Banking crises and the lender of last resort: How crucial is the role of information?

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A B S T R A C T

This article develops a model that studies how the presence of a lender of last resort (LOLR) affects the ex ante investment incentives of banks. We show that a perfectly informed LOLR induces a first-best outcome for small and medium sized banks but causes moral hazard in larger banks given the high contagion cost of their failure. On the other hand, an imperfectly informed LOLR causes allocational inefficiencies in the investment decisions of smaller banks but mitigates the moral hazard problem in larger banks due to the constructive ambiguity nature of bail-outs when the LOLR’s information set is noisy. Policy implications include stricter supervision for smaller banks, and “buffer” requirements complemented with liquidity provision at penalty rates for larger banks.

1. Introduction

Banks are an integral part of the economy as they provide an important channel through which funds are transferred from investors to the entrepreneurial sector. However, history has shown that banks are subject to runs and panics. A bank run occurs when depositors fearing that the bank will be unable to fulfill its obligations, attempt to withdraw their funds immediately. Moreover, many banks have been increasingly using short-term wholesale funding to finance long-term assets. The providers of such funds are very sensitive to the underlying credit risk as well as the macroeconomic environment. Thus banks are subject to liquidity risk given the possibility of runs (either from individual depositors or wholesale funding providers). If the total withdrawals from a bank are high enough, then even healthy banks can ultimately become bankrupt as they are forced to prematurely liquidate their assets at fire sale prices. Such banking crises can seriously disrupt economic activity. Because of the central position of financial intermediaries in the economy, the adverse impact of banking crises on economic activity cannot be overemphasized.

Since banks hold only a fraction of their deposits as reserves, they are vulnerable to liquidity shocks which might hit the economy as such shocks might induce panic and may affect the behavior of the depositors. The role of the central bank as a lender of last resort was thus a natural response to the fractional reserve system. Some economists claim that the LOLR is not necessary in a well developed financial system as the interbank market can provide liquidity to solvent banks facing liquidity problems. However, as argued by Goodhart and Huang (2005), the interbank market cannot provide liquidity in two instances. First, the interbank market might not suffice in case of a market failure, for instance, when a large amount, which is too much for a single bank, is needed to bail out a solvent institution. Second, the market mechanism cannot provide insurance against liquidity shocks which affect the whole economy.

In this paper we study the role of a LOLR in an economy characterized by heterogenous banks with different sizes. The LOLR...
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We next show that if the LOLR is imperfectly informed, such that it receives a noisy signal about bank fundamentals, then it bails out a bank as long as the signal received is good enough and exceeds a certain threshold. We show that this bailout threshold is decreasing in bank size, i.e. the LOLR bailout policy is lenient towards larger banks but stricter towards smaller banks.

In Section 2.4 we augment our base model by studying the investment allocation decision of a bank in the presence of a perfectly informed LOLR. We show that for smaller or medium sized banks the presence of a perfectly informed LOLR leads to a first-best outcome whereby there is neither underinvestment nor overinvestment by any small or mid-sized bank. In the absence of a LOLR, as in our base model, the smaller and medium sized banks make too little investments (relative to first-best) so as to avoid the likelihood of incurring a cost of premature liquidation. This underinvestment problem is alleviated by the introduction of a LOLR who is willing to bail out all banks that are solvent.

For larger banks, however, the first-best outcome is not achieved in the presence of a perfectly informed LOLR. This is because larger banks are aware that they will be bailed out irrespectively of whether or not they are solvent due to the high contagion costs associated with their failure. Consequently, larger banks underprice risk and set the lending rate lower than the first-best level resulting in an overinvestment problem. Hence, even though a perfectly informed LOLR alleviates the underinvestment problem of smaller and medium sized banks but nevertheless creates a moral hazard problem in the case of larger banks.

In Section 2.5 we further augment our model by introducing noise in the information set of the LOLR. We show that in the presence of an imperfectly informed LOLR there is a deviation from the first-best outcome for small and medium sized banks. The deviation from first-best is dichotomous in the sense that for ‘good’ banks with relatively strong fundamentals there is a problem of underinvestment. However, for ‘bad’ banks with relatively weaker fundamentals there is now a moral hazard problem of overinvestment. Intuitively, if the LOLR is imperfectly informed, then good banks which are likely to be solvent fear that the LOLR may make a Type I error whereby it may inadvertently not bail out solvent banks. The possibility of a Type I error discourages investment by good banks since they prefer to keep a buffer (in the form of higher reserves) to avoid the cost of premature liquidation. On the contrary, bad banks which are likely to be insolvent are now incentivized to overinvest since there is now a likelihood that an imperfectly informed LOLR may make a Type II error whereby it may inadvertently bail out insolvent banks. This leads to a moral hazard problem for small and medium sized banks with relatively weak fundamentals.

We then analyze the investment decisions of larger banks in the presence of an imperfectly informed LOLR. We show that the moral hazard problem in large banks, that was identified in Section 2.4, is increasing in the size of the banks, i.e. the bigger the bank the more severe the moral hazard problem. Intuitively, the contagion cost of bigger banks is higher and thus the LOLR’s bailout policy becomes more and more lenient as the size of the bank increases. This is conducive to an ex ante moral hazard problem in big banks. Nevertheless, we show that the severity of the moral hazard problem in large banks is not as high when the LOLR has imperfect

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