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Is a Reduction in Government Expenditure a Good Strategy to Reduce Budget Deficits?: A Case Study from the Middle East

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Abstract

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Keywords

Reduction, Government, Expenditure, Good, Strategy, Reduce, Budget, Deficits, Case, Study, from, Middle, East

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Is a Reduction in Government Expenditure a Good Strategy to Reduce Budget Deficits ? : A Case Study from the Middle East

Ali Salman Saleh* and Charles Harvie**

This paper explores the macroeconomic implications arising from the Lebanese government's approach to dealing with its budget deficit, which has become one of the highest amongst in the Middle East. In doing so a macroeconomic model is developed to analyse the effects of increased government expenditure upon key macroeconomic variables and the government's current policy approach to the Lebanese fiscal crisis. The complexity of the model prevents the derivation of analytically unambiguous results, requiring a focus on numerical simulations of these cases. The parameters used in the simulation are estimated using efficient estimation techniques. A major finding from the study suggests that the implementation of expansionary government capital expenditure produces larger favourable economic effects in comparison with expansionary government consumption expenditure. Money deficit financing is found to be inflationary with resulting high interest rate sensitivity, while bond financing is found to be non inflationary with little interest rate sensitivity. A policy emphasis of reducing government capital expenditure to reduce the budget deficit is found to be undesirable.

Key words: Lebanon, Budget deficits, Numerical simulation, Policy analysis

1.Introduction

The budget deficit issue, and its impact upon economic performance, has attracted considerable attention over the past few decades. For Lebanon, the budget deficit has become a major problem and is reflected in substantial debate among academics and policy makers alike. The deficit appeared during the period of the Civil War (1975-1990) and the post-war reconstruction period (1990-2003). The budget deficit, as a percent of GDP, increased from only 3% in 1975 to 32.3% in 1989, becoming one of the highest of the Middle East countries. As a result public debt increased after 1975, with gross public debt rising to 99.8% of GDP by the end of 1990. Of this, 80.6% was domestic public debt. The second phase of the evolution of the deficit and public debt was during 1993-2003. As a result of rebuilding the country's infrastructure, the growth of government capital expenditure, together with large and expanding current expenditure and the slow recovery of the revenue-generation capacity, led to sizable fiscal imbalances. Consequently, government budget deficits increased from 9.2% of GDP in 1993 to 20.6% in 1996 before declining to around 15% in 2003.

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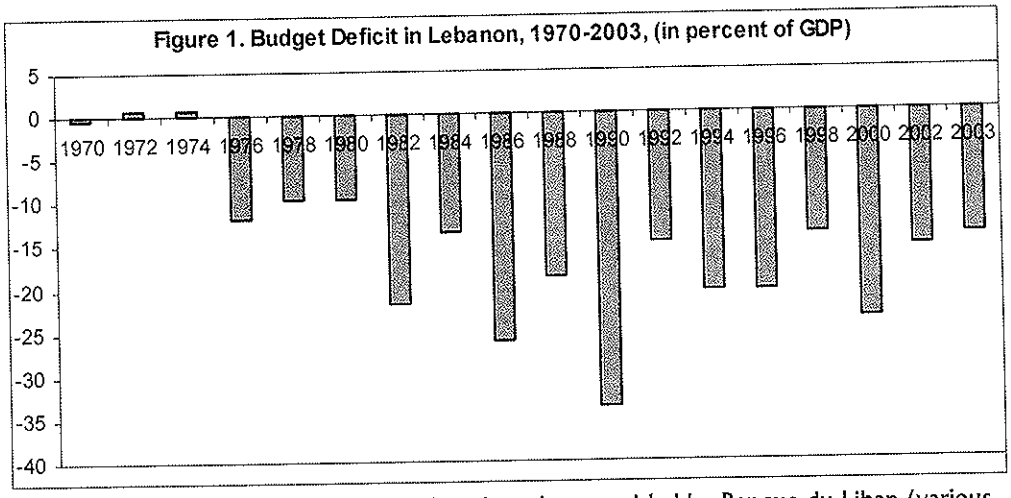
The main purpose of this study is to examine the macroeconomic implications arising from the Lebanese government's approach to dealing with the ballooning budget deficit and the financing of it. In doing so a dynamic macroeconomic model for Lebanon is developed, based on the theoretical contributions of Dornbusch (DB) (1976), the portfolio balance model (PBM) (Branson (1977, 1984)) including the work of Dornbusch and Fisher (1980), and the Harvie and Kearney model (HKM) (1996), which explicitly incorporates: the budget deficit and its financing; as well as the composition of government expenditure (capital or current). Numerical simulations of the model are then conducted to analyze, specifically, the effects of: increased government expenditure (capital expenditure or consumption expenditure) upon key macroeconomic variables, as well as an evaluation of the government's policy approach in response to the fiscal crisis. The paper is divided into six main sections. Section 2 examines Lebanon's budget deficits and public debt. Section 3 specifies the macroeconomic model developed in this study. Section 4 specifies the model estimation techniques and estimation results. Simulation and key policy implications are discussed in section 5. Section 6 concludes the paper by listing the main findings from our simulation results in the context of the Lebanese fiscal deficit.

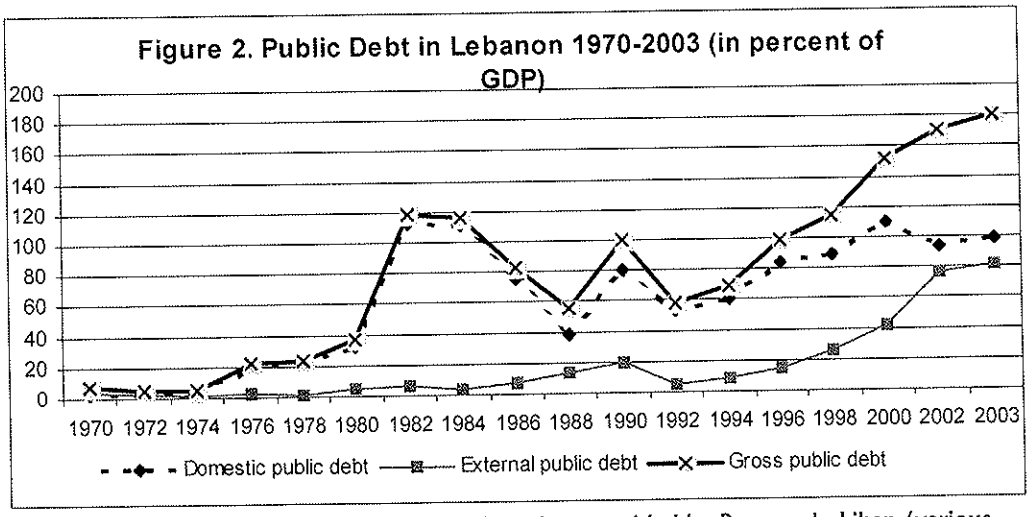
2. Budget Deficits and Public Debt in Lebanon

