Journal of Banking & Finance 48 (2014) 350–360

Contents lists available at ScienceDirect

Journal of Banking & Finance

journal homepage: www.elsevier.com/locate/jbf

Banking risk and macroeconomic fluctuations

Yi Jin *, Zhixiong Zeng

Department of Economics, Monash University, Caulfield East, VIC 3145, Australia

ARTICLE INFO

Article history:
Available online 2 August 2013

JEL classification:
E44
E32
D82
D86
G01
G32

Keywords:
Two-sided financial frictions
Systemic risk
Financial crisis

ABSTRACT

This paper develops a model of banking frictions and banking risk. As a sort of systemic risk, changes in banking risk lead to fluctuations in aggregate economic activity. We decompose the macroeconomic effect of a banking risk shock into a pure default effect and a risk-aversion effect when risk sharing among investors is imperfect. When the shock generates a bank risk spread similar to the peak value during the Global Financial Crisis, the overall effect is a decline in employment by 4.66%. The default effect leads to a 3.40% employment decline by a "within-model" measure, and a 3.51 decline by a "between-model" measure. The remaining is attributed to the risk-aversion effect. A practical implication of our analysis is that by developing financial safety net and improving risk sharing among investors, the society can mitigate the adverse macroeconomic effects of banking risk shocks to some extent, but cannot eliminate all of them.

1. Introduction

Banking is risky business, and the bankruptcy of banks is a real possibility. When banks fail they default on at least part of their liabilities. Although there has been deposit insurance and the insurance coverage was raised from $100,000 to $250,000 in October 2008 in the United States, a large amount of bank liabilities remain uninsured, especially when the liabilities of investment banks are also taken into account.[1] For example, large-denomination certificates of deposits (CDs) are normally issued in million dollar pieces and are not insured. To compensate for the possibility of default, banks' liability holders (investors henceforth for ease of exposition) require a premium on their funds over default-free securities, giving rise to interest rate spreads between, say, CDs, and Treasury bills (T-bills). The recent Global Financial Crisis (GFC) calls attention to the importance of banking risk and the frictions present in the bank-investor relationship. From 2001Q1 to 2007Q2, the spread between 3-month CD rate and the 3-month T-bill rate was as low as 27 basis points per annum on average. For the second half of 2007 and the year of 2008 this spread rose to as high as 153 basis points per annum on average, with a spike at 252 basis points in the last quarter of 2008 (Fig. 1a).[2] The rise in this spread partly reflected the rising likelihood of bankruptcy of banks. Taking FDIC-insured financial institutions for example, the number of failed banks was simply zero in 2005 and 2006. The number, in contrast, was 3 in 2007, 30 in 2008, and 148 in 2009 (Fig. 1b).[3]

In this paper we develop a model of banking frictions, where changes in the riskiness of banking affect the economy's employment and output. By banking frictions we mean the asymmetric information and agency problem on the liability side of the bank balance sheet, that is, between banks and their lenders, i.e., investors. The macroeconomic literature on financial market imperfections has so far focused on what we call "credit frictions"—the agency problem on the asset side of the bank balance sheet, that is, between banks and their borrowers, e.g., entrepreneurs. See the seminal work of Bernanke and Gertler (1989) and a large literature that follows.[4] To introduce banking frictions we extend the costly-state-verification (CSV) framework of Townsend (1979), Gale and Hellwig (1985), and Williamson (1986), Williamson (1987) to a two-sided financial contracting framework.[5] In our

* Corresponding author. Tel.: +61 3 99032042; fax: +61 3 99031128.
E-mail addresses: yi.jin@monash.edu (Y. Jin), zhixiong.zeng@monash.edu (Z. Zeng).

[1] In this paper we follow Gertler and Kiyotaki (2010) to lump all types of financial intermediaries, including commercial banks and investment banks, into a single "banking sector".

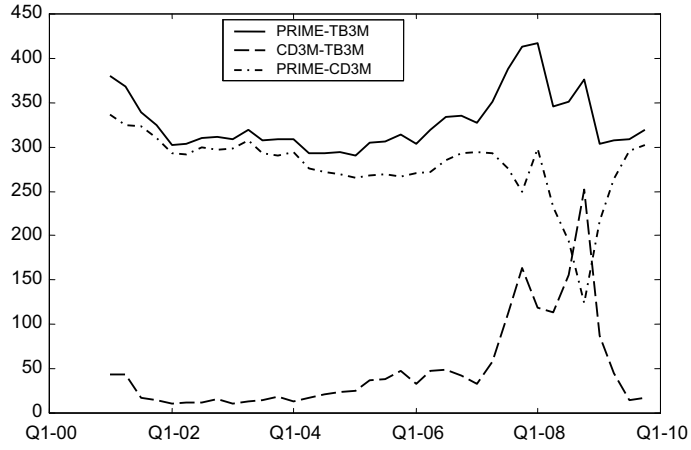
[2] Data source: the Board of Governors of the Federal Reserve System.

