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Banking Panics, Information, and Rational Expectations Equilibrium: Discussion

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{6, 7, 8}. We have already shown that individuals will wish to liquidate if $\theta \in \{6, 7, 8\}$. Therefore $k(K(6)) > 0$ cannot be optimal.

It follows that *any* equilibrium must involve panic in the sense that agents choose to liquidate even though *nobody* has any information.⁴ Q.E.D.

⁴ The reader can verify that there are parameter values satisfying the restrictions imposed in Theorem 1. An example is $\beta = 0.0000001$; $H = 2.31$; $p = q = 0.5$; $r_0 = 0.1875$; $r_1 = 0.75$; $r_2 = 0.0625$; $\bar{\alpha} = 0.05$; $t_1 = 0.25$; $t_2 = t_1 + \bar{\alpha}(1 - t_1) = 0.2875$; $a = 0.66$. The value of the left side of inequality (11) is $1.026 > 1$, and the left side of inequality (12) is $0.308 < (1 - a) = 0.34$.

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DISCUSSION

JOSEPH WILLIAMS*: This paper is an interesting addition to the rapidly growing literature on banking panics. Like Bhattacharya and Jacklin [1], Bryant [2], and Gorton [4], the assets of the representative bank are risky. Some depositors have private information about the future return on these assets, while others try to infer this information from the number of depositors who line up to withdraw their funds. As suggested in Bryant [2] and formalized first in this paper, this inference is confounded by the unknown number of depositors who withdraw funds solely to finance their current consumption. In the resulting equilibrium with rational expectations, all depositors sometimes withdraw their funds even though no depositor has negative private information. This panic is possible without the sequential service constraint familiar from previous papers because the bank's assets are illiquid. If withdrawals exceed a critical level, then the bank must liquidate loans and thereby incur a transaction cost. In this case, suspending convertibility can improve depositors' welfare by blocking the forced liquidation of loans in runs unrelated to private information.

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This explanation of bank runs differs from the pure panic equilibrium in Diamond and Dybvig [3]; there, the assets of the representative bank are riskless, yet a panic is still possible. An uncertain number of depositors have private preferences for current consumption; liquid assets yield less than illiquid assets; and the bank must honor a sequential service constraint when depositors line up to withdraw. If depositors somehow conjecture that other depositors will run to the bank, then even depositors with no personal utility for current consumption run to close their accounts before the bank exhausts its assets. This Nash equilibrium is Pareto-dominated by a second Nash equilibrium with no run. In this second equilibrium depositors believe that other depositors will not run, so that they withdraw their funds early only if they prefer current consumption. However, the bank's assets are known to be riskless; hence, an equilibrium cannot be induced by rumors, or the absence of rumors, about the bank's insolvency. Instead, it arises as a purely random phenomenon, much like sunspots.

Both this paper and Diamond and Dybvig [3] have been criticized because neither has a positive role for a bank or other financial intermediary. In this model all investors are risk-neutral, so that deposits are not needed to provide insurance against investors' unexpected demands for liquidity. By contrast, Jacklin [5] and Jacklin and Bhattacharya [6], motivate deposit contracts as an insurance mechanism. But they do so by considering two extreme examples: one with only nontransferable deposits and another with only transferable stock. In fact, investors can acquire both deposits and traded securities, like stock. In this more realistic example, the *ex ante*, Pareto-superior allocations that are feasible with only nontransferable deposits may be precluded by the multilateral, incentive-compatibility constraints from traded securities. Perhaps, economies that include both demand deposits and traded securities with claims on distinct types of assets permit allocations that Pareto-dominate equilibria in economies with only traded securities. However, this is an open issue.

Deleting the sequential service constraint is more problematic. As argued in Wallace [7], this realistic constraint reflects limitations on feasible communication between depositors. In turn, constraints on communication restrict feasible regulatory schemes, such as deposit insurance. Conversely, without constraints on communication the optimal deposit contract may reflect the random order in which depositors withdraw. Moreover, optimal actions by managers may reflect both the sequential service constraint and feasible communication between depositors. For example, without this constraint managers may optimally condition their deposit contract on verifiable, interim information about the return on their bank's risky assets. By contrast, Chari and Jagannathan allow no active management of the bank's assets. Only if informed depositors receive negative interim information and precipitate a run does the bank somehow liquidate at a positive price its inevitably valueless loans. Because the bank's managers realistically receive the same signal as informed depositors, why do they not immediately liquidate its bad loans and thereby both maximize its market value and avoid a run?

The important, promising, provocative literature, of which this paper is a part, is so new that many interesting issues are still unresolved. For example, with multiple banks what is the role of the central bank as the designer of the *ex ante*

optimal mechanism? In part, this problem is explored in the inter-bank loan market of Bhattacharya and Gale [1]. If runs on a single bank are distinguished from runs on the banking system, what is the optimal mechanism for insuring deposits? How is this mechanism affected if bank managers are subject to moral hazard? Nor are these issues restricted to demand deposits in financial intermediaries. As an example, consider debentures. Both debentures and demand deposits are unsecured debt. Also, some debentures are privately placed and therefore untraded. If a firm defaults on its debentures, then bondholders rush to attach specific assets. With cross-default clauses in indentures and priorities of liens determined by recording dates, debentures suffer from runs just like demand deposits. Moreover, the resolution of bankruptcy in Chapter 11 includes rules that replicate the suspension of convertibility with demand deposits. In this case, what mechanism for resolving conflicts in bankruptcy maximizes the ex ante welfare of debtors and creditors?

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