Government Spending, Growth And Sustainability of Deficits and External Public Debt: The Case of Lebanon [1]

Simon Neaime, Ph. D.
Associate Professor
Department of Economics
American University of Beirut
Beirut-Lebanon
Tel (9613) 829944-Fax (9611) 744484
Email: sn01@aub.edu.lb

Abstract

This paper presents a thorough empirical analysis of fiscal developments in Lebanon over the past three decades. After an evaluation of major fiscal and monetary developments, the paper establishes empirically that the optimal size of government spending as a percent of GDP is estimated at about 28 percent. The paper then uses debt ratio analysis and the Present Value Constraint framework to analyze whether debt and deficits are sustainable. Unit root and cointegration tests reveal that public debt and external debt in Lebanon are both not sustainable. In short, Lebanon could be heading towards a debt and exchange rate crisis, which could degenerate into a banking crisis similar to the one observed in Argentina, unless timely fiscal adjustment measures are introduced in the near future.

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1. Introduction

In the past two decades, an increasing number of exchange rate and debt crisis have brought forward the potential damage on a given economy emanating from a weak public sector. Policy makers and academics have thus devoted considerable efforts in trying to study the weaknesses of the public sector, particularly in emerging economies that are exposed to various domestic fiscal and external imbalances. These efforts are primarily devoted to try and forecast whether budget deficits and total public debt are sustainable. In the instance where debt is not sustainable, then reforming fiscal policies will be a must in avoiding a fiscal, monetary and exchange rate crisis.

After the accumulation of a sizeable debt in Lebanon, the financial distress of the public sector has become a major source of concern for the Lebanese economy. It is well known that Lebanon has been running a permanent budget deficit for the past two decades for about 30 percent of GDP, resulting in a debt that is currently above 180 percent of GDP. While some efforts have been undertaken recently in order to balance the primary deficit, by introducing the Value Added Tax (VAT), reforming the archaic taxation system, and improving government collection of tax revenues, fiscal policy seems unable to generate a structural change via privatization or the use of the proceeds[2] of the Paris II Conference of International Donors' Countries, in order to change the growing trend of the Debt/GDP ratio. The fiscal problem is made even more urgent by the donors' countries, which have put pressure on the Lebanese government to restructure its debt, privatize and improve tax collection. Failure of the Lebanese government to timely implement the necessary fiscal adjustments will certainly lead to a debt and currency crisis, and subsequently, to a chain of bank failures, since a major portion of public debt is held by the Lebanese banking system.

This paper will attempt to assess the sustainability of the Lebanese current fiscal policy, and evaluate whether it is violating the intertemporal budget constraint for the public sector. Broadly speaking, such a constraint stipulates that a fiscal policy is sustainable when it is expected to generate sufficient net revenues in the future to repay the accumulated debt and its service. However, a fiscal policy becomes unsustainable if the government intends to finance its future interest expenses by issuing further debt, and is unable to generate adequate revenues even via seigniorage.

Studies analyzing public sector's vulnerability have considered closely the issue of fiscal sustainability. Fiscal sustainability can be determined in various ways and the economic literature is rich in studies trying to assess the vulnerability of the public sector. Three

[2] The Paris II Conference has pledged USD 4.2 billion in loans at prime interest rate.

theoretical frameworks have been used frequently in the literature to assess the sustainability of public policies: (1) Debt Ratio analysis; (2) the Present Value Constraint (PVC); and (3) the Accounting Approach. This paper will make use of the first 2 frameworks to look at the issue of fiscal sustainability in Lebanon. It also employs unit root and cointegration tests on different components of the public budget and the balance of payments to analyze the sustainable of internal and external debt.

A country's external debt is sustainable if it can be serviced without either a restructuring of debt obligation, or a large correction in the balance of income and expenditure. Thus, solvency of a country depends on both a willingness to pay, as well as, an ability to pay.

While a country facing a liquidity problem does not necessarily mean that its debt is unsustainable, insolvency of a given economy means that debt is unsustainable. An economy faces a liquidity problem when its due liabilities in a given period exceed its liquid foreign currency assets. In other words, a country may face a cash flow problem, even if it might be solvent in the long run. Consequently, the economy is unable to meet its immediate external obligations. However, a solvency[3] problem arises when a given country will never be able to service its debt out of its own resources. Under these circumstances the external debt burden is said to be unsustainable.

The conduct of fiscal policy in the emerging economy of Lebanon has recently become critical in determining the country's future economic and fiscal situation, due to the accumulation since the early 1990s of a sizable level of debt. The Lebanese financial market is still under developed and the government has been the only body that is currently borrowing domestically and from the international bond market, whether to finance its current expenditures or to repay its foreign debt. Since Lebanon has been financing its budget deficits via borrowing, this has had a direct bearing on interest rates, inflation, and exchange rates, and the rate of growth of GDP. Deficit financing has also affected private sector's growth directly by crowding out private investment. Thus, Lebanon's ability to repay its external debt obligation can be viewed in the context of its ability to tax its residents and use the revenue to buy foreign exchange for debt service payments on one hand, and on its ability to reduce government spending and control the debt and its service on the other.

[3] Insolvency of a given economy means also that the present value of the sum of future income minus expenditure is larger than the initial level of indebtedness.

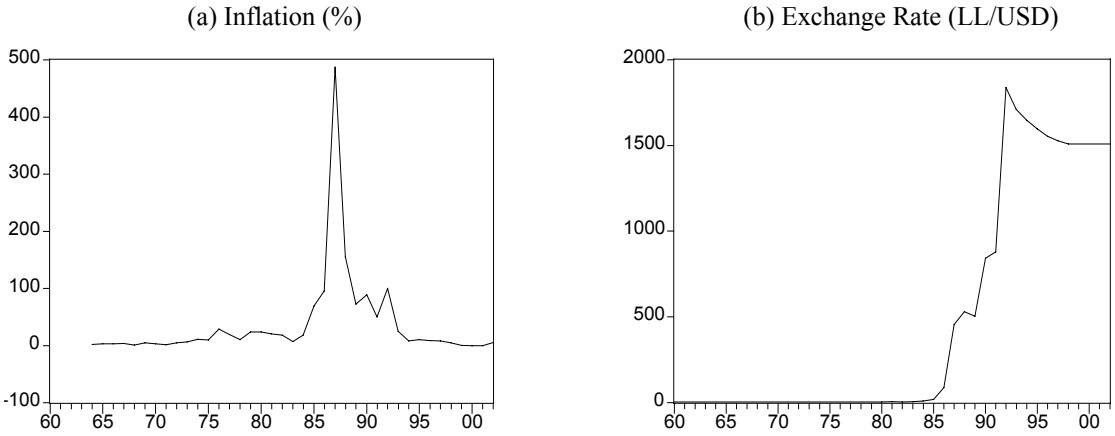
The rest of the paper is divided as follows. In the next section we review the macroeconomic developments in Lebanon over the past three decades with a detailed overview of the development of fiscal and other macroeconomic variables. Section 3 highlights the size of the public sector in Lebanon and establishes empirically the optimal level of government spending. Section 4 explores empirically the issue of public debt sustainability in Lebanon, using ratio analysis and the Present Value Constraint. Section 5, analyses in details the issue of external debt sustainability using unit root and conintgeration tests. Section 6 concludes the paper with some policy implications.

2. Fiscal and Macroeconomic Developments in Lebanon: 1970-2002

Subsequent to fifteen years of disturbances, which resulted in massive infrastructure damage[4], and economic difficulties, Lebanon has engaged since the early 1990s into a massive reconstruction plan. During the war period, the Lebanese government revenue base was eroded due to the inability of the government to collect taxes, and the absence of adequate infrastructure. There was no external support available given the high political instability and the shaky macroeconomic performance. The latter led to intense reliance on domestic currency financing for government spending, and to increased resort to monetary financing during the years 1989-1991. The rate of inflation was at its highest historical levels of 400 percent, 99.79 percent and about 50 percent in 1989, 1990 and 1991 respectively. Total public debt stood at 40 percent of GDP by end-1992 even before any major reconstruction measure was undertaken. From about Lebanese Lira (LL) 3/USD prior to 1985, the exchange rate, by late 1992, shot up by 110 percent over its 1991 level to reach as high as L.L. 1838/USD (see Figure 1). At that time, however, Lebanon's Gross Domestic Product (GDP) was taking on an upward drift, increasing from USD 2.835 to 4.455 and 5.168 billion in 1991, 1992 and 1993 respectively (Figure 2).

[4] Physical assets ruin was estimated, by the United Nations, to be around USD 25 billion.

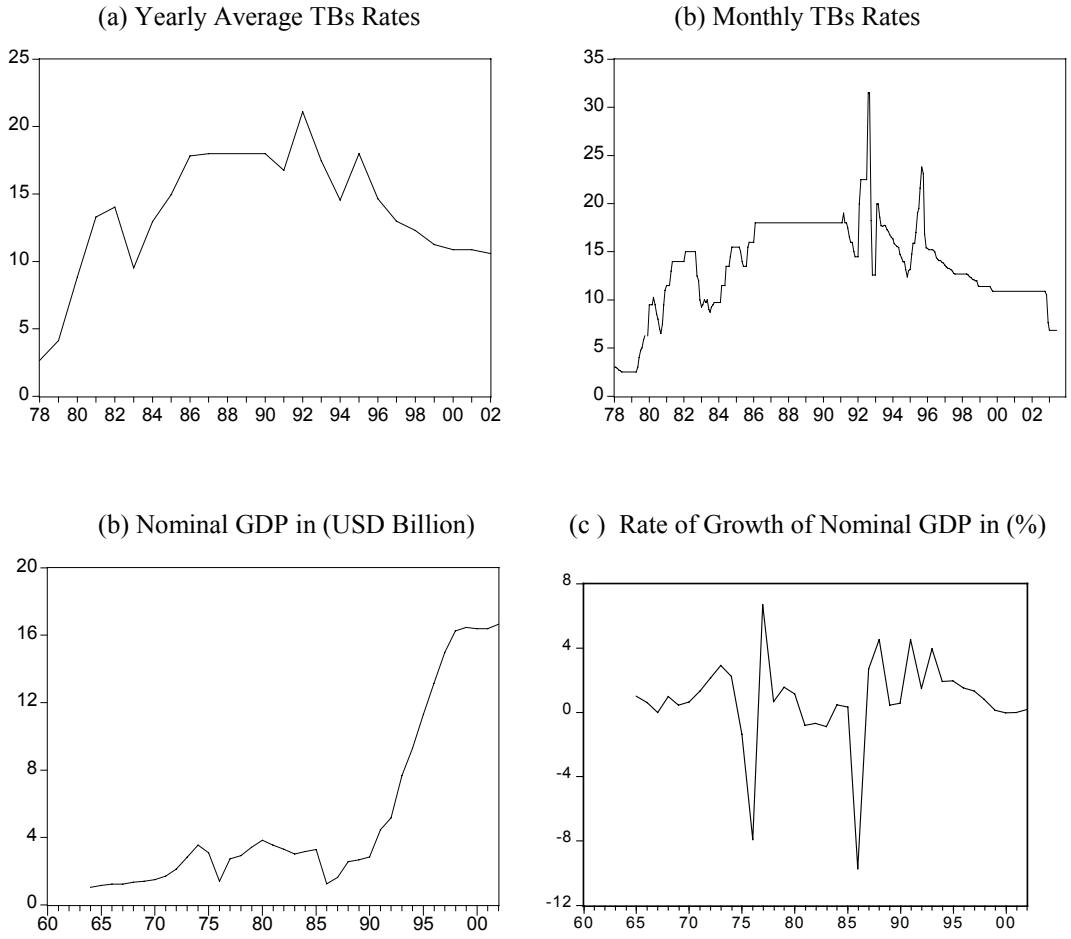
Figure 1. Inflation and Exchange Rates: 1960-2002



Source: Banque Du Liban (BDL), Lebanese Ministry of Finance and IMF.

To reinstate confidence in the country as a preparatory procedure for external assistance request, the newly established government that took office in 1992, opted for exchange rate based stability policies. The Lebanese pound appreciated against the dollar by 6.91 percent and 3.74 percent in 1993 and 1994 respectively. The inflation rate declined to 30 percent in 1993 to reach the single digit level, 9 percent, by 1994, and down to about zero percent since 1997 (Figure 1). A low inflation rate coupled with high real rates of interest encouraged the inflows of private capital and the initiation of the reconstruction program, which received its initial funds from foreign donors and was embarked on in 1993. The Lebanese pound was stabilized and was appreciating steadily against the USD dollar since 1993. However, the 3 month Treasury Bills (TBs) rate kept on increasing to reach its highest level, 33 percent in 1993, with a milder peak of 25 percent in 1995, at a time when all observers were expecting these rates to fall as a result of the steady appreciation of the LL. With a low rate of inflation rate of 2 percent, this constituted a real effective return on domestic short-term debt of 28 percent. There was, however, a reversal in the increasing trend of TB rates since end of 1996, and the real return on Lebanese treasury bills with maturities between 3, 6 and 24 month ranged between 12-18 percent. It goes above the US dollar and the Euro LIBOR (or risk free rate) by about 12-15 percent (see Figure 2).

