Theoretical Considerations of the Endogenous Money Hypothesis:

The Turkish Experience

by

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Abstract

This paper aims at exploring the endogenous money hypothesis as this is implied by the Post Keynesian tradition. Turkey serves as the platform on which the undertaken empirical analysis is conducted. The inconclusive cointegration results obtained reflect the turbulent economic environment that Turkey has experienced over the last decades. The causal dimension however, appears to be in line with the Post Keynesian hypothesis.

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1.0 Introduction

The nature of money supply has been at the forefront of the academic debate over the last decades, with the endogenous money hypothesis receiving a lot of attention in terms of both theoretical exposition as well as empirical investigation. In Post Keynesians economics money supply is perceived to be endogenous[1].

As Kaldor and Trevithick, (1981) sustained, it is through bank lending that credit money comes into existence. Borrowing from banks creates deposits, i.e. bank money, which is turn when repaid cease to exist. The key element during this process is the interest rate which is charged on bank loans and paid on bank deposits.

The causal dimension as this is established on the basis of the above argument, i.e. from bank lending to bank deposits, renders central banks unable to have control over total borrowing and hence money stock

In this study, Turkey provides the basis on which an empirical investigation into the existing alternative views on the endogenous money hypothesis is undertaken. The rest of the paper is organised as follows: Section 2 exposes the dynamics of money in the Turkish economy for the last decades. Section 3 touches upon the alternative views surrounding the endogenous money hypothesis, while section 4 through econometric techniques provides empirical evidence on the underlying hypothesis. Finally, section 5 concludes.

2.0 The Dynamics of Money in the Turkish Economy. An Overview.

Prior to engaging in the theoretical exposition of the issues concerning the endogeneity of money it is imperative that we very succinctly touch upon the very dynamics of money pertaining to the Turkish economy.

The last cycle of what can be termed as Turkey's attempt to shape a modern economy closer to EU accession criteria, dates back to the 1980s. Turkey, up to that time would conform to the general description of a relatively closed economy following protective policies of import substitution industrialisation. During the early 1980s, total exports amounted to only 7% of GDP, the agrarian sector dominated economic activity, inflation averaged at 70% reflecting monetisation of public budget deficits and GDP per capita hovered around $1050. Annual growth averaged at 3.2% but given population growth at 2% this represented a performance below potential.

[INSERT TABLE 1]

An export promotion strategy coexisting with policies towards the gradual opening up of the economy to global competition and financial reform leading towards the liberalisation of international capital flows and the upgrading of the financial system were the major pillars of Turkey's new economic direction. In the mid 1990s, total exports had consolidated at 25% of GDP and their structure had shifted away from agrarian products and towards manufacturing goods that came to represent almost 80% of total merchandise exports and GDP per capita had tripled to around $3000 by 2000.

Over this period of intense change, a number of issues remained unresolved and often came to haunt the speed of the overall transformation. The inability to finance budget deficits in a non-inflationary manner was the key issue that cast a shadow on the macroeconomic outlook. A narrow tax base, limited domestic financial instruments, a growing dollarisation of assets and political inability to reign on public finances were forcing the resort to monetisation (reaching 3-5% of GDP) of public deficits (Anastasiadis 1992). The result was the establishment of a permanently high inflation plateau that could not allow for the sustainability of a stable exchange rate policy to

provide the nominal anchor for the economy. Hence, stop-go cycles remained a dominant characteristic maintaining an uncertain investment climate. The following graphs (1,2 and 3) provide a brief illustration of Turkish money dynamics:

[INSERT GRAPH 1]

A central aspect in the development of the money economy in Turkey was the empowerment of residents to hold foreign currency (FX) deposits (since 1985). This resulted in FX denominated assets coming to constitute around 50% of money supply. This process resulted in the gradual erosion of the monetary base (denominated in domestic currency) implying significant loss of segniorage for the government which in turn implied that the same public deficit would now require more advances from the Central Bank (money printing) for its financing (Rodrick 1991).