Prior to 1975 the budget had always been balanced and the government had never resorted to borrowing. Hence, borrowing and deficits are recent phenomena in Lebanon. As shown in Figure 1 increased budget deficits occurred after 1974, but the largest increases occurred after 1980 and peaked during the 1980s and 1990s. The period 1975-1990 was one of deepening crisis for the economy, as evidenced by the marked deceleration in economic growth and private investment activity. The budget deficit, as a percent of GDP, increased from only 3% in 1975 to 32.3% in 1989. Increased government expenditure and declining government revenues were both responsible for the steep increase. Total government expenditure as a percentage of GDP increased from 15.4% in 1972 to 39.4% in 1990. The dramatic increase in total government expenditure was mainly made up of current expenditure, generous wages and salaries paid to government employees, and interest payments on the public debt. Government revenues during the same period, on the other hand, remained very low at around 6% of GDP, due to the slowdown of economic activity, the inability of the government to collect revenues (Lebanon's Civil War), most of the government's revenues were in the form of indirect taxes, and custom and trade taxes became a difficult mission with the loss of control over legal ports of entry and a consequent surge in illegal imports. In addition, Lebanon's budgetary capital expenditure witnessed a decline as well from 6% of GDP in 1980 to 1.7% in 1990, and contributed to the deterioration in Lebanon's public capital stock.



Source: Plotted by the authors based on data provided by Banque du Liban (various years);
Ministry of Finance (various years); Eken et al. (1995); Eken and Helbling (1999);
Authors'calculations.

Over the post-war period (1991-2003), and as a result of rebuilding the infrastructure, the acceleration in the growth of government capital expenditure, together with large and expanding current expenditure and the slow recovery of the revenue-generation capacity, led to sizable fiscal imbalances. Consequently, government budget deficits increased from 9.2% of GDP in 1993 to 20.6% in 1996 before declining to around 15% in 2003. This huge increase in the budget deficit led to a sustained growth in government debt during the period 1993-2003 (Figure 2). In addition, domestic public debt as a percent of GDP increased from 44.2% in 1993 to 86.5% in 1997 and to around 170% in 2003. In nominal terms, the gross public debt increased from US$3.7 billion in 1993 to about US$32 billion in 2003. The external public debt increased from US$0.3 billion to about US$15 billion in 2003 as a result of the Paris II conference in 2002[1]. The majority of the public debt was in the form of domestic public debt. However, money creation remained the primary method of budget financing with the issuance and sale of treasury bills to the private sector. It has been argued that the main effect of the huge budget deficit, and the way it was financed, led to a permanent deficit in the budget, higher interest rates, increases in the money supply, rising inflation, a depreciation of the Lebanese pound, stagnation and a slowing of economic growth.



Source: Plotted by the authors based on data provided by Banque du Liban (various years);
Ministry of Finance (various years); Eken et al. (1995); Eken and Helbling (1999);
Authors' calculations.

3. Theoretical Framework - Macroeconomic Model for Lebanon

The conceptual model to be developed for Lebanon combines the contributions of the DB (1976) and PBM (Branson (1977), Pentecost (1993)) models, as well at that of Harvie and Kearney (HK, 1996). However, a number of amendments need to be made to these existing models in order to make them applicable to the case of Lebanon, and especially to apply them for analysis of the impact of budget deficits and their funding (e.g. monetary accommodation or bond financing[2]) and the composition of government expenditure, capital and current, on key macroeconomic variables. Specifically, the model: distinguishes between two types of government expenditure, capital expenditure and current expenditure; incorporates budget deficit funding via bond financing (pure fiscal policy), via money accommodation (pure monetary policy) or a mixture of the two; and incorporates exogenous shocks arising from an increase in the budget deficit such as that arising from an increase in government expenditure and the impact of this on macroeconomic variables.

The Macroeconomic Model for Lebanon

The model developed for Lebanon is based upon a number of important assumptions: the economy operates under a flexible exchange rate and perfect capital mobility, with the latter implying that capital is perfectly mobile and domestic and foreign assets are seen as being perfect substitutes, and the uncovered interest parity condition holds continuously; the model is a dynamic one emphasising long run adjustment; economic agents possess rational expectations and complete information, which is equivalent to the case of perfect foresight; financial markets are in continual equilibrium; non-financial markets do not clear continuously as they are subject to sticky price and quantity adjustment; emphasis is also placed on the supply side of the economy; wealth effects, including that of capital stock accumulation, are crucial in driving the economy to long run equilibrium; explicit recognition is given to the role of budget deficits and their funding in macroeconomic adjustment. In addition, there are assumed to be four financial assets, domestic money, domestic bonds, foreign bonds, and equities, which determine the q ratio. Assets denominated in either domestic currency or foreign currency are assumed to be perfect substitutes, with arbitrage between them resulting instantaneously in the same expected rate of return.

The equations of the model are now presented. The model is divided into four sub headings: product market, assets market, wage-price nexus, and definitions. As shown in Table 1, all equations in the model, except the domestic nominal interest rate and the world interest rate, are reported in log-linear form. Equilibrium in the model depends upon simultaneous equilibrium in the product market, assets market and external balance. Firstly, equilibrium in the product market will be outlined. The product market consists of nine equations, which are presented by equations (1)-(9). The demand for real output (y^d), given by equation (1), comprises private consumption, private investment, government expenditure and the trade balance consisting of exports less imports. Equation (2) describes private consumption, which depends positively on the level of real income (aggregate supply) and real private sector wealth. Equation (3) describes private investment, which equals the change in the stock of private capital, and depends on Tobin's q. Equation (4) indicates that government consumption spending is an exogenously determined variable, whilst government investment spending (Equation (5)) arises from a gradual adjustment of the actual public capital stock to its policy-determined level.

