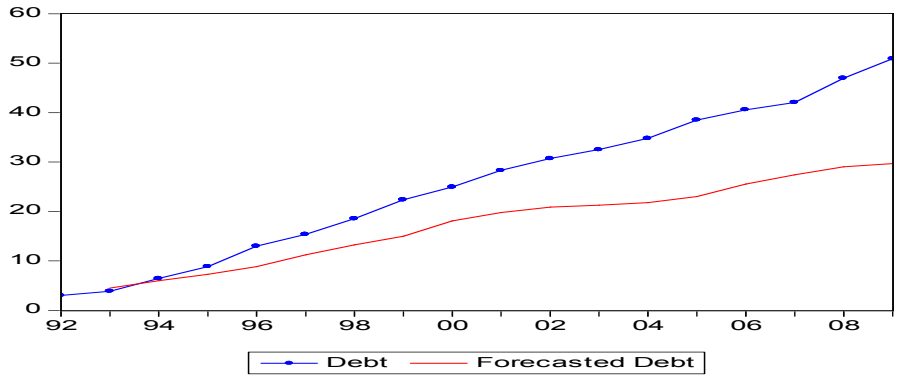

Figure 4.1: Actual and Forecasted Total Debt
Source: Authors Calculations and IMF

Figure 4.1illustrates the actual debt and the forecasted/estimated debt. The estimated debt in 2009 is USD22 billion lower than the actual debt. The year 1992 was not chosen arbitrarily, it was chosen because it was the year where civil war ended and the government started rebuilding and spending on infrastructure and other massive destruction Lebanon witnessed during the war. The interest rate that the government should have paid on the debt is estimated. It is composed of the 12 months LIBOR rate

adding to it a subjective risk premium ranging from 5% in peace time and 7% in war and other shocks that Lebanon witnessed from 1993 till 2009. Then the debt is calculated as the previous debt plus the debt service on the outstanding debt and adding the budget balance if it was a deficit and subtracting budget balance if it was a surplus.

If the public debt grows at a 6 percent and primary budget balance at a rate of 7 percent from now till 2032, the public debt will reach its peak in 2029 and then decline. The public debt growth was estimated by assuming that the 12-month LIBOR rate being 2 percent and the risk of Lebanon being 4 percent. This analysis was done without taking into consideration any additional debt and taking into consideration that the primary budget balance would always be positive in the period under consideration. Figure 4.2 shows the projected debt.

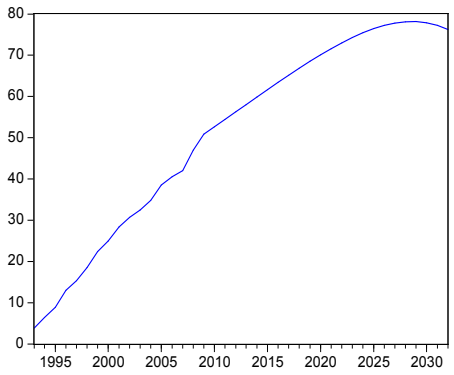

Figure 4.2: Projected Debt (in billions of USD)

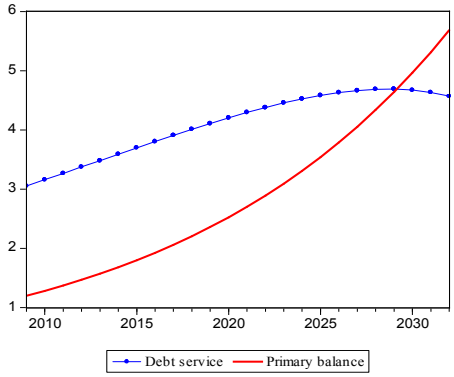

Figure 4.3: Projected Debt Service and Primary Balance (in billions of USD)

Source: Authors Calculations and IMF

Figure 4.3 shows the debt service and primary balance. One could see that the in 2029 the two variables intersect, and then primary balance becomes greater than the debt service. This is where the public debt starts declining because the additional/excess money would be theoretically used to pay back the debt.

CHAPTER V

CONCLUSIONS AND POLICY IMPLICATONS

In the last quarter of the 20th century Lebanon witnessed a civil war massively damaging, directly and indirectly, its infrastructure, its economy and its growth and development opportunities. The government was forced to undertake fiscal policies characterized by long term budget deficit. It was also forced to embrace the burden of public debt. However, the debt could have been sustainable and manageable has the government didn't offer high treasury bills interest rates.

The purpose of the project is seeing the evolution of the debt in the pre-war, war, and post-war eras. Debt and all macro-economic variables, linked directly or indirectly to debt, were analyzed. Debt reached USD51 billion in 2009 and the debt-to-GDP ratio was at its highest in 2006 (181 percent). The debt structure is composed of local/domestic and external/foreign debt. In 2009, it was composed of almost 45% foreign debt and 55% of domestic debt.

