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FINANCIAL FRICTIONS AND MONETARY POLICY OF INDIA

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Abstract: *The New Keynesian framework adopted in Clarida, Gali and Gertler (1999) give adequate importance to monetary transmission mechanism. Yet, they consider the monetary transmission to operate without any frictions in the market. The assumption implies that monetary signals are passed without any disturbance in the financial sector and then from the financial sector to the real sector. Individual agents then react to these signals adjusting their portfolios accordingly. In this paper, we explore whether there are financial frictions in the transmission.*

Keywords: *Financial Frictions, Monetary Transmission mechanism, Financial Sector, Real Sector*

Some may argue that looking at frictions in the financial markets may be a non issue because if one achieves stable empirical relationship in the analysis of monetary transmission mechanism, the path through which that has been achieved is non consequential. However, frictions in the path may indicate important decision points.

Looking at this issue from the classical interest rate transmission mechanism, the efficacy of this mechanism lies in the causation that runs from a change in nominal interest rate to a change in real interest rate finally having an impact on real variables and inflation. Assuming that people do not suffer from money illusion, the economic agents are going to bring about a reallocation of their assets based on changes in real interest rates. We have looked at the transmission mechanism in the framework provided by Lucas where he considers a household as the unit for making consumption and investment decisions and this has helped us understand important decision making points when it comes to Indian monetary policy transmission path.

In this paper we are trying to explore whether there are financial frictions present when it comes to the monetary policy transmission mechanism of India. We have made use of the traditional VAR approach to look at the quarterly data of the past decade of the monetary policy parameters in India. The underlying idea being that the time lags witnessed in the transmission path may indicate frictions at the respective points. A review of the VAR results in terms of targets and objects of monetary policy

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throws important deductions regarding the frictions that may be present in the transmission mechanism of the monetary path of India. The results clearly indicates that frictions exist in the transmission of monetary policy signals from the financial sector to the real sector in India.

A SURVEY OF LITERATURE

Poole's analysis has set the tone for such an enquiry by relating the choice between exogenously setting a monetary quantity and exogenously setting an interest rate to the relative magnitudes of the unpredictable elements of the non bank public's behavior in the market for goods and services and the market for financial assets, respectively. Poole concludes that uncertainties in the market for financial assets warrants a policy of fixing interest rate while uncertainties in the market for goods and services renders fixing money stock as a better instrument of monetary policy. The underlying idea being that if there are any disturbances to portfolio behavior, interest rate adjustments can bring them in line and thus save the impact of such disturbances on income. The implicit assumption is that household units in the market for financial assets arrange their portfolio as per the signals of interest rate. Also implicit is the acceptance of the fact that uncertainties in both the goods and the financial asset markets causes friction in the monetary transmission mechanism. The question that we then ask is how to understand the behavior of the households regarding buying of financial assets in particular and other goods in general.

The basis for looking at financial frictions in particular comes from the literature on limited participation models. When the central bank conducts an open market operation, it is only a limited number of financial intermediaries who get directly impacted. These intermediaries may not be directly connected to all other economic agents and this is one major reason for the frictions that we are talking about in the financial sector.

Stephen D Williamson brings this aspect out nicely in his paper, "Limited Participation and the Neutrality of Money". He says, "…when the Fed conducts an open market operation, the economic agents on the receiving end of this transaction typically are large financial institutions that are not directly connected to all other economic agents in the economy through exchange. Initially, an open market operation can affect only the financially interconnected sector of the economy—mainly banks and other financial intermediaries and the economic agents who transact frequently with these institutions. In contrast to what happens in a currency reform, a typical open market operation will, in the short run, have different effects in the financially interconnected sector of the economy from what happens in the decentralized sector of the economy. This difference will be important for short-run movements in interest rates, aggregate output, and the distribution of wealth across the population."

Robert E Lucas Jr. (1990) gave the framework for this kind of analysis by looking at the smallest unit i.e., the household's behavior. He has given a construct of a

household which comprises of three members, the worker, the shopper and the financial transactor. The financial transactor makes the decision regarding buying of financial assets post the decisions made by the worker and the shopper. Lucas has shown that open market shocks does not impact the division of cash balances among these agents, nor do they impact the price of the goods. He shows that the price of one period bonds will be the only variable responding to these shocks. In this paper, Lucas, though concedes that open market operation that induces a liquidity effect will also alter the distribution of wealth, yet the complications that may be induced by lingering distributional effects discouraged him from enlarging the scope of this analysis to these distributional effects.