Equation (6) describes total government expenditure, which depends positively on government consumption expenditure (c^g) (exogenous) and government capital spending, but negatively on the supply of output. The latter arises due to welfare/unemployment expenditure. When output is high unemployment is low, and welfare expenditure is low and vice versa. Equation (7) describes the budget deficit, which is government expenditure less tax revenue. The budget deficit, as shown in this equation, can be financed in three ways, through an expansion in the money supply and/or domestic bonds, or a combination of the two. Equation (8) is tax revenue, which depends positively on the supply of output. Equation (9) describes the trade balance, which depends positively upon the real exchange rate (the nominal exchange rate deflated by the domestic price (e-p)), negatively on aggregate demand for domestic real output, and positively on world real income.

Asset market equilibrium is given by equations (10)-(14). As mentioned previously four financial assets should be addressed here, domestic money, domestic bonds, foreign bonds, and equities which determine the q ratio. Assets denominated in domestic currency and foreign exchange are assumed to be perfect substitutes, with arbitrage between them resulting instantaneously in the same expected rate. Equation (10) identifies the demand for real money balances, which depends positively on the level of aggregate demand and domestic real wealth, and negatively on the domestic interest rate. Equation (11) represents the real return on private capital, which depends positively on the level of real income (measured by output supply), negatively on the stock of private capital due to diminishing marginal returns, and positively on the stock of public capital. The latter holds because public capital and private capital are assumed here to be complementary in nature. The productivity of private capital rises as the government provides more public investment such as in the form of infrastructure (see Aschauer, 1989).

Equation (12) identifies the change in Tobin's q ratio. It comes from the arbitrage condition equating the returns on domestic and foreign bonds and equities. Equation (13) describes private sector wealth, which depends positively on the real domestic currency value of domestically held foreign assets (f), on the value of the private capital stock $(k^p + q)$, on real money balances $(m - p)$, and on holdings of real bonds $(b - p)$. Equation (14) defines the current account of the balance of payments, which is equivalent to the change in domestic holdings of foreign assets, depending positively on the trade balance, foreign interest income ($r^* f$), and negatively on the real exchange rate. In long run steady state the current account balance must be zero, otherwise further wealth effects will increase which in turn implies further macroeconomic adjustment.

Table 1 The Macroeconomic Model

Product Market

$$y^d = \alpha_1 c^p + \alpha_2 i^p + \alpha_3 g + \alpha_4 T \quad (1)$$

$$c^p = c_1 y^s + c_2 w^p \quad (2)$$

$$i^p = \dot{k}^p = \eta q \quad (3)$$

$$c^g = \bar{c}^g \quad (4)$$

$$i^g = \dot{k}^g = \psi(k^{g*} - k^g) \quad (5)$$

$$g = \beta_1 c^g - \beta_2 y^s + \beta_3 i^g \quad (6)$$

$$bd = g - t = a_1(\dot{m} - \dot{p}) + a_2(\dot{b} - \dot{p}) \quad (7)$$

$$t = \tau y^s \quad (8)$$

$$T = \mu_1(e - p) - \mu_2 y^d + \mu_3 y^* \quad (9)$$

Assets Market

$$m = p + \sigma_1 y^d - \sigma_2 r \quad (10)$$

$$R = \gamma_1 y^s - \gamma_2 k^p + \gamma_3 k^g \quad (11)$$

$$\dot{q} = \delta_3^{-1}\left[q - \delta_1 R + \delta_2(r - \pi)\right] \quad (12)$$

$$w^p = \Omega_1(f + e - p) + \Omega_2(k^p + q) + \Omega_3(m - p) + \Omega_4(b - p) \quad (13)$$

$$\dot{f} = \varepsilon_1 T + \varepsilon_2 r^* f - (1 - \varepsilon_2)(e - p) \quad (14)$$

Wage/Price Nexus

$$p = \delta w + (1 - \delta)e \quad (15)$$

$$\dot{w} = \phi_1(y^d - y^s) + \phi_2 \pi \quad (16)$$

$$y^s = \lambda_1 k^p + \lambda_2 k^g - \lambda_3(w - p) \quad (17)$$

Definitions etc

$$c = e - w \quad (18)$$

$$l = m - w \quad (19)$$

$$\dot{m} = \pi \quad (20)$$

$$\dot{e} = r - r^* \quad (21)$$

$$B = b - w \quad (22)$$

A dot (.) above a variable signifies its rate of change.

Table 2 Explanation of Symbols Used in the Model

Endogenous Variables

y^d	Aggregate demand for real output
c^p	Private consumption
i^p	Private investment
g	Total government expenditure
T	Trade balance
t	Total tax revenues
r	Domestic nominal interest rate
R	Real profit
f	Foreign asset stocks
e	Nominal exchange rate
b	Nominal Domestic bonds (this variable is endogenous with the condition that $\dot{b} = 0$ in the long run)
p	Domestic price level
w	Domestic nominal wage
y^s	Aggregate supply of output
w^p	Real private sector wealth
k^p	Private capital stock
k^g	Actual public capital stock
q	Tobin's q
c	Real exchange rate
l	Real money balances
π	Inflationary expectations
B	Real domestic bonds

Exogenous variables

c^g	Government consumption
k^{g*}	Desired public capital stock
y^*	World real income
r^*	World nominal interest rate (also the world real interest rate since world prices (and hence inflation) is assumed exogenous (constant)
m	Nominal money supply

The wage-price nexus and aggregate supply of output is given by equations (15)-(17). Equation (15) describes the domestic price level, a weighted average of domestic nominal wages and the world price of the imported good. Equation (16) describes nominal wage adjustment, which adjusts in line with a simple inflation expectations augmented Phillips curve. Equation (17) identifies aggregate supply, derived from a simple production function relationship, and depends positively on the private capital stock, public capital stock, and negatively on the real wage rate.

