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# **Politics, Foreign Reserves and the Exchange- Rate-Based-Stabilization-Policy The Lebanese Case**

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## **Abstract**

Lebanon, as well as many underdeveloped countries, uses its foreign reserves as a tool to support its exchange rate based stabilization policy. Looking at the causes behind fluctuations of foreign reserves is of extreme importance, especially after it has been proved that foreign reserves are causes of stability and disturbances to stabilization policies around the globe. Of particular interest is the political variable; it emerged in the literature that politics play a strong role in determining the stability of the foreign reserves, but that did not happen in Lebanon. Politics in Lebanon did not have an impact on the level of foreign reserves, and it did not disturb the stabilization policy. My results, however, confirm that the stabilization policy is a viable policy, and especially after I showed that Lebanon's key macroeconomic variables behave as predicted by the stylized facts of exchange rate based stabilization policy.

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Lebanese Currency

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## **Introduction and theoretical background**

### *a. Introduction*

Foreign reserve holdings by central banks have been used as a tool to defend the exchange-rate-based-stabilization-policies around the globe. The depletion of these holdings is a major cause of concern. It is a dimension over which there is little control; it relates among other things, to regional and domestic politics. Focusing on this dimension is quite important, especially when we consider that a small open economy like Lebanon with its history of political instability is subject to reserve depletion due to its vulnerability to domestic and regional politics. This vulnerability shakes confidence in the local economy and raises the question as to whether the Lebanese financial authority fulfils its commitment by protecting its stabilization policy in the event political problems occur. Nonetheless, the policy of defending the stabilization policy by direct intervention in the foreign exchange market proved to be very successful, and that is despite the difficulties that the stabilization program has encountered. Some of these difficulties are political instability, large budget and current account deficits and huge debt. The large budget deficits, for instance, created pressure for the government to monetize its debt and it put upward pressure on inflation and downward pressure on the peg, thus losing foreign reserves and putting the stabilization policy at risk.

*b. Theoretical Background*

A significant amount of literature exists concerning the survival of the ERBSP<sup>2</sup>. The literature focused on the experience of countries plagued by high and chronic inflation (rates above 30-40 percent a year) and by severe macroeconomic instability. These experiences have several common elements: after the stabilization policy is implemented, inflation usually falls, but convergence to the inflation rate of the pegged currency is slow and incomplete. Domestic demand rises quickly, output expands, national saving declines, the current account deficit widens, and nominal interest rate falls.

*i. Why governments adopt the ERBSP*

It is important to explore the reasons that motivate governments to adopt the ERBSP and that is despite the heavy burdens that governments could carry. First, in the short run, a fixed exchange rate provides a nominal anchor for the currency, thereby reducing inflationary expectations. In a longer-term view, it makes access to international capital markets easier by providing more stability and predictability in foreign exchange markets. Trade relations constitute a second reason for fixing the exchange rate. Small, open economies like Lebanon that trade heavily with one or a few bigger partners do not have much scope for an independent monetary policy, and a stable exchange rate carries the advantage of reducing transactions cost. Third, a fixed exchange rate may induce greater financial discipline on the part of the authorities since it places

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<sup>2</sup> Exchange Rate Based Stabilization Policy

their foreign reserve holdings at risk. Fourth, a nominal exchange rate anchor is readily observed by all participants in the economy and may be more effective in reducing high inflation in the face of unstable money demand, large movements in velocity, and a high degree of dollarization. Yet, even well-engineered exchange-rate-based-stabilization programs that succeed in bringing down inflation for a sustained period may set in motion a dynamic process that can lead to a financial crisis and the program's collapse.

## *II. Literature review*

Several theories were set forth to explore the relationship between the holding of foreign reserves and the ERBSP. Among them is:

- i. The first generation currency crisis model represented by (Krugman 1979), where economic agents perceive the decline of the stock of foreign reserves, and to avoid losses, they launch a speculative attack on the currency before it depletes, thus the collapse of the ERBSP.
- ii. The sticky inflation theory by (Dornbusch and Rodriguez 1982) states that fixing the exchange rate reduces the nominal and real interest rate, which leads to an appreciation of real exchange rate and a deterioration of trade balance. Two opposing effects emerge: the expansionary effect and the contractionary effect. The expansionary effect of the fall in the interest rate dominates the contractionary effect of the loss of competitiveness, causing aggregate demand to increase. The increase in demand, combined with the inertia in inflation rates and the currency

peg, causes an overvaluation of the domestic currency. Overvaluation, in turn, causes output to decline and, eventually, leads to a speculative attack on the currency; thus, the loss of foreign reserves and the deterioration of the ERBSP.

- iii. The wealth effect theory by (Helpman and Razin 1987) is generated by intergenerational redistribution of wealth, where the dynamics of disinflation program, anchored by fixing the nominal exchange rate, are driven by wealth effects. It results in a temporarily higher consumption level, worsening trade accounts, large government debt, and reserve losses.
- iv. In the second generation currency crisis model by (Obstfeld 1994), there is a tension between the government's desire to abandon its ERBSP and its desire to defend it by using its foreign reserves. It follows that the cost of defending the policy increases when people suspect that the government is leaning towards abandoning the stabilization policy.

Additional and relevant theories that explore the link between foreign reserves and the ERBSP are presented by (Calvo and Mendoza 1996a, b) and (Krugman 1979). The theory states that because deposits are guaranteed by the monetary authority, depositors do not question the behavior of bankers which in turn induces bankers to pursue risky activities. As a result, the prospect of

devaluation increases. Devaluation in turn leads to a shift from domestic currency towards foreign currency. Banks will not be able to honor the depositors and will be rescued by the central bank as the lender-of-last-resort, thus the economy loses foreign reserves. Krugman (1979) agreed with Calvo and Mendoza (1996) but added that bankers are speculators who have nothing to lose but a lot to gain from riskier portfolios, and that large current account deficits with a slow inflow of capital leads to the expectation that foreign reserves may reach exhaustion.

*c. Definitions of success and failures*

The definitions of success and failures of the ERBSP are of great importance, and in order to define success or failure I follow the following criteria.

