



# Money, financial stability and efficiency <sup>☆</sup>

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## Abstract

Most analyses of banking crises assume that banks use real contracts but in practice contracts are nominal. We consider a standard banking model with aggregate return risk, aggregate liquidity risk and idiosyncratic liquidity shocks. With non-contingent nominal deposit contracts, a decentralized banking system can achieve the first-best efficient allocation if the central bank accommodates the demands of the private sector for fiat money. Price level variations allow full sharing of aggregate risks. An interbank market allows the sharing of idiosyncratic liquidity risk. In contrast, idiosyncratic (bank-specific) return risks cannot be shared using monetary policy alone as real transfers are needed.

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## 1. Introduction

Most models in the banking literature (e.g., Diamond and Dybvig [15]; Chari and Jagannathan [12]; Jacklin and Bhattacharya [21]; Calomiris and Kahn [9]; Allen and Gale [2,3]; Diamond and Rajan [16,17]) treat banking as a real activity with no role for fiat money. Following Diamond and Dybvig [15], consumers' liquidity preference is modeled as uncertainty about their time preference for consumption. Liquid assets are modeled as a storage technology. A deposit contract promises a depositor a fixed amount of consumption depending on the date of withdrawal. Thus, a crisis can arise when a large number of consumers decide to withdraw their deposits from the banking system, because the demand for goods is greater than the banks' limited stock of liquid assets.

While "real" models have provided valuable insights into the nature of financial fragility, they do not capture important aspects of reality, such as the role of fiat money in the financial system. In practice, financial contracts are almost always written in terms of money. This fact has important consequences for the theory. Because the central bank can costlessly create fiat money in a crisis, there is no reason why the banking system should find itself unable to meet its commitments to depositors (see, e.g., Buiter [8]).

In this paper, we develop a model, based on Allen, Carletti and Gale [1], henceforth ACG, in which fiat money is issued by the central bank. Deposit contracts and loan contracts are denominated in terms of money and money is used in transactions. In other words, money is both a unit of account and a medium of exchange. In contrast to most of the banking literature, which is reviewed below, we show that the combination of nominal contracts and a central bank policy of accommodating commercial banks' demand for money leads to first-best efficiency. This result holds when there are aggregate liquidity and asset return shocks and also when there are idiosyncratic liquidity shocks.

There are three dates and, at each date, there is a single good that can be used for consumption or investment. Assets are represented by constant returns to scale technologies that allow the consumers' initial endowment of the good to be transformed into consumption at the second and third dates. The short-term asset is a storage technology. The long-term asset requires an investment at the initial date and yields a random return at the final date. There is a large number of ex ante identical consumers, each of whom is endowed with one unit of the good at the initial date. At the second date, a random fraction of consumers discover they are early type and want to consume only at the second date while the remaining consumers are late type and want to consume only at the third date.

We start by characterizing the first-best allocation as the solution to a planner's problem. The planner invests the consumers' endowments in a portfolio of short- and long-term assets and distributes the asset returns to the early and late consumers at the second and third dates. The portfolio is chosen before the realization of the aggregate state, which consists of the fraction of early consumers and the return on the risky asset. The consumption allocation is determined after the state is realized and is therefore state contingent.

Our first main result is to show that the planner's allocation can be implemented in a decentralized economy, where there are three types of institutions, a central bank, commercial banks, and firms. At the initial date, the central bank makes money available to the commercial banks on an intraday basis at a zero interest rate. The banks make loans to the firms, which in turn

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