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Optimal choice of monetary policy instruments in an economy with real and liquidity shocks

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Abstract

Faced with real and nominal shocks, what should a benevolent central bank do, fix the money growth rate or target the inflation rate? In this paper, we make a first attempt at studying the optimal choice of monetary policy instruments in a micro-founded model of money. Specifically, we produce an overlapping generations economy in which limited communication and stochastic relocation creates an endogenous transactions role for fiat money. We find that when the shocks are real, welfare is higher under money growth targeting; when the shocks are nominal and not large, welfare is higher under inflation targeting. While under inflation targeting, it is always optimal to pursue an expansionary policy, it is never optimal to do so under money growth targeting.

JEL classification: E31; E42; E63

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1. Introduction

How should a monetary authority decide whether to use the money stock or the interest rate as its policy instrument of choice? Using a stochastic IS-LM model,

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with reduction in variability of aggregate output as the yardstick, Poole (1970) was the first to pose this 'instrument problem'. His advice was clear and precise: when the shocks are real in nature, fix the money supply; if the shocks are monetary, fix the interest rate. This prescription continues to guide monetary authorities around the globe even today and remains to date among the most influential policy counsels in monetary economics.

Surprisingly, though, Poole's instrument problem has received almost no attention in formal micro-founded models of money, a lacuna we attempt to remedy in this paper.[1] To that end, we produce a two-period lived pure-exchange overlapping generations model in the tradition of Townsend (1987) where limited communication and stochastic relocation create an endogenous transactions role for fiat money.[2] At the end of each period a fraction (deterministic or random) of agents is relocated (the 'movers') to a location different from the one they were born in and the only asset they can use to 'communicate' with their past is fiat money. This allows money to be held even when dominated in rate of return. The other asset is a commonly available linear storage technology with a fixed real return. The 'stochastic relocations' act like shocks to agents' portfolio preferences and, in particular, trigger liquidations of some assets at potential losses. They have the same consequences as 'liquidity preference shocks', and motivate a role for banks that take deposits, hold cash reserves, and make other less liquid investments. Depending on agents' risk aversion, the banks' cash reserves are sensitive/insensitive to the real return on money.

We study two variants of this model, one in which there are real shocks (the young-age endowment of the agents is stochastic), and one where the fraction of agents relocating is *itself* random (liquidity preference or monetary shocks). In either case, banks can promise a real return to only the non-movers. For the movers, the banks can promise an amount of money (paid out of the bank's reserve holdings) but not the real return on it. To see this, consider the case of endowment shocks. Here, the bank cares about next period's endowment because the latter will potentially influence that period's money demand and hence the price level and therefore affect the return on money between this period and the next. But next period's money demand depends on the following period's endowment, and so on. We assume that all agents know the distributions of the real or monetary shocks and form expectations about the return on money conditional on these distributions. We focus solely on long run stationary equilibria under which agents expectations are coordinated across time, i.e., expectations of one generation are validated by the behavior of the next and so on ad infinitum.

[1] Stern and Miller (2004) argue that questions regarding optimal monetary policy are best conducted in dynamic, stochastic general equilibrium models of money that incorporate a rationale for why money is held even when dominated in return by assets of similar risk profile. Poole (1970) satisfies all these desiderata except for the return dominance issue and the fact that his criterion for optimality is not agents' welfare. It also deserves mention that our work is not directly comparable to that of Poole's because monetary disturbances have no direct effect on output variability in our setup.

[2] The random relocation with limited communication model was popularized by Champ et al. (1996) and has been used to investigate monetary policy issues in Paal and Smith (2004), Smith (2002), Haslag and Martin (forthcoming), among others.