- i. Two or more years below 40 percent annual inflation following two or more years above 40 percent constitutes a successful stabilization episode (Bruno and Easterly 1995).
- ii. An “inflation crisis” as a period of at least two consecutive years of inflation above 40 percent and “non-crisis” as a period of at least two consecutive years with inflation below 40 percent (Easterly 1996).
- iii. (Hamann and Prati 2001) collected seven years of data: the stabilization year, three years before, and three years after. They implied that disinflation that lasts at least three years should be classified as successful, but there is no presumption that they will not fail later on.



- iv. (Willett 1999) defines a successful stabilization program as one which results in the reduction of annual inflation rates to the low double-to single-digit range (below 25 percent per annum), without price and wage controls, and maintains low rates for at least three years. Willett does not believe that these criteria are too strong and, not wanting his conclusions to rest on the use of a single controversial definition, he considers a second looser indication of success that requires only that there be a substantial reduction in inflation from the previous years that is not due to wage and price controls.

In Part II of this paper, I test for the effectiveness of the ERBSP on inflation and on the behavior of key macroeconomic variables. In Part III, I explore the variables that affect the holdings of foreign reserves. I proceed by implementing modern time series analysis where several variables are tested on the dependent variable-‘Foreign Reserves’. In Part IV, I conclude with policy recommendations.

## **Part II. Testing for the effectiveness of the ERBSP.**

To test as to whether Lebanon’s stabilization policy produced the desired outcome, I compare the behavior of some of its key macroeconomic variables to those of four countries of Latin America that adopted the exchange rate as a stabilization tool. The importance of the countries I chose stems from fact that

after repeated failures their stabilization policies succeeded. By successful, I mean key macroeconomics variables behaved as predicted by the stylized facts of ERBSP<sup>3</sup> and that the success rate is based on the standard criteria used by the above mentioned scholars. To illustrate success or failure, I denote the year in which the stabilization program was initiated as year T and the years that follow-year T+1, T+2 and T+3 and so on. I also identify the year before the stabilization year as year T-1. Figure 1 illustrates that in year T, the stabilization year, the inflation rate started to decline in all of the countries under study<sup>4</sup> and it continued to decline in the subsequent years till T+6, an indication that the stabilization policy was successful in controlling for inflation. This conclusion enables me to proceed further by testing for the stylized facts of ERBSP.

a. *Stylized Facts of Exchange Rate Based Stabilization Policies.*

Reinhart and Vegh (1995), Khamis (1996), and Hamann (1999), have documented key stylized facts for ERBSP based on observing the behavior of key macroeconomic variables that characterized the ERBSP in high inflation countries during the past thirty years. Their observations include:

- i. *Current account as a percent of GDP:* The behavior of the current account as a percent of GDP is considered as one of the key stylized facts of ERBSP. The current account deteriorates with the current

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<sup>3</sup> Most of those countries used the foreign reserve as a tool to defend the stabilization policy. They include Lebanon, Argentina, Brazil, Peru and Mexico whose stabilization program started at year T. T for Argentina corresponds to 1991.2, for Brazil 1994.3, for Mexico 1988.1, for Lebanon 1992.12, for Peru 1990.4

<sup>4</sup> Mexico, Argentina, Brazil and Peru provide important and highly contrasting experiences with ERBS programs. Each of their economies suffered financial crisis because of reserves depletion.

account deficits being financed by large capital inflows.<sup>5</sup> In a (small) open economy like Lebanon subject to exogenous shocks, central banks sometimes try to use monetary (or credit) policy in an attempt to counter the effects of terms of trade disturbances. Under these circumstances, domestic credit would be expanded when the terms of trade worsen, and contracted when the terms of trade improve. The current account, as a percent of GDP for Lebanon, Brazil, Argentina, Peru, and Mexico, exhibits the predictable J curve, an initial decrease, and then an increase as illustrated by Figure 2.

- ii. *Domestic Credit as a percent of GDP:* Under fixed exchange rates, the magnitude of credit expansion will be restricted by the availability of international reserves and the country's capacity to borrow internationally. The share of private credit (lending to the private sector in domestic currency) as a percent of GDP resumed the upward trend for Lebanon, Brazil, Argentina, Mexico and Peru since the initiation of their stabilization policies. This is predicted by one of the stylized facts of ERBSP, a steady increase, and then a decline, as shown in Figure 3.
- iii. *Fiscal Discipline:* The success of the stabilization policy did not seem to discipline governments' fiscal spending. However, these

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<sup>5</sup> Reliable data on capital flow for Lebanon are not available because capital flow in and out throughout private individuals. Nevertheless, some inference about the size of such flows may be drawn from changes in foreign reserves of the BDL.

governments realized that unless fiscal behavior is controlled, the stabilization policy would eventually collapse. Figure 4<sup>6</sup> illustrates clearly the shift in government policies from worsening to improving their fiscal discipline. The sustainability of a fiscal policy program depends on, among other factors, the overall macroeconomic policy mix and the current level and structure of the debt-to-GDP ratio. In Lebanon, and due to war recovery effort, a sharp increase in government expenditure was the predominant characteristic of public finances during the period 1993-97. Government expenditure rose from 23 percent of GDP in 1993 to 42 percent in 1997. This expenditure category consists primarily of salaries and wages, purchases of goods and services, and transfers and subsidies. Mexico's fiscal discipline, as illustrated by Figure 5, did not behave as predicted. Mexico's fiscal discipline improved at the time the stabilization policy was initiated, but worsened at a later stage which led to the Mexican financial crisis and the collapse of the ERBSP.

- iv. *Gross National Expenditures:* The initiation of a stabilization policy triggers an expansion in economic activities that is primarily caused by a private consumption boom and an increase in real wages. Although the post-stabilization path of the economic activity level reproduces the

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<sup>6</sup> I used the actual budget deficit as a percent of GDP. I did not use the standardized budget deficit because it lacks data on tax revenue and because many of the countries under studies do not depend on tax as a major source of revenue.

usual economic boom that follows stabilization programs based on exchange-rate anchors, such a boom did not appear in Lebanon, as shown in Figure 6, and that could be attributed to the fact that most of the economic activities at the early stages of the stabilization program were due to war recovery effort.