The premise for such a kind of analysis is that at any time the economy's money is distributed over different markets and it takes time to move funds from one market to another. This inherent friction has been termed by Lucas as liquidity constraints and he analyzed them in a cash in advance framework. Lucas has treated agents of these different markets as members of one family, sharing a household utility function.

Lucas's contention was that liquidity constraint is only going to affect the price of bonds. However, Fuerst in his paper, "Liquidity, Loanable Funds, and Real Activity", argues that the liquidity effect and the loanable funds effect are linked. Fuerst explains the idea with the example of a situation in which larger than anticipated monetary injection has happened. Under such a situation, he contends that such a situation will leave the borrowers more liquid that anticipated. This will happen due to the fact that injections have added to his volume of loanable funds and thus this will redistribute purchasing power in their favor. Since this leaves the borrowers relatively cash rich, it stimulates real demand for the goods and services they purchase. The opposite effect would be experienced by the non borrowers. Fuerst has used the Lucas methodology of a family sharing a household utility function. This helps in modeling cash injections which are asymmetric within family but symmetric across families. Thus, the liquidity and loanable funds effect can be seen in identical family environment.

Fuerst shows that monetary injections has compositional effects i.e., large injections will shift current real activity in the direction of the sectors most closely linked to the financial sector and away from the sectors less closely linked. The frictions in the monetary transmission mechanism is related to the extent of connectedness of a particular sector to the financial sector. The transmission of the monetary signals are smoother to connected sectors rather than the disconnected ones.

Grossman and Weiss have tried to study the transmission mechanism creating real effects through wealth redistribution associated with open market operations. This is also a cash in advance model but the frictions are caused due to spatial difference between the agents at the bank and those not at the bank at the moment of open market operations. The authors justify their argument by assuming that all current period receipts accrue as interest earning deposits. Thus, those agents not at the bank implicitly lend their current period income to those making withdrawals. Hence a

decline in interest rates redistributes wealth from creditors to debtors. This in turn causes real effects on consumption of goods.

Motivation to study frictions in the transmission mechanism also comes from the 'time inconsistency' literature on monetary policy pioneered by Kydland and Prescot which emphasized the time gaps in decision making causing frictions in the monetary transmission mechanism. Interestingly, a study done by Petrevski, Sergi and Bogoev on 17 central and east European economies found that after introducing dynamics in the empirical model and controlling for some macroeconomic and institutional variables, the significant relationship between central bank independence and inflation disappeared. This study attests to the importance of studying frictions in the monetary policy transmission mechanism.

The Framework and Methodology

We have adopted Lucas' Framework to look at the transmission mechanism. In the limited participation framework given by Lucas, a typical household consists of three members, the worker, the shopper and the financial transactor. The worker is responsible for collecting the endowment bestowed on it on account of its provision of factor service to the productive activity in the economy. The shopper buys whatever consumption goods are required by the household and the cash that remains is utilized in the end by the financial transactor to buy financial assets. Lucas has assumed that the only financial asset available is a government bond which is auctioned off in the securities market and we also stick to this assumption.

Each household is aiming to maximize its utility function with respect to it's consumption and purchase of bonds. In this simplistic framework, Lucas has arrived at a stationary equilibrium in which goods and bonds markets clear and utility of the household is maximized. The equilibrium is arrived at by assuming that the shock in the financial asset markets are announced after the households have made allocations of cash between the uses of consumption and investment. These shocks are assumed to be random and independently and identically distributed. Thus, by implication, the price of the financial assets will be the only variable affected by these shocks.

However, as Neil Wallace has suggested, if we bring about a change in timing of security trading to the next period, where cash is received by the financial transactor as the remuneration for holding the security from the last period to the current period, this may result in consumption also getting impacted. If indeed such is the case then impact on consumption should be observed with a lag. If we fail to observe such a thing, then it may point to certain frictions in this path. This would then be in line with earlier works which have attributed this friction to spatial and temporal reasons. In this framework, the frictions can be due to both these reasons.

In the model given by Lucas, use of bellman equation gives us the stationary equilibrium. This dynamic programming model looks at only the last period by making an assumption that all the past periods have yielded the most efficient path given

different states under different time periods. As we wish to consider two time periods, we take the help of a vector autoregressive model. This framework allows us to have an understanding of the direction of causality. This understanding helps us in looking at the Indian households in terms of their decisions regarding financial assets and real assets. Taking two time periods helps us to look at the impact of shocks on consumption as well. In Lucas' framework, this will give an indication of the behavior of the three agents in the Indian Households.

