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The Competition between Relationship-Based Microfinance and Transaction Lending*

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Abstract

We empirically analyze the competition between a relationship lender and a transaction lender in the credit business with micro and small entrepreneurs. Drawing on a data set about the customers of the relationship lender ProCredit Ecuador combined with data about all other loans of these customers in the Ecuadorian banking system, we are able to analyze the competition between different banking types. We find that the quality of ProCredit borrowers who have a transaction loan as well is below average. They also have higher default probabilities. Furthermore, we find evidence that ProCredit customers with payment problems prefer to serve their relationship loan while defaulting on their transaction loan. These findings suggest that customers of a relationship bank value their banking relationship and try to protect it as long as possible. This result stands in contrast to the common presumption that the market entrance of transaction lenders will destroy the market for lenders applying relationship lending techniques.

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1 Introduction

For microfinance in developing and transition countries, relationship lending is considered the most appropriate lending technique when lending to young firms and micro and small entrepreneurs (MSEs). In an environment characterized by little public information on potential clients and low legal enforcement of creditor rights, relationship lenders are able to overcome market imperfections by establishing a long-term relationship with a firm, gathering firm specific information during the relationship (Rajan and Zingales 1998). During the last decade, microfinance institutions (MFIs) have shown that by applying relationship lending techniques they were able to extend the outreach of financial services to the poor while developing micro- and small enterprise lending into a profitable business at the same time (Armendáriz de Aghion and Morduch 2005).

However, this success has induced new players to enter the microfinance markets in various countries. As markets have become increasingly saturated, many countries now see various different lenders competing directly for the same clients. Among the competitors, there are not only socially motivated MFIs applying relationship techniques, but also private for-profit institutions supplying transaction based loans. In contrast to typical MFIs, the latter try to overcome the problems of asymmetrical information and high enforcement costs by applying credit scoring systems saving on fixed costs for loan officers' salaries (Rhyne 2002). Usually, their main focus lies on consumer finance, but they provide loans to MSEs as well.

Various papers have pointed out that competition in the banking sector might not be a purely positive phenomenon driving prices down and enhancing efficiency. Competition may cause unwanted effects like excessive risk taking (Allen and Gale 2004) or suboptimal levels of screening (Cetorelli and Peretto 2000). Concerning competition between relationship and transaction banks, two strands of theoretical literature can be identified. Representing the first strand, Rajan (1992) argues, that relationship banking might be destroyed by competition as this lending technique can only be applied if the lender has some monopolistic power. In a market with information spill

overs and with many institutions competing for the same clients, relationship customers might switch to transaction banks which offer more favorable credit terms. Hence, transaction lenders undermine the possibilities of relationship lenders to establish long term relationships and provide liquidity insurance to their customers in times of crisis (Petersen and Rajan 1995). Representing the second strand of literature, Boot and Thakor (2000) show, that both, transaction lending and relationship lending, can co-exist when focusing on different market segments. Borrowers who earn a fixed salary and therefore can easily supply reliable information and collateral turn to transaction lenders. Opaque borrowers, however, like MSE prefer relationship loans because relationship lenders invest in information gathering and provide insurance in times of crisis. Accordingly, relationship banks will survive the market entrance of transaction lenders by focusing on clients for whom the distribution of information is highly asymmetrical.

Empirical results provide evidence that higher levels of competition result in lower access to credit and higher lending costs for low quality borrowers like MSEs (Petersen and Rajan 1995). However, since in developed economies, lending institutions usually apply both, relationship lending and transaction based lending technologies at the same time, these studies do not specifically analyze the effect of competition between relationship lenders and transaction lenders, but of banking competition in general. Studies analyzing competition in general between microfinance institutions in developing countries find that competition is associated with higher default rates of MSE borrowers. This effect is not strong enough, however, to undermine the outreach or the financial sustainability of the microbanks themselves (McIntosh, de Janvry and Sadoulet (2005), Schaefer, Siliverstovs and Terberger (2009), Chaudhury and Matin (2002)).

Neither of the above mentioned studies answers the question how competitors purely focused on transaction lending affect pure relationship lenders and whether opaque borrowers actually do prefer relationship banking to transaction based lending. Rhyne (2002) provides anecdotal evidence describing the situation of the Bolivian microfinance market in the end of the nineties. She claims, much in line with Petersen and Rajan (1995), that transaction based

institutions lure the good clients away from MFIs and encourage customers to take several loans simultaneously. As a consequence, the relationship between MSEs and the relationship lender is destroyed. Additionally, the amount of collateral that the lender can recover from an insolvent client is decreasing with multiple loans as customers have to serve their transaction loan beside their microloan. Navajas, Conning and Gonzalez-Vega (2003) analyzes competition between two relationship lenders in Bolivia. They find that the borrower pool of the lender with the most standardized loan contract has lower quality. Vogelgesang (2003) tries to provide empirical evidence for Rhynes' hypothesis on transaction lenders undermining relationship based microfinance. However, as Vogelgesang is lacking data concerning different banking types, her study again is only able to analyze the general competition effect.

This paper attempts to close this gap by analyzing an unique data set of the ProCredit Bank in Ecuador. Besides information from the internal management system of the bank, the data set includes credit bureau information on ProCredit's clients about every single one of their loans in the whole Ecuadorian banking system within a period of one year. Categorizing banking types, we are able to directly tackle the question whether there is a special competition effect of pure transaction lenders and which strand of the theoretical literature is more adequate analyzing competition between the two lending types in environments with highly asymmetrical information.

