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The fragility of short-term secured funding markets [☆]

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Abstract

This paper develops an infinite-horizon model of financial institutions that borrow short-term and invest in long-term assets that can be traded in frictionless markets. Because these financial intermediaries perform maturity transformation, they are subject to potential runs. We derive distinct liquidity, collateral, and asset liquidation constraints, which determine whether a run can occur as a result of changing market expectations. We show that the extent to which borrowers can ward off an individual run depends on whether it has sufficient liquidity, collateral, and asset liquidation capacity. These determinants depend on the borrower's (endogenous) balance sheet and on (exogenous) fundamentals. Systemic runs are possible if shocks to the valuation of collateral held by outside investors are sufficiently strong and uniform, and if the system as a whole is exposed to high short-term funding risk. The theory has policy implications for prudential regulation and lender-of-last-resort interventions.
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1. Introduction

This paper develops a model of financial institutions funded by short-term borrowing and investing in long-term marketable assets. We show that such institutions are subject to the threat of runs similar to those faced by commercial banks and study the conditions under which runs can occur. The analysis derives liquidity, collateral, and asset liquidation constraints for such institutions that depend on whether the run is on an individual institution only or is systemic. When these constraints are violated, runs can occur.

Institutions threatened by a run can liquidate assets through market sales to raise cash or increase the collateral they offer to attract emergency lending. For both these reactions, the institution's asset base compared to its borrowing exposure is decisive. In our steady-state model, these two key variables are endogenous, but not pinned down uniquely. The ability to survive a run depends on these two variables, as well as on exogenous parameters such as the institution's profitability and size.

Our work builds on the theory of commercial bank instability developed by Diamond and Dybvig [14], Qi [30], and others. As pointed out by Gorton and Metrick [19], there are important similarities between the fragility of commercial banks that borrow unsecured deposits and hold nonmarketable loan portfolios, and of "securitized" or "shadow" banks, which borrow in repo or other short-term funding markets against marketable securities as collateral.[1] In particular, repo markets perform maturity transformation by allowing investors with uncertain liquidity needs to lend short-term against longer term, less liquid securities. We provide a formal model of shadow banking to identify the determinants of equilibrium profits, liquidity, collateral, and asset market prices that support such maturity transformation during normal times, and examine its fragility.

This paper uses the model developed in Martin, Skeie, and von Thadden [26], which focuses on the market microstructure of short-term funding markets and compares the impact of different market structures on the possibility of runs, but ignores asset markets. The present paper simplifies the microstructure, but introduces asset market activity and analyzes its impact on market fragility. The interdependency between the asset side and liability side of a borrower's balance sheet determines the borrower's fragility and in aggregate determines market fragility.

In contrast to Diamond and Dybvig [14], we study an infinite-horizon model. A key benefit is that profits are endogenous, so that we can make predictions about how the model's structural parameters affect the stability of the steady state via the endogenously generated liquidity, rather than performing comparative statics with respect to exogenous liquidity levels. Qi [30] also considers an infinite-horizon model, but his financial institutions are assumed to make zero profits.[2] In fact, we show that competition does not necessarily drive up interest rates to zero-profit levels in equilibrium, because borrowers with liquidity of their own must have an incentive to borrow rather than using their own funds for investment. Since investing own funds is profitable, so must be borrowing. This equilibrium argument for positive profits has been developed in Martin, Skeie, and von Thadden [26] and relies on a trade off between the use of external and internal funds, which are endogenous in our infinite-horizon model, but would need to be exogenously specified in a static model.

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[1] See Pozsar, Adrian, Ashcraft, and Boesky [29] for a detailed discussion of the role of shadow banking in the recent financial crisis.

[2] Other recent infinite-horizon models of banking instability such as He and Xiong [21] or Segura and Suarez [32] also generate positive equilibrium profits, but do not consider their interaction with asset markets and fire sales, which is the focus of the present paper.