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Financial Crises in Emerging Market Economies

Contagious bank failures in a free banking system

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Abstract

This paper develops a model of an unregulated banking system based around a private clearing house arrangement. Whilst such a system may dominate one with a public safety net in reducing moral hazard in lending and therefore the scope for individual bank insolvency, it also increases the likelihood of contagious bank failures following a systemic shock or an aggregate liquidity shortage. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

An increasingly influential view on banking regulation holds that:

(1) the proliferation of bank failures over the past two decades is caused to a large extent by 'safety-net' regulations put in place during the great depression to avert banking panics, and that

(2) the only way to regain financial stability is to remove these protections and let the banking system operate with minimal regulatory intervention,

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(3) protection against systemic shocks can be provided more efficiently through private institutional arrangements such as clearing houses (see e.g. Calomiris, 1999).

In this short paper we shall examine more closely the last point by considering equilibria in an unregulated banking sector, which may be vulnerable to contagious bank runs. We base our analysis on a model developed in Aghion et al., (1999).

2. Our model

The model is a variation of Diamond and Dybvig (1983) and Postlewaite and Vives (1987) with multiple banks. It has four periods and it allows for $N \geq 2$ banks, each with the same mass 3 of depositors. At date $t = 0$, each depositor deposits $I = 1$ in their local bank. This deposit (plus interest if any) can be withdrawn at any subsequent date $t \in \{1, 2, 3\}$. As in Diamond and Rajan (1998) a fraction 1/3 of depositors wants to withdraw an amount $I = 1$ from the bank at each date $t \in \{1, 2, 3\}$ to invest it in a better project (offering a private gross return of $B > 1$). A depositor with a better investment opportunity at date t is referred to as a type-t depositor. At date $t = 0$ depositors do not know their type. They only learn whether they are of type t at date $t \in \{1, 2, 3\}$ (this is strictly true only for type $t = 1, 2$, since type $t = 3$ is bound to learn her type by elimination at date $t = 2$).

Banks offer deposit contracts $\{d_1, d_2, d_3\}$, where d_t is the total amount that can be withdrawn at date t, for every dollar invested at date 0 (provided there have been no previous withdrawals). In equilibrium, depositors choose to withdraw everything they have in a single period so that it is not necessary to consider other withdrawal patterns. For B sufficiently large, it is optimal for a bank to commit to repay $d_1 \geq 1$ and $d_2 \geq 1$. Each bank invests deposits obtained at date $t = 0$ in a partially liquid project which yields cash flow r_t at date $t = 1, 2, 3$ for every dollar invested at date $t = 0$. The bank can only bring forward future cash flow at a cost of $(1 - \gamma)$ per dollar (with $\gamma < 1$). Cash flow may be random, so that a bank may not always have the cash available to meet the demand for withdrawals. In that case it may borrow cash from other banks. Should it be unable to raise enough cash to pay back all its deposit obligations then (as is standard) it is assumed that depositors are paid back on a first come first served basis.

The cash-flow structure takes the following simple form. Cash flows are independently and identically distributed, with

$$(r_1, r_2, r_3) = \begin{cases} R_1 - \Delta, R_2 - \Delta, 0 & \text{with prob. } (1 - q), \\ (R_1, R_2, R_3) & \text{with prob. } qp, \\ (R_1 - \Delta, R_2 - \Delta, R_3 + 2\Delta) & \text{with prob. } q(1 - p), \end{cases}$$

where, $R_t > 1$ for all t, $R_t - \Delta < \frac{1}{2}$ for $t = 1, 2$ and $R_1 + R_2 < 3$.