Our results suggest that besides the competition effect in general there exists an additional negative effect of transaction banks. Default probability of ProCredit clients increases by four percentage points if the client also has another relationship loan. For clients with loans from multiple sources who borrow from a transaction bank, default probability even is two percent higher. These findings suggest, that competition leads to higher risk taking, that is, banks granting loans to clients with a higher probability of payment problems. Since transaction banks do not screen borrowers as thoroughly as relationship banks, the effect is larger for the former banking type. This also supports the hypothesis that transaction banks in particular might contribute to the overindebtedness-problem in environments with highly asymmetrical information.

Additionally, we find support for the argument of Boot and Thakor (2000) that a banking relationship has a value on its own for the borrower. Although the average interest rate of transaction banks is lower, clients with payment problems prefer to repay their relationship loan instead of their transaction loan to keep their credit window at the relationship lender open. We find no evidence for the hypothesis that clients with higher salary incomes turn to transaction lenders. In contrast, the probability of a ProCredit client having a transaction loan on top of the microloan is higher, if the client has liquidity problems, that is if the relationship lender does not provide the loan amount demanded, if the client's relationship loan is close to maturity or if the client has a high number of loans. Consequently, relationship banks can survive competition with transaction banks in developing countries.

The remainder of the paper is organized as follows. Section 2 presents the theoretical framework and our hypotheses. Section 3 discusses our data set and gives some descriptive statistics. The econometric models employed are presented in Section 4 while Section 5 is concerned with the empirical results. Finally, Section 6 closes the argument.

2 Relationship and Transaction Lending

A central feature of the lending approach of relationship banks is to gain and to use "soft" qualitative information about their customers besides hard financial information. Soft information is obtained during the continuous interaction with the client, for example through the provision of loans (Berger, Udell and Klapper 2001) and depositing service and other financial products (Cole 1998). Furthermore, suppliers of microfinance gather additional information through contact with the local community of the client such as neighbors, business customers or suppliers. The local community can give specific information about the history of the firm, the creditworthiness of the owner and general information about the business environment in which the MSE operates (Morduch 1999). This information is especially valuable if the firm is in financial distress. Based on this information the bank can make a superior judgment whether the crisis is of a temporary or a permanent

nature, whether the investment project of the firm still has a positive net present value, and whether the client's default might be strategically motivated and he is trying to divert cash away from the bank and into his own pocket. If the project and the borrower's repayment morals are of good quality, the bank will continue the relationship and provide liquidity insurance in times of crisis. In case of strategic default, close ties with the local community may be used as a disciplining device. Spreading the information of the default in the social environment of the borrower may worsen his reputation among clients and suppliers and thus lower the incentive for strategic default all together (Rahman 1999). Another important disciplining device applied by relationship lenders is the threat of cutting off the customer from the bank's future credit supply in case of default. This threat, combined with the promise of access to progressively higher loan amounts and longer maturities when keeping repayment discipline, can be a powerful weapon against borrowers' moral hazard (Armendariz de Aghion and Morduch 1999). The methodology of progressive lending also enables the lender to test borrowers with small loans at the start in order to filter out the worst borrowers within the first credit cycle (Tedeschi 2003).

Relationship lending requires a certain organisational structure of the bank. As the loan officer has the greatest access to soft information about the firm, about the owner, and his community and as this information is hard to quantify and is difficult to communicate through the organisational structure, a large amount of decision authority has to be handed over to the loan officer¹ (Berger and Udell 2002).

In contrast to relationship banking, granting loans in transaction-based lending is based only on "hard", quantitative information that is relatively easily available at the time of loan origination. This could be information from financial statements or from salary income slips. Transaction lenders often apply credit scoring systems. In addition, important weight is put on the financial condition and history of the principal owner, given that the

¹In order to obtain information, he also typically lives in the local community, has contacts with other local firms and is in charge of the same customers over several cycles of the relationship (Rhyne 2002).

creditworthiness of the firm and the owner are closely related for most small businesses (Berger and Udell 2002). The main focus of transaction lenders is on consumer loans, that is, rapidly disbursed loans directed towards buying specific goods. However, borrowers might also use consumer loans to invest into their business.

Hence, the organisational structure of transaction lenders differs substantially from the one in relationship banking. Instead of one loan officer being responsible for one customer, the work is broken up into various steps, each performed by a different person. In assembly-line fashion, each person performs his own special task. The credit officers granting the loans act like salesmen, making most of their money on provisions. After that, separate staff enter data, verify data accuracy, evaluate the credit (using credit scoring), verify client identity, notarize documents, disburse, and collect. This has important implications in case of default. Transaction lenders usually are far more lax on delinquency than relationship lenders, since they do not have information on the customer anyway. Within the first week of delinquency, a transaction lender usually would not call on the client to try to collect the loan. Higher default rates are compensated by the pricing system (Rhyne 2002). Consequently, transaction lenders have lower personnel costs and charge high overdraft fees. The differences between relationship banking and transaction lending are summarized in Table 1:

Table 1: Relationship vs. Transaction Lending

	Relationship	Transaction
Loan Types	Mainly productive loans	Mainly consumer lending
Basis for Loan Approval	Enterprise and household cash flow credit history	Salary, credit iscorei
Basis for Repayment	Motivation for continued access to credit; peer pressure	Steady salary and high overdraft fees
Tolerance for Delinquency	"Zero Tolerance" policy. Expected delinquency: low	Not worried in the first days Expected delinquency: high
Method of Follow up	Immediate, personal visit	A letter in the mail
Staff Organisation	Loan officer responsibility for client from start to finish	Assembly-line loan processing.
Economic Sector	All sectors	Urban sectors
Shareholder Philosophy	Profit and development	Profit

Notes: [1] Table is based on Rhyne (2002).

