



# Financial contagion and the role of the central bank

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## Abstract

We investigate the role of a central bank (CB) in preventing and avoiding financial contagion. The CB, by imposing reserve requirements on the banking system, trades off the cost of reducing the resources available for long-term investment with the benefit of raising liquidity to face an adverse shock that could cause contagious crises. We argue that contagion is not due to the structure of the interbank deposit market, but to the impossibility to sign contracts contingent on unforeseen contingencies. As long as incomplete contracts are present, the CB may have a useful role in curbing contagion. Moreover, the CB allows the banking system to reach first-best allocation in all the states of the world when the notion of incentive-efficiency is considered. If the analysis is restricted to constrained-efficiency, the CB still avoids contagion without, however, reaching first-best consumption allocation. The model provides a rationale for reserve requirements without the presence of fiat money or asymmetric information.

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## 1. Introduction

Various theoretical interpretations have been proposed in order to give a rationale for financial contagion. Financial systems seem to be particularly vulnerable to systemic risk given their characteristics: the structure of bank balance sheets, the network of exposure

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among financial institutions, and the character of financial contracts. Although a general paradigm has not yet emerged, we have a better understanding of the propagation of shocks in the banking and payment system.<sup>1</sup> In this paper, we focus the attention on financial institution linkages, in particular the interbank deposit market, that are able to generate the possibility of contagion. In this context, we analyze the possible role for the central bank (henceforth CB) in preventing and avoiding bank crises and contagion.

From the early contribution by [Diamond and Dybvig \(1983\)](#), there is a shared view of banks as providers of liquidity. Banks, in this context, are ‘pools of liquidity’ and their existence is not rooted in the presence of information asymmetries in credit markets.<sup>2</sup> However, the Diamond–Dybvig model treats the whole banking industry as a single entity. In reality there are many banks in different regions, and problems arising in one bank can spread through the entire banking system. Financial contagion can be induced by an information-based mechanism. Difficulties in one bank may cause depositors to suspect that the whole bank industry is under pressure. For example, [Jacklin and Bhattacharya \(1988\)](#) argue that bank runs are triggered by asymmetry between the banks’ knowledge about its depositor’s liquidity needs and the depositor’s information about the bank’s asset. [Chen \(1999\)](#) argues that information externalities are important in causing contagious bank runs, since they force depositors to respond to noisy information such as failures of other banks. However, financial contagion is possible even without the presence of asymmetric information.

[Allen and Gale \(2000\)](#) provide an explanation of financial contagion as a phenomenon that emerges in the banking system of a multi-region economy. Contagion can be the equilibrium outcome in which, after the distress of a region due to an adverse shock on agents’ preferences, there is the possibility of a spillover in other regions because of the presence of cross-holding interbank deposits. The interbank deposit market is able to provide insurance to the different regions against asymmetric liquidity needs, thus allowing the economy to reach first-best allocation in a decentralized setting. However, this arrangement is vulnerable to financial contagion if the unexpected liquidity shock occurs. Then we can ask the following question: Is there any instrument that is able to avoid contagion in the most efficient way? We show that the CB could offer a solution.

The intervention of the CB takes the form of reserve requirements, which are a fraction of the amount of the bank’s deposits. The reserve requirements imposed on the banking system imply that less resources can be allocated in long-term productive activities. However, the reserves give the opportunity for the CB to face the adverse liquidity shock. Then the problem of the CB is to choose the optimal fraction of reserve requirements that, on the one hand, ensures enough liquidity in case of an aggregate liquidity shortage occurs and, on the other hand, does not divert too many resources from profitable investment opportunities.

The intervention of the CB allows the decentralized banking system to reach first-best allocation when contingent contracts are considered. Indeed, when there is no shortage of aggregate liquidity, the imposition of reserve requirements delivers the efficient consumption allocation, making the payment to early (late) consumers higher (lower) than what the decentralized banking system alone would offer. When the unexpected shortage of aggre-

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<sup>1</sup> See [Rochet and Tirole \(1996\)](#), [Allen and Gale \(2000\)](#), [Freixas et al. \(2000\)](#), and [Dasgupta \(2004\)](#).

<sup>2</sup> The alternative view of banks as agents who provide delegated monitoring services is due to [Diamond \(1984\)](#) and [Williamson \(1986\)](#).

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