

**Sustainability of Exchange Rate  
Policies and External Public Debt  
in Lebanon**

**Simon Neaime**



## Sustainability of Exchange Rate Policies and External Public Debt in Lebanon

Simon Neaime \*

### Abstract

The conduct of exchange rate and fiscal policies in the small open economy of Lebanon has recently become critical in determining the country's future economic and fiscal situation. This is due to the accumulation of a sizable level of internal and external debts since the early 1990s of the last century, and the pursuit of a fixed exchange rate regime to the US dollar. This paper presents an empirical analysis of the sustainability of exchange rate and fiscal policies using unit roots and co-integration tests. It is shown that foreign debt in Lebanon has recently become unsustainable. It is also shown that if the Central Bank of Lebanon continues to opt for maintaining a fixed US dollar exchange rate arrangement, it would have to implement crisis-prevention measures, namely by exercising fiscal discipline, managing properly its debts and foreign reserves, and avoiding future real exchange rate appreciations.

## إستدامة سياسات سعر الصرف والدين العام الخارجي في لبنان

سيمون نعيمة

### ملخص

أصبحت السياسات المالية والنقدية أساسية في رسم مستقبل الوضع المالي والاقتصادي في لبنان. يعود ذلك إلى تنامي حجم الدين العام المحلي والأجنبي منذ بداية تسعينات القرن الماضي. تقدم هذه الورقة بحثاً علمياً يدور حول قدرة الاقتصاد اللبناني على الحفاظ على استقرار الوضع المالي والنقدي. يبيّن البحث أن تنامي الدين العام الخارجي في لبنان قد أصبح يشكل خطراً أساسياً على الوضع الاقتصادي. كما يبيّن أنه إذا ما استمر البنك المركزي على سياسته الحالية في تثبيت سعر صرف العملة المحلية فإن عليه اتخاذ إجراءات نقدية ومالية عاجلة

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(كالحيلولة دون تنام أكبر في الدين الخارجي والداخلي، والحفاظ على مخزون مرتفع من العملات الأجنبية) تحول دون الوقوع في أزمة مالية.

## Introduction

In 1994, the government of Mexico undertook a devaluation that had been recommended by knowledgeable observers, in part to correct a real exchange rate overvaluation that appeared to be stifling growth in the country. A similar correction of the exchange rate had in fact, resulted in an acceleration of economic growth a few years before in the United Kingdom and Italy when these countries decoupled their currencies from the ERM (Exchange Rate Mechanism of the European Monetary System) and allowed them to depreciate. Surprisingly, in Mexico, the devaluation was followed not by an acceleration of growth, but by a debt crisis (a refusal of creditors to roll over existing debt or extend new loans) that resulted in a sharp contraction of economic activity.

While the cases of Mexico and Argentina have received a substantial amount of attention, there is substantial evidence that debt and exchange rate crises are strongly linked in emerging economies more generally. Reinhart (2002), for example, finds that 84% of all default episodes in her 59-country sample over the period 1970-99 were followed within 24 months by currency crises, while 66% of all currency crises in her developing-country subgroup were followed within 24 months by debt defaults. It remains to understand why the link between the two phenomena should be so strong empirically, as well as why in some cases, the two types of crisis tend to occur together while in others they do not.

The purpose of this paper is to attempt to identify the underlying macroeconomic characteristics that help to explain the links between these phenomena within the context of the Lebanese economy

Two separate strands of literature address this issue peripherally. One strand is the literature on sovereign debt. Following the debt crises in the early 1980s, several authors focused on how a no-default debt equilibrium could be explained for sovereign borrowers (see Eichengreen, 1991 for a review) using models based on reputation (Grossman and Van Huyck, 1988) or sanctions (Bulow and Rogoff, 1989). Some early empirical work associated with this literature e.g. Edwards (1984) and Cline (1985), attempted to link sovereign default to exchange rate policy by considering

how the exchange rate regime prevailing prior to a debt crisis, could influence the occurrence of such a crisis. The central idea was that the willingness to use the exchange rate as a mean of adjustment could have the effect of reducing the likelihood of a crisis.

A second strand is the second-generation variant of the currency crisis literature (e.g. Obstfeld, 1996), which examines the factors that influence an optimizing government's choice to alter (or not) an existing exchange rate peg. However, this literature does not typically consider such a choice as part of a wider menu of policies that also includes a fiscal instrument and a debt default option.

This paper may thus be perceived as addressing gaps in both the debt crisis and currency crisis literatures by simultaneously looking at the interaction among exchange rate policy, fiscal policy, and potential default on external debt within the context of a small open economy.

All East Asian crisis-stricken countries followed some form of pegged exchange rate regimes *vis-à-vis* the United States Dollar (US\$) before the crisis. Monetary policy deviations and some other international factors contributed to increasing pressures on these pegs. During the period from 1995 to 1997, the dollar, and thus all currencies pegged to it, had appreciated significantly against the yen. The East Asian currencies became increasingly overvalued because of the dollar appreciation, and more so because of the notable deviation from US monetary policy. While average annual M2 growth in the US for the period 1991-1997 was 2.14%, the figure for the crisis-stricken countries for the same period, was almost eight times as high. The overvaluation was further augmented by the diverging inflation rates between the US and East Asian economies. The average annual inflation rate was 5.75% for crisis-stricken countries, and 2.6% for the US. Currency overvaluation eroded the countries' competitiveness and helped weaken their current accounts. Each of the crisis-stricken countries had, on the average, a current account deficit in the period from 1990-1996. The average current account for Thailand, Indonesia, South Korea and Malaysia stood at 6% of GDP in 1995, decreasing to 5% of GDP in 1996. In

contrast, Singapore and Taiwan had a current account surplus of 17% and 4% respectively. These deficits were mainly due to currency overvaluations.