3 Theoretical Framework

Based on these differences between relationship lenders and transaction based lenders and drawing on the literature on banking competition we turn to the development of the hypotheses which are to be tested.

In general, various authors predict higher risk taking of banks if competition increases. Allen and Gale (2004) for example show in a simple model relying on the same mechanism as (Stiglitz and Weiss 1981), that competition can induce higher risk taking. Banks' margins are falling with higher competition. Hence, the limited liability of managers and shareholders will induce higher risk taking. But also other reasons might contribute to risk shifting. When banks compete for the same market share, the bank that ends up with the largest share may be able to exploit its market power to increase profitability. Consequently, institutions competing with each other will be more willing to grant loans to borrowers with a loan of the competitor bank in order to gain their market share. Both banks will be willing to accept borrowers with higher default risk, if borrowers also have a loan of the competitor bank. For the microfinance sector, most pertinent is a paper by Hoff and Stiglitz (1998) which examines the role that multiple uncollateralized lenders will play in reducing each other's abilities to use dynamic incentives effectively. Competition has an adverse effect on the threat of cutting off a defaulting client from future credit supply since the switching costs for the borrowers are lower. This effect might raise contract enforcement costs for all relationship banks and lead to a lower loan supply. However, information sharing about the credit record of customers may help to overcome this problem in the microfinance sector at least partially (Padilla and Pagano 2000). In summary, theory suggests that default rates and the number of loans per customer will rise with competition. Banks will grant riskier loans and repayment incentives diminish.

Consequently, clients that borrow from multiple sources will have a higher default probability than clients with only one loan. Furthermore, the more fiercely the competition between two banks, the higher will be the risk taking of both banks and the higher will be the default rates of clients having loans

of both competitors. At the same time, competition effects will also differ across lending types. Since transaction banks are lacking in depth screening mechanisms and are specialized on disbursing loans rapidly, they will grant riskier loans in environments with highly asymmetrical information. Thus, clients in the need of another loan to cover up payment problems tend to end up with a transaction loan. Therefore, default rates and the number of loans will be higher for those relationship banks' customers that have a transaction bank as one of their borrowing sources. Accordingly, our first hypothesis can be phrased as follows:

Hypothesis 1: *Relationship customers who borrow from multiple sources have higher default rates than customers borrowing only from one source, and relationship customers for whom at least one loan is supplied by a transaction lender have higher default probabilities than multiple source borrowers who stick only to relationship lenders.*

If hypothesis 1 is true, all relationship clients who are having an additional transaction loan will be characterized by factors usually associated with higher default rates. In addition, clients who have been turned down by the relationship lender or whose loan demand was not met will have a higher probability of having a transaction loan.

Hypothesis 2: *Borrowers' quality will be lower for relationship clients who are borrowing from a transaction bank at the same time.*

However, this hypothesis crucially depends on the assumptions concerning the nature of relationship lending in comparison to transaction lending. There exist two opposing views. Petersen and Rajan (1995) argue, that switching to a transaction lender will always be favorable for clients of relationship banks because being a client of a relationship bank serves as a signal for good quality. Hence, the transaction bank is able to offer more favorable loan terms to relationship clients since it does not have to compensate for expensive information gathering. In contrast, Boot and Thakor (2000) assume in their model, that relationship lending has a certain additional value for the client. Relationship loans add a value to the borrowers' payoff since the bank

provides liquidity support in times of crisis. This additional payoff is getting smaller for borrowers with higher quality since they are able to get other loans at any point of time. Consequently, the additional value of the relationship loan will be higher in an environment with highly asymmetrical information. Our hypotheses are consistent with the view of Boot and Thakor (2000). Otherwise, following Petersen and Rajan (1995), relationship banking would have broken down in the market or at least all relationship clients regardless of their quality would take multiple loans at other transaction lenders. No additional negative competition effect of transaction banks could be observed. If relationship loans are actually preferred by the clients, we can state the following additional hypothesis:

Hypothesis 3: Borrowers protect their credit window at the relationship lender.

Hypothesis 3 implies that we should find two results. First, if low quality borrowers try to protect their access to relationship loans, they will demand transaction loans in order to assure the payment of the installments of their relationship loans. Following this line of thought, the probability of observing a transaction loan should be higher when the relationship loan is close to maturity. Close to maturity, the balance of the relationship loan is closer to zero, only a small number of installments to be payed is left, and accordingly the likelihood of solving the payment problem and keeping the good client record at the relationship lender by turning to the transaction lender is high. Second, we should observe that clients with payment problems will rather stop to pay the installments of the transaction loan than of the relationship loan.