Figure 2. Nominal 3 Month Treasury Bills Rates and GDP



Source: Banque Du Liban (BDL), Lebanese Ministry of Finance and IMF.

On the other hand, the Lebanese monetary authority, Banque Du Liban (BDL) was pursuing a conservative monetary policy with as target price and exchange rate stability. While these efforts were successful in stabilizing the exchange rate and bringing down the rate of inflation to about zero percent, the strict monetary policy was also exerting upward pressures on domestic interest rates. Instead of pursuing an accommodating monetary policy to ease up the upward pressure on domestic interest rates, BDL was reluctant to take that venue due to several episodes of political instability, and fears from a renewed devaluation of the local currency. The outcome of a restrictive monetary policy coupled with a heavy reliance on domestic credit was clear. A sizeable public debt started to emerge coupled with its heavy service burden, which subsequently translated into recurrent budget deficits.

All this helped in the acceleration and widening of subsequent budgetary deficits even at a time when government revenues were increasing by four folds in 1996, increasing from USD 619 million in 1992 to about USD 2.2 billion in 1996. To finance the fiscal imbalance, the Lebanese debt was soaring up rapidly. The debt and the need to finance it, have

contributed to the early 2000s' recession (with an average growth in GDP of 1 percent) by the crowding out of private sector's investments subsequent to high interest rates peaking at 30 percent in 1993 (Figure 2).

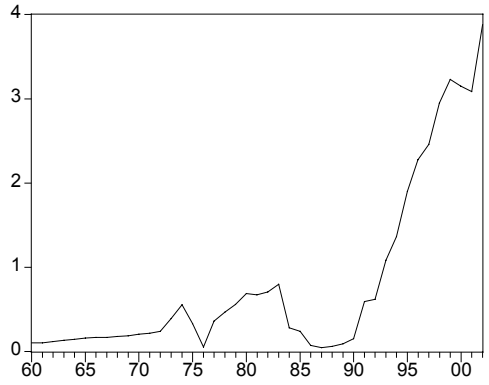
The fiscal and debt burden were carried on to the latter half of the 1990s and early 2000, with the rate of growth of GDP decreasing steadily since 1997. Tapping international capital markets was becoming more difficult or almost impossible for Lebanon, due to the East Asian financial crisis that diverted away all kinds of external support to other emerging economies, on one hand, and the deteriorating fiscal position of the Lebanese government on the other. As a consequence, Lebanon's sole option was to turn to more domestic borrowing, but in foreign currency, tapping the financial savings of the Lebanese private sector[5] and the pool of resident investors, while offering increasing spreads given the disturbingly increasing debt and deficit. The high debt cost could not but further deteriorate the fiscal imbalance and called for immediate action. The previously mentioned crowding out effect of private sector investments materialized in the slow growth of GDP which came close to stagnating with a mere 1 percent increase recorded in 1999, 2000 and 2001. Moreover, the narrow debt holder base was concentrated in Lebanese private commercial banks, which retained more than 70 percent of total public debt at end of 1998. This fact urged the government to diversify its sources of financing, broaden the investors' base and ensure better debt management.

After ten post-war years of the so-called reconstruction and economic revival, the Lebanese government reviewed its list of priorities with debt reduction now occupying the lead position. In September 2000, international credit agencies threatened to further downgrade Lebanon's credit rating. Moody's declared that it would review its B1 rating on Lebanon's short-term domestic debt, essentially Treasury Bills. Standard and Poor lowered its rating on Lebanon's long-term foreign-currency debt by one notch to B+ from BB, citing Lebanon's onerous debt-service burden, persistent high budget deficits, and the stemming debt as the main reasons for such action. The new decade's budgets initiated a correction in the country's fiscal imbalances, by relying on a dual track of decreasing expenditures and increasing public revenues.

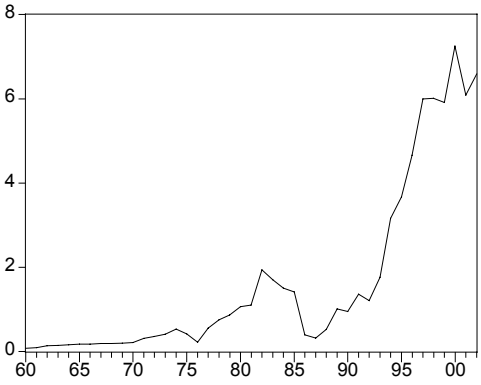
[5] The 14 million wide Lebanese expatriate base contributed in 20% of total capital inflows in 1998 (Lebanese Ministry of Finance, 1999).

Figure 3. Fiscal Developments: 1960-2002

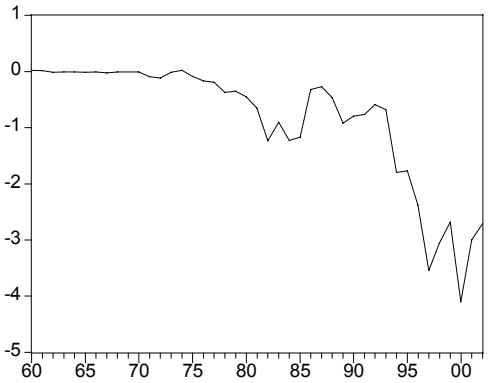
(a) Revenues in (USD Billion)



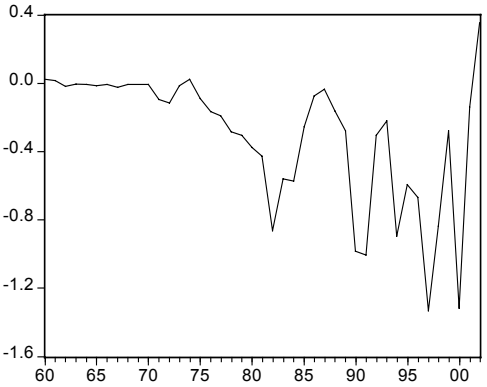
(b) Government Spending in (USD Billion)



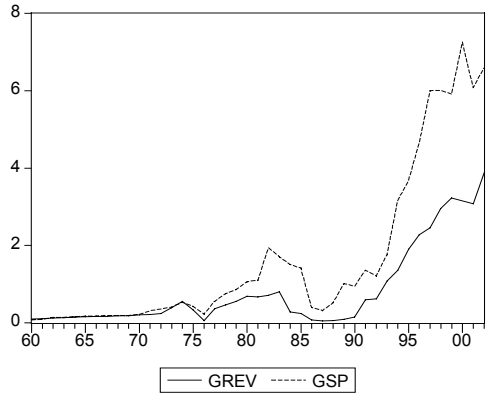
(c) Deficit or Surplus in (USD Billion)



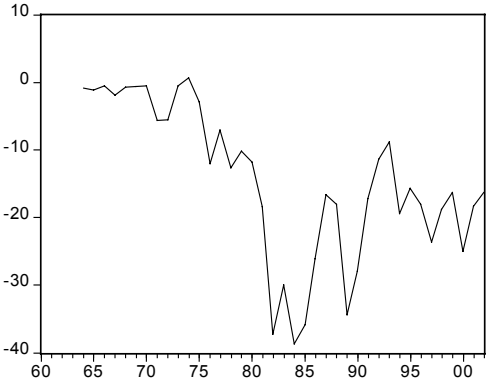
(d) Primary Deficit or Surplus in (USD Billion)



(e) Government Spending (GSP) and Revenues (GREV) in (USD Billion)



(f) Budget Deficit/GDP in (%)



Source: Banque Du Liban (BDL), Lebanese Ministry of Finance and the IMF.

Figure 3 indicates a steady increase in government revenues since the early 1990s, while at the same time government spending inclusive of servicing of the debt was also moving in the same direction. However, since the early 1990s the gap between government expenditures and revenues seems to be widening at an alarming rate (see Figure 3(e)). Another key variable in analyzing debt sustainability is the primary fiscal deficit. A permanent increase in the primary deficit would increase the likelihood of debt becoming unsustainable and contribute to the worsening of the management of public debt. Moreover, a

continuous increase in the primary deficit through insufficient tax revenues or increased government expenditures would render debt unsustainable by (1) increasing the real interest rate, (2) reducing GDP growth, and (3) through increasing the level of debt. The Lebanese primary deficit seems to be reverting to zero over the last two decades indicating no real concerns in the foreseeable future. However, the total deficit, which reflects addition of debt service of Lebanese public debt to government expenditures, has become significant since the early 1990s, averaging between USD 3-3.5 billion. The deficit to GDP ratio has also been hovering between 20-30 percent since the mid 1990s (see Figure 3(f)).

A high burden of debt service, coupled with high government spending and modest increases in government revenues led to the accumulation of a sizeable public debt. The debt to GDP ratio, which has exceeded 180 percent by end of 2003, and which is the highest in the Mediterranean region, has put Lebanon in the forefront of emerging economies with foreign debt problems. As noted before, the significant debt service in Lebanon is primarily behind the continuous fiscal deficit and the increased debt stock. Total debt service represented 18 percent of total GDP in 2002, and was described by the government's official report in the Paris II meeting as "unusual" and "unsustainable". Banks and other private sector entities hold the larger part of total domestic currency debt with USD 12.7 billion in 2002, which corresponds to around 61 percent of total public debt (see Table 1).

Table 1. Domestic Currency Debt Composition

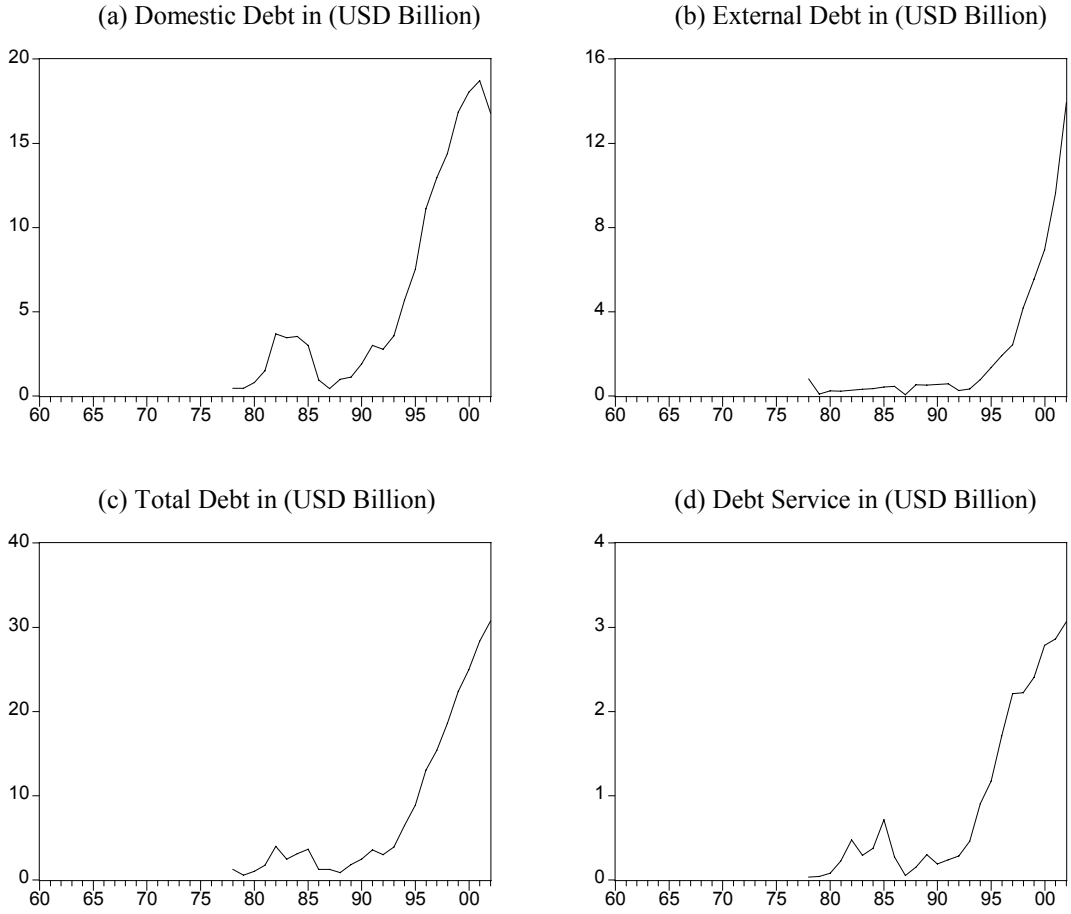
USD Billions	**2000**	**2001**	**2002**
Banks and the Private Sector	14.5	11.9	12.7
Public Sector	2.9	6.1	5.9
Banque du Liban (BDL)	1.1	4.1	3.8
Other	1.8	2	2.1
Public Sector Deposits	-1.7	-1.3	-1.3
Domestic Currency Debt (Gross)	17.4	18	18.6
Domestic Currency Debt (Net)	15.7	16.7	17.3

Source: The Ministry of Finance, 2002.