[INSERT GRAPH 2]

In the background, the government attempted to rely on loose exchange rate pegs to reign on inflation. However, fast currency appreciation, in the face of mounting inflationary pressures, usually also evident in rising external deficits would eventually erode confidence in the exchange rate regime. Soon government policy became predictable and investors would shift to domestic assets during appreciation and back to foreign assets when depreciation risks were visible introducing significant a speculative aspect into asset allocation.

The diagram below attempts to depict the typology of Turkish economic cycles over the 1990s using the analysis above:

[INSERT GRAPH 3]

Most notable economic cycles over the 1990s are those of 1991, 1994, 1999 and 2001. Quite characteristic was the crisis of the spring of 1994. It was triggered by a loss of confidence in the currency, which collapsed by 80% within a few months in

the presence of a high current account deficit, a rising public deficit and delays in the privatisation process. The result was triple-digit inflation and a crash in the booming stock market as a major asset reallocation away from domestic and towards foreign assets was taking place either in the form of FX-deposits or capital flight.

The other important crisis occurred in February 2001 with similar characteristics but this time triggered by external pressures (rising oil prices, dollar and international interest rates) combined with an overheating economy supporting a 6% external deficit and a fast appreciating currency in real terms. This time around the banking sector also found itself exposed to credit risk as many borrowers in foreign currency could not repay their debts. The currency collapse and inflationary pressures led to growth falling by 8% that year. Since then, significant progress has taken place and inflation has been at single digit figures (since 2004) with growth having recovered.

3.0 Views on Endogenous Money.

The pivotal role of the central bank as the key institution controlling the money supply is one of the tenets of the orthodox monetary approach. Thereby, increasing or reducing the quantity of the monetary base rests entirely at the discretion of such an edifice. According to the monetarist approach the central bank, by exogenously controlling the monetary base, can achieve the desired money supply target[2].

In contrast, the proponents of the endogenous money hypothesis envisage a totally different framework upon which they expound their theoretical arguments. It should be stressed however, that within this novel framework three different approaches have been put forward, namely the accommodationist view, the

structuralist view, and the liquidity preference view. At this point a brief exposition of the aforementioned approaches is deemed essential as these will set the tone of the analysis to follow.

More specifically, the focal point of the accomodationist view is that the central bank acts as the sole supplier of reserves and currency on demand and hence the one that sets the cost of short-term liquidity through overnight interest rates. As a result, depository institutions set their loan rates as a mark-up over these rates, and bank loans are offered to prospective borrowers. Short-term demand for bank loans in turn are thought to be determined by working capital finance (Moore, 1989). During the process of deposit creation, and deposit destruction, aggregate demand is also galvanised through net lending. Thereby, not only do rates charged on loans and deposits affect the growth of money, but aggregate income as well.

Fluctuations in money income cause changes in demand for banks loans which affects monetary growth. Similarly, bank loans create deposits which in turn are used to finance increases in aggregate demand (Kaldor and Trevithick, 1981).

The central bank is supposed to be setting a target interest rate which is in turn maintained at the desired level by a continual injection or withdrawal of reserves. The money supply and the monetary base are therefore 'perfectly endogenous, determined by the quantity of bank credit demanded, at the interest rate set exogenously by the central bank[3]' (Moore, 1998, p.176).

One of the key elements differentiating the accomodationist from the structuralist view lies in the nature of the money supply function. In particular, proponents of the structuralist approach contend that the supply function is upward sloping (Palley, 1996). It is also sustained that the monetary institution does not fully accommodate reserves demand by commercial banks, implying that interest rates

should be adjusted accordingly in the process. According to this view the central bank has an option of either targeting the monetary base or interest rates (Palley, 1998). In addition, more emphasis is put on the use of liability management by banks to obtain cheapest source of funding[4].

Despite the fact that the advocates of liquidity preference approach subscribe to the money endogeneity hypothesis, as well as acknowledge the platform on which both the srcucturalist and the accomodationists views are expounded upon, they are at odds with the notion that credit money can never be in excess supply. More specifically, accomodationists contend that without demand for money there won't be any supply, implying that there is no independent demand function for money (Moore, 1991; Kaldor, Trevithick, 1981).