In light of the above findings, it is legitimate to conclude that the stabilization program in Lebanon induced key macroeconomic variables to behave as predicted by the stylized fact of exchange rate stabilization policy, and thus it produced the desired outcome. This conclusion enables me to proceed with the empirical analysis.

### **Part III. Empirical analysis**

I begin the empirical analysis by explaining the explanatory variables, and then I proceed to results interpretations.

#### *a. Explanatory Variables:*

- i. Foreign Reserve: The international reserves net of gold holdings. The inclusion of gold will not change the results of the paper for two reasons. First, central banks in general do not vary their holdings of gold reserves. Second, gold holdings by central banks lost its importance since the collapse of the Bretton-Woods system in the early 1970s.

- ii. Dollarization: Defined as the ratio of foreign currency deposits to total deposits. In a country such as Lebanon, which has been marked by political instability, currency substitution/dollarization must be investigated carefully. When there is extensive currency substitution it is likely that monetary shocks will be relatively larger in magnitude, as unexpected shifts between domestic and foreign capital may occur. A negative sign is expected
- iii. Domestic Credit: An increase in private sector credit growth, being interpreted as an increase in GDP growth, would, *ceteris paribus*, reduce the fiscal deficit as a percent of GDP and reduce the supply of domestic assets and increase the demand for domestic assets, thereby increasing the foreign reserves. A positive sign is expected
- iv. Interest rate differential: The cost of holding reserves which is the difference between Lebanese three months treasury bills and comparable US three months treasury bills. The differential has been large and positive since the 1980's. From this perspective, the persistent positive interest rate differential in Lebanon reflects its status as a postwar economy. However, given the unsterilized intervention a positive sign is expected
- v. Dummy Variable: The 0-1 dummy variable (D) takes the value of 1 during periods of heightened political uncertainty, such as anti-government demonstrations, number of assassinations, major cabinet

changes, and major government crisis, war on national territory, civil war, and sectarian tension. A negative sign is expected

- vi. External debt: Many studies discovered that external debt is among the main factors contributing to foreign reserves depletion. Thus a positive sign is expected.
- vii. Confidence variable: Presented by the ratio of short term debt to foreign reserves. High ratio of short-term debt to reserve makes it hard for the country to pay off all short-term creditors in the event of a panic. Thus, the country is more vulnerable to a confidence crisis. A negative sign is expected

*b. Data:*

The data is monthly, ranging from 1993 till end of 2005. It is taken from the Lebanese Central Bank, the International Financial Statistics, and the World Development Indicators. I estimate the above variables using Ordinary Least Squares for the period of January 1993 to December 2005. I chose this set of dates because it is the time period starting from the initiation of the stabilization policy till the assassination of late Prime Minister Hariri.

*c. Regression analysis:*

I start this section by regressing the dependent variable “Foreign Reserve” on the independent variables as shown in the below equation, but before I proceed I must look for stationary and correct for it.

$$LNFR = \alpha + \beta_1 LN(FCD_t / TD_t) + \beta_2 LN(DC_t) + \beta_3 LN(i_t^{leb} - i_t^{US}) + \beta_4 LN(D_t) + \beta_5 (ED_t) + \beta_6 (STD_t / FR_t) + \varepsilon_t$$

- LN (FR): Natural Log of international reserve net of gold holdings
- LN( $FCD_t / TD_t$ ): Natural Log of dollarization
- LN( $DC_t$ ): Natural Log of domestic credit to private sector
- LN( $i_t^{Leb} - i_t^{US}$ ): Natural Log of interest rate differential between Lebanese three month treasury bill minus US three Months Treasury bills
- LN( $SRD_t / TR_t$ ): Natural Log of confidence interval measured as the ratio of short term debt to total reserve.
- ( $D_t$ ): Dummy variable
- LN( $ED_t$ ): Natural Log of external debt

i. *Testing for stationary:* Theory suggests that shocks to a stationary time series are temporary; the effect of the shocks will dissipate and the series will revert to its long-run mean. Non-stationary variables, on the



other hand, may have a pronounced trend or meander without a constant long-run mean or variance. In addition, a stationary error term means that the variables have tended to move together over the long run; and that if an exogenous shock drives the variables out of equilibrium, there is a tendency for them to move together again. In order to test for the presence of a unit root, I use the Dickey-Fuller and the Augmented Dickey-Fuller tests. The Philip-Perron test, which entails less stringent restriction on the error process, is used as well. It is important, however, to mention that structural change complicates the tests for trends; a structural break makes an otherwise stationary series appear to be non-stationary. For instance, the series 'Foreign Reserve' exhibits a structural break and with that, Dickey-Fuller and Phillips-Perron test statistics are biased toward the non rejection of a unit root. By applying the above tests, Table 1 and table 2, I conclude that all of the variables except the "Dummy variable" has a unit root, thus a correction is required.

- ii. *Correcting for stationary:* The correction for stationarity entails different treatment for different variables. Series such as 'Dollarization', 'Interest Rate Differential', and 'Confidence', can be transformed into a stationary model by differencing. On the other hand, series that exhibits sustained upward trend such as 'External Debt' and 'Domestic Credit' can be transformed into a stationary

model by removing the deterministic trend; consequently, a serious problem is encountered when the inappropriate method is used. Thus, the de-trending procedure entails estimating the series ‘External Debt’,  $ED_t$ , on a constant and time and estimating the series ‘Domestic Credit’,  $DC_t$ , on a constant and time as shown by Equation a and Equation b.

$$LN(ED_t) = \frac{6.39}{(141.59)} + \frac{0.02}{(51.52)} \text{ time} + e_t \quad \text{Eq. a}$$

$$LN(DC_t) = \frac{9.438}{(327.033)} + \frac{0.0131}{(37.425)} \text{ time} + e_t \quad \text{Eq. b}$$

