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The case for a financial approach to money demand

Xavier Ragot*

CNRS and Paris School of Economics, PSE, 48 Bd Jourdan, 75014 Paris, France

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ABSTRACT

The distribution of money across households is much more similar to the distribution of financial assets than to that of consumption expenditures. This is a puzzle for theories which directly link money demand to consumption. This paper shows that the joint distribution of money and financial assets can be explained in a heterogeneous-agent model where both a cash-in-advance constraint and financial adjustment costs, as in the Baumol–Tobin literature, are introduced. Studying each friction in turn, one finds that the financial friction explains more than 78% of total money demand.

1. Introduction

Why do households hold money? Various theories of money demand answer this question by focusing on the transaction role money plays in goods markets (e.g., shopping-time and cash-in-advance (CIA) models), transaction costs in financial markets (Baumol, 1952; Tobin, 1956) or simply assuming a liquidity role for money, as in models with money in the utility function (MIUF). In this paper, microeconomic data are used to quantify the contribution of the previous frictions to money demand. The shape of the distribution of money across households is indeed close to that of the distribution of financial wealth and dissimilar to that of consumption expenditures. Using a heterogeneous agent model, it is shown that reproducing such a money distribution allows quantifying the contribution of the frictions on the goods market and those in financial markets. In addition to its theoretical interest, the ability to reproduce the distribution of money is crucial for the assessment of the real and welfare effects of inflation.

In more detail, in both Italian and US data, the distribution of money (M1) is similar to that of financial wealth, and much more unequally distributed than that of consumption expenditures (as measured by the Gini coefficient, for example). In the US, the Gini coefficients are around .3 for the distribution of consumption expenditures across households, .5 for that of income, .8 for that of net wealth and .8 for that of money in 2004. This stylized fact, further detailed below, holds for different definitions of money, various time periods, and after controlling for life-cycle effects. This distribution of money cannot be understood in standard macroeconomic models where money demand is modeled only via frictions on the goods markets, such as CIA, MIUF or shopping-time considerations. In these models, real money balances are proportional to consumption, and the distributions of money holdings and consumption should be equally distributed among households (i.e. have the same Gini coefficient). As shown below, this property holds even when more general transaction technologies in the goods market are considered, which may produce scale economies.

* Correspondence author. Tel.: + 33 1 43 13 63 00; fax: +33 1 43 13 63 10.
E-mail address: xavier.ragot@gmail.com

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In this paper, it is shown that a realistic joint distribution of consumption, money and financial assets can be reproduced when a friction in financial markets is introduced in addition to a transaction friction in goods markets. The friction in the *goods* market considered in the paper is a standard cash-in-advance constraint stating that household must hold money to consume. The friction in *financial* markets follows the Baumol–Tobin literature: money holdings can be freely adjusted, but there is a fixed cost of adjusting the quantity of financial assets. The initial Baumol–Tobin model considered a cost of going to the bank and thus modeled the choice between currency and bank deposits. Following many others, a fixed cost of adjusting the financial portfolio is here introduced in order to model the choice between money (including bank deposits) and other financial assets. This portfolio adjustment cost creates a financial motive to hold money: households hold monetary balances to smooth consumption without paying the fixed cost to adjust their financial portfolio. They go only infrequently to the financial market to replenish their money account, which is the standard result of the Baumol–Tobin model.[1]

This portfolio choice together with the cash-in-advance constraint is introduced into an economy where infinitely lived agents face uninsurable income fluctuations and borrowing constraints, a framework often described as the "Bewley–Huggett–Aiyagari" environment. In this type of economy, households choose between two assets with different returns, but also different adjustment costs, in order to smoothen uninsurable idiosyncratic income fluctuations. This type of economy does not introduce life-cycle considerations and is thus well-suited for the analysis of heterogeneity within generations. The model is calibrated to reproduce the idiosyncratic income fluctuations faced by US households, as estimated by Heathcote (2005). The average inflation rate and the average return on the safe financial asset are their average values in 2004 in the US, a date at which the shape of the money distribution is available for US households. The adjustment cost and the severity of the cash-in-advance constraint are chosen to match the average quantity of money held by households in the US economy and the considerable inequality in money holdings.

The main result of this paper is that the model generates a realistic joint distribution of money and financial assets, when both frictions on financial and goods market are introduced. Removing in turn the two frictions, one finds that the friction on the goods market is necessary to explain why many households hold a small amount of money. The friction on financial market is necessary to explain why a few households hold large quantities of money. This last friction is thus necessary to generate the inequality in money holdings. The reasoning behind this result is that households go infrequently to financial markets to replenish their money holdings because of the adjustment cost. But as the opportunity cost of money holding is high, households decumulate rapidly their money holdings, and wait before going back to financial markets. As a consequence, a few households temporarily hold a large quantity of money, which contributes to money inequality. A stochastic cash-in-advance constraint is also introduced to generate a precautionary demand for money, as in Telyukova and Wright (2008). One still finds that a sizeable portfolio adjustment cost is necessary to reproduce the money distribution.

Finally, removing the transaction constraint on the goods market and the participation cost on the financial market, one finds that the transaction motives account for at most 22% of the total money stock, whereas the financial motives account for 78%, motivating the title of this paper.

To my knowledge this paper is the first to reproduce a realistic distribution of money across households as an equilibrium outcome. It can be related to two strands of literature: the first is the Baumol–Tobin literature and the second is the heterogeneous-agent literature applied to monetary economics.

First, the Baumol–Tobin model has recently been used to explain money demand in quantitative models. Alvarez et al. (2002) introduce both a fixed transaction cost and a cash-in-advance constraint in a general-equilibrium setting. To simplify their analysis of the short-run effect of money injections, they assume that markets are complete and, consequently, that all agents hold the same financial wealth. This paper departs from the complete market assumption to match the money and wealth distribution. Bai (2005) revisits quantitatively the welfare cost of inflation in a Baumol–Tobin framework. Alvarez and Lippi (2009) use Italian household data to estimate a model where households face a cash-in-advance constraint, a fixed transaction cost and a stochastic cost of withdrawing money, which generates a precautionary demand for money. They show that this stochastic component improves the outcome of the model as compared to the deterministic Baumol–Tobin framework. In their analysis they take household cash expenditure as given to be able to tightly parameterize their model with data about cash management of Italian households. This paper instead tries to generate a realistic distribution of consumption, wealth and money in a simpler model, taking the income process as given. Finally, Kaplan and Violante (2011) use a Baumol–Tobin model in a heterogeneous-agent setting to analyze the effect of fiscal stimulus payments. They find that this model can reproduce a realistic marginal propensity to consume out of announced fiscal transfers. Although they do not consider the money distribution, their estimation of the financial participation cost is consistent with the value used in the paper. This paper is also related to the empirical work which has estimated money demand using household data. Erosa and Ventura (2002) introduce a fixed adoption cost of the technology to participate in financial markets, in addition to a shopping-time constraint. They estimate the adoption cost via various economic and econometric models using US household data. Attanasio et al. (2002) estimate a shopping-time model *à la* McCallum and Goodfriend (1987), using Italian household data.

[1] This friction alone generates a positive price for money in equilibrium, as the early works of Heller (1974) and Chatterjee and Corbae (1992) have shown.