The conduct of monetary and fiscal policies 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 external debt and the pursuit of a fixed exchange rate regime since the mid 1990s. It is well known that Lebanon has been running permanent current account and budget deficits for the past decade for about 35 and 18% of GDP respectively, resulting in a debt above 200% of GDP by the end of October 2004. After the accumulation of a sizeable debt, the financial distress of the public sector has become a major source of concern for the Lebanese economy rendering the sustainability of the debt financing program unsustainable. This paper is set out to examine empirically the sustainability of foreign debt policies in Lebanon. It will also establish the links between foreign debt and exchange rate policies.

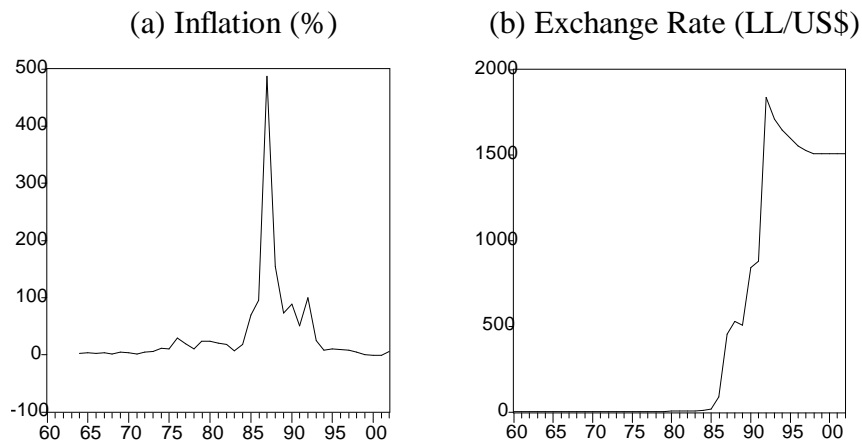
## **Monetary and Fiscal Policies in Lebanon: Some Recent Trends**

### **Macroeconomic and Monetary Developments**

After a decade of market-determined exchange rates, Lebanon entered a period of exchange rate stability in the mid-1990s with the adoption of a fixed exchange rate regime linked to the US dollar. Prior to 1992, the Lebanese Lira (LL and also known as Lebanese pound) depreciated tremendously in a relatively short period of time, declining from about LL 3/US\$ in 1985, to about LL 2,000 to the dollar during the period 1989-1992. A narrow range of variability has been permitted in recent years, with rates remaining close to LL 1,507 per US\$. In sum, the LL depreciated substantially in the late 1980s and early 1990s following the end of the conflict, and subsequently appreciated slightly before stabilizing in the mid-1990s close to the currently prevailing central parity of LL 1,507 to the dollar (see Figure 1). While the Central Bank succeeded since 1993 in its endeavor to bring down the rate of inflation to about zero% (Figure 1), the rigid policy of a deliberate gradual appreciation of the LL carried with it substantial economic costs. The authorities had to maintain high interest

rates on Treasury Bills (TBs) to be able to borrow from the banking system and other international sources for the purpose of financing the fiscal deficits that continued to run at high levels averaging over 16% of GDP for the period under consideration. The consequence was the accumulation of sizeable domestic and foreign debts, in addition to a “crowding out effect.”





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

**Figure 1. Inflation and exchange rates: 1960-2002.**

The primary objective of a pegged exchange rate regime was to reinstate confidence in the country as a preparatory procedure for external assistance requests. The LL appreciated against the dollar by 7% and 4% in 1993 and 1994 respectively. The inflation rate declined to 33% in 1993 to reach the single digit level, 9%, by 1994, and down to about zero% since 1997 (Figure 1). A low inflation rate coupled with high real interest rates encouraged the inflow 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 LL was stabilized and was appreciating steadily against the US dollar since 1993. However, the 3 month TBs' rate kept on increasing to reach its highest level of 33% in 1993, with a milder peak of 25% 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, this constituted an average real effective return on domestic short-term debt of about 30%. These high real interest rates have, and are still having detrimental consequences on the economy, stifling the rate of growth of GDP.

There was, however, a reversal in the increasing trend of TBs rates since the end of 1996, and the real return on Lebanese TBs with maturities between 3, 6 and 24 months ranged between 12-18%. It goes above the US\$ and the Euro LIBOR (London Inter-Bank Official Rate) or risk-free rate by about 12-15%.

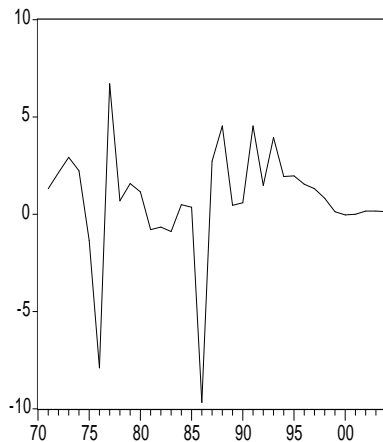
Lebanon's monetary authority has retained a fixed peg to the US dollar. This is despite recommendations from the World Bank and the International Monetary Fund (IMF) for it to consider a move towards a more flexible regime. Lebanon has always enjoyed a fully liberalized capital account, with free capital movement. However, the rigidity of the exchange rate has imposed significant pressures on the domestic economy. The Central Bank has lost between US\$ 7-8 billion in the past 10 years trying to maintain its US dollar peg. This has been coupled with high interest rates, leading to the accumulation of a sizeable debt and continued budget deficits. The central bank has not been able to take full advantage of its monetary policy to release pressure on domestic interest rates during times when the Lebanese Government has had to borrow from the international and domestic markets to finance the rebuilding of the country's devastated infrastructure.