Finally, Equations (18)-(22) define some key variables used in the analytical solution of the model. Equations (18)-(19) define the real exchange rate and real money balances respectively. Equation (20) shows that inflationary expectations depend upon the monetary growth rate. Equation (21) identifies the characteristic of a flexible exchange rate and perfect capital mobility. With a flexible nominal exchange rate the money stock is exogenously determined in the model. With perfect capital mobility the risk premium does not exist. Assets are assumed to be perfect substitutes, and arbitrage between them implies the same expected rate of return. Equation (22) defines real bonds.

4. Model Estimation

The data utilised for model estimation are yearly data from 1970-2003[3] [4]. First, the time series data was subjected to the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller (1979)), for the existence of a unit root for the respective variables. If the series is found to have a unit root, differencing the data is appropriate before performing the regression analysis, to avoid the problem of spurious regression arising from non-stationary time series. Second, the study tested for the existence of cointegration using Johansen's full information maximum likelihood (FIML) approach (Johansen, 1988; 1991; 1995) to detect for the existence of long run relationships between variables included in the study. To investigate the short-run dynamics of the system, and based upon the existence of a long-run cointegration relationship, an error-correction model (ECM) (Engle and Granger (1987)) is estimated.

4.a Estimation Results

Some of the behavioural equations of the model were estimated by applying the cointegration and error-correction techniques (results are not reported here). Preliminary data analysis was conducted using OLS estimation on the variables, which were made stationary by differencing according to the ADF test. The results are not reported here because the cointegration estimation being FIML (full information maximum likelihood) is a preferred procedure. Due to data limitations only the following ten behavioural equations of the model (1), (2), (6), (7), (9), (10), (13), (14), (15), (17) were able to be estimated. A summary of these estimates (the long run and short run estimated from cointegration and the error correction model) are presented in Table 3. Each individual equation was evaluated using.descriptive statistics such as t-values, F test, Durbin-Watson (DW) test, R^2 (coefficient of determination) and the standard error of the regression. Other non estimated parameters had to be imposed using values obtained from previous studies or on the basis of casual empiricism.

4.b Simulation Results

Analysis of the steady state and dynamic properties of the model is calibrated through the use of the numerical values of the parameters of the model. The parameter values utilised for this purpose are identified in Table 3. Three scenarios arising from exogenous shocks and their impact upon six macroeconomic variables are presented in this section. The results of each shock upon the adjustment of key macroeconomic variables are presented in Figures 3 to 5. The horizontal axis contains the time period and the vertical axis indicates the percentage deviation of that variable from baseline, its initial value. Each diagram is divided into four adjustment periods. The impact period occurs immediately on the occurrence of the exogenous shocks. The short run period is assumed to occur over a period of two years[5], the medium run period from two to four years, and the long run period from four years onwards until steady state is achieved.

Table 3 Estimated and Imposed Parameters for the Simulations

Equation	Parameters	LR estimated coefficients (1)	SR estimated coefficients (2)	Confidence intervals		Chosen parameter from (1) or (2)	Chosen/ imposed parameters	Sources for imposed parameters
(1)	α_1	1.0000	-0.9979***			1		
	α_2	-0.0855	0.1690*	-0.3632	0.1920	0.1		
	α_3	1.2320	-2.8730	-3.1249	5.3713	1		
	α_4	-0.1103	-0.3549***	-0.5862	0.3655	0.1		
(2)	c_1	0.4152***	-0.4933***	0.1047	0.7257	0.4		
	c_2	0.1739***	0.2848	0.0506	0.2972	0.2		
(3)	η						0.7	#
(5)	ψ						0.7	#
(6)	β_1	0.0204		-0.2640	0.3048	0.02		
	β_2	-0.8370	-0.0038	-3.8170	2.1429	0.8		
	β_3	0.6577***	0.8619	-1.5274	2.8430	0.6		
(7)	a_1	0.5364	-0.1859	-0.9989	0.6270	0.2		
	a_2	1.2634	-0.0472	-0.6024	0.0823	0.1		
(8)	τ						0.8	@
(9)	μ_1	1.5233***	-0.6185	0.7889	2.2576	0.6		
	μ_2	0.4385	-0.2225	-0.1122	0.9893	0.4		
	μ_3	0.3445				0.4		
(10)	σ_1	0.2200	0.2803**			0.2		
	σ_2	-0.2263	0.0084	-0.5116	0.0590	0.2		
(11)	γ_1						0.5	#
	γ_2						0.5	#
	γ_3						0.5	#
(12)	δ_1						0.5	#
	δ_2						0.5	#
	δ_3						0.5	#
(13)	Ω_1	0.6427***	-0.1695	0.4380	0.8474	0.7		
	Ω_2	0.2549***	0.4108*	0.1067	0.4030		0.6	@
	Ω_3	0.6741***	-1.0507**	0.0297	1.3184	0.6		
	Ω_4	-0.0565***	0.0100	-0.0913	-0.0216	0.1		
(14)	ε_1	0.2119	-0.1521	-0.1917	0.6156	0.2		
	ε_2	0.0121***	-0.0031	0.1527	0.6904	0.6		
(15)	δ	0.3664	0.3414	-0.4372	1.1200	0.4		

(16)	ϕ_1						0.7	#
	ϕ_2						1.0	#
(17)	λ_1	0.5478*	0.2744	-0.3525	1.1914	0.2		
	λ_2	0.2360	-0.5644	-0.1070	0.5790	0.2		
	λ_3	-0.9298***	0.1675	-1.5280	-0.3276	0.2		

Note: (1) Estimated coefficients obtained by using FIML approach.
(2) Estimated coefficients obtained by using ECM.
Harvie and Kearney (1996).
@ Author's calculation; LR long run; SR short run
* significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.

Scenario 1. An Expansion in Public Capital Expenditure

The purpose of this section is to analyze the effects of an expansion in capital expenditure on the Lebanese macro-economy, for two cases:

Case 1. An instantaneous and unanticipated increase in public capital expenditure by 3%, which occurs in the impact period (0').

Case 2. A gradual increase in public capital expenditure. The presumed increase in public capital expenditure is that of a 1% increase from its baseline on impact, then it is assumed to increase to 2% from its baseline in period 8 (the end of the short run period), and then an increase to 3% from baseline in period 12.

n both cases it is assumed that the budget deficit in Lebanon is financed partly through a temporary increase in the monetary growth rate by 2% (monetary growth is assumed to rise to 2% on impact, and then gradually declines and ends in period 12), and through an endogenous expansions of bonds. The results of both cases are presented in Figure 3. All results for each variable are expressed as percentage deviations from their baseline values. The main finding from the simulation results, for the two cases assumed, is that this policy has some positive effects. This includes an increase in the q ratio, which has a positive impact on private sector investment, resulting in a large accumulation of private capital stock during the adjustment process. This also stimulates the supply side of the economy (crowding in effect). The simulation results indicate that the private capital stock and aggregate supply increase in both cases during the adjustment process, but with greater volatility in Case 1.