The t-statistic (shown in parentheses) in Eq. a and Eq. b indicates that the coefficients are highly significant, and by observing the ACF and PACF of the de-trended data in ‘External Debt’ series, the ACF does die out after 16 months. In such a case, de-trending the data does result in a stationary series and the residuals, ( $e_t$ ), become the de-trended values of the ‘External Debt’. On the other hand, the ACF for the series ‘Domestic Credit’ does not die out after 16 months which means that de-trending the data does not result in a stationary series. The remedy is to regress the variable ‘Domestic Credit’ on time, time squared and time cubed as shown in Eq. c. The t-statistic (shown in parentheses) in Eq. c are significant; thus ( $e_t$ ) become the de-trended values of the series ‘Domestic Credit’.

$$Log(DC_t) = \frac{9.04}{(693.62)} + \frac{0.03}{(38.75)}t - \frac{0.00014}{(-10.85)}t^2 + \frac{1.3178176}{(2.225)}e - 0.07t^3 \quad \text{Eq. c}$$

iii. *The first round of Analysis:* Having corrected for stationarity, I begin with the first round of analysis and I derive the following results

$$\begin{aligned} \text{Log}(FR_t) = & \begin{pmatrix} 0.0067 \\ 1.84 \end{pmatrix} - 1.17 \text{Log} \begin{pmatrix} FCD_t \\ TD_t \\ -6.03 \end{pmatrix} + 0.82 \begin{pmatrix} DC_t \\ 3.15 \end{pmatrix} + 0.156 \text{Log} \begin{pmatrix} i_t^{Leb} - i_t^{us} \\ -3.26 \end{pmatrix} + 0.0052 \begin{pmatrix} D_t \\ 0.51 \end{pmatrix} - \text{Log} 0.046 \begin{pmatrix} ED_t \\ 1.06 \end{pmatrix} \\ & - 0.21 \text{Log} \begin{pmatrix} STD_t \\ FR_t \\ -6.37 \end{pmatrix} + \varepsilon_t \end{aligned} \quad \text{Eq. 1}$$

$$R^2 = 0.6 \quad DW = 1.56 \quad F = 33.96$$

$R^2 = 0.6$  Suggest that the regression equation is a good fit, and the F test at 33.39 is highly significant which means that the model is good in predicting the level of foreign reserves. However, the DW of 1.56 implies serial correlation which requires additional testing. Additional testing for the presence of serial correlation is conducted by using the Breusch-Godfrey Serial correlation LM. Unlike the Durbin-Watson statistic for AR(1) errors, the (Breusch-Godfrey, 1978) Serial correlation LM test is applicable whether or not there are lagged dependent variables. In addition, the F statistic shown in Table 3 is an omitted variable test for the joint significance of all lagged squared residuals. The observations times R-squared statistic is the Engle's LM test statistic, computed as the number of observations times the  $R^2$  from the test regression. Therefore, the test does not reject the hypothesis of no

serial correlation up to order four, indicating that the error terms are serially correlated. In addition, the analysis of table 4 indicates that the Auto Regressive Conditional Heteroskedasticity and the White Heteroskedasticity tests for Eq. 1 reject the null hypothesis of no Heteroskedasticity.

The assumption of normality is tested for by using (Jarque – Bera 1987). It is a statistic for testing whether the series is normally distributed. The kurtosis of Eq. 1 is 10.69 which entails that the distribution is peaked relative to the normal. Under the null hypothesis of a normal distribution, the Jarque-Bera statistic is distributed as  $X^2$  with 2 degrees of freedom. The reported probability is the probability that the Jarque-Bera statistic is 423.2, which exceeds (in absolute value) the observed value under the null hypothesis. Therefore, the null hypothesis is rejected at the 0% level of significance indicating that the error term is normally distributed with mean almost equal to zero; thus satisfying the assumptions that the error term must be normally distributed with zero mean.

iv. *The Second Round of Analysis:* The interpretation of equation 1 illustrates that the results exhibit low R-squared and that the presence of serial correlation persists. I correct for serial correlation by adding AR(1) on the right hand side of Eq. 2

$$\begin{aligned} \text{Log}(FR_t) = & \left( \begin{array}{c} 0.0051 \\ 1.66 \end{array} \right) - 1.15 \text{Log} \left( \begin{array}{c} FCD_t \\ TD_t \\ -6.9 \end{array} \right) + 0.97 \text{Log} \left( \begin{array}{c} DC_t \\ 4.17 \end{array} \right) + 0.162 \text{Log} \left( \begin{array}{c} i_t^{leb} - i_t^{us} \\ -3.94 \end{array} \right) + 0.0076 \left( \begin{array}{c} D_t \\ 0.87 \end{array} \right) \\ & - 0.059 \text{Log} \left( \begin{array}{c} ED_t \\ 1.54 \end{array} \right) - 0.166 \text{Log} \left( \begin{array}{c} STD_t \\ FR_t \\ -5.79 \end{array} \right) - 0.051 \left( \begin{array}{c} AR(1) \\ -0.662 \end{array} \right) + e_t \quad \text{Eq. 2} \end{aligned}$$

$$R^2 = 0.65, \quad DW=1.78, \quad \text{and } F=34.4$$

The three indicators improved relative to Eq. 1. In addition, skewness improved to 0.635, the Jaque-Bera improved to 19.3, and the Kurtosis improved to 4.3. However, dummy's coefficient that was expected to show strong improvement after the correction did not perform. This could be attributed to the fact that the impact of the political shock was not felt till several months.

v. *Final round of analysis:* Several lags were tried on each of the explanatory variables of Eq.2. The results did not improve till I lagged the 'Dummy Variable'  $D_t$  by three periods. The derived results are shown in Eq. 3

$$\begin{aligned} \text{Log}(FR_t) = & \left( \begin{array}{c} 0.0039 \\ 1.186 \end{array} \right) - 1.18 \text{Log} \left( \begin{array}{c} FCD_t \\ TD_t \\ -6.9 \end{array} \right) + 0.884 \text{Log} \left( \begin{array}{c} DC_t \\ 3.93 \end{array} \right) + 0.156 \text{Log} \left( \begin{array}{c} i_t^{Leb} - i_t^{us} \\ -3.8 \end{array} \right) \\ & + 0.019 \left( \begin{array}{c} D_{t-3} \\ 2.21 \end{array} \right) - 0.062 \left( \begin{array}{c} ED_t \\ 1.71 \end{array} \right) - 0.166 \text{Log} \left( \begin{array}{c} STD_t \\ FR_t \\ 5.7 \end{array} \right) + 0.058 \left( \begin{array}{c} AR(1) \\ 0.636 \end{array} \right) + e_t \quad \text{Eq.3} \end{aligned}$$

The three main indicators,  $R^2=0.67$ ,  $DW=2.01$ ,  $F=37.9$ , improved in comparison to Eq. 2.

