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What do a million observations have to say about loan defaults? Opening the black box of relationships[☆]

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ABSTRACT

Using a unique dataset of more than 1 million loans made by 296 German banks, we evaluate the impact of many aspects of customer–bank relationships on loan default rates. Our research suggests a practical solution to reducing loan defaults for new customers: Have the customer open a simple transactions account – savings or checking account. Observe for some time and then decide whether to make a loan. Loans made under this model have lower default, as banks can use historical data about their borrowers to establish a baseline against which new client-related information can be evaluated. Banks assemble this historical information through relationships of different forms. We define relationships in many different ways to capture non-credit relationships, transaction accounts, as well as the depth and intensity of relationships, and find each of these can provide information that helps reduce default – even establishing a simple savings or checking account and observing the activity prior to loan granting can help reduce loan defaults. Our results show that banks with relationship-specific information act differently compared with banks that do not have this information both in screening and subsequent monitoring borrowers which helps reduce loan defaults.

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1. Introduction

The 2008–2009 global financial crisis and the subsequent sovereign debt crisis in Europe revealed considerable problems in loan books of banks that funded an unprecedented growth of credit to governments, firms, and households in the years before the crisis. Banks around the globe subsequently incurred huge write-downs on their risky corporate loan portfolios. The discussion of how to regulate banks' lending processes has thus been at

the heart of then recent debate and an important question is what is the right process to follow in making loans so as to decrease default risk.

We provide a simple but powerful answer: have the customer set up a simple transaction account – savings or checking account and observe the customer before making a loan. Loans made under this model have lower default rates. The reason is simple. Banks need historical data about their borrowers in their screening process, but also to establish a baseline against which new client-related information (such as current account overdrafts) obtained through monitoring the borrower can be evaluated. Banks can act on this relationship specific information, for example, when current overdrafts deviate substantially from the baseline. In this paper, we open the black box of “relationships” and show how banks use their relationship-specific information which eventually reduces default rates.

While bank relationships with their clients are generally thought to be important, the classic way in which relationships are modeled is through its lending relationships (Diamond, 1991). But relationships can be of many kinds. They can differ in scope, depth, and intensity. For example, a relationship could be non-credit based, marked by just a transaction account such as a savings or checking account. Relationships can also differ in intensity

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and depth. Importantly, some of the information obtained through relationships is hardly verifiable by outside lenders.

To assess the effect of relationship specific information on default rates, we use a new and proprietary dataset that comprises all consumer loan applications to German savings banks, the loan decisions, and the performance of these loans between November 2004 and June 2008. We have access to more than 1 million loan applications to 296 German savings banks and their performance after loan origination, with detailed information on loan and borrower characteristics as well as loan applicants' relationships that exist *prior* to loan origination used by banks to establish a baseline of their customer. We define relationships in many different ways to capture non-credit relationships, transaction accounts as well as the depth and intensity of relationships.

On the extensive margin, we show that the existence of bank-depositor relationships reduce default rates, on average, by 0.4 percentage points, a sizable reduction given an unconditional average default rate of 0.6% in the overall sample. We find relationships of all kinds matter – even the simplest form of relationships such as having a savings account or a checking account is economically significant in reducing defaults. On the intensive margin, we show that relationship intensity as well as the scope and depth of relationships significantly reduce default rates.

We analyze different channels through which relationships affect the likelihood of borrower default: The distinct advantage of possessing private information in (1) screening; (2) in monitoring, and (3) effects beyond that derived from private information, in particular, reduced incentives of borrowers to default.

First, we argue that relationships provide valuable information to lenders in the screening process. We analyze the impact of various relationship proxies on the likelihood that an application is accepted and find significantly higher acceptance rates among relationship customers on both the extensive and the intensive margin. For example, relationship customers have a 2% higher probability of being approved for a loan. While the prior literature argues that collateral increases the capacity of firms to borrow by mitigating ex-ante information asymmetries (Barro, 1976; Stiglitz and Weiss, 1981; Hart and Moore, 1994), we provide evidence that bank-depositor relationships significantly increase access to credit in uncollateralized lending such as consumer lending. Moreover, we find that borrower characteristics that increase the likelihood of getting credit are negatively correlated with default rates, which supports banks' screening to reduce default rates, and with relationships being an important part of this process.