The accumulation of consecutive budget deficits, coupled with high interest rates, high levels of government spending with no adequate revenues led to the accumulation of a huge public debt. Total debt stood at about USD 32 billion by the end of 2002 after an exponential increase since 1993, at a time when it was hovering between USD 0.5-3 billion during the 1977-1993 period (see Figure 4(c)). The fast accumulation of the huge public debt took policy makers and academics by surprise. The rate of growth of foreign debt is even faster since 1995, and by the end of 2002, foreign debt amounted to about USD 13 billion when it was at about USD 1 billion in 1996 (see Figure 4(b)). This is partly due to the fact that the

Government has been converting a major portion of its domestic debt with high service costs and low maturity to foreign debt with relatively lower interest rate costs and higher maturity. Indeed, the accumulation of a huge debt entails a heavy debt service burden, after being below USD 1 billion in 1994, it stood at about USD 3 billion in 2002 (see Figure 4(d)).

Figure 4. Evolution of Public Debt in Lebanon: 1960-2002



Source: Banque Du Liban (BDL), Lebanese Ministry of Finance and the IMF.

On the regional and international level, Lebanon's preparation for future adherence to international agreements, in particular those now signed with the European Union (EU) in the context of the Euro-Mediterranean (MED) partnership, put the country on the track of cutting down import tariffs. Lebanon entered into an Association Agreement with the EU in 2002, which granted a five-year grace period for the Lebanese government in order to fully dismantle tariffs on imports.[6] In the meantime and for a quite similar purpose, Lebanon was progressing towards membership of the World Trade Organization (WTO), expected to take

[6] Most categories of imports, 86% of all items, are already subject to 0 % or 5% tariff rate.

place in late 2003.[7] Since customs revenues accounted for more than 50 percent of total tax revenues in 2000, the latter led to a decline in tax returns, the government's main source of income. In 2000, taxes made up around 70 percent of total revenues, the fact that highlights the extent of risk invested in such action. In return, the Lebanese government expected to stir up the stagnating economy, where GDP recorded a sluggish increase of 1.28 percent in late 1999, and later declined by 0.3 percent in 2000 to reach USD 16.4 billion, and stagnate at the same level in 2001 and 2002. All these are signs of an economy that is drifting to a recession.

In addition, by liberalizing trade, the government sought to induce further competition, which would be expected to ameliorate domestic production efficiency and standards, in order for it to be in line with the internationally recognized ones that will in turn stimulate exports. The authorities also wanted to minimize their dependence on international trade related taxes for their fiscal revenues. Consequently, tax revenues dropped by 3 percent at end 2000, from USD 3.239 billion in 1999 to USD 3.15 billion in 2000. A significant improvement on the revenue side was later on brought about in early 2002 with the introduction of the value added tax. Revenues went up from USD 3.08 in 2001 to USD 3.88 in 2002 with the difference being attributed solely to the introduction of the VAT. The adoption of the VAT came as compensatory measure for the loss of customs revenues, which resulted from reductions in import taxes. The VAT was at a rate of 10 percent on goods and services with some exceptions. The introduction of the VAT was accompanied by other forms of taxes whose rates were repeatedly increased like gasoline taxes,[8] as well as, illegal property taxes and income and profit related taxes.

On the expenditure side, a plan was established to limit discretionary spending. Since higher spending leads to larger budget deficits, puts pressure on the domestic currency and would probably lead to higher interest rates, which in turn will reduce the likelihood of economic growth, the Lebanese government sought to lower non-interest expenditures through major structural reforms, improvement of revenue collection techniques,

[7] Lebanon has already started implementing structural measures to conform to the requirements needed to become a WTO member. For instance, "Modern Custom's Law" and "Custom's Tariff Reduction" have been applied for this purpose. The "Modern Custom's Law" came into force on April 22, 2001. The new law represents a major overhaul of the 1950 vintage law and is based on best international practices and conforms to WTO regulations. The law will touch on all areas of customs declaration and clearance with the intent to modernize systems and accelerate and simplify customs procedures. As for the "Custom's Tariff Reduction", the decision to drastically reduce tariff duties was taken in December 2000. The decision was taken in order to reduce cost of production, stimulate growth and further liberalize the economy and facilitate concluding regional and international trade agreements. In other words, the government wanted to crate a positive market shock, at the cost of reducing tariff revenues generated from custom duties. The effective customs tariff – without excises – was reduced from 12 per cent to 6 per cent (Ministry of Trade and Economy, 2002).

[8] Raised three times during 2001-2002, yielding 50% more in 2002 than it did in 2001.

privatization-led efficiency enhancement, and overall service cost reduction. The cutback in the government's expenditures, excluding debt servicing, materialized in 2001 in the form of employee layoffs from public owned enterprises, like the case was in the government's television station, Tele Liban (TL), and the national airline, Middle East Airline (MEA).[9] A number of surplus employees in public institutions were redeployed in other vacant positions where they can fill needed civil service posts. These proceedings have eventually contributed in the government's plan to reduce its operational costs through lower salary payments. Enhanced techniques were put in place to better collect revenues from the public power company, Electricite du Liban (EDL) via the installation of new meters and the check up of the existing ones. The improved performance of EDL has resulted in 40 percent revenue increase. While these measures were widely welcomed by the Lebanese public and various international observers, they were still considered to be insufficient by academics in order to adjust the fiscal imbalances that the economy is currently facing.

3. An Empirical Model For Optimal Government Spending

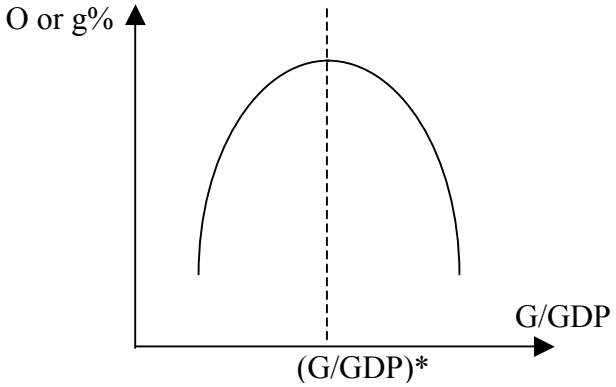
3.1 Background and Related Literature

This section proposes an empirical approach to determine, if any, an optimal efficient level for public spending in view of its positive contribution to growth. Despite many critics of the early 1990's when the more liberal economic system was set against government intervention in the economy, many empirical studies, conjectured that public spending leads to growth. Endogenous growth models, and many neoclassical studies, clearly stated that government intervention might have a positive effect on growth. In those studies, public spending was analyzed based on its contribution to the productive sector –from the supply side -; and to its contribution to the demand side – in the Keynesian and post-Keynesian framework. It's clear that the government should not intervene whenever the market, i.e. the private sector, is able to enhance growth (investment, technical innovations, research, etc….).

The discussion shows that the share of public spending in GDP is neither negligible nor excessive. This explains the existence of an optimal level of public spending expressed as a percentage of GDP (see R. Vedder, and L. Gallaway, (1998), R. Armey, (1995); E. Ayadi (2002)), as shown in the following figure which relates the explanatory variable G/GDP on the x-axis to the dependant variable (a variable that measures growth, O for GDP or g% for its rate of growth) on the y-axis.

[9] Layoffs in both, TL and MEA, totaled 2000 staff members in 2001 (Lebanese Ministry of Finance).

Figure 5. The Optimal Level of Government Spending (Armey 1995)



The numerical value of the optimal G/GDP ratio should be estimated using adequate econometric tests. In the above mentioned literature, empirical studies are conducted by using two types of tests; either by explaining directly the size of GDP (0) in terms of G/GDP and some other variables, or by explaining the rate of growth of GDP (g%), and then testing the quadratic relations in terms of this variable. If the coefficient of the term $(G/GDP)^2$ is negative, then we can calculate the optimal level of government spending.

Hence, Vedder and Gallaway (1998) test an expression of the form

$$O = A + b(G/GDP) - c(G/GDP)^2 + \mathrm{K}\ (other\ \mathrm{var}iables), \qquad (1)$$

where O is GDP in level, and G/GDP is the level of government spending to GDP, and another expression of the form

$$g\% = A + b(G/GDP) - c(G/GDP)^2 + \mathrm{K}\ (other\ \mathrm{var}iables). \qquad (2)$$

Before running the above regressions, one should examine the data to locate the periods where a linearly increasing or decreasing relationship exists between G/GDP and the rate of growth of GDP or GDP in level. This relationship can be tested. This is because the explanatory variable G/GDP is accompanied by other variables playing a favorable role in explaining growth. The choice of these other variables is open and is country-specific.

In Vedder and Gallaway (1998), the following relationship was tested for the US and for the period 1947-1997.

$$O = A + b(G/GDP) - c(G/GDP)^2 + dT - eU \qquad (3)$$

where T and U designate respectively time and the unemployment rate. They get:

$$O = -566.2 + 121.2(G/GDP) - 3.47(G/GDP)^2 + \mathrm{K} \quad (4)$$

which gives an estimation of 17.5% for the optimal level of government spending.

Those same authors, for the US and for the period 1976-1996, test the following relationship:

$$g\% = A + b(G/GDP) - c(G/GDP)^2 + dT + fW \quad (5)$$

where T still represents here time and W is a variable that measures the number of war years.

$$g\% = 73.7 + 1.52(G/GDP) - 0.069(G/GDP)^2 - \mathrm{K} \quad (6)$$

which gives an estimation of 11.1% for the optimal level of government spending.

In E. Ayadi (2002), a better adjustment is obtained for Tunisia and for the period 1968-1997, with the following relation:

$$g\% = a + b(G/GDP) + c(G/GDP)^2 + dT + eInfl + f(I_p/GDP) + h(X/GDP) + i(T/GDP) + j((G-T)/GDP), \quad (7)$$

where T represents total imports; *Infl* represents the inflation rate; (I/GDP) the share of private investment in GDP; X total exports; and (G-T) the public deficit. He obtains a better adjustment:

$$g\% = -0.52 + 3.26(G/GDP) - 4.65(G/GDP)^2 + \mathrm{K} \quad (8)$$

The obtained estimation for the optimal level here is 35%.

It should be noted that in both papers, whether in Vedder and Gallaway's or in E. Ayadi, the issue of colinearity of certain variables and the risk of spurious correlations may constitute a source of concern to the authors. The stationarity of the variables of every case and every country should be taken into consideration and accordingly, special methods should be used to treat the fallacious correlations that are present in the data. For the US case, we realize that the more or less long period of the econometric adjustment modifies a lot the value of the estimated variable. It is therefore necessary to give importance a priori to the period of the numerical series under study.

3.2 Econometric Analysis and Results

Following Vedder and Gallaway (1998), we estimate the following model for the Lebanese economy for the period 1964-2002, except for exports, which are tracked since 1981.

$$GDP = c_1 + c_2(G/GDP) - c_3(G/GDP)^2 + c_4(def) + c_5(def/gdp) + c_6(T/GDP) + c_7(X/GDP) + c_8(M2/GDP) + \varepsilon_t, \quad (9)$$

where GDP is the Gross Domestic Product; G/GDP is the ratio of government spending to GDP; $(G/GDP)^2$ is the squared ratio of government spending to GDP; *def* is the budget deficit; *def/GDP* is the ratio of the budget deficit to GDP; T/GDP is the ratio of government revenues to GDP; X/GDP is the ratio of exports to GDP; and M2/GDP is the ratio of M2 to GDP.

Before carrying out the estimation it is necessary to check the time series properties of each individual series by establishing their non-stationarity to avoid any problem of spurious regression. We use the ADF and PP unit root tests on each individual series. The unit root test results in Table 2 indicate that all series are non-stationary in levels and need to be differenced once to become stationary. That is all series are integrated of order one.

Table 2. Unit Root Tests

					Mackinnon's Critical Values	
	GDP	G/ GDP	$(G/GDP)^2$	M2/ GDP	5 %	1%
Constant and Time Trend						
PP (3)	-1.01	-2.57	-2.72	-2.15	-3.51	-4.18
PP FD (3)	-4.10*	-5.34**	-5.74**	-6.70**	-3.52	-4.19
Constant						
PP (3)	0.60	-1.90	-2.30	-2.14	-2.93	-3.59
PP FD (3)	-3.79**	-5.43**	-5.86**	-6.79**	-2.93	-3.59
Constant and Time Trend						
ADF (1)	-1.14	-2.85	-2.56	-2.15	-3.52	-4.19
ADF FD (1)	-4.04*	-4.64**	-5.55**	-6.55**	-3.52	-4.20
Constant						
ADF (1)	0.32	-2.08	-2.19	-2.14	-2.93	-3.59
ADF FD (1)	-3.74**	-4.71**	-5.63**	-6.64**	-2.93	-3.60

Table 2 (Cont'd). Unit Root Tests

	Deficit	Deficit/ GDP	X/GDP	T/GDP	Mackinnon's Critical Values 5 %	1%
Constant and Time Trend						
PP (3)	-2.43	-2.40	-2.57	-2.27	-3.51	-4.18
PP FD (3)	-7.88**	-6.79**	-4.60**	-6.27**	-3.52	-4.19
Constant						
PP (3)	-0.72	-2.05	-1.52	-2.20	-2.93	-3.59
PP FD (3)	-7.81**	-6.83**	-4.80**	-6.28**	-2.93	-3.59
Constant and Time Trend						
ADF (1)	-2.04	-2.25	-2.74	-2.11	-3.52	-4.19
ADF FD (1)	-6.04**	-4.94**	-3.99*	-4.74**	-3.52	-4.20
Constant						
ADF (1)	-0.49	-2.02	-1.51	-2.01	-2.93	-3.59
ADF FD (1)	-5.82**	-4.97**	-4.41**	-4.72**	-2.93	-3.60

NOTES: 1- PP is the Phillips-Perron test; FD is the first difference; and ADF is Augmented Dickey Fuller. 2-The numbers in parenthesis are the proper lag lengths based on the Akaike Information Criterion (AIC). 3- A * indicates rejection of the null hypothesis of non-stationarity at the 5% level of significance, while ** indicates a stronger rejection at the 1% level. 4-For most variables the time trend variable is statistically insignificant at the 5%level, except for the GDP, deficit and X/GDP series.