#### *IV. Interpretation of Results*

In interpreting the new results in equation 3, the intercept is positive and significant, which means that if all the variables are equal to zero, the inflow of capital continues. Capital flows to Lebanon because of the large number of Lebanese expatriates living outside of Lebanon. Due to reasons that are beyond the scope of this paper, most Lebanese expatriates transfer money to Lebanon regardless of the political situation, and regardless of government policy, national debt, interest rate differential or domestic credit. On the other hand, the political variable represented by the dummy variable shows weak and positive relationship vis-à-vis the level of foreign reserves. That is contrary to what has been found by previous scholars. (Radelet and Sachs 1998) found out that major causes of reserve depletion are political instability. It is important however, to explain the reasons that isolated the holding of foreign reserves from the political situation. First, political tension in Lebanon is a double-edged sword which is likely to exacerbate the depletion of the foreign reserves such as to alleviate it. In addition, the capital that inflows to Lebanon can be categorized into two different categories. The first category is the “Hot Capital”; the accumulation of “Hot Capital” should be a major concern because these flows are quickly reversible in the case of a change in the political conditions. The second category is the “Political Capital”; it flows to Lebanon in the form of financial aid to the government and to the people by foreign governments and world financial institutions. I conclude that when the

political situation worsens, “Hot Money” outflows while “Political Money” inflows. The results I derived in Eq. 3 show that the political money is slightly stronger than the hot money. I conclude that political tensions in Lebanon trigger capital to inflow to the country rather than to outflow.

Additional interpretation into Eq. 3 indicates that the extent of ‘Dollarization’ has the strongest impact on the ‘Foreign Reserve’ with a significant coefficient of 1.18. In a country such as Lebanon, where the dollar is used as a medium of exchange, unit of account and store of value; ‘Dollarization’ must be looked and analyzed carefully. When the Lebanese pound started to depreciate since the early 80’s till the early 90’s, the ordinary Lebanese citizen did not comprehend fast enough the meaning of a depreciated currency; thus the rate of depreciation was much faster than an ordinary Lebanese citizen can understand. However, the situation changed completely during the 90’s and early 2000. When political turmoil or suspicion about the economy occurred, people did not hesitate to convert the domestic currency to US dollars; thus the impact of dollarization on the level of foreign reserves was felt immediately. Furthermore, the growth of ‘Domestic Credit’, ( $DC_t$ ) to the private sector is positive and significant with a coefficient of 0.88 and  $t = 3.39$ . The growth of domestic credit is correlated to the growth of the gross domestic product, thus economic growth translates into higher level of reserves. External debts

( $ED_t$ ) series is negative with a coefficient of 0.06 and t-test of 1.71. Donor countries provide easy loans to Lebanon in order to increase its holding of foreign reserves. This build up of reserve has been used as cushion signaling the authorities' commitment to their ERBSP by conducting unsterilized intervention. Interest rate differential between short-term assets denominated in Lebanese pounds and comparable US dollar assets have been large and positive since the 1990's. The average interest rate differential between three-month treasury bills denominated in Lebanese pounds and U.S dollars has amounted to about 12 percent. During the 80's, the large differentials reflected the war-related macroeconomic instability, and the large differential continued to be large even after the end of 1992, when the authorities moved decisively to overcome the inflationary expectations by adopting the ERBSP, which has been maintained since. Last variable is the 'Confidence' variable. It is significant and negative. It indicates that the accumulation of short term debt reduces confidence in the economic system.

#### **IV. Policy Recommendations**

Despite the political turmoil that Lebanon experienced, the ERBSP survived and the holdings of reserves remained strong. In light of that, it is legitimate to conclude that the ERBSP is a viable policy for Lebanon. I attribute my decision to several reasons: the stabilization policy supported by the high level of foreign reserves succeeded in stabilizing the price level, and it induced key



macroeconomic variables to behave as predicted by the stylized facts of ERBSP which is a sign of a healthy economy. In addition, the ERBSP brought confidence to the Lebanese currency by reducing the level of dollarization. However, dollarization must be an issue of concern to policy makers and it cannot be ignored. One of the quickest remedies for keeping low levels of dollarization is to increase the interest rate on the Lebanese Pound, but too much of an increase may generate the opposite effect. Some institutional measures to cut on dollarization might be appropriate. Furthermore, the Lebanese government must take additional steps is to stabilize its fiscal account, that the level of external debt resulting from government borrowing drops, so the stock of reserves does not reach low levels that can reduce the validity of the stabilization policy. In addition, good macroeconomic policies, manageable fiscal deficits and monetary policy directed towards sustaining the ERBSP are extremely important, but these policies must be accompanied by good political climate and efficient institutions. Without the proper settings, maintaining the ERBSP may become so costly that the government may abandon it. Consistency between macro and fiscal policies are crucial to the survival of the ERBSP. The monetary policy and the fiscal and trade policies must be devoted entirely to maintaining the ERBSP. If these policies do not support stabilization policy, costs will eventually outweigh benefits and the peg will become prohibitively expensive to maintain. In this case, it would be better to abandon the policy when the costs of doing so are still low. The

costs of maintaining and abandoning the ERBSP is also important with regard to credibility issues. A government that tries to create credibility by pegging the currency can reap short-term benefits by lowering inflationary expectations and eliminating exchange rate volatility. However, this credibility must be earned by prudent macroeconomic management and institutional development. Therefore, in principle, there is no way for policymakers to categorically prove to the public that the ERBSP will be protected until the economy actually arrives at a point when the public expects the policy to change its course. Hence, in practice the stabilization program in Lebanon is likely to suffer from credibility problems at some point.

