

The Endogenous Money In Iran: What it is and Why it Matters

J. Haghghat

Abstract—This study examines the long run equilibrium relationship between the demand for loans and deposits and M1 and M2 with rate of profit on bank deposit (interest rate) in the Iran using the Cointegration technique. In addition, the study investigates both the short run dynamics and the direction of the causality in the long and short run between the demand for loans and deposits in order to test the endogeneity/exogeneity of money supply utilizing the vector error correction model (VECM) technique.

The Cointegration test indicates the existence of long run equilibrium between loans and deposits and M1 and M2 with rate of profit on bank deposit(interest rate). The causality tests indicate that there is a unidirectional causal relationship from loans to deposits in the long but not in the short run. This result indicates that money supply is endogenous since interest rate elasticity is highly significant and the demand for credit does create money. also, one may conclude that money supply is mostly not under the control of the Central Bank of the Iran.

Index Terms—Endogenous money, cointegration technique, interest rate elasticity, causality tests.

I. INTRODUCTION

Virtually every monetary economist believes that the CB can control the monetary base and...the broader monetary aggregates as well. Almost all of those who have worked in a CB believe that this view is totally mistaken¹ [1].

One of the controversial issues in monetary economics is the debate over the concept of exogenous and endogenous money. The debate has been going on since the 17th century and has its theoretical roots as well as its policy implications.

Exogenous money supply along with the stable money demand function is an important element in the Monetarists' model that asserts the effectiveness of monetary policy. On the other hand, post-Keynesians advocate the concept of endogeneity of money supply since the ultimate goal of the economic activity is to create money.

According to the post- Keynesians, the main function of commercial banks in the modern economy is to finance the business sector which would in turn determine the quantity of money. Therefore, money supply has no impact on real variables such as investment, employment, and national income. The debate over the exogenous and endogenous money supply concepts has become in recent years an empirical issue.

The purpose of this paper is to investigate the nature of the money supply process in light of the debate over the concept of exogenous and endogenous money supply in the

Iran over the period 1968- 2007. The paper is organized as follows: Section II is devoted to the theoretical debate and some relevant previous empirical works regarding the concepts of exogenous and endogenous money supply. Section III discusses the methodology used to test the nature of the relationship between the demand for loans and deposits and between M1 and M2 with rate of profit on bank deposit (interest rate) in the Iran and presents the empirical results and concludes the paper as well.

II. LITERATURE

Economists have been debating for years the issue of endogeneity/ exogeneity of money supply. Two schools of thought, originating from Keynesian and monetarist sources, have merged over time, resulting in a consensus that money is exogenous. On the other hand, post-Keynesians have come to support the idea that money is endogenous. However, the existence of evidence of money exogeneity means that the old school is still not out of consideration.

Monetarists believe that the central banks have control over money supply through their control over high powered money, e.g. Brunner [2]. Easy monetary policy leads to a higher inflation rate which raises expectations of inflation and in turn increases the nominal interest rate, Friedman [3]; thus, money supply is exogenous in the controllability sense.

However, Tobin [4] challenged the monetarist's view of the exogeneity of money. According to him, money supply is not fully controlled by the central bank, where commercial banks and the public can manipulate the money supply. Commercial banks through their control over the excess reserves and the public through changing their preferences between time and demand deposits can affect the money multiplier and in turn the money supply.

Moreover, monetary targeting by the FED in the 1970s and 1980s was attacked by a number of economists including Kaldor [5]. On the other hand, post-Keynesians believe that money supply is completely endogenous. Post-Keynesians reinterpreted Keynesian economics in many aspects including monetary economics.

Kaldor [6] and Moore [7] have criticized Keynes's treatment of the money supply in "The General Theory" as exogenously determined. In contrast, Kaldor [5], Moore [8], and Rogers[9] argue that the Quantity Theory of Money in which the money supply is exogenous is consistent with barter economy, but is not compatible with modern credit economy.

Moreover, Moore [10]–[17] has argued that the endogenous money supply which is determined by the demand for bank loans and the short run interest rate invalidates the liquidity preference theory. Post-Keynesians

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J. Haghghat is with Associate Professor of Economics and Director of Research Affairs Department at University of Tabriz, Iran (e-mail:haghghat@tabrizu.ac.ir; Jafarhaghghat@yahoo.com).

define money as a debt instrument that transfer purchasing power from the future to the present in order to allow deficit spending [18].

Considerable empirical work has been undertaken with respect to the exogenous/endogenous money supply issue using different econometric methods. Applying the standard Granger causality tests to the US money supply, Moore ([7], [14]) and Palley [19] found support for the endogenous money supply hypothesis.

Howells and Hussein [20] investigated the endogeneity of money supply for the G7 countries using causality techniques. Their findings suggest that broad money is endogenous.

Caporale and Howells [21] have tested the nature of the relationship between loans and deposits along with GDP in order to avoid incorrect references for the UK

The theoretical literature has convincingly put forward arguments in favor of money endogeneity. To support this theoretical argument, the empirical literature on the endogeneity of money has vehemently demonstrated that money supply is endogenously determined for various economies. However, all these studies exclusively encompass developed and middle-income economies. Lavoie [22], Nell [23], Vera [24], and Pollin [25] have presented a time series analysis to test the money endogeneity hypothesis for the case of Canada, and USA, South Africa, Spain, and US respectively. Diagne [26], and Tang [27] also empirically reinvestigate the long-run money demand function and its stability .

