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Economic growth, liquidity, and bank runs

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Abstract

We construct an endogenous growth model in which bank runs occur with positive probability in equilibrium. In this setting, a bank run has a permanent effect on the levels of the capital stock and of output. In addition, the possibility of a run changes the portfolio choices of depositors and of banks, and thereby affects the long-run growth rate. These facts imply that both the occurrence of a run and the mere possibility of runs in a given period have a large impact on all future periods. A bank run in our model is triggered by sunspots, and we consider two different equilibrium selection rules. In the first, a run occurs with a fixed, exogenous probability, while in the second the probability of a run is influenced by banks' portfolio choices. We show that when the choices of an individual bank affect the probability of a run on that bank, the economy both grows faster and experiences fewer runs.

JEL classification: E42; G21; O42

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1. Introduction

Bank runs and banking crises in general are an important economic phenomenon, both historically and in recent years. Much has been written about these crises, including analyses of their possible causes and of the magnitude of the economic

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disruptions that accompany them.[1] We focus on one particular facet: the effect of the possibility of bank runs on capital formation and thereby on economic growth. While there is now a fair amount of empirical evidence on the effects of banking crises on economic growth, not much theoretical work has been done on the subject. In this paper, we present an endogenous growth model where bank runs occur with positive probability in equilibrium. This allows us to examine not only the impact of an actual bank run, but also how the *possibility* of a run changes the decisions made by agents in the economy and how these changes affect long-run economic growth. Performing this analysis requires bringing together models and results from a number of different literatures: endogenous growth, the overlapping generations model, sunspot equilibrium, and (obviously) equilibrium bank runs. Another common thread uniting these literatures is that they have all benefitted from fundamental contributions by Karl Shell, and our intellectual debt to him is obvious throughout the analysis.

Our model of the behavior of banks is in the tradition of Diamond and Dybvig [9], which highlights the role of the banking system in creating liquidity by taking in short-term deposits and making long-term investments. In particular, Diamond and Dybvig [9] show how demand-deposit contracts can easily lead to a situation where there are two pure-strategy equilibria of the game played by a bank's depositors (the "post-deposit" game), one where a bank run occurs and one where there is no run. The optimal contract for the bank to offer in the "pre-deposit" phase therefore depends critically on how an equilibrium of the post-deposit game is selected. One approach is to assume that agents coordinate their actions on a sunspot variable, a publicly observed random variable that is *extrinsic* in the sense that it has no effect on the fundamentals of the economy.[2] Peck and Shell [19] show that if a sunspot-induced run is sufficiently unlikely, depositors can prefer a contract that permits runs, even when a broad set of possible deposit contracts is considered.[3] It is always feasible for a bank to choose a contract that is "run proof" in the sense that it generates a unique, no-run equilibrium of the post-deposit game. However, choosing such a contract is costly ex ante because it provides less risk sharing among the bank's depositors. If the probability of a run is small enough (below some critical value), depositors will prefer to have more risk sharing and to live with the possibility of a run.

We keep our model of bank behavior as simple as possible, while retaining the spirit of the Peck and Shell [19] analysis. In particular, we restrict banks to offer simple demand-deposit contracts in order to make the problem tractable even with a large number of depositors. There is a substantial literature on the roles of the

[1] Caprio and Klingebiel [6] provide evidence that the costs of such crises are very large. For example, they estimate the costs of the Chilean and Argentine crises in the early 1980s to be 40% and 55% of GDP, respectively. For a large number of other crises, they report costs in excess of 10% of GDP.

[2] This is just one of the many applications of the sunspot equilibrium concept introduced by Cass and Shell (see Shell [23] and Cass and Shell [7]). In a recent comprehensive study of modern banking crises, Boyd et al. [4] conclude that the available evidence strongly points toward a sunspots-based explanation for the cause of these crises (see also Ennis [10]).

[3] This type of result is shown for a restricted set of deposit contracts in Cooper and Ross [8].