

Money Demand in DSGE Models

Our New Keynesian model has the price level, i.e., the amount of money that must be turned over to purchase a good. It also has the nominal wage rate, the amount of money a firm must pay for a unit of labor. In addition, it has a nominal rate of interest, the amount of money you get in the next period if you commit one unit of money in the current period. Yet, there is no supply or demand for money in the conventional presentation of the model (for an exception, see Christiano, Eichenbaum and Evans' 2005 JPE paper). This question explores an interpretation of what may at first seem to be an odd state of affairs.

The interpretation is that money supply and demand in fact *are* in the model, but that to write out the equilibrium conditions it is not necessary to be explicit about these things. The idea is that money demand enters separably from the various decisions taken by the agents in the model and that monetary policy is an interest rate rule in which policy makers do not make any explicit reference to the money supply. In reality, money demand is in fact not separable from decisions. Still, the New Keynesian literature, in ignoring money demand, is implicitly taking the position that the non-separabilities that do exist are not quantitatively important. Various numerical exercises to evaluate this have found support for this position.

1. Consider the standard graphical representation of the undergraduate text book IS-LM model. Show that if monetary policy is an interest rate rule that feeds back in a positive way on output (so it's an upward sloped line in the interest rate, output diagram), then the LM curve plays no role in the analysis of inflation, interest rates and output. That is, money demand and money supply can be completely ignored, as is done in the standard presentation of the New Keynesian model.
2. Do the analog of (1) in the New Keynesian model presented in class. In particular, suppose that people get utility from money in a way that is represented by including an additive term, $\phi \log(M_{t+1}^d/P_t)$, in the period t utility function. Here, M_{t+1}^d means the quantity of money demanded at the end of period t (i.e., the start of period $t+1$), by the household. In addition, modify the household budget constraint so that there is an extra term, $M_{t+1}^d - M_t^d$, on the spending side the the budget

constraint. Finally, suppose that on the income side of the budget constraint, there is a monetary transfer provided by the government. The transfer is a payment made to everyone, in the amount $x_t \bar{M}_t$, where \bar{M}_t is the per-household stock of money in the economy at the start of period t and x_t is the money growth rate: $\bar{M}_{t+1} = x_t \bar{M}_t$. There is a money market clearing condition, according to which in equilibrium $\bar{M}_t = M_t^d$ in each period. Show that the equilibrium conditions of the model derived in lecture are completely unaffected by these monetary considerations. In particular, the parameter ϕ does not enter in the conditions. Derive the Euler equation associated with the household's money demand decision. Show that we get the usual sort of money demand equation, where money demand is a negative function of the nominal rate of interest and an increasing function of GDP .