We have tried to understand this phenomenon with respect to shocks given by the Indian monetary policy system in terms of announcement of interest rates. We have looked at a Vector Autoregressive Framework in which we look at interest rates, money supply and GDP of India. We have considered the data for repo rates in India as announced time to time by the RBI. We have considered the quarterly average of repo rates along with the quarterly GDP and an average measure of quarterly levels of M3 in India in the respective quarters. The data covers the quarterly periods from year 2002 to 2013. The levels of M3 gives us an idea of liquidity shocks in the economy. The Indian economy's liquidity is shocked by the levels of foreign exchange inflows and this is reflected in the levels of M3.

Data Analysis and Conclusions

The results of the Vector Autoregression are presented in the table in appendix and it helps guide our focus on frictions in the Indian monetary policy transmission mechanism. All the variables are considered in log form and in real terms.

The reaction of the repo rates to the level of money in the economy comes out as statistically significant both with one quarter lag and two quarters lag. The price of the financial assets seems to be seamlessly getting affected by the levels of liquidity in the economy and atleast in this leg of the monetary transmission mechanism, there does not seem to be any frictions even with two quarters lag.

The level of money is getting affected significantly by repo rates both with one quarter lag and two quarter lags. There seems to be an adjustment of financial assets and money stock/liquidity in response to the signals given by each other in the past. Such significant reactions also prove that these adjustments are happening in a frictionless manner.

However, when it comes to the last leg of monetary transmission in terms of its impact on GDP, we do not witness statistically significant effects. Repo rates and stock of money, both fail to affect the GDP even if we look at two period lags. The lack of transmission of signals at this stage indicates frictions in the transmission of monetary policy to the real sector of India.

These results seems to be partially in line with Fuerst's conclusions that frictions in the monetary transmission mechanism depends on the extent of connectedness to the financial sector. The study of transmission mechanism by Grossman and Wiess in

terms of creating wealth effects do not seem to be holding in the case of monetary policy transmission mechanism in India. In Lucas' framework, the only thing getting affected by liquidity is the price of the financial asset. The real assets on the other hand seem to be disconnected with the financial sectors showing frictions in this path. In terms of a typical household in Lucas' framework, the financial transactor does not influence consumption and production decisions.

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Appendix

Vector Autoregression Estimates
Date: 03/11/14 Time: 15:19
Sample (adjusted): 3 44
Included observations: 41 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	LN_REAL_REPO	*LN_REALGDP*	*LN_REALMON*
LN_REAL_REPO(-1)	1.234001	0.516761	0.281353
	(0.23515)	(0.40266)	(0.10726)
	[5.24764]	[1.28336]	[2.62319]
LN_REAL_REPO(-2)	-0.426386	-0.719893	-0.284028
	(0.22997)	(0.39378)	(0.10489)
	[-1.85413]	[-1.82817]	[-2.70788]
LN_REALGDP(-1)	-0.187355	0.765640	0.141913
	(0.10157)	(0.17393)	(0.04633)
	[-1.84452]	[4.40203]	[3.06318]
LN_REALGDP(-2)	0.306440	-0.669461	-0.056922
	(0.12238)	(0.20955)	(0.05582)
	[2.50406]	[-3.19474]	[-1.01980]
LN_REALMON(-1)	-1.414434	1.116904	0.940687
	(0.39517)	(0.67667)	(0.18024)
	[-3.57928]	[1.65059]	[5.21901]
LN_REALMON(-2)	1.254810	-0.840737	0.005509
	(0.38657)	(0.66195)	(0.17632)
	[3.24598]	[-1.27010]	[0.03124]
C	0.574554	5.588945	-0.240325
	(1.00425)	(1.71963)	(0.45805)
	[0.57212]	[3.25009]	[-0.52467]
R-squared	0.892721	0.693226	0.988368
Adj. R-squared	0.865901	0.616532	0.985460
Sum sq. resids	0.097685	0.286422	0.020322
S.E. equation	0.063798	0.109244	0.029099
F-statistic	33.28600	9.038896	339.8741
Log likelihood	45.29288	28.61919	69.62855
Akaike AIC	-2.470509	-1.394786	-4.040552
Schwarz SC	-2.146705	-1.070983	-3.716748
Mean dependent	1.289514	8.405038	8.189102
S.D. dependent	0.174219	0.176414	0.241319
Determinant resid covariance (dof adj.)		2.92E-08	
Determinant resid covariance		1.35E-08	
Log likelihood		148.8626	
Akaike information criterion		-8.249202	
Schwarz criterion		-7.277792	