III. METHODOLOGY AND EMPIRICAL RESULTS

In order to test the exogeneity/endogeneity of money supply hypotheses, the cointegration between M1 and M2 with rate of profit on bank deposit (interest rate) with the ARDL approach together the causality concept known as Granger causality between the demand for loans and the demand for deposits along with the Gross Domestic Product (GDP) is investigated using time series data from the Iran over the period 1968- 2007.

Various factors are considered as determinants of the money supply function. The general agreement in the literature a money supply studies is assumed that the money supply function takes the following form:

$$\ln M_t = \alpha_0 + \alpha_1 2RP_t + \alpha_2 \log NFA_t + \alpha_3 \log NGBC_t + u_t \quad (1)$$

Where NGBC is net claims on the government, NFA= net foreign assets, RP is rate of profit on bank deposit (interest rate). For this section, the Microfit (version 4) statistical software was used for all the computations of ARDL approach for cointegration and error correctio model estimates [28].

According to results the interest rate elasticity is 10.8323, which is highly significant as reflected by a t-statistic of 2.6150. The long-run model of the corresponding ARDL (1, 1, 0, 0) for the supply of money can be written as follows:

$$\ln M_t = -8.8109 + 10.8323 \log RP_t + -.1262E-4 NFA_t + -.4686E-4 NGBC_t \quad (2)$$

As can be seen from results: the ECT-1 carries an expected negative sign (ecm(-1) = -.03249), which is highly significant, indicating that, M2, net claims on the

government, net foreign assets, and rate of profit on bank deposit (interest rate) are cointegrated. We also report the Lagrange Multiplier (LM) statistic for serial correlation and Ramsey's RESET test for functional specification, Since our calculated LM statistic is less than the critical value we conclude that the residuals of the estimated ARDL are free from serial correlation. and also, since our calculated RESET statistic is less than its critical value we conclude that the ARDL model is correctly specified.

As known, the causality test relationship requires the applications of three steps. First, the time series properties are analyzed in order to test their stationarity and to determine the order of integration. Second, the long run relationship between the variables is investigated using Cointegration technique. Finally, the short run, as well as, the long run causality relationship between loans and demand deposits are investigated using the Vector Error Correction Model (VECM).

The result of the short run dynamics as well as the short and long run causality tests between the 1) money supply(MS), bank credit(BC) and income(Y), 2) monetary base(MB) and bank credit(BC), and 3) money multiplier (MM) and bank credit(BC), in the Iran utilizing the VECM estimation is shown in TABLE I and II.

TABLE I: ESTIMATES FOR VECM REGRESSION

Equation	ECT	t-stst	Conclusion
MS-BC BC-MS	- 0.046 - 0.056	- 1.48 - 0.85	BC---->MS
MS-Y Y-MS	0.0038 -0.012	0.766 -1.53	MS ----> Y
BC-MB MB-BC	-0.0095 -0.81	-0.225 -2.3	BC---->MB
BC -MM MM-BC	0.0079 -0.18	1.106 -2/717	BC---->MM

TABLE II: GRANGER CAUSALITY TESTS RESULTS

Relation	Granger tests	
	F-statistic	Probability
MS to BC	2.39	0.079
BC to MS	4.72	0.006
MS to Y	3.38	0.026
Y to MS	1.34	0.286
BC to MB	23.03	4.E-05
MB to BC	2.15	0.152
BC to MM	7.97	0.001
MM to BC	0.56	0.557

In Data properties were analyzed in order to determine their stationarity using the ADF and PP unit root tests which indicated that loans, deposits are integrated of order I(0) , and GDP is integrated of order one i.e. I(1). The results of the cointegration test based on the maximum eigenvalue and

trace tests indicated the existence of cointegration between loans, deposits, and GDP. Therefore, the time series under consideration have a long run equilibrium relationship although they may be in disequilibrium in the short run.

Furthermore, the estimates of the VECM present the direction of Granger causality in both the short and long run. The long run causality test from the VECM indicated that causality runs from loans to deposits since the coefficient of the error term in the deposits equation was statistically significant and negative based on the standard t-test which means that the error term contributes in explaining the changes in deposits.

However, the coefficient of the error term in the loans equation was statistically insignificant which means that the error term does not contribute in explaining changes in loans. Therefore, there is unidirectional causality running from loans to deposits in the Iran in the long run.

IV. CONCLUSION

The goal of the paper was to investigate cointegration between M1 and M2 with rate of profit on bank deposit (interest rate) with the ARDL approach together the direction of causality in both the short and long run in order to test the endogeneity/ exogeneity hypotheses of money supply in the Iran

The results show that M1 and M2 is cointegrated with net claims on the government, net foreign assets, and rate of profit on bank deposit (interest rate). With respect to stability, the results show that the estimated relation is somewhat stable most especially with CUSUM test. The question, then, is what are the implications of these findings on policy formulation in Iran?

One, the result shows that there is cointegration among M2, NFA, RP, NGB and a major implication of using interest rate elasticity estimates from M2 function is that money is endogenous and argues that endogeneity of money matters for both short run comparative static macroeconomics and longer run macro dynamics. Second, the endogeneity of money means that attempts to control the economy through monetarist styled money supply rules and targets are likely fail. This suggests that policy authorities should look to other means of control. The notion that the supply of money is, or could be, carefully controlled as in Friedman's famous money supply growth rate rule is also rejected.

The endogeneity of money supply requires that causality runs from bank lending to deposits. This result indicates that loans cause deposits which support the endogeneity hypothesis. Furthermore, the findings showed the inability of the Iran central Bank to control money growth rate which confirms the presence of an endogenous money supply process in Iran.

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