Howells (1995), on the other hand, argues that such a contention may be flawed as individuals may generally have different liquidity preferences about the amount of money they wish to hold. According to him the accomodationists' view of no independent demand function should be carefully reconsidered unless there is an automatic mechanism ensuring that both supply and demand are matched[5]. He concludes however, that in the event where there is a mismatch between supply and demand, the interest rate assumes a significant role as the equilibrating mechanism.

4.0 Empirical framework

On the basis of the above exposition it is imperative that we establish a framework within which the economic variables interact. The causal dimension (i.e. unidirectional or bi-directional) will therefore provide the platform on which the econometric hypothesis will be set up.

In particular, according to the accomodationist approach, there will be a unidirectional causality from total commercial bank loans to the monetary base and the money supply. Moreover, the fact that borrowers determine their loan demands based on the expectations of income and the deposit creation through new loans used to finance increases in aggregate demand implies a bidirectional causality between money income and money supply.

The structuralist approach can be looked upon as a concoction of ideas from both the orthodox monetarist approach, implying a causality from the monetary base and the money multiplier to total bank loans and the accomodationist one, implying a causality from total bank loans to the monetary base[6]. In addition, the structuralist view on the relationship between money income and money supply coincides with the accomodationist one implying a bidirectional relationship. Finally, the use of liability management when loan demand increases will cause an increase in the money multiplier. Therefore, causality from bank loans to the money multiplier is envisaged.

According to the liquidity preference view, total bank loans will cause money supply. Central to this analysis is however the notion that the independent demand functions would condition the ability of loans to create deposits. In view of the latter, the implying causality runs from money supply to total bank loans.

4.1 Econometric methodology

For the econometric investigation annual time series data (which were later transformed to logarithms) from 1970 to 2003 were utilized for Turkey. The main source for our data is the IMF financial Statistics, DRI/McGraw-Hill and the Turkish Government (S.P.O).

It should be stressed that lower frequency data would have ensured greater precision but unfortunately, data unavailability was experienced for some of the variables so opting for annual data was the only choice.

According to Granger (1969) the implementation of Granger causality tests requires that the variables in question are stationary. Thereby, testing the variables for unit root is the first step in the undertaken analysis[7]. Next, provided that the variables turn out to be I(1) the error correction model (ECM) proposed by Engle and Granger (1987) will be used to test the long-run relationships[8].

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4.2 Emerging evidence: Unit roots and cointegration

Table 2 summarises the Phillips Perron (PP) tests for identifying the order of the integration of our variables. A quick inspection of the table indicates that for all variables the null hypothesis can not be rejected. In order to specify the order of integration of the non-stationary variables, we repeat the unit root tests on the first differences of each time series, the results of which are documented in the same table. On the basis of the results obtained, the null hypothesis for all variables is rejected. Therefore according to Phillips Perron test we can treat the underlying time series as I(1) variables[9].

[INSERT TABLE 2]

Given that we treat the variables as I(1) processes, it becomes possible to use cointegration methodology in order to test whether there is a long run relationship between the variables in question (Engle and Granger, 1987). In this study, we adopt the residual based cointegration analysis to test whether there is a cointegrating relationship between the variables in question. The resulting evidence is documented in the table below:

[INSERT TABLE 3]

4.3 Interpretation of Results

A quick inspection of the cointegration tests suggests that non of variables under scrutiny are cointegrated. In effect, the next step would be to test for short run evidence through pairwise Granger causality tests, the results of which are provided in table 4.

[INSERT TABLE 4]

On the basis of the evidence obtained, there appears to be a bi-directional causality between bank loans and money supply, as well as between money income and money supply, which is in line with the endogenous money hypothesis. In addition, the theoretical expositions of the proponents of both the accomodationist as well as the liquidity preference views are also bolstered up. The generated evidence however provides no support to the structuralist view as no causality was established between total bank loans and the money multiplier. Thereby, the notion that the use of liability management when loan demand increases will cause an increase in the money multiplier, has to be carefully reconsidered.

