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Monetary policy and distribution ☆

Stephen D. Williamson [a,b,c,*]

[a] Department of Economics, Washington University in St. Louis, St. Louis, MO 63130, USA
[b] Federal Reserve Bank of Richmond, USA
[c] Federal Reserve Bank of St. Louis, USA

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ABSTRACT

A segmented markets model of monetary policy is constructed, in which a novel feature is goods market segmentation, and its relationship to conventional asset market segmentation. The implications of the model for the response of prices, interest rates, consumption, labor supply, and output to monetary policy are determined. As well, optimal monetary policy is studied, as are the costs of inflation. The model features persistent nonneutralities of money, relative price effects of increases in the money supply, persistent liquidity effects, and a negative Fisher effect from a money supply increase. A Friedman rule is in general suboptimal.

1. Introduction

In this paper, a model of the monetary transmission mechanism is constructed, based on market segmentation. This builds on ideas in the literature on financial market segmentation and limited participation, but includes an important new element—goods market segmentation. Goods market segmentation, and its relationship to financial market segmentation, is critical in this model in determining the effects of monetary policy actions on prices, interest rates, consumption, labor supply, and output.

Why do we need another model of the monetary transmission mechanism? Some might argue that New Keynesian sticky price models, as represented for example in Woodford (2007), provide an adequate account of the key short-run nonneutralities of money and perform well in guiding monetary policy. There are good reasons to doubt these views however. First, Bils and Klenow (2004) find evidence on price-setting behavior that seems inconsistent with New Keynesian models. Second, Golosov and Lucas (2007) show, in an explicitly formulated and calibrated menu-cost model, that the real effects of monetary policy are quantitatively unimportant. Third, it seems important in analyzing the monetary transmission mechanism and monetary policy to capture the key frictions in exchange that make money matter. New Keynesian models do not model these frictions and are therefore at odds with modern monetary theory (Wallace,

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* Corresponding author at: Department of Economics, Washington University in St. Louis, St. Louis, MO 63130, USA. Tel.: +1 314 935 9283.
E-mail address: swilliam@artsci.wustl.edu

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1998; Lagos and Wright, 2005). Thus it seems important to explore nonneutralities of money that arise for reasons other than price stickiness, in models with explicit frictions that matter for monetary exchange.

The key ideas at work in the model are the following. Some economic agents are *connected* to financial markets, in that they frequently trade financial assets, and are on the receiving end of the first-round effects of changes in monetary policy. In practice, these connected agents are banks and other financial intermediaries and the consumers and firms that trade frequently with these financial intermediaries. *Unconnected* economic agents trade infrequently in financial markets, and are affected by monetary policy only indirectly. In practice, of course, there is a varying degree of connectedness across economic agents in the economy, but in our model we assume only two types of agents, who are at the two extremes. Connected economic agents are assumed to trade in each period in financial markets, while unconnected economic agents never do.

In contrast to a Friedman helicopter drop, which distributes money uniformly across economic agents, outside money injected into the economy by the central bank is initially received just by connected economic agents. How does this money eventually become dispersed through the economy? The new money will find its way to unconnected economic agents by way of transactions, and since unconnected agents are not trading in financial markets, such transactions must involve the exchange of goods. That is, the rate at which the new money finds its way from connected to unconnected agents is determined by the frequency with which the two groups trade in goods markets. An important element of our theory is that connected agents are more likely to trade with connected agents, and similarly for unconnected agents. The more economic agents tend to trade with their own types (connected or unconnected) the slower will be the process by which the new money is ultimately distributed across the population.

In the short run, a central bank money injection results in a redistribution of wealth towards connected economic agents from the unconnected ones. An important feature of this model is that, once an increase in the money supply occurs, whether it was anticipated or not is irrelevant for the effects on real and nominal variables. The fact that goods markets are segmented implies that relative prices change in the short run. That is, in the markets in which connected economic agents trade more frequently there will be increases in prices that are initially larger than those observed in unconnected markets. Then, over time, as the size of the money stock decreases in connected markets and increases in unconnected markets, the connected market prices fall and the unconnected market prices rise. Connected market prices initially overshoot their long-run values, while unconnected market prices adjust gradually to the increase in the aggregate money stock. The changes in the relative prices of goods that occur in the short run as a result of a money injection bear some similarity to what occurs in menu-cost models (e.g. Golosov and Lucas, 2007). However, the friction that permits these relative price changes is quite different. Prices are perfectly flexible in our model, but goods markets are segmented.

A central bank money injection increases the dispersion in consumption across the population. As the behavior of consumption of connected economic agents and the goods prices faced by these agents determines asset prices, we will observe a liquidity effect—a decrease in the nominal interest rate. This liquidity effect is obtained for two reasons here. First, when the money injection occurs and consumption increases for connected agents, these agents expect their consumption to fall over time, so the real interest rate falls, just as in many other models of segmented asset markets. Second, there is a negative Fisher effect in our framework, which is novel in the literature. That is, because connected market prices overshoot, the average market price of goods faced by a connected agent falls over time after the money injection occurs, so that a connected agent expects deflation, which contributes to the drop in the nominal interest rate.

What about the real effects of a central bank money injection on labor supply and output? When a money injection occurs, a connected (unconnected) agent faces an effectively higher (lower) expected real wage. Labor supply responses to these changes in expected real wages roughly net out across the population and give a negligible effect on aggregate labor supply and output. However, a central bank money injection also leads to a short run increase in uninsurable real wage risk for all economic agents. Conditions are established under which this yields an increase in aggregate labor supply and output, so that agents self-insure in the face of increased real wage risk by working harder.

In addition to the dynamic responses of prices, interest rates, consumption, labor supply, and output, to a one-time increase in the money stock, the consequences of long-run money growth are also studied in this model. Given the relative price distortions that result when the aggregate money supply is not constant over time, a Friedman rule for monetary policy is not optimal. The welfare losses from inflation are potentially large at low inflation rates. A version of the model is also examined with stochastic money growth, and equilibrium solutions are computed. As this illustrates, the virtues of the model include analytical and computational tractability.

The main purpose of this paper is to explore the theoretical properties of this model, but it is important to provide support for the theory in terms of its plausibility and consistency with basic empirical evidence. Three key elements of the theory are financial market segmentation, goods market segmentation, and the link between the two. First, it seems obvious that financial market participation, in the United States for example, is limited. Evidence from the Federal Reserve System's Survey of Consumer Finance indicates that 12.7% of families did not hold a checking account in 2001, only 21.3% held publicly tradeable stocks, and only 17.7% held mutual funds (see Aizcorbe et al., 2003). Clearly, a large fraction of the U.S. population sees no initial effect on their portfolio of assets when the Fed intervenes in financial markets. Second, goods markets are clearly segmented, due to spatial frictions and differences in consumption across income and wealth classes. Third, financially connected sellers tend to sell to financially connected buyers, for example financial intermediaries more frequently sell services to financially connected consumers. Thus, reality seems consistent with the key frictions at work in this model.