We can therefore estimate next model (9) and the following adjustment is obtained

$$GDP = 5.37 + 1468.15(G/GDP) - 25.70(G/GDP)^2 + ... \quad (10)$$

R^2=0.97; DW= 2.29.

which gives an estimation of the order of 28.5 percent for the optimal level sought. This high level of government spending as a percent of GDP is not surprising and can be explained by the fact that in the last decade the growth rate of GDP has been mainly due to the large government spending on the devastated infrastructure. Most of the growth in GDP in the early and late 1990s was due to the huge government spending on the reconstruction efforts of the Lebanese government.

4. The Sustainability of Public Debt

4.1. Debt Ratio Analysis: 1960-2002

Debt and debt-service indicators are widely used in the economic literature to assess an economy's fiscal situation and the exposure to debt-related risks of liquidity and solvency. The standard indicators fall into two broad categories – flow indicators and stock indicators. The flow indicators are based on flow variables; typically gross domestic product or exports.

From an intertemporal perspective, these variables represent the resources that are available to meet debt obligations. Flow indicators may thus be useful in assessing solvency problems, since a solvency problem implies that an economy may never be able to service its debt out of its own resources. Stock indicators are based on stock variables and tend to reflect liquidity problems.

There are three flow indicator ratios: Debt/GDP, Debt Service/Exports, and Debt Service /GDP. They relate debt and its service to resources that are available to meet these obligations, namely, exports and GDP. These indicators are useful for evaluating both solvency and liquidity risks, but have some limitations. The debt/GDP ratio indicates the amount of resources in a given economy that can be generated to repay debt. A rising debt to GDP ratio signals that the rate of growth of debt exceeds the growth rate of the economy, and if this continues then the country will have difficulty in meeting its debt obligations in the future. Debt service measures[10] include interest payments on all debt and amortization payments on long-term debt only. The assumption is that short-term debt is normally rolled over. A more comprehensive measure of debt service should include all amortizations.

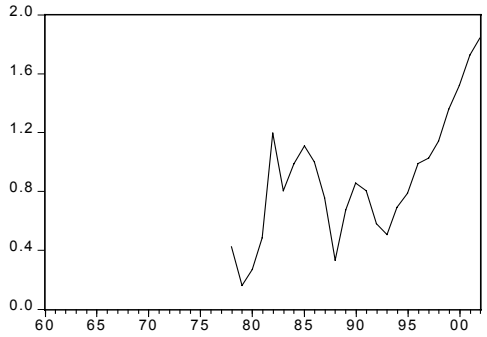
Figure 6(a) shows that from 0.4 percent of GDP in late 1970s, total Lebanese public debt grew steadily in the last 5 years to stand by the end of 2002 at 180 percent of GDP. This is a clear indication of the fast growing rate of debt at a time when GDP growth has been stagnating at around 1 percent since 1999. This has put Lebanon in the forefront of indebted Mediterranean countries, and at a well advanced standing relative to highly indebted emerging countries like Argentina, Brazil, and Mexico. A huge debt entails of course a heavy debt service burden, and by the need of 2002, the debt service to GDP ratio stood at about 18 percent, which is also quite significant given the size of the Lebanese economy, as measured by its GDP (see Figure 6(b)). Even more alarming is the fact that in 2002, debt service became about 4 times the size of Lebanese exports. In other words, the Lebanese economy has to generate every year hard currency of about USD 3 billion to service its debt from sources other than the proceeds from exports-usually the main source of hard currency for an economy. This discrepancy will put more strains on the balance of payments, the amount of foreign currency reserves available at the central bank, and subsequently on the local currency.

[10] Debt service is commonly computed on a cash basis instead of an accrual basis. If a country is in arrears on its debt payments, the debt service paid undercounts the true obligation. Thus, a better measure is debt service due instead of debt service paid.

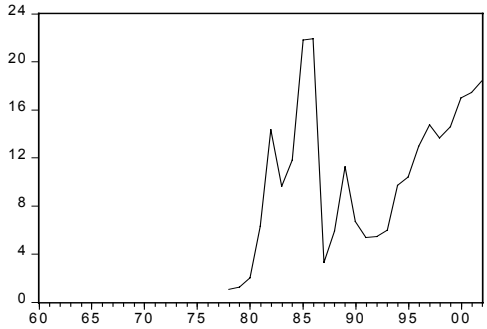
The other broader flow indicators are the External Debt/Exports, and External Debt/GDP.[11] These indicate the repayment capacity of a country, and are used for evaluating solvency risk. A higher debt to exports ratio indicates a larger amount of resources needed to service obligations. This in turn implies increased vulnerability to the balance of payments and larger repudiation risk. Foreign debt is 16 fold the size of Lebanese exports, this in turn is expected to put more pressure on the external balance (see Figure 6(d)). After being below the 30 percent level in the 1980s and early 1990s, foreign debt has more than tripled since 1997 to stand at 80 percent of GDP by the end of 2002 (see Figure 6(e)).

Figure 6. Public Debt Related Ratios

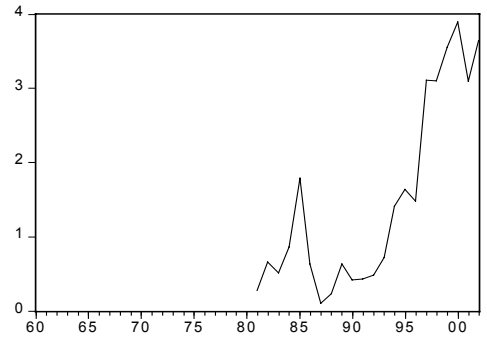
(a) Total Public Debt/GDPin (%)



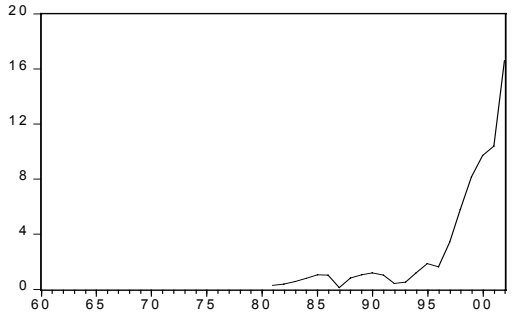
(b) Debt Service/GDP in (%)



(c) Debt Service/Exports in (%)

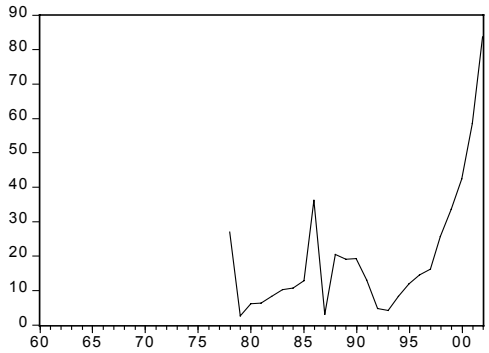


(d) External Debt/Exports in (%)

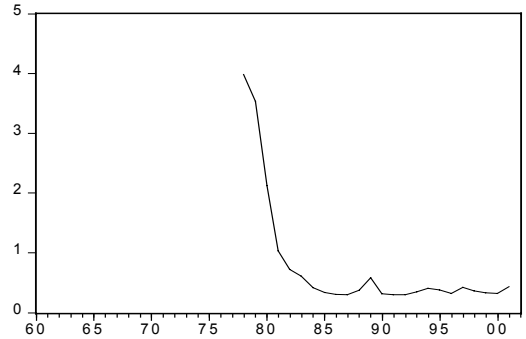


[11] Indicators with total debt have many limitations: The size of debt to GDP or exports is likely to be influenced by the stage of development of a country. Debt-level based indicators are expected to be higher in the early stages of development. Thus, using a debt-level based indicator without an inter-temporal or dynamic context can be misleading. Aggregate debt-level indicators do not provide any information on debt structure in terms of maturity, borrower (public or private) creditor, currency, or interest rate composition. All these aspects of debt structure have important implications for vulnerability to external shocks. Thus, measures using total debt stock, instead of the characteristics of debt, ignore the fact that some of these debts are more vulnerable to an external shock than others.

(e) External Debt/GDP in (%)



(f) International Reserves/Short-Term Debt in (%)



Source: Banque Du Liban (BDL), Lebanese Ministry of Finance and IMF

The most useful stock indicator is International Reserves/Short-Term Debt. It relates the size of international reserves of the monetary authority to the amount of debt coming due within a year and is an important indicator of liquidity risk. This indicator shows whether the economy has enough foreign exchange reserves to cover the amount of debt that is coming due in the short term.[12] Figure 6(f) indicates again that this ratio has been steadily declining since the late 1980s. This is due mainly to fast growth in short-term debt coupled with a steady decline in foreign currency reserves at the Central Bank. On average the central bank can at most cover 3-4 percent of maturing short-term debt. This is signaling an increasing liquidity risk faced by the Lebanese government.

The ratio analysis portrayed above presents a rather bleak and alarming picture regarding Lebanese fiscal sustainability. While these indicators are in no doubt reflecting the current fiscal realities, the ratio analysis to fiscal sustainability used above and in the literature suffers from many shortcomings. The debt and debt-service ratios should be used in both static (point in time) and dynamic (intertemporal) contexts. Although these indicators can give useful information about the ability to pay, no one indicator provides information on all the dimensions of a payment problem. Critical debt levels are likely to vary over time. So they have to be accompanied by comprehensive economic evaluation. We, therefore, turn next to a more rigorous dynamic empirical analysis of fiscal sustainability in Lebanon by studying the econometric time series properties of the fiscal variables of interest within the government Present Value Constraint framework.

[12] This ratio has however some limitation. (1) It may not be very useful for open economies that have relatively large amount of short-term trade credits, this is because trade credits are less likely to be withdrawn during a crisis; And (2) it does not provide any information on the quality of international reserves. If international reserves are illiquid, then they cannot be used to meet immediate external obligations.

4.2. Literature Review

After several emerging economies experienced recently increased debt levels and in some instances debt crisis, the issue of whether fiscal policies are sustainable has gained considerable attention among policy makers and academics. Since the early 1990s, there has been an important emergence of empirical literature dealing with the issue of debt sustainability. The econometric literature testing the present value constraint focuses on the time series properties of government expenditures and tax revenues, budget deficits and the level of public debt. These variables were never related in a structural model. Ideally, the stationarity and cointegration based tests of debt sustainability should employ long time series (say 30-50 annual observations) on various macro economic variables. It should also take into consideration issues that are particularly relevant to Less Developed Countries (LDCs).

The empirical studies on debt sustainability are numerous in the last decade and have gained extreme importance after the latest financial and debt crisis worldwide. Two empirical frameworks have been used in the empirical literature. The first rests mainly on testing stationarity of the various fiscal variables, while the second employs cointegration techniques and explores the existence of a long-run equilibrium relationship between the fiscal variables of interest. Under the first framework, if the deficit series is non-stationarity, then it means that it is growing without bound over time, which means that subsequent debt will also also grow without bound rendering fiscal policy unsustainable. This will also violate the PVC and the No-Ponzi-Game (NPG) constraints. A stationary deficit means that the series is reverting to a certain mean overtime being in general close zero. If that were the case, then obviously fiscal policy and debt would be sustainable, since deficits will be under control, oscillating between small deficits and surpluses overtime. In the second framework, cointegration tests were used to explore the existence of a long-run relationship between government revenues and expenses. If such relationship exists, this means that the respective government is not spending without bound and is taking into account the amount of revenues it is generating. Subsequently, it will not have to borrow to cover its expenses, and debt would be sustainable and will not grow without bound.

