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Financial contagion and depositor monitoring

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A B S T R A C T

This paper analyzes market discipline in a many-bank economy where contagion and bank runs interact. We present a model with differently-informed depositors, where those depositors that are more informed have incentives to monitor banks' investments. It is shown that when banks are undercapitalized, and the probability of success of the risky asset is low, depositors might prefer a contract that is subject to bank runs in the interim period to a contract that allows banks to gamble with their funds and maintain their investment. The results of the paper emphasize the benefits of private monitoring of banks in order to promote market discipline.

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1. Introduction

The recent financial turmoil has restored the debate concerning deposit insurance schemes. European governments have increased depositors' protection up to almost 100%, in an attempt to prevent *panic* bank runs. Nevertheless, this policy was implemented before knowing the real quality of banks' assets. It is largely claimed that these interventions will intensify the riskiness of banks' investments and generate bankruptcies and contagion in the future. All these events have called for a system of supervision that prevents institutions from taking on excessive risk. Additionally, they have highlighted that a sound transparency framework based on improved disclosure and high quality accounting standards is essential in order to ensure market confidence and enhance market discipline.

Market discipline is one of the three pillars generally accepted by regulators and scholars to limit the bank risk-shifting incentives that are exacerbated by financial safety nets. Nevertheless, the incentives to acquire information and exercise market discipline vary across countries and depend on the regulatory, institutional and supervisory environment (see Fonseca and González, 2010; Cubillas et al., 2012).

There is empirical research that has documented that depositors exercise market discipline in banking, even in the presence of deposit insurance. Martinez Peria and Schmukler (2001) study the experiences of Argentina, Chile, and Mexico during the 1980s and 1990s. They find that depositors punish banks for risky behavior, by both withdrawing their deposits and requiring higher interest rates.[1] Market discipline becomes more important after crises and deposit insurance does not appear to diminish the extent of market discipline. Similar results are found by Hosono et al. (2005) for the case of Asia. Hadad et al. (2011) analyze changes in the deposit-guarantee scheme and capital regulation in Indonesian banks following the 1997–1998 financial crisis. They find that the adoption of a blanket-guarantee scheme weakens market discipline, although market discipline works better in listed banks than unlisted banks and in foreign banks than domestic ones.

Additionally, recent papers have shown that market discipline varies with the particular regulatory, supervisory, and institutional environment. For example, Demirgüç-Kunt and Huizinga (2004) analyze whether differences in market discipline across countries can be explained by different designed features of financial safety

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[1] For example, bank deposits in Greece have fallen by 70 billion euros since the start of the crisis in 2009.

nets. In particular, they show that co-insurance, coverage of foreign currency deposits, and private and joint management of insurance schemes may improve market discipline. Cubillas et al. (2012) have also analyzed to what extent variations in market discipline after a banking crisis depend on a country's bank regulation, supervision, and institutions. They provide evidence that the adoption of an explicit blanket guarantee, forbearance, government recapitalization, and nationalization programs are interventions that have a weakening effect on market discipline.

The aim of this paper is to analyze market discipline and its effect on financial contagion. This is a very important topic as it is precisely during crises when governments tend to adopt blanket guarantees to avoid runs (in fear of a systemic crisis) and thus these policies weaken market discipline and increase bank risk taking in the future. Our results suggest that, in certain circumstances, allowing for runs (and hence contagion) might be welfare superior to maintaining risky banks operating. To the best of our knowledge, this is the first paper that analyzes market discipline in a many bank economy where bank runs and contagion interact.

We model a two region economy, with a continuum of risk-averse consumers (depositors) and risk-neutral investors (bankers). Consumers have the standard Diamond–Dybvig preferences. Banks in each region have access to illiquid long-term investment projects, that allow depositors to increase their expected welfare. In particular, at $t = 0$, banks can choose between a safe asset and a risky one (the gambling asset) that yields a lower expected return at $t = 2$. However, this gambling asset may become attractive when banks are undercapitalized. At $t = 1$, some depositors acquire information about the bank's investments. In particular, these depositors may run on the bank, if the bank has invested in the gambling asset. On the other hand, banks are fully rational and are aware that depositors can obtain information. Hence, in order to avoid a bank run in the interim period, the bank contract has to be appropriately designed. We will refer to this contract as the *run-proof contract*. We show that when banks are undercapitalized (and hence, have incentives to take risk), depositors might prefer a contract that is subject to bank runs in the interim period to a contract that prevents runs and allow banks to gamble and maintain their investment (*run-proof contract*), provided that the probability of success of the gambling asset is low.[2] Finally, it is assumed that the two regions have negatively correlated liquidity shocks, and so banks will maintain interbank linkages in order to ensure themselves against the liquidity shock. As a result, during a crisis, the failure of one institution may have negative effects on the other institution to which it is linked (contagion).