This policy also implies a gain of competitiveness and improved trade and current account performance (due to a depreciation in the real exchange rate), and hence decreased external borrowing. During the adjustment process the real exchange rate depreciates in both cases, but with less volatility in Case 2. The disadvantage of this policy appears to be in the first year of the short run period, where the rate of inflation in both cases is pushed up towards the baseline after an initial downturn. This is due to aggregate demand exceeding aggregate supply, in addition to the monetary financing of the deficit. The interest rate is higher during the first year of the short run period because part of the increased public spending is also funded through bond sales; the increased public spending also stimulates aggregate demand for output and for money. Over the long run, specifically when the monetary growth rate ends in financing the deficit in period 12, the rate of inflation falls back towards baseline. The interest rate also declines towards baseline, and shows little sensitivity to bond financing after period 12. A policy of monetary financing of the deficit is, therefore, inflationary, and also contributes to larger volatility of the interest rate. Bond financing of the deficit, on the other hand, is non inflationary and produces little interest rate volatility.

It can be concluded from the simulation results that this policy produces a positive impact upon almost all the key macroeconomic variables under consideration during the adjustment process towards the long run steady state. It is noticeable, however, that this policy produces the largest positive impact during the first year of the short run period in terms of domestic improvements as well as external improvements. Consequently, if the government gives high priority to short-term policy outcomes the simulation results reported here would support the adoption of such a policy. The preferred approach by the government, however, should be Case 2 (gradual approach), because this produces considerably less volatility in terms of the major macro variable outcomes.

Scenario 2. An Expansion in Government Consumption Expenditure

The effects of an expansion in government consumption expenditure on key macroeconomic variables is now discussed, assuming the following two cases:

Case 1. An instantaneous and unanticipated increase in government consumption expenditure by 3%.

Case 2. A gradual increase in government consumption expenditure. The presumed increase in government expenditure is 1% on impact, rising to 2% in period 8, and further increasing to 3% in period 12 (the first year of the medium run period).

In both cases it is assumed that the budget deficit in Lebanon is financed through a temporary increase in the monetary growth rate by 2% (the monetary growth is assumed here to increase 2% on impact, and then gradually falls and then ends in period 12), and also through bond financing (bond financing is assumed to be endogenously determined).The simulation results in both cases are reported in Figure 4. This suggests that, for these two cases, there are some advantages and some disadvantages for Lebanon. The advantage of this policy appears to be during the first year of the short run period in terms of domestic improvements, where both the private capital stock and aggregate supply increase. By the end of the short run period, however, the private capital stock and aggregate supply decline from their initial increase in both cases (to below the baseline in Case 2, but above the baseline in Case 1). In addition, the rate of inflation falls on impact but subsequently rises as aggregate demand increases faster than aggregate supply. The key disadvantage of this policy is that the trade and current account balances deteriorate in both cases arising from an appreciation in the real exchange rate, and this exacerbates foreign debt. Hence, if the government considers a short-term policy in order to improve only domestic developments such as private investment and aggregate supply, this simulation suggests support for such an approach. The government should pay particular attention, however, to its adverse effects on external developments. Another important conclusion from this simulation scenario is that the government should adopt Case 2 (gradual approach) because it produces less volatility in terms of the major macro variables.

Overall, it can be concluded from the above discussion that if the government wishes to implement an expansionary fiscal policy to improve macroeconomic performance, it should adopt an expansion in capital expenditure as it produces the most desirable outcomes. In addition, it should adopt a gradual approach because this produces considerably less volatility in terms of the major macro variables.

Scenario 3. The Lebanese Government's Approach to Dealing with the Financial Crisis

This scenario focuses upon the government's policy approach in response to the development of the financial crisis in Lebanon. The policies, or government plan, to deal with this crisis, as assumed here, are as follows.

First, a tightening of fiscal policy by reducing public capital expenditure as well as government consumption expenditure by 3%[6]. This reduction is analysed in the context of two assumed cases:

Case 1 - an instantaneous and unanticipated decline in capital expenditure as well as government consumption expenditure; Case 2 – a gradual decline in these expenditures (1% decline from its baseline on impact, then a further decline by 2% from baseline in period 8, and then a 3% decline from baseline in period 12). Second, an expansionary monetary policy by assuming an instantaneous and unanticipated increase in the monetary growth rate by 3% (Case 1), as well as gradual increase in the monetary growth rate (Case 2). The presumed increase in the monetary growth in case 2 is that of a 1% increase from its baseline on impact, then it is assumed to increase to 2% from baseline in period 8, and to further increase to 3% from baseline in period 12

Third, increasing government revenues through increased taxes by assuming an increase in the parameter value for the tax revenue equation in Equation 8 from $\tau = 0.5$ to $\tau = 0.8$.
The results of this policy, for these two assumed cases, are shown in Figure 5. Implementation of the government policy approach for both cases (unanticipated/gradual) results in adverse effects on almost all the key macroeconomic variables under consideration during the whole adjustment process towards long run steady state. This policy produces the largest negative impact, during the short run period, in terms of private capital stock, aggregate supply and foreign asset stocks. Over the whole adjustment process towards long run steady state this policy has adverse effects on private sector investment and the supply side of the economy (crowding out effect). The private capital stock and aggregate supply decline in both cases but with less volatility in case 2. Another cost of this policy is that the trade balance deteriorates in both cases during the adjustment process because of the appreciation in the real exchange rate. This also results in a deterioration in foreign asset stocks and current account balances, thereby adding to foreign debt. The deterioration in the trade balance in Case 1 is slightly larger than that in Case 2, due to a larger real exchange rate appreciation in Case 2. The rate of inflation in both cases is pushed up due to the permanent increase in the monetary growth rate. The minor advantage of this policy appears to be over the impact period as aggregate supply improves in both cases with a larger magnitude in Case 1, despite an unchanged private capital stock.

