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Payment instruments and collateral in the interbank payment system

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Abstract

This paper presents a three-period model to analyze why banks need bank reserves despite the presence of other liquid assets, such as Treasury securities. The model shows that if a pair of banks settle bank transfers between them without the central bank, a hold-up problem occurs when they bargain over the terms of settlement. This result stems from the confidentiality of bank-transfer requests, which makes it necessary for a depositor to retain an outside option to withdraw cash to enforce a bank-transfer request in a deposit contract. In light of this result, the large value payment system operated by the central bank can be regarded as an implicit interbank settlement contract to prevent a hold-up problem. In this contract, the central bank is characterized as the custodian of collateral. Bank reserves correspond to the balances of liquid collateral that banks submit to the central bank. This result can explain the rate-of-return dominance puzzle as well as why the central bank must replace liquid assets with bank reserves. The optimal implicit contract features a type of deferred net settlement in which the value of bank reserves transferred between banks is smaller than the net value of bank transfers to be settled.

JEL classification: E41; E42

Keywords: Bank reserves; Large value payment system; Interbank money market; Rate-of-return dominance puzzle; Privacy

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1. Introduction

Banks receive depositors' requests to send bank transfers every day. They settle bank transfers among them by remitting bank reserves, i.e., current-account balances at the central bank, to one another. The daily transfer of bank reserves in a country tends to be as large as a sizable fraction of annual GDP.[1] This observation indicates that banks hold bank reserves not only to satisfy a reserve requirement, but also to make interbank payments. In fact, several countries have abandoned reserve requirements.[2] Banks in these countries still use bank reserves to settle bank transfers.

Banks can obtain bank reserves by giving up liquid securities, such as Treasury securities, to the central bank through open market operations and standing liquidity facilities.[3] In theory, however, any liquid asset should be able to serve as a payment instrument. Thus, banks' use of bank reserves poses two questions: Why do banks need bank reserves despite the presence of other liquid assets? Why does the central bank need to replace liquid assets with bank reserves?

These questions are related to the legal restrictions theory of the demand for money by Wallace (1983), which discusses why banknotes issued by the central bank can co-exist with Treasury securities, despite having a dominated rate of return.[4] This paper brings similar questions to bank reserves. Given the fact that banks can easily transfer Treasury securities among them, this paper presents a parsimonious model featuring a pair of banks with divisible assets that are transferable between banks at no physical transaction cost.

In the model, depositors deposit cash, i.e., an instrument for retail payment, at banks, because only banks can invest cash in wholesale assets with higher yields. It is costly to convert these assets into cash before maturity. Nonetheless, depositors can request bank transfers to pay for goods and services they buy, which saves banks from converting their assets into cash.

Given this environment, the model features the confidentiality of bank-transfer requests due to depositors' preference for privacy. This preference prohibits depositors from relying on the court to enforce bank-transfer requests, as doing so requires the revelation of their requests. Therefore, depositors must retain an outside option to withdraw cash, which can be paid anonymously, as a threat to enforce bank-transfer requests. This threat, however, causes a hold-up problem: when two banks bargain over the settlement of bank transfers between them, the bank sending more bank transfers ends up paying a premium on top of the net value of bank transfers it sends, because it faces a greater threat of cash withdrawals.

This premium can be interpreted as interest in the interbank money market. This interpretation is based on the literature on the over-the-counter (OTC) interbank money market, such as Ennis and Weinberg (2013), Afonso and Lagos (2015), and Bech and Monnet (2016), which characterizes each transaction in the market as bilateral bargaining.

Banks can avoid a hold-up problem if they can write a contract to specify the terms of settlement of bank transfers in advance. The confidentiality of bank-transfer requests, however,

[1] For example, the average daily transfer of bank reserves in the U.S. was 16.4% of annual GDP in 2016.

[2] As of 2010, these countries included Australia, Canada, Denmark, Mexico, New Zealand, Norway, Sweden, and the U.K. See Gray (2011) for more details.

[3] Depositing banknotes at the central bank is no longer a channel for new reserve supply, as banks can obtain new banknotes only by withdrawing bank reserves in the current practice.

[4] Wallace (1983) argues that even though the large denominations and nonnegotiability of Treasury securities are inconvenient for retail payments, private financial institutions should be able to issue small-denomination bearer notes backed by Treasury securities. He concludes that it is necessary to consider legal restrictions on such intermediation to explain the co-existence between banknotes and Treasury securities.