Empirical studies on developed economies are numerous and were initiated by the paper of Hamilton and Flavin (1986). Using yearly data for the US, covering the period 1962-1984, they tested the validity of the PVC, or equivalently the NPG condition, or the budget

constraint.[13] In their study, if the government deficit and debt series are stationary then debt is sustainable which was the case for the US sample used. Using also yearly data for the US economy over a larger sample covering respectively the periods: 1890-1983 and 1960-1984, Trehan and Walsh (1988, 1991) looked at the stationarity of public deficits and debt, and concluded that since they were stationary for both sample periods, then debt is sustainable. Running the same empirical tests, Kremers (1988) used a different sample period: 1920-1985, and found debt to be sustainable until 1981.[14]

Within the same framework other researchers conducted stationarity tests on other countries to see whether debt is sustainable. For instance, Smith and Zin (1991) used Canadian monthly data for the period 1946-1984, and looked at the stationarity of public debt and deficits and found debt to be unsustainable. For India, and using the same tests and the sample period 1970-1988 but yearly data, Buiter and Patel (1992) found that public debt in India was not sustainable. Using monthly data for Italy and the period 1979-1991, Baglioni and Cherubini (1993) found that debt is not sustainable. Caporal (1995), using annual data on some EU countries over the period 1960-1991, found that Italian, Greek, Danish and German debts to be unsustainable. Makrydakis (1999) using annual data for Greece over the period 1958-1995 also found that debt is not sustainable.

Other empirical studies have used cointegration techniques to test whether debt is sustainable. These cointegration techniques were used to test whether a long run relationship exits between government revenues and expenditures. If such relationship exits, then one can conclude that debt is sustainable. Using annual data covering the period 1953-1987, Elliot and Kennedy (1988) found that the Australian debt is sustainable. For the US, Tanner and Liu (1993) and Haug (1995) found that the US debt is sustainable. Using Quarterly US Data for the period 1947-1992, Quintos (1995) found that US debt was sustainable until 1980. Using EU data from 1692-1992, Ahmed and Rogers (1995) found that debt is sustainable. Payne (1997) used annual data for some G7 countries and found that debt is sustainable for Germany. Crowder (1997) used Quarterly US data and found debt to be sustainable until 1982. Athanasios and Sidiropoulos (1999) also used EU data over the period 1961-1994 and found debt to be unsustainable for Spain, Belgium, Greek, Italy and Portugal.

[13] Agenor and Montiel (1996) argued that the government is solvent if the present value of the future resources available to it for debt service at least equal to the face value of its initial debt stock (p123). Thus, satisfying the present value budget constraint, implying that the government is solvent.

[14] However, Wilcox (1989) found that debt was not sustainable over the 1960-1984 sample period.

The empirical literature focusing on developed economies has ignored for instance, the issue of money printing to finance fiscal deficits. Seigniorage has been used in many emerging economies to finance budget deficits, but its use varies from one country to another.[15] Fiscal variables in some LDCs may exhibit structural breaks due to specific fiscal regime. One framework used to circumvent this shortcoming may be through the introduction of a level-shift dummy variable to the cointegration relationship involving tax revenues and government expenditures (see Tanner and Liu (1994) and Hakkio and Rush (1991)).

While in developed economies the issue is whether the fiscal regime has shifted from sustainable to unsustainable in recent years, in LDCs various emerging governments have been trying to move from unsustainable fiscal deficits to a situation where debt is sustainable. Researchers often study whether the regime shifts reflect fundamental changes in the conduct of fiscal policy, or is the change in the time series properties of the data reflecting a change in the short-run dynamics of fiscal variables, and not due to a structural shift in the fiscal regime. It might be wise to focus on more recent fiscal conducts in the instance of structural breaks, and not study the whole sample period. Yet Ahmed and Rogers (1995) in their analysis of whether fiscal policy is sustainable, studied the period 1692-1992 which included important data breaks, including World Wars I and II, and concluded that the US fiscal policy is sustainable. The use of a long time series for the US made it possible to deal with the problem of data breaks. However, in most LDCs the unavailability of large data sets might surface and amplify the problem of structural breaks.

4.3. Theoretical Framework

Insolvency of a given economy means that debt is unsustainable; i.e., that the respective government cannot pay back its debt. It also means that the present value of the sum of future revenues minus expenditures is larger than the initial level of indebtedness. In this context, empirical tests on the present value constraint should not be interpreted as test of government insolvency, but rather as tests of whether its conduct of fiscal policy is unsustainable. That is, could the past dynamic behavior of government revenues, expenditures, and budget deficits as captured by their time series properties, be continued indefinitely without leading to an insolvency situation where the government can no longer service its debt and subsequently default on it. Meeting the present value constraint is often

[15] Inflation has been contained in Lebanon since the early 1990s, and the Lebanese government has rarely used seigniorage revenues to finance its budget deficit.

seen as a no violation of the No-Ponzi-Game Constraint. That is the government cannot go on borrowing and spending without bound.

Empirical studies dealing with these issues start with the financing constraint of the public sector. This constraint relates the primary deficit plus nominal debt servicing to changes in outstanding debt. Specifically, the following dynamic equation relates the stock of debt in period t, B_t to last period's debt B_{t-1} plus debt service rB_{t-1}, and the primary surplus (Z).

$$B_t = (1+r)B_{t-1} - Z_t \,. \tag{11}$$

Z will be negative when it represents a deficit and will constitute an addition to the stock of debt, and will be positive when it represents a surplus. B_t is outstanding debt at the end of period t, and r_t equals the ex post return on government debt during period t.[16] Given time paths for r_t and Z_t, the government financing constraint in (11) describes the time path of the stock of debt, i.e., the dynamics of debt accumulation or decumulation. [17]

Iterating equation (11) forward n periods and summing up we get

$$B_{t-1} = E_t \sum_{j=0}^{n} \frac{T_{t+j}}{(1+r)^{j+1}} - E_t \sum_{j=0}^{n} \frac{G_{t+j}}{(1+r)^{j+1}} + E_t \lim_{n\to\infty} \frac{B_{n+1}}{(1+r)^{n+1}}, \tag{12}$$

where G is defined to exclude interest payments and E_t is the expectation operator. Seigniorage revenues are some time used in LDCs to finance budget deficits; and in poorer LDCs grants and concessional lending might also constitute a source for financing budget deficits. Equation (12) can thus me modified to account for seigniorage revenues

$$B_{t-1} = E_t \sum_{j=0}^{n} \frac{T_{t+j}}{(1+r)^{j+1}} + E_t \sum_{j=0}^{n} \frac{\Delta m_{t+j}}{P_{t+j}} - E_t \sum_{j=0}^{n} \frac{G_{t+j}}{(1+r)^{j+1}} + E_t \, Lim_{n\to\infty} \frac{B_{n+1}}{(1+r)^{n+1}}, \tag{13}$$

where Δm_t is the change in the nominal stock of high powered money, and P_t is the consumer price index.

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[16] Equation (1) may be interpreted in nominal or real terms. However, the empirical literature on debt sustainability suggest that the use of macroeconomic variables in real terms may be more robust, and empirical tests are more likely to be satisfied if one considers real debt (i.e. nominal debt divided by a price index such as the Consumer Price Index). Hence, r_t and Z_t may be interpreted as the real interest rate and real primary surplus.

[17] According to equation (1), If the government runs a primary surplus equal to zero ($Z_t = 0$), the stock of debt will grow at a rate equal to the interest rate: $\Delta B_t = rB_{t-1}$. If the government runs a primary deficit ($Z_t < 0$), the stock of debt will grow at a rate exceeding the interest rate. If the government runs a primary surplus ($Z_t > 0$), the stock of debt will grow more slowly than the interest rate. If the surplus more than offsets payments on existing debt (i.e. the conventional surplus, $Z_t + r_t B_{t-1}$ is positive), then the debt will actually shrink over time.

If the last term in (12) or (13) approaches zero as the number of periods increases, then the No-Ponzi-Game Constraint will be satisfied, i.e.,

$$E_t \lim_{n\to\infty} \frac{B_{n+1}}{(1+r)^{n+1}} = 0. \tag{14}$$

The No-Ponzi-Game Constraint in (14), also known in the literature as the transversality condition is stating that the present value of the government's debt in the indefinite future converges to zero. For this to occur, debt B in the numerator must grow more slowly than the rate of interest r. The government cannot finance interest payments on debt by continuously issuing new debt. This will happen when equation (14) is not violated, and equation (12) reduces to

$$B_{t-1} = E_t \sum_{j=0}^{\infty} \frac{T_{t+j}}{(1+r)^{j+1}} - E_t \sum_{j=0}^{n} \frac{G_{t+j}}{(1+r)^{j+1}}, \tag{15}$$

while equation (13) becomes

$$B_{t-1} = E_t \sum_{j=0}^{n} \frac{T_{t+j}}{(1+r)^{j+1}} + E_t \sum_{j=0}^{n} \frac{\Delta m_{t+j}}{P_{t+j}} - E_t \sum_{j=0}^{n} \frac{G_{t+j}}{(1+r)^{j+1}}. \tag{16}$$

Equivalently, empirically if the primary deficit/surplus and debt series are conintegrated, then again equation (14) will not be violated (see Haug 1991).

If we assume that public debt is growing over time at a constant rate λ to have $B_{t+j} = (1+\lambda)B_{t+j-1}, \forall j$, we can rewrite equation (14) as follows

$$E_t \lim_{n\to\infty} \left(\frac{1+\lambda}{1+r}\right)^n B_0 = 0. \tag{17}$$

For equation (17) to converge to zero, λ should be less than r, i.e., the rate of growth of debt should be less than the rate of growth of the real interest rate.

The literature relates the PVC to the accounting approach to assess fiscal sustainability by focusing on debt ratios to GDP. The accounting approach has, however important impediments, due to the fact that all variables are taken in ratios to GDP.[18] We will thus not

[18] While the PVC in levels or in ratios to GDP is unchanged, the conversion of fiscal variables from levels to ratios and implementing stationarity tests may constitute an important impediment. The series in levels may be integrated of order 1, I(1), when converted to ratios they may become stationary, or I(0) series. Equivalently, For cointegration based test, one requirement for two series to be cointegrated is that both be integrated of order 1, thus, using I(0) ratio series may lead to the conclusion that the series are not cointegrated when in fact they are.

consider this approach in the present paper, and we turn next to testing empirically the PVC constraint within the context of the Lebanese economy.

4.4 Econometric Analysis and Results

In this section, the fiscal data used are from the Banque Du Liban (BDL), Quarterly and Yearly Bulletins, and from the Lebanese Ministry of Finance. We gather data on government revenues and expenditures, budget deficits, and government total debt. Depending on data availability, government revenues and expenditures are tracked since 1960 until 2002. Data prior to 1990 are from BDL, while data after 1990 are from the Ministry of Finance. For macroeconomic data, we use also the International Monetary Fund's International Financial Statistics various issues. The exchange and interest rates are tracked as early as 1960, while nominal GDP since 1964, and the rate of inflation since 1965.

The econometric tests to be carried out rest on the two frameworks advanced in the literature, that is stationarity and cointegration tests. If the total budget deficit is stationary, i.e., integrated of order zero, I(0) then according to Trehan and Walsh (1988, 1991) this constitute a sufficient condition to conclude that fiscal policy is sustainable. That is, the government deficit will not grow without bound, and the actual deficit will asymptotically converge to zero over time. The convergence to zero of the government deficit means that the PVC or the transversality condition in (14) is actually satisfied. In fact, an equivalent empirical test would be to test for the existence of unit roots in government expenditures (inclusive of debt service: $G_t + r_t B_{t-1}$) and revenues series. If the two series do not contain a unit root, then the budget deficit will be integrated of order zero and the transversality condition (14) will be satisfied pointing to the sustainability of fiscal policy. According to Hakio and Rush (1991), if the two series contain a unit root (i.e., are integrated of order 1) then one must search for a long-run equilibrium relationship between them. If such relationship does not exist, debt would be unsustainable. However, if such relationship exists with a cointegrating vector (1, -b), where b=1, we obtain the condition of Trehan and Walsh according to which the total budget deficit is I(0) and debt would be sustainable. On the other hand, if $0<b<1$, then the total budget deficit will be integrated of order I(1), and fiscal policy will be unsustainable. However, Quintos (1995) shows that the condition b=1 is only a sufficient but not a necessary condition for fiscal sustainability, and a sufficient and necessary condition is that $0<b<1$. In this case when b=1, we will have a strong sustainability of fiscal policy and when $0<b<1$, then fiscal policy will be weakly sustainable.

Thus, we start by testing the non-stationarity of government total expenditures and revenues series. If the two series are stationary, i.e., are I(0) then the total budget is also stationary and the transversality condition will be satisfied, pointing to the sustainability of fiscal policy.

We establish stationarity or non–stationarity of the individual fiscal series by applying both the Phillips-Perron (PP) and Augmented Dickey–Fuller (ADF) unit root tests. The following regressions will be carried out

$$\Delta X_t = \beta_1 + \beta_2 X_{t-1} + \sum_{i=1}^{k} \delta_i \, \Delta X_{t-i} + \varepsilon_t , \tag{18}$$

where Δ is the first–difference operator; $(X_{i,t})$ represents respectively the following fiscal time series for Lebanon: G (government spending); T (Tax Revenues), Total Deficit, and Total Debt, as well as the ratio of these variables to GDP ; β_i, δ_i, are constant parameters; and ε_t is a stationary stochastic process. The number of lags (k) will be determined based on the Akaike Information Criterion (AIC).