5.0 Concluding Remarks

Taking into account both the discussion of stylized facts and the econometric analysis, our main conclusions seem to be in line with the endogenous money hypothesis. The fact that the Turkish financial sector has not yet reached a level of full maturity implies that a long-term convergence has not yet been established. Hence, the fast changes that have been occurring particularly since the 1980s and the implied series of structural breaks explain to a great extent the inconclusive results of the cointegration analysis.

In the short-run analysis, the significant relationships obtained primarily stem from the fact that the development of the monetary sector in Turkey was a precondition for the materialization of a modern economic structure. The latter has been a key factor behind a more stable economic growth providing the feedback to the further evolution of the monetary sector. This is reflected in the prevalence of the accomodationist and liquidity preference approaches.

Finally, despite the fact that the undertaken analysis does provide significant evidence in support of the endogenous money hypothesis for the case of Turkey, It should be stressed however that more research effort is required in order to gain a stronger insight into the dynamics of the relationship and feedback between money and the rest of the economic structure.

Table 1. Economic Indicators (Turkey: 1980-2005)

	80-85	85-90	90-95	95-00	2000	2001	2002	2003	2004	2005
GDP growth	3.2	4.3	4.5	4.4	7.23	-7.9	7.7	5.8	8.9	4.5
Inflation	64	59	61	55	55	54.5	45	25.7	9.3	9.1
Unemployment Rate	13	12	11.8	11.2	11.5	13.1	12.5	11.3	11.2	10.8
Govt.Balance (% GDP)	-10,2	-5	-6.2	-4.1	-11.6	-11.2	-19.7	-11.2	-7.1	-5.5
Current Account (%gdp)	-4,1	-2.9	-1.2	-1.1	-5	1.8	-1.1	-2.9	-5.2	-7.8
$ GDP per capita	1009	1350	2010	2800	3100	2090	3200	3600	3950	n.a.
External Debt (%GDP)	n.a.	n.a.	n.a.	n.a.	59.7	89.6	75.4	59.5	51.1	45.7
Interest Rate (Lending)	n.a.	n.a.	n.a.	n.a.	47.2	74.7	50.4	31	24	17.5

Sources: IFS, SPO, DRI

Table 2: Unit Root Tests (Phillips Perron test)

Variable	Levels (test statistics)	First difference (test statistics)
bl	0.838	-6.756*
ms	1.546	-8.106*
mb	1.809	-4.166*
mm	-0.553	-7.155*
y	1.977	-4.953*

Notes: where, *bl*, *mb, ms, mm,* and y, stand for bank loans, monetary base, money supply (M3), money multiplier, and nominal money income respectively.
(*) indicates significance at 1%,

Table 3: Cointegration Tests

y_t	x_t	Test statistic	
bl	*ms*	-1.673	
ms	*bl*	-1.687	
bl	*mb*	-0.456	
mb	*bl*	-0.675	no cointegration
bl	*mm*	-1.154	
mm	*bl*	-1.034	
y	*ms*	-1.987	
ms	*y*	-1.899	

Table 4. Pairwise Granger Causality Tests

Null Hypothesis	F-stat.	Prob.
Dbl does not Granger Cause *Dms*	2.42	0.05*
Dms does not Granger Cause *Dbl*	3.545	0.04*
Dbl does not Granger Cause *Dmb*	0.147	0.86
Dmb does not Granger Cause *Dbl*	0.579	0.57
Dbl does not Granger Cause *Dmm*	0.253	0.779
Dmm does not Granger Cause *Dbl*	0.601	0.56
Dy does not Granger Cause *Dms*	8.192	0.00*
Dms does not Granger Cause *Dy*	3.713	0.04*

Note: (*) indicates significance at the 5% level. The prefix D denotes first difference.

