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journal homepage: [www.elsevier.com/locate/jfec](http://www.elsevier.com/locate/jfec)Banks as patient fixed-income investors<sup>☆</sup>Samuel G. Hanson<sup>a,\*</sup>, Andrei Shleifer<sup>a</sup>, Jeremy C. Stein<sup>a</sup>, Robert W. Vishny<sup>b</sup><sup>a</sup> Harvard University, USA<sup>b</sup> University of Chicago, USA

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## ABSTRACT

We examine the business model of traditional commercial banks when they compete with shadow banks. While both types of intermediaries create safe “money-like” claims, they go about this in different ways. Traditional banks create money-like claims by holding illiquid fixed-income assets to maturity, and they rely on deposit insurance and costly equity capital to support this strategy. This strategy allows bank depositors to remain “sleepy”: they do not have to pay attention to transient fluctuations in the market value of bank assets. In contrast, shadow banks create money-like claims by giving their investors an early exit option requiring the rapid liquidation of assets. Thus, traditional banks have a stable source of funding, while shadow banks are subject to runs and fire-sale losses. In equilibrium, traditional banks have a comparative advantage at holding fixed-income assets that have only modest fundamental risk but are illiquid and have substantial transitory price volatility, whereas shadow banks tend to hold relatively liquid assets.

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## 1. Introduction

What defines the business model of traditional banks in a modern financial system where they compete with market-based intermediaries such as “shadow banks”? To address this question, we present a model in which traditional and shadow banks coexist in the marketplace. We begin with the premise that the primary function of both types of intermediaries is to create safe, “money-like” claims that are of value to households because they are useful for transactions purposes (Gorton and Pennacchi, 1990; Stein, 2012; DeAngelo and Stulz, 2015). However, traditional banks and shadow banks invest in different portfolios of assets to support such claims. Traditional banks hold illiquid fixed-income assets, such as long-term securities and loans, which may be subject to substantial short-run price fluctuations but have little long-run fundamental risk. To hold such assets, they maintain a costly equity cushion in their capital structure but also rely on deposit insurance and other elements of the government safety net. This strategy allows bank depositors to remain “sleepy”: they do not have to pay attention to transient fluctuations in the mark-to-market value of bank assets and never run. In contrast, the shadow banking system—intermediation chains that often involve money market funds—relies less on the government safety net and costly equity capital. For shadow banks, manufacturing money-like claims requires them to hold more liquid assets that can be easily sold at only a modest discount should their investors decide to exit.

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\* Corresponding author. Tel.: +1 617 495 6137.

E-mail address: [shanson@hbs.edu](mailto:shanson@hbs.edu) (S.G. Hanson).

We see asset fire sales as a key source of illiquidity. In our model, asset liquidations temporarily push prices below fundamental value. So, on the one hand, traditional banks' more stable deposit funding structure has an advantage: it enables them to hold investments to maturity, riding out transitory valuation shocks until prices revert to fundamental values. On the other hand, funding stability is expensive due to higher costs of equity capital and regulatory compliance. Because the endogenous fire-sale discount is greater when shadow banks hold more of an asset, this tradeoff pins down the equilibrium holdings of any given asset across intermediary types. The most liquid assets are held entirely by shadow banks, while less liquid (but fundamentally low risk) assets are held entirely by commercial banks. When an asset is held by both intermediary types, the relative holdings of banks and shadow banks must be such that the expected loss to a shadow bank from liquidating an asset at a temporary discount to fundamental value is just balanced by the added cost a traditional bank pays for more stable funding.

This logic leads to our main finding: for traditional banks there is a critical synergy between the asset and liability sides of the balance sheet. Issuing stable money-like claims is complementary to investing in fixed-income assets that have only modest fundamental risk but are relatively illiquid and may have substantial exposure to interim fire-sale risk and the accompanying transitory price volatility. In our view, this synergy between funding structure and asset choice is at the heart of the modern business of commercial banking and is what fundamentally distinguishes traditional banks from shadow banks: traditional banks are patient investors that can invest in illiquid fixed-income assets with little risk of being interrupted before maturity.

