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Banking panics and output dynamics ☆

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ABSTRACT

This paper develops a dynamic general equilibrium model with an essential role for an illiquid banking system to investigate output dynamics in the event of a banking crisis. In particular, it considers the ex-post efficient policy response to a banking crisis as part of the dynamic equilibrium analysis. It is shown that the trajectory of real output following a panic episode crucially depends on the cost of converting long-term assets into liquid funds. For small values of the liquidation cost, the recession associated with a banking panic is protracted as a result of the premature liquidation of a large fraction of productive banking assets to respond to a panic. For intermediate values, the recession is more severe but short-lived. For relatively large values, the contemporaneous decline in real output in the event of a panic is substantial but followed by a vigorous rebound in real activity above the long-run level.

1. Introduction

The relationship between banking crises and macroeconomic activity has gained renewed importance in the academic circles as a result of the recent global financial crisis. Many empirical studies have documented that banking crises are usually associated with significant decline in real activity across all sectors of the economy.[1] In addition, these studies have concluded that recessions associated with banking crises tend to be more severe and persistent, even though they have found considerable disparity in the behavior of real output across different episodes. An important conclusion in these studies is that the output dynamics following a banking panic seems to crucially depend on the way in which banking authorities have intervened to mitigate the adverse effects of a panic.[2]

The goal of this paper is to construct a dynamic general equilibrium model with an essential role for an illiquid banking system to investigate output dynamics in the event of a banking crisis. My contribution to the existing literature is to consider the ex-post efficient policy response to a banking crisis as part of the dynamic equilibrium analysis. Ennis and Keister (2009, 2010) have shown that a fragile banking system subject to a self-fulfilling panic can be the outcome of

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[1] The classical reference is Friedman and Schwartz (1963). Prominent recent studies include Boyd et al. (2005), Abiad et al. (2009), Reinhart and Rogoff (2013), Jalil (2015), and Muir (2017).

[2] In this paper, the terms "banking panic" and "banking crisis" are used interchangeably. In addition, I follow the definition provided in Calomiris and Gorton (1991) and refer to a panic or crisis as an event in which numerous depositors suddenly choose to exercise the option of converting their checkable deposits into currency from a significant number of banks in the banking system to such an extent that these banks suspend convertibility.

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an optimal deposit contract when agents form their expectations based on the knowledge of the ex-post optimal policy response to a panic. In this paper, I consider the optimal deposit contract in a dynamic economy, given the expectation of an ex-post optimal policy intervention, and characterize output dynamics in the presence of a potentially fragile banking system.

The main advantage of adopting this approach is that it makes the theoretical analysis consistent with the documented panic episodes, given that in virtually all of these episodes government authorities resorted to suspensions of convertibility, deposit freezes, and banking holidays to end a systemic run on the banking system. As we will see, the output trajectory associated with a banking crisis crucially depends on the optimal liquidation strategy adopted as part of the equilibrium deposit contract.

In the analysis that follows, banks form their portfolio by issuing deposit-like claims to finance productive investments. A bank claim works as a transferable payment instrument and, for this reason, circulates as a medium of exchange in the economy. A key element of the analysis is that depositors may want to prematurely withdraw their funds from the banking system before bank claims can circulate as a means of payment in decentralized markets. Thus, the occurrence of a banking panic will result in a contraction of the amount of liquid assets (i.e., bank claims) in the economy, affecting the real return on these assets and the agents' purchasing power in retail transactions. Most important, a banking panic affects the state of the banking portfolio in the post-panic period. As a result, the real return on liquid assets following a panic episode is altered, affecting output in the post-panic period.

In the event of a panic, the social planner, to be interpreted as a banking authority, will intervene to jointly decide the optimal rule for suspending the convertibility of deposits and the fraction of long-term assets that can be prematurely liquidated to respond to a banking panic. The planner's objective is to maximize the ex-post welfare of depositors by implementing an optimal liquidation strategy. As we will see, this optimal policy response to a banking panic will imply a specific pattern for the evolution of real output in a dynamic economy.

I show that the trajectory of real output following a panic episode crucially depends on the cost of converting long-term assets into liquid funds. For small values of the liquidation cost, the recession associated with a banking panic is protracted. Specifically, output remains below its socially efficient level in the post-panic period as a result of the premature liquidation of a large fraction of productive banking assets to respond to a panic episode. For intermediate values, the recession associated with a banking panic is more severe but short-lived, with output returning to its efficient level in the post-panic period. For relatively large values, the contemporaneous decline in real output in the event of a panic is substantial but followed by a vigorous rebound in real activity above the long-run level.

Thus, the theoretical analysis developed in this paper shows that an economy with an illiquid banking system can display different patterns for the evolution of output following a banking crisis as a result of a time-consistent policy response to a panic. Depending on how costly it is to prematurely convert long-term assets into liquid funds, the solution to the optimal liquidation problem can result in a quick recovery from a panic or even a post-recession boom. I believe that considering a time-consistent intervention provides a more realistic representation of the relationship between banking crises and output dynamics, making it consistent with the documented episodes.

The model has two main ingredients: (i) decentralized exchange with search frictions and (ii) dynamic portfolio analysis. The advantage of using a search-theoretic model to study consumer behavior is that it provides a more realistic representation of the effects of a banking panic in the presence of sequential service. Depositors who end up not being served in the event of a panic lose all their wealth and, consequently, cannot spend in decentralized markets, affecting the extensive margin of trade. Depositors who are served end up with a smaller wealth available for spending in decentralized markets, affecting the intensive margin. Thus, there are fewer trade meetings, together with a reduction in the amount produced, amplifying the effects of premature liquidation due to a panic.

The dynamic analysis captures the persistence of the output loss associated with a banking panic by explicitly showing the effects of premature liquidation on the state of the banking portfolio in the post-panic period. As we will see, the evolution of capital as the determinant of the feasible set for the members of the banking system is a crucial mechanism to explain the persistence of the real effects of a banking panic.

The model has two key empirical implications. First, it implies that the value of bank claims declines during the panic-induced recession. Second, it predicts that the expected return on bank claims rises above the long-run level when the liquidation cost is relatively large. These empirical implications of the model seem to be consistent with the findings in Muir (2017), who studies the behavior of expected returns across banking crises in 14 countries over 140 years. This author has shown that expected returns rise abnormally in a financial crisis as a result of the contemporaneous fall in asset prices associated with a systemic run on the banking system.

It is possible to argue that the model is consistent with these empirical findings. Because the banking authority liquidates only a small fraction of the productive capital in the banking system to respond to a panic when the liquidation cost is relatively large, it depresses the value of bank claims during the crisis but raises the expected return on bank claims going forward. As we will see, the expected inflow of new deposits in the post-panic period contributes to raise the value of the banking portfolio above its long-run value, so that the expected return on bank claims rises in a panic episode as observed in the data.

Finally, the framework developed in this paper is in line with the Friedman–Schwartz analysis of the real effects of banking panics; see Friedman and Schwartz (1963). These authors emphasize the decline in the money supply associated with a sharp contraction in bank deposits in the event of a banking panic as the main channel depressing real economic