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Floor systems for implementing monetary policy: Some unpleasant fiscal arithmetic ☆

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ABSTRACT

An increasing number of central banks implement monetary policy via a channel system or a floor system. We construct a general equilibrium model to study the properties of these systems. We find that a floor system is weakly optimal *if and only if* the target rate satisfies the Friedman rule. Unfortunately, the optimal floor system requires either transfers from the fiscal authority to the central bank or a reduction in seigniorage payments from the central bank to the government. This is the unpleasant fiscal arithmetic of a floor system. When the central bank faces financing constraints on its interest expense, we show that it is strictly optimal to operate a channel system.

1. Introduction

Over the past years, a monetary policy framework known as a channel or corridor system has been implemented by several central banks and is being considered by other central banks.[1] In this system, a central bank operates two facilities: a lending facility and a deposit facility. At the lending facility, the central bank stands ready to supply money overnight to financial intermediaries at a given borrowing rate, i_ℓ, against collateral. At the deposit facility, intermediaries can make overnight deposits at the central bank to earn the interest rate $i_d < i_\ell$, where the spread is called the *interest-rate corridor* or *channel*. This simple framework immediately raises three questions. First, why provide these facilities? Second, why choose a positive corridor as opposed to a zero corridor? Third, what is the optimal value of i_d? We construct a general equilibrium model of standing facilities to help answer these questions.

Why do we consider a general equilibrium model? The typical answers to the questions above are based on partial equilibrium analysis, which we find incomplete. The usual answer to the first question is that the standing facility provides an

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[1] Channel systems are widely used in practice; see Bernhardsen and Kloster (2010). Versions are, for example, implemented by the Bank of Canada, the Bank of England, the European Central Bank (ECB), the Reserve Bank of Australia, the Swiss National Bank, the Reserve Bank of New Zealand, and the U.S. Federal Reserve System.

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outside option for intermediaries who, for whatever reason, were unable to execute desired trades in the money market. In this sense, the central bank is "completing" the money market by providing liquidity insurance to intermediaries. However, whenever insurance is provided, there may be incentive problems that lead to inefficient outcomes. Thus, is it optimal to provide this insurance? The answer to this question requires a general equilibrium model with a well-defined objective for the central bank.

The typical answer to the second question is that a positive corridor gives intermediaries an incentive to trade amongst themselves rather than accessing the standing facilities. By exploiting gains from trade, intermediaries move the market rate, i_m, inside the corridor; i.e., $i_d < i_m < i_\ell$. This allows the central bank to control the money market rate by either changing the width of the corridor or shifting it with the goal of keeping the money market interest rate close to its target.[2]

A *floor system* is a special case where $i_d = i_m$, which can easily be achieved by setting $i_d = i_m = i_\ell$, i.e., by setting the channel width to zero. This would give the central bank perfect control of the money market rate. Thus, controlling the market rate cannot be the reason for a positive spread. So, is there another reason for doing so?

Finally, in general but more importantly for a floor system, what determines the optimal value of i_d? The typical answer is that i_d is set at the "target" interest rate. But what determines that rate? Are there restrictions that affect the feasible set of target rates? Again, the answers to these questions require a general equilibrium model.

We use a Lagos–Wright monetary model with financial intermediation to study the allocation of money/reserves. In this framework, we assume that some intermediaries are randomly excluded from trading in the money market (i.e., exogenous market segmentation). We then use our model to answer the three questions posed above.

We show that by choosing $i_d = i_m = i_\ell$, i.e., with the use of a floor system, the central bank can effectively eliminate market segmentation and "complete" the money market. We find that this is the optimal policy if the central bank can implement the Friedman rule, which involves paying interest at the deposit facility that compensates for the time cost of holding reserves.

If the Friedman rule cannot be implemented, then it is optimal to do two things. First, set the deposit rate as high as feasible (get as close to the Friedman rule as possible). Second, run a corridor system by setting $i_d < i_\ell$. By increasing the borrowing rate, the central bank "penalizes" intermediaries, who do not have sufficient reserves if they are excluded from the money market. As a result, intermediaries demand more reserves, which increases the real value of money/reserves and welfare. This is a pecuniary general equilibrium effect that is absent in partial equilibrium analysis.

Why might it be infeasible for the central bank to implement the Friedman rule? Under this rule, banks are satiated with reserves and they do not need to borrow from each other or the central bank; yet, they will deposit excess reserves at the central bank to earn the deposit rate. How is this interest expense financed? The central bank can 1) print money, 2) use income from its asset holdings, or 3) receive transfers from the fiscal authority. Most of the existing analysis ignores this question and assumes that all of these options are sufficient. We argue in this paper that this is not a trivial issue and clearly affects the choice of a floor or corridor system.

Our results take into account the possibility that central banks may be unable, or are unwilling for political reasons, to incur the interest expense required by the optimal floor system. We argue that this possibility is relevant for the following reasons:

(i) Using taxes to finance interest payments to banks may not be politically acceptable, since other areas of government spending may be affected. As Feinman (1993) documents, the Federal Reserve long requested the power to pay interest on reserves only to be denied this on budgetary grounds. To illustrate the political opposition, consider the following Congressional testimony by a U.S. Treasury official on the proposal to pay interest on reserves:

> "As a general matter we are sympathetic to many of the arguments put forth by the proponents, particularly with regards to monetary policy. At the same time, however, we are also mindful of the budgetary costs associated with this proposal which would be significant. The President's budget does not include the use of taxpayer resources for this purpose. At this time, then, the Administration is not prepared to endorse that proposal."[3]

(ii) Interest payments on reserves are quantitatively important. The Federal Reserve's Large Scale Asset Purchases (LSAP) generated $1.5 trillion in reserves at the end of 2012, and they are projected to be over $2.5 trillion if the latest LSAP continue to 2014. Analysis of the Fed's balance sheet by Federal Reserve economists suggests that the interest expense for locking up reserves in the banking system could top $60 billion for a couple of years under a plausible scenario of rising interest rates.[4] In this scenario, the analysis also shows that remittances to the Treasury would be zero for more than five years. To highlight the potential political backlash from such large payments, note that according to Federal Deposit Insurance Corporation (FDIC) data, the combined net income of the top 10 U.S. banks in 2010 was less than $55 billion.

[2] In theory, there is no need for direct central bank intervention to control the market rate of interest, since money market participants will never mutually agree to trade at an interest rate that lies outside the interest-rate corridor. In practice, central banks still conduct open market operations to adjust the quantity of central bank money in circulation. In "normal" times, they do so to accommodate, for example, seasonal fluctuations in the demand for central bank money. In "exceptional" times, in response to severe aggregate shocks they do so to restore the functioning of money markets.

[3] March 13, 2001: Special House Hearing related to H.R. 1009. Statement by Donald V. Hammond, Acting Under Secretary for Domestic Finance, Department of the Treasury. The proposal was not approved.

[4] See Carpenter et al. (2012). For an other recent estimate of the potential costs with probabilities attached to it, see also Christensen et al. (2013).