

Bank incentives, contract design and bank runs

David Andolfatto^{a, b}, Ed Nosal^{c, *}

^a*Department of Economics, Simon Fraser University, 8888 University Drive, Burnaby, B.C., Canada V5A 1S6*

^b*Rimini Centre for Economic Analysis, Rimini, Italy*

^c*Financial Markets Group, Federal Reserve Bank of Chicago, 230 South LaSalle Street, Chicago, IL 60604-1413, USA*

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Abstract

We study the Diamond–Dybvig [Bank runs, deposit insurance, and liquidity, *J. Polit. Econ.* 91 (1983) 401–419] model as developed in Green and Lin [Implementing efficient allocations in a model of financial intermediation, *J. Econ. Theory* 109 (2003) 1–23] and Peck and Shell [Equilibrium bank runs, *J. Polit. Econ.* 111 (2003) 103–123]. We dispense with the notion of a bank as a coalition of depositors. Instead, our bank is a self-interested agent with a technological advantage in record-keeping. We examine the implications of the resulting agency problem for the design of bank contracts and the possibility of bank-run equilibria. For a special case, we discover that the agency problem may or may not simplify the qualitative structure of bank liabilities. We also find that the uniqueness result in Green and Lin [Implementing efficient allocations in a model of financial intermediation, *J. Econ. Theory* 109 (2003) 1–23] is robust to our form of agency, but that the non-uniqueness result in Peck and Shell [Equilibrium bank runs, *J. Polit. Econ.* 111 (2003) 103–123] is not.

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1. Introduction

A distinguishing characteristic of banks is their propensity to issue demandable liabilities. While the option to redeem debt presumably serves an economic purpose (Diamond and Dybvig [3], Calomiris and Kahn [2]), it is commonly asserted this liability structure opens the door to welfare-reducing bank-runs driven by non-fundamental factors. That is, depositors without any

* Corresponding author.

E-mail address: ed.nosal@chi.frb.org (E. Nosal).

pressing need to redeem their liabilities, may nevertheless choose to do so if they believe—for whatever reason—that others will behave similarly.

Diamond and Dybvig [3] were the first to formalize the concept of an equilibrium bank-run as a coordination failure. It appears, however, that their conclusion relies more on an *ad hoc* restriction on the set of admissible contracts, than on any fundamental property of the environment they study. In particular, Green and Lin [5], building on the work of Wallace [8], demonstrate that when the bank is modeled as an optimal allocation mechanism, the prospect of bank-run equilibria in the Diamond–Dybvig environment disappear entirely. Andolfatto et al. [1] demonstrate that this latter result generalizes considerably. On the other hand, Peck and Shell [7] demonstrate—using a preference specification that slightly different than [5]—that it is possible to generate a bank-run equilibrium when one employs a different sort of mechanism.

A common approach adopted in this literature [1,5,7] is to interpret a bank as a coalition of depositors (or, equivalently, as a benevolent social planner). While this approach has some merit, it abstracts from potentially relevant agency problems that are likely to exist between bankers and depositors. In the present context, we think this may be important for two reasons.

First, the optimal bank contract that emerges in (say) the Green–Lin [7] environment bears little resemblance to any empirical counterpart. In particular, the returns on early redemptions must vary in a complicated manner on the history of depositor-types arriving at the bank. But as individual depositors are not privy to these histories, this outcome relies heavily on the assumption that the bank faithfully conditions allocations on true information as it unfolds over time. In contrast, a self-interested banker might be tempted to fabricate the historical record for personal gain. One question we ask is how the problem of aligning bank incentives with those of depositors restricts the set of incentive-compatible allocations. Does the resulting bank contract, for example, look any less complicated?

Second, it seems natural to explore how bank-run phenomena might be related to any agency problems existing between bankers and depositors. Green and Lin [7] themselves offer a conjecture that the likelihood of a bank-run may increase when depositors must worry about how banks might exploit their private information. They also suggest that these same agency problems may be one explanation for why the banking contract in their model is not observed.¹ Our paper constitutes an attempt to formalize these related ideas.

To do so, we consider the environment as specified by Green and Lin [5] and modify it by introducing a self-interested banker; we assume that the banker's objective is to maximize own-wealth, rather than depositor utility. The banker's comparative advantage lies in the fact that he possesses a superior record-keeping technology. For simplicity, we take an extreme view by assuming that the banker has a perfect memory, while depositors have no memory at all. Any implementable allocation must therefore rely entirely on the banker's version of recorded history. As a self-interested banker may have an incentive to falsify records, additional incentive-compatibility restrictions must be placed on the allocation—the implications of which constitute the focus of our study.

¹ Calomiris and Kahn [2] also stress the role of bank incentives in contract design. Their analysis differs from the standard Diamond–Dybvig [3] set-up along several dimensions. First, demandability is not desired as a form of consumption insurance; rather, it serves as a mechanism to discipline potentially fraudulent behavior. Second, their sequential service constraint emerges endogenously for the same purpose. Finally, a “bank-run” in their model corresponds to bank liquidation based on a set of fundamental shocks (information pertaining to the quality of the bank's assets). Others have also stressed agency problems in relation to determining a bank's capital structure (see [4,6], among others) but do not examine the implications for bank-runs.

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