While our formal model emphasizes fire sales (Shleifer and Vishny, 1992), our message would also emerge in other models in which early liquidation can occur at prices below fundamental value. For example, early liquidation can be costly in models that combine noise trader shocks with limited arbitrageur risk-bearing capacity (DeLong, Shleifer, Summers, and Waldmann, 1990; Shleifer and Vishny, 1997). Alternatively, liquidation costs could come from adverse selection (Gorton and Pennacchi, 1990; Dang, Gorton, and Holmström, 2013). The general point is that transitory nonfundamental movements in asset prices are central to understanding financial intermediation and especially the connection between the asset and liability sides of intermediary balance sheets. A stable funding structure is an important source of comparative advantage for holding assets that are vulnerable to transitory price movements. In this way, traditional banks are similar to deep-pocket arbitrageurs who specialize in fixed-income assets.

It is important to stress that what our model actually pins down is not literally the roles of different types of legal institutions (e.g., commercial banks or money market funds) but rather the equilibrium mix between two intermediation strategies that use risky assets to back money-like claims. For any given asset, our model asks how much of its total supply will be intermediated using a “stable funding strategy” that relies on an equity cushion and insured deposits, and how much will be intermediated using an “unstable funding strategy” in which investors protect the safety of their claims with an early exit option. The interdependencies between asset characteristics and funding strategies are the true equilibrium outcomes of our model. In reality, there is a close correspondence between funding strategies and specific legal forms. In particular, when intermediaries are distinguished by their access to deposit insurance and the lender of last resort, commercial banks are the dominant institutional vehicle for implementing the stable funding strategy. And we primarily associate the unstable funding strategy with the so-called shadow banking system.

We motivate our analysis in Section 2 by presenting some stylized facts about the assets and liabilities of modern commercial banks. We show that commercial banks have significant holdings of relatively illiquid long-term fixed-income securities, such as asset-backed securities, mortgage-backed securities, and corporate bonds. At the same time, banks generally avoid the most liquid debt securities, such as short-term money market paper and Treasuries, as well as highly risky securities such as equities. These facts offer important clues for understanding the business of commercial banking. In Section 3, we present our model of alternative strategies for supporting money-like claims and show how commercial and shadow banks coexist in equilibrium. We then turn to some evidence bearing on our model's key predictions about the connections between the asset and liability sides of intermediary balance sheets.

Section 4 briefly takes a historical look at the US commercial banking industry. We find that prior to the introduction of federal deposit insurance, US commercial banks followed a strategy that resembles that of shadow banks today. Like today, a commercial bank in, say, 1870, was in the business of taking deposits and thereby offering its customers safe money-like claims. At the same time, commercial banks in 1870 held assets with much shorter maturities and experienced more runs than they do today. The shift of commercial bank assets to longer-maturity loans and long-term securities can be linked to the introduction of deposit insurance, as our model predicts.

Another way to examine the predictions of the model is to look at the asset and liability structures of financial institutions more broadly. In Section 5, we use the Financial Accounts of the United States (formerly the Flow of Funds) to provide some contemporary aggregate evidence addressing the model's key predictions. In the data, looking across fixed-income asset classes, today's traditional banks have a larger market share in more illiquid assets, be they loans or securities. Similarly, looking across financial intermediary types, intermediaries with more stable funding such as traditional banks have asset portfolios that are more illiquid. In this way, our model yields a novel synthesis of several aggregate facts about the structure of financial intermediation.

Our paper relates to several strands in the literature. Our starting point is the liability-centric view of banks, which holds that an important part of banks' value comes from their ability to manufacture safe money-like liabilities.<sup>1</sup> This view helps make sense of the fact that, in contrast to nonfinancial firms, banks have capital structures that are highly homogeneous in

<sup>1</sup> This view has its roots in Gorton and Pennacchi (1990). Recent papers in this vein include Dang, Gorton, and Holmstrom (2013), DeAngelo and Stulz (2015), Gennaioli, Shleifer, and Vishny (2013), Stein (2012), and Krishnamurthy and Vissing-Jorgensen (2015).

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