In order to minimise the adverse effects of its policy package, the government should adopt a gradual approach since this leads to much less macroeconomic volatility. In addition, if the government considers applying this approach over a short term period, it will have the largest negative impact on private investment, aggregate supply, and foreign asset stocks. This policy also has a considerable problem in terms of generating higher inflation, which in turn will exacerbate Lebanon's economic difficulties. A separate analysis of each of the three separate policies[7] suggests that the reduction in government expenditure (capital or consumption) exerts the most important and undesirable influence on the overall impact. The separate expansionary monetary policy produces a favourable impact compared to the others. Hence, if the government in Lebanon decides to implement this overall policy approach, it should be aware that the reduction in government expenditure, in order to reduce the budget deficit, is not the best strategy and especially the policy of reduction in government capital expenditure. If the government in Lebanon decides to implement an expansionary monetary policy in order to partially fund the budget deficit, this will have some positive effect on Lebanon's economy but will exacerbate inflation.

5. Summary and Conclusions

The focus of this paper has been to macro model prospective developments in the Lebanese economy for policy analysis and evaluation. The macroeconomic model developed was utilised to analyse the effects of exogenous shocks arising from increased government expenditure (capital expenditure and consumption expenditure) upon key macroeconomic variables, as well as the government's current policy approach.

It was clear from model simulations that implementing a policy of expansion in government capital expenditure, for the two cases assumed, produces larger favourable impacts upon economic development in terms of private sector investment, and in terms of the supply side of the economy

(crowding in effects) during the whole adjustment process towards long run steady state. This policy also produces favourable impacts in terms of external developments. It results in a gain of competitiveness and a better external performance. It is noticeable that this policy produces the largest positive impact during the first year of the short run period in terms of domestic improvements as well as external improvements. If the government gives priority to short-term policy outcomes this simulation result supports such a policy initiative. Another important finding is that the government should adopt Case 2 (gradual approach), as this produces considerably less volatility in terms of the major macro variables. Implementing the policy of an expansion in government consumption expenditure produces unfavourable effects in terms of external developments during the adjustment process. The trade balance deteriorates in line with a deterioration in foreign asset stocks as a result of current account deficits, and hence results in an increase in foreign debt. This policy also produces unfavourable effects in terms of private investment and aggregate supply (crowding out effect) during periods 7 to 11.

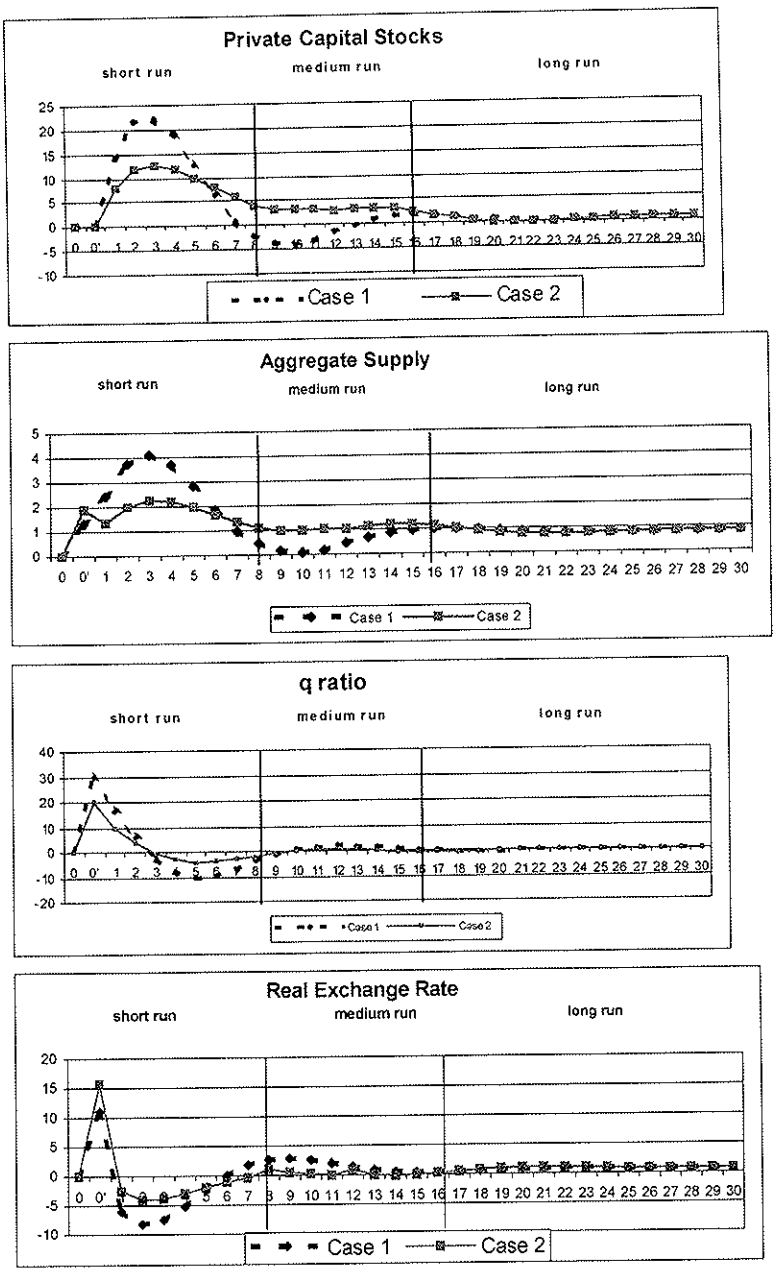
Implementing the two policies (expansion in capital expenditure/government consumption expenditure) produces similar outcome in terms of the interest rate and the rate of inflation. Both policies produce higher inflation during the short run period due to the increase in aggregate demand being more than aggregate supply, in addition to the partial financing of the deficit through monetary growth. The interest rate is higher as well during the first year of the short run period due to the partial funding of the increased public spending through bond sales; this increase in public spending stimulates aggregate demand for output and money. The simulation results for the two policies show that money deficit financing is inflationary and results in large volatility of the interest rate. Bond financing is non inflationary but produces little interest rate volatility. The main finding is that if the government considers an expansionary fiscal policy in order to improve macroeconomic performance, it should expand capital expenditure as it produces the most desirable outcomes. In addition, it should adopt a gradual approach because this produces considerably less volatility in terms of major macro variables.