The aid conferences mainly Paris I, II, and III constituted an important part in this project. Some of the pledges were used productively, while others are still to be signed and received by the government. They weren't received yet basically because of the slow decision making and slow ratification by parliament.

After a literature review concerning the twin deficit hypothesis, the twin deficit theory was tested in the case of Lebanon. In our case, there exists no long term relationship between the current account deficit and the budget deficit. The twin deficit theory fails to hold and in the short run there is a one way causality relationship which

goes from the current account deficit to the budget deficit; i.e. current account deficit causes budget deficit.

A meticulous literature review was done concerning the debt sustainability and after testing the sustainability of the Lebanese public debt, excluding the debt service and including made us reach the same conclusion. Debt turned out to be unsustainable. Then, we tried to catch the effect of debt service on the public debt. It was evident that the effect of a decrease of USD1 billion in debt service will decrease the debt in Lebanon by USD 2.3865 billion. The effect of debt on the GDP (which was assumed to catch up the welfare in the economy) was tested and it was apparent that an increase of USD1 billion in debt will decrease the GDP by USD 0.43 billion. In the final part of the project, some assumptions were taken into consideration related to debt management. If these assumptions hold and the government starts implementing a proper debt management program, debt would reach its peak (around USD80 billion) in 2009 and then start declining. If the primary budget surplus is not increased and the debt interest rates are not managed, the debt would be unsustainable and will threaten the economy as a whole and the financial system would fail. Had the government managed the debt from the beginning (i.e. in 1992) and paid realistic interest rates, Lebanon debt would have stood at USD29 billion instead of USD51 billion in 2009.

To solve the public debt problem, the Lebanese government has either to reduce its expenditures or increase its revenue in a way to have a surplus in its budget and pay part of the outstanding debt and the interest. Debt in absolute term in not harmful to the economy, it becomes harmful when compared to GDP, however. Debt-to-GDP ratio in Lebanon reached an alarming level 181% in 2006. One should take into consideration that Lebanon, unlike other oil-rich Arab countries, is not rich in natural

resources (except water). Maybe Lebanon is rich in natural resources, oil and gas probably, but wells are not discovered yet. The government could rely on one or more of the proposed solutions to reduce and eliminate public debt gradually.

The government can fire unproductive workers from the public sector. If it doesn't want to fire them, at least it can find a "matching job" for every worker or group of workers. Some workers do nothing; all what they do is drinking coffee and reading newspapers every day. Why don't they do something productive? For example, public sector workers could be shifted to municipalities and do some patrolling, which in return would be increasing the welfare of the citizens by increasing the security level in the country.

The electricity of Lebanon has been losing every year and the loss is directly related to the price of oil. In 2008, the deficit stood at $1.86 billion and in 2009 it decreased to $1 billion. This loss was mainly financed by the government. Instead of paying high bills for an obsolete old energy producing firm, the government could privatize the EDL. Privatization of EDL could take one of the following forms. The government can sell it or lease the plants for an investor (the investor could be a company), it can privatize its management, or it can sell it by issuing shares and selling them on the stock market. In all three cases, the government would increase its current and future income stream. On one hand, the government would increase it revenues instantaneously by privatizing the EDL. On the other hand, the future income streams are quasi-assured because the government would benefit by taxing the EDL. Taxing the profits of the company and taxing stockholders on capital gain. Moreover, the government can sell the physical plants and initiate a long term lease contract. On one hand it could benefit from the upfront payment received to pay part of the debt or to

repair or pay maintenance fees for the plants. On the other hand, the production of electricity would be still under its control.

Policy makers have to be credible. If the public doesn't believe in the government due to the lack of credibility, transparency, had bad experience or there is an inconsistency of monetary or fiscal policy, the government has to increase the interest rate to make their bonds attractive. Moreover, foreign grants and remittances inflows are highly affected by the credibility of policymakers and by the political stability in Lebanon. Hence the inflow would increase consumption and investments, increase government revenues (through taxation) and credibility would reduce the burden of interest payment (after the reduction of the debt service the government could repay part of the principle) eventually eliminating the debt gradually.

One of the strategies to reduce the public debt is to find a strategy by which the economy grows at a faster pace than that of the public debt (the main the objective of the forecasted debt done in chapter IV was to highlight this idea).

An efficient taxing system can increase government revenues. An efficient taxing system should be characterized by transparency, fairness, and efficiency of tax collection. The government has the tools, all the tools, which, if used wisely, increase the revenues.

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