We next examine the second way that private information can help the bank – through improved monitoring. We find that loan officers also use their private information as a distinct advantage in monitoring borrowers after loan origination. We ask why relationship lenders are better monitors and how they behave differently than other lenders. Our data allow us to observe changes in bank behavior as a response to changes in borrower behavior. We observe borrower account activity on a monthly basis and the new credit limit the banks provide at the end of each month. The results suggest that relationship lenders, which have a baseline from transactional accounts before taking the loan, are able to spot unusual account activity and respond by reducing credit limits earlier than non-relationship lenders to keep borrowers on a tighter leash. Lower credit limits, *ceteris paribus*, are associated with lower default rates.

A third channel through which relationships can reduce default rates is lower customer incentives to default on their loans. We have detailed information about the checking account activity for a subset of our sample borrowers, which is only known to the bank, but not included in the internal rating, and thus provides the bank with unique information. Our results suggest that this information is important for subsequent monitoring, but relationship proxies

have explanatory power even after controlling for private information. These results suggest that other factors in relationships beyond private information are important for loan performance. One potential explanation of our results is that there are reduced borrower incentives to default because of the potential value of relationships to the borrower.

We can provide more evidence on the underlying effects by distinguishing between “weak” defaults (such as 90 days late in repayment) and “hard” defaults (such as borrower insolvency). Consistent with reduced incentives for borrowers to default, we find that those borrowers with prior loans with their savings bank are more likely to incur weak relative to hard defaults.

The empirical design of our paper also addresses endogeneity concerns. Banks might establish relationships with higher quality customers based on factors that are unobservable to us and which reduce default rates. We use the availability of savings banks in a particular region as an instrument for relationships. The underlying intuition is that a customer is more likely to have a relationship with a savings bank if the bank has more branches in that region relative to the population, i.e. if the distance between customer and savings bank is small. The identifying assumption is that distance facilitates relationships, however, that living in a region with a high availability of savings banks does not affect default rates directly. We first show that borrower characteristics and internal ratings are unrelated to the availability of savings banks in a region. We then use a bivariate probit model instrumenting our relationship variable. Overall, we still find that prior relationships significantly and meaningfully reduce default rates.

The rest of the paper is organized as follows. The next section describes the theoretical framework and data. Section 3 presents the results how relationships matter in increasing access to credit. Section 4 discusses how banks use their relationship specific information when monitoring borrowers. Section 5 shows how relationship matter in shaping borrower incentives and discusses endogeneity and selection concerns. Section 6 provides a discussion of the related literature and Section 7 concludes.

2. Theoretical framework and data

2.1. Theoretical framework

Information asymmetries and other frictions play an important role in the availability of credit. Stiglitz and Weiss (1981) and Jaffee and Russell (1976) argue that credit rationing persists in equilibrium. Increasing interest rates on loans as a response to informational frictions encourages loan applications of either riskier borrowers (adverse selection) or ex-post riskier borrower behavior (moral hazard). Thus, lenders do not increase interest rates beyond a particular level, but ration credit if lenders are concerned about borrower risk. These frictions can be overcome if lenders produce information about these borrowers and use this information in their lending decisions. Observing a customer over the course of the relationship and multiple products increases the lender's precision of the information regarding borrower quality (Diamond, 1991; Petersen and Rajan, 1994). Relationship specific information thus reduces the costs of funds for lenders and increases the availability of credit for borrowers such as retail customers for whom information is hardly publicly available.¹

These theories do not have a clear prediction regarding default rates of borrowers. One could argue that portfolio risk of banks increases as there is less credit rationing of risky borrowers

¹ Greenbaum et al. (1989), Sharpe (1990), and Rajan (1992) argue that relationship lenders can extract a rent from their informational advantage vis-à-vis outside lenders. While the effect on interest rates is ambiguous, these theories also suggest that the information advantage should increase the availability of credit, on average.

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