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Banking with nominal deposits and inside money[☆]

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ABSTRACT

Bank runs in the literature take the form of withdrawals of demand deposits payable in real goods, which deplete a fixed reserve of goods in the banking system. That framework describes traditional bank runs based on currency withdrawals as occurred historically in the US and more recently in developing countries. However, in a modern banking system, large withdrawals typically take the form of electronic payments of inside money, with no analog of a depletion of a scarce reserve from the banking system. In a new framework of nominal demand deposits repayable in inside money, pure liquidity-driven bank runs do not occur. If there were excessive early withdrawals, nominal deposits would hedge the bank and flexible monetary prices in the goods market would limit real consumption. The maturity mismatch of short term liabilities and long term assets is not sufficient for multiple equilibria bank runs without other frictions. A key role of the bank is to ensure optimal real liquidity, which allows markets to optimally distribute consumption goods through the price mechanism.

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1. Introduction

In this paper, nominal demand deposits that are repayable in inside money are introduced to a Diamond and Dybvig (1983) framework. Pure liquidity-driven bank runs do not occur, and consumers receive the optimal consumption allocation. In a frictionless setting, these nominal deposits are Pareto improving to real demand deposits. The results show that with nominal deposits and inside money, the mismatch of short term liabilities and long term illiquid assets does not alone explain self-fulfilling bank runs. This implies that additional frictions are needed to produce runs. The results also show that a key role of the bank is to ensure the optimal amount of real liquidity, which a market

[☆] The views expressed in this paper are those of the author and do not necessarily reflect the views of the Federal Reserve Bank of New York or the Federal Reserve System.

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does not do. But with the optimal real liquidity chosen by the bank, a market does distribute consumption goods optimally through the price mechanism to consumers.

A nominal deposits framework contrasts with the standard real deposits framework in the literature. Starting with Diamond–Dybvig, banks pay withdrawals of deposits in real goods. Excessive early withdrawals of deposits are initially triggered due to various causes in the different strands of the literature, including multiple equilibria following Diamond–Dybvig and asymmetric information about assets following Chari and Jagannathan (1988) and Calomiris and Kahn (1991). Regardless of the trigger, excessive withdrawals deplete a fixed reserve of liquid real goods available to be paid out from the banking system. Because demand deposits are modeled as fixed promises of goods, payments to withdrawers cannot be rationed. Long term investments have to be inefficiently liquidated to provide short term payouts. The bank will not be able to pay future withdrawals, so all depositors try to withdraw immediately. Even if the bank is otherwise fundamentally solvent, a run can occur in the real deposits framework because of the fragile liquidity structure of the bank's real short term liabilities and long term assets.

The literature describes bank runs that occurred historically in the US and in recent decades in developing countries, where bank deposits were withdrawn in outside money (currency) or had a real value because of a pegged exchange rate or gold standard backing. Gorton (1988) and Friedman and Schwartz (1963) show that during banking crises in the US, the ratio of currency to deposits increased. This implies that depositors withdrew currency and stored it outside of the banking system, corresponding to bank run models in which real goods are withdrawn from the banking system. Allen and Gale (1998) and Smith (2003) cite the withdrawals of currency from the banking system during these historical bank runs as what their models explain. Diamond and Rajan (2005) state that their real deposit model most closely resembles the gold standard era in the US, with an inflexible value of money, and the recent banking crisis in Argentina, with deposits repayable in dollars that could be withdrawn from the country. Contrasting the nominal and real models highlights two properties of bank deposits that are fundamental in addition to the asset-liability maturity mismatch for understanding traditional bank runs: bank deposits were redeemed for currency or had a real value.

Nominal deposits payable in inside money may better describe a modern banking system and economy, in which bank deposits and assets are primarily denominated in domestic currency with a floating exchange rate value. Large bank withdrawals are typically not converted to currency that is stored outside the banking system, but rather take the form of electronic payments of inside money for the purchase of goods or financial securities on markets.¹ There is no correspondence to the real-deposits bank run literature of a depletion from the banking system of a scarce reserve. This paper points out that unless currency is withdrawn and stored outside of the banking system, bank reserves are not drained from the banking system in a closed economy absent central bank intervention. To explain liquidity runs, frictions in addition to the asset-liability mismatch are needed, such as problems in the interbank market. These frictions need to be studied within a nominal deposits framework to understand modern banking liquidity crises.

In the model, the bank initially lends inside money to entrepreneurs who store and invest goods and then sell them on the goods market. If depositors run the bank by making excessive early withdrawals to purchase goods, an abundance of money to buy goods drives the price up in the early period. The bank's short term deposit withdrawals increase in nominal value, but the bank is hedged against the real cost of excessive early withdrawals since the price level increases. The bank borrows the excess funds it paid out that are received by the entrepreneur selling goods, requiring no liquidation of long term loans and illiquid investments. Higher prices in the goods market limit the real consumption received by early purchasers and save goods for those who wait to withdraw, regardless of how many other late consumers withdraw early. Depositors face lower relative prices at the later

¹ An electronic withdrawal is much more practical and timely than a costly and risky physical withdrawal of a large sum of currency, especially if there is an imminent run on a bank. Demirguc-Kunt et al. (2006) show that in contemporary times, aggregate bank deposits do not significantly decline during times of financial distress, especially in developed countries and even in many less-developed economies. This suggests that currency is not withdrawn from the banking system in any critical amount in modern economies. Skeie (2004) examines nominal deposits allowing for withdrawals of currency, which may be stored outside of the banking system, and also withdrawals of inside money paid within a clearinghouse system of banks.

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