To determine the order of integration of the series, model (18) is modified to include second differences on lagged first and k lags of second differences. That is,

$$\Delta^2 X_t = \lambda_1 \Delta X_{t-1} + \sum_{i=1}^{k} \mu_i \, \Delta^2 X_{t-i} + \varepsilon_{1t} \tag{19}$$

where, $\Delta^2 X_t = \Delta X_t - \Delta X_{t-1,;}$ λ_i, μ_i, are constant parameters; and ε_{1t} is a stationary stochastic process. The k lagged difference terms are included so that the error terms ε_t and ε_{1t} in both equations are serially independent. Equations (18) and (19) are also estimated with a time trend. The unit root test results are reported in Table 3. Based on ADF and PP tests, the null Hypothesis of non-stationarity ($H_0 : \lambda_1 = \beta_2 = 0$) of government spending (G), government revenues (T), and public debt and deficit could not be rejected. Specifically, PP test on public debt indicates that it is non-stationary in the level, and I(0) in its first difference at the 5 percent level of significance. In addition, the PP and ADF[19] tests are pointing towards stationarity when the test is carried out without a time trend. When we consider the series as

[19] It is now well known in the econometrics literature that the Dickey Fuller type tests nay have serious shortcomings in the presence of structural breaks in the data (see Perron 1989, 1990). Perron shows that Dickey-fuller tests may fail to reject the unit root hypothesis if the series present a break-in-the-trend. Since the data used in the above analysis spans the periods 1960-2002, structural breaks may not be ruled out. We, therefore, supplement the ADF tests with the PP unit root tests.

ratio to GDP, our earlier results of non-stationarity are also confirmed indicating that all the new series are non-stationary. Moreover, unit root tests on the budget deficit indicates that it is non-stationary, i.e., integrated of order zero, I(1) whether in level or as ratio to GDP, then according to Trehan and Walsh, this constitute a sufficient condition to conclude that fiscal policy is unsustainable. That is, the government deficit will grow without bound, and the actual deficit will not asymptotically converge to zero over time. The non-convergence to zero of the government deficit means that the PVC or the transversality condition in (14) is actually violated. Equivalently, Table 3 also tests for the existence of unit roots in government expenditures (inclusive of debt service: $G_t + r_t B_{t-1}$) and revenues series. It is also clear that the two series contain a unit root, which means again that the transversality condition (14) will not be satisfied reconfirming our earlier finding that fiscal policy in Lebanon is not sustainable. Thus, we can safely conclude that based on our unit root tests, the conduct of fiscal policy in Lebanon is unsustainable.

Table 3. Unit Roots Tests For Stationarity

									Mackinnon's Critical Values	
	G	G/ GDP	T	T/ GDP	Deficit	Deficit/ GDP	Debt	Debt/ GDP	5 %	1%
Constant and Time Trend										
PP (1)	-0.82	-2.60	0.50	-2.22	-2.36	-2.29	0.33	-1.72	-3.53	-4.21
PP FD (1)	-6.61**	-5.39**	-4.90**	-6.25**	-7.68**	-6.34**	-3.9*	-4.88**	-3.52	-4.19
Constant										
PP (1)	0.96	-1.95	2.37	-2.13	-0.72	-2.07	3.15*	-0.74	-2.93	-3.59
PP FD (1)	-6.15**	-5.47**	-3.96**	-6.26**	-7.68**	-6.38**		-4.99**	-2.94	-3.61
Constant and Time Trend										
ADF (1)	-0.79	-2.85	0.38	-2.10	-2.05	-2.16	0.51	-1.71	-3.52	-4.22
ADF FD (1)	-6.60**	-4.64**	-3.57*	-4.73**	-6.10**	-5.07**	-3.8*	-3.55*	-3.52	-4.20
Constant										
ADF (1)	0.90	-2.09	1.94	-2.01	-0.50	-2.00	3.7**	-1.08	-2.94	-3.61
ADF FD (1)	-6.14**	-4.71**	-2.70	-4.71**	-5.87**	-5.08**		-3.61**	-2.93	-3.60

NOTES: 1- PP is the Phillips-Perron test, FD is the first difference, and ADF is the Augmented Dickey Fuller. 2- The numbers in parenthesis are the proper lag lengths based on the Akaike Information Criterion (AIC).
3- A * indicates rejection of the null hypothesis of non-stationarity at the 5% level of significance, while ** indicates a stronger rejection at the 1% level. 4-When the series are taken as ratios to GDP the time trend becomes insignificant. The time trend is statistically significant for the debt series where the t-stats. is 2.57, and for both the G and T series the time trend is highly significant. For all series the constant is statistically insignificant.

According to Hakio and Rush (1991), if government expenditures and revenues series contain a unit root (i.e., are integrated of order 1), then one must search for a long-run equilibrium relationship between them. We next use the Johansen (1991, 1995) efficient maximum likelihood test to test for the existence of a long-run relationship between government revenues and expenditures. If such relationship exists than one can conclude that fiscal policy in Lebanon is sustainable. More specifically, consider a Vector autoregression (VAR) of order z

$$X_t = A_1 X_{t-1} + ... + A_z X_{t-z} + \varepsilon_t, \tag{20}$$

where X_t is our y-vector of the non-stationary I(1) government revenues and spending series, and ε_t is a vector of innovations. We can rewrite the VAR as

$$\Delta X_t = \theta\, X_{t-1} + \sum_{i=1}^{z-1} \lambda_i \Delta X_{t-i} + \varepsilon_t, \tag{21}$$

where, $\theta = \sum_{i=1}^{z} A_i - I_i$, and $\lambda_i = -\sum_{j=i+1}^{z} A_j$.

Granger's representation theorem asserts that if the coefficient matrix θ has reduced rank r<y, then there exist y x r matrices ω and Ω each with rank r such that $\theta = \omega\Omega'$ and $\Omega' X_t$ is stationary. r is the number of cointegrating relations (the cointegrating rank) and each column of Ω is the cointegrating vector. The elements of ω are known as the adjustment parameters in the vector error correction model. Johansen's method is to estimate θ matrix in an unrestricted form, then test whether we can reject the restrictions implied by the reduced rank of θ.

Table 4. Cointegration Tests: Government Revenues and Expenditures

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
r=0	$r \geq 1$	13.88	15.14	20.04
$r \leq 1$	$r = 2$	2.74	3.76	6.65

NOTES: 1-The Johansen Cointegration Likelihood Ratio Test is based on the trace of the stochastic matrix.
2-The test allows for a linear deterministic trend in the data, and no constant.
3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively. The asymptotic critical values are from Osterwald-Lenum (1992).

Tables 4 indicates no co-integrating vector at both levels of significance between government spending and revenues, and the null hypothesis of no-cointegration cannot be rejected. Thus, according to our cointegration tests fiscal policy in Lebanon appears to be on a non-sustainable path, since government spending and revenues are drifting too far apart and

do not seem to converge to a long-run equilibrium relationship. The factor behind this is the servicing of a huge debt, which is rendering government expenditure exceed by far government revenues. This result is also confirmed when using the series as ratios to GDP. Tables 5 re-confirms the empirical results obtained above, indicating again no long-run relationship between the series as ratios to GDP.

Table 5. Cointegration Tests: Government Revenues and Expenditures as Ratios to GDP

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
r=0	$r \geq 1$	6.84	12.53	16.31
$r \leq 1$	$r = 2$	0.14	3.84	6.51

NOTES: 1-The Johansen Cointegration Likelihood Ratio Test is based on the trace of the stochastic matrix. 2-The test allows for no deterministic trend or constant in the data, normalized to government revenues. 3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively. 5-The asymptotic critical values are from Osterwald-Lenum (1992).

5. The Sustainability of Foreign Debt in Lebanon

The traditional literature on fiscal sustainability has always distinguished between domestic and foreign debt. Within this context foreign debt has always been viewed as a more serious threat to an economy because it involves a transfer of wealth to foreign lenders, and because debt service payments are limited by foreign exchange earnings. Domestic debt, however, rests mainly on domestic borrowing and lending and may be financed sometime through seigniorage revenues. These views, however, have proved to be misleading and the recent financial and debt crisis in several emerging economies are pointing in the opposite direction. Specifically, the hyperinflation in Latin America in the 1980s and 1990s, and in Turkey in late 1990s showed that there is a limit to deficit financing through printing money. It is also interesting to note that while many less developed countries chose to default on their external debt like Brazil and Argentina, they continue to honor their domestic debt obligations. In addition, the Mexican crisis of 1994 and subsequently the East Asian, Argentinean, and Turkish crises have all demonstrated that with free capital mobility, the stock of domestic debt could become closely integrated with external debt. Another phenomenon which strengthens the linkages between fiscal policy and monetary and exchange rate policies is currency substitution or dollarization, which has become popular in many developing countries. These linkages make it impossible to examine fiscal policy independently from other macroeconomic polices.

Over the past three decades Lebanon has always enjoyed a relatively low level of external debt. Lebanon did not have any external debt prior to 1978, subsequently, when

Lebanon started accumulating external debt, it was kept within a narrow ceiling and did not exceed the USD 1 billion level until 1995. However, since 1996 external debt started increasing at an exponential rate reaching USD 15 billion in less than five years. The major factor behind this steady increase in external debt in the last five years is the conversion of major portions of domestic debt with relatively high servicing costs into external debt with lower servicing costs on one hand, and financing the current account successive and recurrent deficits since early 1990s. External debt in Lebanon has become recently an issue of great concern that deserves special attention. In the next section, we take a closer look at the accumulation of a sizeable external debt in Lebanon and attempt to identify whether this debt has become recently unsustainable.

5.1 Theoretical Framework

The analysis of both the sustainability of public and external debts is structurally identical. In fact, both frameworks are based on the study of government intertemporal budget constraints. Specifically, consider the following process of external debt accumulation, denoted by D_t

$$D_{t+1}=(1+r)D_t-NX_{t+1}, \qquad (22)$$

where NX_t represent net exports and r is the nominal interest rate.

In the Actuarial Sustainability Approach, If g is the rate of growth of external debt D_t, then equation (22) will have a stable forward solution, as long as $g \le r$. In other words, for external debt to be sustainable in the long run, it should grow less rapidly than the interest rate.

In practice, this condition could be insufficient when the interest rate exceeds the rate of growth of the economy (n). If debt grows at a rate g such that n<g<r, sustainability is satisfied, but debt service would grow more rapidly than total resources and ends up exceeding available resources.

The Effective Sustainability Approach takes into consideration resources that insure the payment of debt service in the long run. If we consider export revenues (X_t) to be a better measure of the capacity to insure debt service, then, for external debt to be sustainable in the long run, the ratio $d_t=D_t/X_t$ should be stationary. In other words, the effective sustainability condition requires the same deterministic and stochastic trends for external debt and for exports.

The net effective sustainability condition imposes the stationarity of the ratio $ca_t = CA_t / X_t$, where $CA_t = NX_t - rD_{t-1}$ is the current account balance. Feve and Henin (1998) show that stationarity of ca_t is an equivalent sustainability condition when $0<g<r$.

On the other hand, and as in the case of public debt sustainability, the empirical literature has also used unit root and cointgeration tests to analyze the sustainability of external debt. However, in many empirical studies the issue of small sample periods in developing countries proved to be a major obstacle in obtaining reliable results. In fact, 25 annual observations do not allow obtaining a valid inference for the usual tests of stationarity or cointegration. Thus, if the temporal dimension is weak, it is necessary to simulate the tests statistic distribution. This is what Feve and Henin have done by proposing an econometric model for external debt sustainability of twelve countries with different development levels: Argentina, brazil, Ivory Coast, India, Indonesia, South Korea, Mexico, Nigeria, Philippines, Portugal, Thailand and Turkey.

The univariate tests led to the acceptance of the null hypothesis of unit root for the ratio of debt to GDP. However, the tests were only accepted for the Ivory Coast and India when they were conducted for the debt to exports ratio. This first evaluation shows a negative global message concerning the effective sustainability of external debt in terms of GDP and the opposite result in terms of exports.

The bivariate tests modify the results especially when GDP is used as a deflator. The hypothesis of stationarity is now accepted for Argentina, Indonesia, Korea and Mexico. In terms of exports, the effective debt of the Ivory Coast is the only one not to be sustainable. The authors argue that when using the univariate approach, sustainability should be often rejected for the test of debt ratios, and when we test external or current balance, it should often be accepted. According to Feve and Henin, the bivariate approach gives more precise results.

Cointegration tests are also used in the empirical literature to depict the sustainability of external debt. In the previous section, and to explain the sustainability of public debt this study looked at cointegration between the different components of the budget balance; mainly government spending and revenues. In this section, we will look at cointegration between the different components of the balance of payments.

Fisher (1995) studies, for instance, the long-term sustainability of the balance of payments deficit by testing the cointegration between imports and exports for the period 1947-1973 in the United States. Due to the existence of a Cointegrating Vector CV = (-1; <1)

for those two variables, the conclusion was that the current account deficit is sustainable for the period under consideration.

