A note On Money Demand and Monetary Policy in Lebanon

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By Invitation:

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The purpose of this note is to share with the reader an empirical estimate of the money demand function for Lebanon with its parameters and arguments, using current econometric procedures. The analysis will consist mainly of presenting narrative economic interpretations, while relegating the statistical and technical part to an appendix, which could be referred to at will. And the experience is undertaken for the first two decades of the current century on a monthly frequency. The period coincides in time with the policy, pursued by the central bank of Lebanon, of targeting the Lebanese foreign exchange rate, mostly against the US dollar, by anchoring the Lebanese pound to the dollar at the rate of LBP 1,507.50. During

that time, the Lebanese financial and real markets were characterized by a freedom to trade, liberty to transact, currency convertibility, moderate inflation, open foreign sector, and a relative political stability, among other good prospects, despite troublesome public finances.

It is held in the economic literature, at least theoretically, that a country cannot choose independently the stance of its monetary, and fiscal policies under fixed foreign exchange rates, and perfect capital mobility. This is termed the "impossible trinity". Foreign money supply, that impounds the foreign exchange rate market, will dictate the evolution of the domestic variables, among which and essentially is the home price level. It is posited that inflation and other financial indicators, like money, would be linked automatically to economic developments in the foreign country of the peg, and outside the influence of the local authorities. Assuming that there is room for maneuvering, monetary policy is effective if and only if there exists a stable money demand function, but also some control over the money supply. As a matter of fact, two instruments are available to the central bank and are subject to its discretion, the money supply being one, but the bank has three goals: inflation, foreign exchange rate, and aggregate output. It is impossible to pursue so many goals. However, this is too stringent and is practically avoidable. Other economists believe that even if the conditions for a stable money demand function are satisfied, the function is unstable, and therefore unreliable. However, other economists hold the opinion that the function is not only stable but also parsimonious in its arguments. The findings in the present note support this last point of view. The test is whether a money demand function can be discovered empirically.

First, it must be recognized that the textbook money demand function is a demand for real balances, i.e. balances adjusted for inflation, and not nominal or current demand. This is fulfilled by deflating money stock M2 by an estimate of the price of the US dollar in Lebanese pounds, as implied by the cross rate of the euro/dollar exchange rate, under the assumption that inflation is reflected by contemporaneous developments in the foreign exchange market.

The composition of the arguments of the money demand schedule includes a scale variable, which can be aggregate consumption, GDP, or industrial production, and other interest rate variables, like the own interest rate on the money stock M2 and its cross rate. Although it is little considered, the function can further be extended by allowing for cyclical scale factors. As such it is realized that temporary and permanent shocks on the scale factor must be separated, with the former having a negative relation, while the latter has a positive relation, with real money.

The econometric model provides the following statistical and economic features:

- The permanent component of the coincident indicator (CI) compiled by the central bank is positively related to real money. The scale elasticity is 0.3129 in the short run, and 3.3571 in the long run. This means that a 1% increase in consumer and business confidence, as a surrogate to the permanent scale factor, increases real money by 0.3129% in the short run, and 3.3571% in the long run. The economic interpretation is that there are economies of scale in the short run, but not in the long run. Moreover, the two elasticities are statistically different from zero, meaning that the relation is significant and can be depended upon. These results are confirmed by empirical research on the topic elsewhere.
- The cyclical scale variable (CICYCLE), obtained through the Hodrick-Prescott cyclical filter applied on the coincident indicator, enters negatively, as expected, in the function, and has the required significance, i.e. the corresponding coefficient is statistically different from zero. This means that temporary scale shocks depress the demand for real money, while permanent scale shocks do not, and to the contrary raise it. Globally, this asymmetry of response permeates other economic sectors.
- The long run own rate elasticity (IDEPLL) of real money is positive and statistically different from zero, as expected. Its magnitude is 2.009. A 1% increase in the own interest rate, i.e. from 7% to 7.7%, increases real money by 2.009%. This sensitivity to own interest rates is surprisingly high by

international standards. The model produces a negative short run interest rate elasticity, with a value of -0.580. It is unclear why this impact is negative, although sensibly different from zero.