The circumstances outlined above indicate that the current exchange rate policy in Lebanon is perhaps unsustainable, where the Central Bank may soon be compelled to institute a floating exchange rate regime. On the other hand, the depreciation of the euro relative to the dollar-between the time the euro was introduced in 1999 and the end of 2002- led to the appreciation of the Lebanese real exchange rate during that period, with devastating consequences on exports- reducing its intra-regional and international trade competitiveness- and economic growth. There was however, a trend reversal since the end of 2002, when the euro appreciated significantly against the dollar. Lebanon could not benefit from the depreciation of its real exchange rate because a higher euro meant higher prices for imported consumer goods exerting upward inflationary pressures on the real exchange rate.

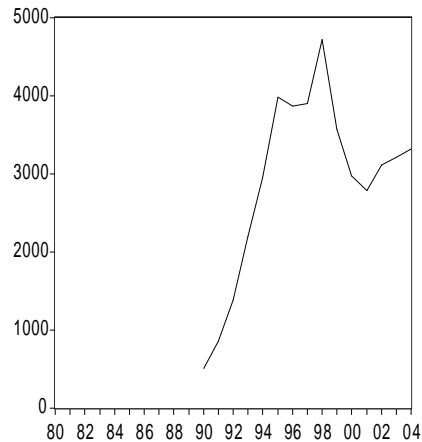
Lebanon continued to suffer because the burden of adjustment was born by macroeconomic fundamentals. The nominal stability for which the pegged arrangement was originally instituted has been achieved. In principle, a more flexible exchange rate arrangement might help release some of the pressures generated by the internal and external imbalances and shocks Lebanon has experienced. At present, however, this may not be a viable alternative for Lebanon, given the virtual absence of an independent monetary policy and well-developed capital markets. Another consideration is that underdeveloped monetary, political and policy-making institutions tend to undermine the effectiveness of discretionary monetary policy.

Figure 2 indicates that after a period of rising growth rates of GDP since the early 1990s as a result of an expansionary fiscal policy which translated into rising interest rates, the rate of growth of GDP started its reverting trend in the mid 1990s with a mere stagnation in early 2000. The same is true for investment where we see a significant trend reversal since 1998 with a 50% decline from about US\$ 5 billion in 1998, to about US\$ 2.8 billion in 2002. However, prior to 2002, there appears to be a reversal in the decreasing trend of the previous 3 years, which may be attributed to Arab investments mainly in real estate.

(a) Rate of Growth of GDP (%)



(b) Investment (US\$ Million)

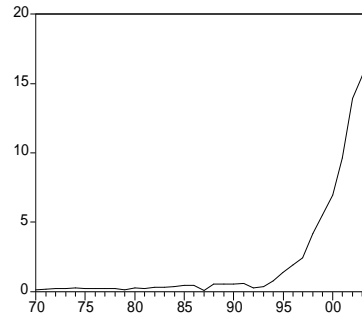
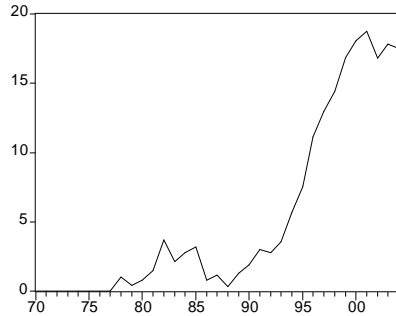


Source: National Accounts Studies of the ESCWA Region, Bulletin No: 17-23.

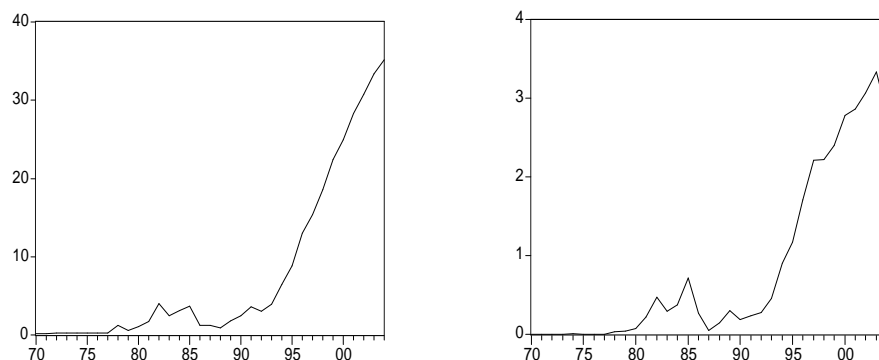
**Figure 2. Investment and GDP: 1970-2004.**

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 US\$ 35 billion by the end of 2004, after an exponential increase since 1993, at a time when it was hovering between US\$ 0.5-3 billion during the 1970-1993 period (Figure 3c). The fast accumulation of a 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 2004, foreign debt amounted to about US\$ 17.5 billion when it was at about US\$ 1 billion in 1996 (Figure 3b). This is partly due to the fact that the Government has been converting a major portion of its domestic debt (Figure 3a) 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 US\$ 1 billion in 1994, it stood at about US\$ 3 billion in 2004 (Figure 3d).

(a) Domestic Debt in (US\$ Billion)      (b) External Debt in (US\$ Billion)



(c) Total Debt in (US\$ Billion)      (d) Debt Service in (US\$ Billion)



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

**Figure 3. Evolution of public debt in Lebanon: 1970-2004.**

### Sustainability of Fiscal Policies

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. Standard indicators fall into two broad categories: (a) flow indicators; and (b) stock indicators. Flow indicators are based on flow variables, typically gross domestic product or exports. From an inter-temporal perspective, these variables represent the resources that are available to meet debt obligations. Thus, 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. On the other hand, 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<sup>(1)</sup> 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 4a shows that from 0.4% of GDP in late 1970s, total Lebanese public debt grew steadily in the last 10 years to stand by the end of 2004 at 200% of GDP. This is a clear indication of the fast growing rate of growth of debt at a time when GDP growth has been stagnating at around 1% 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 naturally entails of course a heavy debt service burden, and by the end of 2004, the debt service to GDP ratio stood at about 18%, which is also quite significant given the size of the Lebanese economy, as measured by its GDP (see Figure 4b). Even more alarming is the fact that in 2003, debt service became about 4 times the size of Lebanese exports, with a slight decline in 2004 to about 3.7 (Figure 4c). In other words, the Lebanese economy has to generate every year hard currency of about US\$ 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.