In particular, we build on the model by Brusco and Castiglionesi (2007), from now on BC, but we modify their framework by introducing the possibility of differently informed depositors. BC analyzed the propagation of financial crises among regions affected by moral hazard problems. In their paper, the existence of limited liability and insufficiently capitalized banks promoted excessive risk taking by banks. This lead to a situation where bankruptcy (and contagion) occurred with positive probability at $t = 2$. In fact, for certain parameter values, depositors preferred a contract that allowed banks to gamble with their money to one that restricted banks to be sufficiently capitalized, in order to avoid the moral hazard problem. However, in the BC model there is no possibility for depositors to acquire information. Therefore, in case there would be such possibility, their implicit assumption is the presence of full deposit insurance.

We depart from BC by considering the possibility of acquiring information. In our model a fraction of uninsured depositors receive information about the bank's investment and may run on the bank. However, runs are not necessarily bad from an ex-ante point of view. Depositors will only allow banks to gamble with their money and maintain their investment, when the probability of success of the gambling asset is sufficiently high (the asset is not very risky). Our results come from the fact that the run-proof contract reduces the consumption of impatient agents, even in the presence of the gambling asset. Then, for low probabilities of success of the gambling asset, the allocation that allows for runs and makes consumption indirectly contingent on the information shock, is preferred. The benefits of private monitoring of banks have been emphasized by the empirical literature. For example, Barth et al. (2004) find, in an extensive study that examines various bank regulations and supervisory practices in 107 countries, that regulations that encourage private monitoring of banks are associated with better banking sector outcomes, greater bank development, lower net-interest margins and small non-performing loans. However, they also show that private monitoring does not reduce the likelihood of a banking crisis.[3]

Market discipline has also been analyzed by several papers in the theoretical banking literature, but in a single-bank economy (where the interaction between bank runs and contagion is not analyzed). The idea of these papers is that uninsured and liquid deposits keep the bank's portfolio choice in line with depositors' preferences. The threat of a bank run by informed depositors after receiving negative information discourages banks' owners from investing in projects that are too risky or committing fraud (see Calomiris and Kahn, 1991; Flannery, 1994; Jean-Baptiste, 1999 or Gorton and Huang, 2003. Dwyer and Samartín, 2009 contains a review of this literature).[4] In our paper, market discipline is exercised by depositors that withdraw their deposits in order to punish banks for bad behavior. On the other hand, we follow one strand of the contagion literature that motivates the existence of contagion through the interbank market. A common feature of this literature is that banks have incentives to establish links ex ante, in order to protect themselves against liquidity shocks, but during a crisis, the failure of one institution may have negative effects on other institutions to which it is linked (see Allen and Gale, 2000; Brusco and Castiglionesi, 2007; Castiglionesi, 2007; Hasman and Samartín, 2008).[5]

The rest of the paper is organized as follows: the basic model is presented in Section 2. Section 3 describes the socially-optimal allocation. Section 4 analyzes the decentralized solution under different scenarios and Section 5 provides some welfare comparisons using numerical simulations. Finally, the concluding remarks are summarized in Section 6.

2. The model

The model builds on Brusco and Castiglionesi (2007). There a three dates ($t = 0, 1, 2$) and a single good. There are two regions, A and B. Each region has a continuum of depositors and a banking sector. Depositors are ex-ante identical and are endowed with one unit of the good at $t = 0$. At $t = 1$, individuals can be of type-1 (or impatient) with probability w^s and derive utility from consumption only in that period, or they can be of type-2 (or patient)

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[2] Alonso (1996) and Samartín (2003) find similar results but in a single-bank economy where contagion effects cannot be considered.

[3] Bhattacharya et al. (1998) and Chen and Hasan (2006) also provide a discussion of the optimality of partial deposit insurance and empirical evidence that supports it.

[4] Qi (1998) and Diamond and Rajan (2001a,b, 2005, 2006), also study the disciplinary effects of liquid deposits in models that abstract from asymmetric information.

[5] Regarding the empirical literature on financial contagion, most of these papers find that contagion is possible but unlikely, that the size of the failing bank as well as the direction and type of linkages are key factors in determining the probability of contagion. One limitation of most of theses studies is that due to the lack of information on bank's mutual exposure, they have to assume a given distribution of interbank linkages. See Allen and Babus (2008), or European Central Bank (2010).