The main findings from our simulation results dealing with the government approach to the fiscal crisis, does not support the government's current policy in dealing with the crisis. The results suggest that it produces the most undesirable economic outcomes, and hence will only exacerbate Lebanon's economic difficulties. However, if the Lebanese government is willing to go ahead with this approach, it is advised that, in order to minimise macroeconomic volatility, the government adopt a gradual implementation approach. Another important conclusion is that if the government in Lebanon considers applying this approach over a short term period, it will have the most adverse impact on private investment, aggregate supply, and foreign asset stocks. Finally, the authorities should be aware that this policy has adverse effects on inflation, which will only exacerbate Lebanon's current economic difficulties.

Notes

[1] An aggregate amount of US$4.3 billion was pledged in 15-year loans at reduced rates to support the government's effort to reduce the public debt.
[2]This study focuses only upon money and bond financing of budget deficits. Tax financing is not considered, and is the subject of further study.
[3]This study chose annual figures because the data for the whole time series from 1970 to 2003 are only available in this form.
[4]All the annual data used in this study cover the sample period 1970-2003, and have been taken from many sources such as the IMF, *International Financial Statistics Yearbook* (IFS); World Bank (WB), *World Tables*, various issues; United Nations, *National Account Statistics* (NAS), various issues; Eken et al., IMF, Occasional Papers (1995; 1999); Ministry of Finance, Lebanon, various years; Central Bank of Lebanon or Banque du Liban (BDL), Annual and quarterly reports, various issues; The Economist Intelligence Unit (EIU), *Country Profile*, (1998-2000); Banque Audi (BA), Economic Research Unit (2000).
[5]Assumed here to be equivalent to 8 time periods – each time period is assumed to be a quarter of a year.
[6]This study has chosen 3% for the simulation because it is in the middle of the feasible range of 1% to 5%.
[7]Not shown here.

Figure 3 Expansion in Public Capital Expenditure (Case 1 and Case 2)



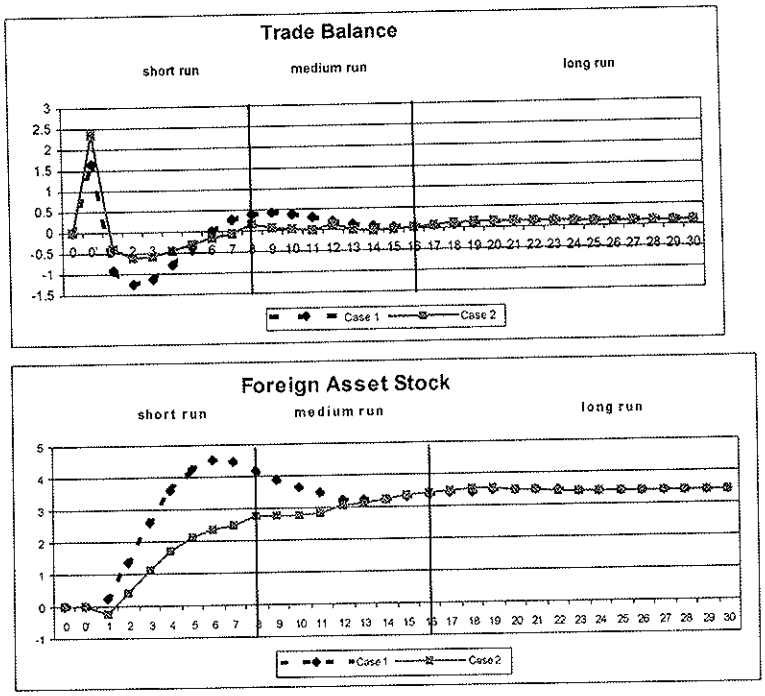
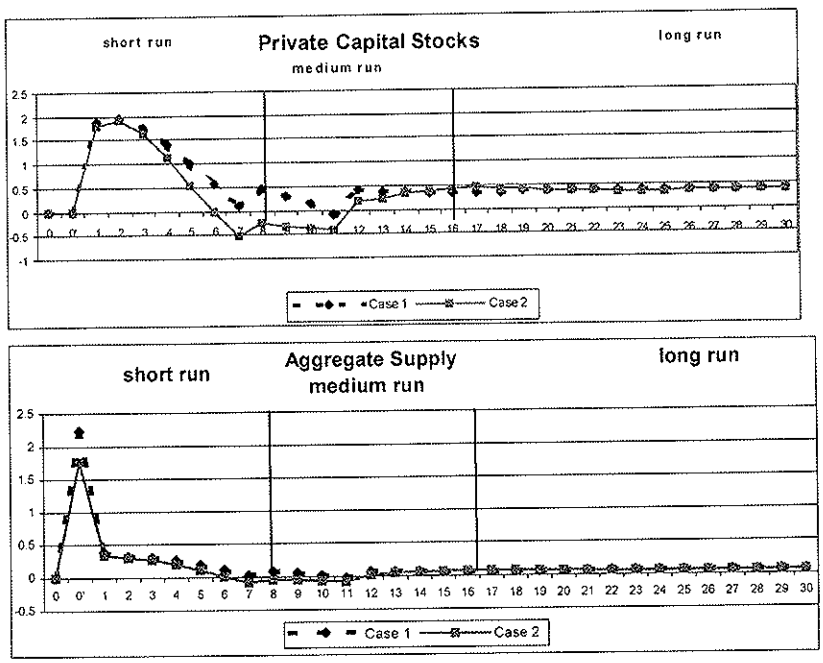


Figure 4 Expansion in Government Consumption Expenditure (Case 1 and Case 2)