4 Description of the Data

For our analysis we use data from ProCredit Bank Ecuador and the corresponding credit bureau information ProCredit acquired from September 2006 until August 2007. ProCredit Ecuador was founded in October 2001 and received a full banking license in 2005. The bank is part of the ProCredit Group

which consists of 22 banks operating in transition economies and developing countries in Eastern Europe, Latin America and Africa. ProCredit Group is led by ProCredit Holding AG, a holding company based in Germany. The group focuses on providing finance for micro, small and medium sized enterprises and follows a development banking approach based on financial institution building and directed towards reaching lower income clients while covering costs and producing moderate profits at the same time. At the end of 2007, ProCredit Ecuador was operating 25 branches throughout the country and had granted loans with a total amount of \$166 million.²

The microfinance market in Ecuador is in a stable growth setting after having overcome a severe banking crisis with a decrease of GDP of 7% in the end of the nineties. The amount of the microcredit portfolio rose from 0.29% of GDP in December 2002 to 1.98% of GDP in December 2005³. The regulated microfinance sector in Ecuador consists today of 17 private banks (54% of the total regulated microcredit portfolio), 2 state-owned institutions (3%), 36 co-operatives (40%) and 7 associated companies (3%). In addition, there exist around 500 small institutes in the non-regulated sector, that roughly account for one third of total microloans granted in the country (Interamerican Development Bank 2006). The largest private institute is Banco Solidario, founded by the private microfinance consultancy ACCION in 1998, with 53% of the microcredit portfolio of all private banks in 2006. Banco Pichincha, one of the largest banks in the country, with its subsidiary Credife, founded in 1999, follows with 22%. The third largest MFI in Ecuador is Banco ProCredit with a share of 16% of total micro loans.

A classification of all these banks in either transaction or relationship lenders is difficult, since especially private banks engage in both lending types. But if a private bank grants both transaction and relationship loans, it is not possible to distinguish between both kinds of loans observing only the loan issuing bank. Therefore, it is important to classify the private banks whose business model corresponds most closely to one of two lending types.

²See <http://www.bancoprocredit.com.ec> and <http://www.procredit-holding.com> for information.

³Information is taken from the ecuadorian banking supervision homepage, if not otherwise stated (<http://www.superban.gov.ec/>)

In a personal interview with the CEO of ProCredit Bank, Pedro Arriola Bonjour, on the 25 September 2007, he describes two Ecuadorian banks as typical transaction lenders, Centro Mundo⁴ and Unibanco. This information is supported by a report of the Ecuadorian Banking Supervisory Authority from 2006 in which Centro Mundo and Unibanco are described as transaction lenders focusing on MSEs (Superintendencia de Bancos del Ecuador 2006). Shareholders of both banks are international investment groups.

ProCredit and Banco Solidario are classified as typical relationship lenders. Shareholders in both banks are international development agencies as well as the microfinance consultancies ACCION (Solidario) or IPC (ProCredit). Unibanco has bought 33% of Banco Solidario shares in September 2006. However, both institutions, ProCredit and Banco Solidario, clearly have communicated that they apply relationship lending techniques⁵. Banco Pichincha as the second largest provider of microloans has not been classified as a typical relationship bank. As one of the largest banks in the country, it is applying both lending techniques in various market segments and therefore cannot be classified as neither a pure relationship lender nor a pure transaction lender. Table 3 presents various indicators for the different lending types.

The transaction banks have the highest share of consumer loans, that is loans which usually are not directed towards productive usage although it cannot be ruled out that borrowers invest these loans into their own enterprises. Consequently, the average loan amount outstanding is considerably smaller for a transaction bank than for a relationship banks. The latter have a high share of loans to small enterprises. These are defined as loans with a loan amount less than 40,000\$ to firms with annual sales less than 100,000\$. Default rates are considerably higher for transaction banks, since it is part of their business model. The average interest rate between the 5 may 2005, the month ProCredit became part of the regulated banking system, and the 1

⁴Centro Mundo was taken over by Banco Pichincha in May 2007. Since the majority of loans were granted before the takeover, we treat Centro Mundo as an independent company

⁵See <http://www.bancoprocredit.com.ec> and <http://www.procredit-holding.com> for information about ProCredit Ecuador and <http://www.banco-solidario.com> and <http://www.accion.org> for information about Banco Solidario

Table 2: Classification of Private Banks

Indicator	<i>Relationship Banks</i>		<i>Transaction Banks</i>	
	ProCredit	Solidario	Unibanco	Centro Mundo
<i>Loan Types</i>				
Share of Consumer Loans (%)	0	18	76	76
Share of Commercial Loans (%)	23	19	0	0
Share of Housing Loans(%)	1	6	0	0
Share of MSE Loans(%)	76	56	24	24
<i>Outstanding Loan</i>				
Outstanding Loan (average)	2,898	1,916	538	782
<i>Average Interest Rates</i>				
MSE Loans (%)	13.3	13.1	12.6	10.6
Consumer Loans (%)	0	12.8	12.4	11.29
<i>Default Rates</i>				
Share of Default MSE Loans (%)	2.2	8.8	20.1	17.6
Share of Default Consum Loans (%)	0	3.4	12.4	13.1

Notes: [1] Table is based on information from the Ecuadorian Banking Supervision. [2] Loan Types: Consumer loans are loans not directed towards productive usage. MSE loans are smaller than 40,000\$ and directed towards firms with sales less than 100,000\$. Commercial loans are loans to firms that are not MSE loans. [3] Average interest rate reported for May 2005 until August 2007. [4] Loan is reported as default if loan is overdue since five days. Shares are averages from June 2006 until August 2007. [5] Average Outstanding loans is calculated with credit bureau data.