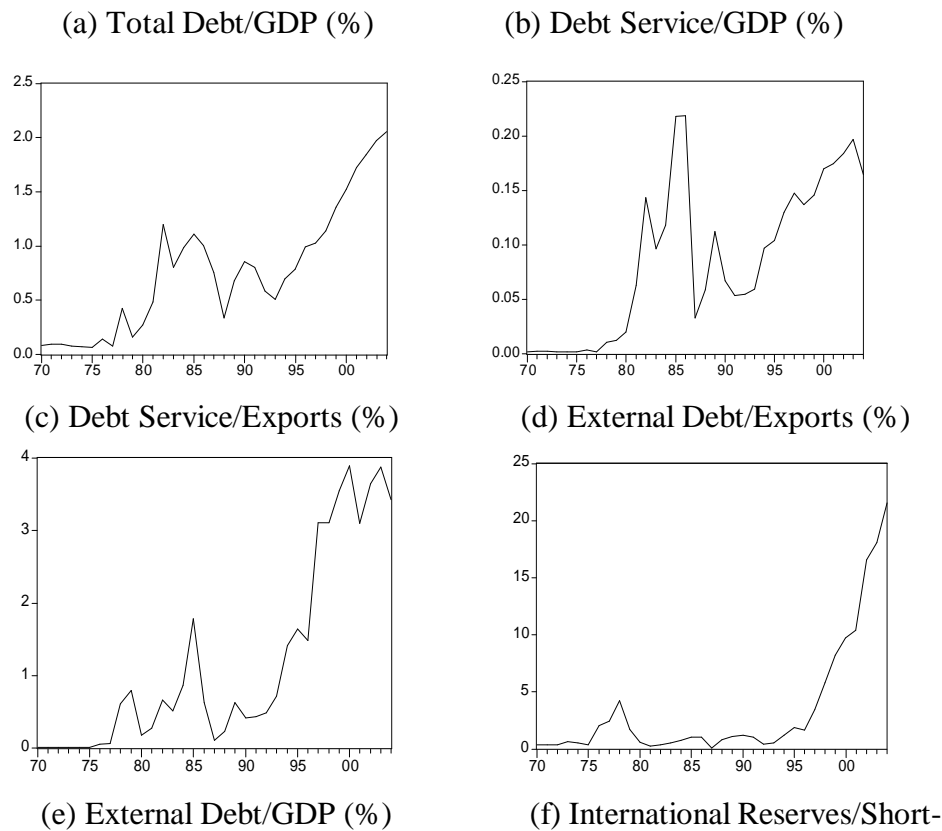
The other broader flow indicators are the External Debt/Exports, and External Debt/GDP.<sup>(2)</sup> These indicate the repayment capacity of a country,

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<sup>(1)</sup> 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.

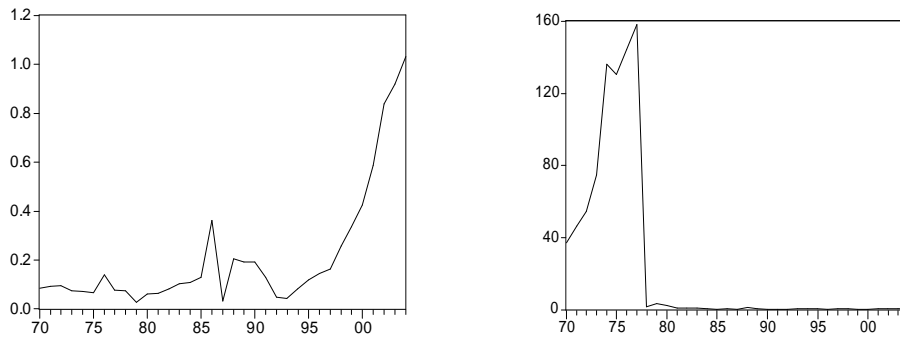
<sup>(2)</sup> Indicators with total debt have many limitations: The size of debt to GDP or exports is likely to be influenced by the stage of development of a country. Debt-level based indicators are expected to be higher in the early stages of development. Thus, using a debt-level based indicator without an inter-temporal or dynamic context may 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

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 20 fold the size of Lebanese exports, and consequently, expected to put more pressure on the external balance (Figure 4d). After being below the 30% level in the 1980s and early 1990s, foreign debt has more than tripled since 1997, to stand at about 100% of GDP by the end of 2004 (Figure 4e).



stock, instead of the characteristics of debt, ignore the fact that some of these debts are more vulnerable to external shock than others.

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

**Figure 4. Public debt related ratios: 1970-2004.**

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.<sup>(3)</sup> Figure 4f indicates again that this ratio has been steadily

<sup>(3)</sup> This ratio has however, some limitations: (a) 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



declining since the late 1980s. This is due mainly to fast growth in short-term debt coupled during various political crises with a steady decline in foreign currency reserves at the Central Bank. On the average, the Central Bank can at most, cover 3-4% of maturing short-term debt. This signals an increasing liquidity risk faced by the Lebanese government, coupled with serious concerns about the sustainability of the fixed exchange rate regime.

The ratio analysis portrayed above presents a rather bleak and alarming picture of 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 (inter-temporal) contexts. Although these indicators may give useful information about the ability to pay, no single indicator provides information on all the dimensions of a payment problem. Critical debt levels are likely to vary over time. Therefore, they have to be accompanied by comprehensive economic evaluation. Therefore, there is a need for a more rigorous dynamic empirical analysis of fiscal sustainability in Lebanon by studying the econometric time series properties of the fiscal variables of interest.