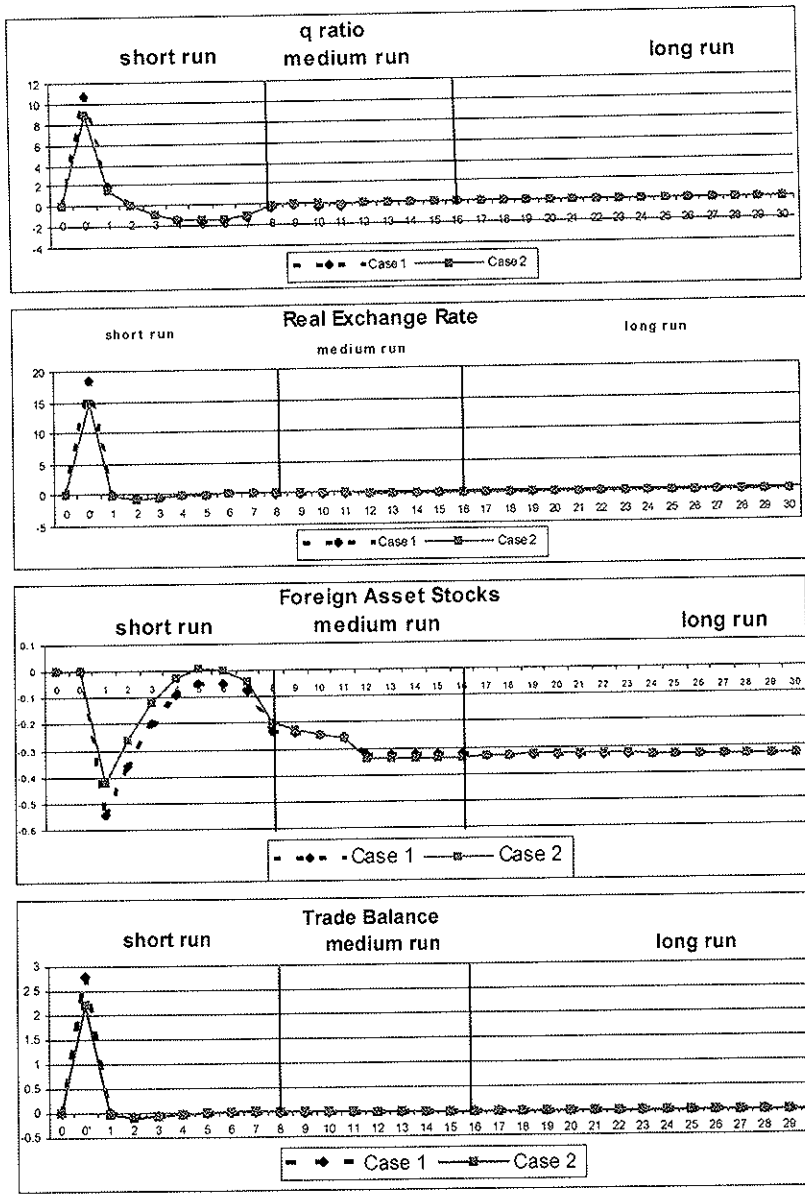
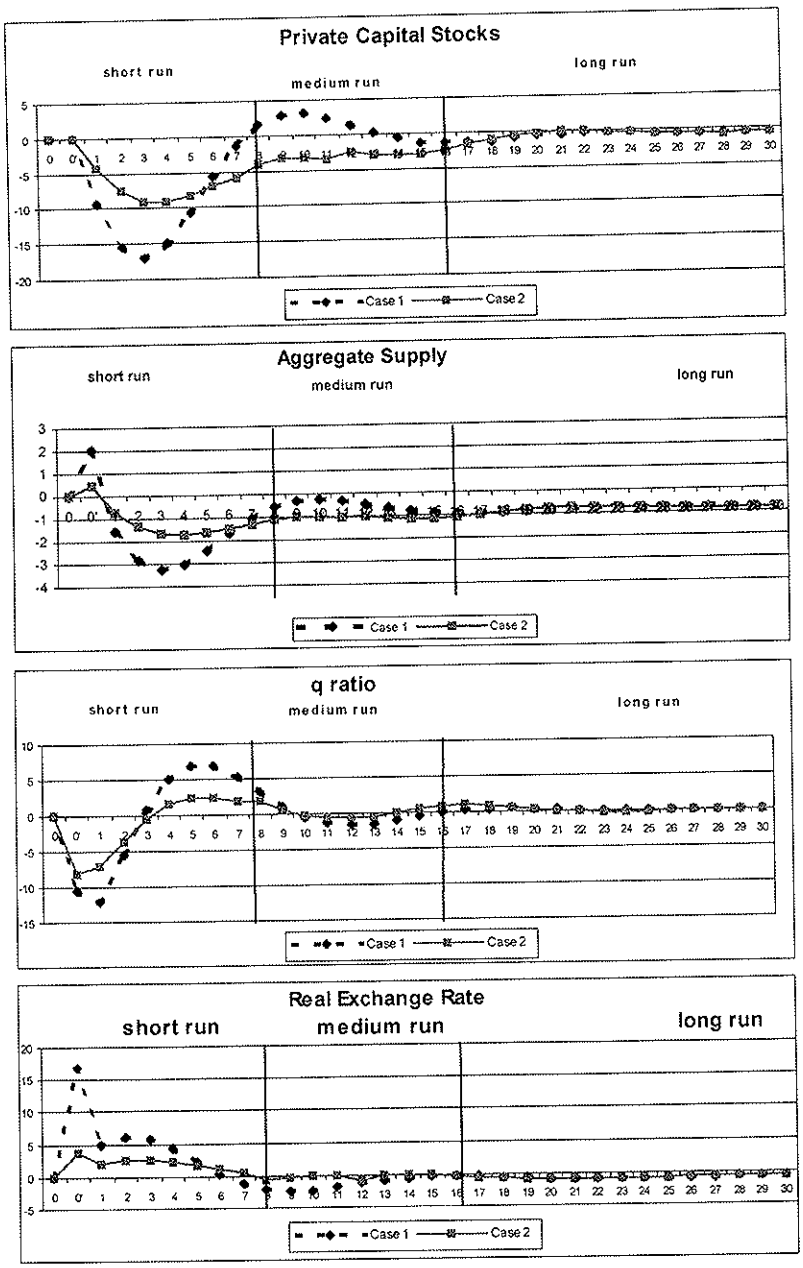

q ratio
short run
medium run
long run
Case 1
Case 2
Real Exchange Rate
short run
medium run
long run
Case 1
Case2
Foreign Asset Stocks
short run
medium run
long run
Case 1
Case 2
Trade Balance
short run
medium run
long run
Case 1
Case 2

Figure 5 Government Policy Approach (Case 1 and Case 2)



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