Graph 1. *Money Supply & Components(%GNP)*

Legend: Money Supply (ToT) — Money Supply (TL) — Money Supply (FX)

Graph 2. *Money Dynamics*

Legend: Monetary Base (%gdp) — Money Multiplier — FX-Money (%Money Suuply) RHS

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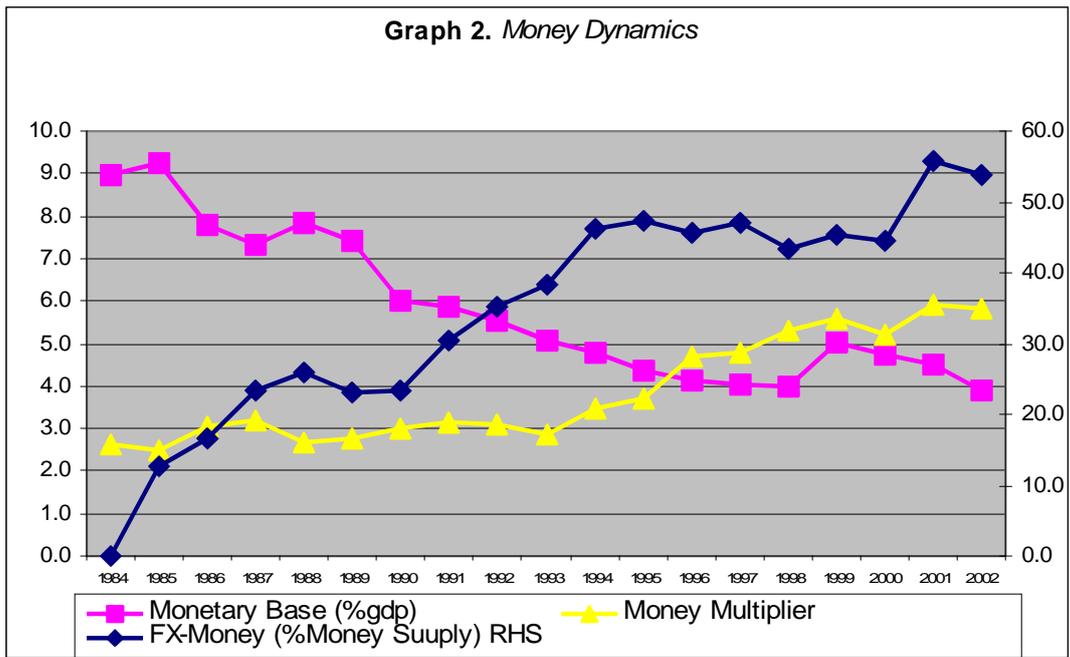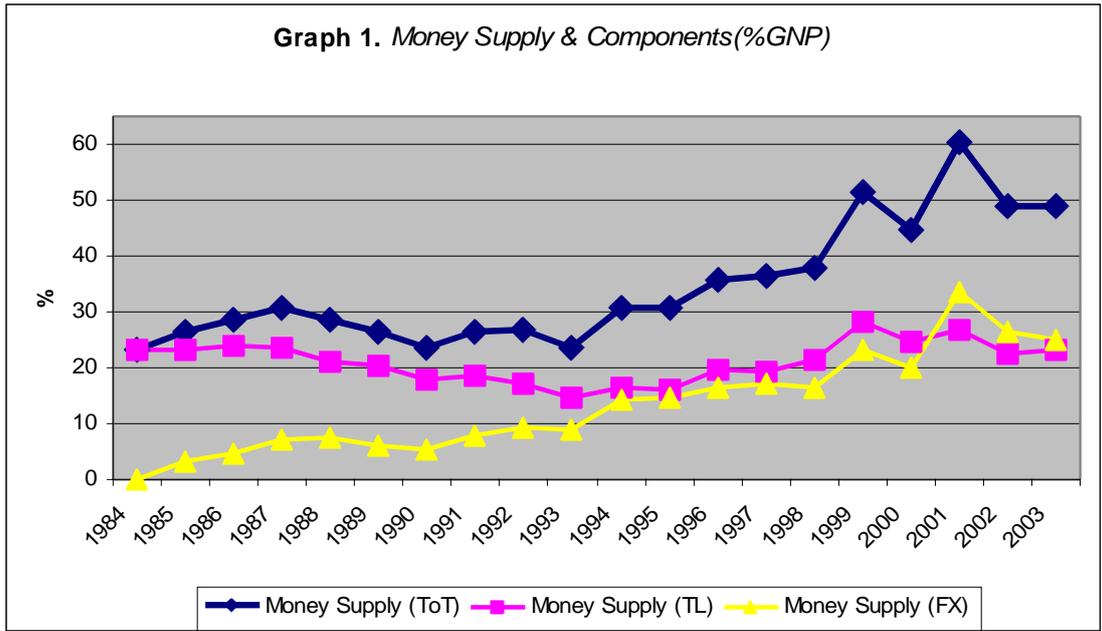
Graph 3. *Typology of Economic Cycles*