### **Sustainability of Foreign Debt in Lebanon**

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,

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crisis; and (b) It does not provide any information on the quality of international reserves. If international reserves are invested in non-cash assets, then they cannot be used to meet immediate external obligations.

and in Turkey in the 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 policies.

Over the past three decades, Lebanon has always enjoyed a relatively low level of external debt. Lebanon had negligible external debt prior to 1978. Subsequently, when Lebanon started accumulating external debt, it was kept within a narrow ceiling and did not exceed the US\$ 1 billion level until 1995. However, since 1996, external debt started increasing at an exponential rate reaching US\$ 17.5 billion in less than nine years. Besides recurrent current account and budgetary deficits, 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, on the other. Recently, external debt in Lebanon has become an issue of great concern that deserves special attention. In the next section, a closer look is taken at the accumulation of a sizeable external debt in Lebanon and attempt is made to identify whether this debt has become recently unsustainable.

## Theoretical Framework and Related Literature

The analysis of both the sustainability of internal public and external debts is structurally identical. In fact, both frameworks are based on the study of government inter-temporal budget constraints. While the former rests on the financing constraint of the public sector which relates the primary deficit plus nominal debt servicing to changes in outstanding debt, the latter relates external debt to debt servicing and next exports. Specifically, consider the following process of external debt accumulation in period  $t+1$ , denoted by  $B_{t+1}$

$$B_{t+1} = (1 + r)B_t - NX_{t+1}, \quad (1)$$

where  $NX$  represents net exports, and  $r$  is the nominal interest rate.

Iterating Equation 1 forward  $n$  periods and summing up we get the external inter-temporal constraint for the Lebanese government:

$$B_t = \sum_{j=1}^n \frac{NX_{t+j}}{(1+r)^{j+1}} + \lim_{n \rightarrow \infty} \frac{B_n}{(1+r)^n}. \quad (2)$$

If the last term in Equation 2 approaches zero as the number of periods increases, then, the No-Ponzi-Game Constraint will be satisfied, i.e.,

$$\lim_{n \rightarrow \infty} \frac{B_n}{(1+r)^n} = 0. \quad (3)$$

The No-Ponzi-Game Constraint in Equation 3, also known in the literature as the transversality condition, states that the present value of external debt in the indefinite future converges to zero. For this to occur, external debt  $B$  in the numerator must grow more slowly than the rate of interest  $r$ . The government cannot finance interest payments on external debt by continuously issuing new debt. This will happen when Equation 3 is not violated, and Equation 2 reduced to:

$$B_t = \sum_{j=1}^n \frac{NX_{t+j}}{(1+r)^{j+1}}. \quad (4)$$

This is the solvability condition that has to be satisfied.

Empirically, if the external debt series is non-stationary, then it means that it is growing without bound over time, which means that subsequent debt will also grow without bound, rendering fiscal policy unsustainable. This will also violate the No-Ponzi-Game constraint in Equation 3. A stationary external debt series means that the series is reverting to a certain mean overtime and is not growing without bounds. If that were the case, then obviously, fiscal policy would be sustainable, since debt will be under control. Equivalently, if the export and import series are co-integrated, then again, Equation 4 will not be violated, since net exports in the numerator will not grow without bounds and therefore, external debt  $B$  will tend to converge and be under control.

On the other hand, if it is assumed that GDP ( $Y$ ) is growing over time at a constant rate  $\lambda$  to have  $Y_t = (1 + \lambda)Y_{t-1}$ , and if  $b = \frac{B}{Y}$ , and  $nx = \frac{NX}{Y}$ , Equation 1 may be re-written as follows:

$$b_t = \frac{(1+r)}{(1+\lambda)} b_{t-1} - nx_t \quad (5)$$

Solving this equation recursively,

$$b_0 = \sum_{j=1}^n \frac{(1+\lambda)^j}{(1+r)^j} NX_j + \lim_{n \rightarrow \infty} \frac{(1+\lambda)^n}{(1+r)^n} b_n. \quad (6)$$

The external solvability condition requires that:

$$\lim_{n \rightarrow \infty} \frac{(1 + \lambda)^n}{(1 + r)^n} b_n = 0. \quad (7)$$

And Equation 6 becomes:

$$b_0 = \sum_{j=1}^n \frac{(1 + \lambda)^j}{(1 + r)^j} NX_j. \quad (8)$$

External solvability requires that the ratio of external debt to GDP be at least equal to net exports. External debt would be sustainable as long as Equation 8 is not violated.

In the actuarial sustainability approach, if both sides of Equation 1 is divided by  $B_t$ , and rearranged:

$$\frac{NX_{t+1}}{B_t} = r - \frac{B_{t+1} - B_t}{B_t}. \quad (9)$$

Defining the rate of growth of debt  $g = \frac{B_{t+1} - B_t}{B_t}$ , then Equation 9 may be re-written as:

$$\frac{NX_{t+1}}{B_t} = r - g, \quad (10)$$

If  $g$  is the rate of growth of external debt  $B_t$ , then Equation 10 will have a stable forward solution, as long as  $g \leq r$ , and external debt would be sustainable. 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 ( $\lambda$ ). If debt grows at a rate  $g$  such that  $\lambda < g < r$ , sustainability is satisfied, but debt service would grow more rapidly than total resources and ends up exceeding available resources.

One has to consider then the effective sustainability approach. This approach takes into consideration resources that insure the payment of debt service in the long run. If export revenues ( $X_t$ ) is considered 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  $b_t = B_t / X_t$  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  $CA_t = NX_t - rB_{t-1}$  is the current account balance. Feve and Henin (1998) show that stationarity of  $ca_t$  is an equivalent sustainability condition when  $0 < \lambda < r$ .