Leachman and Francis (2000), believe that traditional unit root tests are not sufficient for the analysis of external debt sustainability, and should be paired with cointegration tests. In fact, according to Feve and Henin (1998), for the external debt to be sustainable in the long run, the ratio $d_t=D_t/X_t$ should be stationary (i.e. effective sustainability condition), or else the hypothesis of unsustainable debt should be accepted. However, for Leachman and Francis the mentioned condition is not sufficient. In order to complete the analysis, the authors propose to integrate the intertemporal dimension in the dynamic debt accumulation by testing the existence of a cointegration relation between exports and debt.

The authors' reasoning is in terms of the balance of payments represented by

$$X_t - M_t - F_t^n + dD_t = 0 , \qquad (23)$$

where exports (X) minus imports (M) are equal to net exports NX; F_t^n is net foreign capital flows and dD_t, the amount lent to foreigners at time t (as a percentage of GDP).

At time $t+1$, the accumulated debt D_{t+1} is equal to $(1+r)\,dD_t$. Suppose that D grows at an annual rate of $\lambda=(D_{t+1}-D_t)/D_t$. As long as $r<\lambda$, the economy can import more than it can export, but its debt will still be sustainable (i.e. actuarial effective sustainability condition).

Consequently, the first step would be to test the existence of a cointegrating relationship between exports and imports in the United States for two sub-periods: (1) From 1947 to 1973, a period characterized by a fixed exchange rate system and limited capital mobility; And (2) from 1974 to 1994, a period characterized by a flexible exchange rate system and accrued capital mobility.

After identifying M_t and X_t as I (1) processes for the two sub-periods, Leachman and Francis found a CV = (1; 1.40) for the first sub-period and no CV for the second sub-period. In fact, for the period 1974-1994, the external deficit increased considerably and was going to end the long-term equilibrium relationship between imports and exports.

The second step consists of testing the existence of cointegration between exports and external debt. If a long run equilibrium relationship exists, then, external debt is sustainable. This hypothesis is rejected for the second sub-period. Nevertheless, since the economic rate of growth is greater than the nominal interest rate ($r < \lambda$), Leachman and Francis conclude, even with the absence of cointegration between M_t and X_t that the US external debt continues to be sustainable. For this situation to prevail, it is mandatory to enhance economic growth by

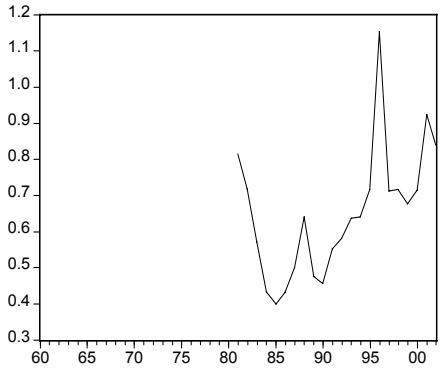
creating political stability, strong financial markets, stimulate investments and create an expanded exports sector.

5.2 Econometric Analysis and Results

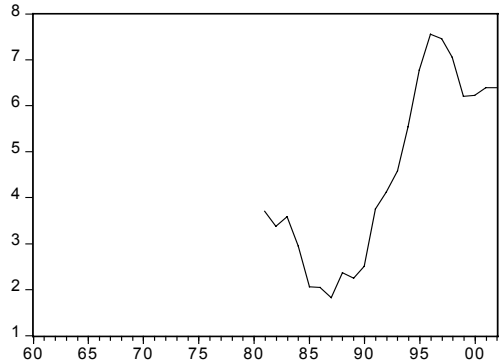
The data used in this section are from the International Monetary Fund's International Financial Statistics and Direction of Trade Statistics, the World Bank's Global development Finance, and the Central Bank of Lebanon. The sample used spans the period 1978-2002. Before establishing non-stationary of the external variables, we start by exploring the dynamics of exports, imports and external debt through the following plots.

Figure 7. Evolution of External Variables in Lebanon: 1978-2002 in Billion of USD

(a) Exports

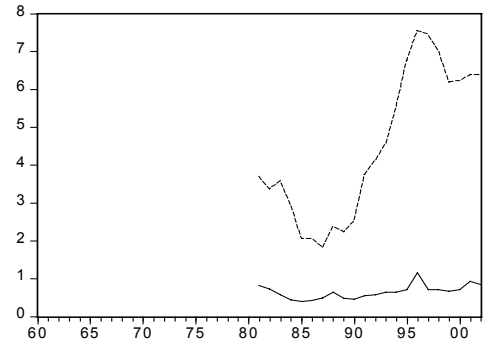


(b) Imports

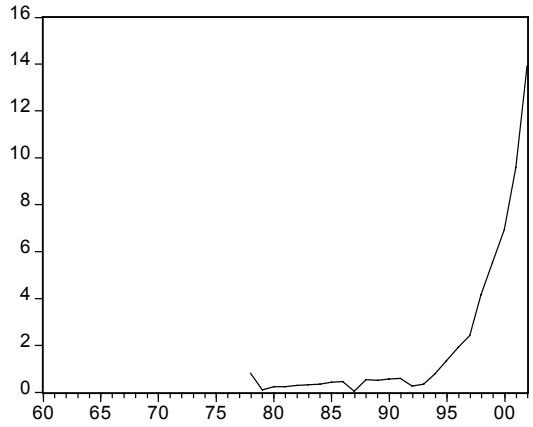


(c) Current Account

(d) Exports and Imports



(e) External Debt



Source: IMF's Direction of Trade Statistics, and World Bank's Global Development Finance

Figure 7 (a) and (b) indicate that Lebanese exports have never exceeded the USD 1 billion level, at a time when Lebanon is a heavy importer of goods and services. This has translated into a huge gap between exports and imports. Subsequently, Lebanon has experienced severe and recurrent current account deficits since the early 1980s (Figure 7 (c)). On the other hand, exports, imports and the current account appear all to contain unit roots, while external debt appears to be stationary prior to 1995, and non-stationary post 1995 (Figure 7 (e)). Before testing formally for the existence of unit roots in the three-variables of interest, Table 6 reports the unit root test results for the ratios of external debt to exports, the current account to exports, and external debt to GDP. The results show that the external debt to export ratio is a non-stationary I(2) series. In addition, the PP and ADF unit root tests are pointing to the non-stationarity of the ratio of the current account to exports, which is an I(1) non-stationary series. Thus, according to Feve and Henin, the non-stationarity of this ratio implies that external debt is not sustainable. In addition, both the ADF and PP unit root tests are pointing to the non-stationarity of the external debt to GDP ratio which is an I(1) non-stationary series. Thus, again and according to the effective sustainability approach, the non-stationarity of this ratio also points to the unsustainability of external debt.

Table 6. Unit Roots Tests for Stationarity

				Mackinnon's Critical Values	
	EDT/X	CA/X	EDT/ GDP	5 %	1%
Constant and Time Trend					
PP (2)	2.11	-0.51	-0.63	-3.53	-4.21
PP FD (2)	-2.42	-3.54*	-8.64**	-3.53	-4.22
Constant					
PP (2)	4.3	-1.60	1.52	-2.93	-3.61
PP FD (2)	-0.88	-3.32*	-7.97**	-2.94	-3.61
Constant and Time Trend					
ADF (1)	2.13	-0.40	0.66	-3.53	-4.22
ADF FD (1)	6.70	-3.57*	-8.66**	-3.53	-4.23
Constant					
ADF (1)	2.43	-1.39	2.02	-2.94	-3.61
ADF FD (1)	2.70	-3.35*	-8.04**	-2.94	-3.62

NOTES: 1- PP is the Phillips-Perron test and FD is the first difference, and ADF is Augmented Dickey Fuller. 2-The numbers in parenthesis are the proper lag lengths based on the Akaike Information Criterion (AIC). 3- A * indicates rejection of the null hypothesis of non-stationarity at the 5% level of significance, while ** indicates a stronger rejection at the 1% level. 4-For all variables the time trend and the constant are statistically insignificant.

Table 7 reports, the ADF and PP tests for exports, imports and external debt series. It is clear that the exports series is a non-stationary I(1) series, while the imports and external debt series are non-stationary I(2) series under both the PP and ADF tests. Following Leachman and Francis (2000) we next look at a long-run relationship between imports and exports.

Table 7. Unit Root Tests for Stationarity: 1978-2002

				Mackinnon's Critical Values	
	X	M	EDT	5 %	1%
Constant and Time Trend					
PP (2)	-3.50	-1.90	7.57	-3.61	-4.39
PP FD (2)	-6.30**	-2.43	1.70	-3.62	-4.41
Constant					
PP (2)	-2.24	-0.70	12.09	-2.99	-3.73
PP FD (2)	-6.16**	-2.54	1.53	-2.99	-3.74
Constant and Time Trend					
ADF (1)	-3.45	-2.18	4.57	-3.62	-4.41
ADF FD (1)	-3.77**	-2.41	2.72	-3.63	-4.44
Constant					
ADF (1)	-1.57	-0.70	12.09	-2.99	-3.74
ADF FD (1)	-8.09**	-2.54	4.29	-3.00	-3.76

NOTES: 1- PP is the Phillips-Perron test and FD is the first difference, and ADF is Augmented Dickey Fuller. 2-The numbers in parenthesis are the proper lag lengths based on the Akaike Information Criterion (AIC). 3- A * indicates rejection of the null hypothesis of non-stationarity at the 5% level of significance, while ** indicates a stronger rejection at the 1% level. 4-For all variables the time trend and the constant are statistically insignificant. 5- X refers to exports, M to imports and EDT to External Debt. 6-Both the external debt and import series are non-stationary I(2) series under both the PP and ADF tests.

Table 8. Cointegration Tests: Exports and Imports

Hypothesis			Critical Values	
Null	Alternative	Trace Statistics	(5%)	(1%)
r=0	$r \geq 1$	5.35	12.53	16.31
$r \leq 1$	$r = 2$	0.007	3.84	6.51

NOTES: 1-The Johansen Cointegration Likelihood Ratio Test is based on the trace of the stochastic matrix.
2-The test does not allow for a linear deterministic trend in the data, and no constant.
3-r represents the number of cointegrating vectors. Maximum lag 1 year in VAR.
4-A **and * indicate significance at the 1 and 5% level of significance respectively.
5-The asymptotic critical values are from Osterwald-Lenum (1992).

Tables 8 report the cointegration tests for exports and imports. It is clear that there is no long run relationship between the two series, and as is clear from Figure 7 (d) the two series are drifting two fart apart and are not bound by a long run relationship. Following Leachman and Francis we can conclude that external debt in Lebanon is not sustainable. Recurrent trade and current deficits means that Lebanon will have to generate foreign currency from sources other than exports to cover the widening huge gap between exports and imports. If such hard currency is not generated then the byproduct would be the accumulation

of a sizeable unsustainable external debt. Since the external debt series is stationary we will not proceed with the second step of Francis and Leachman, which consists of testing for a long-run relationship between exports and external debt.

Overall the empirical results of this section are all pointing to the non-sustainability of external debt in Lebanon.

6. Conclusion and Policy Recommendations

This paper has closely evaluated the fiscal developments in Lebanon since the end of the civil war in 1990. After highlighting the major monetary and fiscal developments, the paper used debt ratio analysis, the PVC framework, and unit root and cointegration test to study the issue of debt sustainability in Lebanon. The empirical section has shown that all debt related ratios are on an exploding path, and do not seem to converge to a stable equilibrium. The Lebanese debt to GDP ratio is among the highest in the Middle East Region, and has been growing fast in the last five years. On a more rigorous level, the paper has tested the transversality condition by studying the time series properties of the fiscal variables. Unit root and cointegration tests on the budget components of the Lebanese government have shown that the current Lebanese public debt is unsustainable. In addition, unit root and cointegration tests on the components of the balance of payments have also shown that external debt in Lebanon appears to be on an unsustainable path. The paper has also shown that the optimal level of government spending as a percent of GDP is estimated at about 28.5 percent.

Due to the current political situation, it appears that the Lebanese government is not able or unwilling to undertake the necessary fiscal adjustment measures to address the rapidly deteriorating fiscal situation. The proceeds from the privatization of public enterprises have not yet materialized, and the improvement in the primary balance did not result in a sustained debt service and debt stock reduction or economic growth.

Faced with an extremely difficult and unsustainable fiscal situation, Lebanon was provided through the Paris II conference a last resort before facing bankruptcy. The main objective behind the Paris II meeting, held on the 23rd of November 2002, was to draw external support in the form of long-term/low interest foreign debt that is intended to substitute the short-term/high cost domestic debt as well as to complement the government's effort of reducing total debt through public enterprise privatization coupled with an increase in the revenue base and a reduction in public expenditures. In other words, the Lebanese government was seeking to change the composition of its debt by reimbursing the high

interest existing public debt with foreign support in the amount USD 4.2 billion, contracted at terms available to prime sovereign borrowers. The Paris II meeting was held in Paris, under the auspices of the French government, with the participation of twenty-two major countries and funds represented by Presidents, Prime ministers, ministers and other high ranked officials.

