Small Macro-Econometric Model of Iran

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Introduction
Different sizes macroeconometric models are used for different policy purposes. The largest-scale macroeconometric model for Iran performed by the author is a high detailed model and working with it is more cumbersome for those who need a general forecast schemes for major macro-variables. Indeed this model is used to draw a simple working scheme to fulfill general view’s needs. In addition to its simplicity, this model substantially has a good performance. This model compromises fiscal position of government, a well understood transmission mechanism between monetary aggregates, price level, production and balance of payments.

The Model
A very simple monetary model is presented according to monetarists view. The following flow chart presents the relationship between the main variables of the model. As it is seen, the liquidity is decomposed to the net domestic assets and net foreign assets of the banking system. The net foreign asset component is affected by the official exchange rate and the balance of payments. The net domestic assets consist of three components: private sector debt to the banking system, government debt to the banking system, and net of other assets. The private sector debt to the banking system is affected by gross domestic product (GDP). The government debt to the banking system is influenced by the government budget deficit and foreign exchange obligations account. The price level is defined as a function of liquidity. Change in GDP is affected by the balance of payments. The estimated results are presented in the following section. The econometric model was estimated by OLS technique. The sample period covers 1960-2001. To avoid integration problems all level variables are used in their first differences.

List of variables:

- M2NFAE=Net foreign assets of the banking system (in billion dollars)
- M2NGV=Net government debt to the banking system (in billion Rials)
- M2LPV=Net private sector debt to the banking system (in billion Rials)
- M2NW= Other assets of the banking system (in billion Rials)
- OBD=Government budget deficit (in billion Rials)
- BOP=Balance of payments (in million dollars)
- GDPV=Nominal GDP (in billion Rials)
- GDP=Gross Domestic Production at fixed prices of 1982 (in billion Rials)
- PGDP=GDP deflator (base year=1982)
- M2 = Liquidity (in billion Rials)

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http://www.bidabad.com, This paper was written in 2003.
E = Exchange rate
D61 = Dummy variable, one for 1982 and zero otherwise
D69 = Dummy variable, one for 1990 and zero otherwise
D72 = Dummy variable, one for 1993 and zero otherwise
D5873=Dummy variable, one for 1994-95 and zero otherwise
D = Difference operator
@Trend = Time trend

### Relationship between the main variables of the monetary model

The model
The following system of equations was built and estimated.

\[
D(M2NFAE) = C(11)*BOP/1000 + C(12)*D72 + C(13)*D69 + C(14)*D60 + C(15)*D7680
\]

\[
D(M2NGV) = C(20) + C(21)*OBD + C(22)*D79 + C(23)*D80
\]

\[
D(M2LPV) = C(31)*D(GDPV) + C(32)*D80
\]

\[
D(M2NW) = C(41)*D7780 + C(42)*D79 + C(43)*D80 + C(44)*D80 + C(44)*D80 + C(44)*D80
\]

\[
D(PGDP) = C(51)*D(M2) + C(52)*D80
\]

\[
D(GDP) = C(60) + C(61)*BOP/1000 + C(62)*D(GDP(-1)) + C(63)*D5659 + C(64)*D65 + C(65)*D55
\]

\[
M2 = M2NFAE * E + (M2NGV + M2LPV + M2NW)
\]

\[
GDPV = GDP * PGDP
\]
### Estimation results

**System:** SYS_INF  
**Estimation Method:** Least Squares  
**Date:** 12/03/03 **Time:** 15:57  
**Sample:** 1339 1380 (1960-2001)  
**Included observations:** 42  
**Total system (unbalanced) observations** 251

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<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
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**Determinant residual covariance** 5.51E+22

**Equation:** D(M2NFAE) = C(11)*BOP/1000 + C(12)*D72 + C(13)*D69 + C(14)*D60 + C(15)*D7680  
**Observations:** 42  
**R-squared:** 0.913271  
**Mean dependent var:** 0.132592

**Adjusted R-squared:** 0.903895  
**S.D. dependent var:** 4.341973  
**S.E. of regression:** 1.346047  
**Sum squared resid:** 67.03814  
**Durbin-Watson stat:** 2.147208

**Equation:** D(M2NGV) = C(20) + C(21)*OBD + C(22)*D79 + C(23)*D80  
**Observations:** 42  
**R-squared:** 0.971197  
**Mean dependent var:** 2320.165

**Adjusted R-squared:** 0.968084  
**S.D. dependent var:** 5260.589  
**S.E. of regression:** 939.8117  
**Sum squared resid:** 32680103
As it is seen in the estimated results the net foreign assets of the banking system has a positive significant relationship with the balance of payments. The coefficient on C(21) is positive and significant, supporting a positive link between the government budget deficit and the government debt to the banking system. Equation (5) suggests that nominal GDP is positively and significantly related to the liquidity, supporting the monetarists view. In other words, any change in the money supply will affect the nominal GDP. In addition, net private sector debt to the banking system is positively and significantly correlated with nominal GDP. Equation (6) suggests that real GDP at fixed prices is positively and significantly related to BOP. In Iran interest rate does not affect the real output. Indeed, monetary transmission policy affects the general price level, leaving trivial effects on the real output.
Graph 1 Plot of residuals of estimated equations

Simulation
To evaluate the performance of the model, we solved the whole system for the whole ex-post sample period through dynamic simulation. The Graph 2 plots the actual value of the endogenous variables versus their simulated values. The 8 plots of the Graph 1 show the high dynamic response and credibility of the model to build simulated series as near as actual series with concordance of turning points.
Graph 2 Simulated versus actual values of the endogenous variables in dynamic solution
Graph 2 (Cont.) Simulated versus actual values of the endogenous variables in dynamic solution

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