September 2007 of the transaction banks was lower than the average interest rate charged by the relationship banks. This fact reflects the larger financial scope of the transaction banks due to lower fixed cost. Therefore, clients that are able to signal their quality could be inclined to switch to the transaction lender.

The customer data was generated using the financial management system of ProCredit Ecuador. It provides detailed information on clients and loans for all branches of the bank at the key date 1 September 2007. Additionally, we also have delinquency data for the same client pool at the key date 1 December 2008. The credit bureau information was provided to the bank by a private Ecuadorian credit bureau on request. The data contains the loan status of every loan in the whole banking system for each ProCredit borrower at the date of request. There were seven data requests of ProCredit at the credit bureau between September 2006 and September 2007. Requests were made on the 30 September 2006, 31 October 2006, 31 December 2006, 28 February 2007, 31 May 2007, 31 July 2007 and 31 August 2007. In order to analyze the effects of competition between different banking types we combine the data from the customer data base of ProCredit Ecuador with the credit bureau data. Hence, all results are based only on ProCredit clients.

We included all 54,077 clients in the analysis that have been ProCredit clients in one point of time between September 2006 and August 2007. For every client, we used the most current credit bureau data available. If the client for example has repaid the loan on 30 April 2007, credit bureau data from the 28 February was used to determine the number of loans and loans from other banks in the banking system. Credit bureau data from 31 August 2007 was used for all clients whose loan was still active.

Table 3: Customer Characteristics

	Total	ProCredit Only	Solidario	ProCredit and Another Transaction	Private	Loans of Co-operative	Other
<i>Personal Characteristics</i>							
Average Age (Years)	39.6	39.1	40.6	39.7	40.0	40.7	41.3
Male (%)	60	61	51	56	60	63	46
Married (%)	67	69	64	59	63	69	63
Number of loans (Average)	1.8	1	3.1	3.3	3.1	3.0	3.1
<i>Destination of Loan</i>							
Agriculture(%)	10.9	15.5	4.9	1.3	3.2	11.1	8.5
Business/Trade(%)	42.6	39.61	53.5	48.6	48.4	37.5	48.3
Livestock(%)	5.5	7.4	4.9	1	2.4	4.2	5.9
Production (%)	15.6	15.8	14.3	16.5	15.4	12.9	11.3
Transportation (%)	9.9	7.9	8.6	10.4	12.3	19.7	11.4
Other Services (%)	15.5	14.3	15.8	22.3	18.4	14.5	14.6
<i>Loan ProCredit</i>							
Loan Amount (Approved)	3,741	3,017	3,874	3,191	5,539	4,248	4,605
Payments	211	177	223	193	298	231	247
Maturity (Month)	17.4	16.9	17.5	16.4	18.5	18.8	17.6
<i>Customer</i>							
Number	54,077	28,997	7,006	6,318	13,846	5,536	2,466
(%)	100	53.6	13.0	11.7	25.6	10.2	4.6

Notes: The data is based on internal client informations of ProCredit and the credit bureau data set.

Table 3 summarizes key personal characteristics of the ProCredit customers as well as typical destinations of loans for the whole period from September 2007 for different banking types. Individual characteristics and loan data are from the ProCredit data base of September 2007. Out of the 54,077 clients analyzed, 28,997 customers had multiple loans. 13% (24% of customers with multiple loans) of all customers also had a loan at Banco Solidario, 10.7% (22%) from either Unibanco or Centro Mundo. Not surprisingly, MFIs such as Banco Solidario and other small MFI⁶, have the highest share of female customers. The transaction lenders have the lowest share of married customers and almost no loans in the agricultural and livestock sector, which reflects both the urban character of their branching network and their business model based on "hard" information. On average, customers of the transaction lenders have a slightly higher number of loans. The loan

⁶The most prominent example is the international village bank organisation FINCA. FINCA was still no part of the regulated banking system in 2007.

amount approved by ProCredit is smallest for clients with only one loan and clients of transaction banks.

Figure 1: Multiple Loans and Delinquency Rates

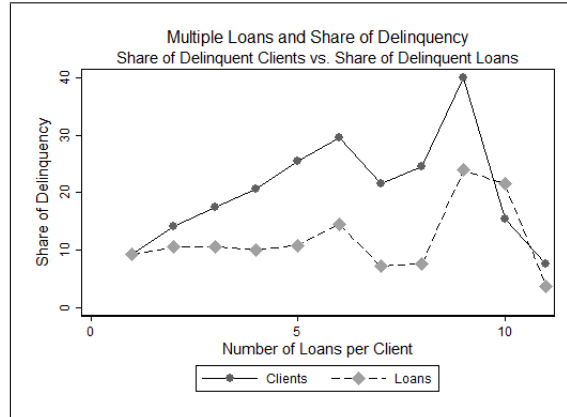


Figure 2 displays delinquency rates for customers with different numbers of loans. The solid line indicates the share of clients with at least one overdue loan at one bank, the interrupted line plots the share of overdue loans. The solid line is rising sharply with the number of loans, whereas the interrupted line shows almost no increase⁷. The probability of late payments seems to be rising with the number of loans. However, clients do not stop payments for all loans simultaneously, but decide to cease payments of only a small number of loans. Thus, the interesting question is which banking types have the highest probability of being served.