The Lebanese banking sector resolved to contribute in the overall macroeconomic adjustments performed by the government. Furthermore, banks will play a crucial role in reflecting the proceeds of the government's economic adjustment through lower rates on new government Treasury bill issues. In November 2002, the scheme aiming to reduce interest payments was put into action where commercial banks purchased two-year government securities in an amount equal to 10 percent of their deposit base. Lower interest rates are intended to stimulate private investment, which in turn will boost up the business cycle resulting in a sustained income growth. In addition, and in the first part of 2002, commercial banks have agreed to zero interest loan to the Lebanese government in the amount of USD 5 billion.

Unless timely used coupled with proceeds from privatization and an end to over-spending and government corruption, the proceeds of the Paris conference can cover at most one year worth of debt service. After less than a year from Paris II, Lebanese government officials started hoping for a Paris III Conference, at a time when none of the commitments to Paris II appear to have been fulfilled. The expected fiscal crisis could degenerate into a banking and currency crisis, since a major portion of the public debt is held by commercial banks. Some academics even believe that with the accumulation of a sizeable public debt, now standing at USD 33 billion, the government is now targeting the savings of the Lebanese private sector, which are in the form of deposits at commercial banks, estimated at about USD 40 billion. The crisis situation could prove to be similar to that in Argentina where banks have refrained from paying private savings deposits.

In order to avert an imminent fiscal and exchange rate crisis, the Lebanese government will have to privatize in the next few months both the telecommunication and power sectors. It should also put an end to corruption and restructure the public sector. However, whether the government can timely deliver on its old promises in such a short period of time is highly unlikely, and all fiscal and monetary indicators are pointing to an imminent fiscal and exchange rate crisis.

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DATA APPENDIX

Table A.1 Fiscal Developments 1960-2002

Year	Government Revenues	Government Expenditure	Primary Deficit/Surplus	Total Deficit/Surplus
1960	0.100	0.077	0.023	0.023
1961	0.104	0.089	0.015	0.015
1962	0.118	0.136	-0.018	-0.018
1963	0.134	0.140	-0.006	-0.006
1964	0.144	0.154	-0.009	-0.009
1965	0.158	0.171	-0.013	-0.013
1966	0.165	0.173	-0.007	-0.007
1967	0.165	0.189	-0.023	-0.023
1968	0.180	0.190	-0.009	-0.009
1969	0.185	0.194	-0.009	-0.009
1970	0.204	0.212	-0.008	-0.008
1971	0.214	0.309	-0.096	-0.096
1972	0.240	0.357	-0.117	-0.117
1973	0.391	0.406	-0.015	-0.015
1974	0.552	0.530	0.023	0.023
1975	0.330	0.420	-0.090	-0.090
1976	0.052	0.219	-0.168	-0.168
1977	0.361	0.554	-0.192	-0.192
1978	0.467	0.752	-0.285	-0.371
1979	0.557	0.861	-0.305	-0.348
1980	0.686	1.061	-0.375	-0.452
1981	0.671	1.098	-0.427	-0.650
1982	0.706	1.939	-0.865	-1.233
1983	0.797	1.704	-0.560	-0.906
1984	0.279	1.505	-0.573	-1.226
1985	0.240	1.412	-0.254	-1.173
1986	0.070	0.394	-0.077	-0.324
1987	0.044	0.315	-0.034	-0.271
1988	0.059	0.520	-0.163	-0.461
1989	0.091	1.009	-0.278	-0.918
1990	0.150	0.943	-0.983	-0.793
1991	0.594	1.361	-1.006	-0.767
1992	0.619	1.207	-0.306	-0.588
1993	1.084	1.763	-0.221	-0.679
1994	1.361	3.160	-0.896	-1.799
1995	1.900	3.669	-0.594	-1.769
1996	2.277	4.655	-0.669	-2.378
1997	2.458	6.000	-1.330	-3.542
1998	2.950	6.009	-0.837	-3.060
1999	3.229	5.910	-0.277	-2.681
2000	3.150	7.252	-1.317	-4.101
2001	3.083	6.083	-0.139	-3.000
2002	3.878	6.590	0.354	-2.712

Notes: All values are in billion of USD converted at current exchange rate.
Source: 1960-1989: Central Bank of Lebanon, Yearly, Quarterly and Monthly Bulletin, Various Issues.
1990-2002: Ministry of Finance of Lebanon.

Table A.2 Debt and Debt Related Variables: 1978-2002

Year	Domestic Debt	External Debt	Total Debt	Debt Service
1978	0.450	0.790	1.240	0.032
1979	0.453	0.093	0.546	0.043
1980	0.800	0.236	1.036	0.077
1981	1.490	0.225	1.715	0.223
1982	3.683	0.273	3.955	0.475
1983	3.450	0.311	2.434	0.292
1984	3.532	0.340	3.121	0.375
1985	3.004	0.420	3.632	0.715
1986	0.940	0.450	1.244	0.272
1987	0.426	0.051	1.229	0.054
1988	0.984	0.525	0.853	0.151
1989	1.120	0.512	1.807	0.301
1990	1.888	0.544	2.432	0.190
1991	3.002	0.577	3.579	0.239
1992	2.758	0.248	3.006	0.282
1993	3.559	0.327	3.886	0.458
1994	5.676	0.772	6.447	0.903
1995	7.517	1.353	8.870	1.175
1996	11.101	1.907	13.008	1.709
1997	12.958	2.432	15.390	2.212
1998	14.381	4.166	18.547	2.223
1999	16.838	5.540	22.377	2.405
2000	18.017	6.948	24.965	2.784
2001	18.716	9.606	28.322	2.860
2002	16.784	13.940	30.724	3.066

Source: Central Bank of Lebanon, Yearly, Quarterly and Monthly Bulletin, Various Issues. Government of Lebanon, Ministry of Finance of Lebanon. All Values are in Billions of USD converted at current exchange rate.

Table A.3 Macroeconomic Developments: 1960-2002

Year	Nominal GDP (Billion of USD)	Inflation Rate in (%)	Exchange Rate LL/Per One USD	M2 (Million of USD)
1960	--	--	3.15	--
1961	--	--	3.02	--
1962	--	--	3.06	--
1963	--	--	3.08	--
1964	1.039	2	3.08	0.86
1965	1.148	3	3.07	1.05
1966	1.220	2.7	3.17	1.08
1967	1.220	3.7	3.13	1.07
1968	1.344	0.7	3.18	1.09
1969	1.405	4.6	3.25	1.14
1970	1.497	3.25	3.25	1.31
1971	1.709	1.60	3.16	1.67
1972	2.115	4.9	3.01	2.12
1973	2.830	6	2.51	3.08
1974	3.538	11.1	2.30	4.17
1975	3.086	9.9	2.43	4.39
1976	1.399	28.9	2.93	3.82
1977	2.733	19.3	3.00	4.79
1978	2.928	10.2	3.01	5.73
1979	3.423	23.8	3.26	6.71
1980	3.838	23.7	3.65	7.90
1981	3.540	20.2	4.63	8.74
1982	3.307	18.52	3.81	12.75
1983	3.024	6.88	5.49	11.24
1984	3.169	18.13	8.89	8.58
1985	3.278	69.13	18.10	6.58
1986	1.242	95.32	87.00	3.72
1987	1.628	487.13	455.00	3.23
1988	2.558	154.97	530.00	4.10
1989	2.673	72.2	505.00	4.88
1990	2.835	88.87	842.00	4.54
1991	4.455	50.12	879.00	6.26
1992	5.168	99.79	1838.00	6.41
1993	7.669	24.7	1711.00	9.16
1994	9.293	8.2	1647.00	11.93
1995	11.296	10.3	1596.00	14.34
1996	13.155	8.9	1552.00	18.63
1997	14.984	7.7	1527.00	22.64
1998	16.253	4.5	1508.00	26.62
1999	16.462	0.2	1507.50	29.73
2000	16.399	-0.4	1507.50	32.66
2001	16.399	-0.4	1507.50	35.10
2002	16.660	5	1507.50	40.2

Notes: All values are converted at current exchange rate.
Source: Exchange Rate and M2: International Monetary Fund, International Financial Statistics, Various Issues. GDP and Inflation: 1964-1982: Central Bank of Lebanon, Yearly, Quarterly and Monthly Bulletins; 1982-1990: International Monetary Fund, International Financial Statistics, Various Issues; 1990-2002: Ministry of Finance of Lebanon.

Table A.4 External Debt and Related Ratios: 1978-2002

Year	Total Debt	External Debt	Exports	Imports	Debt Service	External Debt/Total Debt	Debt Service/External Debt
1978	1.24	0.79	--	--	0.032	0.637097	0.020387
1979	0.546	0.093	--	--	0.043	0.17033	0.007324
1980	1.036	0.236	--	--	0.077	0.227799	0.017541
1981	1.715	0.225	0.814	3.70673	0.223	0.131195	0.029257
1982	3.955	0.273	0.71848	3.37727	0.475	0.069027	0.032788
1983	2.434	0.311	0.57182	3.59344	0.292	0.127773	0.03731
1984	3.121	0.34	0.43358	2.95013	0.375	0.108939	0.040852
1985	3.632	0.42	0.39984	2.06569	0.715	0.115639	0.082682
1986	1.244	0.45	0.43154	2.04624	0.272	0.361736	0.098392
1987	1.229	0.051	0.50045	1.82069	0.054	0.041497	0.002241
1988	0.853	0.525	0.63973	2.37099	0.151	0.615475	0.092937
1989	1.807	0.512	0.47583	2.24555	0.301	0.283343	0.085286
1990	2.432	0.544	0.45639	2.51529	0.19	0.223684	0.0425
1991	3.579	0.577	0.55261	3.75178	0.239	0.161218	0.038531
1992	3.006	0.248	0.58058	4.11959	0.282	0.082502	0.023265
1993	3.886	0.327	0.63661	4.587	0.458	0.084148	0.03854
1994	6.447	0.772	0.64007	5.53937	0.903	0.119746	0.10813
1995	8.87	1.353	0.71601	6.76899	1.175	0.152537	0.179231
1996	13.008	1.907	1.15338	7.55951	1.709	0.146602	0.250543
1997	15.39	2.432	0.71131	7.4565	2.212	0.158025	0.349551
1998	18.547	4.166	0.71584	7.0596	2.223	0.224619	0.499327
1999	22.377	5.54	0.67648	6.20574	2.405	0.247576	0.595419
2000	24.965	6.948	0.71424	6.22758	2.784	0.27831	0.774814
2001	28.322	9.606	0.9237	6.39442	2.86	0.339171	0.970029
2002	30.724	13.94	0.84055	6.39576	3.066	0.453717	1.391096

Notes: All values are in USD billion, converted at current exchange rates.

Source: Central Bank of Lebanon, and Ministry of Finance, International Monetary Fund's International Finance Statistics and Direction of Trade Statistics, and the World Bank's Global Development Finance.

Table A.5 External Debt and Related Ratios: 1978-2002

Year	External Debt/Exports	External Debt/GDP	Current Account	Current Account/Exports
1978	--	0.269767	-0.02039	--
1979	--	0.02717	-0.00732	--
1980	--	0.061486	-2.91027	--
1981	0.276413	0.063559	-2.68805	-3.30227
1982	0.379969	0.08255	-3.05441	-4.25121
1983	0.543877	0.102855	-2.55386	-4.4662
1984	0.784169	0.107299	-1.7067	-3.9363
1985	1.05042	0.128131	-1.69738	-4.24515
1986	1.042777	0.362198	-1.41863	-3.28737
1987	0.101908	0.031326	-1.7335	-3.46388
1988	0.820659	0.205199	-1.86266	-2.91163
1989	1.076015	0.191526	-2.14419	-4.5062
1990	1.191963	0.191893	-3.24167	-7.10285
1991	1.044136	0.129516	-3.57754	-6.4739
1992	0.427159	0.047987	-3.97366	-6.84429
1993	0.513658	0.042638	-4.93784	-7.75646
1994	1.206118	0.083076	-6.16111	-9.62568
1995	1.889638	0.11978	-6.58536	-9.1973
1996	1.653401	0.144961	-6.99573	-6.06542
1997	3.419044	0.16231	-6.69331	-9.40984
1998	5.819736	0.256327	-6.02859	-8.4217
1999	8.189451	0.336539	-6.10876	-9.03021
2000	9.727823	0.423693	-6.24553	-8.74431
2001	10.39948	0.585779	-6.52524	-7.06424
2002	16.58438	0.836733	-1.3911	-1.65498

Notes: All values are in USD billion, converted at current exchange rates.
Source: Central Bank of Lebanon, and Ministry of Finance, International Monetary Fund's International Finance Statistics, and the World Bank's Global Development Finance.

Table A.6 Treasury Bill Yearly Average Rates: 1978-2003 in (%)

Year	Rate
2003	6.84
2002	10.58
2001	10.88
2000	10.88
1999	11.25
1998	12.31
1997	12.99
1996	14.64
1995	18.00
1994	14.54
1993	17.47
1992	21.12
1991	16.75
1990	18.00
1989	18.00
1988	18.00
1987	18.00
1986	17.83
1985	14.96
1984	12.96
1983	9.52
1982	14.04
1981	13.29
1980	8.85
1979	4.12

Source: Banque Du Liban

Notes: TBs monthly rates are available from the Author.