Alternatively, both sides of Equation 1 may be divided by  $NX_{t+1}$ , and rearranged to get:

$$\frac{B_{t+1} - B_t}{NX_{t+1}} = \frac{rB_t}{NX_{t+1}} - 1. \quad (11)$$

Defining  $b_t = \frac{B_t}{NX_{t+1}}$ , then Equation 11 maybe re-written as follows:

$$\frac{\Delta B_{t+1}}{NX_{t+1}} = rb_t - 1. \quad (12)$$

Equivalently,

$$NX_{t+1} = rB_t - \Delta B_{t+1}, \quad (13)$$

where  $\Delta B_{t+1}$  is the new debt accumulated. And if  $b_t$  in Equation 12 is stationary, then external debt is stationary in the long, and thus, external debt would be sustainable.

On the other hand, and as in the case of public debt sustainability, the empirical literature has also used unit root and co-integration 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. Thus, if the temporal dimension is weak, it is necessary to simulate the tests statistic distribution. This is what Feve and Henin (*op.cit*) 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 lead 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. Feve and Henin 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 the authors, the bivariate approach gives more precise results.

Co-integration tests are also used in empirical literature to depict the sustainability of external debt. To explain the sustainability of public debt, empirical literature looks at co-integration between the different components of the budget balance — mainly government spending and revenues. This paper looks at co-integration between the different components of the balance of payments.

Fisher (1995) studied, for instance, the long-term sustainability of the balance of payments deficit by testing the co-integration between imports and exports for the period 1947-1973 in the United States. Due to the existence of a co-integrating Vector  $CV = (-1; <1)$  for these 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 co-integration tests. In fact, according to Feve and Henin (1998), for the external debt to be sustainable in the long run, the ratio  $b_t = B_t / X_t$  should be stationary, i.e. effective sustainability condition. Otherwise, the hypothesis of unsustainable debt should be accepted. However, for Leachman and Francis (*op.cit*), the aforementioned condition is not sufficient. In order to complete the analysis, they propose to integrate the inter-temporal dimension in the dynamic debt accumulation by testing the existence of a co-integration relation between exports and debt. The authors' reasoning is based on balance of payments represented by:

$$(X_t - M_t) - F_t^n + dB_t = 0, \quad (14)$$

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

At time  $t+1$ , accumulated debt  $B_{t+1}$  is equal to  $B_t + (1+r)dB_t$ . Suppose that B grows at an annual rate of  $g = (B_{t+1} - B_t) / B_t$ , as long as  $r < g$ , 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 co-integrating relationship between exports and imports in the United States for two sub-periods: (a) From 1947 to 1973, a period characterized by a fixed exchange rate system and limited capital mobility; and (b) 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 co-integration 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 rate of growth of GDP is greater than the nominal interest rate ( $r < \lambda$ ), Leachman and Francis conclude, even with the absence of co-integration 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.

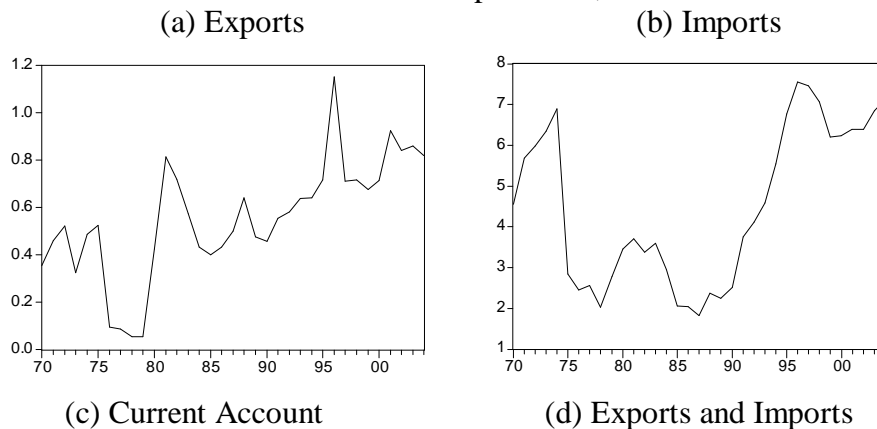
### **Econometric Analysis and Results**

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, the Central Bank of Lebanon, and the Lebanese Ministry of Finance. The sample used spans the period 1970-2004. Before establishing non-stationary of the external variables, the dynamics of exports, imports and external debt through the following plots are explored.

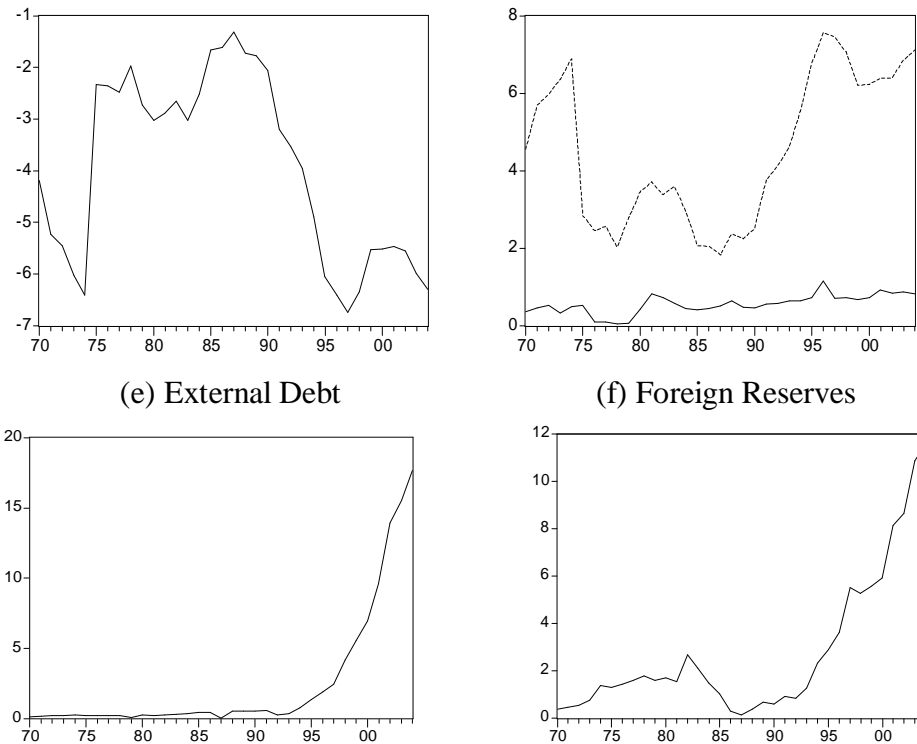
Figures 5a and 5b indicate that Lebanese exports have never exceeded the US\$ 1 billion level, at a time when Lebanon is a heavy importer of goods and services for a yearly average of US\$ 4.5 billion. This has translated into a huge gap between exports and imports. When grouped together, exports and imports appear to be diverging quite significantly over time (Figure 5d). Subsequently, Lebanon has experienced severe and recurrent current account deficits since the mid 1980s (Figure 5c). Despite