[3] Source: FDIC.

[4] Examples include Carlstrom and Fuerst (1997), Bernanke et al. (1999), and Christiano et al. (2003, 2009).

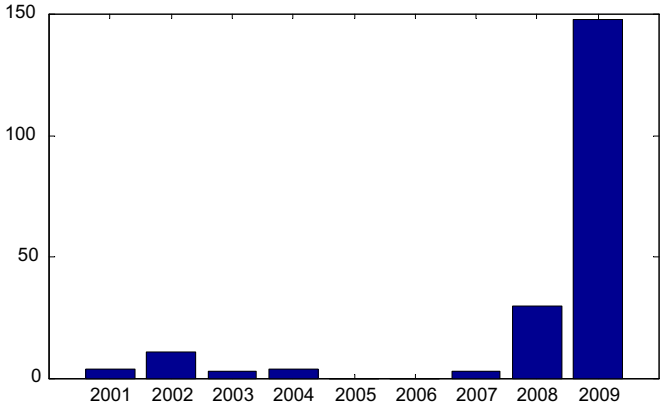
[5] Alternative models of banking include Diamond and Dybvig (1983), Holmstrom and Tirole (1997), and Diamond and Rajan (2012). A distinguishing characteristic of our model is its emphasis on the costly revelation of bank solvency information to investors.

0378-4266/$ - see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.jbankfin.2013.07.039



(a) Interest rate spreads (in basis points per annum)

Solid: Prime lending rate minus 3-month T-bill rate; Dashed: 3-month bank CD rate minus 3-month T-bill rate; Dash-dot: prime lending rate minus 3-month bank CD rate.



(b) Number of failed FDIC-insured financial institutions

Fig. 1. Interest rate spreads and bank failure.

model banks face idiosyncratic risks and investors have to expend monitoring costs in order to verify banks' capacities to repay, just like banks themselves have to incur such costs in order to verify entrepreneurs' revenues. If banks are subject to risks that cannot be fully diversified, then the kind of agency problem between banks and entrepreneurs applies equally well to the relationship between banks and investors. In that case there are needs to "monitor the monitor", in the terminology of Krasa and Villamil (1992a). In our environment the optimal financial contract is a two-sided debt contract, which features equilibrium default by both the entrepreneurs and banks. The overall financial frictions that are relevant for the determination of equilibrium employment and output are summarized by a financial friction indicator, which itself is a function of the entrepreneurs and banks' default thresholds as specified by the contract.

We capture the extent of banking risk by the dispersion of information private to banks. We allow a dispersion parameter in the distribution of banks' idiosyncratic profitability factors to be subject to disturbances. These disturbances are termed "banking risk shocks". A positive banking risk shock represents worsening of the asymmetric information problem between banks and investors. Banking risk as this paper perceives represents a kind of systemic risk. In our model, all banks face the same distribution of idiosyncratic profitability factors. A change in the dispersion of the common distribution thus affects the riskiness of all banks. An increase in banking risk not only corresponds to an increase in volatility at individual-bank level, but is also manifested in a larger cross-sectional dispersion in bank performance.[6] An important consequence of the increased dispersion is the increased number of defaulting banks. Our paper thus complements the strand of systemic risk literature that investigates the role played by common shocks (e.g., Herring and Wachter, 1999 and Reinhart and Rogoff, 2009).

It should be noted that banking risk in our model is different from the kind of systemic risk that results from the interconnectedness of financial institutions, as studied in Allen et al. (2012a). In their model banks hold overlapping portfolios and the resulting asset commonality and informational linkage among banks interact with short-term debt to generate systemic risk. See also Giesecke et al. (2009).[7] To focus on the role played by banking risk, the fluctuation of which represents a common shock, our paper does not consider the interconnectedness aspect of systemic risk. Nor do we consider contagion issues as in Allen and Gale (2000). Our analysis is related to papers that emphasize bank default when studying

[6] Relatedly, Gorton and Metrick (2012) find that there were increases in both the means and standard deviations of various credit spreads, the interbank spreads, and repo rate spreads during the GFC.

[7] Wagner (2010) and Ibragimov et al. (2011) argue that diversifying into other banks' assets reduces the probability that an individual bank fails, but at the same time makes banks exposed to each other's risk so that bank failure can spread through the whole financial system when a subset of banks are hit by adverse shocks. Based on this consideration, full diversification is not desirable.