



Alternative central bank credit policies for liquidity provision in a model of payments[☆]

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Abstract

I explore alternative central bank policies for liquidity provision in a model of payments. I use a mechanism design approach so that agents' incentives to default are explicit and contingent on the credit policy designed. In the first policy, the central bank invests in costly enforcement and charges an interest rate to recover costs. I show that the second-best solution is not distortionary. In the second policy, the central bank requires collateral. If collateral does not bear an opportunity cost, then the solution is first best. Otherwise, the second best is distortionary because collateral serves as a binding credit constraint.

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1. Introduction

A primary role of a central bank is to facilitate a safe and efficient payments system. One source of inefficiency in payment systems is a potential shortage of liquidity. Central banks often respond by providing liquidity through the extension of credit. Because of this role, a central bank must manage its exposure to the risk that an agent does not repay. Some central banks, such as the European Central Bank, manage this risk by requiring borrowers to post collateral. Others, such as the Federal Reserve in the U.S., charge an explicit interest rate on credit and limit the amount any particular agent can borrow. In this paper, I explore these alternative credit policies in a theoretical model of payments and offer a rationale for why some central banks may choose one credit policy over another. I do this in a mechanism design framework, paying particular attention to the moral hazard issues associated with the repayment of debt that alternative credit policies aim to mitigate.

The payment systems most relevant to this paper are large-value payment systems which are mainly intraday, interbank payment systems. Many large-value payment systems are operated by central banks and are often real-time gross settlement (RTGS) systems. In an RTGS system, payments are made one at a time with finality during the day. Examples of RTGS systems include Fedwire operated by the Federal Reserve in the U.S. and TARGET operated by the European Central Bank in the EMU.¹ Because payments are made one at a time, liquidity is needed to complete each transaction. If participants do not have enough liquidity to make a payment at a particular point in time, they can typically borrow funds from the central bank by overdrawing on an account with the central bank, which they then pay back by the end of the day. The central bank faces a trade-off between supplying this intraday liquidity at little or no cost to enhance the efficiency of the system and accounting for moral hazard issues associated with the extension of credit. Of fundamental interest in this paper is how a central bank should design a credit policy for the provision of liquidity in an RTGS system to improve efficiency while dealing with moral hazard associated with debt repayment.

The main contribution of this paper is a framework with which to study the alternative credit policies of central banks. The key features of the framework are (i) default decisions of agents are endogenous, and (ii) mechanism design. The first is important to rigorously introduce a moral hazard problem that arises when debt is extended. The second is a useful approach to evaluate what good outcomes are achievable under alternative credit policies taking into account agents' incentives to default.

This framework is applied to a model of payments that is similar to that of Freeman (1996). Such a model captures some key features of large-value payment systems. These features are (i) fiat money is necessary as a means of payment, (ii) there is a need to acquire liquidity (in the form of fiat money) during the day to make such payments, and (iii) money is also necessary to repay debts by the end of the day. These three features provide an endogenous role for an institution such as a central bank to provide liquidity to facilitate payments.

An important abstraction in Freeman's original model, however, is that there is costless enforcement that exogenously guarantees that debts are repaid. Such an abstraction has led to conclusions by Freeman (1996), Green (1997), Zhou (2000), Kahn and Roberds

¹TARGET is the collection of inter-connected domestic payment systems of the EMU that settle cross-border payments denominated in Euros.

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