these current account deficits, the Lebanese Central Bank has been able to accumulate foreign reserves starting in the early 1990s from capital inflows seeking investments in Lebanese TBs, thus offsetting the current account deficits by corresponding capital account surpluses. By the end of 2004 foreign reserves amounted to about US\$ 11.5 billion (Figure 5f).

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 5e). Before testing formally for the existence of unit roots in the three-variables of interest, Table 1 reports the unit root test results for the ratios of external debt (EDT) to exports (X), the current account (CA) to exports, and external debt to GDP.<sup>(4)</sup> While the results are mixed for external debt to export ratio, both the PP and ADF unit



<sup>(4)</sup> Unit root tests were also performed on the ratio of external debt to the current account. These tests also indicate that this ratio is I(1), pointing to the non-stationarity of external debt and therefore to its unsustainability.



Source: IMF's Direction of Trade Statistics, World Bank's Global Development Finance, the Lebanese Central Bank and Ministry of Finance.

**Figure 5. Evolution of balance of payment components and external debt in Lebanon: 1970-2004 (US\$ Billion).**

root tests point 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 (1998), the non-stationarity of this ratio implies that external debt is not sustainable. In addition, both the ADF and PP unit root tests point to the non-stationarity of the external debt to GDP ratio which is also an I(1) non-stationary series. Thus, again and according to the effective sustainability

approach, the non-stationarity of this ratio also indicates that external debt is not sustainable.

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

Table 3 reports the co-integration 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 5d, the two series are drifting two far apart and are not bound by a long run relationship. Looking at the average Lebanese rate of growth of GDP (2 %), and comparing it with the average nominal interest rate (10 %), it may be seen that the nominal interest rate is much higher than the rate of growth of GDP ( $r < \lambda$ ) over the period under consideration. In the study of Leachman and Francis (2000), and with the absence of co-integration between  $M_t$  and  $X_t$ , the conclusion is that the US external debt is still sustainable because  $r < \lambda$ . However, they argue for this situation to prevail in the US, it is mandatory to enhance economic growth by creating political stability, strong financial markets, stimulate investments and create an expanded exports sector. Over the past three decades, Lebanon has, and still suffers from political instability, weak financial markets, and low levels of investment and exports. Therefore, following Leachman and Francis (*op.cit*) and based on the co-integration results of this study, it may be safely concluded that external debt in Lebanon is not sustainable.

**Table 1. Unit Root Tests for Stationarity**

	EDT/X	CA/X	EDT/ GDP	Mackinnon's Critical Values	
				5 %	1%
Constant and Time Trend					
PP (2)	2.51	-3.06	0.69	-3.54	-4.25
PP FD (2)	-5.07*	-6.26**	-7.59**	-3.54	-4.25
Constant					
PP (2)	4.45**	-2.79	2.34	-3.54	-4.25
PP FD (2)	--	-6.37**	-6.45**	-3.54	-4.25
Constant and Time Trend					
ADF (1)	2.14	-2.96	1.35	-3.55	-4.27
ADF FD (1)	2.78	-4.73**	-3.77*	-3.55	-4.27
Constant					
ADF (1)	3.29*	-2.60	2.73	-2.95	-3.64
ADF FD (1)	--	-4.81**	-2.95*	-2.94	-3.62

N.B.

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

**Table 2. Unit Root Tests for Stationarity**

	X	M	EDT	Mackinnon's Critical Values	
				5 %	1%
Constant and Time Trend					
PP (2)	-3.38	-1.68	3.96	-3.54	-4.25
PP FD (2)	-5.98**	-5.01**	-2.89	-3.53	-4.22
Constant					
PP (2)	-2.20	-1.24	6.64	-3.54	-4.25
PP FD (2)	-6.06**	-4.87**	-1.43	-3.54	-4.25
Constant and Time Trend					
ADF (1)	-3.50	-2.13	1.70	-3.55	-4.27
ADF FD (1)	-4.76**	-3.79*	-2.27	-3.55	-4.27
Constant					
ADF (1)	-2.05	-1.36	2.25	-2.95	-3.64
ADF FD (1)	-4.81**	-3.56**	-1.08	-2.94	-3.62

N.B.

1. PP is the Phillips-Perron test and FD is the first difference, and ADF is Augmented Dickey Fuller.
2. The numbers in parentheses are the proper lag lengths based on the Akaike Information Criterion (AIC).
3. An \* indicates rejection of the null hypothesis of non-stationarity at the 5% level of significance, while \*\* indicates a rejection at the higher 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. The external debt series is a non-stationary I(2) series under both the PP and ADF tests.