5 Econometric Model

Evaluating repayment behavior of ProCredit loans over the full duration of the loan (and not at one point in time in the regression before) is quite complicated, since many loans have different repayment schedules. The structure of these payments could affect the number of days payments are overdue. Therefore, we use the internal rating of ProCredit to determine late payments and default. This rating consists of five classes indicating the quality

⁷Since the number of customers with ten loans or more are below 10, changes in the share of delinquency are quite large.

of repayment behavior. For normal loans with monthly repayment, clients are part of the highest category 1 if their average number of days overdue is smaller than one. The average number of overdue days is calculated dividing the total number of overdue days by the number of realized installments. To obtain the average number of days overdue, the total number of days overdue of all installments is divided by the number of installments. If the average number of days overdue is higher than five or if the number of days overdue exceeds 15 days, the client is rated in the lowest category 5. However, for loans with different repayment schedules (for example agricultural loans), another rating system is applied, but results are translated to the same five categories. Consequently, these risk categories are a good proxy measuring repayment behavior. Our analysis distinguishes between only two categories: In the first category we comprise all loans in the rating classes 1, 2, 3 and 4 because even in class 4 repayment behaviour is still regarded as sufficiently reliable by ProCredit, while all loans in risk class 5 – in analogy to the ProCredit interpretation – we consider as heavily overdue or defaulted (we denote a loan in this category as "default loan" from now on).

We observe the full duration of the loans only if they were repayed during the available time interval. Since the number of these loans is very small, we also include the loans still active in September 2007. However, in order to account for different default probabilities at different stages of maturity, we run two different regressions. In the first one, we calculate estimates for all loans that on the 1 September 2007 were in the first half of maturity, in the second one we include all loans that on the 1 September 2007 were in the second half of maturity or already had been terminated. To analyze the effect of being a customer of a transaction bank on late payment or default at ProCredit, we estimated the following probit model⁸.

$$Y_i^* = \alpha + B_i\beta + L_i\delta + X_i\gamma + \epsilon_i, \quad i = 1, \dots, N \quad (1)$$

⁸In order to compare different econometric approaches, we also estimated the effects using a linear probability model (LPM). Results do not change in comparison to the Probit results.

with the observed variable

$$Y_i = 1\{Y_i^* > 0\}. \quad (2)$$

The dependent variable Y_i equals one if the ProCredit loan was in the 'default loan' category. B_i is a vector containing dummy variables for the different banking types. The dummies take the value of 1 if a client is a customer of the respective banking type. Using this setting, we are able to compare the likelihood of default for transaction clients and clients having only one ProCredit loan. The vector L_i comprises loan characteristics of the ProCredit loans such as the credit amount and maturity. X_i is a vector of personal characteristics such as age, marital status, gender and the net non-business income reported to ProCredit. Furthermore, destination of loan and region dummies are included in the regression. Finally, ϵ_i is the error term.

In order to analyze determinants of being a customer of a transaction bank, we use a probit model since the decision for a certain bank is a binary-choice variable⁹. We will estimate this model two times with different data sets. First, we run the regression with the whole data set. Second, we exclude all clients from the sample that have no loans from other lenders, since we are especially interested in comparing the decision for a certain banking type, not in determining the reasons for having multiple loans¹⁰. The according latent variable model can be written as

$$Y_i^* = \alpha + L_i\beta + X_i\delta + B_i\gamma + \epsilon_i, \quad i = 1, \dots, N \quad (3)$$

The dependent variable Y_i equals one if the ProCredit customer is also customer of a transaction bank and zero otherwise. The vector L_i comprises

⁹In order to compare different econometric approaches, we also estimated the effects using a linear probability model (LPM). Results do not change in comparison to the Probit results.

¹⁰With this selection, I assume that the decision to have more than one loan in the mean is independent from the decision for a certain banking type. An alternative estimation method would be an Heckman-Selection model. Since we are lacking appropriate instrumental variables, that affect only the decision of taking another loan and not the decision of choosing different banking, we simply run two Probit regressions with different data sets.

loan characteristics of the ProCredit loans such as the credit amount, maturity and also the dummy "Close to Maturity", that equals one, if the loan is in the last quarter of maturity. Additionally, it contains a dummy that indicates whether households have received a loan from ProCredit previously and a dummy that indicates if the demanded loan amount was higher than the loan amount approved. The vector B_i contains all other banking types as control variables. Finally, ϵ_i is the error term.

6 Estimation Results

Table 4 shows the competition effect for the probit regression of different banking groups on delinquency of ProCredit loans for all loans in the first half of maturity. Since default mainly occurs towards the end of maturity, banking coefficients are not significantly different from zero. But when looking at the results for all loans in the second half of maturity, it can be seen that significance levels rise substantially. Generally, the age of the applicant, being married and a high non-business income decrease the probability of delinquencies. Perhaps surprisingly, the gender dummy is not significant. Coefficients of the banking dummies are all positive, indicating higher probability of defaulting loans for clients with multiple loans. However, there exist certain differences between banking types. The effect of co-operative banks and other banks on default are smaller and have lower significance levels.

