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Lending relationships in the interbank market

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ABSTRACT

We use a unique dataset to show that relationships are an important determinant of banks' ability to access interbank market liquidity. More precisely, we find that: (i) banks with a larger reserve imbalance are more likely to borrow funds from banks with whom they have a relationship, and to pay a lower interest rate than otherwise; (ii) smaller banks and banks with more non-performing loans tend to have limited access to international markets, and rely more on relationships; (iii) relationships are established between banks with less correlated liquidity shocks. These results suggest that relationships allow banks to insure liquidity risk in the presence of market frictions such as transaction and information costs. Our analysis explicitly controls for the endogeneity of bank relationships.

1. Introduction

Many interactions between economic agents are of a frequent and repeated nature. In such a setting agents may establish relationships, and equilibrium outcomes may be different from those that arise in an anonymous market. In a recent paper, Carlin et al. (2007) solve a dynamic model of trading based on liquidity needs. They show that cooperation is an equilibrium outcome of the repeated-game model. Cooperation involves refraining from predation and allows the trader who has suffered a liquidity shock (the distressed trader) to transact at more favorable prices. Their model predicts that the level of cooperation is an important determinant of traders' ability to access funds, and of the amount of liquidity available in the market.

Our paper studies the role (if any) of relationships in the process of liquidity provision in the interbank market. The importance of interbank markets as distributors of liquidity is well recognized in

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the literature. Ho and Saunders (1985) examine a model in which banks' reserve positions are affected by stochastic customers' deposits and withdrawals; interbank trading allows them to meet their reserve requirements. In Bhattacharya and Gale (1987) interbank market trading also provides insurance against inter-temporal liquidity shocks. Similarly, in Allen and Gale (2000) liquidity shocks arise from uncertainty in the timing of depositors' consumption, whereas in Freixas et al. (2000) liquidity risk arises from consumers' uncertainty about where to consume. A common feature to these models is that a well functioning interbank market is important for banks' ability to access liquidity, and as a result, it is important for firms' and consumers' ability to access bank financing, and ultimately for the efficiency of the financial system.

The interbank market is a natural setting to study the question of whether relationships play a role in the process of liquidity provision. The interbank market is fragmented in nature. For direct loans, which account for most of the market volume, the loan's terms are agreed on a one-to-one basis between borrower and lender. Other banks do not have access to the same terms. When quotes are posted on screens, they are merely indicative. In addition, there are frequent and repeated interactions between the same banks. This market structure allows relationships to play an important role.[1]

In order to study this question we use a unique dataset that contains information on *all* direct loans that took place in the Portuguese interbank market between January 1997 and August 2001. The Portuguese market is smaller than the Fed Funds and most Euro area interbank markets, but its market structure is similar to that of these larger markets. Our dataset contains comprehensive information on each loan (date, amount, interest rate, maturity, and identity of lender and borrower). These data allow us to track loans between each and every pair of banks over time, information that we use to construct dynamic measures of relationships, based on the intensity of pair-wise lending activity. Our data also include daily information on banks' reserve deposits, and quarterly information on balance sheet variables such as total assets and non-performing loans. Finally, we also observe all financial flows between banks, other than interbank market loans, which we use to construct a measure of "other interactions" that take place between them.

Our results support the prediction that bank relationships are an important determinant of their ability to access funds, and of the amount of liquidity available in the market. First, we find that banks with a larger imbalance in their reserve deposits are more likely to borrow funds from banks with whom they have a relationship, and to pay a lower interest rate on these loans than they would otherwise. This result supports the prediction of Carlin et al.'s (2007) model that under repeated interaction, cooperation among banks is an equilibrium outcome that involves refraining from predation, and that allows those with a larger reserve imbalance to transact at more favorable prices.

Second, we find that small banks and banks with a higher proportion of non-performing loans tend to have limited access to international markets, and that they tend to rely more on relationships when borrowing funds in the domestic interbank market. This result is consistent with relationships allowing banks to access liquidity in the presence of market frictions, such as transaction and information costs. It provides support for the assumption of Freixas and Holthausen's (2005) model that information on foreign banks is coarser that on domestic peers, with whom inter-bank market relationships may have developed over a longer time period. We find evidence that these relationships are likely to extend beyond the interbank market. More precisely, we show that the relationship measure constructed using interbank market data is positively correlated with a measure of other relationships constructed using data on other financial flows.

Third, we use the information on each bank's reserve deposits to construct a measure of liquidity shocks which is equal to the daily change in these deposits. We find that banks with more volatile liquidity shocks are more likely to rely on relationships, and they tend to do so with banks which face less volatile liquidity shocks. Furthermore, we find that banks establish relationships with those banks with whom they have a lower correlation of liquidity shocks, which may further enhance the liquidity of the overall market. This is an important finding since Allen and Gale's (2000) model predicts that

[1] The issue of price formation and the properties of prices in centralized versus fragmented markets has been the subject of much research (see for example Wolinsky, 1990 or Biais, 1993).