**Table 3. Co-integration Tests Between Exports and Imports**

Hypothesis		Trace Statistics	Critical Values	
Null	Alternative		(5%)	(1%)
$r=0$	$r \geq 1$	7.599756	12.53	16.31
$r \leq 1$	$r = 2$	0.087284	3.84	6.51

N.B.

1. The Johansen Co-integration 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 co-integrating vectors. Maximum lag 1 year in VAR.
4. An \* and \*\* indicate significance at the 5% and 1% level of significance respectively.
5. The asymptotic critical values are from Osterwald-Lenum (1992).

On the other hand, and since the external debt series is a non-stationary I(2) series, this study does 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 all point to the non-sustainability of external debt in Lebanon.

Given the unsustainability of external debt, the question is asked as to the implications on the current pursued fixed exchange rate arrangement to the US dollar. It has been shown earlier that Lebanon needs to generate an average of US\$ 4.5 billion per year to pay for the imports of goods consumed domestically. The fact that on the average, Lebanon exports for about US\$ 0.550 billion per year, means an average yearly current account deficit of about US\$ 4 billion. In other words, Lebanon has to generate the equivalent of US\$ 4 billion in foreign exchange to cover its current account deficits. These permanent deficits have so far been offset by surpluses in the capital account due mainly to foreign investments in Lebanese TBs. If for whatever reason, these capital inflows decline, just like in the recent political crisis, the Central Bank will have to tap once again its foreign exchange reserves. During the recent political turmoil, the Central Bank lost the equivalent of US\$ 4 billion in trying to maintain its current peg to the dollar, decreasing its foreign reserves from US\$ 11.5 billion to US\$ 7.5 billion.

The fiscal and monetary outlook for the period 2005-2007 is rather bleak. If it is assumed that the government can easily roll over the maturing short term domestically issued TBs over the period 2005-2007, the rolling over of external debt may turn out to be a rather difficult task. Table 4 indicates that the government will have to generate the equivalent of US\$ 2.3 billion in 2005, US\$ 3.05 billion in 2006, and US\$ 0.5 billion in 2007, to pay for its maturing Eurobonds respectively.

**Table 4. Outstanding Eurobonds as at December 31, 2003**

Year of Issue	Maturity	Original Principal Amount (US\$ Million)	Outstanding Principal Amount (US\$ Million)	Coupon Rate (%)
1997	2007	100	100	7.5
1997	2007	400	369	8.6
1998	2005	450	417	8.75
1999	2006	300	Euros 264 million	8.87
1999	2009	650	636	10.25
2000	2004	850	844	9.50
2000	2005	850	847	9.37
2001	2006	1150	1110	9.87
2001	2008	750	750	10.12
2001	2016	400	400	11.62
2002	2005	1000	900	10.25
2002	2006	350	349	10.50
2002	2006	500	105	10.50
2002	2006	750	649	10.50

Source: Ministry of Finance (2004).

Given the current fiscal indicators, tapping new international sources of financing is becoming more and more difficult, rendering the financing of the current external debt program unsustainable. Therefore, the government may be compelled to abandon its fixed exchange rate peg, and may have to introduce painful fiscal adjustment measures to generate the necessary foreign exchange from its own internal recourses to finance its external debt in the coming three years.



## Conclusions and Policy Implications

Recurrent budget and current account deficits and a fixed exchange rate system imply that Lebanon will have to generate foreign currency from sources other than exports: (a) To cover a widening huge gap between exports and imports; (b) To service a fast growing external debt; and (c) To maintain its exchange rate peg to the US dollar. If hard currency is not generated, then the consequence would be the continuous accumulation of a sizeable unsustainable external debt and a significant depreciation of the exchange rate. The Central Bank must loosen its monetary policy to ease the pressure on local interest rates as these high rates have contributed greatly to the accumulation of a large public debt. Once fiscal reforms are implemented, the monetary authority may then seriously consider a departure from the US dollar peg, and introduce more flexibility in the exchange rate, in a manner involving the lowest possible fiscal and monetary costs.

On several occasions, the Central Bank of Lebanon has intervened on the foreign exchange market to maintain its peg to the US\$ since 1995. Mounting political pressures in early 2005 alone obliged the Central Bank to intervene in the market selling hard currency again in favor of maintaining its peg. Some unofficial figures put the total reserves loss of the Central Bank to about US\$ 4 billion. The unsustainability of the government's foreign debt policies renders the task of the monetary authority in trying to maintain its peg even harder. Given the low level of overall exports and the heavy reliance on foreign reserves to defend its peg, the Central Bank may soon find itself with little foreign reserves to be able to defend its peg to the dollar, much less able to repay the interest on its accumulated foreign debt. Therefore, the level of foreign exchange reserves at the Central Bank appears to be the main link which could trigger either a currency crisis or a debt crisis.

The empirical section of the paper has shown that the external debt in Lebanon is not sustainable. The same is true for the current exchange rate policy where the Central Bank may soon be compelled to institute a floating exchange rate regime. In all cases, if Lebanon still opts for maintaining

fixed US\$ exchange rate arrangements, it will have to implement crisis-prevention measures, namely by exercising fiscal discipline, managing properly its debts and foreign reserves, and avoiding future real exchange rate appreciations. Given the unsustainable fiscal policies since the mid 1990s, most analysts have anticipated that Lebanon may first experience a debt crisis leading subsequently to a currency crisis. However, the latest political crisis has shown that despite the high levels of foreign reserves at the Central Bank, an exchange rate crisis may occur at any time leading to a debt crisis. Recently, the international community has pledged once again to intervene and help Lebanon to overcome its current fiscal and monetary difficulties. This may constitute a last resort for the Lebanese economy to once again put itself on sustainable fiscal and monetary paths.

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