Being a customer of another private bank has no significant effect on default. This can be explained by the fact that especially large successful clients turn to private banks in order to get higher loan amounts. For clients of the relationship bank competing most fiercely with ProCredit, Banco Solidario, likelihood of default is four percent higher. Being a customer of a transaction bank increases the probability of default. The probability of default is 6 percent higher than for clients having only ProCredit loans. The difference to Banco Solidario is 2% and significant at the 5% level using a Wald-Test. This difference of 2% is quite high, since the coefficients for being married or being a returning client, factors usually considered as being highly negatively correlated with default rates, are also around 2%. Denoting loans with rating

Table 4: Other Loans and Delinquency

	1. Half of Maturity	2. Half of Maturity
<i>Other Loans</i>		
Solidario Client	0.000266 (0.82)	0.0401*** (7.13)
Transaction Client	-0.000316* (-1.69)	0.0603*** (9.58)
Private Client	-0.000164 (-0.93)	0.00586 (1.45)
Co-operative Client	0.000127 (0.41)	0.0126** (2.24)
Other Client	0.000967 (1.30)	0.0204** (2.39)
<i>ProCredit Loan</i>		
Loan Amount	-2.51e-08 (-1.40)	-0.00000190* (-1.90)
Maturity	0.0000157** (2.50)	-0.00736*** (-17.46)
Old Client	0.0000281 (0.14)	-0.0230*** (-6.59)
<i>Personal Characteristics</i>		
(Net)Non-Business Income	-0.000000527** (-2.40)	-0.0000252*** (-3.77)
Age	-0.00000385 (-0.48)	-0.000409*** (-2.76)
Male	0.000155 (0.85)	-0.00361 (-1.04)
Married	-0.000604* (-1.95)	-0.0153*** (-4.05)
<i>Wald Test: Difference of Solidario and Transaction Clients</i>		
χ^2	3.02*	5.18**
Observations	21,872	31,339

Notes: [1]Robust Probit regression reporting marginal effects[2] *t* statistics in parentheses. ***denotes significant at the 1 percent level, **at the 5 percent level, and *at the 10 percent level. [3] Region, year, and destination of loan dummies included.

categories 2, 3 and 4 also as defaulting loans does not change the results, significance levels are even higher. These results support Hypothesis 1. Multiple source borrowing increases the probability of late payments and default, and the probability of ProCredit clients having repayment problems is highest for those multisource borrowers who borrow from transaction banks.

The results of the Probit regression of being a customer of a transaction bank on different client characteristics is presented in table 5. When looking

at the loan characteristics of the ProCredit loan for the full data set, it can be seen that factors usually correlated with higher default rates are mainly positively correlated with having a consumer loan: The ProCredit loan amount approved is lower, the loan demand applied for was met with a lower probability, (net)non-business income is lower and borrowers are rather not married and younger. However, it is important to distinguish which of these results reflects the decision to have multiple loans, and which results determine the probability of being a customer of a consumer bank. Therefore, we run a second regression including only clients with multiple loans. Being married is no longer significant, suggesting that this variable only has an impact on the decision to have multiple loans. Older, more experienced clients have a higher probability of having a transaction loan as well. The significance level of the other coefficients does not change running the second regression, the size of the coefficients even increases.

Table 5: Determinants of Loan at a Transaction Bank

	Full Dataset	Multiple Loans Only
<i>ProCredit Loan</i>		
Loan Amount	-0.00000117*** (-4.82)	-0.00000584*** (-7.03)
Maturity	0.000417*** (2.78)	0.000507 (1.28)
Loan Amount < Amount Applied	0.0140*** (5.25)	0.0191*** (3.27)
Close to Maturity	0.0202*** (5.40)	0.0441*** (5.21)
<i>Personal Characteristics</i>		
(Net)Non-Business Income	-0.0000322*** (-6.74)	0.0000430*** (4.55)
Old Client	0.0127*** (5.04)	0.0185*** (3.24)
Age	-0.000283*** (-2.74)	-0.00150*** (-5.87)
Married	-0.00914*** (-3.41)	-0.0146** (-2.43)
Male	-0.00354 (-1.39)	0.00399 (0.69)
Observations	54,086	25,053

Notes: [1]Robust Probit regression reporting marginal effects[2] t statistics in parentheses.

[3]***denotes significant at the 1 percent level, **at the 5 percent level, and *at the 10 percent level. [4] Region, year, and destination of loan dummies included.

These results support Hypothesis 2. First, being married, usually correlated with lower default, is negatively correlated with being a transaction client. Second, (net)non-business income is negatively correlated with having a transaction loan. Higher (net)non-business income is usually correlated with lower default rates as can be seen in Table 4. However, in comparison to multisource borrowing from other banks, (net)non-business income is positively correlated with being a transaction client. This result reflects the scoring system of the bank. Third, the probability of being a client of a transaction bank is higher, if the client's loan demand was not met which also is characteristic for low quality borrowers. Consequently, results suggest that transaction clients tend to have lower quality than clients having only ProCredit loans.