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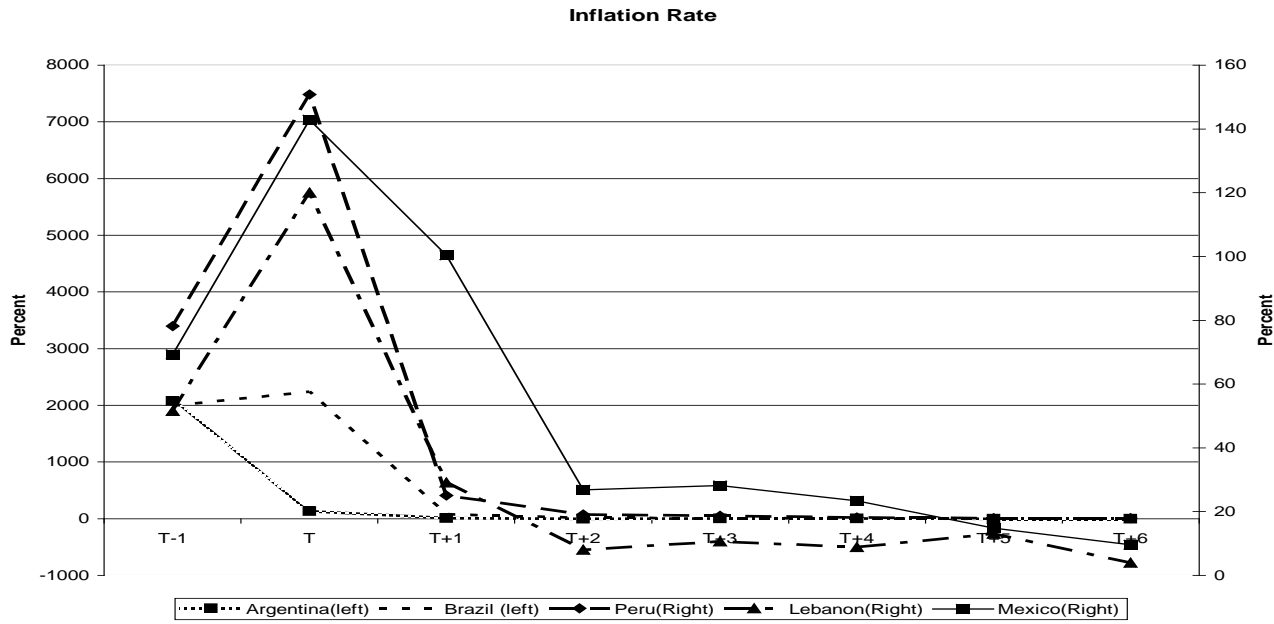
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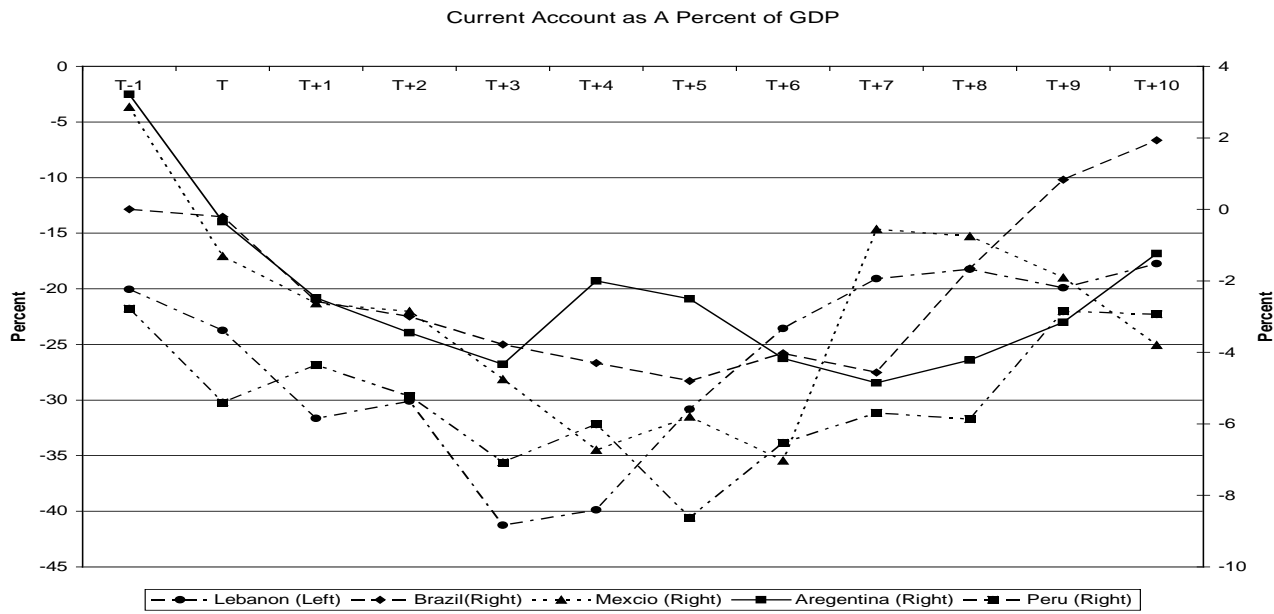
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*Figure 1*