- The long run cross rate elasticity (for IDEPUSD) is negative, as expected, and is substantially significantly different from zero, and carries a value of -0.9502. A 1% increase in the interest rate on foreign currency deposits, i.e. from 5% to 5.5%, decreases holdings of real money by almost 1.00%. This figure is close but higher than international standards. There is no significant short run effect of the cross interest rate. It seems that investors are not responsive to temporary shocks in that rate. Again it is not very clear why this is so.

- The fact that the interest rates are specified in logs indicates that the model allows for a liquidity trap. In other terms, at low interest rates, monetary policy becomes impotent. While this is a rare occurrence in the history of nations it did show up during the period of the Great Recession in the US.

- The adjustment to the long run is found to be correctly signed and totally different from zero. It implies an ultimate full speed of 16.02 months, which corresponds to one year and one third of a year. This means that the adjustment to the long run has a pace of 6.24% per month. This is called an error-correction coefficient, because short run errors are duly and quickly corrected, and eliminated by the passage of time. Such an adjustment is quite fast.

A stable money demand function is one requisite for monetary policy to work. The other requisite is a stable money supply function. Preliminary results show that there is a positive and significant link between foreign exchange reserves of the Lebanese central bank and domestic money supply M2. Whether foreign exchange reserves are under the control of the central bank, or are endogenous to balance of payments developments, is not obvious and is hard to detect. Nothing prevents the two from acting together.

The first requisite for an effective monetary policy is that of stability of the money demand, which is validated here for six reasons. One, the econometric diagnostics like the R-Square, t-statistics, p-values, the Durbin-Watson statistic, and the finding that the parameters have in general the expected theoretical signs are favorable. Second, the estimates of the elasticities are concordant in general to international measures. Third, the demand function is indeed parsimonious in structure, involving at most 4 variables. Fourth, the analysis separates and covers both short run and long run effects, and hence is more encompassing. Fifth, accounting for a residual variance equation in the model is definitely a plus and serves to improve the statistical fit. And finally, adding a temporary cyclical effect is original and helps in defining and identifying better the parameters of the demand function.

Should the money demand function remain stable for the period after October 2019? While it is difficult to adventure an answer, the likelihood of a stable function is high. This is due to the evidence presented here that the Lebanese individual is quite sophisticated in her economic behavior, maybe without consciously knowing the mathematical details. This does not mean that the variables and the parameters will remain the same. Since monetary policy has largely shifted after October 2019, it is expected that the individual behavior has also shifted. Hence, the money demand function will remain stable, and will include the same parsimonious explanatory variables, but with a different set of parameters. That is good news, as most likely the post-crisis exchange rate regime will be a flexible or adjustable one so monetary policy can play a more active, independent role in the economy.

APPENDIX: Multiple Regression Analysis

Dependent Variable: Δ(LOG(M2))-Δ(LOG(DOLLAR))
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Sample (adjusted): 1999M02 2018M01
Included observations: 228 after adjustments
Convergence achieved after 76 iteration

Mean Equation

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.614964	0.156238	-3.936070	0.0001
Δ(LOG(CI))	0.312933	0.062182	5.032510	0.0000
CICYCLE	-0.001154	0.000333	-3.469729	0.0005
Δ(LOG(IDEPLL))	-0.580471	0.069534	-8.348056	0.0000
Δ(LOG(IDEPUSD))	0.082184	0.122403	0.671415	0.5020
LOG(M2(-1))	-0.062419	0.019559	-3.191264	0.0014
LOG(CI(-1))	0.209550	0.045945	4.560858	0.0000
LOG(IDEPLL(-1))	0.125382	0.028235	4.440715	0.0000
LOG(IDEPUSD(-1))	-0.059308	0.019959	-2.971500	0.0030
AR(1)	-0.177273	0.061150	-2.898987	0.0037

Variance Equation

C	7.77E-05	6.87E-05	1.131169	0.2580
GARCH(-1)	0.930683	0.064630	14.40012	0.0000

R-squared	0.233501	Mean dependent variable	0.006937
Adjusted R-squared	0.201856	S.D. dependent variable	0.037587
S.E. of regression	0.033580	Akaike info criterion	-3.901998
Sum squared residuals	0.245816	Schwarz criterion	-3.721506
Log likelihood	456.8278	Hannan-Quinn criterion	-3.829175
Durbin-Watson stat	2.047319		

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