Table 5 also provides evidence that clients protect their relationship lending window. The probability of having a transaction loan in comparison to having a loan from another competing bank is four percent higher if the relationship loan at ProCredit is close to maturity. This result hints at clients trying to repay their relationship loan with a transaction loan since defaulting on a relationship loan and being denied future relationship credit is more devastating to the client when he has almost fulfilled his payment duties. When looking at the results of the regression for loans in the first half of maturity in table 4, our presumption that clients use transaction loans to cover up payment problems seems to get further support. The probability of being a transaction client is lower in the first half of the ProCredit loan maturity, but being a client of a transaction bank even has a negative effect on default. However, this coefficient is not significant.

Finally, Table 6 presents the evidence concerning order of payment, giving further backing for our hypothesis 3. To analyze order of payment, we pooled the credit bureau data from all seven dates of request. That way we do not throw away valuable information about payment behavior at different points of time. Then we end up with 261,767 observations of 54,077 clients. Table 6 reports cross tabulations for overdue payments at different points of time for transaction banks on the one hand and both pure relationship lenders, ProCredit and Banco Solidario, on the other hand. In each case, we display

only observations for clients that have been a customer of the two banking types compared. Since we rely only on the credit bureau data, we cannot use the internal rating system of ProCredit in order to determine default categories.

Table 6: Order of Payment (in %)

		Days Overdue ProCredit			Days Overdue Solidario		
		0	< 10	> 10	0	< 10	> 10
Transaction	0 Days Overdue	79.4	2.3	0.2	75	2.9	0.1
	< 10 Days Overdue	9.5	1.4	1.6	12	0.8	0.1
	> 10 Days Overdue	1.8	3.5	6.7	2.3	3.5	7.4
Observations		33,268			7,419		
Solidario	0 Days Overdue	83.7	3.7	0.4			
	< 10 Days Overdue	3.4	3.9	2.2			
	> 10 Days Overdue	0.2	1.3	5.2			
Observations		34,504					

Notes: [1]Table reports cross-tabulation of order of payments for relationship and transaction lenders.

[2]Table is based on credit bureau data only.

When looking at borrowers of ProCredit as well as of a transaction bank, it can be seen that it is more likely that a client's transaction loan is overdue than his ProCredit loan. Interestingly, this result is not only observable for loans overdue for less than 10 days (9.5% to 2.3%), but also for loans overdue for more than 10 days (1.6% to 0.2%). Comparing transaction lenders and Banco Solidario, we have the same pattern: We observe a Solidario loan defaulted while the transaction loan of the same customer is diligent in only 0.1% of the observations, whereas the opposite type of observation with the transaction loan in default and the Solidario loan being duly served accounts for 2.3% of the observations. Comparing repayment behavior for ProCredit and Banco Solidario, there is not much difference in payment behavior. These findings support Hypothesis 3: Clients prefer to repay the relationship loan instead of the transaction loan although overdraft fees of transaction lenders are higher and interest rates are lower. In addition, it seems that results are not only driven by low enforcement methods of the transaction lender. We observe the same behavioral pattern not only for loans being overdue for just a few days, but also for loans with a delay longer than 10 days. Since the difference in enforcement methods between the two lending types are especially striking in the first overdue days, the results for loans with long delay suggest that clients actively decide to preferentially repay the

relationship loan.

7 Conclusion

There exist quite contrasting views and hypotheses concerning the effects of competition between relationship lenders and transaction lenders in an environment of highly asymmetrical information. While authors like Boot and Thakor (2000) assume, that relationship lending has an additional value for the borrower in such an environment, Petersen and Rajan (1995) and the microfinance practitioners' literature highlight that transaction lenders lure away the good clients from relationship lenders and free-ride on the spillovers of relationship-specific information. Yet, empirical evidence in support of either of these views is lacking.

This paper attempted to close this gap by tackling the question whether there really exists a unique competition effect of transaction banks and whether the view of the one strand of theoretical literature is more adequate than the other when the two lending types are competing in an environment of highly asymmetrical information.

The main findings of our analysis support the hypothesis that relationship lending has an additional value for borrowers. The probability of having a transaction loan as well as a relationship loan is positively correlated with factors usually associated with higher default rates. In addition, clients clearly prefer to repay the relationship loan instead of the transaction loan. These findings support the hypothesis of Boot and Thakor (2000). On average, mainly bad quality clients of a relationship lender will borrow from the transaction bank as well. Default probability of ProCredit clients is six percent higher if the client is also a customer of a transaction bank while it is only four percent higher if the ProCredit client at the same time is serving a loan from another relationship lender. This also supports the hypothesis that not only multiple source borrowing but transaction lending in particular is contributing to the overindebtedness-problem in environments with highly asymmetrical information.

In summary, our results suggest that the business model of pure transac-

tion lending is inferior to the one of a relationship banks in an environment where asymmetrical information is high and, accordingly, there is a great number of opaque clients. The failure of pure transaction lenders in Bolivia during the economic crisis in the end of the nineties and Ecuador (Centro Mundo has been bought by Banco Pichincha after making severe losses in 2007, Unibanco has purchased 33% of Banco Solidario in order to develop a business model that incorporates transaction and relationship lending) might reflect this result. However, this does not imply that certain transaction lending techniques cannot or should not be incorporated into the microfinance sector. This will be a promising area for future research.

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