Legend: Real Exch.Rate — Inflation(wpi) — FX-Money/Money (RHS)

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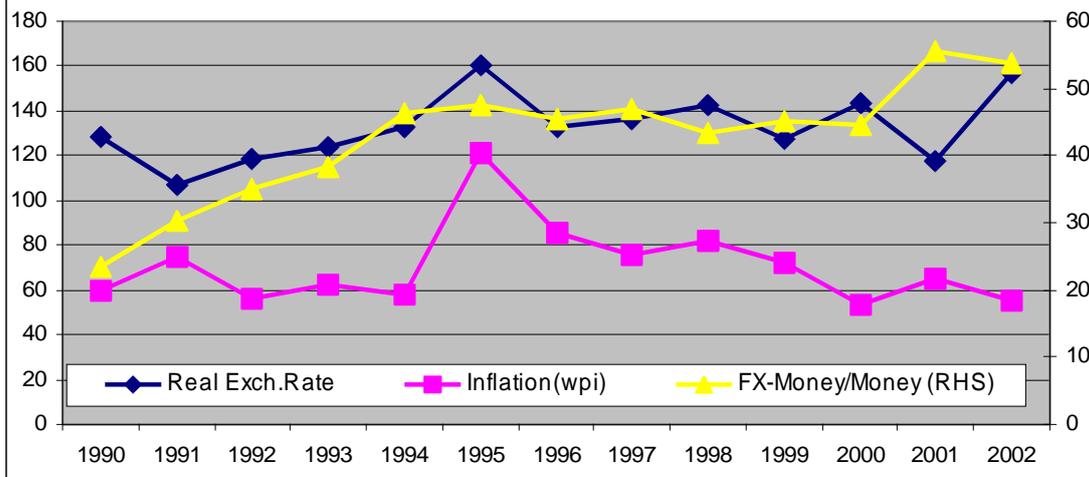
Endnotes:

[1] From the little number of studies done on the endogenous money hypothesis it is worth noting the ones by Moore, (1988), Palley, (1994), Howells and Hussein, (1998), Nell, (2000-2001), Vera, (2001).

[2] Such a contention assumes that the money multiplier i.e. the ratio of deposits to the monetary base, is empirically stable (Moore, 1988).

[3] In view of the scant evidence on the relationship between interest rates and level of bank lending, a perfectly interest elastic money supply function is envisaged (Moore, 1989).

[4] Pollin, (1991) sustains that liability management may not create an adequate supply of reserves to meet demand.

[5] Kaldor and Trevithick (1981) envisage the automatic repayment of loans to be the appropriate mechanism.

[6] Palley, (1998) and Pollin, (1991) maintain that the central banks retain some control over the supply of reserves.

[7] The Phillips Perron (PP) test was deemed as appropriate as it has more power than ADF one (Davidson and McKinnon, (1993). The Optimal lag length was determined by the Newey-West technique.

[8] Assuming that $y_t = b\,x_i + v_t$, is the resulting long-run model, the PP unit root test will be applied on the residuals v_t to determine if the long-run model is cointegrated. If there is a long-run relationship, then the following ECM will be considered: $\nabla y_t = b_0 + \sum_{i=1}^{p} b_1 \nabla y_{t-i} + \sum_{i=1}^{q} b_2 \nabla x_t + v_{t-1}$

Both the AIC and SIC will be used to determine the optima lag length. If the variables are not cointegrated, i.e. there is no long-run relationship, the standard Granger causality test will be adopted to test for causality in the short-run.

[9] It should be stressed that for the PP test bandwidth selection is based on Newey - West.

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