*Figure 2*

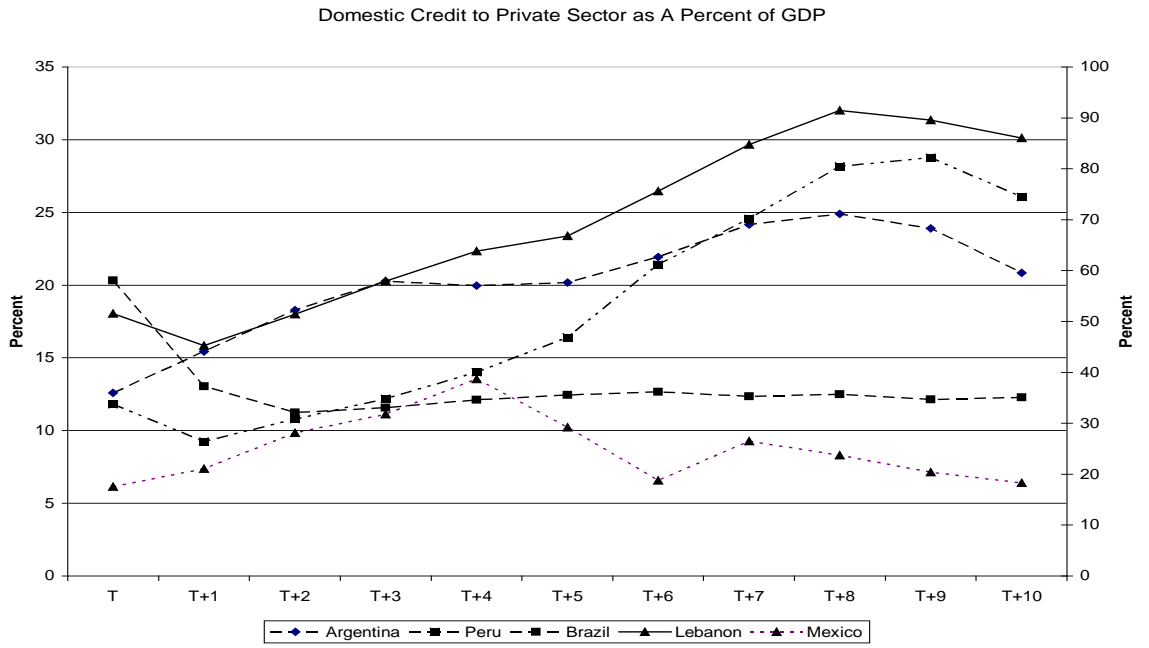


Figure 3

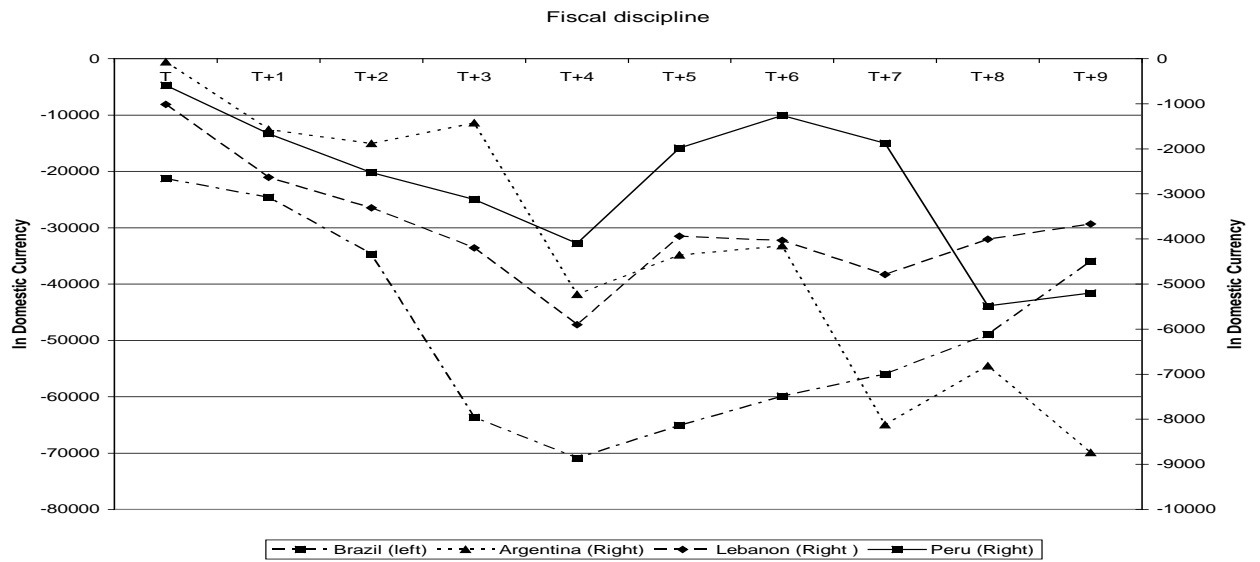


Figure 4<sup>7</sup>

<sup>7</sup> To facilitate the understanding of the graph, I separate Mexico into a different graph

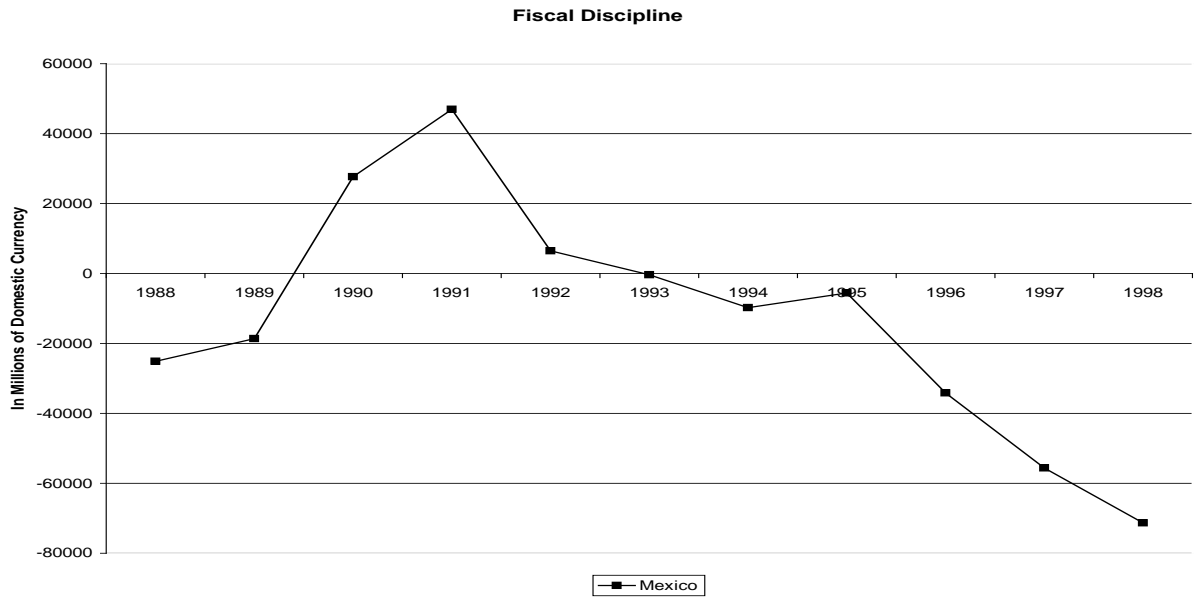


Figure 5

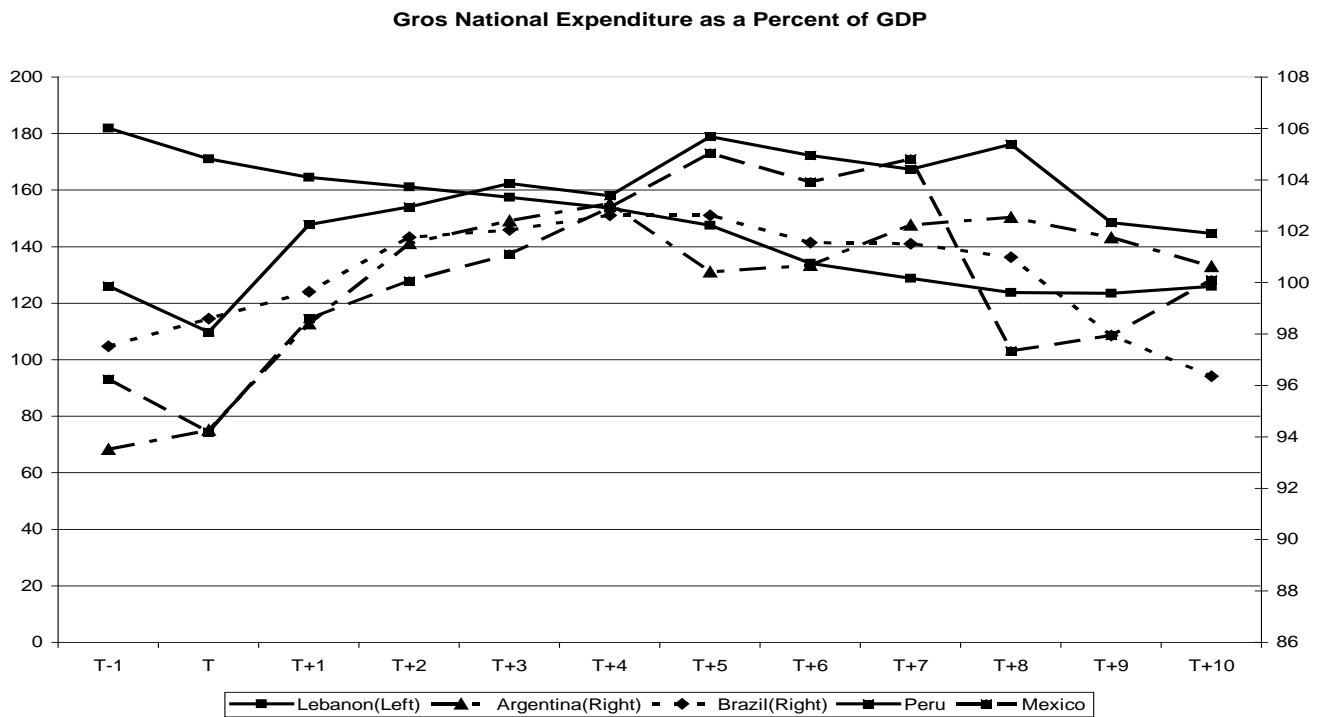


Figure 6



**Table 1. Philip\_Perron Test, Jan. 93-Dec. 05**

Test Statistics	Variables in LN							CV <sup>8</sup>
	$(FR_t)$	$\left(\frac{FCD_t}{TD_t}\right)$	$(DC_t)$	$(i_t^{leb} - i_t^{us})$	$(D_t)$	$(ED_t)$	$\left(\frac{STD_t}{TR_t}\right)$	
PP	-2.21	-2.01	-6.03	0.15	-11.24	-3.08	-1.69	-2.88
PP (1)	-9.48	-7.59	-10.88	-8.03	-84.31	-12.41	-8.06	-2.88

**Table 2. Dickey Fuller Test, Jan. 93-Dec. 05**

Test Statistics	Variables in LN							CV
	$(FR_t)$	$\left(\frac{FCD_t}{TD_t}\right)$	$(DC_t)$	$(i_t^{leb} - i_t^{us})$	$(D_t)$	$(ED_t)$	$\left(\frac{STD_t}{TR_t}\right)$	
DF	0.38	-1.46	1.01	0.88	-10.52	2.06	-1.05	-1.94
ADF	-1.262	-2.04	-6.55	-0.241	-11.72	-2.45	-1.41	-2.88
ADF (1)	-9.35	-7.59	-3.93	-8.07	-8.89	-12.40	-7.77	-2.88

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<sup>8</sup> At the 5% Level

**Table 3. Breusch-Godfrey Serial Correlation LM Test:**

	<u>F statistic</u>	<u>Probability</u>	<u>Obs*R squared</u>	<u>Probability</u>
Equation (1)	0.79	0.45	1.66	0.44

**Table 4. Auto Regressive Conditional Heteroskedasticity and the white Test:**

	<u>F statistic</u>	<u>Probability</u>	<u>Obs*R squared</u>	<u>Probability</u>
ARCH	2.88	0.092	2.86	0.091
White	2.72	0.003	26.6	0.005